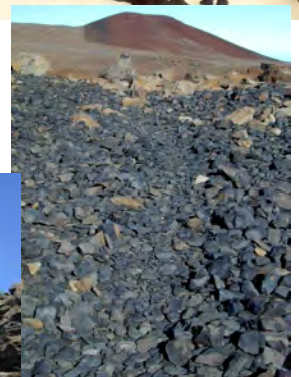
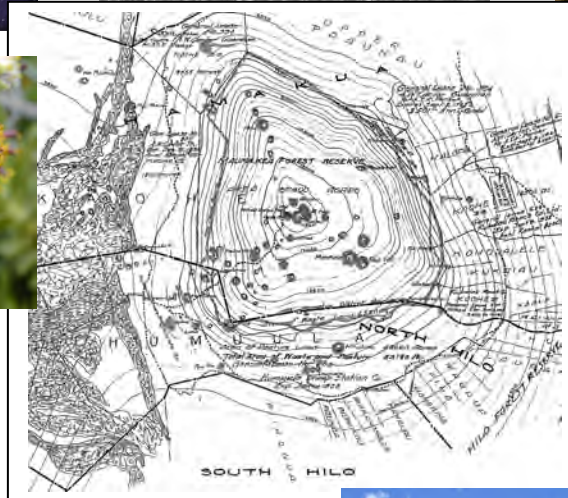
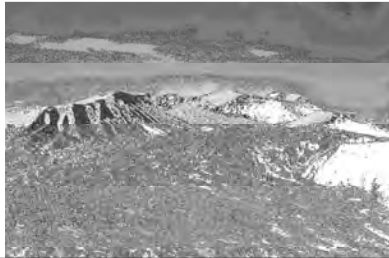


“MAUNA KEA— KA PIKO KAULANA O KA ‘ĀINA”

(MAUNA KEA—THE FAMOUS SUMMIT OF THE LAND)

***A Collection of Native Traditions, Historical Accounts, and
Oral History Interviews for: Mauna Kea, the Lands of Ka‘ohe,
Humu‘ula and the ‘Āina Mauna on the Island of Hawai‘i***



Kumu Pono Associates LLC

*Historical & Archival Documentary Research · Oral History Interview Studies · Researching and Preparing
Studies from Hawaiian Language Documents · Māhele ‘Āina, Boundary Commission,
& Land History Records · Integrated Cultural Resources Management Planning ·
Preservation & Interpretive Program Development*

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By

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Prepared for

*The Office of Mauna Kea Management (University of Hawaii-Hilo)
640 N. A‘ohōkū St. # 206
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March 30, 2005-b

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Resources Management Planning · Preservation & Interpretive Program Development*

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Cover Photos

Portion of HTS Plat Map 701, depicting Mauna Kea and the 'Āina Mauna.

No. 511. Kohatek (20 min 1-20-74). Courtesy of UH-Intitute for Astronomy.

Aerial View, Summit of Mauna Kea (1939). Photo No. 37382 A.C., in Collection of National Archives and Records Administration.

KPA-931. The Kalai'eha-Waiiau Trail, through Keanakāko'i.

KPA-3746. Altar at Keanakāko'i, Mauna Kea.

KPA-4224. Na'ena'e (Raillardia) of Ka-houpo-a-Kāne, Mauna Kea.

KPA-2567. Mauna Kea in the Morning, View from the Waiākea-Pi'ihonua uplands to the Summit.

KPA-3733. Ka-wai-hū-a-Kāne and Waiiau, Mauna Kea.

KPA-S076. Mauna Kea viewed from the Mauna Loa Shrine on Pu'u Alaula.

Cowboys atop Summit of Mauna Kea, 1938. Courtesy of Rally Greenwell.

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We wish to acknowledge here, the kindness of the *kūpuna* and *kama'āina* who graciously allowed us to record some of their histories that present and following generations may understand the paths that have been traveled to the present-day. The voices of these people help give life to the landscape. They remind us of our past, and give us clues as to how to behave and care for the *'āina mauna*.

The interviewees, a number of whom have since passed on, include:

John AhSan, Teddy Bell, Stephen Bowles, Howard Ellis, Rally and Pat Greenwell, Helen Hale, Jess Hannah, F.L. Coco and Robby Hind, Toshi Imoto, Kinoulū Kahananui, Pualani Kanaka'ole-Kanahele, Sonny and Daniel Kaniho, Elisabeth and Hisao Kimura, Rolf Peter Kudritzki, Pete L'Orange, AhFat and Barbara Lee, Kamaki Lindsey, Irene Lindsey-Fergerstrom (and family), Eva Lindsey-Kealamakia (and family), Martin Pence, Barbara Dorothy Phillips-Nishie, Phillips-Robertson, Elisabeth and J.K. Spielman, Walter Steiger, David and Leiana Woodside (with Ulalia Woodside), and Jiro and Marc Yamaguchi.

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EXECUTIVE SUMMARY

At the request of Stephanie Nagata, on behalf of the University of Hawai'i-Office of Mauna Kea Management, *Kumu Pono Associates LLC* undertook research, compiled a detailed collection of archival-historical records, and conducted oral history interviews with *kūpuna* and elder *kama'āina*, pertaining to the *ahupua'a* (native land divisions) of Ka'ohe, Humu'ula and neighboring *'āina mauna* (mountain lands) of Mauna Kea, on the island of Hawai'i. This work was undertaken as a part of on-going archival and oral historical research conducted by *Kumu Pono Associates LLC*, since 1996, and builds upon the accounts published by Maly in 1997, 1999, 2002, and 2003. The study is multifaceted, and includes detailed verbatim accounts and descriptions of Mauna Kea, the larger Humu'ula-Ka'ohe lands, and *'āina mauna*, covering the periods of Hawaiian antiquity and traditions, to first-hand accounts of travel on and around Mauna Kea, dating from the early 1820s to the 1960s.

One of the primary goals of this study has been to bring a significant collection of historical resource material, describing—native Hawaiian traditions, traditional and customary practices and beliefs; early descriptions of the landscape, land use, and access; changes in the environment; efforts at conservation of the mountain landscape; and the events leading to development of observatories on Mauna Kea—into one manuscript. Such a manuscript will provide readers with access to the diverse, and at times, difficult to locate, historical narratives that document the cultural landscape, and history of land use on Mauna Kea. It being believed that this information may in turn serve as a platform for informed discussions—in the field of cultural and historical resources—in planning for the future well-being of Mauna Kea as a cultural, natural, and scientific resource.

Because of the nature of the Hawaiian system of beliefs and land management, this study looks not only at the upper regions of Mauna Kea, but also at the lands which lie upon the slopes of Mauna Kea. In the traditional and historical setting, the people living on the lands which rested upon, or even viewed Mauna Kea, shared ties to the upper mountain regions as well. The historical records—including oral testimonies of elder *kama'āina* of the mountain lands—provide readers with detailed descriptions of traditional and customary practices; the nature of land use, and the types of features found on the mountain landscape; and early efforts in conservation on Mauna Kea and the adjoining *'āina mauna*. The descriptions of land use and subsistence practices range from antiquity to the 1970s, and represent the knowledge of generations of life upon the land.

It is important to note that in the summit region of Mauna Kea (from approximately 11,000 feet and above) and on the lower mountain slopes are found several features named for, or associated with Hawaiian gods and deity. These associations are indicators of Mauna Kea's place in the culture and history of Hawai'i as a sacred landscape. With each part contributing to the integrity of the whole cultural, historical, and spiritual setting.

Through the collection of historical-archival texts and oral history interviews, we have found that a wide range of traditional knowledge and practices, including, but not limited to the following, are described for Mauna Kea and the adjoining *'āina mauna*:

- **Mauna Kea**—though simply translated as “White Mountain” since at least 1823, the name, Mauna Kea is also known in native traditions and prayers as Mauna a Wākea (Kea), “The Mountain of Wākea.” It is the first-born mountain son of Wākea and Papa, who were also progenitors of the Hawaiian race. Mauna Kea is symbolic of the *piko* (umbilical cord) of the island-child, Hawai'i, and that which connects the land to the heavens.

- ***Pu'u o Kūkahau'ula***^{*}, named for a form of the god Kū, where the *piko* of new-born children were taken to insure long life and safety. This practice is still participated in at the present time.
- ***Waiau***, named for the mountain goddess, Waiau (Ka piko o Waiau), and home of the *mo'o* (water-form) goddess Mo'o-i-nanea. Place where *piko* of newborn children were taken to ensure long life; and from which "*ka wai kapu o Kāne*" (the sacred water of Kāne) was collected. These practices are still participated in at the present time.
- ***Pu'u Poli'ahu***^{**} and ***Pu'u Lilinoe***, named for, and the abode of goddesses of Mauna Kea.
- In 1823, the first missionary party to visit the summit of Mauna Kea learned from the natives that it was "the abode of the gods," and none could be induced to travel to the summit (Goodrich in Ellis, 1963:292).
- ***Heiau*** and ***'ahu***—ceremonial sites, shrines, and places where *mele* (chants) and offerings were presented.
- ***'Ahu***—stone mounds as land markers.
- ***Ana*** and ***lua kā ko'i*** (caves and quarries from which stone was harvested for making tools).
- ***Ilina*** (burial features) extending from the summit to the lowlands. Specific mention is made in several important historical accounts—recorded by both native witnesses and non-Hawaiians—of the presence of burials in the *pu'u* and summit plateau of Mauna Kea. The remains of individuals who share ties to Mauna Kea are still taken to the various *pu'u* on Mauna Kea for interment.
- Native trails—portions of which, on the ascent to the summit, and around the base of Mauna Kea, are overlaid by modern routes of access.
- Shelters and habitation caves.
- Resource collection sites.
- Later features, dating from the middle 1800s, including pens—such as ***Kulaka***, on Humu'ula above Pu'u 'Ō'ō; and ***Aiakala***, in Ka'ōhe, above the Pu'u Nanahu section of the mountain—walls and fence lines.
- Stone and wooden houses.
- Water collection and storage facilities;
- Bird hunting blinds—in the form of single, double or tri-sided stone walls; former garden plots; and other ranch "support" features.

Another facet of this study, was a review of native lore associated with traditional knowledge of the heavens. While we have uncovered no specific archival references to native astronomy on Mauna Kea, the association of the gods and deities whose forms are seen in the heavens and whose names are commemorated at locations on Mauna Kea is significant. We have found, that as is the case in all areas of Hawaiian life, the traditions, customs and practices associated with the *'oihana kilokilo* (astronomy) and *kilo hōkū* (observing and discerning the nature of the stars) were deeply tied to the spiritual beliefs of the Hawaiian people. The stars are physical manifestations of the gods who created the heavens, earth, and humankind, or are body-forms granted to select individuals or beings of nature (Malo, 1951 and Beckwith, 1951). The combined writings of native and foreign historians on this subject—recorded between the 1830s to 1935—provide us with a list of more than 270 Hawaiian names for stars (not including alignments of stars which marked the heavens and pathways of traditional navigators).

* The name Pu'u o Kūkahau'ula is the traditional name of the summit cluster of cones on Mauna Kea, appearing in native accounts and cartographic resources until ca. 1932. The recent names, Pu'u Wekiu, Pu'u Hau'oki and Pu'u Haukea, have, unfortunately been used since the 1960s (since the development of astronomy on Mauna Kea), and have displaced the significant spiritual and cultural values and sense of place associated with the traditional name, Pu'u o Kūkahau'ula.

** The place name Poli'ahu, was recorded in native texts (cf. Kamakau, 1961 in this study), and as a part of Boundary Commission proceedings in 1873 (in this study); it was also widely documented as the name of the primary goddess of Mauna Kea. The specific usage of the place name "Puu Poliahu" (also referred to as Peak A), was apparently given to the present-day location in 1892, by W.D. Alexander, commemorating the goddess, Poli'ahu, (cf. Alexander and Preston, 1892-1893, in this study).

Also, of importance in discussions regarding modern astronomy on Mauna Kea, the narratives cited in this collection provide readers with first-hand accounts—from archival documents and oral history interviews—of the early days of astronomy on the mountain, including the thoughts and recommendations of the pioneer scientists, responsible agencies, and community members on the island of Hawai‘i, in regards to use and limitations of Mauna Kea. An example of the kind of information recorded by the early scientists and community on the island of Hawai‘i, between 1964 to 1980, was that development of telescope facilities on Mauna Kea should be carefully limited—by 1980, the recommended number being six observatories.

Historical Land Use on the Mountain Lands

As early as the 1820s, introduced cattle, sheep, goats, and wild dogs had made their way up to the mountain lands, and were bothersome to those who traveled the *‘āina mauna*. In 1834, Scottish naturalist, David Douglas was killed by a wild bullock at Keahua-ai (now called Douglas Pit or Kaluakauka), near the boundary of Humu‘ula and Laupāhoehoe. By 1850, the natural-cultural landscape of the *‘āina mauna* was being significantly altered by the roving herds of wild bullocks, sheep and other ungulates, and ranching interests were being formalized in the region. In 1857, the Crown and Government mountain lands of Humu‘ula and Ka‘ohe—including the summit of Mauna Kea—were leased to Francis Spencer and the Waimea Grazing and Agricultural Company, which established ranching stations and operations around the mountain lands. Portions of the land of Pi‘ihonua were leased to native bird hunters in the middle 1860s, and subsequently to native and foreign bullock hunters. As a result, Humu‘ula and the larger *‘āina mauna* have been intensively ranched for more than 150 years.

Because hunting, and subsequently ranching of bullocks, cattle and sheep were the primary historic activities on the mountain lands, areas once forested soon became open pasture land. While the first formal lease of Humu‘ula and Ka‘ohe was issued in 1857 (Keoni Ana to F. Spencer), it was Samuel Parker and Parker Ranch that held the longest lease on the Humu‘ula and Ka‘ohe mountain lands. In between 1900 to 2002, their leases extended around Mauna Kea to the Pu‘u Huluhulu vicinity, and for a period, the leases also included portions of the *‘Āina Hou* lands. The Parker Ranch interests initially focused on sheep ranching in the Humu‘ula-Kalai‘eha section, but in 1964, the ranch terminated its sheep program. Cattle operations were maintained till the end of the Parker lease in August, 2002.

Today, limited ranching of cattle is continued on the lands extending from Humu‘ula to Hānaipoe, Pā‘auhau, and the Parker Ranch lands—the Humu‘ula section being worked under a permit by the Department of Hawaiian Home Lands, and leases from the State of Hawai‘i. While the Humu‘ula section is still partially grazed, some 6,000 acres between the Pu‘u ‘Ō‘ō and Pu‘uloa, have succumb to an infestation of the introduced gorse (first recorded on the land in 1892), which has had little maintenance since ca. 1980.

As early as 1831, portions of the land of Pi‘ihonua Uka and neighboring forest lands were being worked by Daniel Castle, and later, by the Castle and Hitchcock brothers for lumber milling and bullock hunting operations. Subsequently by the 1860s, native lessees were granted the right of hunting in the Pi‘ihonua uplands. Then in 1887, the *ahupua‘a* of Pi‘ihonua (everything from above Hilo Town to the upland boundary with Humu‘ula) was leased to John Timoteo Baker, who undertook ranching operations in Pi‘ihonua in the 1890s.

Prior to Baker’s lease, the Puu Oo Ranch Station had been established, with its buildings developed as a part of the Humuula Sheep Station Company; this due to an error in locating the boundary between Humu‘ula and Pi‘ihonua. In 1896, the boundary matter was settled, and Baker maintained cattle and livestock ranching operations in the area. Baker sold his lease to W.H. Shipman in 1899, which was followed by the sale of a 40 acre parcel—the Pu‘u Oo Ranch headquarters—in Patent Grant No. 8970, to W.H. Shipman. In 1902, Shipman secured leases on the lands of Pāpa‘ikou, Makahanaloa and other Hilo District lands, which were incorporated into the Pu‘u Oo ranching

operation. W.H. Shipman, Limited, sold its interest in the Pu'u 'Ō'ō parcel in the 1970s, and it remains in private ownership to the present day.

Early leases of the Ka'ohe mountain lands date back to 1857 (Keoni Ana to F. Spencer), and the operations of Francis Spencer's Waimea Grazing and Agricultural Company. The lease took in all of the mountain lands (to the summit of Mauna Kea), across Ka'ohe to its' Mauna Loa boundary. Activities were all tied to sheep and cattle ranching. Subsequently, in 1870, the lease was acquired by Parker Ranch, which held most of the Ka'ohe mountain lands until their removal in 1905 for the Mauna Kea Forest Reserve, and later withdrawals as a part of the Pōhakuloa Military installation in 1956 (Governor's Executive Order No. 1719; and Presidential Executive Order No. 1167). Portions of the land of Ka'ohe, generally those on the northern (Waimea) side of Mauna Kea, are still grazed by Parker Ranch. The land of Ka'ohe IV (the Pōhakuloa section), were turned over to the United States Army, and have been used for military training operations since that time.

The summit of Mauna Kea, situated in the *ahupua'a* of Ka'ohe, was noted as a site of importance for modern astronomical observations by the Pendulum Party of 1892. In 1964, the first modern observatory was built on top of Pu'u Poli'ahu. By 1965, the National Aeronautics and Space Administration (NASA) and the University of Hawaii initiated their program "*to exploit the exciting potentialities of the Mauna Kea site for astronomical purposes*" (cf. Newell to Hiatt, Feb. 16, 1965, in this study). In 1967, the University of Hawaii Institute for Astronomy was founded, and in 1968, the Board of Land and Natural Resources leased the entire summit of Mauna Kea to the University by Lease No. S-4191. While the practice and activities associated with astronomy on Mauna Kea represent the shortest of the periods of history and land use described in this study, its forty-one years (at the time of this writing) in the summit region of Mauna Kea, also represent the period of most significant changes in the natural and cultural landscapes on the mountain.

Archival Resources of the Present Study

Records cited—many as verbatim transcripts, allowing readers to understand the full context of the accounts as meant by the original authors—include native accounts translated from Hawaiian language sources; the records of Kingdom and Government agencies; journals of historic visitors; records of the lessees and ranching operations on the mountain lands; and narratives from scientific expeditions to Mauna Kea through the 1960s. There are also cited, a number of the early letters by participants in the development of astronomy on Mauna Kea, dating from 1963 to 1980.

Archival-historical resources were located in the collections of the Hawai'i State Archives, Survey Division, Land Management Division, and Bureau of Conveyances; the Bishop Museum Archives; the Hawaiian Historical Society; University of Hawai'i-Hilo Mo'okini Library; private family collections; the Parker Ranch & *Paniolo Preservation Society* (PPS) collections; the National Archives and Records Administration, and NOAA Central Library; the Houghton Library-Harvard; the USGS Central Library, Denver; the Hawaiian Historical Society; the Hawaiian Mission Children's Society Library; the Hilo Public Library; the Archives of the Institute for Astronomy; and in the collection of *Kumu Pono Associates LLC*. The oral history interviews cited in this study represent selected interviews conducted by Maly between 1999 to 2005, and reflect the recollections of elder native Hawaiians and *kama'āina* of lands of the *'āina mauna*. The interviewees ranged in age from their 60s to 90s, and in their stories they describe life upon the land, practices associated with travel and work on the mountain lands, and the early days of astronomy on Mauna Kea.

TABLE OF CONTENTS

INTRODUCTION	• 1
<i>Background</i>	• 1
<i>Archival-Historical Research and Oral History Interviews</i>	• 1
A CULTURAL-HISTORICAL OVERVIEW OF THE ‘ĀINA MAUNA OF HAWAII	• 4
<i>“Kumulipo” Traditions of the Heavens, Gods, Land, Natural Resources, and People in the Hawaiian Cultural System</i>	• 4
<i>Nā Wao—Traditional Regions and Elevational Zones on the Mountain Lands</i>	• 10
<i>Ahupua‘a—Nā Kuleana a me nā Pono</i>	• 12
<i>Sequence of Hawaiian Settlement</i>	• 14
<i>Historical Overview of Land Use Practices and Travel on the ‘Āina Mauna</i>	• 15
<i>Humu‘ula</i>	• 15
<i>Ka‘ohe</i>	• 15
<i>Na ‘Āina e pili ‘ana iā Mauna Kea</i>	• 16
<i>Na Ala Hele o ka ‘Āina Mauna</i>	• 16
NATIVE HAWAIIAN TRADITIONS AND HISTORICAL NARRATIVES OF KA‘OHE, HUMU‘ULA AND THE ‘ĀINA MAUNA	• 18
I. <i>Mo‘olelo ‘Āina: Native Traditions of the Land</i>	• 18
<i>Kai-a-ka-Hinalii: An Account of the Ocean Flood of Ka-Hina-Li‘i and Mauna Kea</i>	• 18
<i>Adze Quarries, a Wooden Image, and Artifacts Found Near the Summit of Mauna Kea (1862)</i>	• 18
<i>“Ka Moolelo o Laieikawai” (1862-1863)</i>	• 20
<i>Heiau of the Mountain Lands Described in “Na Kaao a Kekahi Elemakule o Hawaii” (1865)</i>	• 26
<i>Warriors Traveled the Mountain Paths and Met in Battle on the ‘Āina Mauna</i>	• 29
<i>“He Moolelo Kaao Hawaii no Laukaieie” (1894)</i>	• 30

<i>Po'e Lawai'a Manu: Bird Catchers in Old Hawai'i (1895)</i>	• 32
<i>"Ahele Manu" – Bird Catching Techniques on the Mountain Lands</i>	• 38
<i>"Kaaoo Hooniua Puuwai no Ka-Miki" (The Heart Stirring Story of Ka-Miki)</i>	• 40
<i>Synopsis of Translations from the Historic Account of Ka-Miki</i>	• 41
<i>Travel Across the 'Āina Mauna in the Time of Kamehameha</i>	• 50
<i>Kūkahau'ula and Lilinoe</i>	• 51
<i>"Lilinoe and Nuu"</i>	• 51
<i>The Rivalry Between Poli'ahu and Pele</i>	• 52
<i>The Love of Poli'ahu and Kūkahau'ula</i>	• 53
II. <i>Ka 'Oihana Kilokilo Hōkū (The Practices Associated with Observing Stars)</i>	• 54
<i>Traditions of Voyages to Marquesas and Tahiti</i>	• 54
<i>"Moolelo Hawaii"</i>	• 56
<i>Hawaiian Astronomy and Navigation The Journal of William Richards (1841)</i>	• 58
<i>"A History of the Sandwich Islands" (Sheldon Dibble, 1843)</i>	• 62
<i>"No ke Ao Hoku" (About Astronomy) (1865)</i>	• 65
<i>Nā Hōkū o ka Ho'okelewa'a (Stars of the Navigators) (1865)</i>	• 68
<i>"Oihana Kilo Kilo" (1920)</i>	• 75
<i>"Hawaiian Names of Stars and Planets" (1924)</i>	• 75
<i>Hawaiians as Navigators and Seamen (1925)</i>	• 80
<i>"The Morning Star Rises"</i>	• 82
<i>Mauna Kea, Pā i ka Lani (Mauna Kea, Touching the Heavens)</i>	• 95
III. <i>Historical Accounts of the 'Āina Mauna Recorded By Natives, Foreign Residents and Visitors (1778-1899)</i>	• 97
<i>The Journal of Captain James Cook (1778-1779)</i>	• 97
<i>The Journal of William Ellis (1823)</i>	• 98

<i>Mauna Kea and the Mountain Lands Described by J.F. Goodrich (1823-1825)</i>	• 100
<i>The Journal of C. S. Stewart (1823-1825)</i>	• 102
<i>Botanist, James Macrae and Party Travel to Mauna Kea in 1825</i>	• 103
<i>Goodrich's Account of Travel From Hilo Bay to The Mountain Lands in 1829</i>	• 112
<i>Gerrit P. Judd's Account of a Visit to the Summit of Mauna Kea and Travel Across Plateau Lands Between Mauna Kea and Mauna Loa in 1830</i>	• 113
<i>The Journal of Hiram Bingham (notes of 1830)</i>	• 114
<i>"Hua Hekili" A Hail-storm on Mauna Kea in 1830</i>	• 117
<i>Mauna Kea and the Mountain Lands Described by David Douglas in 1834</i>	• 118
<i>Road Constructed Across the Mountain Lands in 1834</i>	• 126
<i>Narratives from Trips to Mauna Kea in 1840 and 1841</i>	• 127
<i>Ascent of Mauna Kea Recorded in Records of the United States Exploring Expedition (1841)</i>	• 131
<i>The Mauna Loa Eruption of 1843</i>	• 136
<i>Ascent of Mauna Kea and Travel Across the Mountain Lands (1845-1848)</i>	• 136
<i>The New Mountain Road Being Constructed in 1849-1850</i>	• 140
<i>The Mountain Lands Visited During the Eruption of 1852</i>	• 141
<i>Kalai'eha-Humu'ula-Ka'ohe and the Mauna Kea- Mountain Lands Described in Letters of Charles De Varigny (1855-1868)</i>	• 144
<i>A Trip to the Mountain Lands of Hawai'i (1859)</i>	• 145
<i>Waimea and the Mountain Lands Described by Isabella Bird (1873)</i>	• 149
<i>Report of the Royal Commissioners on Development of Resources (1877)</i>	• 153
<i>George Bowser's "Directory and Tourists Guide" (1880)</i>	• 154
<i>Queen Emma's Ascent of Mauna Kea (1882)</i>	• 155

<i>Emma Kaleleonalani ma Kohala</i>	• 156
<i>Accounts of Queen Emma's Trip to Mauna Kea Recorded in Interviews with James Kahalelaumāmane Lindsey and Kalani Ka'apuni Phillips</i>	• 159
<i>James Kahalelaumāmane Lindsey (October 24, 1966)</i>	• 159
<i>Kalani Ka'apuni-Phillips (January 30, 1967)</i>	• 161
<i>Geological Survey Trip To Humu'ula, Kalai'eha, Ka'ohe, and the Summit of Mauna Kea (1882)</i>	• 161
<i>Surveyor's Ascent of Mauna Kea (1889)</i>	• 173
<i>Pendulum Party's Ascent of Mauna Kea (1892)</i>	• 176
<i>"The Ascent of Mauna Kea, Hawaii"</i> <i>Report of W.D. Alexander on the Mauna Kea Trip of 1892</i>	• 182
<i>Report of E.D. Preston on the Mauna Kea Trip of 1892</i>	• 195
IV. <i>Historical Accounts of the 'Āina Mauna Recorded After 1900</i>	• 206
<i>"Hawaii Rdeivivus" (Orchards of the Keanakolu Vicinity Planted in ca. 1885)</i>	• 206
<i>Mauna Kea, The Highest of Island Peaks (1911)</i>	• 207
<i>Trails of Mauna Kea and the 'Āina Mauna Originally Built in the Time of 'Umi</i>	• 211
<i>A Visitor's Guide to the "Mountain Country" (1913)</i>	• 212
<i>"Large Party Makes Mauna Kea Climb" (1915)</i>	• 213
<i>"Ke Alanui Mawaena o Na Mauna" (1915)</i>	• 214
<i>"A Great Land and Road Plan on this Island" (1915)</i>	• 214
<i>"Sets Mountain Climbing Record, Prof. Bryan Ascends Four Volcanoes within Nine Days." (1916)</i>	• 215
<i>"A Christmas Holiday Mountain Trip" (1922)</i>	• 217
<i>"On Arctic Peaks 'Neath Tropic Skies Afoot Over Mounts Hualalai, Mauna Kea and Mauna Loa on Hawaii's Largest Isle" (1922)</i>	• 218
<i>"Hiking Hawaii's Highest Heights" (1923)</i>	• 222
<i>"The Lone Man's Trail" Ascent of Mauna Kea in 1925</i>	• 225

<i>Geologist's Survey of Mauna Kea by Jerome Kilmartin (USGS) in 1925-1926</i>	• 228
<i>The Mauna Kea Expedition of 1935</i>	• 231
<i>"Climbing Hawaii's Highest Mountain" (1935)</i>	• 232
<i>"Mauna Kea, The White Mountain of Hawaii" (1935)</i>	• 235
<i>"Snow Storm in Hawaii" (1937)</i>	• 238
<i>"Wild Sheep in Hawaii" (1937)</i>	• 239
<i>"The Big Fence on the Big Island" (1937)</i>	• 241
<i>"Wild Cattle in Hawaii" (1937)</i>	• 243
<i>"New Discoveries Made on Mauna Kea. Big Island Volcano Site of Worlds Largest Stone Age Workshops" (1937)</i>	• 244
<i>"Ski Aloha" (1937)</i>	• 246
<i>Visitor's Guide to Mauna Kea and the Mountain Lands (1937)</i>	• 249
<i>Civilian Conservation Corps in the Hawaiian Islands (1937)</i>	• 250
<i>"Mauna Kea" (1938)</i>	• 251
<i>"Maui 'Sword' for Big Island" (1938)</i>	• 253
<i>"The Adz Makers of Mauna Kea" (1938)</i>	• 254
<i>"CCC on Island of Hawaii" (1938)</i>	• 256
<i>"Ka Pua Mamane" (1938)</i>	• 257
<i>"Lake Waiau of Hawaii" (1939)</i>	• 257
<i>"Vegetation of Lake Waiau, Hawaii" (1939)</i>	• 258
<i>"Suncups in Hawaiian Snowbanks" (1939)</i>	• 260
<i>"Glacial Ice of Hawaii" (1941)</i>	• 261
<i>"Skiing on Snow-Capped Peak of Mauna Kea" (1948)</i>	• 264
<i>The Mauna Kea Hunting Program of the Territory of Hawaii (1948)</i>	• 264
MO'OLELO 'ĀINA: A CHRONOLOGICAL HISTORY OF LAND TENURE, ACCESS, RANCHING, LEASEHOLD INTERESTS, AND CONSERVATION ON THE 'ĀINA MAUNA (1842-1963)	• 265
I. Land Tenure and the Māhele 'Āina (1842-1855)	• 266

<i>Disposition of Selected Lands of the ‘Āina Mauna During the Māhele</i>	• 269
<i>Disposition of Livestock on the ‘Āina Mauna</i>	• 270
<i>The “Right” to Hunt on Mauna Kea and the Mountain Lands not Held as a Public Interest in 1861</i>	• 274
II. Mauna Kea and the Neighboring ‘Āina Mauna (1790s-1890s): Traditional Customs, Practices, Resource Collection, and Land Use Described Before the Boundary Commission	• 278
<i>Ahupua‘a in the District of Hilo</i>	• 280
<i>Humuula Ahupuaa</i>	• 280
<i>Makahānaloa Ahupuaa</i>	• 307
<i>Nanue Ahupuaa</i>	• 315
<i>Pi‘ihonua Ahupuaa</i>	• 320
<i>Waiakea Ahupuaa</i>	• 327
<i>Waipunalei Ahupuaa</i>	• 328
<i>Ahupua‘a in the District of Hāmākua</i>	• 335
<i>Kalopa Ahupuaa</i>	• 335
<i>Kaohe Ahupuaa</i>	• 337
<i>Koholalele Ahupuaa</i>	• 339
<i>Kukaiau Ahupuaa</i>	• 340
<i>Paauihau Ahupuaa</i>	• 351
<i>Ahupua‘a in the District of Kohala</i>	• 354
<i>Waikoloa, Ili of Waimea</i>	• 354
III. Land Use and Leasehold Interests on the ‘Āina Mauna Following the Māhele ‘Āina (1850-1963)	• 371
<i>History of the Humu‘ula Sheep Station and Land Use on the ‘Āina Mauna</i>	• 389
<i>Leasehold Interests and Ranching in Humu‘ula and Pi‘ihonua (1883-1900)</i>	• 391
<i>The Humuula Sheep Station Journal of August Haneberg</i>	• 393

<i>Selected Entries from Haneberg's Journal—Describing Land Use, Development of Station Features, and Daily Operations</i>	• 394
<i>Leasehold Interests and Ranching on the Government Lands of Ka'ōhe and Pi'ihonua</i>	• 420
<i>Ranching the Mountain Lands in the Early 1900s, and Transfer of Humu'ula to the Management of Parker Ranch</i>	• 437
<i>Ranches on the Mountain Lands Described in 1929</i>	• 444
<i>Transitions in Leasehold Interests and Land Use on the 'Āina Mauna (1950s-1960s)</i>	• 447
<i>Identification and Development of the Mauna Kea Springs for Water Supply</i>	• 450
IV. <i>Nā Ala Hele o ka 'Āina Mauna— Native Trails to Government Roads</i>	• 453
<i>Trails and Roads Developed on the Mountain Lands Under Kingdom Programs</i>	• 455
V. <i>Historical Surveys of the Lands of Humu'ula, Ka'ōhe, and the 'Āina Mauna</i>	• 484
<i>Field Surveys on the 'Āina Mauna by J.S. Emerson (1882)</i>	• 492
<i>Surveys of Mauna Kea and the Hilo Region Mountain Lands by E.D. Baldwin (1889-1891)</i>	• 503
<i>Mauna Kea Survey Notes (1891-1894)</i>	• 513
<i>Mauna Kea Survey Records in Collection of U.S. Coast and Geodetic Survey (1876-1892)</i>	• 514
THE HILO AND MAUNA KEA FOREST RESERVES: RANGE LANDS WITHDRAWN FROM GRAZING USES	• 521
<i>Proposal and Description of Lands in the Hilo Forest Reserve</i>	• 522
<i>Land and Resources of Ka'ōhe IV and Mauna Kea Described (1905)</i>	• 533
<i>Proclamation of the Hilo Forest Reserve (1905)</i>	• 535
<i>Leasehold Interests Modified on the Lands of Ka'ōhe and Mauna Kea (1906-1908)</i>	• 541
<i>The Pi'ihonua Forest and Watershed (1907)</i>	• 546
<i>The Mauna Kea Forest Reserve (1909)</i>	• 548

<i>Modifications in Boundaries of the Mauna Kea and Hilo Forest Reserves (1910-1937)</i>	• 553
<i>Humu'ula and Land Interests of the Department of Hawaiian Home Lands (1920-present)</i>	• 561
ASTRONOMY ON MAUNA KEA	• 563
<i>Mauna Loa and Mauna Kea, The Birth of Modern Astronomy on the Mountain Lands of Hawai'i</i>	• 563
<i>Communications and Manuscripts Documenting Development of Astronomy Facilities on Mauna Kea</i>	• 565
<i>July 15, 1963 Thomas H. Hamilton, President, University of Hawaii; to Mr. Mitsuo Akiyama, Executive Secretary, Hawaii Island Chamber of Commerce (Regarding Interest and Considerations by the University of Hawaii in High Altitude Astronomy on Mauna Loa and Mauna Kea)</i>	• 565
<i>January 17, 1964 Mitsuo Akiyama, Executive Secretary, Hawaii Island Chamber of Commerce; to The Honorable John A. Burns, Governor, State of Hawaii (Regarding Investigation by Dr. Kuiper of sites on Mauna Loa and Mauna Kea)</i>	• 567
<i>January 22, 1964 Gerard P. Kuiper, Director, Lunar and Planetary Laboratory, The University of Arizona; to President E.A. Harvill (Regarding Investigation into Development of Astronomy Site and Access Road on Mauna Kea; and Interest by NASA in the same)</i>	• 567
<i>March 4, 1964 Board of Supervisors, County of Hawaii; to Governor John A. Burns Resolution No. 361 (Regarding Development of the Mauna Kea Access Road)</i>	• 568
<i>March 10, 1964 Governor John A. Burns; to Helene Hale and Members of the Board of Supervisors, County of Hawaii (Regarding Proposed Development of the Mauna Kea Access Road)</i>	• 569
<i>March 18, 1964 Gerard P. Kuiper, Director, Lunar and Planetary Laboratory, The University of Arizona; to Dr. Fujio Matsuda, Director, State Department of Transportation (Regarding Development of the Mauna Kea Access Road; Support of NASA for a Test Program on Mauna Kea; and Preference for Development on "Puu Poliahu")</i>	• 569

- March 18, 1964
Gerard P. Kuiper, Director, Lunar and Planetary Laboratory, The University of Arizona; to The Honorable John A. Burns, Governor, State of Hawaii (Regarding Support for use of the Summit of Mauna Kea as the "Most outstanding observatory site in the world;" Construction of the Summit Road; and use of Mauna Loa as a Lunar Training Field) • 570
- March 27, 1964
Mitsuo Akiyama, Executive Secretary, Hawaii Island Chamber of Commerce; to The Honorable John A. Burns, Governor, State of Hawaii (Regarding Support for Big Telescope to be Built on Mauna Kea; NASA Participation; and Eliciting Congressional Support) • 571
- May 4, 1964
Gerard P. Kuiper, Director, Lunar and Planetary Laboratory, The University of Arizona; to Dr. G.P. Woollard, Director of Institute of Geophysics, University of Hawaii (Regarding Development of Telescope Terrace on Puu Poliahu; Use of Water from Lake Waiau for Facilities; and Proposed Restrictions to be set in Place) • 572
- May 7, 1964
Gerard P. Kuiper, Director, Lunar and Planetary Laboratory, The University of Arizona; to The Honorable John A. Burns, Governor, State of Hawaii (Regarding Completion of the Mauna Kea Access Road, and Preparation of the Telescope Terrace) • 573
- June 15, 1964
Mitsuo Akiyama, Executive Secretary, Hawaii Island Chamber of Commerce; to Mr. William R. Norwood, Administrative Director, Office of the Governor, State of Hawaii (Regarding Initiation of Test Research on Mauna Kea by Alike Herring; Shipping of the Observatory Dome; Construction of the Cement Platform for the Observatory on Mauna Kea; and Dedication and Proposal that the Mauna Kea Access Road be Named for Governor John Burns) • 574
- July 1, 1964
James L. Reid, President, Hawaii Island Chamber of Commerce (Regarding Invitation and Notice of Dedication of The Mauna Kea Access Road) • 575
- July 20, 1964
Participants in Dedication Ceremony For Completion of Mauna Kea Summit Road and Observatory Dome • 576
- July 20, 1964
Dedication Ceremony For Completion Of Mauna Kea Summit Road And Observatory Station • 580

July 20, 1964 Gerard P. Kuiper, University of Arizona, Lunar and Planetary Laboratory Address given at Mauna Kea Station Dedication	• 580
“Mauna Kea” Pamphlet of the Hawaii Island Chamber of Commerce (July 1964)	• 583
July 28, 1964 Dr. George P. Woollard, Director, Institute of Geophysics, University of Hawaii; to The Honorable John A. Burns, Governor, State of Hawaii (Regarding Proposed Management Measures and Restricted Access to the Summit of Mauna Kea)	• 599
December 1964 Proposal for the Design, Construction, and Installation of a 60-Inch Telescope on Mauna Kea, Hawaii (Describing the proposed Telescope Project on Mauna Kea, and History of Research on Mauna Kea as an Astronomy Site in 1962-1964)	• 600
1. Introduction and Summary	• 600
2. The Hawaii Test Program	• 602
3. The Proposed Research Telescope and Auxiliaries	• 604
January 5, 1965 Dr. George P. Woollard, Director, Institute of Geophysics, University of Hawaii; to Major General Edmond H. Leavey, U.S.A. (Ret.), Chairman, Governor’s Advisory Committee on Science and Technology, Department of Planning and Economic Development (Regarding Determination of Roles of the University of Hawaii, NASA, Dr. Kuiper, and others in the Development of the Mauna Kea Observatory; and Plans for Lease of the Summit to the University of Hawaii)	• 606
February 16, 1965 Homer E. Newell, Associate Administrator for Space Science and Applications; to Dr. Robert W. Hiatt, Vice President for Academic University of Hawaii (Reporting on Developing Agreement between the University of Hawaii and NASA for Development of the First Observatory on Mauna Kea)	• 608
February 25, 1965 Robert Hiatt, Vice President for Academic Affairs, University of Hawaii; to Mr. Mitsuo Akiyama, Executive Secretary, Hawaii Island Chamber of Commerce (Update on Agreements Between the University of Hawaii and NASA; it Being Decided that a more Long-term Approach to Development be Undertaken, Instead of the “Crash Program” originally Proposed by Dr. Gerard Kuiper)	• 609

July 2, 1965
 Richard L. Callaghan, Assistant Administrator for
 Legislative Affairs, National Aeronautics and Space
 Administration; to Honorable John A. Burns Governor
 of Hawaii (Notification that Funding from NASA for
 Development on Mauna Kea had been Obtained) • 611

April 29, 1966
 Thomas H. Hamilton, President, University of Hawaii;
 to The Honorable John A. Burns Governor of Hawaii
 (Regarding the Proposed Science Reserve Boundaries
 on Mauna Kea) • 611

July 1, 1966
 Robert W. Hiatt, Acting Executive Officer, University of
 Hawaii; to The Honorable John A. Burns Governor
 of Hawaii • 612

Establishment of the Mauna Kea Science Reserve (1967) • 613

General Lease S-4191 Issued to the University of Hawaii (1968) • 615

Mauna Kea Ice Age Natural Area Reserve—
 Reduction of the Mauna Science Reserve • 621

Draft Environmental Assessment
 State of Hawaii - Department of Land and Natural Resources
 Natural Area Reserves System Commission
 Proposed Mauna Kea Ice Age Natural Area Reserve (August 1977) • 622

Survey of the Mauna Kea Ice Age Natural Area Reserve (1979) • 627

Mauna Kea Ice Age Natural Area Reserve –
 Draft Management Plan (1982) • 629

Mauna Kea (1980): Community Voices—Agency Debates,
 County of Hawaii Recommends that Development be
 Limited to Six Observatories • 631

Mauna Kea (Past, Present and Future) • 632

Plans drawn for majestic Mauna Kea • 632

Perspective: reflections of Mauna Kea • 637

Personal Recollections of Mitsuo Akiyama—
 Mauna Kea and Early Years of Astronomy • 638

REFERENCES CITED • 645

ILLUSTRATIONS

- Figure 1. *Mauna Kea and Neighboring ‘Āina Mauna, on the Island of Hawai‘i (Hawaiian Territorial Survey, 1901)* • 2
- Figure 2. *Nā Wao–Kuahiwi, Kualono, Kua Mauna, Kuahea o Mauna Kea (The Mountain Regions of Mauna Kea, with Waiau and the Head of Pōhakuloa Gulch in Foreground). (National Archives and Records Administration, B-2897-11th Photo Section, January 26, 1925)* • 13
- Figure 3. *Portion of ‘Ahu-a-‘Umi Heiau, Mauna Kea Viewed in the Background (ca. 1890; in collection of the Hawai‘i State Archives)* • 27
- Figure 4. *Kia-manu (N.B. Emerson, 1895)* • 35
- Figure 5. *Ka Paepae Kapu o ka Pōhaku a Kāne (Photo KPA-3722)* • 44
- Figure 6. *Hā wai (Water Channel) from Waiau to Pōhakuloa Gulch, above Ka Wai Hū a Kāne (Photo KPA-3733)* • 48
- Figure 7. *Sketch of Cattle-Pits – Keanakolu Vicinity (Wilkes 1970:204)* • 134
- Figure 8a. *Sketch of the Mauna Kea Summit Region – Depicting Trail, “Axe Maker’s Cave,” “Pillar” of Queen Emma, Heiau and Burial Place and other Cultural Features (J.M. Muir, July 23, 1892. Field Note Book, Reg. 429:7-8)* • 184
- Figure 8b. *Annotated Aerial Photo – Portion of Mauna Kea (1978 Advance Print); Depicting Approximate Locations of the “Pillar” of Queen Emma, “Crag,” “Axemaker’s Cave,” “Heiau” or “Burial Place,” and Named Pu‘u Described by W.D. Alexander in 1892. (From Notes Prepared by John P. Lockwood, Ph.D., March 29, 2005)* • 185
- Figure 8c. *Remains of ‘Ahu on Pu‘u Kōko‘olau (area indicated by Muir’s sketch map of July 23, 1892. Alexander’s Field Book No. 429; see Figure 8a) (Photo KPA-S2526)* • 185
- Figure 9. *Sketch of Waiau Lake and Crater (J.M. Muir, Field Note Book, Reg. 429:15-16)* • 187
- Figure 10. *Sketch – View from the Summit Ridge Station, Looking Towards Puna (J.M. Muir, July 23, 1892. Field Note Book, Reg. 429:9-10)* • 188
- Figure 11. *Sketch – View from the Summit Ridge Station, Plateau between Papalekoi and Makanaka (J.M. Muir, July 23, 1892. Field Note Book, Reg. 429:5-6)* • 190

Figure 12. Sketch – View from Waiau Crater Looking North (J.M. Muir, July 25, 1892. Field Note Book, Reg. 429:19-20)	• 191
Figure 13. Gravity, Latitude, and Magnetic Station at Waiau, Looking Northeast. Elevation 13,060 Feet (3,981 meters). Plate No. 22 (E.D. Preston, 1892; Photo No. 976, in the Collection of the Hawaiian Historical Society)	• 195
Figure 14. Mauna Kea, as seen from Waimea, Distant 15 Miles, Looking Southeast. Cloud Belt at 10,000 Feet Elevation. Preston's Plate No. 29 (1892) (Photo No. 1016, in the Collection of the Hawaiian Historical Society)	• 198
Figure 15. Preston's Map of Route to Mauna Kea, and Locations Where Specimens were Collected (Library of Congress; Copy Photo, KPA-N043)	• 199
Figure 16. Mauna Kea viewed from Kalai'eha, the Humuula Sheep Station Headquarters Viewed in Foreground (Triptych Photo by E.D. Preston, 1892; in collection of the Hawaiian Historical Society)	• 200
Figure 17. Waiau Lake, Near Summit of Mauna Kea. Elevation over 13,000 Feet. Plate No. 33 (E.D. Preston, 1892)	• 201
Figure 18. Summit Plateau of Mauna Kea (Surveyed July, 1892 by W.D. Alexander). E.D. Preston's, Plate No. 34	• 202
Figure 19. View from Ku-ka-hau-ula, the Summit of Mauna Kea, Looking Southwest. Elevation 4,214 Meters (13,825 Feet). E.D. Preston, 1892. Plate No. 35. (Copy Photo KPA-N093; in collection of NOAA Central Library, Silver Spring, Maryland)	• 203
Figure 20. In Midsummer Waiau Pond, near the summit of Mauna Kea [White Mountain] at 13,014 Feet. (Copy Photo, KPA-N078)	• 216
Figure 21. Portion of Mauna Kea Quadrangle, Annotated by J. Kilmartin, 1925-1936; Depicting sites Visited and Survey Points on Mauna Kea	• 229
Figure 22. Kemole Camp of the CCC Fence Gang (Copy Photo KPA-N841 (2))	• 242
Figure 23. New Fence above Puuloa (Copy Photo KPA-N840)	• 242
Figure 24. Adze Quarry on Mauna Kea (Hawaii Tourist Bureau Photo, 1937)	• 245
Figure 25. Figure 25. L.W. Bryan. Harold Dillingham, Jr., Dudely C. Lewis and Gordon Scruton Skiing on Mauna Kea (A. Robinson, Photo; Copy Photo KPA-N839)	• 247

Figure 26. Photo of Lake Waiau, 13,000 Feet, Mauna Kea, Island of Hawaii (Copy Photo, KPA-N868)	• 258
Figure 27. Suncups and Sunpeaks; C. Wentworth photo (1939) (Copy Photo KPA-N 887)	• 260
Figure 28. Skiers on the Snow-banked Slopes of Mauna Kea (ahu in foreground, Mauna Loa in background). Arthur Robinson, Photographer (Copy Photo KPA-N869)	• 262
Figure 29. Map of the Glaciated Area on Mauna Kea (Gregory & Wentworth, 1937:1731)	• 263
Figure 30. T. Metcalf's Sketch of Proposed Division of Mountain Lands – Aamoku (Keamoku), Lae Eha (Kalaieha), Laumaea (Laumaia) and Nauhi	• 272
Figure 31. Reduction of Register Map No. 668, the Land of Humuula (S.C. Wiltse, April 1862)	• 281
Figure 32. Map to General Lease No. 608, Portion of the land of Humu'ula	• 435
Figure 33. Roads and Trails of the Hawai'i Island Mountain Lands (Pacific Commercial Advertiser, February 17, 1859)	• 457
Figure 34. Sketch of proposed Route of Mountain Road from Hilo Town, Towards Kalai'eha (D.H. Hitchcock, 1866)	• 462
Figure 35a. Portion of Register Map No. 528, Depicting Pi'ihonua Forest to Kahiliku- Ohanapapapa Section of the 1869 Alignment of the Hilo to Waimea Road via Kalaieha	• 465
Figure 35b. Portion of Register Map No. 528, Depicting Kahiliku to Ahumoa Section of the 1869 Alignment of the Hilo to Waimea Road via Kalaieha	• 466
Figure 36. Sketch of the Waimea-Humuula, and Waimea Hamakua Mountain Roads (W. Vredenburg, 1897)	• 481
Figure 37. Portion of an 1896-1897 Map of the Island of Hawaii, Depicting the Mountain Lands, and Government Roads Between Hilo and Waimea (S.M. Kanakanui, Surveyor) (In collection of Library of Congress)	• 483
Figure 38. Reduction of Register Map No. 1641 (C.J. Lyons, 1891), Depicting Humuula, Kaohe and Adjoining Lands	• 484
Figure 39. Reduction of Register Map No. 1718 (E.D. Baldwin, Surveyor), Map of Central Hawaii, Depicting the Summit of Mauna Kea and the Humuula-Kaohe Flat Lands	• 486

Figure 40. Sketch of Mauna Kea Stations–Kaupo (Red Hill) and Stations from Halai (C.J. Lyons, 1877)	• 491
Figure 41. C.J. Lyons' Field Book 315 (pages 17-18), Depicting the Boundary between Humu'ula and Makahanaloa-Honohina (November 18, 1879)	• 493
Figure 42. J.S. Emerson Field Book 251:105; View of Mauna Kea from Ahumoa (April 7, 1882)	• 495
Figure 43. J.S. Emerson Field Book 251:139; View of "Valley Between Mauna Kea & Mauna Loa" (April 12, 1882)	• 496
Figure 44. J.S. Emerson Field Book 251:149; View of Ahumoa and portion of Mauna Kea from Napuukulua (April 13, 1882)	• 498
Figure 45. J.S. Emerson Field Book 252:15; View of Mauna Kea from Keamuku (April 20, 1882)	• 499
Figure 46a. Pu'u 'Ō'ō Vicinity Trails and Fence Line (E.D. Baldwin, Field Book No. 323:15; June 6 th , 1891)	• 506
Figure 46b. Lower Pu'u 'Ō'ō Vicinity Trails, Paddocks and House (E.D. Baldwin, Field Book No. 323:22; June 8 th , 1891)	• 507
Figure 47. Sketch of Mauna Kea from Puu Oo, Depicting named Puu; & Sketch of Mauna Kea from Puu Io, Depicting Puu Koko (with Road), Puu Keekee, Puu o Kauha, and Named Pu'u of Kaohe (E.D. Baldwin, Field Book No. 323:19-20; June 7 th , 1891)	• 508
Figure 48. No. 1. Sketch of Mauna Kea from Puu Io (locating Waihu); and No. 2. Sketch of Mauna Kea from Puu Io (locating Upper Edge of Mamane and Puu) (E.D. Baldwin, Field Book No. 323:22-23; June 9 th , 1891)	• 509
Figure 49. Humu'ula and Mauna Kea from 'A'ahuwela; Depicting Named Pu'u and Gulches, Fence Lines, and Forest Lands (E.D. Baldwin, Field Book No. 323:38-39; June 12 th , 1891)	• 510
Figure 50. The Kalai'eha Station, Buildings and Pens (E.D. Baldwin, Field Book No. 323:48; June 15 th , 1891)	• 511
Figure 51. The Kalai'eha Station and Mauna Kea (Locating - Puu o Kukahauula, Waiau, Lilinoe and Trail to Summit), viewed from Pu'u Huluhulu (E.D. Baldwin, Field Book No. 323:54-55; June 16 th , 1891)	• 512
Figure 52. Mauna Kea Triangulation Signal; NARA Collection, Series RG-23 (page 36)	• 515
Figure 53. Apakuie Triangulation Signal; NARA Collection, Series RG-23 (page 48)	• 517

Figure 54. Kaloaloe Triangulation Signal; NARA Collection, Series RG-23 (page 54)	• 518
Figure 55. Omaokoili Triangulation Signal; NARA Collection, Series RG-23 (page 62)	• 519
Figure 56. Ahumoa Triangulation Signal; NARA Collection, Series RG-23 (page 64)	• 519
Figure 57. Keamuku Triangulation Signal; NARA Collection, Series RG-23 (page 66)	• 520
Figure 58. Boundaries of the Mauna Kea Forest Reserve (1909 – traced from Reg. Map No. 2060)	• 549
Figure 59. “Summit Cluster, View from north slope of Mauna Kea, at about 12,000 feet altitude. Glaciated terrane (foreground), cinder cones (in the distance).”	• 558
Figure 60. Mauna Kea (ca. 1965), Depicting Pu‘u and Lake Waiau, Pu‘u Lilinoe, Pu‘u o Kūkahau‘ula, and a portion of New Road to Summit (USGS Library, Denver; Copy Photo KPA-N183)	• 564
Figure 61. Governor John Burns Speaking at Hale Pohaku, prior to Ascent to Pu‘u Poli‘ahu (July 20, 1964); Geo. Woollard in background. (Courtesy of Walter Steiger)	• 576
Figure 62. Dr. Gerard Kuiper Speaking at Hale Pohaku, prior to Ascent to Pu‘u Poli‘ahu (July 20, 1964). (Courtesy of Walter Steiger)	• 581
Figure 63. Dr. Kuiper, Mitsuo Akiyana, Howard Ellis and others at the Test Telescope Site on Pu‘u Poli‘ahu Alike Herring, Photographer (ca. July 1964)	• 582
Figure 64. Aerial Photograph of the Pu‘u Poli‘ahu Lunar and Planetary Laboratory – Test Telescope Site. Alike Herring, Photographer (October 14, 1964)	• 583
Figure 65. Proposed Boundary Radius of the Mauna Kea Science Reserve	• 612
Figure 66. C.S.F. 15,343 Survey of Mauna Kea Summit, Withdrawn from Mauna Kea Forest Reserve for the Mauna Kea Science Reserve (September 22, 1967)	• 614
Figure 67. C.S.F. 15,344 – Mauna Kea Science Reserve (September 22, 1967)	• 619
Figure 68. University of Hawaii 88-inch Telescope Project Development, ca. July 1968 (Photo in Collection of University of Hawaii-Institute of Astronomy (Copy Photo, KPA-N950)	• 621

- Figure 69. *Proposed Mauna Kea Hawaii Ice Age
Natural Area Reserve (Figure 1, August 1977:3)* • 623
- Figure 70. *C.S.F. 18,645 - Survey of the Mauna Kea Ice Age
Natural Area Reserve Including a Portion of the
Mauna Kea Forest Reserve and the Mauna Kea
Science Reserve (May 4, 1979)* • 628

INTRODUCTION

Background

At the request of Stephanie Nagata, on behalf of the Office of Mauna Kea Management, *Kumu Pono Associates LLC*¹ conducted research, compiled a detailed collection of archival-historical records, and conducted oral history interviews with *kūpuna* and elder *kama'āina*, pertaining to the *ahupua'a* (native land divisions) of Ka'ohe, Humu'ula and neighboring *'āina mauna* (mountain lands²) of Mauna Kea, on the island of Hawai'i (Figure 1). This work was undertaken as a part of on-going archival and oral historical research being conducted by *Kumu Pono Associates LLC*, since 1996, and builds upon detailed accounts published by Maly in 1997, 1999, 2002a & 2002b, and 2003. The study is multifaceted, and includes detailed verbatim accounts and descriptions of Mauna Kea, the larger Humu'ula-Ka'ohe lands, and *'āina mauna*, covering the period of Hawaiian traditions to first-hand accounts of travel on the *'āina mauna* and Mauna Kea, dating from the early 1820s, to the 1970s.

Through the detailed and extensive narratives, we seek to provide the University of Hawai'i; Native Hawaiians and other community members; planners; land and resource managers; and those interested in future plans and activities on Mauna Kea, and the larger *'āina mauna*, with access to a significant collection of documentation pertaining to the traditional, cultural, historical and natural assets of Mauna Kea and the *'āina mauna*. Many of the records reported herein, have not been previously known, or made available in their entirety. While future researchers will likely find more information, and be able to answer further questions about the traditions and history of Mauna Kea, we have sought to ensure that through this collection, readers and parties with responsibility for Mauna Kea, will have a solid foundation of traditional and historical knowledge to speak and work from.

Archival-Historical Research and Oral History Interviews

The archival-historical research conducted as a part of past studies and the present study, was performed in a manner consistent with Federal and State laws and guidelines for such studies. Among the pertinent laws and guidelines are the National Historic Preservation Act (NHPA) of 1966, as amended in 1992 (36 CFR Part 800); the Advisory Council on Historic Preservation's "Guidelines for Consideration of Traditional Cultural Values in Historic Preservation Review" (ACHP 1985); National Register Bulletin 38, "Guidelines for Evaluating and Documenting Traditional Cultural Properties" (Parker and King 1990); the Hawai'i State Historic Preservation Statue (Chapter 6E), which affords protection to historic sites, including traditional cultural properties of on-going cultural significance; the criteria, standards, and guidelines currently utilized by the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD) for the evaluation and documentation of cultural sites (cf. Title 13, Sub-Title 13:275-8; 276:5 – 2003); and the November 1997 guidelines for cultural impact assessment studies, adopted by the Office of Environmental Quality Control (which also facilitate the standardized approach to compliance with Act 50 amending HRS Chapter 343; April 26, 2000).

Maly and Maly have conducted detailed research in archival-historical literature, referencing both native Hawaiian language and English texts; conducted field visits with elder *kama'āina*; and conducted oral history interviews with individuals known to be knowledgeable about the history, residency and land use on the *'āina mauna*.

¹ Kepā Maly, Cultural Historian-Resource Specialist & Onaona Maly, Researcher.

² The native term *'āina mauna*, was used affectionately by elder Hawaiians, to describe all of the mountain lands surrounding, and including Mauna Kea. It is used in this text, in the same manner.

While conducting the research, primary references included, but were not limited to—land use records, including the Hawaiian Land Commission Awards (L.C.A.) records from the *Māhele ‘Āina* (Land Division) of 1848; the Boundary Commission Testimonies and Survey records of the Kingdom and Territory of Hawai‘i; and historical texts authored or compiled by—D. Malo (1951); S.N. Haleole (1862-1863); J.P. I‘i (1959); Kupahu (1865); S. M. Kamakau (1961, 1964, 1976, and 1991); Wm. Ellis (1963); records of the American Board of Commissioners of Foreign Missions (A.B.C.F.M.) (1820-1860); Chas. Wilkes (1845); Alexander & Preston (1892-1894); A. Fornander (1916-1919 and 1996); Isabella Bird (1964); G. Bowser (1880); and many other native and foreign writers. The study also includes several native accounts from Hawaiian language newspapers (compiled and translated from Hawaiian to English, by Maly), and historical records authored by nineteenth century visitors, and residents of the region.

Archival-historical resources were located in the collections of the Hawai‘i State Archives, Survey Division, Land Management Division, and Bureau of Conveyances; the Bishop Museum Library and Archives; the Hawaiian Historical Society and the Hawaiian Mission Children’s Society Library; University of Hawai‘i-Hilo Mo‘okini Library; the National Archives and Records Administration (NARA), Maryland; the Library of Congress (LoC), Washington D.C.; the National Oceanic and Atmospheric Administration (NOAA) Library, Maryland; the Smithsonian Institution Natural History and National Anthropological Archives libraries, Washington D.C.; the Houghton Library at Harvard; the United States Geological Survey Library, Denver; the *Paniolo Preservation Society* (PPS) and Parker Ranch collections; private family collections; and in the collection of *Kumu Pono Associates LLC*. This information is generally cited in categories by chronological order of the period depicted in the narratives.

The oral history interviews cited in this study (Appendix A) represent selections from interviews conducted by Maly between 1998 to 2005, and reflect the recollections of elder native Hawaiians and *kama‘āina* residents of the *‘āina mauna*. The interviewees ranged in age from their 60s to 90s, and in their stories they describe life upon the land, and practices of their families, and changes observed over the years in the condition of the landscape.

The recorded interviews were transcribed and returned (with the recordings) to each of the interviewees. Follow up discussions were then conducted to review each of the typed draft-transcripts. The latter process resulted in the recording of additional narratives with several interviewees. Following completion of the interview process, all of the participants in the tape recorded oral history interviews gave their permission for inclusion of portions of their transcripts in historical studies of the *‘āina mauna*. Because of the review and follow-up discussions with interviewees, the final transcripts cited in this study at times differ from the original recorded interview. The final released transcripts supersede the original documentation.

The historical records—including oral testimonies of elder *kama‘āina* of the mountain lands—provide readers with detailed descriptions of traditional and customary practices, the nature of land use, and the types of features to be expected on the landscape, and early efforts in conservation on Mauna Kea and the adjoining *‘āina mauna*. The descriptions of land use and subsistence practices range from antiquity to the middle 1950s, and represent the knowledge of generations of life upon the land. Importantly, in the discussion regarding astronomy on Mauna Kea, the narratives cited in this collection also provide readers with first-hand accounts—in archival literature and oral history interviews—of the early days of astronomy on the mountain, including the thoughts and recommendations of the pioneer scientists and community members on the island of Hawai‘i, in regards to use and limitations of Mauna Kea.

A CULTURAL-HISTORICAL OVERVIEW OF THE ‘ĀINA MAUNA OF HAWAI‘I

This section of the study provides readers with a general overview of the cultural and natural³ landscapes of Mauna Kea and the *‘āina mauna*. The narratives include discussions on Hawaiian settlement, population expansion, evolution of the traditional land management practices, and attachment to place. We find that the ancient Hawaiian system of land management is rooted in the beliefs, practices, traditions and values of the people, and that these formed the basis of the sustainable relationship shared between the Hawaiian people and the land. As this system evolved, the *ahupua‘a* of Ka‘ohe and Humu‘ula were established as the largest lands of the Mauna Kea region. There are also some 75 additional *ahupua‘a* in the Hilo District; 82 *ahupua‘a* in the Hāmākua District; and one *ahupua‘a* with several large *‘ili* divisions in the Kohala District, that rest upon the slopes of, and are enriched by the tangible and intangible resources of Mauna Kea. These traditional land divisions defined the rights of access of people to the resources necessary to life and culture; they were intricately tied to the lifeways of the people; and are reflected in the on-going cultural attachment⁴ of Hawaiians to Mauna Kea.

“Kumulipo” Traditions of the Heavens, Gods, Land, Natural Resources, and People in the Hawaiian Cultural System

In the Hawaiian world view, natural and cultural resources were treated alike, the well-being of one depended upon the well-being of the other. We find that native traditions describe the formation of the heavens, the islands, and all forms of life and nature, in the context of a genealogy, and the birth of children.

The epic “*Kumulipo*,” a Hawaiian Creation Chant, was translated by Martha Warren Beckwith (1951). The “*pule*” (prayer) was given, in ca. 1700, at the dedication of the new-born chief, Ka-‘Ī-i-mamao, also known as Lono-i-ka-Makahiki. Beckwith described the *pule* as:

The Hawaiian *Kumulipo* is a genealogical prayer chant linking the royal family to which it belonged not only to primary gods belonging to the whole people and worshiped in common with allied Polynesian groups, not only to deified chiefs born into the living world, the Ao, within the family line, but *to the stars in the heavens* and the plants and animals useful to life on earth, who must also be named within the chain of birth and their representatives in the spirit world thus be brought into the service of their children who live to carry on the line in the world of mankind... [Beckwith 1951:8]

Beckwith’s primary resources for the *Kumulipo*, came from the papers of King David Kalākaua, his sister, Queen Lili‘uokalani, who published the *Kumulipo* in 1897; and papers of Prince Jonah Kūhiō Kalaniana‘ole.

In her introduction to the *Kumulipo*, Queen Lili‘uokalani observed that the language was itself at times difficult to translate, “because the true signification has been lost.” (Liliuokalani, 1897). Of Hawaiian

³ In the Hawaiian mind, cultural and natural landscapes are one and the same. It was the nature of place that shaped the cultural and spiritual view of the Hawaiian people.

⁴ “Cultural Attachment” embodies the tangible and intangible values of a culture—how a people identify with, and personify the environment around them. It is the intimate relationship (developed over generations of experiences) that people of a particular culture feel for the sites, features, phenomena, and natural resources etc., that surround them—their sense of place. This attachment is deeply rooted in the beliefs, practices, cultural evolution, and identity of a people. The significance of cultural attachment in a given culture is often overlooked by others whose beliefs and values evolved under a different set of circumstances (cf. James Kent, “Cultural Attachment: Assessment of Impacts to Living Culture.” September, 1995).

practices of navigation, and knowledge of the and heavens, stars, and world around them, she also observed — “The ancient Hawaiians were astronomers, and the terms used appertained to the heavens, the stars, terrestrial science, and the gods.” (Liliuokalani, 1897).

Ka-‘Ī-i-mamao, also called Lono-i-ka-Makahiki, was the son of Keawe-i-kekahi-ali‘i-o-ka-moku and Lono-ma-‘Ī-kanaka. She noted that the Kumulipo was:

“A prayer of dedication of a chief, A *Kumulipo* for Ka-‘Ī-i-mamao and (passed on by him) to Alapai‘i-wahine (woman)...” “An ancient prayer for the dedication of the high chief Lono-i-ka-makahiki to the gods soon after his birth...” [Beckwith 1951:8]

This chant of Kumulipo is the chant recited by Pu‘ou to Lono (Captain Cook) as he stood while a sacrifice of pork was offered to him at the *heiau* of Hikiau at Kealakekua.

The priest had said at the time of Ka-‘Ī-i-mamao’s death that Lono would come again, that is, Ka-‘Ī-i-mamao, and would return by sea on the canoes ‘Auwa‘alalua.

That was why Captain Cook was called Lono... [Beckwith 1951:10]

The following excerpts of the “*He Pule Ho‘ola‘a Ali‘i He Kumulipo, No Ka-‘Ī-i-Mamao*” (A Dedication Prayer for the Chief, the Kumulipo, for Ka-‘Ī-i-Mamao) are among those that address the relationship between the stars of the heavens, the chiefly line, and earth. The entire Kumulipo, is comprised of more than 2,100 lines, with narratives describing every facet of life and nature known in the Hawaiian system:

Ka Wa Akahi

1. *O ke au i kahuli wela ka honua*
2. *O ke au i kahuli lole ka lani*
3. *O ke au i kuka‘iaka ka la.*
4. *E ho‘omalamalama i ka malama*

5. *O ke au o Makali‘i ka po*
6. *O ka walewale ho‘okumu honua ia*
7. *O ke kumu o ka lipo, i lipo ai*
8. *O ke kumu o ka Po, i po ai*
9. *O ka lipolipo, o ka lipolipo*
10. *O ka lipo o ka la, o ka lipo o ka po*

11. *Po wale ho—‘i*
12. *Hanau ka po*
13. *Hanau Kumulipo i ka po, he kane*
14. *Hanau Po‘ele i ka po, he wahine...*

[page 187]

Ka Wa Umikumamaha

1846. *Hanau o Pau-pani-akea*
1847. *O Wakea no ia, o Lehu‘ula,*
o Makulukulukalani
1848. *O ko laua hope, o kanaka ‘ope‘ope nui*
1849. *Huihui a kau io Makali‘i, pa—‘a*
1850. *Pa‘a na hoku kau i ka lewa*

The First Period

1. At the time when the earth became hot
- At the time when the heavens turned about
- At the time when the sun was darkened
- To cause the moon to shine

5. The time of the rise of the Pleiades
- The slime, this was the source of the earth
- The source of the darkness that made darkness
- The source of the night that made night
- The intense darkness, the deep darkness
10. Darkness of the sun, darkness of the night
- Nothing but night.
- The night gave birth
- Born was *Kumulipo* in the night, a male
- Born was *Po‘ele* in the night, a female...

[page 59]

The Fourteenth Period

- Born was *Pau-pani-a[wa]kea*
- This was *Wakea*; [born was] *Lehu‘ula*;
- [born was] *Makulu-kulu-the-chief*
- Their youngest, a man of great bundles
- Collected and placed with *Makali‘i*; fixed fast
1850. Fixed are the stars suspended in the sky

1851. <i>Lewa Ka'awela, lewa Kupoilaniua</i>	[There] swings ⁵ <i>Ka'awela</i> [Mercury], swings <i>Kupoilaniua</i>
1852. <i>Lewa Ha'i aku, lewa Ha'i mai</i>	<i>Ha'i</i> swings that way, <i>Ha'i</i> swings this way
1853. <i>Lewa Kaha'i, lewa Kaha'ihai</i>	<i>Kaha'i</i> swings, swings <i>Kaha'ihai</i> [in the Milky Way]
1854. <i>Lewa Kaua, ka pu'uhoku Wahilaninui</i>	Swings <i>Kaua</i> , the star cluster <i>Wahilaninui</i>
1855. <i>Lewa ka pua o ka lani,</i> <i>Kaulua-i-ha'imohai</i>	1855. Swings the flower of the heavens, <i>Kaulua-i-ha'imohai</i>
1856. <i>Lewa Puanene, ka hoku ha'i haku</i>	Puanene swings, the star that reveals a lord
1857. <i>Lewa Nu'u, lewa Kaha'ilono</i>	<i>Nu'u</i> swings, <i>Kaha'ilono</i> swings
1858. <i>Lewa Wainaku, lewa Ikap'a.</i>	<i>Wainaku</i> [patron star of Hilo] swings, swings <i>Ikap'a</i>
1859. <i>Lewa Kiki'ula, lewa Keho'oea</i>	Swings <i>Kiki'ula</i> , swings <i>Keho'oea</i>
1860. <i>Lewa Pouhanu'u, lewa Ka'ili'ula</i>	1860. <i>Pouhanu'u</i> swings, swings <i>Ka-ili'ula</i> , The-red-skinned
1861. <i>Lewa Kapakapaka, lewa Mananalo</i>	Swings <i>Kapakapaka</i> , [and the morning star] <i>Mananalo</i> [Jupiter or Venus]
1862. <i>Lewa Kona, lewa Wailea</i>	Swings <i>Kona</i> , swings <i>Wailea</i> [patron star of Maui] [page 126]
1863. <i>Lewa ke Auhaku, lewa Ka-maka-Unulau</i>	Swings the <i>Auhaku</i> , swings the Eye-of- <i>Unulau</i>
1864. <i>Lewa Hinalani, lewa Keoea</i>	Swings Hina-of-the-heavens, <i>Hina-lani</i> , swings <i>Keoea</i>
1865. <i>Lewa Ka'aka'a, lewa Polo'ula</i>	1865. <i>Ka'aka'a</i> swings, swings <i>Polo'ula</i> [star of Oahu]
1866. <i>Lewa Kanikania'ula, lewa Kauamea</i>	<i>Kanikania'ula</i> swings, <i>Kauamea</i> swings
1867. <i>Lewa Kalalani, lewa Kekepue</i>	Swings <i>Kalalani</i> [of Lanai], swings [the astrologers' star] <i>Kekepue</i>
1868. <i>Lewa Ka'alolo, lewa Kaulana-a-ka-la</i>	Swings <i>Ka'alolo</i> [of Ni'ihau], swings the Resting-place-of-the-sun [<i>Kaulana-a-ka-la</i>]
1869. <i>Lewa Hua, lewa 'Au'a</i>	<i>Hua</i> swings, <i>'Au'a</i> [Betelgeuse] swings
1870. <i>Lewa Lena, lewa Lanikuhana</i>	1870. <i>Lena</i> swings, swings <i>Lanikuhana</i>
1871. <i>Lewa Ho'oleia, lewa Makeaupe'a</i>	Swings <i>Ho'oleia</i> , swings <i>Makeaupe'a</i>
1872. <i>Lewa Kaniha'alilo, lewa 'U'u</i>	Swings <i>Kaniha'alilo</i> , swings <i>'U'u</i>
1873. <i>Lewa 'A'a, lewa 'Ololu</i>	Swings <i>Aa</i> [Sirius], swings <i>'Ololu</i>
1874. <i>Lewa Kamaio, lewa Kaulu[a]lana</i>	<i>Kamaio</i> swings, swings <i>Kaulu[a]lana</i>
1875. <i>Lewa o Ihu-ku, lewa o Ihu-moa</i>	1875. Swings Peaked-nose, swings Chicken-nose
1876. <i>Lewa o Pipa, lewa Ho'eu</i>	Swings <i>Pipa</i> , swings <i>Ho'eu</i>
1877. <i>Lewa Malana, lewa Kaka'e</i>	Swings <i>Malana</i> , swings <i>Kaka'e</i>
1878. <i>Lewa Mali'u, lewa Kaulua</i>	Swings <i>Mali'u</i> , swings <i>Kaulua</i>
1879. <i>Lewa Lanakamalama, lewa Naua</i>	<i>Lanakamalama</i> swings, <i>Naua</i> swings
1880. <i>Lewa Welo, lewa Ikiiki</i>	1880. <i>Welo</i> swings, swings <i>Ikiiki</i>
1881. <i>Lewa Ka'aona, lewa Hinaia'ele'ele</i> [page 235]	<i>Ka'aona</i> swings, swings <i>Hinaia'ele'ele</i>
1882. <i>Lewa Puanakau, lewa Le'ale'a</i>	<i>Puanakau</i> [Rigel] swings, swings <i>Le'ale'a</i>
1883. <i>Lewa Hikikauelia, lewa Ka'elo</i>	Swings <i>Hikikauelia</i> [Sirius of navigators], swings <i>Ka'elo</i>

⁵ In this context, Beckwith uniformly translated the word “*lewa*” as “swings,” which is one translation for the word; while others, depending on context might include, the sky, firmament, afloat, dangling, etc. We suggest, that a more poetic translation might be that “Afloat is *Ka'awela*, afloat is *Kupoilaniua*...” and so on with each of the references to the named stars, which appear to float in the heavens (*lewa*).

1884. <i>Lewa Kapawa, lewa Hikikaulonomeha</i>	Swings Kapawa, swings Hikikaulonomeha [Sirius of astrologers]
1885. <i>Lewa Hoku'ula, lewa Poloahilani</i>	1885. Swings <i>Hoku'ula</i> , swings <i>Poloahilani</i>
1886. <i>Lewa Ka'awela, lewa Hanakalanai</i>	Swings <i>Ka'awela</i> , swings <i>Hanakalanai</i>
1887. <i>Lewa Uliuli, lewa Melemele</i>	<i>Uliuli</i> swings, <i>Melemele</i> swings [two lands of old]
1888. <i>Lewa Makali'i, lewa Na-huihui</i>	Swings the Pleiades, <i>Makali'i</i> , swings the Cluster, <i>na Huihui</i>
1889. <i>Lewa Kokoiki, lewa Humu</i>	Swings <i>Kokoiki</i> [Kamehameha's star], swings <i>Humu</i> [Altair]
1890. <i>Lewa Moha'i, lewa Kauluokaoka</i>	1890. <i>Moha'i</i> swings, swings <i>Kaulu[a]okaoka</i>
1891. <i>Lewa Kukui, lewa Konamaukuku</i>	<i>Kukui</i> swings, swings <i>Konamaukuku</i>
1892. <i>Lewa Kamalie, lewa Kamalie-mua</i>	Swings <i>Kamalie</i> , swings <i>Kamalie</i> the first
1893. <i>Lewa Kamalie-hope</i>	Swings <i>Kamalie</i> the last
1894. <i>Lewa Hina-o-na-leilena</i>	Swings Hina-of-the-yellow-skies, <i>Hina-o-na- Leilena</i> .
1895. <i>Lewa na Hiku, lewa Hiku-kahi</i>	1895. Swing the Seven, <i>na Hiku</i> . [Big Dipper], swings the first of the Seven
1896. <i>Lewa Hiku-alua, lewa Hiku-kolu</i>	The second of the Seven, the third of the Seven
1897. <i>Lewa Hiku-aha, lewa Hiku-lima</i>	The fourth of the Seven, the fifth of the Seven
1898. <i>Lewa Hiku-ono, lewa Hiku-pau</i>	The sixth of the Seven, the last of the Seven
1899. <i>Lewa Mahapili, lewa ka Huihui</i>	Swings <i>Mahapili</i> , swings the Cluster [page 127]
1900. <i>Lewa Na Kao</i>	1900. Swing the Darts [Kao] of Orion
1901. <i>Lu ka 'ano'ano Makali'i, 'ano'ano ka Iani</i>	Sown was the seed of <i>Makali'i</i> , seed of the heavens
1902. <i>Lu ka 'ano'ano akua, he akua ka Ia</i>	Sown was the seed of the gods, the sun is a god
1903. <i>Lu ka 'ano'ano a Hina, he walewale o Lonomuku</i> [Beckwith, 1951:236]	Sown was the seed of Hina, an afterbirth of Lono-muku... [Beckwith, 1951:128]

In the *Kumulipo*, and other *mele* of creation, we find that all forms of the natural environment, from the skies and mountain peaks, to the watered valleys, plateau lands, and lava plains, and to the shoreline and ocean depths are believed to be *kinolau* (physical embodiments) of Hawaiian gods and deities.

Another Hawaiian genealogical account, records that *Wākea* (the expanse of the sky—the male) and *Papa-hānau-moku* (Papa, who gave birth to the islands—the female)—also called *Haumea-nui-hānau-wāwā* (Great Haumea, born time and time again)—and various gods and creative forces of nature, gave birth to the islands. Hawai'i, the largest of the islands, was the first-born of these island children. This birth of the islands is commemorated in various *mele ko'ihonua*, chants describing the forming of the earth. On such *mele* includes the following lines:

<i>'O Wākea Kahikoluamea ea, 'O Papa, Papa-nui-hānau-moku ka wahine; Hānau o Kahiki-kū, Kahiki-moe Hānau ke 'āpapanu'u, Hānau ke 'āpapalani, Hānau Hawai'i i ka moku makahiapo, Ke keiki makahiapo a lāua...</i>	<i>Wākea the son of Kahikoluamea, Papa, Papa-nui-hānau-moku the wife Kahiki-kū and Kahiki-moe were born The upper stratum was born, The uppermost stratum was born, Hawai'i was born, the first-born of the islands, The first born child of the two... (S.M. Kamakau 1991:126)</i>

As the Hawaiian genealogical account continues, we find that these same god-beings, or creative forces of nature who gave birth to the islands, were also the parents of the first man (Hāloa), and from this ancestor all Hawaiian people are descended (cf. David Malo, 1951; Beckwith, 1951 & 1970; Pukui and Korn, 1973). It was in this context of kinship, that the ancient Hawaiians addressed their environment, and it is the basis of the Hawaiian system of land use. Importantly, in these genealogical accounts, we find too, that Mauna Kea is referred to as “*Ka Mauna a Kea*” (Wākea’s Mountain), and it is likened to the first-born of the island of Hawai’i (cf. Pukui and Korn 1973).

A *mele hānau* (birth chant) for Kauikeaouli (Kamehameha III), who was born in 1814, describes the chiefly lineage in the context of creation and genealogy spanning—the heavens; placing the sun above; the spirit realms and physical earth—land and ocean forms; the birth of the island of Hawai’i; and subsequent birth of Mauna Kea, as the son of Wākea. Excerpts from the *mele*, published in several issues of the *Nupepa Kuokoa*, in 1866, follow below:

Nupepa Kuokoa

March 24, 1866:4

No Kalani “Kauikeaouli Kamehameha III.”

*O hanau ka po ia luna,
Hanau ka po i luna nei,
O lani haneē ka po o pinai ke ewe,*

*O pipili ka po o moe anaana le’a,
O koho ana le’a ka po o Mahinale’a,*

O huli e ka po o kaawale ka pili,

O ke keiki po lani keia a “Kea,” i hanau,

Keiki akahi a ka po keiki alua a ka po,

*Keiki akolu a ka po,
O ke kuakoko o ka po,
E hanau mai auanei ka po,
Oia hoi, o ka Po, hanau ka po,
O ka po la hoi auanei ko luna nei la,
Owai la hoi auanei ko lalo?*

Na Aua.

*O hanau ka Moku a kupu,
A lau, a loa, a ao, a muo a liko.*

*Ka moku ia luna o Hawaii.
O Hawaii nei no ka moku.
He pulewa ka aina he naka Hawaii,
E lewa wale ana no i ka lani lewa.
Hanoa mai e Wakea pa hano ia.*

*Malia ikeā ka moku me ka honua,
Paa ia Lewaalani i ka lima akau o Wakea.*

Paa Hawaii, a laa Hawaii la ikeā he moku.

O ka moku la hoi auanei kolalo nei la,

For the Chief,

“Kauikeaouli Kamehameha III.”

Born was the night above,
Born was the night up here.
The heavens slid away into the night,
swift came the afterbirth.
The nights came closer together,
stretching along until came a separation
Making distinct the night of Mahinale’a
The night turned, closeness became
separated.

This is the royal offspring of night
borne by Kea,
First child of the night, second child of
the night,
Third child of the night.
The night lay in travail,
To give birth to the night.
He is in the night, the night newly born,
So it is the night that is there above,
Who then is below?

By Aua.

Born was the island, it grew,
And sprouted, it flourished, rooted
deeply, budded, formed tender leaves.
That was the island over Hawaii.
Hawaii itself was an island.
The land was unstable, Hawaii quivered,
Moving freely about in space.
Wakea recognized the island, recognized,
it remained.
Visible were island and earth,
Held in heavenly space by the right hand
of Wakea.
Hawaii was held, Hawaii was seen,
an island.
Down here shall be the island,

Owai la hoi auanei ko luna, owai la?
O ke Ao! Aia, aia hoi ha.

Na Hauna.

O hanau ke Ao, o hiki ae.
O ohi ae ke ao o hiki ae
O mukupawa ke ao o hiki ae,

O aka ula ke ao o hiki ae,

O moakaka ku ke ao mala'e,

O opukupuku ke ao melemele,
O memele ka opua he la-i,

O opua nui, uli ka opua hiwahiwa,
O hiwahiwa ka opua lani ele,
Eleele ka lani huhulu weo,
Lani ekaeka ha eleele,

Hakona, hakuma, hakumakuma.
O ke ao nui mai hee ua keia,
E hoowiliwili mai ana e hanau,
Oia hoi, o ke Ao, hanau ke ao,
O ke ao la hoi auanei ko luna nei la,
Owai la auanei ko lalo la?
Owai la, o ka Mauna aia, aia hoi ha.

Na Piopio.

O hanau ka mauna a Kea,
Opuu ae ka mauna a Kea.
O Wakea ke kane,
O Papa o Walinuu ka wahine,
Hanau Hoohoku he wahine,
Hanau Haloa he alii,
Hanau ka mauna he keiki mauna na Kea,

O ka lili o Wakea o ka hai i ka hala.
O ke ku kuku laau ana me Kane,
I hoouka ai i iloko o Kahikiku,
Hee Wakea kalewa kona ohua,

Kuamu ia e Kane, kuawa ia e Kane,

Hoi mai Wakea a loko o lani momo-e,
Moe Wakea moe ia Papa,
Hanau ka la na Wakea,
He keiki kapu na Wakea,
O ka uluna o Wakea na Kea no,
Hanau ka mauna he makahiapo kapu na Kea.

Who shall be above, who?
The cloud! That is who is shall be.

By Hauna.

The cloud was born, it rose and appeared.
The cloud thrived, it rose and appeared.
The cloud came at dawn, it rose and appeared.

The cloud flushed with a reddish tinge,
it rose and appeared.

The cloud rose and appeared in clearest
configuration,

Turned yellow and menacing.

The horizon cloud hung yellow over a
calm sea.

A swelling cloud, a dark cloud,
A cloud whose deepening darkness

Turned to black, a sky already black

In with feathery clouds of dusk,

A sky heavy with blackness, rough,
lowering,

A sky speaking in threat.

A vast cloud foretelling the approach of rain.

The sky writhed in labor to give birth.

He is the Cloud. Thus the cloud was born.

A cloud shall be up there.

Who shall be below?

Who, it shall be the Mountain there indeed.

By Piopio.

Born of Kea was the mountain (mauna).

The mauna of Kea budded forth.

Wakea was the husband,

Papa Walinuu was the wife.

Born was Hoohoku, a daughter,

Born was Haloa, a chief,

Born was the mountain, a mountain-son
of Kea.

Jealous was Wakea, he revealed his fault,

Told of his smiting Kane with a club,

In battle, fought at Kahikiku.

Wakea was routed, fled in confusion
with his family.

None spoke to Wakea save in whispers,
but Kane shouted.

Wakea returned to the sky seeking a wife.

Wakea mated with Papa,

The sun was born to Wakea,

A sacred off-shoot of Wakea,

The growth of Wakea was Wakea's own.

The mountain was born, the sacred first-
born of Kea.

Oia hoi ha, o ka mauna. Hanau ka mauna,

*O ka mauna auanei ko lalo nei la,
Owai la auanei ko luna la?
Owai la? O ka la, aia, aia hoi ha.*

Na Hehena.

So it is, the mountain. The mountain
was born.

The mountain shall be down here.
Who shall be above?

Who? The sun, that is who it is.

By Hehena. [cf. Pukui and Korn 1973:13-28]

Through such narratives as those above, we begin to perceive that in the traditional-cultural context, natural resources—such as the stars in the heavens, the *pu'u* (hills) and rock outcrops, a pool of water, the *mea kolokolo* (insects), the *hau* (snow and dew), a forest grove, the *moa uakea a Kāne* and *lilinoe* (white rains of Kāne and thick mists of *Lilinoe*), an ocean current, a mountain, and even the sunrise-tinted snows of Mauna Kea (Kūkahau'ula)—are valued as cultural properties by the Hawaiian people. It is this “cultural attachment” to the natural world and heavens above that defines and shapes the beliefs, traditional cultural properties, and cultural practices of Hawaiians.

Nā Wao—Traditional Regions and Elevational Zones on the Mountain Lands

Several early descriptions of the lands of Humu'ula and Ka'ōhe, describe them as sharing the summit region of Mauna Kea (see Wiltse, Register Map No. 668, and Boundary Commission testimonies in this study). While final settlement of the boundaries of Humu'ula and Ka'ōhe, in 1891, took Humu'ula down to around the 9,300 foot elevation, the land rests on Mauna Kea, and with Ka'ōhe, extends to the summit of Mauna Loa. They are among the largest *ahupua'a* in the Hawaiian Islands.

In any discussion of Hawaiian land—*'āina*, that which sustains the people—and its place in culture, it is also appropriate to briefly discuss traditional Hawaiian land terms, as the terms demonstrate an intimate knowledge of the environment about them. We observe once again, that in the Hawaiian mind, all aspects of natural and cultural resources are interrelated. All are culturally significant. Thus, when speaking of Mauna Kea—the first born child of Hawai'i, abode of the gods—it's integrity and sense of place depends on the well-being of the whole entity, not only a part of it.

As introduced in the above narratives, and further recorded throughout this study in native testimonies and historical accounts, readers are provided with documentation of the detailed knowledge that Hawaiians had of the *'āina mauna*. Native accounts and other historical writings record that the vast regional land divisions of Humu'ula and Ka'ōhe, and the smaller *ahupua'a* and *'ili* which adjoin them on the lower mountain slopes, included a wide range of named environmental zones (*wao*). Each of these *wao* were noted for resources—extending from the sea to the forested lands, and in some instances, to the summits of the two mountains. It was these resources that sustained Hawaiian life, culture and spirituality.

Hawaiian customs and practices demonstrate the belief that all portions of the land and environment are related. Indeed, just as place names tell us that areas are of cultural importance, so too, the occurrence of a Hawaiian nomenclature for the *wao* tells us that there was an intimate relationship between Hawaiians and their environment. Writing in 1869, in his history of Hawai'i, Samuel Kamakau described the various regions and divisions of land. Of the mountains Kamakau observed:

...Here are some other divisions of the islands, together with their descriptive names.

Heights in the center or toward the side of a land, or island, are called *mauna*, mountains, or *kuahiwi*, “ridge backs.” The highest places, which cover over with fog and have great “flanks” behind and in front (*kaha kua, kaha alo*)—like **Mauna Kea**—are called *mauna*; the place below the summit, above where the forests grow is the *kuahiwi*. The peak of the mountain is called *pane po'o* or *piko*; if there is a sharp point on the peak it is called *pu'u*

pane po'o; if there is no hill, *pu'u*, and the peak of the mountain spreads out like the roof of a house, the mountain is described as a *kauhuhu mauna* (house ridgepole mountain); and if there is a precipitous descent, *kaolo* [from the peak] to the *kauhuhu mauna* below this is called a *kualo* ("block"). If there are deep ravines (*'alu ha'aha'a*) in the sides of the mountain it is called a *kihi po'ohiwi mauna* ("shoulder edge" mountain). A place that slopes down gradually (*hamo iho ana*) is called a *ho'oku'u* (a "letting down"); a sheer place is called a *pali lele koa'e* (cliff where *koa'e* birds soar), or a *holo* ("slide"), or a *waihi* (a "flowing down"). Rounded ridges that extend from the mountains or "ridge backs" or hills are called *lapa* or *kualapa* or *mo'o*—and, if they are large, *'olapalapa* or *'omo'omo'o*. Depressions between *lapa* or *mo'o* are *awawa*, valleys.

MOUNTAIN ZONES

Here are some names for [the zones of] the mountains—the *mauna* or *kuahiwi*. A mountain is called a *kuahiwi*, but *mauna* is the overall term for the whole mountain, and there are many names applied to one, according to its delineations (*'ano*). The part directly in back and in front of the summit proper is called the *kuamauna*, mountaintop; below the *kuamauna* is the *kuahea*, and *makai* of the *kuahea* is the *kuahiwi* proper. This is where small trees begin to grow; it is the *wao nahele*. *Makai* of this region the trees are tall, and this is the *wao lipo*. *Makai* of the *wao lipo* is the *wao 'eiwa*, and *makai* of that the *wao ma'ukele*. *Makai* of the *wao ma'ukele* is the *wao akua*, and *makai* of there the *wao kanaka*, the area that people cultivate. *Makai* of the *wao kanaka* is the *'ama'u*, fern belt, and *makai* of the *'ama'u* the *'apa'a*, grasslands.

A solitary group of trees is a *moku la'au* (a "stand" of trees) or an *ulu la'au*, grove. Thickets that extend to the *kuahiwi* are *ulunahale*, wild growth. An area where *koa* trees suitable for canoes (*koa wa'a*) grow is a *wao koa* and *mauka* of there is a *wao la'au*, timber land. These are dry forest growths from the *'apa'a* up to the *kuahiwi*. The places that are "spongy" (*naele*) are found in the *wao ma'ukele*, the wet forest.

Makai of the *'apa'a* are the *pahe'e* [*pili* grass] and *'ilima* growths and *makai* of them the *kula*, open country, and the *'apoho* hollows near to the habitations of men. Then comes the *kahakai*, coast, the *kahaone*, sandy beach, and the *kalawa*, the curve of the seashore—right down to the *'ae kai*, the water's edge.

That is the way *ka po'e kahiko* named the land from mountain peak to sea. [S.M. Kamakau (in *Ke Au Okoa*, November 4-11, 1869; Kamakau, 1976:8-9)]

The native tradition of Ka-Miki, penned by native historians, John Wise, Isaac Kihe and a group of their associates (in *Ka Hoku o Hawaii*, 1914-1917), provides readers with a detailed account of Hawaiian land divisions and environmental zones. While competing in a riddling contest at the court of the chief, Palikū-a-Kiko'oko'o, the hero, Ka-Miki sparred with Pīna'au, the foremost riddler of the district of Hilo Palikū (northern Hilo). The riddles covered topics describing regions from the mountain tips to the depths of the ocean, and descriptions of *kalo* (taro growth), the *ala loa* (trail systems), and *nā mea lawai'a* (fishing practices). As the contest unfolded, it was seen that each of the competitors were well matched. In one of the riddles, Ka-Miki described the various regions of the island of Hawai'i, extending from the mountain to the sea. Ka-Miki then told his opponent, that if he could rise to the challenge of answering the riddle, his knowledge could be compared to one who has ascended to the summit of Mauna Kea, described as the "***mauna o Poliahu***" (mountain of Poli'ahu) (in *Ka Hoku o Hawaii*, September 21, 1916).

Through one of the riddles, readers learn about the traditional *wao* of land, districts, and land divisions of the administrators who kept peace upon the land (diacritical marks and numbers have been added to these texts to facilitate correlation between Hawaiian and English narratives). The environmental zones include:

1—*Ke kuahiwi*; 2—*Ke kualono*; 3—*Ke kuamauna*; 4—*Ke ku(a)hea*; 5—*Ke kaolo*; 6—*Kawao*; 7—*Ka wao ma'u keke*; 8—*Ka wao keke*; 9—*Ka wao akua*; 10—*Ka wao lā'au*; 11—*Ka wao kākāka*; 12—*Ka 'ama'u*; 13—*Ka 'āpa'a*; 14—*Ka pahe'e*; 15—*Ke kula*; 16—*Ka 'ilima*; 17—*Ka pu'eone*; 18—*Ka po'ina nalu*; 19—*Ke kai kohola*; 20—*Ke kai 'ele*; 21—*Ke kai uli*; 22—*Ke kai pualena*; 23—*Kai pōpolohua-a-Kāne-i-Tahiti*.

1—The mountain; 2—The region near the mountain top; 3—The mountain top; 4—The misty ridge; 5—The trail ways; 6—The inland regions; 7 and 8— The rain belt regions; 9— The distant area inhabited by gods; 10—The forested region; 11—The region of people below; 12—The place of *'ama'u* [fern upland agricultural zone]; 13— The arid plains; 14—The place of wet land planting; 15—The plain or open country; 16—The place of *'ilima* growth [a seaward, and generally arid section of the *kula*]; 17—The dunes; 18—The place covered by waves [shoreline]; 19—The shallow sea [shoreline reef flats]; 20—The dark sea; 21—The deep blue-green sea; 22—The yellow [sun reflecting— sea on the horizon]; and 23—The deep purplish black sea of Kāne at Tahiti. (*Ka Hoku o Hawaii*, September 21, 1916; Maly, translator)

The *kuahiwi*, *kualono*, *kuamauna*, *kuahea*, *kaolo*, *kawao*, *wao ma'ukele*, *waokele*, *wao akua*, *wao lā'au*, and *wao kākāka*, are all considered part of Mauna Kea (Figure 2). These wao extend from the mountain peaks, down slope through the *wao akua*—the region where the clouds settle upon the mountain lands, concealing the presence of the gods—to the lower region frequented by mankind, and from where resources were regularly collected and tended.

Ahupua'a—Nā Kuleana a me nā Pono

In the generations that followed initial settlement, the Hawaiians developed a sophisticated system of land use and resource management. By the time 'Umi-a-Līloa rose to rule the island of Hawai'i in ca. 1525, the island (*moku-puni*) was divided into six districts or *moku-o-loko* (cf. Kamakau, 1961; and Fornander 1973—Vol. II:100-102). Hilo, extending from the sea to the mountain slopes of Mauna Kea, and on to the summit of Mauna Loa—through the land division of Humu'ula—is one of those six major districts. The land division of Ka'ohe in the district of Hāmākua, another of the six major districts on the island of Hawai'i, shares a common boundary with Humu'ula, running across Mauna Kea, and up to the summit of Mauna Loa.

The large districts (*moku-o-loko*) like Hilo, and sub-regions (*'okana* and *kalana*) were further divided into manageable units of land. These smaller divisions or units of land were tended to by the *maka'āinana* (people of the land) (see Malo 1951:63-67). Of all the land divisions, perhaps the most significant management unit throughout the islands was the *ahupua'a*. *Ahupua'a* are subdivisions of land that were usually marked by an altar with an image or representation of a pig placed upon it (thus the name *ahu-pua'a* or pig-altar). In their configuration, the *ahupua'a* may be compared to wedge-shaped pieces of land that radiate out from the center of the island, extending to the ocean fisheries fronting the land unit. Their boundaries are generally defined by topography and geological features such as *pu'u* (hills), ridges, gullies, valleys, craters, or areas of a particular vegetation growth (see Boundary Commission Testimonies, 1865-1891; and C. Lyons, 1875, in this study).

The *ahupua'a* were also divided into smaller manageable parcels of land—such as the *'ili*, *kō'ele*, *mahina 'ai*, *māla*, and *kīhāpai*—that generally run in a *mauka-makai* orientation, and are often marked by stone wall (boundary) alignments. In these smaller land parcels the native tenants cultivated crops necessary to sustain their families, and supplied the needs of the chiefly communities they were associated with. As long as sufficient tribute was offered and *kapu* (restrictions) were observed, the common people who lived in a given *ahupua'a* had access to most of the resources from mountain slopes to the ocean, needed to sustain life and culture. These access rights (*pono*) were almost uniformly tied to residency on a particular land, and earned as a result of taking responsibility (*kuleana*) for stewardship of the natural environment, and supplying the needs of ones' *ali'i* (see Malo 1951:63-67 and Kamakau 1961:372-377).



Figure 2. Nā Wao–Kuahiwi, Kualono, Kua Mauna, Kuahea o Mauna Kea (The Mountain Regions of Mauna Kea, with Waiau and the Head of Pōhakuloa Gulch in the Foreground), (National Archives and Records Administration, B-2897-11th Photo Section, January 26, 1925)

Entire *ahupuaʻa*, or portions of the land were generally under the jurisdiction of appointed *Konohiki* or subordinate chief-landlords, who answered to an *aliʻi-ʻai-ahupuaʻa* (chief who controlled the *ahupuaʻa* resources). The *aliʻi-ʻai-ahupuaʻa* in turn, answered to an *aliʻi ʻai moku* (chief who claimed the abundance of the entire district). Thus, *ahupuaʻa* resources supported not only the *makaʻāinana* and *ʻohana* who lived on the land, but also contributed to the support of the royal community of regional and island kingdoms. In the Hilo District, the primary chiefly center, extended from the lowlands of Pīihonua to the shore of Waiākea. In Hāmākua, the chiefly center was focused around Waipiʻo, while in South Kohala, the center was in the Waimea section, the *ʻili* of Puʻukapu and Puʻukalani.

In 1875, Curtis J. Lyons, son of Reverend Lorenzo Lyons, of Waimea, one of the foremost surveyors of the Hawaiian Kingdom, authored a paper on “Hawaiian Land Matters” (Lyons 1875). In his discussion, he provided readers with important references to the rights of native tenants on the *ahupuaʻa* of Humuʻula and Kaʻohe. He also discusses their relationship with the neighboring mountain lands on the slopes of Mauna Kea:

The ordinary *ahupuaa* extends from half a mile to a mile into this [forest] belt. Then there are larger *ahupuaas* which are wider in the open country than others, and on entering the woods expand laterally so as to cut off all the smaller ones, and extend toward the mountain till they emerge to the open interior country; not however to converge to a point at the tops of the respective mountains. Only a rare few reach those elevations, sweeping

past the upper ends of all the others, and by virtue of some privilege in bird-catching, or some analogous right, taking the whole mountain to themselves... The whole main body of **Mauna Kea** belongs to one land from Hamakua, viz., **Kaohe**, to whose owners belonged the sole privilege of capturing the *ua'u*, a mountain-inhabiting but sea-fishing bird. High up on its eastern flank, however, stretched the already mentioned land of **Humuula**, whose upper limits coincide with those of the *mamane*, a valuable mountain *acasia*, and which starting from the shore near **Laupahoehoe**, extends across the upper ends of all other Hilo lands to the crater of Mokuaweoweo... [Lyons 1875:111 (emphasis added)]

Sequence of Hawaiian Settlement

Archaeologists and historians describe the inhabiting of these islands in the context of settlement which resulted from voyages taken across the open ocean. For many years archaeologists have proposed that early Polynesian settlement voyages between Kahiki (the ancestral homelands of the Hawaiian gods and people) and Hawai'i were underway by AD 300, with long distance voyages occurring fairly regularly through at least the thirteenth century. It has been generally reported that the sources of the early Hawaiian population—the Hawaiian Kahiki—were the Marquesas and Society Islands (Emory in Tatar 1982:16-18).

For generations following initial settlement, communities were clustered along the watered, windward (*ko'olau*) shores of the Hawaiian Islands. Along the *ko'olau* shores, streams flowed, rainfall was abundant, and agricultural production became established. The *ko'olau* region also offered sheltered bays from which deep sea fisheries could be easily accessed. Also, near-shore fisheries, enriched by nutrients carried in the fresh water running from the mountain streams, could be maintained in fishponds and coastal fisheries. It was around these bays such as at Hilo, that clusters of houses where families lived could be found (see McEldowney 1979). In these early times, the residents generally engaged in subsistence practices in the forms of agriculture and fishing (Handy, Handy and Pukui, 1972:287).

Over a period of several centuries, areas with the richest natural resources became populated and perhaps crowded, and by ca. 900 to 1100 AD, the population began expanding to the Kona (leeward side) and more remote regions of the island (Cordy 2000:130). Kirch (1979) reported that by ca. AD 1200, there were small coastal settlements at various areas along the western shore line of Hawai'i (Kirch 1979:198). In this system of settlement and residency, the near-shore communities shared extended familial relations with those of the uplands.

By the 1400s, upland regions to around the 3,000 foot elevation were being developed into areas of residence and a system of agricultural fields. By the 1500s to 1600s, residency in the uplands was becoming permanent, and there was an increasing separation of royal class from commoners. During the latter part of this period, the population stabilized and a system of land management was established as a political and socio-economic factor (see Kamakau 1961; Ellis 1963; Handy, Handy & Pukui 1972; Tomonari-Tuggle 1985; and Cordy 2000).

The lowlands of Ka'ohe, Humu'ula and the other neighboring *ahupua'a*, extending from the shore to around the 3,000 foot elevation, supported residential, agricultural, and subsistence activities, spanning the centuries of Hawaiian residency. The upper mountain lands of the Ka'ohe-Humu'ula region were frequented by travelers, collectors of natural resources, and for a wide range of cultural practices (see Kamakau, 1961; and Boundary Commission Testimonies, 1865 to 1891, in this study).

Traditions and historical records tell us that the deification and personification of the land and natural resources, and the practices of district subdividing and land use as described above, were integral to Hawaiian life, and were the product of strictly adhered to resource management planning. In this system, the people learned to live within the wealth and limitations of their natural environment, and were able to sustain themselves on the land and ocean. It is in this cultural system that we can understand the significance of the lands of Ka'ohe, Humu'ula and the neighboring *'āina mauna*.

Historical Overview of

Land Use Practices and Travel on the ‘Āina Mauna

The land of Humu‘ula—extending from sea level to the 9,000 foot elevation on Mauna Kea, and above the 13,000 foot elevation on Mauna Loa—is apparently named for a type of stone (Red jasper stone) that was used in making *ko‘i* (adze). The place name of Ka‘ohe—a land area extending from sea level to the summits of Mauna Kea and Mauna Loa—may be literally translated as “The-bamboo” or named for a type of *kalo* (taro) that may have been common in the region (cf. Pukui, et al. 1974).

Native Hawaiian traditions and historical accounts describe the lands of Humu‘ula and Ka‘ohe—those areas extending from shore to around the 6,000 foot elevation—as having once been covered with dense forests, and frequented by native practitioners who gathered forest-plant resources, birds, and food. The larger *‘āina mauna* were frequented by individuals who were traveling to the upper regions of Mauna Kea to worship, gather stone, bury family members, or deposit the *piko* (umbilical cords of new-born children) in sacred and safe areas; and by those who were crossing from one region of the island to another.

As early as the 1820s, introduced cattle, sheep, goats, and wild dogs had made their way up to the mountain lands, and were bothersome to those who traveled the *‘āina mauna*. In 1834, Scottish naturalist, David Douglas was gored and killed by a wild bullock near the boundary of Humu‘ula and Laupāhoehoe. By 1850, the natural-cultural landscape of the *‘āina mauna* was being significantly altered by the roving herds of wild bullocks, sheep and other ungulates, and ranching interests were being formalized in the region. By 1857, the Crown and Government mountain lands—including Humu‘ula and Ka‘ohe—were leased to Francis Spencer and the Waimea Grazing and Agricultural Company, which established ranching stations and operations around the mountain lands. As a result, the *‘āina mauna* have been intensively ranched for more than 150 years.

Humu‘ula

Because hunting, and subsequently ranching of bullocks, cattle and sheep was the primary activity on the mountain lands of Humu‘ula, areas once forested, soon became open pasture land. While the first formal lease of Humu‘ula was issued in 1857 (Keoni Ana to F. Spencer), it was interests of the Parker Ranch that held the longest lease on the Humu‘ula mountain lands. The lease, from 1900 to 2002, covered the area extending around Mauna Kea to the ‘Āina Hou-Pu‘u Huluhulu vicinity. The Parker Ranch interests initially focused on sheep ranching in the Humu‘ula-Kalai‘eha section, but in 1964, the ranch terminated its sheep program. Cattle operations were maintained until the end of the Parker lease in August, 2002.

Today, limited ranching of cattle is continued on Humu‘ula, under a permit by the Department of Hawaiian Home Lands, and leases from the State of Hawai‘i. Also, some 6,000 acres between Pu‘u ‘Ō‘ō and Pu‘uloa, have succumb to an infestation of the introduced gorse (first recorded on the land in 1892), which has had little maintenance since ca. 1980.

Ka‘ohe

Early leases of the Ka‘ohe mountain lands date back to 1857 (Keoni Ana to F. Spencer), and the operations of Francis Spencer’s Waimea Grazing and Agricultural Company. The lease took in all of the mountain lands, to the summit of Mauna Kea, across Ka‘ohe to its Mauna Loa boundary. Activities were all tied to sheep and cattle ranching. Subsequently, in 1870, the lease was acquired by Parker Ranch, which held most of the Ka‘ohe mountain lands until their removal from the lease in 1905 for the Mauna Kea Forest Reserve, and later withdrawals as a part of the Pōhakuloa Military installation in 1956 (Governor’s Executive Order No. 1719; and Presidential Executive Order No. 1167). Portions of the land of Ka‘ohe, generally those on the northern (Waimea) side of Mauna Kea, are still grazed by Parker Ranch. The lands of Ka‘ohe V (the Pōhakuloa section), were turned over to the United States Army, and have been used for military training operations since that time.

The summit of Mauna Kea, situated in the *ahupua'a* of Ka'ōhe, was noted as a site of importance for modern astronomical observations by the Pendulum Party of 1892. In 1964, the first modern observatory was built on top of Pu'u Poli'ahu. By 1968, the scientific community recognized the value of Mauna Kea as a setting for development of multiple observatories, and in 1967, the University of Hawaii Institute for Astronomy was founded. In 1968, the Board of Land and Natural Resources leased the entire summit of Mauna Kea to the Institute by Lease No. S-4191.

Na 'Āina e pili 'ana iā Mauna Kea

All other lands lying on the slopes of Mauna Kea—those belonging to the districts of Hilo, Hāmākua and Kohala—generally extended through the forests, where they are cut off by the traditional boundaries of Ka'ōhe and Humu'ula. From the middle 1800s, those lands such as Waiākea, Pi'ihonua, Pāpā'ikou, Laupāhoehoe, 'O'ōkala, Ka'ala, Kūka'iau, Pā'auhau, and Waikōloa, were either held in fee-simple interest or leased out by the Crown and Government, for development of lumber collection, bullock hunting, cattle and sheep grazing, and in the elevations below approximately the 2,000 foot level, to development of sugar plantations.

In the early 1900s, forest lands below Humu'ula and Ka'ōhe, and the Mauna Kea mountain lands from approximately the 9,000 foot elevation to the summit, were turned over to preservation in the form of forest reserves. The primary interest in the development of the reserves was the protection of water sheds to ensure that plantations would have access to water, necessary for the cultivation, harvesting, and processing of sugar. Interest in, and the value of Hawaiian forests and watersheds has since evolved as a greater awareness of the unique and fragile ecosystems of the Hawaiian mountain lands has been developed.

Na Ala Hele o ka 'Āina Mauna

Travel across the *'āina mauna* is documented in native traditions, which describe *ala hele* (trails) passing from the coastal lowlands through the forest lands; along the edge of the forests; across the plateau lands of the Pōhakuloa-Ka'ōhe region, and to the summit of Mauna Kea. These *ala hele* approached Mauna Kea from Hilo, Hāmākua, Kohala, Kona, and Ka'ū, five of the major districts on the island. Only Puna, which is cut off from direct access to the mountain lands, apparently did not have a direct trail to the *'āina mauna*. Thus, people traveling to Mauna Kea from Puna traveled through the lands of Waiākea, Hilo or Keauhou, Ka'ū to reach Humu'ula and the slopes of Mauna Kea.

By the early 1820s, foreign visitors, in the company of native guides, began making trips across the *'āina mauna* and to the summit of Mauna Kea. Based on their accounts, travel in the region through the middle 1800s basically followed the old trails, or cut across new areas—a result of dense forest growth, and new lava flows covering older routes. By the 1850s, the Kingdom of Hawai'i entered into a program of improving ancient trails and identifying new routes, by which to improve travel between various locations and facilitate commerce. The earliest recorded improvements, describing work government on a trail around Mauna Kea, document work on the Waimea-Kula'imano trail (cutting across the lands of Ka'ōhe, Hāmākua and Hilo), running above the forest line and to the coast of Hilo, date from 1854, when the Waimea-Kula'imano route was improved to accommodate wagon travel.

In the later 1850s, as leases were given out for the lands of Humu'ula and Ka'ōhe, and the sheep and bullock hunting interests grew, the 1854 route was maintained, and the upper trail between Kula'imano-Makahalanaloa, was improved to the Kalai'eha vicinity. In 1862, the Kingdom again initiated a program to improve the government roads across the *'āina mauna*. Two routes were proposed, one between Hilo and Waimea via Kalai'eha, and the second to improve on the trail from Kalai'eha towards Kula'imano-Makahalanaloa, and around through Hanaipoe-Mānā and Waimea. These trails, termed *Alanui Aupuni*, were appropriated and work completed by the late 1860s. The routes appear on island maps through 1901, with subsequent designations as trails on later maps.

Several ancient trails approached the summit of Mauna Kea, and were used by *maka'āinana* through the 1920s. Most of these trails were accessed via the improved government roads around the

mountain. Primary approaches included, but were not limited to the Kalai'eha-Wai'au Trail, the 'Umikoa-Ka'ula Trail, and the Kemole-Pu'u Nanahu Trail. Historical accounts and oral history interviews record that these trails provided travelers with access to various sites, including areas where rituals and practices were observed, and that the trails converged at Wai'au. At Wai'au, travelers found a sheltered area and water for their use while on the mountain. Those who were traveling to the summit of Mauna Kea, or to other locations in the summit region then followed smaller trails that provided them with the access necessary for their purposes.

By the early 1870s, the ancient trail between Kalai'eha and the summit of Mauna Kea, was improved into a horse trail by the Spencers, lessees of the Mauna Kea mountain lands. Other routes, accessing outlying ranching stations, such as at Pu'u 'O'o and Puakala (Pua'akala), Lahohinu, and Hānaipoe had also been improved by lessees, with routes running around the mountain, and down to Hilo or out to Waimea. In the leases of the Crown Lands and Government Lands, it was specified that improvements, including trails, reverted to the Crown or Government upon termination of the leases. Until the late 1940s, early 1950s, these trails and government roads were primarily used by lessees for transportation of goods—and cared for by the lessees. There are also numerous accounts by visitors to the *'āina mauna* document travel in the region. By the late 1890s, the Kohala road supervisor, reported that while the mountain roads belonged to the government, they were all but private by the nature of their use.

Between the 1930s to 1940s, improvements were made to the Kalai'eha-Waipunalei section of the road to Waimea as a part of the Civilian Conservation Corps (CCC) and Territorial Forestry programs, with work also being done by the Parker Ranch. Likewise, the Kalai'eha-Waiki'i route was maintained by the ranch, and improved by the United States Army-U.S.E.D., in 1942.

Apparently little work was done on the Kalai'eha-Hilo section of the road (trail), after the 1870s. The trail was accessed by ranchers, with routes diverging to Kalai'eha and Pu'u 'O'o, as described in survey records, journals, and *kama'āina* testimonies. It was also periodically used by visitors to the mountain lands, usually those who were traveling to view Mauna Loa lava flows, or to make the ascent of Mauna Kea. It was not until 1942, that the route was modified as a vehicular road in what became the Saddle Road, following in areas, the native trail and historic route, while also cutting across new lands in other locations. The "Saddle Road" was formally turned over to the Territory in 1947, following which time the general public was then given an opportunity to travel to the mountain lands unhindered.

In 1963, interest in Mauna Kea as a site for a telescope, manifested itself. Hawai'i based scientists, Walter Steiger (with the University of Hawai'i) and Howard Ellis (with the National Weather Service's Mauna Loa Weather Station) facilitated trips by Dr. Gerard Kuiper and Alika Herring (both, associated with the University of Arizona and NASA) to the summits of Mauna Loa and Mauna Kea. The Mauna Kea route basically followed the old foot trail from Kalai'eha, past Kalepeamoā, Keonehe'ehe'e, and up to the summit. Over the years, the old trail was modified for horses and pack animals, and after World War II, for the occasional four-wheel drive vehicles that ascended the mountain. In 1964, Pu'u Poli'ahu on Mauna Kea had been chosen as the site for the first telescope, and state funds were released for grading a road to Pu'u Poli'ahu, to facilitate construction and access by the scientists. Since 1964, the primary route of access up the mountain slopes has remained generally the same, though as additional development in the summit region has occurred, new accesses and realignments of the earlier route have occurred.

Historical accounts cited in various sections of this study, provide readers with detailed descriptions of the histories summarized above.

NATIVE HAWAIIAN TRADITIONS AND HISTORICAL NARRATIVES OF KA'OHE, HUMU'ULA AND THE 'ĀINA MAUNA

In Hawaiian *mo'olelo* (traditions and historical narratives) are found expressions of native beliefs, customs, practices, and history. Indeed, in Hawai'i the very landscape is storied (*wahi pana*). Each place name is associated with a tradition—names might describe the presence and interactions of the gods with people, or document events, or the characteristics of a given place. Unfortunately, today, many of those *mo'olelo* have been lost, though some still remain, and from them we are able to glimpse into the history of the lands and people of the *'āina mauna*.

This section of the study presents readers with a collection of narratives written by native Hawaiian authors and nineteenth century historians, recording history, the occurrence of events and travel, and traditions of place names, that have survived the passing of time. Several of the *mo'olelo* were translated here from the original Hawaiian by Maly; selected place names and events are emphasized by use of bold face (as in place names), and by italics. The accounts date back to the period of antiquity to the first hand accounts of those who traveled the *'āina mauna* in historic times, and were found in accounts written between 1794 to 1940. The narratives are presented in four sections — I. *Mo'olelo 'Āina: Native Traditions of the Land*; II. *Ka 'Oihana Kilokilo Hōkū: Native Knowledge of the Stars and Navigation*; III. *Historical Accounts of the 'Āina Mauna Recorded by Visitors and Foreign Residents (1778-1899)*; and IV. *Historical Accounts of the 'Āina Mauna Recorded After 1900*.

I. Mo'olelo 'Āina: Native Traditions of the Land

Among the most significant sources of native *mo'olelo* are the Hawaiian language newspapers which were printed between 1838 to 1948, and the early writings of foreign visitors and residents. Most of the accounts that were submitted to the papers were penned by native residents of areas being described and noted native historians. Over the last 30 years, the author has reviewed and compiled an extensive index of articles published in the Hawaiian language newspapers, with particular emphasis on those narratives pertaining to lands, customs, and traditions. Several traditions naming places on Humu'ula, Ka'ohe, and the neighboring mountain lands, have been located in these early writings. Those accounts describe native practices, the nature of land use at specific locations, and native lore. Thus, we are given a means of understanding how people related to their environment and sustained themselves on the land.

Kai-a-ka-Hinalii:

An Account of the Ocean Flood of Ka-Hina-Li'i and Mauna Kea

In 1823, British missionary William Ellis, documented the earliest penned tradition of Mauna Kea (Mouna-Kea). Following a sermon in Hilo, in which Ellis had mentioned the biblical account of the Great Flood and Noah's Ark, several Hawaiians approached him with questions and recalled a tradition of Mauna Kea that they had learned. Ellis reported that the natives were:

...informed by their fathers, that all the land had once been overflowed by the sea, except a small peak on the top of Mouna-Kea, where two human beings were preserved from the destruction that overtook the rest, but they said they had never before heard of a ship, or of Noah, having always been accustomed to call it the kai a Kahinarii (sea of Kahinarii)... (Ellis 1963:321).

Adze Quarries, a Wooden Image, and Artifacts Found Near the Summit of Mauna Kea (1862)

The *Pacific Commercial Advertiser* of Honolulu, reported on October 23, 1862, that Dr. William Hillebrand, who was the director of the Queen's Hospital and personal physician to the royal family.

Hillebrand, who also was an avid botanist, traveled around the Hawaiian Islands collecting plant specimens. In October 1862, he conducted a tour of the island of Hawai'i, which also included a trip to the summit of Mauna Kea. The article is of particular importance as it described the adze quarries; the presence of cultural remains, documenting extensive visitation to the summit region of Mauna Kea by ancient Hawaiians; and that he found a carved wooden image at the front of a cave in an adze quarry workshop. We also learn that artifactual materials were removed from the cave including the wooden image by Dr. Hillebrand.

Under the "Notes of the Week," the Pacific Commercial Advertiser reported:

Hawaiian Antiquities. — On a recent tour around Hawaii, Dr. Wm. Hillebrand ascended to the summit of Mauna Kea, in company with Charles Hall and Capt. Cumings. About 1500 feet below the top, on a side of the mountain seldom visited by either foreigners or natives, they discovered an ancient manufactory of stone implements. It consists of a cave, in front of which was a pile of stone chips 25 feet high, which had evidently accumulated from the manufacture of stone adzes, *maika* balls, &c. &c., which lay scattered about in an unfinished state. In front of the cave was found a wooden idol, in good preservation, which with the pedestal attached to it, measures nearly five feet high. In form the image very much resembles that picture in Jarves' History, page 27. Bones of pigs and dogs, *kapa*, pieces of cocoa-nut shells, fragments of hewn wooden implements, sea shells, and many other curiosities were also found. The Party loaded their guide and themselves with as many of these curiosities as they could carry, and returned to Waimea. On reaching Rev. Mr. Lyons' residence, the discovery soon became noised abroad among the natives, who flocked to the mission premises to learn the truth of the report.

On inquiry among them, no person appears ever to have heard of the existence of the manufactory, — even the oldest natives were ignorant of it. From this it is inferred that its antiquity must date back beyond the present generation. On reaching Kona, Dr. H. learned from Capt. Cumings that an old native was living there, who in his younger days had heard the place spoken of by his fathers, but nothing definite can be learned regarding it. The discovery forms an interesting incident in Hawaiian History, and may lead to further searches and perhaps discoveries regarding the ancient customs of this people. [Pacific Commercial Advertiser, October 23, 1862:2]

While the above article implies that almost no one knew of the adze quarries, native witnesses, hailing from the Humu'ula region, testified before the Boundary Commission in 1873, that they had traveled to the quarries, and that their elders had previously worked in the quarries (see testimonies of the Boundary Commission in this study).

Two days later, on October 25th, the native language newspaper *Kuokoa* carried news of Hillebrand's "discovery" to readers in its columns, reporting:

KOENA O KA WA KAHIKO. Eia Kauka Hilebarana (Hillebrand) i hele aku nei i ke Kaapuni ma ka mokupuni o Hawaii, ua loa ia ia ma Maunakea, he kii o ka wa kahiko, a me kekahi paila pahoa e waiho ana mawaho iho o ka waha o kekahi ana. He elima kapuai ka loihi o ua kii'la. He nui no paha na mea o ia ano e waiho huna mai nei iloko o ko kakou mau awaawa uliuli a me na kuahiwi no hoi a pau.

*REMNANT OF ANCIENT TIMES. Doctor Hillebrand went around the island of Hawaii, and on **Maunakea** he obtained an image of ancient times, and a large pile of adzes situated outside the mouth of a cave. The image is five feet long. There are perhaps many things of this kind hidden in our green valleys and all the mountains. [Kuokoa, October 25, 1862; Maly, translator]*

W.D. Alexander (1892, in this study) reported that in 1892, the carved wooden image was still in the possession of his family.

“Ka Moolelo o Laieikawai”

One of the earliest *mo’olelo* which provides us with references to Humu’ula, Mauna Kea and neighboring lands, and associates the names of places on Mauna Kea with the goddesses of the mountain, is “*Ka Moolelo o Laieikawai*” (The Tradition of Laieikawai). This tradition spans the Hawaiian Island group, and was collected by native historian, S.N. Haleole. While introducing the series, Haleole noted that he originally wrote out the tradition in 1844 (Haleole, November 29, 1862). It was published as a serial in the Hawaiian language newspaper, *Kuokoa*, between November 29, 1862 to April 11, 1863. In 1919, Martha Beckwith published Haleole’s, account, titled “The Hawaiian Romance of Laieikawai by S.N. Haleole.”

In Beckwith’s translation, Poli’ahu is referred to as the “goddess of the snow covered mountain,” Mauna Kea. Below, is a synopsis of the account, by Beckwith, focusing on the main characters of the tradition, and their association with Mauna Kea:

The young chief [Aiwohikupua] of Kaua’i when he goes to seek the beauty of Puna makes a vow to enjoy no other woman until he has won Laieikawai. At Hana on Maui, he is attracted by the lovely Hina-i-ka-malama as she rides the famous surf at Puhele, and he turns in at Haneoo. The chiefess falls in love with the handsome stranger and wins him at a game of *konane* (Hawaiian checkers). He excuses himself until his return and goes on to Hawaii, where he courts an even more beautiful chiefess in the person of Poliahu, who also promises him her hand. When he finally loses hope of winning Laie-i-ka-wai, he “claps his hands before his god” to free himself from his rash vow and proceeds to a marriage with **Poliahu**, whom he fetches home with a great cortege to Kauai. While the festivities are proceeding at Mana, the disappointed Hina, apprised of her lover’s duplicity, appears and claims the forfeited stake. Aiwohikupua is obliged to relinquish himself to her embraces, but the angry **Poliahu** envelopes the lovers in alternate waves of unendurable heat and cold until they are obliged to separate, when the mountain goddess retires to her home attended by her three maidens, **Lilinoe**, **Waiaie** [sic⁶], and **Kahoupokane**, and Aiwohikupua finds himself bereft of both ladies... [Beckwith 1970:222].

Excerpts of the native texts from Haleole’s publication in *Kuokoa* are cited below, with translation by Maly. We focus here on excerpts that mention Humu’ula and specific locations on the upper slopes of Mauna Kea (sites today identified as being in the *ahupua’a* of Ka’ohe):

Mokuna VII (Dekemaba 27, 1862)

Ia Aiwohikupua ma i haalele ai ia Paliuli, hoi aku la laua a hiki i Keaau, hoomakaukau na waa, a ma ia wanaao, kau maluna o na waa, a hoi i Kauai...

Ma keia holo ana mai Keaau mai, a kau i Kamaee, ma Hilopaliku, a ma kekahi la ae, haalele lakou ia laila, hiki lakou i Humuula, ma ka palena o Hilo, me Hamakua... A hala hope o Humuula ia lakou, hiki lakou mawaho pono o Kealakaha, ike mai la lakou nei i keia wahine e noho ana i ka pali kahakai, e hiamoe ana nae ke Alii ia manawa.

Chapter VII (December 27, 1862)

Aiwohikupua and his companion departed from Paliuli, and went to Keaau, where the canoe was readied in the early morning, and they boarded the canoe to return to Kauai...

While on their way from Keaau, they arrived at Kamaee, in Hilopaliku, and on the following day they departed and arrived at Humuula, on the boundary of Hilo and Hamakua... Passing Humuula, they were outside of Kealakaha, where they saw a woman sitting along the ocean cliff. The chief (Aiwohikupua) was asleep at that time.

⁶ Waiaie appears as a typesetting error in one section of Haleole’s tradition, though is written as “Waiau” in another section of the account (see Chapters XVIII & XIX, below).

la lakou i ike aku ai i kela wahine, hoohe ana lakou iluna o na waa, "E! ka wahine maikai hoi!"

A no keia, hikilele ae la ka hiamoe o Aiwohikupua, ninau ae la i ka lakou mea e walaau nei, haiia aku la, "He wahine maikai aia ke noho mai la i ka pali." Alawa ae la ke Alii, a ike aku la he mea e o ka wahine maikai.

A no keia mea, kauoha ae la ke Alii i na hoewaa e hoe pololei aku ma kahi a ka wahine e noho mai ana, a holo aku la a koke, halawai mua iho la lakou me ke kanaka e paeaea ana, ninau aku la, "Owai kela wahine e noho mai la iluna o ka pali maluna pono ou?"

Haiia mai la, "O Poliahu."

A no ka manao nui o ke Alii e ike i kela wahine, peahiia aku la, a iho koke mai la kela me kona aahukapa i hoopuniia i ka hau, a haawi mai la i kona aloha ia Aiwohikupua...

la laua e halawai malihini ana, i aku o Aiwohikupua, "E Poliahu e! E ka wahine maikai o ka pali, pomaikai wale wau ia oe ma ko kua halawai ana iho nei, a nolaila e ke Alii wahine o ka pali nei, ke makemake nei wau e lawe oe ia'u i kane hoao nau, a e noho kanaka lawelawe aku malalo ou, ma kau mau olelo e olelo ai, a malaila wale no wau. Ina hoi e ae oe e lawe ia'u e like me ka'u e noi aku nei ia oe, alaila, e kau kua maluna o na waa, a holo aku i Kauai, a pehea ia?"

I mai la ka wahine, "Aole wau he wahine no keia pali, no uka lilo mai wau, mai ka piko mai o kela mauna, e aahu mau ana i na kapa keokeo e like me keia kapa a'u e aahu aku nei. A pehea la i hikiwawe ai ka loa ana o ko'u inoa ia oe e ke Alii?"

Olelo aku la o Aiwohikupua, "Akahi no wau a maopopo no Maunakea mai oe, a ua loa koke kou inoa ia makou ma ka haiia ana e kela kanaka paeaea."

"A no kau noi e ke Alii," wahi a Poliahu, "E lawe wau ia oe i kane na'u, a nolaila, ke hai aku nei wau ia oe, me ka ninau aku; aole anei

Seeing the woman, they called out from the canoe, "Oh! What a beautiful woman!"

Because of this, the sleep quickly departed from Aiwohikupua, and he asked what was this that they were talking about, they said, "There is a beautiful woman there, sitting on the cliffs." The Chief looked, and he saw indeed that there was a beautiful woman there.

Because of this, the Chief ordered the canoe paddlers to paddle straight to the place where the woman was sitting. Arriving there shortly, they met with a man who was pole fishing, and asked, "Who is that woman sitting there atop the cliff above you?"

He answered, "It is Poliahu."

Great was the Chiefs desire to see this woman, he waved, and she quickly surrounded herself with her snow garment, and then extended her aloha to Aiwohikupua...

Meeting as strangers, Aiwohikupua spoke, "Say Poliahu! The beautiful woman of the cliff, I am indeed blessed by you, at our meeting here. So you, Chiefess of these cliffs here, I desire that you would take me as your husband, as one who will live as a person below you. If you will speak the words, there I will be. If you agree to take me as I have asked you, then we two shall board the canoe, and travel to Kauai. How would that be?"

The woman responded, "I am not a woman of these cliffs, I come from the distant uplands, from the summit of that mountain, always adorned in the white garment, just as I am wearing now. And how is it that you come to have my name, o Chief?"

Aiwohikupua then said, "I only now, understand that you are from **Maunakea**, but I got your name from the man that is fishing there.

"And regarding your request, o Chief," Poliahu said, "I will consider taking you as my husband. But, I say this of your request; are

o oe ke Alii i ku iluna a hoohiki ma ka inoa o kou mau Akua, aole oe e lawe i hookahi wahine o keia mau mokupuni, mai Hawaii nei, a Kauai; aia kau wahine lawe noloko mai o Moaulanuiakea? Aole anei oe i hoopalau me Hinaikamalama, ke kaikamahine Alii kaulana o Hana? A pau ko huakai kaapuni ia Hawaii nei, alaila, hoi aku a hoao olua? A no kau noi mai e lawe kua ia kua i mau mea hoohui nolaila, ke hai aku nei wau ia oe; aia a hoopau oe i kau hoohiki mua, alaila, aole na'u e lawe ia oe, nau no e lawe ia'u a hui kua e like me kou makemake."

A no keia olelo a Poliahu, pili pu iho la ko Aiwohikupua manao me ke kaumaha no hoi; a liuliu hoopuka aku la o Aiwohikupua i wahi ninau pokole penei, "Pehea la oe i ike ai, a i lohe ai hoi no ka'u mau hana au e hai mai nei? He oiaio, e Poliahu e, o na mea a pau au e olelo mai nei, ua hana wau e like me ia nolaila, e hai mai i ka mea nana i olelo aku ia oe."

"Aole o'u mea nana i hai mai i keia mau mea, e ke Alii kane, no'u iho no ko'u ike," wahi a ke Alii wahine, "no ka mea, ua hanau kupuaia mai wau e like me oe, a ua loa no ia'u ka ike mai ke Akua mai o ko'u mau kupuna a hooili ia'u, e like me oe, a na ia Akua wau i kuhikuhi mai e like me ka'u e olelo nei ia oukou. la oukou no e holo mai ana i Humuula, ua ike wau nou na waa, a pela wau i ike ai ia oe."

A no keia olelo, kukuli iho la o Aiwohikupua, a hoomaikai aku la imua o Poliahu, me ke noi aku e lilo ia i kane hoopalau na Poliahu, me ke noi aku a holo pu i Kauai...

you not the Chief who stood and made an oath in the name of your Gods, that you would not take a wife, from Hawaii to Kauai; for your wife is to be taken from Moaulanuiakea? Yet, are you not betrothed to Hinaikamalama, the famous young chiefess of Hana? And when your journey around Hawaii was completed, that you would return and you two would be married? Now that you have asked that the two of us be joined together, I tell you that you must end your previous oath, or else I cannot take you; if you do, then you may have me as you desire."

Because of these words of Poliahu, Aiwohikupua's thoughts were saddened; Aiwohikupua then asked, "How do you know, how have you heard of my tasks, as you have stated? Poliahu, it is true, all the things that you have said, I have done as you've described. So tell who told you these things."

"No one has told me these things, o Chief, it is known to me by my own knowledge," the Chiefess said. "Because I, like you am of a wondrous birth, and I have the knowledge from the Gods, from my ancestors, as inherited by me, like you. These Gods have directed me in my words to you. When you traveled to Humuula, I saw your canoes, and thus, I saw you."

Because of these words, Aiwohikupua, kneeled down, and praised Poliahu, asking her to take him as the promised one of Poliahu, and also asked that she travel with him to Kauai... [Maly, translator]

The narratives continue, telling readers that Poli'ahu stated that she would only travel with 'Aiwohikūpua and his companions as far as Kohala. She then told him that if she was to agree to a betrothal, he must first be released from his previous engagement to Hina-i-ka-mālama.

Upon preparing for his departure from Kohala, Poli'ahu gave 'Aiwohikūpua her "*kapa hau*" (snow mantle), describing its sacred nature. The following events are described in the narratives below:

...la lakou ma Kohala, a hiki i ka la i haalele ai o Aiwohikupua ma ia Kohala, lawe ae la o Poliahu i kona kapa hau, a haawi aku la ia Aiwohikupua me ka olelo aku, "O kuu kapa hau, he kapa i papa loaia e ko'u mau makua, aole e lilo i kekahi mea e ae, ia'u wale iho no;

Arriving at Kohala, the day for Aiwohikupua's departure arrived, **Poliahu** took her snow mantle and gave it to Aiwohikupua, saying, "This is my *kapa hau* (snow mantle), it is a mantle that is very sacred to my parents, not to be given carelessly to any other, only for

*aka, no ko kua lawe ana ia kua i kane hoao
oe na'u, a pela hoi wau ia oe, nolaila, he
haawi lilo aku nei wau i keia kapa, a hiki i kou
la e manao mai ai ia'u a loaa, iluna o
Maunakea, alaila, hoike ae oe ia'u, alaila, hui
kino kua...*

*...Ia manawa, kii aku la o Aiwohikupua i kona
Ahuula, lawe mai la a hoouhi aku la ia
Poliahu, me ka olelo aku, "E like me kau olelo
ia'u mamua o kou haawi ana mai ia'u i ke
kapa hau, pela no oe e malama ai a hiki i ko
kua hui ana e like me ke kauoha."*

*A pau ka laua kamailio ana i ka wanaao,
hookaawale lakou i ka wahine noho mauna, a
holo aku la a hiki i Hana, a halawai me
Hinaikamalama...*

me. But because you are to be my husband, I thus give it to you, until the day that you think of me and take me, there atop **Maunakea**, then you will know me, and we two shall join together..."

At that time, Aiwohikupua took his Feather Cloak, and placed it upon Poliahu, saying, "As you have told me, when you gave me your snow mantle, so too shall you keep this until we two are joined together as instructed."

It was as the early light of dawn appeared, that they finished their conversation. They then departed from the woman who dwells upon the mountain, sailing to Hana, to meet with Hinaikamalama... [Maly, translator]

'Aiwohikūpua then returned to Kaua'i, though he failed to formally break off his betrothal to Hina-i-kamālama. After some time, 'Aiwohikūpua sent his messenger to Hawai'i to arrange for Poli'ahu to meet with him in preparation for their marriage.

At this point, Haleole introduced readers to Lilinoe, Waiau (a type setting error by the newspaper in this issue gave the name as Waiaie), and Kahoupokane, the companion-goddesses of Poli'ahu, who dwelled upon the mountains; and places for which names are still known on the mountain landscape today.

The messenger, Koa'e, went to Hawai'i and met with Poli'ahu, giving her the message of 'Aiwohikūpua. Arrangements were made, and on the appointed day, 'Aiwohikūpua and his retinue, departed from Kaua'i, and traveled to Kawaihae, and then on to the designated meeting place at Wai'ula'ula (the boundary between the *ahupua'a* of Kawaihae and 'ili of 'Ōuli, Waimea):

Mokuna XVIII (Ianuali 17, 1863)

*...hoouna hou aku la oia ia Koa'e, kekahi o
kana mau elele mama e like me ka olelo
kauoha i na elele mua.*

*A hiki o Koa'e i o Poliahu la, halawai aku la
laua, hai aku la o Koa'e i ke kauoha a ke Alii e
like me ka mea i hāiia ma na pauku hope o
ka Mokuna XVII o keia Kaao; a pau na olelo a
ke Alii i ka hāiia, hoi aku la ko ke Alii elele, a
hai aku la ma ka pololei, alaila, he mea
maikai ia i kona Haku.*

*Noho iho la o Aiwohikupua, a i na la hope o
ke kolu o ka malama; lawe ae la ke Alii i kona
mau kaukualii, a me na punahele, i na
haiawahine hoi, na hoa kupono ke hele pu
ma ke kahiko ana i ka hanohano Alii ke hele
ma kana huakai no ka hoao o na Alii.*

Chapter XVIII (January 17, 1863)

...he sent Koa'e, one of his swift messengers, with the command, as given to the first messenger.

Koa'e arrived before Poliahu, and they met. Koa'e told her the command of the Chief, as given in the last paragraph of Chapter XVII of this tale. When the words of the Chief had been spoken, the Royal messenger repeated the words to his Lord's satisfaction.

Aiwohikupua then sat down, and in the last days of the third month; the Chief took his royal attendants, favorites, female retainers, and those necessary companions, adorned in their Chiefly manner, and traveled to where the chief would be married.

I na la i o Kaloa kukahi, haalele o Aiwohikupua ia Kauai, holo aku oia he kanaka kaulua, elua kanaka kaukahi, he iwakalua peleleu.

Mamua o ka po hoao o na Alii, i ka po i o Huna, hiki lakou i Kawaihae, ia manawa, hoouna aku la oia ia koae, kona elele e kii ia Poliahu e iho mai e halawai me Aiwohikupua, i ka la i kauohaia'i e hoao.

A hiki ka elele imua o Aiwohikupua mai ke kii ana ia Poliahu, a hai mai la i kana olelo mai a Poliahu mai, "Eia ke kauoha a ko wahine, ma Waiulaula olua e hoao ai, ina e ike aku kakou ma ke kakahiaka nui o ka la o Kulu, e halii ana ka hau mai ka piko o Maunakea, Maunaloa, a me Hualalai, a hiki i Waiulaula, alaila, ua hiki lakou i kahi o olua e hoao ai, alaila, hele aku kakou, pela mai nei."

Alaila, hoomakaukau ae la o Aiwohikupua i kona hanohano Alii.

Kahiko aku la o Aiwohikupua i kona mau kaukualii kane, a me na kaukualii wahine, a me na punahele, i ka Ahuula, a o na haiawahine kekahi i kahikoia i ka Ahuoeni. A kahiko iho la o Aiwohikupua i kona kapa hau a Poliahu i haawi aku ai, kau iho la i ka mahiole ie i hakuia i ka hulu o na liwi. Kahiko aku la oia i kona mau hoewaa o ke Alii, pela no na hoewaa o kona puali alii a pau...

Ma ka la o Kulu, ma ke kakahiaka, i ka puka ana ae o ka la a kiekie iki ae, ike aku la o Aiwohikupua ma i ka hoomaka ana o ka hau e uhi maluna o ka piko o na mauna, a hiki i kahi o laua e hoao ai.

I kela manawa, ua hiki o Poliahu, Lilinoe, Waiaie [Waiau], a me Kahoupokane, i kahi e hoao ai na Alii.

Ia manawa, hoomaka o Aiwohikupua e hele e hui me ka wahine noho mauna o Maunakea. E like me ka mea i oleloia maluna, pela ko ke Alii hele ana.

Ia Aiwohikupua ma e holo aku ana i ka moana mai Kawaihae aku, he mea e ka olioli

On the day of *Kaloa kukahi*, Aiwohikupua departed from Kauai with his people on double and single-hulled canoes, and twenty *peleleu* canoes.

Before the night of the Royal wedding, on the night of Huna, they arrived at Kawaihae, he [Aiwohikupua] then sent his messenger, Koae, to fetch Poliahu, bringing her down to meet with Aiwohikupua, on the day set for the wedding.

Returning from his trip to get Poliahu, the messenger went in front of Aiwohikupua, and gave him the message that Poliahu had given him, "Here is the command of your woman; at Waiulaula you two will be wed. When, in the early morning of Kulu we see that the snows have spread from the summit of **Maunakea**, to Maunaloa, and Hualalai, and are descending to Waiulaula, we are to go, for there is the place where you two will wed."

So Aiwohikupua prepared in his Royal honor.

Aiwohikupua adorned his supporting chiefs and chiefesses, and his favorites in Feather cloaks; his female attendants were adorned in fine woven garments (*ahu'o'eno*). And Aiwohikupua was adorned in the snow mantle, which **Poliahu** had given him, and with an *ie* helmet, covered with the feathers of the *iiwi* birds. He also adorned all of his Royal paddlers and all of his warriors...

On the day of *Kulu*, in the early morning, as the sun was just rising, Aiwohikupua and companions saw that the snow began to cover the summits of the mountains, and then descended to the place where they two were to be married.

At that time, **Poliahu**, **Lilinoe**, **Waiaie** [**Waiau**], and **Kahoupokane** arrived at the place where the Royal couple was to be wed.

At that time, Aiwohikupua then went to join the mountain-dwelling woman of **Maunakea**. As described above, the Chief went to meet her.

Aiwohikupua and his companions traveled across the ocean from Kawaihae, and Lilinoe

o Lilinoe i ka hanohano launa ole o ke Alii kane.

A hiki lakou i Waiulaula, ua pauia lakou e ke anu, a nolaila, hoouna aku la o Aiwohikupua i kona elele e hai aku ia Poliahu, "Aole e hiki aku lakou no ke anu."

la manawa, haalele e Poliahu i kona kapa hau, lalau like ae la ka poe noho mauna i ko lakou kapa la, hoi aku la ka hau a kona wahi mau.

la Aiwohikupua ma i hiki aku ai ma ko Poliahu ma wahi e noho ana, he mea lealea loa i ke Alii wahine na mea kani o na waa o ke Alii kane, a he mea mahalo loa no hoi ia lakou ka ike ana i ko ke Alii kane hanohano, a maikai hoi.

la laua i hui ai, hoike ae la o Aiwohikupua, a me Poliahu, i na aahu o laua i haawi muaia i mau hoike no ka laua olelo ae like...

Poli'ahu, 'Aiwohikūpua and his party then departed for Mānā, Kaua'i, as had been agreed upon earlier. They joined the Chiefs Hauailiki and Makaweli, and entered into enjoyable contests in the lover's game of *kilu*.

In the meantime, Hina-i-ka-mālama heard of 'Aiwohikūpua's wedding to Poli'ahu, and she determined to travel to Kaua'i to claim her first right to 'Aiwohikūpua as a husband.

As described in the summary of the *mo'olelo* prepared by Martha Beckwith (1970), the promised marriage between Poli'ahu and 'Aiwohikūpua was not meant to be. Outraged, Poli'ahu abandoned 'Aiwohikūpua to Hina, but punished them by sending waves of cold and heat over them.

Mokuna XIX (Ianuali 24, 1863)

...Iloko o ko laua manawa i hoomaka ai no ka hooko ana i ka hoohiki, alaila, ua pono ole ia mea i ko Poliahu manao.

la manawa, lawe ae la o Poliahu i kona kapa la, a aahu iho la, ia manawa ka hookuu ana'ku o Poliahu i ka wela maluna o Hinaikamalama. la manawa, hapai ae la oia he wahi mele, penei:

*"He wela--e, he wela,
Ke poi mai nei ka wela a kuu ipo ia'u,
Ke hoohahana nei i kuu kino,
Ke hoonakulu nei hoi i kuu manawa,
No kuu ipo paha keia wela---e."*

rejoiced at the unequalled glory of the Chief.

When they arrived at Waiulaula, they were overtaken by the cold. Therefore, Aiwohikupua sent his messenger to tell **Poliahu**, "They could not continue because of the cold."

Poliahu then set aside her snow mantle, as did the others who dwell on the mountain, and the snows returned to their usual abode.

When Aiwohikupua and his companions arrived at the place where **Poliahu** and her companions were sitting, there was great joy between the Chiefesses, and those of the canoes of the Chief. They greatly admired the Chief in his glory.

When they met, Aiwohikupua and **Poliahu** both showed one another their garments which they had first given as a sign of their original agreement... [Maly, translator]

Chapter XIX (January 24, 1863)

...Poliahu felt sorely wronged at the time they [Aiwohikupua and Hinaikamalama] set out to fulfill their oath.

At that time, **Poliahu** took her mantle and put it on, and then she released a heat upon Hinaikamalama. At that time, she [Hinaikamalama] took up a chant, thus:

*It is so hot, so hot,
The heat of my love covers me,
Warming my body,
Causing my feelings to flutter,
Perhaps the heat is from my sweetheart.*

I aku o Aiwohikupua, “Aole no’u na wela, malia paha no Poliahu no na wela, ua huhu paha ia kaua...”

...I ke kolu o ka po lealea o Hauailiki, i na’lii e akoakoa ana, a me na mea e ae, oia ka po i hui ai o Lilinoe, me Poliahu, o Waiau, a me Kahoupokane, no ka mea, ua imi mai lakou ia Poliahu, me ka manao ke pono nei ko Aiwohikupua ma noho ana me Poliahu.

la po, ia Aiwohikupua me Makaweli, e kilu ana, a i ka waenakonu o ko laua manawa lealea, komo ana na wahine noho mauna iloko o ka aha lealea.

la Poliahu ma eha e ku ana me na kapa hau o lakou, he mea e ka hulali, ia manawa, nei aku la ka aha lealea no keia poe wahine, no ke ano e o ko lakou kapa. la manawa, popoi mai la ke anu i ka aha lealea a puni ka papai kilu, a kau mai la maluna o ka aha ka pilikia a hiki i ka wanaao, haalele o Poliahu ma ia Kauai. O keia manawa pu no hoi ka haalele ana o Hinaikamalama ia Kauai...

Aiwohikupua said, “This heat is not from me, it is perhaps a heat from **Poliahu**, who is perhaps upset with us...”

On the third night of the contests of Hauailiki, the chiefs gathered together, as well as the others. And it was on that night that **Lilinoe**, **Waiau**, and **Kahoupokane** joined with **Poliahu**. They had been searching for her, thinking that all was good between **Poliahu** and Aiwohikupua.

That night, while Aiwohikupua and Makaweli were playing *kilu*, the women who dwell upon the mountain entered the assembly.

With **Poliahu**, the four of them stood in their glistening snow mantles. The crowd murmured among themselves about these women and the nature of their garments. Then, the assembly in the *kilu* shelter was buffeted waves of severe cold, a trouble which persisted to the early morning light. **Poliahu** and her companions then left Kauai. Hinaikamalama also left Kauai at that time... [Maly, translator]

As described by Beckwith, ‘Aiwohikūpua was left without the company of either of the women, Poli’ahu and Hina-i-ka-mālama.

Heiau of the Mountain Lands Described in “Na Kaa a Kekahi Elemakule o Hawaii” (1865)

Among the early accounts penned by Hawaiian writers, in which reference to features associated with Humu’ula, Ka’ohe and the *‘āina mauna* are found, is an 1865 account, originally collected in 1853. The Hawaiian newspaper “*Ke Au Okoa*” published an article titled “*Na Kaa a Kekahi Elemakule o Hawaii*” (May 8, 15, & 22, 1865), taken from the stories collected by Jules Remy, a French man who came to Hawai’i in 1851. While introducing the article, readers are told that Remy dwelt in Hawai’i for about three years, during which time he became quite proficient in the Hawaiian language. While here, Remy traveled around the islands, documenting sites and events which he witnessed, and recording histories that were related to him. His narratives, written in French, reached Hawai’i, and were translated into Hawaiian by W.D. Alexander (*Ke Au Okoa, Mei 8, 1865*).

“*Na Kaa a Kekahi Elemakule Hawaii*” was collected by Remy in March 1853, when he visited Ho’opūloa, South Kona. Upon landing, Remy records that he was warmly greeted by the people on the shore, and among the many people gathered, he observed an elderly gentleman. He was “stout and broad-chested, and on the account of his age, his hair was reddish gray.”

Remy learned that the old man was Kanuha⁷, a man of chiefly descent, born before the time that Alapa’i-nui died, in 1752 (*Ke Au Okoa, Mei 8, 1865*). Remy noted that Kanuha was nearly 116 years old, and in good health. Because of his advanced age, he spoke with authority on ancient customs and history of the Hawaiian people, that few, if any, other people were able to (*Ke Au Okoa, Mei 8, 1865*).

⁷ Kanuha is found in several historical accounts recorded by Kamakau (1961) and Fornander (1973).

Among the traditions which Kanuha told Remy, was an account of the ascent of 'Umi to the position of king on the island of Hawai'i. In the account, Kanuha describes the history behind the construction of the famed *heiau* (temple) Ahu-a-'Umi, and the construction of three other *heiau* on the *'āina mauna*—one on Mauna Kea, one on Mauna Loa, and one on a hill near the Ka'ohe-Waikōloa boundary. In addition to 'Ahu-a-'Umi (*Figure 3*), these *heiau* included Pu'u Ke'eke'e (an area of a known *pu'u* in Ka'ohe, near Pu'u ka Pele), Mauna Halepōhaku (on Mauna Kea), and Pōhaku o Hanalei (on Mauna Loa). By description, and in some cases, by physical features on the ground, these *heiau* were situated in the lands of Humu'ula (perhaps two of the *heiau*), Ka'ohe, and Keauhou.



Figure 3. Portion of 'Ahu-a-'Umi Heiau, Mauna Kea viewed in the Background (ca. 1890; in collection of the Hawai'i State Archives)

It is noted here, that in his own work, Abraham Fornander (1973) acknowledged the age and authority of Kanuha, but he also found inconsistencies in the genealogical relationship of individuals mentioned by Kanuha (Fornander 1973:99-101). In particular, Remy reports that Kanuha conveyed to him that 'Umi went to war with Keli'iokaloa, a chief of Kona. Historical accounts by native writers and Fornander record that Keli'iokaloa was the son of 'Umi, and that he became king of Kona for a time following his father's death (Fornander 1973:99-101). It should be considered here that this historical inconsistency may actually be attributed to Remy's own hand, rather than the narratives of Kanuha.

Regardless of the possible genealogical differences, one of the unique qualities of the account is that it provides us with otherwise unrecorded documentation regarding construction and occurrence of *heiau* in the high mountainous region of Hawai'i. The following narratives, with excerpts of the original Hawaiian and translations of the accounts (translated by Maly), are taken from Remy's recording of Kanuha's story in 1853, and published in *Ke Au Okoa* on May 22, 1865:

Umi ruled in place of Hakau, and his friends Koi and Omaokamau dwelt with him. Piimaiwaa, Umi's war leader dwelt in Hilo. With Umi, there was also his trusted companion Pakaa, and his priest Lono. At this time, Umi ruled the eastern side of Hawaii, while on the western side, his relative Keliokaloa, ruled and dwelt at Kailua... In the time that he dwelt in Kailua, Keliokaloa was known as an evil chief, he cut down the coconut trees and desecrated the cultivated fields. It was because of these evil deeds that Umi made preparations to go to war against him. Umi marched to battle, joined by his famous warrior, Piimaiwaa, and his companions Koi and Omaokamau. Also with him were his favorite, Pakaa, and his priest Lono.

The Hawaiian narrative then reads:

*Mawaena o **Maunakea** a me Hualalai ka hele pualu ana o ua alii nei me kona manao e iho ae i Kailua. Aole nae i kali o Keliokaloa, aka, ua pii nui aku oia me kona poe koa e houka aku ia Umi. Ua halawai na puulu kaua a i elua maluna o kekahi wahi papu i hoopuni ia e na mauna ekolu, a i kapaia hoi ke **Ahu a Umi**. Kaua mai o Laepuni ma (he mau kanaka makaainana pili alii ole) ia Umi, a aneane e make o Umi ia laua, lele mai o Piimaiwaa e kokua iaia, a oia ka mea nana i hooholo ae ka lanakila ma ko Umi aoao. Aohe mau mea nui i hai ia mai, aka, me he mea la, ua make ke alii o Kailua iloko oia kaua ana. Ma keia kaua ana, ua lilo holookoa ia Umi ke Aupuni, a lilo iho oia ke alii ai moku o ka mokupuni o Hawaii. I mea e ili aku ai ka hoomanao ana no ia kaua ua hanauna aku a ia hanauna aku, ua kukulu ae la ia i ke ahua aa, e o ia nei a hiki i keia wa ke **ahua a Umi**...*

Between **Mauna Kea** and Hualalai the chief and all his party traveled, with the thought of descending to Kailua. Keliokaloa did not wait though, but instead, traveled with his warriors to meet Umi in battle. The two armies met on a broad open plain, surrounded by the three mountains, at the place [now] called **Ahu a Umi**. There, Laepuni and them (people who were unattached to a chief) fought with Umi. Umi was almost killed, but Piimaiwaa leapt in and helped him, it was he who turned the battle in the favor of Umi's side. There is not much else that is said, but, it is known that the chief of Kailua died in the battle. Thus, with this battle, the entire kingdom was gained by Umi. He became the chief that controlled the entire island of Hawaii. *So that the battle would be remembered from generation to generation, he (Umi) built the stone altar, that remains to this day, the altar (ahua) of Umi...* [Ke Au Okoa; Mei 22, 1865]

The narrative records that early in 'Umi's life, the priests Nunu and Wawa had discerned 'Umi's nature, and foretold that his god Kā'ilī, made with a feather from the god Halulu, had empowered him. Indeed, 'Umi was a religious chief, and made many temples for his god. Among the temples were—

*...Ua kukulu no hoi ia he heiau malalo o **Pohaku Hanalei**, a ua kapaia o ke **ahua o Hanalei**; a ma na aoao o **Maunakea** e hele ala i Hilo, ua kukulu no ia i ke kolu o ka heiau, ma kahi i kapa ia o **Puukekee**⁸; a ma **Mauna Halepohaku** malaila ia i kukulu ai i ka ha o na heiau, a malaila no hoi i olelo ia ai ua noho o Umi malaila me kona mau kanaka. Ua olelo ia o Umi he alii noho mauna, no kona aloha i kona poe kanaka, nolaila, ua hoi aku ia i waenakonu o ka mokupuni ilaila kona wahi i noho ai me kona poe kanaka, a na kona makaainana e noho ana ma na kapakai, e lawe mai i ka ai na lakou, mai kela pea, keia pea...*

*...He (Umi) also built a heiau (temple) below **Pohaku Hanalei**, it is called the **ahua o Hanalei** (altar of Hanalei); and on the side of **Mauna Kea**, by where one travels to Hilo, he built the third of his temples, at the place called **Puukekee** [also written Puu Keekee in historical texts]; and there at **Mauna Halepohaku** he built the fourth of his temples;*

⁸ Puukekee (Pu'u Kēke'e or Pu'u Ke'eke'e) is a hill that sits on the boundary between Waikōloa, Kohala, and Ka'ohe, Hāmākua.

there, it is said, Umi dwelt with his many people. It is said that Umi was a chief who dwelt upon the mountain, it was because of his love of his people, that he (Umi) returned and dwelt in the middle of the island [Ahu-a-Umi], that is where he dwelt with his beloved people. His commoners lived along the shores, and they brought food for them (in the uplands), from one side of the island to the other... [Ke Au Okoa; Mei 22, 1865; Maly, translator]

Also, in the 1860s, Hawaiian historian Samuel Mānaiakalani Kamakau (1961), provided readers with several early Hawaiian historical accounts of Mauna Kea and environs (either directly or indirectly by association with place names). These accounts are particularly significant because they can be dated by genealogical associations with individuals identified in text. Two of Kamakau's narratives are set in the period of the great king 'Umi-a-Liloa, who in c. 1525-50, unified the island of Hawai'i under his rule, and established the land division and land management system that remained in place until the *Māhele* of 1848.

In Kamakau's description of the rise of 'Umi to power, we learn of his conquest of Hilo, and the route traveled from Waipi'o, Hāmākua, crossed Mauna Kea, via the trail that ran across Humu'ula-Pi'ihonua, and through Kaūmana, to the royal community on Hilo Bay:

It was decided to make war on the chiefs of Hilo and to go without delay by way of **Mauna Kea**. From back of Ka'umana they were to descend to Hilo. It was shorter to go by way of the mountain to *the trail of Poli'ahu and Poli'ahu's spring [Waiau]* at the top of **Mauna Kea**, and then down toward Hilo. It was an ancient trail used by those of Hamakua, Kohala, and Waimea to go to Hilo. They made ready to go with their fighting parties to **Mauna Kea**, descended back of Hilo, and encamped just above the stream of Wai-anuenue... [Kamakau 1961:16-17]

Describing a later period during the reign of 'Umi, Kamakau related an account of the death and burial of the *kahuna* Pae, who served 'Umi. Kamakau reports that Pae was "a descendant of **Lilinoe**, the woman of the mountains" (Kamakau 1961:215). Kamakau also reported that Lilinoe was an important ancestral figure in the genealogy's of Hawai'i's *ali'i* (royalty), and that she was buried on Mauna Kea. He observes that in 1828 Ka'ahumanu traveled to Hawai'i to:

...attempt the recovery of the bones of **Lilinoe on Maunakea** where her body was said to have lain for more than a thousand years in a well-preserved condition, not even the hair having fallen out. Others deny this and say her body was too well-hidden ever to have been found. Her offspring count from Hua-nui-i-ka-la'ila'i; she was the ancestress of ruling chiefs, and from her line was born 'Umi-ka-lani [father of the Mahi family on Hawaii], son of Keawe-nui-a-'Umi by Ho'opili-a-Hae. It is said that Ka'ahu-manu did not find the bones of Lilinoe... [Kamakau 1961:285]

Warriors Traveled the Mountain Paths and Met in Battle on the 'Āina Mauna

Among S.M. Kamakau's traditions are found the history of Keawe-nui-a-'Umi and his brother Ke-li'i-o-Kaloa, who shared the rule over Hawai'i. When it was learned that Ke-li'i-o-Kaloa was abusing his people, Keawe-nui-a-'Umi determined to depose Ke-li'i-o-Kaloa. The warring parties traveled across the mountain lands, with Keawe-nui-a-'Umi's war parties marching from Hilo, Puna, and Ka'ū, across the plateau between Mauna Kea and Mauna Loa, and towards 'Ahu-a-'Umi, the temple built by his father. Kamakau (1961) reported:

When Keawe-nui-a-'Umi learned of the unjust rule of Ke-li'i-o-kaloa and the burdening of the common people, he was filled with compassion for the chiefs and commoners of Kona. Therefore he made himself ready with his chiefs, war lords, war leaders, and

warriors from Hilo, Puna, and Ka-‘u to make war on Kona. The war parties [met?] at the volcano (pit of Pele) before going on to battle along the southern side of **Mauna Kea** and the northern side of Mauna Loa. The mountain road lay stretched on the level. At the north flank of Hualalai, before the highway, was a very wide, rough bed of lava—barren, waterless, and a desert of rocks. It was a mountain place familiar to ‘Umi-a-Liloa when he battled against the chiefs of Hilo, Ka-‘u, and Kona. There on that extensive stretch of lava stood the mound (*ahu*), the road, the house, and *heiau* of ‘Umi.* It was through there that Keawe-nui-a-‘Umi’s army went to do battle against his older brother, Ke-li‘i-o-kaloa.

When the chiefs of Kona heard that those of Hilo were coming by way of the mountain to do battle, Ke-li‘i-o-kaloa sent his armies, but they [page 35] were defeated by the armies from Hilo. The armies of Kona were put to flight. When the armies of Hilo reached the shore of Kona the war canoes arrived from Ka-‘u and from Hilo. The battle was [both] from the upland and from the sea. Ke-li‘i-o-kaloa fled and was killed on a lava bed. The spot where he was killed was called Pu‘u-o-Kaloa (Kaloa’s hill), situated between Kailua and Honokohau... [Kamakau, 1961:36]

In the next generation, Lono-i-ka-makahiki, grandson of ‘Umi-a-Liloa, was also called upon to battle, this time, against the invading forces of the Maui chief, Kama-lālā-walu. Once again, we find that warriors of Hawai‘i made use of the mountain land trails to meet the final challenge on the plains of Waimea. The warriors from the Ka‘ū, Puna and Hilo districts passed by Mauna Kea, to join in the battle below Pu‘u ‘Oā‘oaka, in Waimea:

Kama-lala-walu, the heedless chief, paid no attention, but followed the advice of two old men of Kawaihae who counseled falsely. One of them was named Puhau-kole. They said, “Pu‘uoa‘oaka is a good battlefield and will be a great help to the chief. All the canoes should be taken apart because the warriors may desire to run back to the canoes and depart in secret for Maui. The best thing to do is to cut up the canoes and outriggers, for there are canoes enough in Hawaii. When it is conquered, there will be many canoes from Kona and Ka-‘u. There will be much property and wealth for the Maui chiefs.” The chief, Kama-lala-walu, listened to the advice of Puhau-kole and his companion. Their suggestions were carried out, and the canoes were broken up. Then Kama-lala-walu’s fighting men went up to the grass-covered plain of Waimea.

After Kama-lala-walu’s warriors reached the grassy plain, they looked seaward on the left and beheld the men of Kona advancing toward them. The lava bed of Kaniku and all the land up to Hu‘ehu‘e was covered with the men of Kona. Those of Ka-‘u and Puna were coming down from **Mauna Kea**, and those of Waimea and Kohala were on the level plain of Waimea. The men covered the whole of the grassy plain of Waimea like locusts. Kama-lala-walu with his warriors dared to fight. The battlefield of Pu‘oa‘oaka was outside of the grassy plain of Waimea, but the men of Hawaii were afraid of being taken captive by Kama, so they led to the waterless plain lest Maui’s warriors find water and hard, waterworn pebbles. The men of Hawaii feared that the Maui warriors would find water to drink and become stronger... [Kamakau, 1961:58]

“He Moololo Kaaō Hawaii no Laukaieie” (1894)

“He Moololo Kaaō Hawaii no Laukaieie...” (A Hawaiian Tradition of Laukaieie) was published in the native language newspaper, *Nupepa Ka Oiaio*, between January 5th 1894 to September 13th 1895. The *mo‘olelo* was submitted to the paper by Moses *Manu*. The story is a rich and complex account with island-wide references to—places; descriptions of place name origins; history and *mele*; interspersed with accounts from other traditions and references to nineteenth century events.

* It is reached “by a fourteen mile journey from Holualoa up the old Judd trail, or by an eighteen or twenty mile trip from Kealahakua, via Pu‘ulehua and Kanahāhā... It is on the slope of Hualalai, at between 4,500 and 5000 feet elevation, with Mauna Kea and Mauna Loa towering snow-clad, much farther away.”

The following narratives (translated by Maly), have been excerpted from the *mo'olelo*, and include an overview of the tradition and those narratives which recount the travels of Pūpū-kani-'oe, an elder of Lau-ka-'ie'ie—

Kaholokuaiwa [w] and Koa'ekea [k] lived at Ulu, in Waipi'o Valley on the island of Hawai'i. They were descended from the chiefly and godly lines of Kahiki and Hawai'i. Their first child was Lauka'ie'ie. But because she was born in an 'e'epa (mysterious) form, looking more like a plant than a child, she was wrapped in *lipoa* seaweed and set in the stream. Without her parents knowledge, Lauka'ie'ie was retrieved by a mountain goddess and nurtured. Later, two other children, boys, were born to Kaholokuaiwa and Koa'ekea. One was named Hi'ilawe, and the other was Makanikeoe (who was also a wind deity).

Koa'ekea's sister was Pōkāhi, and her husband was Kaukini. Though they had been married for a long time, they were childless, and because of their prayers and offerings, the forest goddess, Hinaulu'ōhi'a, approached Pōkāhi while she was gathering seaweed, and told her that she would have a girl child to raise as her own. The condition was, that no one, not even her brother and sister-in-law were to know about this child. Because Pōkāhi and Kaukini lived on the mountain ridges between Waipi'o and Waimanu, it was easy for her to keep the secret. It was in this way, that Lauka'ie'ie came to be raised by her own aunt and uncle. As a youth, Lauka'ie'ie's companions were the spirits of the plants and animals of the forest. When she matured, she was very beautiful, and thoughts of finding an acceptable mate for her began to grow. One night, when Lauka'ie'ie was sleeping, she dreamed of flying past the valley lands of Hawai'i, and across, Maui, Moloka'i, O'ahu, Kaua'i, Ni'ihau, Ka'ula, and on to *Lehua*⁹, where she saw a handsome young chief, named Kawelonaakalāilehua. It was this chief that was destined to become her husband, and who was fetched to Hawai'i, by her elder relative, Pūpū-kani-'oe... [January 5-19, 1894]

Pūpū-kani-'oe and her companions from *Lehua* and Ka'ula, sailed in their canoe, passing Kaho'olawe, guided by the sharks of those waters. They entered the channel of 'Alenuihāhā, and her companions, who had never before seen Hawai'i, saw the mountains of **Mauna Kea**, **Mauna Loa** and Hualālai rising above. Ka-welona-a-ka-lā-i-*Lehua* inquired of Pūpū-kani-'oe, the names of those places on Hawai'i. She answered, telling them that they were the mountains on which dwell the women who wear the *kapa hau* (snow garments), and who covered the lands down to where the woods were found. Pūpū-kani-'oe then chanted:

Ma'ema'e i ka hau ka luna o Mauna Kea,
Ōpū iho la iluna o ka hinahina,
Ka pua luhiehu a ka māmane,
He lama wale ala no ke ike aku,
Aloha mai nei hoi ka Aina...

Pure are the snows atop **Mauna Kea**
Little clumps settled upon the hinahina,
Adorned with the blossoms of the *māmane*,
It looks like a light when seen,
There is such love for the land...

She then called out, describing Haleakalā:

Aia ho'i ke kuahiwi kaulana o Maui,
Ke kunihi a'e la i ka makani,
Akāka wale no Haleakalā,
Ka 'uwē a ke kini of Ko'olau...

Behold the famous mountain of Maui,
Standing boldly in the winds,
Haleakalā is clear,
And the multitudes of Ko'olau cry out...

⁹ The lengthy narratives include site descriptions and traditional accounts for various locations on each of the named islands.

The party then passed Kohala, and arrived at Waipi'o, where they landed. [March 9, 1894; Maly, translator]

Po'e Lawai'a Manu: Bird Catchers in Old Hawai'i (1895)

Among those people who would have most often frequented the uplands of the *'āina mauna*, being both the forested region and the upper plateau and mountain slopes were the *lawai'a manu* or *kia manu* (bird catchers). Their knowledge of the mountain lands, trails, shelters, and resources was widely valued throughout the nineteenth century, and the bird catchers were often sought out as guides and for their expertise in matters of land.

There are a number of traditional accounts describing the arts of the class of people who caught native birds in order to collect their feathers, or catch birds which were considered delicacies in the Hawaiian diet. And several methods of bird catching were widely practiced by native Hawaiians. The practices of the *kia manu* were also dictated by *kapu* and a code of conduct. Accounts from the later period in the life of Kamehameha I, reported that as a result of growing commercial activities in the islands, traditional methods of harvesting resources and catching birds, were changing (Kamakau, 1961 & Emerson, 1895). Regarding these changes, and the response of Kamehameha I to careless collection of bird feathers, in which the birds were killed, Kamakau (1961) wrote:

...Troubles that arose were not of his [Kamehameha's] making, and those that had to do with disputes about religion came after his time. He ordered the sandalwood cutters to spare the young trees and, not to let the felled trees fall on the saplings. "Who are to have the young trees now that you are getting old?" he was asked and he answered, "When I die my chief and my children will inherit them." He gave similar orders to bird catchers, canoe makers, weavers of feather capes, wood carvers, and fishermen. These are the acts of a wise and Christian king who has regard for the future of his children, but the old rulers of Hawaii did the same... [Kamakau, 1961:209-210]

In 1895, N.B. Emerson, published an article pertaining to bird catchers of old. The article notes the importance of the Hilo region forest lands for the favored honey creepers, which were sought after by the *kia manu*. The following narratives describing the arts and practices of the *kia manu*, and the nature of the forest and birds therein, were collected by Emerson from native practitioners:

...Bird-catching, while of great fascination, was a most exacting profession, demanding of the hunter a mastery of bird-craft and wood-craft attainable only by him who would retire from the habitations of men and make his home for long periods in the wooded solitudes of the interior.

The kings of Hawaii constantly had men in their service who followed the vocation of bird-catching, called *kia-manu*. It is related of one of the ancient kings that at a critical juncture in his affairs he led off his warriors into the mountains with the purpose or pretext of engaging in bird-catching for plumage. But this is not a business in which a multitude can successfully engage in close proximity to each other. The *kia-manu* needs room; he must do his work in solitude, with the field to himself.

The feathers of Hawaiian plumage-birds may be divided, as to color, into several classes:

1. Pure yellow. The yellow feathers were taken either from the *o-o* or from the coat of the still rarer *mamo*. Those of the *mamo* were of a deeper tint, but of shorter staple than the former, and as the bird was shy and difficult of capture, they were greatly coveted for the richest articles for feather-work, cloaks, capes and necklaces. It is a question still in dispute whether this rare bird is not extinct.

The *o-o*, though a proud and solitary bird, was more prolific than the *mamo*. Its coat was of deep black, set off with small tufts of clear yellow under each wing

and about the tail and in some varieties about the neck and thighs. Those from the axial were called *e-e* and were the choicest, and being of a longer staple were in the greatest demand for the *lei*.

No swan's down can surpass, in delicacy of texture, the axillary tufts of the *o-o*.

2. Red. Scarlet, or red feathers were obtained from the body of the *i-iwi* and the *akakani* (*akakane* or *apapane*). It may be disputed whether one or the other of these is not to be designated as common. The color-tone of the feathers varies. They were song-birds, and when on the wing, displaying their plumage of black and scarlet, were objects of great brilliancy. There [page 102] was, I am told, another red-feathered bird called *ula-ai-hawane*, a beautiful thing in scarlet, wild and shy, a great fighter, a bird very rarely taken by the hunter. Its plumage would have been a welcome addition to the resources of Hawaiian feather-workers had it been obtainable.
3. Green. Feathers of an olive green were obtained from the *o-u*, and from the *amakihi* those of a greenish-yellow. Though of less value than some others, the green feathers were an important resource in adding variety to Hawaiian feather-work. This color, however, was not used in the richest and most costly cloaks and capes.
4. Black. Feathers of black were obtained from the *o-o*, *mamo*, *i-iwi* and *akakani*, not to mention numerous other sources, including the domestic fowl, which also contributed feathers of white.

While this list is not intended to be exhaustive, mention should be made of the *koa'e* (bosen, or tropic bird), which furnished two long feathers from its tail used in making kahilis. Though this bird took its prey from the ocean, its nest was in the face of the steep mountain palis and in the cliffs of the small, rocky island, Kaula, Nihoa, Lehua, and Necker. There are two varieties of this feather.

The methods used by one hunter in the capture of the birds differed from those used by another. They also varied somewhat, no doubt, in different districts, on the different islands, at different seasons of the year and seen in the different islands, at different hours of the day.

There could be nothing stereotyped in the way the hunter of birds practiced his art. While the method might remain essentially the same, it was necessarily subject to a wide range of modification, to suit the skill and ingenuity of each hunter in his efforts to meet the habits and outwit the cunning of the birds themselves.

For the purpose of observing more closely the manner of life and methods of the bird-catcher, let us transport ourselves in imagination to the interior wilderness of Hawaii, and live for a time amid the stretches of forest with which the climate of rainy Hilo clothes the volcanic debris of active Kilauea and extinct **Mauna Kea**. [page 103]

There were two seasons of the year favorable to the operations of the hunter; first, during the months of March and April, extending into May, and second, during August, September and October.

These two bird-seasons corresponded with the two flowering seasons of the *lehua*. The *lehua* of the lower woods flowered in the earlier season, that of March, April and May, at the same time with the *ohia-ai*, (the fruit-bearing *ohia*), commonly known as the mountain-apple.

The upland *lehua*, situated in a more temperate climate, flowered during the later season, that from about the beginning of August till the last of October or into the early part of November.

The birds in general moved from upland to lowland, or vice versa, to be in at the flowering season, and many of the hunters moved likewise.

In the early season (*kau mua*), the birds, except the *mamo*, who was a true highlander and despised the lowlands, migrated to the lower levels, *makai*. Later in the year, during the second season, the birds were to be found in the more interior uplands.

The yellow-green *amakihi*, and the *elepaio*, famous in legend and poetry, were exceptions to this rule. These two birds were insectivorous, in addition to being honey and fruit-eaters.

A bird-hunting campaign was not an affair to be lightly entered upon. Like every other serious enterprise of ancient Hawaii, a service of prayer and an offering to the gods and aumakuas, must first be performed... Having selected a camp, he erects the necessary huts for himself and his family. His wife, who will keep him company in the wilderness, will not lack for occupation. It will be hers to engage in the manufacture of *kapa* from the delicate fibers of the *mamake* bark, perhaps to aid in plucking and sorting the feathers.

The early morning, when the vapors are beginning to lift, is the favorite time for most of the birds to visit their aerial pasturage. A few hours later, when the sun has had time to dull the edge of the sharp morning air, and to clear away the fogs, the aristocratic *o-o* will come to his more fashionable breakfast. Necessity makes the hunter an early riser, that he may repair to his chosen ground before the morning sun has begun to illuminate the summits of **Maunakea** and **Maunaloa**.

Behold him then setting forth at dawn from his rude thatched cottage, with the implements of his craft in hand. The bag, or wallet, hanging at his side contains, besides food for himself, fine lines twisted from tough *olona* fiber, to be used in making snares, also a supply of tenacious bird lime carefully wrapped in leaves of the ti plant.

This important article was made in several ways. The sticky gum of the breadfruit tree was sometimes used but that of the *papala*, and of the *oha* were more highly esteemed. Sometimes a compound of two or more was made, being mixed and purified while gently boiling with the water over a fire.

The most important implements of the hunter's craft were his spears, called *kia*, or *kia-manu*, a name often used to indicate his vocation [Figure 4]. They were long, slender, well polished poles, like fishing rods, made sometimes of dark spear wood, *kaui*, also of tough *ulei* wood from Kona. Bamboo was sometimes used, but for some reason or other it was not a favorite. The birds did not take to it. And as they were the ones whose tastes were most to be considered, that settled the question.

There were different styles of dressing the *kia*, and no one can assume to be acquainted with them all. One method is that illustrated in the cut.

The hunter himself must remain concealed beneath the shelter of the foliage, or, if that be too scanty, under a covert extemporized from material at hand, fern leaves, or *i-e-i-e* fronds. If the day is a good one and the charm of his prayer works well, the birds will presently make their appearance, singly, or by twos and threes. Anon a struggling and a

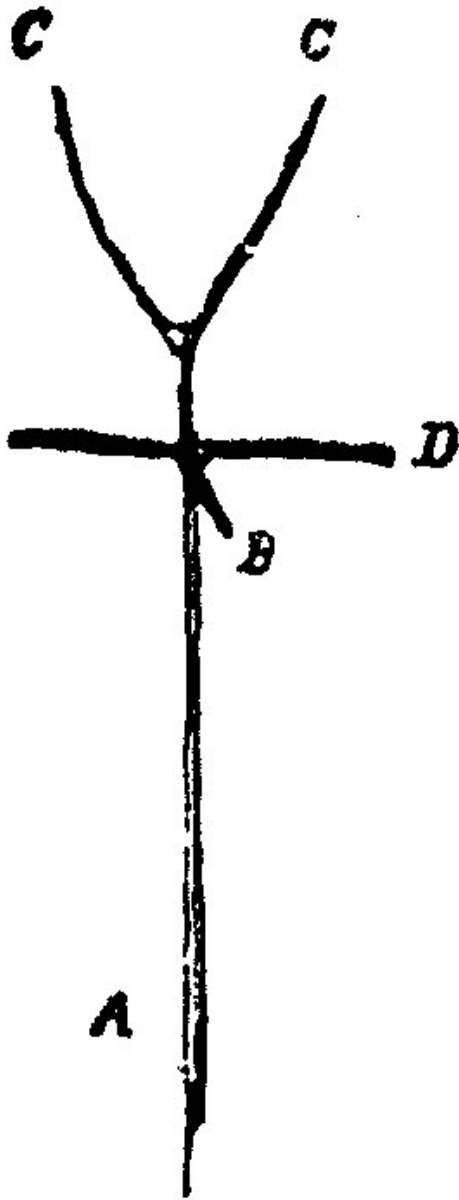


Figure 4. Kiamanu.

- A. Portion of the pole, *kia-manu*.
- B. The hook, *kihele*, by which the pole is hung in position high up in the tree.
- C. The forked branch, *lalua* or *amana*.
- D. The cross-piece, *kano*.

of its wings, if extended in an effort to fly. [page 107] It was a common practice to preserve alive in special cages certain birds to be used as decoys, feeding them daily with their nectar-flowers. The *o-o*, *i-iwi* and *akakani* were thus treated. In time these wild things became quite domesticated and were of great service.

The *o-o*, with his suit of jetty black touched with points of gold, was of a jealous and domineering spirit that would allow no other bird to enjoy a meal peacefully in his

fluttering of wings an- [page 106] nounces to the watchful hunter that the little creatures have alighted on his poles and are held fast by the sticky gum.

It would seem as if the alighting of one bird on the limed fork or cross-piece of the hunter's pole did not deter others from seeking to put themselves in the same plight. At the right time the hunter cautiously withdraws one pole after another, and using care that no bird escapes, transfers the captured birds to the bag that hangs at his side, or to a cage of wicker work that is kept at hand.

It seems unaccountable, almost incredible, that any wild thing of the air should prefer alighting on the limed twig of the hunter's pole to seeking refreshment elsewhere from the scarlet honey-flowers of the *lehua* which at this season abound. The explanation given me by the hunter was that he depended entirely upon the efficacy of his incantations to draw the birds to his *kepau* (birdlime). Sometimes instead of this formal arrangement of fork and cross-piece, a small branch with several twigs attached, the whole plentifully smeared with gum, was bound to the tip of the pole and displayed as before.

The hunter often made his pole attractive to the birds by baiting it with their favorite honey-flowers. This was done in a variety of ways, but always with an effort to imitate nature, appreciating that the highest art is to conceal art. With this intent he sometimes attached to his pole a flowering branch artfully smeared with gum, or the *kepau* would be applied directly to some part of the tree where the hunter's judgment told him the bird would alight to feed.

Another ingenious plan was the use of the decoy, called *maunu* (literally bait). For this purpose the gay *i-iwi*, or *akakani*, were among the favorites, perhaps because they were likely to be captured earliest in the day. The decoy, still alive, was tied in an upright position to the prong at the tip of the pole, together with an arrangement of flowers. It was necessary to smear the gum at such a distance from the decoy as not to be within reach

presence. He no sooner espied the hunter's decoy, though of his own species, in quiet possession of a flowery perch than he would alight to dispute with him its tenancy and seek to drive him away, thus himself becoming a captive. The note of the *o-o* is one that no one who has heard it can ever forget; it may be properly described as "most musical and most melancholy".

It delights to sound it forth from the topmost branch of some over-looking forest-tree, either as a call to its mate, or in pure joy of existence, as a token that its delicate tastes have been satisfied.

The *mamo*, from the richness and brilliancy of its coat, as well as from the pride and audacity of its nature, was often spoken of as the prince, or king, of Hawaiian plumage-birds. If one is not to distrust the enthusiasm of a Hawaiian writer on birds, its actions and manners entitled it to that distinction. To quote from this writer: "The *mamo-kini-oki* was the king of the small birds of the uplands. This bird was most ostentatious in its bearing, proud and lordly. Look at it perched on its tree prinking and preening and displaying itself, turning this way and that, disdaining the *o-o*, *i-iwi* and other birds that approach, attacking and driving away any bird that comes to alight upon its tree," etc., etc. In addition to its mixture of pride and vanity the *mamo* had a reputation for great shrewdness and for being full of alert suspicion and watchfulness. The hunter had to use all his wits to compass its capture.

While the *o-o* haunted the depths of the forest and ranged equally the lower as well as the higher forest-regions, the *mamo* made his home principally in the upper borders, where the forest-vegetation is seen to have changed from its dense massing into a more open and park-like arrangement. Here the *lehua* no longer reaches its full height as the lord of the forest, and, [page 108] becoming somewhat more branching and scrubby, yields its supremacy to the still more imposing *koa*.

The means generally employed for the capture of the *mamo* was the snare, *pahele*, baited with flowers or fruit.

The flowers of the *ke'a*, *oha*, *lehua* and *mamane* were often used, also the flowers and fruit of the banana, and the fruit (*kokole*) of the parasitic *i-e-i-e*, of which the *mamo* was very fond. The *hawane*, a palm that grew in the protection of the upland forests of Hawaii, had a flower, the nectar of which the *mamo* was said to esteem as a food and the hunter sometimes succeeded in capturing this bird by means of gum applied directly to its flower-stalk.

The greatest art was necessary in arranging the snare and bait for the *mamo*. The bird was most shrewd and observant, and if he detected any traces (*meheu*) of the hunter's work, from breakage or trampling his suspicions were aroused and he would take his leave at once. Having baited his trap and fixed in position his snare, which was a simple noose at the end of a fine line, fifteen or more yards long, the hunter placed himself in hiding, with his line in hand, and began to call the bird with an imitation of its penetrating whistle.

If the *mamo* was within hearing and pleased with the hunter's call, he would answer, and soon be on the wing in that direction to make acquaintance of the siren that had called him. At the bird's approach the hunter modulates his tone, only piping forth an occasional reassuring note, to lead the *mamo* still nearer, relapsing into silence and motionless quiet soon as the bird has come within sight of the baited trap. Having made his reconnaissance and satisfied himself that all is right, the bird alights and, warily cocking his head to one side and the other, to observe more closely, he moves forward to taste

the hunter's bounty, in doing which he must set his foot within the reach of the nicely placed snare;—on the instant the bird-catcher pulls his line and the bird is his.

One old bird-catcher aroused my incredulity by the surprising tale, which I recommend the readers of this article to take with as many grains of salt as are necessary for the attaching of a bird, that so long as the hunter remained rigidly motionless and kept his features hidden from the sight of the [page 109] *mamo*, by bending his head forward upon his chest, not even venturing to open his eyes, lest their flash betray him, the little creature took no offence, and would even go so far as to perch unsuspectingly upon the hunter's head and shoulders. "*Credatiste Judaeus! Non ego.*"

The plumage-birds, like everything else in Hawaii, were the property of the *alii* of the land, and as such were protected by *tabu*; at least that was the case in the reign of Kamehameha I, and for some time before. The choicest of the feathers found their way into the possession of the kings and chiefs, being largely used in payment of the annual tribute, or land tax, that was levied on each *ahupuaa*.

As prerequisites of royalty, they were made up into full length cloaks to be worn only by the kings and highest chiefs. Besides these there were capes, *kipuka*, to adorn the shoulders of the lesser chiefs and the king's chosen warriors, called *hulumanu*, not to mention helmets, *mahiolo*, a most showy head-covering. The supply needed to meet this demand was great, without reckoning the number consumed in the fabrication of lei and the numerous imposing *kahili* that surrounded Hawaiian royalty on every occasion of state.

It is, therefore, no surprise when we learn that in the economic system of ancient Hawaii a higher valuation was set upon bird-feathers (those of the *mamo* and *o-o*) than upon any other species of property, the next rank being occupied by whale-tooth, a jetsam-ivory called *palaoa pae*, monopolized as a perquisite of the king.

While the plumage-birds were of such diminutive size and so difficult of capture that it would not have been profitable to hunt them for food, they were in reality such delicacies for the table, that the hunters were quite willing to use them in that way.

And, in truth, it is difficult to see what better disposition could have been made of them in many cases. In the case of the *mamo*, *i-wii*, *akakani*, *o-u* and *amakihi* the extent of skin-surface left bare after stripping the plumage from the bird was so considerable that it would have been an act of cruelty, if not of destruction, to have set it loose in such a condition. It was entirely different with the *o-o*. In its case the injury done was trifling and constituted no bar to its being immediately released. [page 110]

Kamehameha I is said to have reproved his bird-catchers for taking the life of the birds. "The feathers belong to me, but the birds themselves belong to my heirs," said the considerate monarch.

It was the practice of some hunters to release the first bird caught, unplucked, as an offering to the gods.

The greatest care was always used to keep the feathers from becoming ruffled or wet in rainy weather.

The *mamo*, *i-iwi* and such birds as were destined to be eaten after being plucked, were, as soon as caught, killed by pressure over the thorax and then wrapped in the outer dried parchment of the banana-stalk, and packed in the hunting bag. The *o-o* and birds destined to be released were secured in cages.

As a means of accomplishing the double purpose of protecting himself and of preserving the plumage of his birds from injury by the wet, the hunter was provided with a long, hooded cloak that encased him from his head to his knees. The basis of this garment was a net-work, into the meshes of which were looped strips of dried ti-leaf that hung point down on the outside. The method was almost identical with that used in roofing a grass hut. The garment might with propriety be termed a thatched cloak. Its water-shedding power is said to have been most excellent, of which it had opportunity to give ample proof in the fierce, tropical, down-pours of the region.

Hooded and encased in this unique garment, the hunter must have presented a fantastic resemblance to a Capuchin monk.

The days of the bird-catchers of ancient Hawaii are over. Their place has been taken by those who know not *Ku-huluhulumanu* and the other gods of the craft. In their hands, instead of the snare and the pole, with its gum, its flowers and decoy, there is the deadly shot-gun.

The birds that were once the pride of Hawaii's woods have to contend for their existence under conditions imposed by the marauding mynah and thievish sparrow, that seem to have been imported for their destruction. Emerson, 1895:111]

“Ahele Manu” – Bird Catching Techniques on the Mountain Lands

While researching various ethnographic records of the Bernice Pauahi Bishop Museum (BPBM), the author reviewed Hawaiian language papers (handwritten and typed) collected by island historian, Theodore Kelsey. Kelsey was born in Hilo in the late 1800s, and spent his entire life speaking with elderly Hawaiian people, collecting their stories, and translating their writings. Among his papers found at the Bishop Museum (BPBM Archives–SC Kelsey; Box 1.5), are notes on various aspects of Hawaiian culture including bird catching. Kelsey's informant, was the elder Reverend Nālimu, who shared his account of bird catching, both as a means of providing feathers used for making Hawaiian emblems of royalty, and with other birds, as a food source. The account specifically references localities in the uplands of the Hilo District, and is a first-hand description of traditional and customary practices which had broad application in the mountain regions.

The following Hawaiian texts are presented verbatim as recorded by Kelsey in c. 1921 (including his use of diacritical marks). The English translation of the Hawaiian narratives was prepared by the author of this study, and reflects the basic tenor of the Hawaiian narratives. It should be noted here, that in the Hawaiian language, occurrences of certain words naturally imply a specific action or statement, which is reflected in the translation:

“Ahele Manu.”

by H.B. Nalimu

Po'e kia manu o Laa, oia ka po'e ahele manu, kekahi me ka laau a kekahi me ka lehua. O ka mea ahele manu ma ka lehua malaila ka puka e hanai kokoke i ka lehua, he puka paa ke-ia. Kekahi piko o ke kaula ma ka la-la o ka 'ohi'a e paa ai. Elima, eono paha anana ka loihi o ke aho mai ka puka mai a hiki i ka lima o ke kanaka e paa nei i ka piko o ke aho. A o ka puka aia ma kahi kokoke i ka lehua e kiko aku ai ka manu i ka lehua. I ka wa e lele mai ai ka manu lele no a ku maluna o ke-ia puka e kiko aku i ka lehua. A ia manawa e huki ai ke kanaka i ka piko o ke kaula a paa ka wawae o ka manu. Pii ke kanaka iluna a lawe i ka manu a hana hou aku i kela puka malaila. O ka akakane a me ka 'iwi, a me ka 'o-o' iluna o ka pua lehua. Ahele me ke aho olona' makalii. Maluna o ka mai'a pala e ahele i' ai ka manu o-u'.

“Kāwili Kēpau.”

O ke kepau oia ke kohu o ka 'ulu. E 'oki-oki ai i ka 'ulu a kahe mai ke kohu ke'oke'o, a i ka wa e maloo ai ua kohu 'la i ke ahiahi alaila ua paa a'e ua kohu la.

Hele oe e ho-ulu-ulu ke-ia kohu a pau. Ho-ulu-ulu a nui, alaila lilo a'e'la ua' kohu nei i kepau. Alaila hele oe e 'ohi i hookahi kukui maka a hemo kona iwi 'a 'o kona 'i'o malama 'oe kela'. Hele hou oe i ka' pa-ihi ku-kepau (kind of clover) he pa-ihi 'ele-ele ia, a hoohui me ke kukui maka, alaila nau a wali ke kukui maka me ka pa-ihi. Hookomo iloko o ke kapa wauke (he mea uua ia), alaila 'uwi' i ka wai o ke kukui a me ka pa-ihi iloko o ka 'opihi, oia ka "ipuhao" e kupa 'ai iluna o ke kapuahi. I ka wa e hoomaka ai e paila alaila 'oki-oki i ke kepau a lili'i a hookomo iloko o ke-ia wai kukui me ka pa-ihi i paila ia. Kii elua ni-au ai 'ole ia, mau laau lili'i paha e koali ai iloko o ke-ia wai paila.

Pela e hanai a pau kela' wai a mo'a kela' kepau. Hookomo iloko o ke poho 'opihi a i 'ole he la-i' a wahi i ka la-i'. Kāwili 'iuka a'e nei o Mokau-lele. Neenee ke pulu 'ohi'a o ia wahi ilalo o ka pahoehoe.

Ilalo no oe e ku ai o ka pahoehoe a hana oe i ke kepau iluna o ka pua lehua. Ina ekolu, eha' pua lehua au i kāwili ai i ke kēpau alaila i ka wa e pili ai kekahi pua lehua i ka manu alaila alualu a loaa. Pee hou oe iloko o ka pulu 'ohi'a (kāhi o ka lau 'ohi'a e luhe ana ilalo, oia ka pulu 'ohi'a) a pili hou kekahi manu. Opa' ke poo o ka manu a make. Hookomo iloko o kekahi eke. Hala ekolu paha alaila ho'i, nui ka manu, i hookahi kaau, iwakalua, kanakolu paha. A kela manu makali; ua momona—kuhikuihiki kona i'o, momona. Oia ke kāwili kēpau.

“Laau Kia Manu.”

Ekolu, eha' paha anana ka lo-ihi o ka laau. Kau ia ka pua lehua iluna o ia laau nei mai kekahi 'ao-ao o ka laau a hiki i kekahi poo o ka laau. Hana elua kanaka, kekahi ma kekahi laau a kekahi ma kekahi. Kepau maluna o ka laau a he mau pua lehua mawaena o ke-ia mau kēpau—he laau kia manu ia [_____]l. Olau ka Aina kia manu a me **Piihonua**. Nui ka manu o-o ma **Puu O-o**. Malaila ka po'e kia manu e hele ai a loaa na lei hulu no na lili. O Pana-ewa kekahi wahi kia manu.

Huki ka laau kia manu iluna mawaena o na 'ohi'a elua. Hana me ka 'upena kekahi. Huki ia iluna ka 'upena, hookahi laau maluna, hookahi laau malalo. He 'upena 'olona' maka hakahaka, a he kaula 'olona' ma na poo. 'Elima, eha', ekolu paha anana kela' 'upena palupalu. Lele no ka manu, paa ka wawae, paa ka pekekeu. Ina' hookahi, elua manu, waiho no pela', oia na manu e kahea ana i na manu e a'e. Nui ka manu, hookuu ilalo ka 'upena a huki hou iluna. He ulu 'ohi'a ma kekahi 'ao-ao a me kekahi 'ao-ao. Oia ka hana ana o ka po'e lawai'a manu. Ho'i i ka hale e wehe ai ka hulu o ka manu 'o-o'. Piha ke po'i i ka hulu a haku lei. Malalo o ka po-ae-ae o ka o-o' oia ka hulu a-a', a maluna o ka piapia oia me pue.

Bird Snaring (or Trapping)

Bird catchers (*kia manu*) of 'Ōla'a were people who snared (*āhele*) birds. Some with branches and others with *lehua* blossoms. The individual who snared birds among the *lehua* made a snare (lasso) close to the *lehua* flower, the snare was secured there.

One end of the line was securely fastened on the branch of the 'ōhi'a. The cord of perhaps five or six fathoms long, extended from the lasso (on the branch) to the man's hand where the end of the line was held tightly. The snare was placed close to a *lehua* blossom, where the bird would step (*kīko'o*) to the *lehua*. At that time, the man would then pull the end of the cordage and secure the feet of the bird. The man then climbed the tree, took the bird, and he would make the snare there again. The 'akakane (*apapane*), the 'i'iwi, and the 'ō'ō were caught up in the *lehua*, snared with fine *olonā* cordage. The 'ō'ū bird was snared while it was on the ripe banana fruit.

Preparing Bird Lime to Kāwili, or Ensnare Birds.

The bird lime (*kēpau*) is made from the sap of the breadfruit. Cut the breadfruit bark and the white sap flows, and when the sap is dry, say in the evening, the sap is hardened. You go and gather the sap. When enough has been gathered, the sap can be made into bird lime. Then you go and gather some raw *kukui*, removing the shell, you keep its meat. You then go and get the “clover” for making bird lime (*‘ihi-ku-kapu*, the *Nasturtium samentosum*), it is a black *pā‘ihi*, and you mix it with the raw *kukui*. Then you chew it, and the *kukui* and *pā‘ihi* become slimy. This is put into a *wauke* bark cloth (it is a tough piece), then the juice of the *kukui* and *pā‘ihi* are squeezed into the *‘ōpihi* (shell), it is the “pot” for cooking the broth over the fire. When it starts to boil, the (*‘ulu*) gum is cut into small pieces and put in the juice of the *kukui* and *pā‘ihi* so it can boil. Then get two coconut mid-ribs or perhaps little sticks to stir this boiling juice. This is how it is done until the juice is cooked and becomes the birdlime. It is then placed into the empty *‘ōpihi* or a *ti* leaf, wrapped up in *ti* leaves. Kāwili is in the uplands adjoining Mokaulele. Then go to where there is low branching *‘ōhi‘a* (*pulu ‘ōhi‘a*), where the *pāhoehoe* is below.

You are below on the *pāhoehoe*, and you apply the bird lime above around the *lehua* flowers. Now you *kāwili* (twist, i.e. apply) this bird lime in among three or four *lehua* flowers, then when a bird is stuck by one of the *lehua* that blossoms, you free it and it is caught. You then hide again among the low *‘ōhi‘a* branches (a place where the *‘ōhi‘a* tops droop down, that is the *pulu ‘ōhi‘a*), and catch another bird. You squeeze the birds head and it is killed. It is placed into a bag. Returning (home) perhaps around three ‘o clock, there are many birds, perhaps forty, twenty, or thirty. Those small birds; when fat—the meat is tasty and sweet. That’s how one prepares *kawili kēpau*, or bird lime to ensnare birds.

Snaring Birds on Branches.

The (decoy) branch is perhaps three or four fathoms long. *Lehua* blossoms are placed on this branch, from one side of the branch up to the tip of the branch. Two men do this job, one at one (end of the) branch and one at the other. Bird lime is placed on top of the branch along with many *lehua* blossoms in between this bird lime—this is a bird catchers (*kia manu*) branch [drawn] |_____|. ‘Ōla‘a and ***Pi‘ihonua*** are lands of bird catchers. There are many ‘ō‘ō birds at ***Pu‘u ‘Ō‘ō***. It is there that the bird catchers go to get the feathers for adornments (*lei*) of the chiefs. Pana‘ewa is also a place of the bird catchers.

The bird catchers (decoy) branch is pulled in between the *‘ōhi‘a lehua* trees. One (person) uses the net. The net is pulled up, one branch is above, one branch is below. It is an open (wide) meshed *olonā* net (*‘upena olonā maka hakahaka*), and *olonā* cordage at the tip. It is a soft (pliable) net perhaps five, four, or three fathoms long. As the birds fly their feet are caught, or their wings caught. Now if there are one or two birds, they are left, these are the birds that call out to the other birds. When there are many birds the net is let down (the birds taken), then the net is pulled up again. *‘Ōhi‘a* growth is all around. So this is the work of the “bird-fishers,” or *lawai‘a manu*. They return to the house and then remove the feathers of the *manu ‘ō‘ō*. When the container is filled with feathers, a *lei* is made. Below the wing-pit is where the male *‘ō‘ō* bird feathers are, and above on the back by the tail, are the pale yellow feathers. [Nalimu in Kelsey; Bishop Museum , Archives—SC Kelsey; Box 1.5; Maly, translator]

“Kao Hooniua Puuwai no Ka-Miki” (The Heart Stirring Story of Ka-Miki)

Perhaps one of the most detailed native traditions which includes rich accounts of place names and practices of natives of the land, and describing features of Mauna Kea, Humu‘ula, Ka‘ohe, Pi‘ihonua and the *‘āina mauna*, is a historical account titled “*Kao Hooniua Puuwai no Ka-Miki*” (The Heart Stirring Tale of Ka-Miki). The story of Ka-Miki was published in the Hawaiian language newspaper *Ka*

Hoku o Hawaii between 1914 to 1917. It is a long and complex account that was recorded for the paper by Hawaiian historians John Wise and J.W.H.I. Kihe with contributions by local informants.

While “Ka-Miki” is not entirely an ancient account, the authors used a mixture of local traditions, tales, and family accounts in association with place names to tie together fragments of site specific history that had been handed down over the generations. The complete narrative includes historical accounts of more than 800 place names (many personified, commemorating particular individuals) around the island of Hawai‘i. While the personification of specific individuals in this account, and their associated place names may not be entirely “ancient,” such place name-person accounts are common throughout Hawaiian traditions (as noted in the preceding *mo‘olelo*); and the locational documentation within the “story of Ka-Miki” is of both cultural and historical value.

The selected narratives below, are excerpted from several sections of the tradition, and provide readers with descriptions of the land, resources, areas of residence, and practices of the native residents, as handed down by *kama‘āina* (those familiar with the land). The English translations (Kepā Maly, translator), are a synopsis of the Hawaiian texts, with emphasis upon the main events of the narratives. Also, when the meaning was clear, diacritical marks have been added to help with pronunciation of the Hawaiian.

Synopsis of Translations from the Historic Account of Ka-Miki

This *mo‘olelo* is set in the 1300s (by association with the chief Pili-a-Ka‘aiaea), and is an account of two supernatural brothers, Ka-Miki (The quick, or adept, one) and Maka‘iole (Rat [squinting] eyes). The narratives describe the journey of the brothers, as they walked around the island of Hawai‘i along the ancient *ala loa* and *ala hele* (trails and paths) that encircled the island. During their journey, the brothers competed alongside the trails they traveled, and in famed *kahua* (contest fields) and royal courts, against *‘ōlohe* (experts skilled in fighting or in other competitions, such as running, fishing, debating, or solving riddles, that were practiced by the ancient Hawaiians). They also challenged priests whose dishonorable conduct offended the gods of ancient Hawai‘i. Ka-Miki and Maka‘iole were empowered by their ancestress Ka-uluhe-nui-hihi-kolo-i-uka (The great entangled growth of *uluhe* fern which spreads across the uplands), who was one of the myriad of body forms of the goddess Haumea, one of the creative forces of nature—also called Papa or Hina— and was also a goddess of priests and competitors.

The excerpted narratives from Ka-Miki, in this study, include place name accounts that range from the summit of Mauna Kea, to the plains of Humu‘ula, Ka‘ohe, and Waimea, and to the depths of Waipi‘o Valley. The names—*Nana-i-ke-kihi-o-Kamalama* and *Nana-i-kaulu-o-Kamalama*—by which Ka-Miki is called while ascending Mauna Kea, and the names by which he was empowered while undertaking his various tasks, are also the names of stars known in the Hawaiian skies. In the Hawaiian cultural context, such narratives demonstrate depth of the relationship of various points of the heavens, land, and resources to one another—

Born in *‘e‘epa* (mysterious – premature) forms, Ka-Miki and Maka‘iole were the children of Pōhaku-o-Kāne (*kāne*) and Kapa‘ihilani (*wahine*), the *ali‘i* of the lands of Kohana-iki and Kaloko, North Kona. Maka‘iole was the first born child and Ka-Miki was the second. Following their birth, Ka-Miki was given up for dead and placed in the cave of Pōnahanaha, and though Maka‘iole was of a misshapen form, he was taken to his paternal grandparents Pohokinikini and Pu‘uwalea to be cared for. Being aware of all that took place at the time of their birth, Ka-uluhe retrieved Ka-Miki from the cave and reared him at Kalama‘ula on the heights of Hualālai. It was there that Ka-uluhe began instructing Ka-Miki in the uses of his supernatural powers. Maka‘iole joined his young brother and together, they learned various techniques of contest skills, in preparation for their journey around Hawai‘i Island.

After a period of training and tests, Ka-uluhe instructed Ka-Miki to journey to the *hālau ali‘i* (royal compound) of one of their elder relatives, ***Poli‘ahu***. Poli‘ahu and her companion

Lilinoe, were the guardians of **Waiau** and the sacred water of Kāne. While Maka-‘iole was to go collect the ‘awa (*Piper methysticum*) of the god Luanu‘u at Waipi‘o. These two items would be used in an ‘ai-lolo (ceremony of graduation), commemorating sacred nature of the brothers and completion of their training in ‘ōlohe skills. Ka-uluhe told the brothers:

Waipi‘o Ha‘iwahine ‘awa of Waipi‘o	<i>O ‘oe e Maka-‘iole, e ki‘i ‘oe i ka ‘awa ‘ili lena a ke akua e inu ala, a ‘ona, ‘ōleha, kūnewanewa nā maka, aia la ia i ka pali kapu o Waipi‘o i ka poli (ka-ulu) o Ha‘iwahine - i ka papa lohi mai o ‘Āpua...</i> ...You, Maka-‘iole, are to fetch the yellow barked ‘awa which the gods drink till they are drunk and bleary eyed, till their eyes are reeling, it is the ‘awa that is there along the sacred cliff of Waipi‘o in the breast (the ledge) of Ha‘iwahine - at the long plain of ‘Āpua...

Maka-‘iole stood up straight, prepared to fly like the ‘iwa bird soaring upon the winds... The ancestress then called to Ka-Miki, telling him:

Poli‘ahu Lilinoe Waiau Pōhaku-a-Kāne & Pōhakuloa a platform feature on Mauna Kea	<i>...e ki‘i ‘oe i ka wai a Kāne, aia i luna i ka piko o ke kuahiwi i ka hālau ali‘i o Poli‘ahu a me Lilinoe, me ka hānai a lāua o Ka-piko-o-Waiau. Aia malalo mai o kaulu o ka paepae o Pōhaku-a-Kāne e nānā iho la iā Pōhakuloa, o ka ‘ohana ‘ia o ko makuakāne. E ki‘i ‘oe i ka wai no ka ‘awa o ‘olua...</i> ...You are to fetch the water of Kāne which is there atop the summit of the mountain (Mauna Kea), at the royal compound of Poli‘ahu, Lilinoe, and their ward, Ka-piko-o-Waiau. The water is there below the ledge of the platform of Pōhakuakāne, from where you may look down to Pōhakuloa; they are your family through your father’s genealogy. You are to fetch the water that will be used to make the ‘awa for you two...

Telling Ka-Miki to travel with all swiftness, Ka-uluhe then offered a traveling chant, to keep Ka-Miki warm while traveling the trail to the *hālau ali‘i* of **Poli‘ahu** —

A mele for traveling on Mauna Kea	<i>Ala hele mauka la Ala hele makai la Ala hele mehamaha i ke kualono Ala hele kuo-ū ko‘eko‘e He ahi kou kapa e mehana ai which warms you E lala ai i ke ala kapu la A ko kūpuna wahine kino manamana Manamana ke ala nui ou e ku‘u kama E Nana-i-ka-ulu-o-Kamalama</i> <i>Ku ana ho‘olono i ka leo o‘u O ko kūpuna wahine nei la Kū—e, kū la Kū ho‘olono, lono e!</i>	The path goes to the uplands The path goes to the lowlands It is a lonely path to the mountain A damp dreary path A fire will be the wrap Warming you along the sacred trail [Fire] of your ancestress with many body forms Your path will have many branches my child O Nana-i-ka-ulu-o-Kamalama (Ka-Miki) Stand and heed my voice It is I your ancestress Stand, make ready Stand and hear, listen!

Ka-uluhe also told the brothers that they were to:

Lani-mamao items used for an 'awa ceremony	Go to the place of their ancestress Lani-ku'i-a-mamao-loa (whose name is commemorated in the place name Lani-mamao at Waimea); for she had the <i>kānoa</i> ('awa bowl) that was called Hōkū'ula and the <i>mau'u</i> 'awa (strainer) Ka-lau-o-ke-Kāhuli, which would be used in preparing the 'awa ceremony. Ka-uluhe then told Ka-Miki:	
Sacred water of Kāne and Kanaloa; awe inspired by Mauna Kea	...e ukuhi ai i ka wai kapu a Kāne mā lāua me Kanaloa, a e hi'i a'e i ka poli a huli ho'i mai. Maluna mai 'oe o nā kualono, kuahiwi, kuakea, e lehe'i ana ma nā kuamauna, mauna kapu kameha'i ho'opa'e'e i ke kanaka, a moe luhi ka leo—e, 'ae... (...dip into the sacred water of Kāne and Kanaloa and hold it close to your breast while returning. You shall be at the heights of the mountainous region, at the whitened peaks, leaping on the mountain top, the sacred and astonishing mountain, that causes people to go astray, and the voice is wearied by calling out—indeed it is so...)	
Lani-mamao	Ka-Miki and Maka-'iole then set out to complete their tasks, first traveling to meet their ancestress Lani-mamao on the windward plains of Waimea (in the region of Mahiki). [February 5, 1914] The brothers greeted their <i>kupuna</i> with genealogical chants, and gained her recognition of their descent. When Lani-mamao inquired of their journey and quest, Maka-'iole called out to her with a <i>mele</i> (chant):	
Mele 'awa	<i>Aia la ilalo o Waipi'o, I ka pali o Kaholokua'i I ka 'awa 'ili lena I ka papa lohi o 'Āpua A kini o ke akua A ka mano o ke akua A ka lehu o ke akua e inu a—i...</i>	[The 'awa] is there below in Waipi'o Along the cliff of Kaholokua'i wawa The yellow barked 'awa of the long plain of 'Āpua ['Awa] of the 40,000 gods ['Awa] of the 4,000 gods ['Awa] which the 400,000 gods drink...
Lani-mamao exclaimed:		
Luanu'u, the god of ghosts	What is your <i>kupuna</i> thinking of, sending you to fetch the cherished 'awa of Luanu'u-a-nu'u-pō'ele-ka-pō-loa, king of the hordes of ghosts who dwelt at Waipi'o? And where is the water that she told you to fetch? Ka-Miki answered:	
The sacred water of Kāne and Kanaloa (Waiau); sacred platform of Kāne; the mountain mist Kākikepa	<i>I ka wai kapu a Kāne mā lāua me Kanaloa, i ka paepae kapu o ka Pōhaku-a-Kāne, ke na'i 'ia ala e ka 'ohu Kākikepa, e ka 'uwahi noe a ka wahine o ka lua...</i> (It is the sacred water of Kāne and Kanaloa at the sacred platform of Pōhaku-a-Kāne, overcome by the mists, <i>Kākikepa</i>, that is like the steaming mists of the woman [Pele] who dwells at the crater...) [Figure 5]	
The thick mountain fog	Because of the great challenges the brothers would face while going to fetch the 'awa and water of the gods, Lani-mamao tested their 'ōlohe skills to make sure that they were prepared to meet the challenges which lay ahead of them. Lani-mamao set out the supernatural net <i>Ku'uku'u</i> which was also called <i>Kanikawī</i> - <i>Kanikawā</i> [the thick rain belt fog] that trapped and	

likened to a
supernatural
net

ensnared many travelers. She told Ka-Miki and his brother to leap into the net, which they did, she then pulled the net closed and placed high overhead in the rafters of her house. In no time, Ka-Miki had pulled on the lines and caused the net to *ho'omōhala* (to blossom or open), thus the brothers were freed. Lani-maomao then told Nana-i-ke-kihi-o-Kamalama (Ka-Miki):

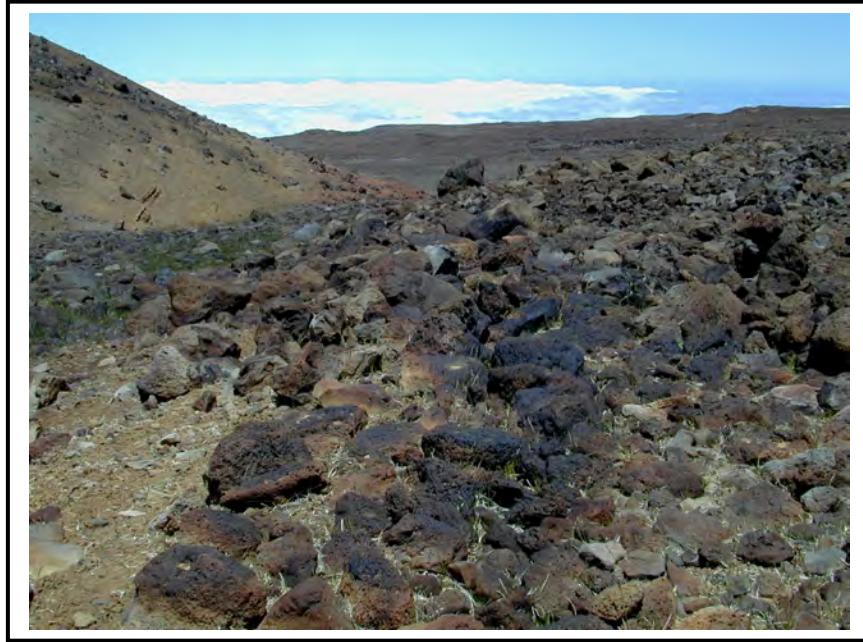


Figure 5. Ka Paepae Kapu o ka Pōhaku a Kāne (Photo KPA-3722)

Great is your alertness, bravery, skill, cleverness, strength, and wisdom; indeed if you possessed only half of your abilities you would not have been able to free yourself. No one has ever escaped from this net, and if you had not been able to free yourselves, your training would not have been adequate. Because of this sign, it is you Ka-Miki who must fetch the 'awa of the ghost king Luanu'u, for only you could succeed. [February 12, 1914]

Waipi'o

Thus, Ka-Miki agreed to go to Waipi'o. Lanimamao then told Maka'iole, that he was to go to fetch the strainer Ka-lau-o-ke-kāhuli [from the plains of Waikōloa]. And this is why Ka-uluhe sent you to me, to test your abilities. Lani-mamao then warned Ka-Miki not to make any sounds lest he awaken the gods as he drew near the ledge of Ha'iwahine. She went on to tell him:

Waikōloa

Sites and
features in
Waipi'o

"When you reach the hill of Pua'ahuku, gaze below to the *heiau* of Pāka'alana, and look upon Waipi'o, there you will see the cliff of Kaluahine. Then look to the side and go into the 'ōhi'a forest of Ka'auana. It is there that you will find the 'awa container called Ka-pāpāiaoa [*Ka pāpāia'awa* (the ceremonial 'awa)], which Luanu'u-a-nu'u-pō'ele-ka-pō uses as his pillow so that no one may take it. Luanu'u will be there in the center of his *hālau hale ali'i* (royal compound), and the assembly of 4,000, 40,000, 400,000 ghosts will be outside."

Mahiki

When Lanimamao completed her instructions, she allowed Ka-Miki to depart. In the blink of an eye Ka-Miki disappeared, leaping to the forest of Mahiki. Leaping again, Ka-Miki arrived at Pua'ahuku, and he looked upon the beauty of Waipi'o. Ka-Miki then turned and leapt to the heights of Ka'auana, and went to the cliff of

The royal
compound of
Luanu'u

Kaholokuaiwa where he saw the royal compound of Luanu'u along the ledge of Hea-ke-Akua, overlooking Nā-po'opo'o (The-nooks and crannies), in Waipi'o, not Kona.

The ghost
hordes of
Luanu'u;

Indeed, there were innumerable ghost beings throughout the region. Ka-Miki called upon Ka-'ohu-kolo-mai-iluna-o-ka-lā'au, and a thick mist settled on Waipi'o, even covering the compound of the god [Luanu'u]. Ka-Miki then leapt and landed upon the ridge pole of the god's long house. Ka-Miki parted the bird feathers, for this is what the house was thatched with, and looked in. He saw that the god and those with him were sleeping, nestled in the mists of the 'awa. Now those in the house were of various shapes and sizes, some with hollow eyes, others with long thin necks, or hands that reached to their feet, truly, things which living people would fear.

Hālau thatched
with bird
feathers

While Ka-Miki was looking in the house, he heard the voice of Luanu'u's lead ghosts, Hio and Nana-nui call out in a *mele*:

mele kahea

*Mū e, Mū a
Mū ho'i, Mū na'ana'a
Mū ho'okiki'i,
Mū ho'olono a lono
Mū kānaka, Mū hauna
Mū hono—a, 'Oia...*

O Mū ghosts, Say Mū
Return Mū, Mū of the protruding bellies
Mū which lean back,
Mū which listen and hear
Mū like men, Mū of the unpleasant odor
Mū of the excrement, So it is...

Upon hearing the call, all of the ghosts arose and left Luanu'u alone in his house with only his guardians Mū-kī and Mū-kā, who also served as Luanu'u's messengers.

Before taking Luanu'u's 'awa, Ka-Miki played a trick on Luanu'u and awakened him from his 'awa induced sleep. Ka-Miki then hid unseen amongst the rafters of the *hālau*. Luanu'u called upon his *kūkini*, Mū-kā and Mū-kī, commanding that they capture the one who would attempt stealing his cherished 'awa.

Luanu'u sent his messengers to places where 'awa was grown or would be consumed.

Sites in Ka'ū,
Kohala, Kona;
And the god
Kapu-ko-malo

Mū-kā was sent to the cliff of Mōlilele by Palahemo, Ka'ū. Mū-kī was sent to start at the cliff of Ka'enamakaohue (at Neue, Kohala), where the wind entered along the cliff of Makanikāhiō. Mū-kī was then to encircle the island searching, Kapākai and Kahuā (Kohala), Kalina'ōpelu, on the plain of Kanikū; and ascend the hills of Anahulu (Kona) to look for a sign from the place of the god, Kapu-ko-malo.

Humu'ula;
The hills of
'Ōma'okoili &
'Ōma'okanihae;
Poli'ahu, Lilinoe
& Waiau; an
'auwai from
the spring

Then they were to circle around to the heights of *Humu'ula* and inquire of '*Ōma'okoili* and '*Ōma'okanihae* if either of them knew who this rascal thief was. "Encircle *Ka-piko-o-Waiiau*, the ward of the chiefesses *Poli'ahu* and *Lilinoe*. Pier down upon the multitudes, and watch the sacred water of Kāne mā¹⁰. Look too, to where they dug the 'auwai (water channel)." Then Luanu'u commanded them to "go to Pu'u-o-Moe'awa in the forest of Mahiki and stand guard."

Mahiki &
Pōkāhi
Pū'awali'i

Mū-kā and Mū-kī departed and the multitudes of other ghosts wandered ('*auana*) through the depths of forests of Mahiki and Pōkāhi in search of this rebel. Ka-Miki heard the indistinct voices of these many ghosts ascend the cliff, and pass through the forests to the heights of Pū'awali'i in the thick mist which ensnares the fished birds (at *Pōkāhi*). When all the ghosts were gone Luanu'u fell

¹⁰ *Mā* is a Hawaiian word that means "and companions, friends," or "and others."

The 'awa
container
of Luanu'u;
'awa preparation

back to sleep with the 'awa container as his pillow. Ka-Miki then leapt from the ridge pole and took Ka-pāpāiaoa which was filled with 'awa that had been made ready to use and bundled into balls [wrapped] with *limu pā'ihī'ihī* (a native *limu pōhaku* (rock moss) weed [*Nasturtium sarementosum*]).

Luanu'u arose greatly angered thinking that he would ensnare this rascal upstart in the net of Nananana-nui-ho'omakua (Nana-nui was also one of Luanu'u's ghost marshals). But unseen, Ka-Miki hid on the ridge pole of the *hālau hale ali'i* where he held the 'awa container. [February 19, 1914]

Luanu'u, also
called Pahulu-nui;
Pahu Hāwea
Pāka'alana

Luanu'u, who was also called Pahulu nui then leapt to the place where the sacred *pahu* (drum) Lono Hāwea was kept at the *heiau* of Pāka'alana. Striking the *pahu*, he called all the wandering ghosts to return to the low-lands of Waipi'o. The voice of this drum was a great sign that all of the path ways were to be sealed. The command was heard by all; along the *hula'ana* cliffs from Waipi'o to the ledge of Mekanikāhiō; heard by those who were at Koholālele and Maulua; heard by those who were by the steep cliffs looking to the uplands of *Kalai'eha*; and heard by those who were in the forests of Mahiki. And so all of the pathways and swimming trails were blocked, and the net trap was set.

Ka-Miki departs
from Waipi'o

While all of this occurred Ka-Miki remained hidden in the rafters of the *hālau*. One of the ghosts looked inside and saw Ka-Miki upon the ridge pole and prepared to call out on the *hōkio* (gourd nose flute) which would alert the ghosts that the upstart had been found. With great speed, Ka-Miki then leapt from Heakeakua up to the ridge heights, and landed on a *kāwa'u* (*Ilex anomala*) tree branch. Ka-'ohu-kolo-mai-iluna-o-ka-lā'au then covered the region in a thick mist, blocking everything from sight.

Ka-Miki thwarts
the hordes of
Luanu'u's
ghosts;
accounts of
various place
name origins

The cry of the ghost hordes could be heard from uplands to shore, as they hungrily looked for Ka-Miki, having been thwarted in their attempts to ensnare him in their supernatural net Nananana-nui-ho'omakua, just as birds were caught. Because the ghosts wandered along the cliffs and forests of Ka'auana (Kohala side of Waipi'o) and Mahiki (Hāmākua side of Waipi'o), and were unable to catch Ka-Miki, they went hungry. Under the cover of his ancestresses' mist body form, Ka-Miki leapt from the *kawa'u* tree to Pu'u-o-Moe'awa in the forest of Mahiki. The ghosts wandered hungrily about and two place names commemorate their wandering and having gone hungry: Ka'auana (The wandering), and in Mahiki, Pōloli-ke-akua (The gods [ghosts] are hungry) which is also called Pōloli-(i)-ka-*manu* (Hungry for the bird). At Pu'uomoe'awa, Ka-Miki met with the ghost runner Mū-kī who had been stationed there by Luanu'u. [February 26, 1914]

Ka-Miki thwarted his efforts at catching him by throwing foul smelling dirt (dabs of excrement) at him. Though many other ghosts arrived for the fight, they were all driven off, as Ka-Miki began destroying them.

The conch
Kihapū

Hio and Nana nui Luanu'u's ghost marshals told their chief about the events at Pu'uomoe'awa, and Luanu'u blew the conch Hā-nō, also called Kiha-pū, which was the conch that the supernatural dog Puapualenalena stole from the ghosts of Waipi'o. Hearing the call of the conch, the remaining ghosts fled from Pu'uomoe'awa, leaving Ka-Miki who returned to Lanimaomao. Ka-Miki presented the sacred 'awa container Kapāpāiaoa and 'awa to his ancestress, and she bathed him in her rains, and caused lighting and thunder to praise his accomplishments.

Hōkū‘ula
Lono-Makahiki
water of Kāne
(Mauna Kea)

Lanimamao then gave Ka-Miki the *kānoa* ‘awa (‘awa bowl), Hōkū‘ula—with the *kapu* of Lono-Makahiki—so that he could go get the *wai kapu* (sacred water) of Kāne and Kanaloa (at Mauna Kea). [March 5, 1914]

Ka-Miki then leapt and disappeared in the mists that seem to crawl upon the forest growth. Arriving at the spring, Ka-Miki began dipping the ladle into the sacred water of Kāne, to fill the ‘awa bowl Hōkū‘ula...

Naming of Ka-
wai-hū-a-
Kāne

...*a ia wā i ‘ike mai ai ua wahi akua kia’i i ka ‘ale o ka wai a hū a’e lā mawaho o ka pūnāwai. A iā lāua i holo mai ai, o ka mā‘alo o ke aka ka lāua i ‘ike a nalo aku lā. A ua kapa ‘ia ka inoa o ua pūnāwai ala o “Ka Wai Hū a Kāne,” a hiki i kēia lā. No ka hū ana i ke kī‘o’e ana a Ka-Miki i ka wai iloko o ke kānoa ‘awa o ke akua.*

...at that time, the guardians [Pōhakuakāne and Pōhakuloa] saw the water rippling, and overflowing from the spring. As they went to investigate, they saw a shadow pass them by. Because of the overflowing of the water, the spring came to be called **Ka-wai-hū-a-Kāne** (The-overflowing-waters-of-Kāne), and so it remains named to this day [Figure 6]. It overflowed because Ka-Miki scooped the water, filling the ‘awa bowl of the god.

Holoholokū;
the wind goddess
Waikōloa;

Pōhaku-a-Kāne;
naming Waiki’i;
Pu‘u Keke‘e

Pōhaku-a-Kāne
& Pōhakuloa,
deity of Mauna
Kea make
other springs

Ka-Miki then joined Maka-‘iole at **Holoholokū** on the plain of Waikōloa. As they traveled along the hill tops, the wind goddess **Wai-kō-loa** (Water-carried-far) caused the water to splash over the brim of Hōkū‘ula. Some of the water was carried afar by the wind and fell, forming a new spring. When the spring appeared, Pōhaku-a-Kāne fetched some of the water. Because Pōhaku-a-Kāne fetched some of the water, that place is called **Wai-ki’i** (water fetched) to this day. This happened near the hills of **Pu‘u Keke‘e**. **Pōhaku-a-Kāne** took the water he retrieved to the base of the cliffs of **Mauna Kea** and dug into the earthen plain of **Pōhakuloa** and placed the water there. From Pōhakuloa, the water flowed underground and appeared as springs at several other places, including **Ana-o-Hiku** at **Hanakaumalu**, Honua‘ula, and **Kīpahe‘e-wai** on the slopes of Hualālai...

...Having successfully completed their tasks, and collected the necessary items, the brothers returned to Kalama‘ula. Ka-uluhe performed the ‘awa and ‘ailolo ceremonies, marking the completion of their ‘ōlohe training, at Kaukahōkū. The ghost king and his hordes had followed after Ka-Miki, thinking they would trap him, but Ka-Miki ensnared the king and his ghost hordes in the supernatural net Ku‘uku‘u.

‘Ailolo and
‘awa ceremonies
Luanu‘u killed
by Ka-Miki

Luanu‘u was bound so tightly that his eyes bulged out and they were used for the *pūpū* ‘awa (‘awa drink condiment) for the ceremony. After the ‘ailolo ceremony was completed, Ka-Miki took the net filled with the bodies of Luanu‘u *mā* and deposited them in the ocean of Makalawena... [March 12-19, 1914]

In a later section of the tradition of Ka-Miki, we find that Ka-Miki and his companions have traveled around the island from Kona, and arrived at Waiākea in the District of Hilo. During competitions on the *kahua* (arena) of Kalepolepo, Ka-Miki defeated all challengers. One last hope was held out for the ‘ōlohe of the region, and a message was sent into the uplands of Pi‘ihonua, at Kīpuka-‘āhina, to call Kālanakāma‘a, the ‘ōlohe-ward of Kīpuka-‘āhina^(k), Hale-aloha^(w), and Hale-loulu^(k). The names of the these guardians of Kālanakāma‘a are all commemorated as places on the mountain landscape. The narratives record:



Figure 6. Hā Wai (Water Channel) from Waiau to Pōhakuloa Gulch, above Ka Wai Hū a Kāne (Photo KPA-3733)

Waiākea ...The lands of Waiākea were named for the high chief Waiākea-nui-kumuhonua, the brother of Pi‘ihonua-a-ka-lani^[k] and Pana‘ewa-nui-moku-lehua^[w]. After departing from Pana‘ewa, Ka-Miki mā¹¹ met Haili-kula-manu, who was a guardian of Waiākea. Haili led Ka-Miki and his companions to his chief’s compound at Kalepolepo [February 17, 1916]. Arrangements were made for Ka-Miki to compete with the ‘ōlohe – experts of Waiākea, with the events to be held at the kahua of Kalepolepo...

‘Ūpēloa Ka-Miki—“the image of the war club of Ka-uluhe-nui-hihi-kolo-i-uka”—entered the kahua and the contest rules were set. It was agreed that the method of competition would be ‘ōka’a lā’au [war club fighting], and that the loser would be killed and baked in an imu... Ka-Miki and the champion ‘Ūpēloa competed, and to everyone’s amazement, ‘Ūpēloa was defeated...

Kapunakō Hearing that his foremost champion had been defeated by Ka-Miki, Waiākea called to his messenger, Kapunakō to go get Kaūmana the foremost teacher of lua, ha‘iha‘i, kākā lā’au [bone breaking, fighting, and spear fighting], and all other manner of fighting, and bring him to the kahua. Upon arriving before his chief, Kaūmana asked Waiākea to send his messenger Kapunakō, to bring Kalanakāma’a, Kaūmana’s foremost student to join him at the kahua of Kalepolepo.

Kīpuka‘āhina [The place called] Kalanakāma’a was named for Kalana-kāma’a-o-uli, the foremost ‘ōlohe student of Kaūmana, and champion of Waiākea. Kalanakāma’a was the ward of Kīpuka-‘āhina^[k], Hale-aloha^[w], and Hale-loulu^[k], who dwelt above Hilo at places which now bear their names. When Kapunakō arrived before Kīpuka-‘āhina, he spoke about the great rains and rivers of Hilo; a poetic reference to the many skilled ‘ōlohe for which Hilo was famed. It was in this way that Kapunakō described the overwhelming skills of Ka-Miki and his victory over ‘Ūpēloa. Kīpuka-‘āhina then asked—

Māmā Hilo i ka wai? – Is Hilo [without] lightened of its water?

¹¹ Mā – a Hawaiian word used to indicate and companion, or associates.

Describing
Hilo rains
and the
mountain
terrain

Kapunakō responded – ‘*Ae māmā Hilo i ka wai ‘ole, ua kau i ka lani ka holo [wa’a] ua o Hilo, na ka Mālualua e ki’i ala i pulu ka liko o ka lehua a me ka māmane!*’
Indeed one can move swiftly through Hilo, for the streams are without water, the water trough [figuratively the clouds] of Hilo are set in the heavens, it is the Mālualua which fetches moisture for the budding *lehua* and *māmane*. **Kīpuka-‘āhina** then asked in amazement – *Nawai e nele o Hilo i ka wai? He lau ka pu’u, mano ka ihona, he kini nā kahawai o Hilo, e ‘au i ka wai o Hilo a pau ke aho!* – Who could possibly make Hilo destitute of water? There are 400 hills, 4,000 places to descend, and 40,000 streams to cross, indeed one is worn out swimming through the waters of Hilo!

It was in this way that **Kīpuka-‘āhina** learned that a master ‘*ōlohe* had come to Hilo challenging it’s many ‘*ōlohe*. Using his *ipu hōkiokio* (gourd nose flute), **Kīpuka-‘āhina** awakened Kalanakāma’a, for this was the only way in which Kalanakāma’a could be safely awakened, or he would kill whoever awakened him [February 24-March 2, 1916].

Kalanakāma’a
and Ka-Miki
compete

Kalanakāma’a joined his teacher Kaūmana, and met with the assembly at Kalepolepo. Carrying his club *Pūpū-kani-oe-i-ka-ua-o-Hilo* (Land snails singing in the rain of Hilo), Kalanakāma’a entered the kahua with Kaūmana and a great cry arose praising the abilities of these Hilo champions. Ka-Miki and Kalanakāma’a exchanged taunts, Ka-Miki stated that Kalanakāma’a would become the *kāma’a lau-’i i hili kuanaka ‘ia* (twined *ti* leaf sandals) which Ka-Miki wears upon his feet. Outraged, Kalanakāma’a leapt to attack Ka-Miki with his club *Pūpū-kani-oe-i-ka-ua-o-Hilo*, Ka-Miki leapt out of the way, and took ‘Upēloa’s club from Maka-’iole. Seeing his student miss, Kaūmana called out to Kalanakāma’a telling him how to strike Ka-Miki—

Placed in the heavens is the water trough of Hilo, entwined in the cordage of the rains, ‘*lo* [Hawk] is the war club strike to use, for there is no place that can’t be hit. Strike at the head and reach to the feet, for once struck, there will be no movement. If there is any movement, he is indeed a skilled expert of the depths [deepest knowledge], then return and strike again in the manner of the wind swept *koa* trees [March 9, 1916].

Kaūmana
and Ka-Miki
compete

Ka-Miki then attacked Kalanakāma’a and quickly over came him, Kaūmana then leapt to the *kahua* and was beaten as well. After Ka-Miki defeated Kaūmana, word spread throughout the region, and Pi’ihonua, Waiākea’s brother called his council together wondering how they might help regain the honor of Hilo from this stranger... [March 16, 1916]

This section of the account ends with Ka-Miki meeting the chief Hanakāhi—for whom the section of Hilo called Hilo Hanakāhi was named—in honorable competition at Kalepolepo. Because of the honest and humble nature of Hanakāhi, Ka-Miki befriended him and peace was restored in the region of Hilo—one and Hilo-Hanakāhi.

Boundary Commission testimonies of 1873 (cited later in this study), and the writings of E.D. Baldwin (1890) give us the locations of three of the upland residential sites referenced in the narratives above (see also Register Map No. 1718). In summary, we find:

Kīpuka-‘āhina is situated on *pāhoehoe* flats, crossed by the boundary of Pi’ihonua and Waiākea (Kainoa Boundary Commission, 1873:57). In drawing near to **Kīpuka-‘āhina**, Baldwin reports, “We are now nearing the main base of **Mauna Kea**,” and once at **Kīpuka-‘āhina**, he states, “We are now on the slopes of **Mauna Kea**” (Baldwin 1890:55).

Hale-aloha is situated at approximately the 4,050 foot elevation. Baldwin noted: “the trail leaves the woods about two miles from **Halealoha**,” and he states that **Halealoha** is about “five miles from **Kīpuka-‘āhina**” (Baldwin 1890:55).

Hale-loulu was identified as being near the boundary of **Humu‘ula**, where **Ka‘ula** gulch meets **Ka‘ala** (below **Ahu-a-po‘o-pua‘a** and near the mountain road) (Waiki Boundary Commission, 1873:41).

Travel Across the ‘Āina Mauna in the Time of Kamehameha

Stephen Desha, Sr., editor of the native newspaper, *Ka Hoku o Hawaii*, and a group of his peers published many historical accounts for the education of Hawaiian readers in their native history. One account, “*He Moolelo Kaa no Kekuhaupio, Ke Koa Kaulana o ke Au o Kamehameha ka Nui*” (A Tradition of Kekuhaupio, the Famous Warrior in the time of Kamehameha the Great¹²), describes the time leading up to Kamehameha’s securing his rule over the island of Hawai‘i (Desha, translated by Frazier, 2000). When Kamehameha (Pai‘ea) inherited the god Kūkā‘ilimoku from Kalani‘ōpu‘u, there was dissension among some of the chiefs. Fearing that treachery might arise, Kekuhaupio traveled with Kamehameha from Ka‘ū towards Kīlauea, to ‘Ōhaikea, and then went on to Mauna Kea and Lake Waiau, where Kamehameha made a ceremonial offering:

...When Pai‘ea had completed the ceremonial offering, Kekuhaupio encouraged them to go, as it was not known what secret harm might come after them, as some of the chiefs had treacherous thoughts. Because of this thought by Kekuhaupio he directed them to leave the customary pathway, and to travel where they could not be followed. They climbed straight up from that place to a certain part of Mauna Loa and came down seaward at a certain part of Ka‘ū named ‘Ōhaikea. They spent the rest of that night in a cave called Alanapo. *The next morning, after Kamehameha had made [page 93] his ceremonial offering and prayer to Kūkā‘ilimoku, they left that place and climbed up another mountain trail till they reached the summit of **Mauna Kea**. At a place close to Lake **Waiau**, Kamehameha again made an offering. They were unable to remain there for long because of the cold, and so they descended to Waimea at a place called Moana by the ancients, going straight down to the wide plain of Waimea...* [Desha, 2000:94]

Following the battle of Moku‘ōhai in ca. 1782, we find again reference to travel across the ‘āina mauna. Kamakau (1961) reported that the sacred chief, Keawemauhili, his wife, Ululani, and their daughter, Kapi‘olani, traveled from Kona to the uplands, across Mauna Kea, and down to Pā‘auhau (Kamakau 1961:122). Desha (2000) elaborated on the account, by which the small party traveled for safety, to the mountain lands, passing the slopes of Mauna Kea and continued on the mountain trail to Hilo.

After the battle ended at Moku‘ōhai, Keawemauhili and his family were held captive, and transported to the Kaumalumu section of Kona. Then, with the help of faithful friends, they escaped, traveling to the uplands of Kona, past Mauna Kea, and on to Hilo. It was reported that:

...Keawemauhili, Ululani his wife, and their small daughter Kapi‘olani were secretly helped to flee. They were taken to Kaumalumu, North Kona, by Kaleipaihala as ordered by the *ilāmuku* Kanuha. When Keawemauhili went ashore at that place of North Kona, he sought escape for them by a mountain trail which ascended to the gap between Hualālai and **Mauna Kea**, taking that path in order to arrive at their home in Hilo. The pathway was very tangled with forest growth. There were five of them on this journey, with Keawemauhili choosing the way, and Ululani following her husband, and the *kahu* [servants] who were carrying Kapi‘olani. There were many impediments in the path but the important thing was to survive. The chill and bitter rain and entanglement of ferns and

¹² *Ka Hoku o Hawaii*, December 16, 1920 to September 11, 1924.

other obstructions were disregarded. At times Ululani carried her beloved daughter because their personal servants were heavily burdened with their bedding which was carried in calabashes on carrying sticks. While they were patiently ascending, Kapi'olani cried because of the strangeness of this mountain way. This grieved the parents of the beloved child but they were unable to help. When they entered into the fern wilderness, Kapi'olani wailed loudly because of this troublesome pathway, causing them to have qualms, because when Kiwala'ō's forces were put to flight, many people had fled into the forest and were being widely sought by the victorious warriors of Kamehameha's side. At this time they were climbing in darkness because they had fled at nightfall. However dawn was breaking at the time they entered the fern wilderness and were pushing through it. When it was full daylight and while they were moving on the mountain trail, the wailing of Kapi'olani was very loud which burdened the minds of Keawemauhili and his wife. At this time, the wails of Kapi'olani guided some of Kamehameha's warriors who were Kohala people, and they met the escapees. The leader of these warriors saw this distinguished man of noble stature, and the thought came to him that this must be the *ali'i* Keawemauhili of whom they had only heard. The leader said to Keawemauhili: "Stand and speak! Are you perhaps Keawemauhili, the *ali'i* of the Hilo districts...?" [Desha, 2000:153]

The account is continued with the eventual safe return of Keawemauhili *mā* to Hilo, and little other mention of the journey over the mountain lands.

Kūkahau'ula and Lilinoe

An undated account from the archive collections of the Bernice Pauahi Bishop Museum, translated by Mary Kawena Pukui, provides us with further details regarding Lilinoe, and her husband Kūkahau'ula (Kukahaula). The narrative also records that Kauikeaouli (King Kamehameha III) visited the graves of Lilinoe and Kūkahau'ula (Kukahaula), and tells us that Pōhe'epali, a descendant of the retainers of Kūkahau'ula, hid their bodies following the visit of Kamehameha III.

A Tale of a Royal Couple who Froze on Mauna Kea

Kukahaula was a chief of Waimea, So. Kohala. He took to wife, Lilinoe of Kau and because his people resented her, chief Kukahaula went to dwell on **Mauna Kea**, above Lake **Waiau**. They died there and their bodies were wrapped for burial.

When King Kauikeaouli (Kamehameha III) reigned, he went there to visit them and was the last ruler to see these chiefs who had practically turned to stone because they were frozen and so remained. It was believed that they were a good likeness of themselves when they were alive, except that their bodies were so stiff.

After this visit of King Kamehameha III (Kauikeaouli) the bodies of Kukahaula and Lilinoe were hidden by the attendant of Kukahaula, Poheepali, who was the very last of the family of retainers who upheld their chiefs. It is said that these chiefs lived in a cave and it was in this cave that their bodies remained until Poheepali hid them away.

It is said that when these chiefs lived on **Mauna Kea**, two strangers went up there on a visit. They became thirsty and discovering a woman wrapped in several layers of *tapa*, they asked where they could get some water to drink. The woman answered, "There is no water now." The sun was shining brightly at the time and they saw the reflection of water on the woman's chest. They said, "There is the water you are hiding, reflected on your chest." The woman was Lilinoe and the water she was hiding was the water of Poliahu. (Bishop Museum, Hawaiian Ethnological Notes; Legends Vol. II:149)

"Lilinoe and Nuu"

Abraham Fornander, a prominent foreign historian, was married to a Hawaiian woman of chiefly rank from the Kāne'alai line of Moloka'i. During his residence in the Hawaiian Islands (c. 1830-1887),

Fornander compiled a great collection of Hawaiian history, much of it directly from native informants. While he worked closely with prominent native historians like Kamakau and Kepelino, he also had contact with many individuals from remote areas, who retained personal family accounts and knowledge. Over the years, it has also become clear that some of the work that Fornander did, also incorporated knowledge or concepts that were foreign to the native Hawaiian experience—his accounts would sometimes link Christian and other religious philosophies into Hawaiian lore and genealogies.

Among the accounts that blended Christian concepts with Hawaiian tradition is a narrative about Lili-noe, her husband Nu'u, and their children, in the time of a great flood. Fornander (1973) wrote:

Nuu, by command of his god, built a large vessel with a house on top of it, which was called and is referred to in the chants as He Waa-Halau-Alii o ka Moku, "the royal vessel," in which he and his family, consisting of his wife Lili-noe, his three sons, and their wives, were saved. When the flood subsided, "Kane," "Ku," and "Lono" entered the "Wa'a Halau" of Nu'u and told him to go out. He did so and found himself on top of **Mauna Kea** the highest mountain on the island of Hawaii), and he called a cave there after the name of his wife [Lili-noe], and the cave remains there to this day... [Fornander 1973:91]

Fornander's narratives were in part constructed from texts recorded previously by native historians, though he added details which none of the earlier versions of the account included. Indeed, native historians, David Malo (1951:234-237) and S. M. Kamakau (1964:13-14:)¹³, refer to a great flood caused by the rising sea (not an inundation of rainfall). Neither of the earlier narratives mention Mauna Kea or sites known to be associated with the mountain. The account collected by Ellis, cited above, conforms with the early Hawaiian accounts, and in reference to Mauna Kea, may reflect localized embellishments to the account.

The Rivalry Between Poli'ahu and Pele

One of the prominent late historic writers, was W. D. Westervelt, who resided in Hawai'i between 1889-1939. Westervelt wrote of the conflicts between Pele and Poli'ahu, and told them how Poli'ahu came to gain control over northern portion of Hawai'i, while Pele retained dominance over the arid and volcanically active southern part of Hawai'i. In his tradition of "Pele and the Snow-Goddess," Westervelt reported an eruptive event that took place after Hawaiian settlement (contrary to geological research) of the island group, explaining how Laupāhoehoe and Onomea Arch were formed. Westervelt writes:

Poliahu...loved the eastern cliffs of the great island Hawaii—the precipices which rise from the raging surf which beats against the coast known now as the Hamakua district. Here she sported among mortals, meeting the chiefs in their many and curious games of chance and skill. Sometimes she wore a mantle of pure white *kapa* and rested on the ledge of rock overhanging the torrents of water which in various places fell into the sea... [Westervelt 1963:55]

Westervelt then tells readers that once, when Poli'ahu and her companions were competing in the sport of *hōlua* (sledding), on the slopes of Mauna Kea, south of Hāmākua. There appeared among them a beautiful stranger, who was invited to participate in the sport with them. But, the woman instead:

...threw off all disguise and called for the forces of fire to burst open the doors of the subterranean caverns of **Mauna Kea**. Up toward the mountain she marshaled her fire-fountains. **Poliahu** fled toward the summit...Soon she regained strength and threw the [snow] mantle over the mountain...the lava chilled and hardened and choked the flowing,

¹³ It is noted here, that in his "*Na Hunahuna no ka Moolelo Hawaii*," Hawaiian historian, John Papa I'i, made no direct references to Mauna Kea (cf. I'i, 1959, in "Fragments of Hawaiian History").

burning rivers... The fire-rivers, already rushing to the sea, were narrowed and driven downward so rapidly that they leaped out from the land, becoming immediately the prey of the remorseless ocean.

Thus the ragged mass of **Laupahoehoe** was formed, and the great ledge of the arch of Onomea, and the different sharp and torn lavas in the edge of the sea which mark the various eruptions of centuries past [Westervelt 1963:61-63]

The Love of Poli'ahu and Kūkahau'ula

In 1931, Emma Ahu'ena Taylor (Ahu'ena), a Hawaiian historian of royal lineage, published an account of the gods Poli'ahu and Kūkahau'ula (Ahuena Taylor in *Paradise of the Pacific*, July 1931). Descended from the Hoapili-Beckley line (the chiefess Ahiakumaikalaniki'eki'e and Geo. Beckley), she had a direct genealogical relationship to the Waimea lands, that were nestled on the slopes of Mauna Kea. Indeed, while introducing her account, she tells readers of her youth and a beloved *kahu* hānai (guardian), who told her stories of ancient times (Ahu'ena 1931:13). In this particular narrative, Ahu'ena speaks of the sacred nature of Poli'ahu, and describes the various attributes of Waiau, Lilinoe, and Kūkahau'ula. She also reports that a *mo'o* (a deity of ponds, capable of taking human and other forms), named Mo'o-i-nanea, was placed at the pool of Waiau, by Kāne, as a guardian of Poli'ahu and Waiau.

Poliahu, the snow goddess of **Mauna-kea**, was reared and lived like the daughter of an ancient chief of Hawaii.

She was restricted to the mountain **Mauna-kea** by her godfather Kane. She had a nurse **Lihau** (the chilling rain) who never left her for a moment.

Kane created a silvery swimming pool for his daughter at the top of **Mauna-kea**. The pool was named **Wai-au**. The father placed a supernatural guard at that swimming pool so that **Poliahu** could play at leisure without danger of being seen by a man... [Ahuena Taylor July 1931:13]

Ahu'ena tells us that the god Kū-ka-hau-'ula ("the pink tinted snow god") had been selected as a husband for Poli'ahu, and that he appeared:

...every morning with the rising of the sun and again every afternoon with the setting of the sun. He saw the secluded water pool **Wai-au** and the lovely **Poliahu**... Each day he became more fascinated and made every effort to reach her abode and win her for his bride.

Poliahu's attendants drove him away. **Lili-noe** (fine mist rain), **Lihau** (chilling frost) and **Kipu'upu'u** (the hail) drove him from the mountain... [Ahuena Taylor July 1931:13-14]

As the story continues, we learn that eventually Mo'o-i-nanea determined that Kūkahau'ula's love was true, and she allowed the god-chief to embrace Poli'ahu. And to this day, "Ku-kahau-ula, the pink snow god, and Poliahu of the snow white bosom, may be seen embracing on Mauna-kea" (Ahuena Taylor July 1931:14-15).

II. Ka ‘Oihana Kilokilo Hōkū (The Practices Associated With Observing Stars)

As described earlier, in the prayer chants like the *Kumulipo*, the stars and heavenly bodies were significant in Hawaiian beliefs and traditions. Thus, as was the case in all facets of Hawaiian life, the traditions, customs and practices associated with the *‘oihana kilokilo* (astronomy) and *kilo hōkū* (observing and discerning the nature of the stars) were deeply tied to the spiritual beliefs of the Hawaiian people. The stars were physical manifestations of the gods who created the heavens, earth, and humankind, or forms granted to select individuals or beings of nature (Malo, 1951 and Beckwith, 1951). One of the *mele pule* (prayer chants) from the class of Lono priests, states “*Oi ho’okui aku o Lono nā hōkū e mihai ka lanī!*” (Behold Lono places the stars that sail through the heavens.!) (*Pule Hainaki* in Malo, 1951:145).

The greatest accounts of Hawaiian knowledge of the stars—their seasons, the paths followed, and how to mark locations on the earth by them—are found in the traditions of the *po’e ho’okelewa’a* or *po’e holomoana* (navigators). Through such knowledge, combined with knowledge of the ocean winds, allowed the *po’e kahiko*—and in the present day, modern wayfinders—to successfully travel the vast expanse of the Pacific Ocean, and settle on the islands of Hawai‘i. Knowledge of the stars and movements of the heavens, was also applied to many facets of life. Such knowledge could ensure success in any undertaking. When planting or fishing during seasons in which certain stars appeared, or on specific nights of the moon, crops and fish would be plentiful. A child born under a certain star was predestined to be a great leader, and the alignment of stars in a manner determined to be inauspicious, could herald the fall of a kingdom.

The earliest recorded accounts of Hawaiian navigation lore were recorded in 1823 by British missionary, Wm Ellis, who conducted a tour of Hawai‘i, in the company of missionaries of the American Board of Commissioners of Foreign Missions, who had settled in Hawai‘i in 1820. Ellis learned of voyages between Hawai‘i and other islands of Polynesia that were made in antiquity. He also named the navigator, and his god. Ellis reported:

Traditions of Voyages to Marquesas and Tahiti

In this part of the island there is another tradition very generally received by the natives, of a somewhat more interesting character; and as it may tend to illustrate the history of the inhabitants, and the means by which the islands were peopled, I shall introduce it in this place.

These traditions respect several visits, which in remote times some of the natives made to Nuuhiva and Tahuata, two islands in the Marquesan group, and to Tahiti, the principal of the Society Islands.

One of these accounts the natives call, “The Voyage of Kamapiikai,” in which they state that Kamapiikai (child running or climbing the sea—from *kama*, a child, *pīi*, to run or climb, and *kai*, the sea) was priest of a temple in Kohala, dedicated to Kanenuiakea.

The exact period of their history when he lived, we have not been able to ascertain; but it is added, that the god appeared to him in a vision, and revealed to him the existence, situation, and distance of Tahiti, and directed him to make a voyage thither. In obedience to the communication, he immediately prepared for the voyage, and, with about forty of his companions, set sail from Hawaii in four double canoes. [page 284]

After an absence of fifteen years, they returned, and gave a most flattering account of Haupokane, the country which they had visited. We know of no island in the neighbourhood called by this name, which appears to be a compound of Haupo,

sometimes a lap, and Kane, one of their gods. Among other things, they described the one *rauena*, a peculiar kind of sandy beach, well stocked with shell-fish, &c. The country, they said, was inhabited by handsome people, whose property was abundant, and the fruits of the earth delicious and plentiful. There was also a stream or fountain, which was called the *wai ora roa*, (water of enduring life).

Other Voyages to Tahiti

Kamapiikai made three subsequent voyages to the country he had discovered, accompanied by many of the Sandwich Islanders. From the fourth voyage they never returned, and were supposed to have perished at sea, or to have taken up their permanent residence at Tahiti. Many were induced to accompany this priest to the country he visited, for the purpose of bathing in the life-giving waters, in consequence of the marvelous change they were reported to produce in those who used them; for it was said, that however infirm, emaciated, or deformed they might be when they went into the water, they invariably came out young, strong, and handsome.

Without making further remarks, these traditions furnish very strong evidence that the Sandwich Islanders were acquainted with the existence of the Marquesan and Society Islands long before visited by Captain Cook; and they also warrant the inference, that in some remote period the Sandwich Islanders have visited or colonized other islands in the Pacific... [Ellis, 1963:285]

We note here that Ellis' reference to "Haupokane" a form of the name Houpo Kāne (also Houpo-a-Kāne), is an important one, as a place of that name is also situated on Mauna Kea, in the vicinity of the springs—which in native tradition are fed by the waters of Waiau. Houpo-a-Kāne, erroneously written as "Hopukani," on maps dating from the 1930s, demonstrates the association of Hawaiian gods with places, and traditions of star lore, and tie the same gods to the celestial bodies. We also see in this one name that there is a depth of relationship and knowledge shared between the native peoples of Polynesia.

Several accounts describing traditional knowledge of the stars have been located. In the 1800s, several native writers described the importance and relationship of *hōkū* (stars) in Hawaiian beliefs, culture and practices (Malo 1951, I'i 1959, and Kamakau 1964 and 1976). Kamakau (1964) tells us that there were many orders of *kāhuna* (priests and expert practitioners). He also recorded that generally, those practitioners in the various orders of the priesthood were of the *papa ali'i*, or chiefly class (Kamakau 1964:7). Among the *kāhuna* were several classes of priest-experts, who specialized in learning about the heavens—both near earth and in the distant night skies. Those *kāhuna* belonged to the classes of:

Papa kilokilo lani, those who could read the signs, or omens, in the sky; the *kilo hoku*, those who studied the stars; the *kilo 'opua*, those who studied and read the omens in clouds... [Kamakau 1964:8]

There follow below, several historical articles on the practices of the *'oihana kilokilo* and *kilo hōkū* of ancient Hawai'i, as recorded by both native writers, and foreign writers, who relied on native informants as their sources. Two of the articles are translated here for the first time, in their entirety, from the original Hawaiian texts. We note that some of the language from the Hawaiian texts was beyond our knowledge base—sometimes presented in metaphorical or esoteric language, or in descriptions that exceed our limited knowledge of the science of astronomy. Thus, we have included the original Hawaiian texts with our translations, to allow readers with greater skill than ours, to delve into the depths of the information conveyed by those who recorded the histories. The combined writings—collected from the 1830s to 1935—provide us with a list of more than 270 Hawaiian names for stars (not including alignments of stars which marked the heavens and pathways of traditional navigators).

“Moolelo Hawaii”

Among the earliest native traditions recorded by Hawaiian writers, are those compiled by Davida Malo, who was of chiefly lineage, and who was among the first students to attend Lahaina Luna seminary. A part of the program at the seminary, included the collection and writing of native traditions and lore—documenting beliefs, practices and customs, of the Hawaiians. In the work compiled by Davida Malo, we find examples of the intimate knowledge and integrated approach of Hawaiians, in observing the relationships of the stars, planets, and heavenly bodies, to the occurrences of natural phenomena—such as the annual position of stars in correlation with annual seasons, and periods of weather—and in the planning of all facets of life, from the most sacred, to the most utilitarian.

In a chapter compiled by Malo, translated by Nathaniel Emerson (ca. 1898), and published in 1951, we find the following account of the pattern of Hawaiian life based on knowledge of the heavens and the earth around them. Readers are requested to keep in mind that Malo’s account, while one of the earliest, is but one of many recorded by native writers and others interested in traditional lore. Thus, other variations of the subject matter exist.

Chapter 12

The Divisions of the Year

1. The seasons and months of the year were appropriately divided and designated by the ancients.
2. The year was divided into two seasons *Kau* and *Hoo-ilo*. *Kau* was the season when the sun was directly overhead, when daylight was prolonged, when the tradewind, *makani moae*, prevailed, when days and nights alike were warm and the vegetation put forth fresh leaves.
3. *Hoo-ilo* was the season when the sun declined towards the south, when the nights lengthened, when days and nights were cool, when herbage (literally, vines) died away.
4. There were six months in *Kau* and six in *Hoo-ilo*.
5. The months in *Kau* were *Iki-iki*, answering to May, at which time the constellation of the Pleiades, *huhui hoku*, set at sunrise. *Kaa-ona*, answering to June,—in ancient times this was the month in which fishermen got their *a-ei* nets in readiness for catching the *opelu*, procuring in advance the sticks to use in keeping its mouth open; *Hina-ia-eleele*, answering to July, the month in which the *ohia* fruit began to ripen; *Mahoe-mua*, answering to August,—this was the season when the *ohia* fruit ripened abundantly; *Mahoe-hope*, answering to September, the time when the plume of the sugar-cane began to unsheath itself; *Ikuwa*, corresponding to October, which was the sixth and last month of the season of *Kau*.
6. The months in *Hoo-ilo* were *Welehu*, answering to November, which was the season when people, for sport, darted arrows made of the [page 30] flower stalk of the sugar-cane; *Makalii*, corresponding to December, at which time trailing plants died down and the south wind, the *Kona*, prevailed; *Kaelo*, corresponding to January, the time when appeared the *enuhe*, when also the vines began to put forth fresh leaves; *Kaulua*, answering to February, the time when the mullet, *anae*, spawned; *Nana*, corresponding to March, the season when the flying fish, the *malolo*, swarmed in the ocean; *Welo*, answering to April, which was the last of the six months belonging to *Hoo-ilo*.
7. These two seasons of six months each made up a year of twelve months,² equal to nine times forty days and nights—but the ancients reckoned by nights instead of days.

8. There were thirty nights and days in each month; seventeen of these days had compound names (*inoā huhui*) and thirteen had simple names (*inoā pakahi*) given to them.
9. These names were given to the different nights to correspond to the phases of the moon. There were three phases—*ano*—marking the moon's increase and decrease of size, namely, (1) the first appearance of the new moon in the west at evening:
10. (2) the time of full moon when it stood directly overhead (literally, over the island) at midnight.
11. (3) The period when the moon was waning, when it showed itself in the east late at night. It was with reference to these three phases of the moon that names were given to the nights that made up the month.
12. The first appearance of the moon at evening in the west marked the first day of the month. It was called *Hilo* on account of the moon's slender, twisted form.
13. The second night when the moon had become more distinct in outline was called *Hoaka*; and the third when its form had grown still thicker, was called *Ku-kahi*; so also the fourth was called *Ku-lua*. Then came *Ku-kolu*, followed by *Ku-pau* which was the last of the four nights named *Ku*.
14. The seventh, when the moon had grown still larger, was called *Ole-ku-kahi*; the eighth, *Ole-ku-lua*; the ninth, *Ole-ku-kolu*; the tenth, *Olepau*, making four in all of these nights, which, added to the previous four, brings the number of nights with compound names up to eight.
15. As soon as the sharp points of the moon's horns were hidden, the name *Huna* (hidden) was given to that night—the eleventh. The twelfth night, by which time the moon had grown still more full, was called *Mohalu*. The thirteenth night was called *Hua*, because its form had then become quite egg-shaped (*hua* an egg); and the fourteenth [page 31] night, by which time the shape of the moon had become distinctly round, was called *Akua* (God), this being the second night in which the circular form of the moon was evident.
16. The next night, the fifteenth, had two names applied to it. If the moon set before daylight *ke ao ana*—it was called *Hoku palemo*, sinking star, but if when daylight came it was still above the horizon it was called *Hoku ili*, stranded star.
17. The second of the nights in which the moon did not set until after sunrise—sixteenth—was called *Mahea-lani*. When the moon's rising was delayed until after the darkness of night had set in, it was called *Kulua*, and the second of the nights in which the moon made its appearance after dark was called *Laau-ku-kahi* (eighteenth); this was the night when the moon had so much waned in size as to again show sharp horns.
18. The nineteenth showed still further waning and was called *Laau-ku-lua*; then came *Laau-pau* (twentieth), which ended this group of compound names, three in number. The name given to the next night of the still waning moon was *Ole-ku-kahi*. Then in order came *Ole-ku-lua* and *Ole-pau*, making three of this set of compound names (twenty-first, twenty-second and twenty-third).
19. Still further waning, the moon was called *Kaloa-ku-kahi*; then *Kaloa-ku-lua*; and lastly, completing this set of compound names, three in number, *Kaloa-pau* (twenty-fourth, twenty-fifth and twenty-sixth).
20. The night when the moon rose at dawn of day (twenty-seventh) was called *Kane*, and the following night, in which the moon rose only as the day was breaking (twenty-eighth), was called *Lono*. When the moon delayed its rising until daylight

had come it was called *Mauli*—fainting; and when its rising was so late that it could no longer be seen for the light of the sun, it was called *Muku*—cut off. Thus was accomplished the thirty nights and days of the month.

21. Of these thirty days some were set apart as *tabu*, to be devoted to religious ceremonies and the worship of the gods. There were four *tabu* periods in each moon.
22. The first of these *tabu* periods was called that of *Ku*; the second, that of *Hua*; the third, that of *Kaloa* (abbreviated from Kana-loa); the fourth, that of *Kane*.
23. The *tabu* of *Ku* included three nights; it was imposed on the night of *Hilo* and lifted on the morning of *Kulua*. The *tabu* of *Hua* included two nights; it was imposed on the night of *Mohalu* and lifted on the morning of *Akua*. The *tabu* of *Kaloa* included two nights; it was imposed on the night of *Ole-pau* and raised on the morning of *Kaloa-ku- [page 32] lua*. The *tabu* of *Kane* included two nights; being imposed on the night of *Kane* and lifted on the morning of *Mauli*.
24. These *tabu* seasons were observed during eight months of the year, and in each year thirty-two days were devoted to the idolatrous worship of the gods.
25. There were now four months devoted to the observances of the *Makahiki*, during which time the ordinary religious ceremonies were omitted, the only ones that were observed being those connected with the *Makahiki* festival. The prescribed rites and ceremonies of the people at large were concluded in the month of *Mahoe-hope*. The keepers of the idols, however, kept up their prayers and ceremonies throughout the year .
26. In the month of *Ikuwa* the signal was given for the observance of *Makahiki*, at which time the people rested from their prescribed prayers and ceremonies to resume them in the month of *Kau-lua*. Then the chiefs and some of the people took up again their prayers and incantations, and so it was during every period in the year. [Malo, 1951:33]

Hawaiian Astronomy and Navigation ***The Journal of William Richards (1841)***

The following narratives are excerpted from an 1841 manuscript written by William Richards, in answer to a series of questions asked by Captain Charles Wilkes, Commander of the United States Exploring Expedition. While Richards comments are at times bigoted and minimize the extent of traditional Hawaiian knowledge of the universe around them, the documentation pertaining to aspects of native knowledge of the skies and navigation, is of historic value. His manuscript offers readers one of the earliest written accounts of such knowledge and the documentation of native customs and practices.

Wm. Richards was among the party of first American missionaries to arrive in the Hawaiian Islands (in 1820), and by the death-bed request of the sacred chiefess Keōpūolani (in 1823), he raised Kamehameha III and his sister, Nahi'ena'ena. In his life time, Richards served in many official capacities in the Hawaiian Kingdom. Richards identified the chief, Hoapili, counselor to the first three Kamehamehas, as the primary source of his information, which was also corroborated by Kamehameha III, prior to Richards sending it to Wilkes (in text below).

Ulumaheihēi Hoapili was the son of Kame'eiamoku, one of the “four Kona uncles” and confidants of Kamehameha I. Kame'eiamoku and his twin brother Kamanawa were of a line of priests of the “class of Ka-uahi and Nahulu” (Kamakau 1961:188, 190, 231); these lines of priests were noted for the knowledge of the stars and heavens. When Kame'eiamoku died in 1804, his son Hoapili, inherited his position, which he retained until his death in 1840. It was also Hoapili, who in 1819, cared for and hid

the bones of Kamehameha I (Kamakau 1961:211, 212, 215). Even this was done, in association with the stars, it being said “*O ka Hoku o ka malamā ke ike ia Kamehameha*” (The morning star alone knows where Kamehameha’s bones are guarded) (Kamakau in *Nupepa Kuokoa* September 28, 1867).

***Wm. Richards; to Charles Wilkes ESQ., Commander
of the U.S.A. Exploring Expedition***

Lahaina March 15—1841:

Previous to your departure from the Islands, I must acknowledge the reception of yours of the 9th. But, in which you have done me the honor to propose several very important questions in relation to these Hawaiian Islands.

I beg you to receive this rather as an apology, than as a full reply to those questions, for though I feel the deepest interest in the subject of them, and the strongest wish that they should be correctly answered, yet your very limited stay at this place removes all possibility of doing justice to a reply. The simple subject of the Government would require a volume to give a full view of it. I can not even enter up on the theory of it in its various branches but simply state a few facts representing it... [page 1]

...“10th If any knowledge of Astronomy.”

Of the system by which the heavenly bodies are regulated, the Hawaiians had no knowledge. With a few of the most noticeable facts in relation to the planets they were acquainted. *They were some what accurate observers of some of the phenomina [sic] of the heavens. There was a clan of persons whose profession it was to watch the motions of the stars. The late Hoapili with whom I have often conversed on the subject was accounted one of their most skillful astrologers. From him I learned that they had names for many of the largest stars, and principle constellations. They were acquainted with five planets, which they called “traveling stars.” Hoapili was much in the habit of observing these that he could at any moment tell the then present positions of each.* [Page 37]

Their names were as follows:

Kawela — Mercury.

Naholoholo —Venus.

Hoomanalo — Jupiter.

Holoholopinau — Mars

Makulu — Saturn.

Hoapili said he had heard from others that there was one more traveling star, but he never recognized it, and was acquainted with only these five. The more distinguished fixed stars and constellations not only had their distinct names, but the people were in the habit of observing them so accurately that they judged the hours of the night quite as correctly as they did the hour of the day. This remark applies most particularly to the fishermen and those persons whose employment called them to be out considerably in the night.

It was by the particular positions of the planets in relations to certain fixed stars and constellations, that the prophets grounded their predictions in relation to the forte of battles, the success of new enterprises [page 38] &c, &c. The contiguity of their planets to certain fixed stars was considered to be a real indication of the pending death of some high chief. The goddess of the Volcano was also supposed to hold intercourse with these traveling stars, and from their movements therefore, the people often predicted hers.

The motions of the stars in the vicinity of the north pole, attracted their attention considerably and were often a subject of dispute among the astrologers. These they said were “traveling stars, but they travel regularly, where as the others wander here and there.”

Of the true manner of accounting for these phenomena they had not the most distant conception.

Their best Chronologists, measured time by means both of the moon and fixed stars. They divided the year into twelve months, and each month into thirty days. They had a distinct name for each of the days of the month, and commenced the numbering on the [page 39] first day that the new moon appeared in the west. This course made it necessary to drop a day about once in two months, and thus reduce their year to twelve lunations instead of three hundred and sixty days which they numbered according to their *theory*.

This being about eleven days less than the sidereal year, they discovered the discrepancy, and corrected their reckoning by the stars. In practice therefore, the year varied, having sometimes twelve, and sometimes thirteen lunar months. So also they sometimes numbered twenty nine days in a month.

Though their system was thus broken and imperfect, still as their chronologists could tell the names of the day and the names of the month on which any great event occurred, it was generally easy to revise their time to ours by a reference to the phase of the moon at the time. But when the change of the moon takes place about the middle of our calendar month, then we are liable to a mistake of a whole month in reducing their time [page 40] to ours. We are also liable to another mistake of a single day from the uncertainty of the day that the moon was discovered in the west. Having nothing to rely upon except merely their memories, they were also liable to numerous mistakes even in their own method.

Eclipses were uniformly considered to be brought about by an attack of the gods on the sun & moon, and always presaged a war, the death of some high chief, or some other disaster.

The ability of foreigners to predict eclipses, and other astronomical phenomena at first created the highest astonishment. The first almanac published by the American missionaries predicting the phases of the moon, eclipses, tides &c., in 1834, was received by them with great interest, and tended much to confirm their belief in the testimony of the missionaries on every subject.

They were however themselves, in the habit of referring the tides to the actions of the moon, and when they could see the moon, were able to tell the state of [page 41] the tides.

Though they thought much of their success depended on their acting on it were in unison with the heavenly bodies, yet as they were unable to calculate even the most simple of all the movements of the planets for any length of time before hand, they were unable to plan their battles or their enterprises with reference to any particular positions of those planets, and therefore, when the time arrived and they saw that position to be what they supposed unfavorable, they were often at once discouraged and gave up their enterprise, or fled from their enemies even though not pursued.

Could one of their ancient warriors have known enough of astronomy to have calculated even a few of the more simple celestial phenomena, it would have given him vast

advantage over those who had not that knowledge; for he might then have planned his attacks and his enterprises in conjunction with the heavenly bodies, and his followers seeing their positions favorable would [page 42] have been inspired with undaunted courage, while his enemies would have fled in dismay, thinking that they were contending not only with human enemies but with the stars in their course too.

The first little book which was published containing some of the true principles of astronomy awakened their surprise and they at once brought forth the common vulgar objections to it.

Hoapili the astrologer mentioned above, said however, respecting the figure of the earth, "Stop, do not be so quick with your objections to the foreign theory. Fact is look at it. This is what I have always seen. When I have been far out at sea on fishing excursions, I always first lost sight of the beach — then the houses and trees — then the low mountains and last of all the high ones. So, when I returned, I first saw the high mountains, then the lower ones, then the trees and houses, last of all, the beach. I think these foreigners are right, and that the earth is round." [page 43]

11th If any knowledge of Navigation.

The Hawaiians were in the habit of sailing frequently from one Island to another in the group, and were frequently out of sight of land, both on these voyages and on their fishing excursions, but still they can hardly be said to have any knowledge of navigation. They were pretty accurate observers of the weather, and of certain atmospheric phenomena, & their observations of these together with the heavenly bodies, when in sight, enabled them to sail a little distance from land with considerable safety.

They usually never went out of sight of land except by accident.

When they found themselves in these circumstances, they rely mostly on the heavenly bodies if in sight. If not, they were able to judge of the points of compass by the winds and state of the atmosphere, there being considerable difference in the appearance of the weather according to the direction of the wind. The appearance of the clouds in the vicinity of or in the direction of land afforded them another beacon. Probably very few Hawaiians have ever been lost at sea by mistaking the points of compass and sailing away from land. Their disasters arose from the frailty and smallness of their canoes, which being in some manner disabled by stress of weather, they were prevented from shaping their course in the direction they desired.

Their skill in the management of canoes was perhaps unexampled, especially in the surf. But since the high chiefs have possessed foreign vessels, there is sailing to a distance in canoes, and the people are probably losing a portion of their skill.

They do well in the management of their own vessels. No one has ever been lost by being driven away from land. The science of navigation is now taught in the seminary and a considerable number have made proficiency in the study... [page 45]

...Thus Sir, in a very hasty and imperfect manner have I attempted the near outline of a reply to your important questions. I regret my inability to do it in a more perfect manner. Several of the subjects were too extensive to allow even an outline of an answer in this letter. But what I have written you may rely upon as correct, for you have it not on my authority only but also on the King's as I have read the above to him and he pronounces it the truth.

Be pleased Sir to accept the assurance of the high considerations and esteem with which I remain very truly your most obedient servant. [Hawaii State Archives, Series M-126:58]

***“A History of the Sandwich Islands”
(Sheldon Dibble, 1843)***

Sheldon Dibble, a member of the American Mission company, arrived in the Hawaiian Islands in June 1831. He remained in the islands most of the time until his death in 1845. After serving a short time in Hilo, Dibble was stationed on Maui, where he had charge over the Lahaina Luna Seminary. While at Lahaina Luna, Dibble undertook a program of collecting Hawaiian histories, with the help of select native students, who were sent out to speak with elder Hawaiians. Describing this effort, Dibble (1843) reported:

The method which I took to collect facts was as follows: I first made out a list of questions, arranged chronologically according to the best of my knowledge. I had continual occasion afterwards to add to the questions, to vary and to change them. I then selected ten of the best scholars of the Seminary [Lahaina Luna], and formed them into a class of inquiry. I met them at an appointed hour, gave them the first questions and conversed freely with them upon it, that they might understand fully and distinctly what was sought for. I then requested them to go individually and separately to the oldest and most knowing of the chiefs and people, gain all the information that they could on the question given out, commit each his information to writing and be ready to read it on a day and hour appointed. At the time of meeting each scholar read what he had written—discrepancies were reconciled and corrections made by each other and then all the compositions were handed to me, out of which I endeavored to make one connected and true account... [Dibble, 1843:iii-iv]

The result of his efforts, led to the collection of significant Hawaiian histories. Among the students were the well known Hawaiian historians, Davida Malo and Samuel Mānaiakalani Kamakau, and a number of lesser-known individuals who in subsequent years, contributed many important historical accounts to the native language newspapers. The above said, we note here, that the writings of the reverend Dibble, while recording significant Hawaiian information, that may have otherwise been lost, also demonstrate an almost unparalleled level of bigotry towards the people he had come to “save.”

Because of the sources of information, and the early date in which much of it was recorded, we include Dibble’s compilation of Hawaiian reckoning of time by nights of the moon, and the Hawaiian calendar—a system reportedly established by Wākea, for whom Mauna Kea is named; and his narratives on concepts of Hawaiian astronomy, which follow closely, those reported by William Richards above, being based in part on the authority of Hoapili.

***Native Division of Time,
Phases of the Moon, and the Hawaiian Calendar***

It is said that their division of time was made by their first progenitor Wakea at the time of his domestic quarrel... Be this true or false, the tradition shows that their division of time was very ancient. [page 13]

In their reckoning, there were two seasons, summer and winter. When the sun was perpendicular and moving toward the north and the days were long, and the trees bore fruit, and the heat was prevalent,—that was summer [*Kau*]. But when the sun was perpendicular and moved towards the south, and the nights were lengthened, and the trees without fruit, and the cold came,—that was winter [*Ho’oilo*]. There were also six months in each season. Those of the summer were, *Ikiki*, *Kaona*, *Hinaialeele*, *Kamahoemua*, *Kamahoehope*, and *Ikua*. The winter months were, *Welehu*, *Makalii*, *Kaolo*, *Kaulua*, *Nana*, and *Welo*. These twelve months united constituted one year. *Welehu* was the completion of the year, and from *Makalii* the new year was reckoned. In one year there were nine times forty nights. The nights were counted by the moon. There were thirty nights in each month, seventeen of which were not very light, and thirteen were; the different nights (and days) deriving their names from the different aspects of the moon, while increasing, at the full, and waning. The first night was called *Hilo* (to twist), because

the part then seen was a mere thread; the next, a little more plain, *Hoaka* (crescent); then *Kukahi*, *Kulua*, *Kukolu*, *Kupau*, *Olekukahi*, *Olekulua*, *Olekukolu*, *Olekupau*. When the sharp points were lost in the moon's first quarter, the name of that night was *Huna* (to conceal); the next on its becoming gibbous, *Mohalu*, then *Hua*; and when its roundness was quite obvious, *Akua*. The nights in which the moon was full or nearly so, were *Hoku*, *Mahealani*, and *Kolu*. *Laaukukahi* was the name of the night in which the moon's decrease became perceptible. As it continued to diminish the nights were *Laaukulua*, *Laaupau*, *Olekukahi*, *Olekulua*, *Olepau*, *Kaolakukahi* [*Kaloakukahi*], *Kaloakulua*, *Kaloapau*. When the moon was very small the night was *Mauli*, and that in which it disappeared, *Muku*. The month of thirty days is thus completed.

From each month four periods were selected in which the nights were consecrated, or *tabu*. The following are the names: *Kapuku*, *Kapuhua*, *Kapukaloa*, and *Kapukane*; the first consisted of three nights; commencing with *Hilo* and [page 14] terminating with *Kulua*; the second was a period of two nights, beginning with *Mohalu* and ending with *Akua*; the two nights, from *Olepau* to *Kaloakulua*; the fourth from *Kane* to *Mauli*.

It is mostly in reference to the sacred seasons that I have here introduced their division of time. The method of reckoning by the moon, led, of course, to many irregularities. On a future page I may, perhaps, notice some of them...

In the regular division of time already mentioned and the occurrence of sacred seasons at intervals four times a month there may be some trace of an ancient weekly Sabbath. There were also yearly feasts, and feasts of the new moon, which were observed with much religious ceremony... [page 15]

Hawaiian Astronomy and Navigation

...Of geography they knew nothing beyond the limits of their own islands. Some names of foreign islands were indeed used in their songs and in their numerous legends, but no distinct knowledge of them existed among the people, at least as late as the days of Kamehameha.

Of astronomy they knew somewhat more, as I think is true of savage nations generally. They knew nothing of course of the system by which the heavenly bodies are regulated, but with a few of the most noticeable facts in relation to the planets they were acquainted. There was a class of persons whose profession it was to watch the motions of the stars. These astrologers, among whom Hoapili, the late Governor of Maui, was particularly skilled, had names for many of the largest stars and principal clusters. They were acquainted with five planets which they called traveling stars. Hoapili was so much in the habit of observing these, that he could at any moment tell the position of each. Their names for these five planets were as follows: *Kawela*—Mercury, *Naholoholo*—Venus, *Hoomanalonalo*—Jupiter, *Holoholopinau*—Mars, *Makulu*—Saturn. Hoapili said that he had [page 89] heard from others that there was one more traveling star, but he had never recognized it and was acquainted with only these five. The more distinguished fixed stars and clusters had their distinct names, and the people were in the habit of observing them so much that they judged of the hour of the night about as accurately as of the hour of the day; this was especially true of fishermen and those persons whose employment called them to be out considerably in the night.

It was by the particular position of the planets, in relation to certain fixed stars and clusters of stars, that the prophets grounded their predictions in relation to the fate of battles, the success of new enterprises, etc. The contiguity of these planets to certain fixed stars was considered to be a sure indication of the speedy death of some high chief. The goddess of the volcano was also supposed to hold intercourse with these traveling stars and from their movements therefore the people often predicted volcanic eruptions.

The motions of the stars in the vicinity of the north pole attracted their attention considerably and were often the subject of dispute. These they said were traveling stars, but did not wander here and there like the others, but traveled regularly.

Those who took the most care in measuring time, measured it by means both of the moon and fixed stars. They divided the year into twelve months, and each month into thirty days. They had a distinct name for each of the days of the month, as has been shown on a former page, and commenced their numbering on the first day that the new moon appeared in the west. This course made it necessary to drop a day about once in two months, and thus reduce their year into twelve lunations instead of three hundred and sixty days. This being about eleven days less than the sidereal year, they discovered the discrepancy and corrected their reckoning by the stars. In practice, therefore, the year varied, being sometimes twelve, sometimes thirteen lunar months. So also they sometimes numbered twenty-nine and sometimes thirty days in a month.

Though their system was thus broken and imperfect [page 90] yet, as they could tell the name of the day and the name of the month when any great event occurred, their time can be reduced to ours by a reference to the phase of the moon at the time. But when the change of the moon takes place about the middle of our calendar month, then we are liable to a mistake of a whole month. We are liable to another mistake of a day, from the uncertainty of the day that the moon was discovered in the west. Having nothing to rely upon except merely their memories, they were also liable to numerous mistakes from that source.

Eclipses were uniformly considered to be an attack of the gods on the sun and moon, and always presaged war, the death of some high chief or some other great disaster.

The ability of foreigners to predict eclipses and other astronomical phenomena, created at first the greatest astonishment. The Almanac published by the Mission, predicting the phases of the moon, eclipses, tides, &c, was received by them with much interest, and tended somewhat to confirm their belief in our testimony on every subject. It is worthy of remark, however, that they themselves were in the habit of referring the tides to the action of the moon and when they could see the moon were able to tell the state of the tides.

Though they thought that much of their success depended on their acting in unison with the heavenly bodies, yet as they were unable to calculate even the most simple of all the movements of the planets for any length of time beforehand, they were unable to plan their battles and their enterprises with reference to any particular position of these planets; and therefore when the time arrived and they saw that position to be what they supposed unfavorable, they were often at once discouraged and gave up their enterprise, or fled from their enemies, even though not pursued. Could one of their ancient warriors have known enough of astronomy to have calculated even a few of the most simple celestial phenomena it would have given him a vast advantage, for he might then have planned his attacks and his enterprises in conjunction with the heavenly bodies, and [page 91] his followers, seeing their position favorable, would have been inspired with undaunted courage, while their enemies would have fled in dismay, thinking that they were contending, not only with human armies, but also with the stars in their courses.

The first little book which was published in their language, containing some of the true principles of astronomy, awakened their surprise, and they at once brought against it the common vulgar objections. Hoapili, the astrologer before mentioned, when others were disputing about the figure of the earth, said: "Stop; do not be so quick with your objections to the foreign theory. Let us look at it. This is what I have always seen. When I have been far out at sea on fishing excursions, I first lost sight of the beach, then of the houses and

trees, then of the hills, and last of the high mountains. So when I returned, the first objects which I saw were the high mountains, then the hills, then the trees and houses, and last of all the beach. I think therefore that these foreigners are right, and that the earth is round."

Of navigation they could hardly be said to have any knowledge. They were in the habit, however, of sailing frequently from one island to another in the group, and were frequently out of sight of land both on these voyages and on their fishing excursions. In some instances they sailed intentionally out of sight of land, from one extreme point of the group to the other. There are numerous traditions also, of voyages performed even to and from foreign islands. When out of sight of land, they sailed by the sun and stars, which in this climate are rarely obscured. The direction of the wind was also another guide, the weather undergoing an entire change on an interruption of the trade winds. Their skill in the management of canoes was perhaps unexampled, especially in the surf. Excepting, however, this practical and common sense sailing they had no knowledge whatever of navigation... [page 92]

"No ke Ao Hoku" (About Astronomy)

In July 1865, native historian, Samuel Mānaiakalani Kamakau, wrote an article which he submitted for publication in the native newspaper, *Kuokoa* (issue of August 5, 1865:4). His account was apparently in response to some narrative or discussion of astronomy and navigation skills being practiced, and in the following article, he provided a detailed explanation of Hawaiian knowledge of the stars. W.D. Alexander, a missionary descendant, and surveyor general of the Kingdom of Hawai'i published a translation of Kamakau's article in the *Hawaiian Annual* of 1891. Below, follow the original Hawaiian texts of Kamakau, and a modified version of Alexander's translation. The accompanying translation, modified by Maly, attempts to provide readers with a more accurate account of Kamakau's texts. The Hawaiian is included in order that readers of the Hawaiian language may compare and clarify the actual meaning of Kamakau's narratives.

No ke Ao Hoku

Na S.M. Kamakau

Honolulu, Iulai 26, 1865

Ua kulai waiho molaēlāe ae au i ka moolēlo o na wahi keiki hookele hoku holo moana, ai ko manao o Mokuleia; noweo maka uawahi kai o Elokupaoa.

Ua ike ae au i ka lakou Kumu Ao Hoku holo moana. He wahi keiki i umi makahiki a oi ae paha, oia ka lakou kumu holomoku.

O Kanowa ke kahua o Hanai, ka halekula o Pekue, ka nalu o Kalakiki, ke kumu o Kanekahoowaha me na haumana.

No Ke Aohoku Ana.

- 1. E lawe ae ke kumu i ka ipu hokeo loihi me he pauku olokaa la ke ano. Ua kunikuni ahi ia he mau alanui. Oia hoi na alanui o na hoku hookele, ua kapaia na Hoku Aiaina.*
A mawaho o na alanui ekolu na hoku ua kapaia na Hoku o ka Lewa.
- 2. Hookahi alanui e moe ana mai ka Hokupaa Akau; a hiki aku i ka Hoku Welelau Hema o Newe. O ka aoao akau o keia alanui; ua kapaia o "Kealaula a Kane." A o ka aoao hema; ua kapaia o "Ke alanui Maaweula a Kanaloa."*
- 3. O na kaha hikina ekolu. O ke kaha hikina ma ka aoao akau; oia kahi e ku ai ka la i ka akau i ka la 15 me ka 16 o Kaulua, ua kapaia alanui "Ke alanui Polohiwa a Kane."*

4. *O ke kaha hikina ma ka aoao hema, oia kahi e ku ai ka la i ka aoao hema i la 15 me ka 16 o Hilinama. Ua kapaia ia alanui o “Ke alanui Polohiwa a Kanaloa.”*
5. *O ke alanui iwaenakonu i kupono i ka lolo, ua kapaia o “Ke alaula a ke Kuukuu;” a o “Ke ala i ka piko o Wakea.”*
6. *Mawaena o keia mau alanui na Hoku paa o ka Aina; i kapaia na Hoku hookele moana. Ua kilokilo ia kela hoku keia hoku maluna o ka ipu.*
7. *I ke ao ana, kuhikuhi mai la ke kumu i na hoku. Eia o Humu me kona mau lala iwaho, a me na lina i ka akau, a me ka hema; ke kulepe, ka puahiohio, ka waiipuilani a pau ke ano. Pela no o Keoe, o Nuuanu, o Kapea, o Kokoiki, o Puwepa, Nakao, Nalalani, o Pililua, Mananalo, Kaawela, Naholo, Pinaau, Polohilani, Kaweo, Hokuloa, Ukali.*
- [8.] *Ua makaukau oe no ka pauku olokaa. Alaila e ao oe i na mea o loko o ka hale, i na ipu o loko, i na mea o ka hale a pau i na lina a pau; he mau hoku kiai ia, ua pau na mea o loko i ke ao ia.*
9. *Mai na po i na Kaloa, a hiki i o Maui. E lawe ae ke kumu i ka moena puao maikai, a hohola ae iwaho ka hua, a e moe iho oe, a e huli ae ko alo iluna; a e loaa ia oe Ke Alapolohiwa a Kane me Kanaloa aia malaila, na hoku hookele; oia hoi na Hoku Ai-Aina. Akaka ia oe na la kupono o ka moana, mala o ke Kau me ka Hooilo.*
10. *I ko holo ana i ka pae Aina o Kahiki ua loaa ia oe he lalani hoku hou me na hoku i ka lewa a me ka lepo.*
11. *I ko hiki ana i ka piko o Wakea e nalowale ia oe ka Hokupaa Akau. Alaila e lilo Newe i hoku alakai hema, a o ka pae hoku o Humu ma na koa alakai maluna. I ka pau ana o na lina ia oe o ka lani.*
12. *E ao oe i na lina o ka moana, i na la e pii ai ke au iluna, a me na e moku ai ilalo, a me na la inoino o ka wili-au, me na la haumalu newenewe malie, a ku o ke au.*
13. *E ao oe i ke Kamaikihulipu i makaukau oe i ka hoolana, i pau ka lina o ke kaula hoolana ai. E ao oe i ka au mai kekahi mokupuni, a i kekahi mokupuni.*
14. *E lolo oe i kau mau oihana i ao ai i paanaau ia oe; i kokua mai ai ke Akua i kona mana Hemolele. I kou holo ana iloko o ke kupilikii a me na kai lipolipo o ke aloha ole.*

O ka Kanekahoowaha aoao Aohoku keia. He mau elemakule Aohoku o Kahipolau, o Namaka, o Pai, o Kahipooula, he poe Aohoku keia. Ua maopopo ia lakou na lina; ua aneane e like no lakou me ka mua, ua oi loa’ku no nae ia o ke komo ana o Kaiahuna maloko o Kuaiako. Aole au i lohe i kekahi mea like me ia ma ke ao nei. O oukou paha kai lohe e hai iho. [S.M. Kamakau in Nupepa Kuokoa, Aukake 5, 1865:4]

Translation of Kamakau – August 5, 1865 (based on Alexander, 1891:142-143)

About Astronomy

I hereby set aside, and clarify the stories of some youth who sail the ocean, the thoughts of Mokuleia, whose eyes are blurred by mist on the sea of Elokupaoa.

I knew their astronomy teacher and sail instructor. I was a child of perhaps ten years, and it was he who was their sailing teacher.

Kanowa was the site, at Hanai, the school of Pekue, the waves of Kalakiki, and the teacher was Kaneakahoowaha and his students.

Instructions in Astronomy.

1. Take the lower part of a gourd or *hula* drum (*hokeo*), rounded as a wheel, on which several lines are to be marked (burned in), as described hereafter. These lines are called, “*Na alanui o na hoku hookele*” (the highways of the Navigation stars), which stars are also called “*Na hoku ai-aina*” (the stars which rule the land).

Stars lying outside of these three lines are called “*Na hoku o ka lewa*,” i.e., foreign, strange or outside stars.
2. The first line is drawn from the “*Hoku paa*” (North Star), to the most southerly of “*Newe*” (Southern Cross). The portion to the right or east of this line is called “*Ke alaula a Kane*” (the dawning, or the bright road of Kane); and that to the left or west is called “*Ke alanui maaweula a Kanaloa*” (the much traveled highway of Kanaloa).
3. Then three lines are drawn east and west (latitudinally), one across the northern section, indicates the northern limit of the sun, about the 15th and 16th days of the month *Kaulua*, and is called “*Ke alanui polohiwa a Kane*” (the black shining road of Kane).
4. The line across the southern section indicates the southern limit of the sun, about the 15th and 16th days of the month *Hilinama*, and is called “*Ke alanui polohiwa a Kanaloa*” (the black shining road of Kanaloa).
5. The line exactly in the middle of the sphere (the drum, the *Lolo*), is called “*Ke alanui a ke Kuukuu*” (the road of the Spider), and also “*Ke alanui i ka Piko o Wakea*” (the way to the navel of Wakea).
6. Between these lines are the fixed stars, “*Na hoku paa o ka aina*,” which are called the stars by which one navigates on the sea. The teacher will mark the position of all these stars on the gourd.
7. Thus he will point out to his scholars the situation of *Humu* (Altair), and its associates on the outside, and to the north and south, with the winds *Kulepe*, *Puahiohio*, *Waipuilani*, and of all types. The stars are *Keoe* (Vega), *Nuuanu*, *Kapea*, *Kokoiki*, *Puwepa*, *Nakao* (Orion), *Nalalani*, *Pililua*, *Mananalo*, *Kaawela*, *Naholo*, *Pina-au*, *Poloahilani*, *Kaweo*, *Hokulua* (Venus), *Ukali* (Mercury).¹⁴
- [8.] Now you are prepared with the gourd container. Now you are taught of the things within the “house,” those things of the *ipu*, all the things of the house, all the customs; there are many guardian stars, all of these things are found in the teachings.
9. During the nights from *Kaloa* to *Mauli* (the dark nights of the moon), are the best times for observation. Spread out a mat, lie down with your face upward, and contemplate the dark-bright sections of Kane and Kanaloa, and the navigating stars contained within them; that is of the *Hoku Ai-aina*. The good days for the ocean, in the seasons of *Kau* and *Hooilo*.

¹⁴ To the list originally recorded by Kamakau in 1865, Alexander (1891) added several additional star names and their English equivalents. Alexander translated the paragraph as:

Between these lines are the fixed stars, “*Na hoku paa o ka aina*.” On the sides are the stars by which one navigates. The teacher will mark the position of all these stars on the gourd. Thus he will point out to his scholars the situation of *Humu* (Altair), *Keoe* (Vega?), *Nuuanu*, *Kapea*, *Kokoiki*, *Puwepa*, *Na Kao* (Orion), *Na Lalani o Pililua*, *Mananalo*, *Poloahilani*, *Huihui* (the Pleiades), *Makalii* (the Twins), *Ka Hoku Hookelewaa* (Sirius), *Na Hiku* (the Dipper), and the planets, “*hoku hele*,” *Kaawela* (Jupiter), *Hokulua* (Venus), *Hokuula* (Mars), *Holoholopinaau* (Saturn), *Ukali* (Mercury), etc. [Alexander, 1891:142-143]

10. If you sail for the Kahiki groups, you will discover new constellations and strange stars over the deep ocean, "*hoku i ka lewa a me ka lepo.*"
11. When you arrive at the "*Piko o Wakea*" (Equator), you will lose sight of the "*Hoku-paa*" (North Star). Then "*Newe*" will be the southern guiding star, and the constellation of "*Humu*" will stand as a guide above you, "*Koa alakai maluna.*" That is when you have mastered all the customs of the heavens.
12. You will also study the regulations of the ocean, the movements of the tides, floods, ebbs and eddies.
13. You will also study the art of righting upset canoes, "*ke kamaihulipu,*" and learn the currents that run from one island to another.
14. All this knowledge contemplate frequently, and remember it by heart, that the God will empower you. So that it may be useful to you on the tough, the dark and unfriendly ocean.

Thus are the Astronomy teachings of Kaneakahoowaha. There are still several old men who know Astronomy, they are Kahipoliau, Namaka, Pai, and Kahipooula, they are Astronomers. They know the customs, and they are of almost the same skill as the first. But he was the foremost, in the skill of entering Kaiahuna and in Kuaiako. I have not heard of any other like him on earth. If perhaps you have heard, say so. [Translation of W.D. Alexander, in the Hawaiian Annual, 1891:142-143; modified by Maly to reflect the original text of S.M. Kamakau]

Nā Hōkū o ka Ho'okelewa'a (Stars of the Navigators)

In December 1865-1866, Kupahu, contributed a series of articles to the native newspaper, *Kuokoa*, discussing Hawaiian religion. One article in the series (*Kuokoa*, December 30, 1865:4), was dedicated to the practices of those people who knew the stars, and their importance in Hawaiian beliefs and customs. Kupahu's article is of particular importance, as it names many stars of the Hawaiian skies, and also provides us with some traditions associated with their names and with whom they were associated. The original Hawaiian texts, as published in the *Kuokoa*, and an English translation, prepared by Maly, follow below. As in the account above, we note that some of the concepts and use of language were confusing to us. Thus, readers more expert in the field of language and astronomy may be able to clarify the meaning of Kupahu, through their own careful review of the narratives.

Hoomana Kahiko.
HELU 33.

Na inoa a ka poe kahiko i kapa ai i na Hoku a me ke kilokilo ana i na Hoku.

Ua oleloia e ka poe Ao-Hoku o Hawaii nei mai kinohi mai, ua lawa pono na kanaka a pau i na hoku, mai ka mea e noho ana ma ka nohoalii, a hiki loa i ka mea i kapaia he kauwakuapaa. Nolaila, eia malalo iho nei kekahi mau hoku, a me ko lakou ano, a me na hana a lakou.

1. O na hoku kokua i ka hookelewaa ana.

Aia ma ka aoao akau kekahi hoku i kapaia e ka haole he Hokupaa Akau, a i kapaia hoi e ko Hawaii nei poe Ao-Hoku i na inoa ekolu; o Kiapaakai, Noho-loa ame Kumau. Ua kapaia keia mau inoa [illegible] no kona panee ole iluna [illegible] aole no hoi ma o, aole [illegible] ma kekahi wale no wahi e no [illegible] e akaka ai kona kokua no na poe hookelewaa. Ina e noho no kekahi kanaka ma Hawaii, a makemake e holo i Maui, alaila, o kana hana no ia, o ka hoomakaukau i na mea e pili ana i ka waa, a makaukau ia mau mea; i ke ahiahi ana aku, o ka hoomaka mai la no ia i ka holo ana mai Hawaii mai, me ka hoopolelei i ka ihu o ka waa i kahi o ka hoku i kau ai, nona na inoa ekolu i haiia maluna'e. A pela mau no hoi e hoopolelei ai a hiki i kahi i makemake ai e holo. I ka hoi ana hoi i Hawaii, e

hoopololei no i ka hope o ka waa i kahi kupono i ua hoku la. Aia hoi mawaho ae o keia hoku, i kapaia i na inoa ekolu, kekahi mau hoku ehiku e poai mau ana ia ia, i ka po a me ke ao; a pela mau aku no. O ke kau ana o keia mau hoku, aia no ia ma ka lalani kekee. Ina e ikeia keia mau hoku ehiku e kau ana maluna pono iho o keia hoku, i ka wa mahope iho o ka napoo ana o ka la, alaila, e maopopo no i ka poe i ike i ke Ao-Hoku o Hawaii nei. Aia a kau hou keia mau hoku i ko lakou poai ana ia ia, alaila, e kokohe ana i ke ao.

2. Kekahi mea e kokua ai i ka poe e hookelewaa ana.

Aia ma kahi i kapaia e ko Hawaii nei poe ao-hoku, o Kuamoo kekahi mau hoku he lehulehu, aka, o ko lakou kau ana, ua kau no ma ka lalani poepoe. He nui na hoku ma kauwahi, a kakaikahi ma kauwahi, a hookahi no ma kauwahi. Ua kapaia na inoa o na hoku o keia lalani, ke nana iho no hoi kakou malalo nei. O ka nui o ko lakou mau inoa, he iwakalua kumamaono. A eia no hoi ka mua: O Ikaika, oia no ka inoa i kapaia e ko Hawaii nei poe ao-hoku, a i kapaia hoi e ka poe akeakamai o lubita, Kaawela. Eia kona wehewehe ana: Ua kapaia aku kona inoa mamuli o kona ano malamalama, oia kela inoa i hoikeia'e nei maluna. O keia hoku no hoi kekahi mea nona i hoike mai ka lilo wale ana mai o Kauai ia Kamehameha I., me ke kaua ole ia. I ka wa e noho alii ana o Kaumualii no Kauai, ua kaua mai o Kamehameha I, me ke alii o Maui nei, ua lanakila no o Kamehameha, a pela no i ko o Oahu. Noho iho la o Kamehameha ma o Oahu, a kupu ae la kona manao e ku e kaua ia Kaumualii, ke alii o Kauai. Mamua ae nae o ka holo ana o Kamehameha i Kauai, hoomaka kona kilokilo hoku, e nana i na ouli o ka lani ma ka mea e pili ana i kana oihana he kilo hoku, aka, i kona nana ana, ike aku la oia i keia hoku i kapaia o Ikaika, a me ko Kaumualii hoku e kau pu ana.— la manawa no, pane ae la ua kilo hoku nei ia Kamehameha, “E lilo ana o Kauai ia oe, no ka mea, ke hoike ia mai la, ua lilo ka Aina nou; a e lilo wale mai aka no ka Aina ia oe, me ke kaua ole mai o ke alii o Kauai, a pela aku no hoi oe.”

Mahope mai, kena ae la o Kamehameha i kona mau waa kaua, e holo aku i Kauai e kaua ai. Ia lakou i hiki ai ma Kauai, hoomaka lakou no ka hoono ana i ke kaua, me ka manao no hoi e kaua koke no. I ko lakou hoomaka ana e kaua aku, ia manawa, pane aku o Kaumualii, “O hoi, a nana mai oe, a uhi ae kapa eleele, a kau ka puna i ka nuku, alaila, kii mai i ko Aina.” Ia manawa, akahi no a hoomaopopo o Kamehameha i ka olelo mua a kona kilo hoku i hai mua aku ai ia ia, mamua ae o ko lakou holo ana i Kauai, me kona olelo iho iloko ona. Ua ko io no ka ike a kona kilo hoku i hai aku ai ia ia ma Oahu. Eia ka lua o na inoa o na hoku o keia lalani hoku. O Mulehu, aole nae oia inoa wale no, aka, he mau inoa e ae no kekahi o keia hoku, oia hoi o Poloahilani, a me Poloula. O ke ano o keia hoku, he hoku makapo, a he pohina no kona ano ke nana aku kakou i ka po. Ua kapaia no hoi ka inoa o keia hoku mamuli o kekahi alii o Hawaii nei, oia hoi o Poloahilani, a o kona ano o ka noho ana, he alii makapo, elua mea nona ia e alakai iwaho, a iloko; e paa ana kekahi ma ka lima akau, a pela no hoi ma lima hema. A no ka makapo o keia alii, ua lele kona hauli iluna o ka lani, a kau i kela mau hoku i kapaia i na inoa ekolu maluna ae. O ke kau ana o keia mau hoku, hookahi mawaena, oia ka hoku pohina, a o kekahi hoku ma kekahi aoao, a o kekahi no hoi ma kekahi aoao, e like me keia kii molale iho, a pela ko lakou ano ke nana aku i ka po.

* *

O keia hoku ua pili ia Kuakini a me kana mau mamo.

Eia ke kolu o na inoa o keia lalani, oia hoi o Nanamua ma. Elua nae keia mau hoku, aole nae i ike ia ko laua mau moololo.

Eia hoi ka ha o na hoku o keia lalani. O Nanaakeauhaku; elua no mau hoku laua, aole no hoi i ikeia ko laua moololo.

Eia ka lima o na hoku o keia lalani, o Kupuku; ehiku mau hoku ko lakou nui, a ua kau paapu lakou ma kahi hookahi. A nolaila mai ke kumu o ko lakou inoa, o Kupuku, no ka paapu loa ma kahi hookahi.

Eia ke ono o na inoa o na hoku o keia lalani, o Haunakelekele; hookahi no hoku ia, aole no hoi he lehulehu ae, aole no hoi i ikeia kona moolelo. Ka hiku o na inoa o na hoku o keia lalani, oia hoi o Makaimoimo. 8. O Makaamoamo. 9. O Makaalohilohi. 10. O Makaholowaa. Aole nae i ike ia ko lakou mau moolelo.

11. O Kanukuokapuahi. Ua like kona ano me keia kii e kau nei ke nana'ku ka kakou i ka po.



A o ka hoku maluna loa, oia hoi ka mea i kapaia kona inoa o Kanukuokapuahi. [Aole nae i pau pono loa na hoku i ke kauia, aka, pela nae ke ano o ke kii i ka nana aku.]

Eia ka umi kumamalu o na inoa o na hoku o keia lalani, o Kapuahi. 13. O Paeloahiki. 14. O Anianikalani. 15. O Pulelehuauli. 16. O Pulelehuakea. 17. O Pulelehuakawaewae. 18. O Makahaiaaku. 19. O Makahaiwaa. 20. Kahaikanai. O keia mau hoku, ua kau pakahi no lakou, aole nae hoi i ikeia ko lakou mau moolelo. Eia ka iwakalua kumamakahi; o Kupualaloakalani ma, aole no i ikeia ko lakou mau moolelo. 22. Eholu o Humu ma, a o ko lakou nui iho la no ia. O ke kumu i kapaia'i o ka inoa o keia mau hoku, mamuli no ia o kekahi hookelewaa akamai o Hawaii nei ka wa kahiko. Penei e maopopo ai; i ka wa kahiko, kupu ae la ka manao o kekahi alii, e holo i Wailuanui i Kauai. Ia manawa, hoomakaukauia na waa, na kanaka, na kaukaualii, na'lii a me ka Moi. I ke ahiahi oia la, hoomaka na kanaka e holo mai Oahu aku, a o na keiki a Humu, o laua ke holo pu. Ua ao ia kekahi i ke kilo hoku, a ua akamai loa, oia hoi ka hiapo. I ka holo ana o na keiki elua a Humu me na kanaka ma ko lakou waa. I ka holo ana nae a waena o ka moana, nana ae la ua keiki mua nei, ua hala loa ka waa i ka lepo, pane ae la oia me ka olelo ae i ka mea nana e hookele ana ka waa, "Hoihoi ia ae ka waa iluna o Humu ma." Pane mai no hoi ka mea nana e hookele ana ka waa, "ua ike no olua." Me ke kuamuamu aku no hoi i na hua ino. A pela mau no ko laua pane ana, a hiki loa iwaena o ka moana, kua ukiuki loa iho la na kanaka maluna o ka waa, a kiolaia aku la laua iloko o ke kai. Ia laua e lana ana iluna o ka ilikai, pane aku la ke keiki muli i kona kaikuaana, "E make paha auanei kaua, no ka mea, ua pau loa aku nei na auwaa i ka hala mamua o kaua." Pane mai hoi ke kaikuaana, "Au ae paha kaua a kupono malalo o Humu (hoku) ma, a malaila kaua e lana ai." Ae a-e la no hoi kona pokii. Au aku la no hoi laua a kupono malalo o ua hoku nei, a lana iho la laua. O Humu oia no ka makuakane o ua mau keiki nei, he hookelewaa kaulana oia no ke akamai. Ua noho no oia a mahope mai ma ka waa o ke alii; oia hookahi no hoi ka waa i koe mahope mai, aole he waa e ae.

Mamua o ka holo ana mai o ua mau keiki nei, aole no i holo mai ko laua makuakane ma ka waa o ke alii. A hala aku la lakou, a liuliu, holo mai la ko laua makuakane me ke alii. I ka wa a ka makuakane e holo aku nei me ke alii, aia no kana mau keiki e lana ana i ka ilikai. Ia wa koke no ike mai la kana mau keiki i keia mea nui e holo mai ana, alaila, pane ae la ka hanau muli i kona kaikuaana, "E, he waa la, eia'e ke holo pololei mai nei la i kahi a kaua e lana nei." Pane aku la ka hanau mua, "o ko kaua papa (makuakane), ae keia me ke'lii." A hiki mai la ka waa i kahi a laua e lana ana, hookui ae la ka hanau mua i kona mau lima ma ka ihu o ka waa; a lohe ae la ke kanaka ma ka ihu o ua waa nei, pane ae la oia me ka leo nui, "E! He mau kakanaka, eia la ke hookui ae nei malalo o ka ihu o ka waa." A lohe o Humu no keia leo, puiwa koke ae la oia, a hookaa ae la i ka ihu o ka waa i ka makani, me ka manao no nae iloko ona, o kana mau keiki no. Ia manawa, hooiia ae la hoi ua mau keiki nei iluna o ka waa, a ikeia iho la o na keiki no a Humu. Lele aku la nae o

Humu, a honi aku la i na ihu o kana mau kama aloha, a uwe iho la. A no ko lakou hauwalaau nui, puoho ae la ka hiamoe o ke'lii, a ninau ae la i ke kumu o ko lakou walaau ana. Pane ae la kana hookele oia hoi o Humu, "o kuu mau keiki hoi paha, ua kiolaia iloko o ke kai, a loa mai la ia kakou." Ninau ae la ke alii ia Humu, "Pehea aku la ko lakou pono?" Pane aku o Humu, "aole lakou e pae i ka Aina, no ka mea, ua hala i ka lepo ko lakou holo ana." Ninau hoi o Humu i kana mau keiki, "Iluna owai ko olua kiolaia ana?" Iluna o Humu ma wahi a na keiki. Pane hou mai ke'lii ia Humu, "E pae pono ana anei lakou i ka Aina?" Aole e pae pono aku lakou, o i holo auanei lakou a launa lihi aku i ka Aina, a pa mai ka makani mai ka Aina mai, hala hou no i ka moana, a o ka make no ko lakou hope," pela aku o Humu i ke'lii. Pane hou aku o Humu, "Ina no auanei kakou e holo aku a pae i ka Aina, a hele aku e imi ma kahakai, aole no e loa aku kekahi auwaa, aole no hoi o kekahi kanaka hookahi." Ma ko lakou nei pae ana aku hoi i Wailua, a ninau aku hoi i kamaaina no na auwaa i holo mua aku ai, aole no he waa hookahi i pae aku, aole no hoi he kanaka hookahi a lakou i ike ai mai ka moana aku. Wahi a kamaaina.

Eia hoi ka iwakalukumamakolu o na hoku o keia lalani: Eha Keoe. O ka nui o keia mau hoku, eha no lakou, a o ke kau ana, ua like no ia me keia ano kii e kau nei. Ua kau no hoi kekahi mamua o ke kahi, me ke kowa loihi ma waena, a pela * * * no hoi kekahi mau hoku, e kau ana kekahi ma kekahi aoao, a o kekahi ma kekahi aoao. Eia hoi ka iwakaluakumamaha, o Kaluaokaoka, 25. O Kawaomaka'lii. 26. O Lehuakona. O ko lakou mau moololo nae, aole no ia i ike ia.

O keia mau hoku nona na inoa i hoikeia ae nei maluna, he mau hoku no lakou e kokua ana i ka mea hookelewaa. Penei nae hoi e maopopo ai. Ina e manao ana kekahi e holo i Oahu mai Maui aku nei, a i ole, mai Hawaii mai paha, a pae aku i Kauai, alaila, e hoopolei ana no oia i ka ihu o kona waa i kahi a ka hoku e napoo ai, oia no hoi ka lalani hoku i hoikeia ko lakou mau moololo maluna ae nei. Pela mau no e holo ai a hiki i ka wa e napoo ai kekahi hoku, alaila, e nana ae no i kona hope iho, a pela wale no e holo ai a hiki i kahi e makemake ai. A pela no hoi i ka wa e hoi mai ai, e hoopolei no i ka ihu o ka waa ma kahi e puka mai ai ka hoku, a o ka hope hoi o ka waa, ma kahi e napoo ai ka hoku. Pela mau iho la no hoi e holo ai a hiki wale i kahi e pae ai.

3. O kekahi poai hoku, a me kekahi hoku hele, o Holoholopinaau kona inoa.

Aia ma ia mau hoku kahi nana e hoike mai i ka pomaikai a me ka poino hoi o ke Aupuni. He umikumamalua ka nui o na hoku ma keia poai. O ko lakou kau ana, aia no ia ma ka lalani poepoe. Eia no hoi ka mea e ikeia ai ka pomaikai a me ka poino o ke Aupuni. Ina e kau ana o Holoholopinaau ma ka Hema, a o keia poai hoku hoi ma ka Akau, alaila, hookokoke mau ae kela i na po a pau, a aneane ae e hiki i kahi o keia poai hoku, alaila, hele hou no i kahi ana e makemake ai, i ka Hikina paha, a i ke Komohana paha, a i ka Hema paha, a ma na wahi e ae paha o ka lalani, aole e poino ke Aupuni. Penei no hoi e maopopo ai ka poino o ke Aupuni, e like no me ka mea i hoikeia ae nei maluna, e hele ae ana no oia mai ka Hema ae i na po a pau, a kokoke i kahi o keia mau hoku o kau ana, a komo ae oia mawaena o kekahi mau hoku, a hele iwaho, a komo hou mawaena aku o ka hoku elua, a me ka hoku ekolu a hemo hou iwaho mawaena o ke kolu a me ka ha; a pela mau aku no a pau na hoku he umikumamalua o keia poai. A ma keia hana ana, ua akaka lea i ka poe kilokilo hoku, he poino nui no ia no ke Aupuni holookoa mai o a o, aka hoi, ina e komo hapa ae o Holoholopinaau iloko o kela poai hoku, alaila, e poino hapa no ke Aupuni.

4. O ka Huhui a me na Kao, a me na hoku e ae a pau, ua oleloia, aia a pii mai na hoku a ike ia aku, alaila, pii pu mai me na kikia makani. O ka nui o na hoku ma ka Huhui, eono lakou, a pela no hoi na Kao, eono no. Ua kau pupupu ka Huhui i kahi hookahi, a o na Kao no hoi, elua lalani e kau hio ana, ekolu ma kekahi lalani, a pela no hoi ma kekahi.

Kupahu.

Ancient Religion.
Part 33.

The names given by the people of old to Stars and about the observing of Stars.

It has been said by the Astronomers of Hawaii, from the beginning, that all of the people knew about the stars, from the people who lived in the presence of the chiefs, all the way to those who were called outcasts (*kauwa kuapaa*). There follows below here, names of some of the stars, their nature, and the things done by, or known about them.

1. Stars which assist the Navigators.

There in the north, is a star called by the foreigners, *Hokupaa Akau*, and known by three names by the Hawaiian Astronomers; they are *Kiapaakai*, *Noholoa*, and *Kumau*. It was given these names [illegible] because it does not move above [illegible], not from one place to [illegible], it remains in one place [illegible]. (Here, I will) explain how it helps the navigators. Say, if there is a man residing on Hawaii, and he wants to go to Maui, then his task is to make ready the things for the canoe, and when everything is ready, in the evening, he begins to sail from Hawaii, with the nose of the canoe aligned straight on the place where the star, with the three names given above, is situated. That is how he gets straight to the place he desires to sail to. Upon returning to Hawaii, the stern of the canoe is aligned straight where the same star is situated. There are, outside (beyond) this star, known by the three names, seven stars which encircle it, in the day and night, and so on. These stars arise in a crooked alignment. If the seven stars are seen rising above this star, it is at the time that the sun is setting (at its extremity). Such is the knowledge of the Hawaiian Astronomers. When these stars are seen as if encircling it, then the day light is close at hand.

2. Some things which help the Navigators.

There is a place, called by Hawaiian astronomers, *Kuamoo*, with many stars, but as they rise, they are in a circular alignments. There are many stars in one area, a few stars in another area, and one star in another place. All of the stars of this alignment are named, as we look below here. The total of their names is twenty-six. Here is the first: it is *Ikaika*, the name given by Hawaiian astronomers, and it is called Jupiter, by the scientists, also *Kaawela*. Here is its explanation: its name is given because of its bright nature, that is the name (*Ikaika*) made known above. This star is the one that foretold the taking of Kauai, without battle, by Kamehameha I. At the time that Kaumualii ruled as king of Kauai, Kamehameha I was in battle with the king of Maui, and Kamehameha was victorious, it was also the same for Oahu. Kamehameha then resided on Oahu, and there arose in his thoughts the idea of fighting against Kaumualii, the king of Kauai. But before Kamehameha traveled to Kauai, his astronomer sought to discern the signs of the heavens, through the arts of observing the stars. As he observed, he saw this star called *Ikaika*, and the star of Kaumualii, rising together. — At that time the astronomer-seer told Kamehameha, “You shall take Kauai, for it is shown that the land shall be yours; but the lands shall come to you without a war with the king of Kauai. Thus it shall be for you.”

Kamehameha then ordered his war canoes to sail to Kauai for battle. When they arrived at Kauai, they made their preparations for battle, thinking that the battle would soon ensue. At the time they began the fight, Kaumualii said, “Return (to Oahu), until you see the black *kapa* cover (me), and the coral is placed in the mouth, then you may fetch your land.” It was at that time, that Kamehameha understood the words spoken to him previously, by his astronomer-seer, prior to their sailing to Kauai. Thus fulfilled, were the words spoken to him by the astronomer-seer on Oahu. Here is the name of the second star in this alignment of stars. It is *Mulehu*, but, its not only that one that is named. There are many other names as well, such as *Poloahilani* and *Poloula*. The nature of this star is that it is a star of the blind, it appears to be gray when we look at it in the night. The name of this star

was given for one of the chiefs of Hawaii, that is *Poloahilani*, and his manner of living, for he was a blind chief, with two people who helped to guide him outside. One person grasped him by the right hand, and one also by the left hand. Because this chief was blind, his spirit ascended into the heavens, and rests at the place of the three stars named above. The position of these three stars is that one is between—that is the gray one—with one star on one side, and another star on the other side,  like the adjoining image. That is how they look in the night.

This star is associated with Kuakini and his descendents.

Here is the name of the third star in this alignment. It is *Nanamua ma* (and companion). There are two stars, but their story is not known.

Here is fourth of the stars in this alignment, *Nanaakeauhaku*. There are also two stars, but their story is not known.

Here is the fifth set of stars in this alignment, *Kupuku*. There are seven stars altogether, and they are tightly clustered together in one place. Thus the reason for their name, *Kupuku* (standing together), because they close together in one place.

Here is the sixth star in this alignment, *Haunakelekele*. This is one star, there are no others, and its story is not known. The seventh name of the stars in this alignment is *Makaimoimo*. 8. Is *Makaamoamo*. 9. Is *Makaalohilohi*. 10. Is *Makaholowaa*. Their stories are not known. 11. Is *Kanukuokapuahi*. Its nature is like the drawing here, when we see them in the night. 

The star at the top, is known by the name, *Kanukuokapuahi*. [That is not all the stars that are set there, but it appears something like the picture when viewed.]

Here is the twelfth of the named set of stars in this alignment, *Kapuahi*. 13. Is *Paeloahiki*. 14. Is *Anianikalani*. 15. Is *Pulelehuauli*. 16. Is *Pulelehuakea*. 17. Is *Pulelehuakawaewae*. 18. Is *Makahaikau*. 19. Is *Makahaiwaa*. 20. Is *Kahaikahai*. All of these stars are set together, and their stories are not known. Here is the twenty-first, *Kupualaloakalani ma* (and companions), and their story is not known. 22. Is *Humu ma* (and companions), there are three together. The reason that this name is given to them is because of one of the skilled navigators of ancient Hawaii. Here is what is known. In ancient times, the thought arose in the mind of a certain chief to sail to Wailua-nui, Kauai. So at that time, the canoes were made ready, along with the people, the lesser chiefs, the higher chiefs, and the King. On the evening of the appointed day, the people began to sail from Oahu, and the two children of *Humu* went along as well. One of them had been instructed in the skills of astronomy, and was very smart, this was the first-born. The two children of *Humu* went along with the people in their canoes. Having sailed into the mid-sea (between the islands), the elder youth observed that the canoe had traveled past the earth alignment. He then said to the one who was navigating the canoe, "Turn the canoe towards *Humu ma*." The navigator-steersman of the canoe replied "as if you two know." Disparaging words were exchanged between them, and when they reached the middle of the ocean, the men aboard the canoe were enraged, and they threw the two youth off, into the ocean. While the two were floating there on the ocean's surface, the younger brother said to his elder brother, "Perhaps we two are going to die, for the canoe fleet has passed before us." The elder brother replied, "Let us two swim to a place below the star of *Humu ma*, and there, we two can float." The younger brother agreed. They swam to a point directly below that star, and there they floated. Now *Humu*, who was the father of these youth, was a famous canoe navigator. He had remained behind, in the canoe of the king; it was the only canoe that had remained behind, there were no others.

The youth had gone ahead, they did not sail with their father on the canoe of the king. They had passed by, and their father had sailed with the king. At the time that the father (*Humu*) sailed with the king on his canoe, his two children were already floating on the ocean's surface. A short time later, the two youth saw a great thing sailing towards them, and the youngest one said to his elder, "Say, there is a canoe, coming directly here, to the place where we are floating." The first-born said, "It is our father with the king." When the canoe arrived at the spot where they were floating, the first-born hooked his arm over the nose of the canoe; the men at the front of the canoe heard this and called out in loud voices, "Say, there are men who have latched onto the nose of the canoe." *Humu* heard the voices, and was exceedingly startled, and turned the nose of the canoe into the breeze, thinking that these must be his children. At that time, the two youth boarded the canoe, *Humu* saw them. *Humu* leapt forward and kissed his beloved children, crying. Their loud talking disturbed the sleep of the king, and he inquired why they were talking so. His navigator, *Humu* replied, "These are my two children who were thrown into the ocean, and they have been gotten by us." The king asked *Humu*, "Where are those they were with?" *Humu* replied, "They will not land on the shore, for they passed beyond the position in their sailing." *Humu* then asked his children, "Was it *Iluna*, who threw you overboard?" It was *Iluna*, said the youths. The king then asked *Humu*, "Will they land properly on the shore?" (*Humu* responded) "They will not arrive safely, for as they approach the side of the land, the wind will blow from the land and drive them again to the ocean, and thus your people will die." Thus *Humu* spoke to the king. *Humu* then told the king, "If we go and land on the shore, and go search on the beach, we shall not find one of the canoes of the fleet, nor even one of the men." When they landed at *Wailua*, they asked the natives there if they had seen the canoe fleet, that preceded them, and not one canoe, nor any people had landed. They had not even been seen on the ocean, so said the natives.

Here is the twenty-third set of stars in the alignment, the Four *Keoe*. There are a total of four stars, and they are situated as shown in this diagram. One is set before the other, with a long space between them; there are several stars, situated on one side, and then on the other side, and so on.



Here is the twenty-fourth of the stars in this alignment, *Kaluaokaoka*.
25. Is *Kawaokamaka'i*. 26. Is *Lehuakona*. Their stories are not known.

All of the stars whose names are known above, are stars which help the navigators. That is how they are known. So if one has the idea of sailing to Oahu from Maui, or perhaps from Hawaii, to land on Kauai, then he shall set the nose of his canoe on the place where the stars set. That is of the alignment of stars, whose stories have been given above. That is how it was done, sail till the decline of certain star. Then you sight the next one in the alignment, and so forth, until you reach the place you desire. It is the same for your return. You set the nose of the canoe at the place where the stars appear, and the stern of the canoe, where the stars set. So it was the custom of traveling and reaching the selected place of landing.

3. Stars in a circle, and the traveling star, *Holoholopinaau* is its name.

There are among these stars, those by which you may know of blessings or ill-luck for the Kingdom. There are twelve stars in this circle. They rise in a circular alignment. Here is how one may know of the well-being, or the ill-luck of the Kingdom. If *Holoholopinaau* rises on the South, and the circle of stars is to the north, then it shall be drawing nearer to it on each night, and when it is almost to the place of this circle of stars, then you go to the place desired. Perhaps to the East, maybe the West, perhaps the South, or other places of the alignment, and the Kingdom will not have ill-luck upon it. Then, how one will know that ill-luck will come upon the Kingdom, is, as shown above, is if it travels from the South on all nights, and draws near to the place where these stars are situated, and it goes

between them, then goes out, and enters between the third and fourth ones; that is how it is for all of the twelve stars in this circle. Through this action, the astronomers and seers, understood that there would be great trouble befalling upon the entire Kingdom. But, if *Holoholopinaau* only partially entered the circle of stars, then there would be misfortune for only a part of the Kingdom.

4. About *Huhui*, *Na Kao*, and the other stars, it is said that when the stars ascend, and are seen, then the sudden, stormy winds will blow. There are six stars in the *Huhui*, and six also in *Na Kao*. The stars of *Huhui* are clustered together, and also, those of *Na Kao*. They are in two lines that lean to the side, three on one line, and so on the other side.

Kupahu. [Maly, translator]

“*Oihana Kilo Kilo*” (1920)

In 1920, W.D. Westervelt published a brief article in the *Paradise of the Pacific* magazine, describing the *‘oihana kilokilo*, explaining why knowledge of the stars was important in Hawaiian navigation practices, and the larger beliefs and customs of the people. Westervelt (*Paradise of the Pacific*, December 1920:99-101), observed:

Oihana is a word applied to the regular ordinary customary duties of an individual. It belonged also to the family or nation as having their individual customs or duties.

Kilo-kilo is a doubling up of the word *kilo*, which in ancient times meant to “look deeply” or to “look far away.” It was applied to the star students who knew the positions of various constellations and could pilot the large canoes for many days in one direction over the great ocean. They were the wonder-men, the sorcerers, the magicians of the past. They were “*Kilo-kilo*,” or men who understood mysteries. They prepared a network of strings which outlined to them a kind of map. This they used by placing it in certain relations to the stars which they were sure they knew. Probably the strings were somewhat like the points of a compass, showing the direction the boat should take. Such a net was for a long time in the care of the Hawaiian Board, but when the present building was erected it was lost or broken and thrown away by someone who did not understand its value.

Oihana kilokilo represented the customs of the ancient Hawaiian astronomers and finally came to mean any mysterious or magical customs. The words were applied to the ordinary superstitions of the Hawaiians and meant any sorceries and enchantments practiced among the people or the priests... [page 99]

“*Hawaiian Names of Stars and Planets*” (1924)

Bishop Museum researcher, Kenneth Emory undertook a project to compile a list of names known to the Hawaiians, for stars and planets. In January, 1924, he completed his notes, observing that he had compiled the list—consisting of 142 names—from previously published sources, native informants, and a manuscript of the *Kumulipo* (from the papers of King Kalākaua and Queen Lili‘uokalani), in the collection of the late, Prince Jonah Kūhiō Kalaniana‘ole (and turned over to the Bishop Museum in 1922). Emory reported that his list was:

Largely from Thos. G. Thrum’s MSS which material is largely from Dibble’s History of Hawaii, 1843, and W.D. Alexander’s translation of Kamakau’s notes, which translation in the Hawaiian Annual for 1891, p. 142. The underscored names are one added from a MSS in Kuhio’s collection, dated 1885, and titled “*Na Hoku a me na Lii nona na Hoku o ka Lewa*,” (The stars and the chiefs having these stars as their own).

1. A‘a. Sirius according to Kalokuokamaile of Napoopoo (1924).
2. Au‘a. Betelgeux according to Kalokuokamaile of Napoopoo (1924).

3. *Anianekalani.*
4. *Aohuku.* Jupiter, see Parker's dictionary under *Kaawela*.
5. *Hakupokano.*
6. *Hanakalani.*
7. *Hanakalauai.*
8. *Haunakelekele.*
9. *Hikikaulia.*
10. *Hikikaulono.*
11. *Hikikaulonomeha.*
12. *Hiku (na).* The Great Dipper. *Hiku kahi*, *Hiku lua*, etc. 1st star in Hiku, etc.
13. *Hinaialeele.*
14. *Hinamailena.* *Ko Hana Hoku* (Star of Hana); star of *alii* Kekaaniau.
15. *Hoku-ao.* The planet Venus when it is the morning star; also *Hokulua* and *Manalo* (Venus).
16. *Hokulea.*
17. *Hoku Hookelewaa.* Canoe guiding star, often applied to Sirius.
18. *Hokulua.* Morning star; Venus, when morning star.
19. *Hoku-paa.* North star.
20. *Hokuula.* Aldebaran, also Mars and Mercury?
21. *Holoholopinaau.* 12 stars. Mars according to Parker.
22. *Holu.*
23. *Hooleia.*
24. *Hoomanalo.* Star of Puna, Kauai; and Queen Emma. (See *Manalo*) Jupiter?
25. *Hookelewaa.* See *Hoku hookelewaa*.
26. *Hua.*
27. *Huhui* or *Huihui.* The Pleiades. Full name: *Huihui a Makalii*.
28. *Humu.* Altair. *Humu-ma*, the constellation Aquilla.
29. *Iao.* Eastern Star. Jupiter when a morning star. In the story of Hawaii-loa, he is related as being out on one of his long voyages when Makalii, the principle navigator, said to him, Let us steer the vessel in the direction of *Iao*, the eastern star, the discoverer of land (*hoku hikina kiu o na aina*).
30. *Ihuku.*
31. *Ihumoa.*
32. *Ikaika.* Jupiter
33. *Ikawaolani.*
34. *Ikiiki.* Jupiter.
35. *Kaalolo.* Star of Niihau Island, and of Kalaniana'ole.
36. *Kaawela.* Mercury. (Jupiter, and Venus when evening stars) Star of the King. Jupiter according to Parker's Dictionary.
37. *Kaaona.* Name of one of the months in the Hawaiian calendar.

38. *Kaekae*.
39. *Kaelo*. Name of one of the months in the Hawaiian calendar.
40. *Kahaikahai*.
41. *Kahoea*. Star of Puna, also of Kawananakoa.
42. *Kahela* or *Kuaia*.
43. *Kekekapue*. Star of Kahoolawe Island, also of Lanihau.
44. *Kailiula*. Star of Kau District, also of Kaiulani.
45. *Kalalani*. Star of Lanai, also of Keaau.
46. *Kaluaokaohe*.
47. *Kamaile mua*. Star of Kona, Oahu, and of chief Auhea.
48. *Kamaile hope*. Star of Koolau, Oahu, and of Kamakahukilani.
49. *Kamaio*.
50. *Kanamee*. Star of Kauai, and of Keliiahonui.
51. *Kanihaalilo*.
52. *Kanoemakalii*.
53. *Kanukuokapuahi*.
54. *Kao*. Red Star (Aldebaran ?) 6 Stars. *Kao Maaiku*, Aldebaran in horns of bull. (*Na Kao* has been called Orion).
55. *Kaoea*. 4 stars. Hanalei, Kauai. Chief Kamauleule.
56. *Kapawa*. A period of time in the early morning.
57. *Kapea*. Cross stars. (Kalokuokamaile)
58. *Kapuahi*.
59. *Kau*. *Kau* = the Milky Way (also *Leleiona*). North Star which served the ancient Hawaiians as a guide in navigation. *Aia a puka o Kau holo kakou* (When *Kau* appears we sail). See *Hokukelewaa*. (Parker's Dictionary)
60. *Kauakapuu*. Star of Kohala, Hawaii; also for the chief (*kahoolina Moi*).
61. *Kaukamalama*.
62. *Kaulanaakalana*.
63. *Kaulu* (*Na Hui*).
64. *Kaulia*.
65. *Kaulua*.
66. *Kauluakaoko*.
67. *Kaululena*. Star of Kaupo, and of chief Owana.
68. *Kauopae*. Rigel, at whose appearance in the evening, the people went after the little red shrimp (*opae*) for *opelu* bait.
69. *Kawae*.
70. *Kawaomakalii*.
71. *Kawela*. (Mercury)
72. *Kaweo*.
73. *Kealakaa*.
74. *Keoe* or *Keowe*. (Vega ?)

75. *Kiapaakai*. North Star.
76. *Kokoiki*.
77. *Konamaukuku*.
78. *Kukui*.
79. *Kumu* or *Hokupaa*.
80. *Kumau*. North Star.
81. *Kumuko'a*.
82. *Kupualaloakalani*.
83. *Kupuku* (7 stars)
84. *Lanakamalama*.
85. *Lanikuhana*.
86. *Laelae*.
87. *Lehuakona*.
88. *Lewa*.
89. *Mahapili*. Star of Kekaha, and of the chief, Kekahuna.
90. *Makaalohilohi*. Kalokuokamaile says of this star *Hokualinolino*.
91. *Makahaiaku*. Says Kalokuokamaile, "*I ka wa puka aku keia hoku oia ka wa e holo ai e lawaia aku*." (When this star comes out, then the *aku* fishermen go out.)
92. *Makaamoamo*. Twinkling eye.
93. *Makahaiwaa*.
94. *Makaholowaa*.
95. *Makaimoimo*.
96. *Makalii*. Pleiades, also applied to Aldebaran in horns of the bull, and the twins.
97. *Makaunulau*. Star of Molokai, and of chief, Koakanu.
98. *Makeaupea*.
99. *Makulu*. Saturn.
100. *Malana*.
101. *Maliu*.
102. *Manalo* or *Hoomanalonalo*. Jupiter. *Mananalo*=*Hokuloa* or Morning Star according to Parker's Dictionary.
103. *Melemele*.
104. *Mohai*.
105. *Mulehu*.
106. *Na Hiku*. Great Dipper.
107. *Nahuihui* or *Nahui*. Pleiades.
108. *Naholoholo*. Venus when evening star. (Saturn according to Parker)
109. *Na Kao*. Six stars.
110. *Na Lalani o Pililua*.
111. *Nanamua* me *Nanahope*. Castor and Pollux.
112. *Napeha*.

113. *Nauaakeahihaku.*
114. *Newa [Newe].* A southern constellation, possibly the Southern Cross.
115. *Noholoa.* North star.
116. *Naholoholo.* Venus.
117. *Nuuanu.*
118. *Ololu (Omalo).*
119. *Paeloahiki.*
120. *Pauahi.*
121. *Pililua.*
122. *Pipa.*
123. *Polapola. Poloahilani* (same as Poloula).
124. *Poloula* or *Pohina.*
125. *Puanakau.* West Maui star, star of Chiefess Kekuiapoiwa.
126. *Puanene.* Hamakua, Hawaii star; star of Chiefess Likelike.
127. *Pukolua.*
128. *Pulelehuakaaweawe.*
129. *Pulelehuakea.*
130. *Pulelehuauli.*
131. *Puuwepa.*
132. *Ukali.* Mercury, from its following close after the sun.
133. *Ukalialii.*
134. *Uliuli.*
135. *Ulukoa.*
136. *Uu.*
137. *Waileia.* Star of Maui and of Chiefess, Kalola.
138. *Wainaku.* Star of Hilo, and Chiefess, Poomaikalani.
139. *Welo.*

Wehewehe or *Wewehe.* Kalokuokamaile says: “*O ka hoku ia i koe i ka wehewehe kai ao.*” (These are the stars left in the sky after the first light of dawn.)

Kane. “*He hoku maluna o ka mahina a malaila e ike ia ai o Kane ia po.*” (A star above the moon, by it is known the night of Kane.)

Lono. “*Hoku nui loa i ka wanaao. Keia hoku malalo o ka mahina, maopopo ka po ia o Lono.*” (A bright star in the morning. When this star is below the moon, then it is the night of Lono.)

Terms:

Hikialoalo = zenith.

Hoku aea, hoku hele, hoku o kaei = planets.

Hoku lele = comet or meteor; also, *hoku puhi baka* (tobacco smoking).

Hoku welowelo = a comet. [Compiled by K.P. Emory, January 1924. BPBM – MS. SC Emory, Grp. 8 Box 4.7, pp. 1-6. Courtesy of B.P. Bishop Museum]

Hawaiians as Navigators and Seamen (1925)

In 1925, the journal of the Hawaiian Historical Society published an article by Samuel Wilder King, in which he discussed the knowledge and accomplishment of Hawaiian navigators and astronomers. King acknowledges the great skill of the ancient Hawaiian navigators, and included a description of their use of stars in their practices:

I was reading recently an article that advanced the proposition that the man who first made use of a rude paddle to propel a crude raft was essentially a greater inventor than the many who later developed the rowing boat to its present mechanical excellence. So, in other fields the first germ of an idea was the most important, the big step forward, the later improvements following as a matter of course, inevitable as midday after morning. Our complicated modern civilization gives us immense knowledge, the use of all the stored experience of thousands of years of people of many races; but the big new ideas are still few and far between. It is doubtful if we excel our ancestors in intellect, however much we may be their superiors in knowledge.

Judged on their grasp of the fundamentals, the ancient Hawaiians had a splendid foundation in seamanship and navigation. Remote and isolated as they were, and had been for years, what they knew was either part of the scanty heritage brought with them from their ancient home in the west and treasured through all the thousands of miles of eastward migrations, and generations of residence on the fair isles of Polynesia, or was of their own devising. Perhaps some unrecorded Galileo or Lord Kelvin added a mite or two to their original store of knowledge. At any rate we know that the Hawaiians could not benefit from the discoveries and improvements being made in the European world, that the narrow limitations of their islands confined their progress in countless ways, and that the lack of writing made it extremely difficult to standardize their knowledge and keep it clear of error.

When the *Haole* first came to Hawaii it was a source of wonder to them how the Hawaiians got here. Further acquaintance with the mele of old voyages increased the wonder. Finally it was borne upon them that the Hawaiians, like their [page 11] kin throughout Polynesia, were great seamen, with a clear knowledge of the prevailing winds, the moods of the sea, and the signs and portents that foretold the weather. In their canoes, the greatest of which were frail craft compared with the vessels of Cook or Vancouver, they traveled the seas of Hawaii daringly, braving the currents and tempestuous waves of the island channels, and making far trips beyond the horizon. With mat sails and paddles they accomplished voyages upon which we moderns would hesitate to venture. With neither compass nor chart, sextant nor chronometer, but with mind filled with the ancient lore, handed down through the generations, the lore of wind and sea and sky, they set out, and counted not the mischance of failing to make a land-fall.

A priestly astrologer, the *kilo hoku*, would give the more important of the prospective trips a good clearance, or hold the boat for a better day; and mixed with his rites there were always the realities of keen weather observing. Of course the pig must be baked, the *awa* chewed and mixed, the gods propitiated with offerings and prayers, and then the heavens and sea scanned for portents. If the rainbow stood arched in the wrong quarter, if the clouds were flying in scattered fragments, the wind and sea from the wrong direction, the sailing was delayed. But if the indications were fair the astrologer completed the prognosis with an inspired dream, and the voyage was well begun.

The canoe captain, the *hookele*, then took command. He knew the different waves with their specific names, equivalent to our own cross sea, following sea, head sea, etc.; and the winds of many kinds, each with its name and peculiar characteristic; and he knew his boat, and how it should be handled under every condition, even to righting it if overturned.

To make the land-fall desired the *hookele* first located the North Star, in Hawaiian, *Hokupaa*, or fixed star, and kept it on the proper bearing; and then selected from the heavens the steering star, the star from among many that would carry him safely to his port. If the little star near *Na Hiku*, The Dipper, was seen to wink frequently, or if other signs were present, a storm was approaching, and he steered for a safe haven.

In this manner the Polynesians populated every habitable [page 12] rock and coral island in an area of ocean greater than a continent. There is no record of those who failed; but of those who achieved a new land-fall, and carried the news back to their kinfolk, we have some record, fragmentary it is true, because the Polynesians lacked the art of writing. From what we have we can piece together epic poems of great journeys, sagas of our Pacific Vikings less known perhaps than those of their Norsemen brothers of the sea, but of equal daring and romance, a tribute to the virility and courage of that ancient Polynesian race.

Our modern astrologer is the weather bureau, and our modern *hookele* has many aids in his struggle with the elements, but the principles of taking a vessel from port to port are much the same, based on good seamanship and navigation.

For the long trips, the great voyages to the far off islands of the South Pacific, the navigator knew his astronomy, *Ka oihana kilokilo*, and his geography, *kukulu o kahiki*, and became *he hookele-moana*, a deep water sailor. His chart might be the circular base of a gourd, lines burnt in to show the meridian of Hawaii, and the tropics. From *Hokupaa*, the North Star, to *Newe*, the Southern Cross, was the Hawaiian Greenwich; the northern tropic was *Kealanui Polohiwa a Kane*, the black shining highway of the sun; the southern tropic was *Kealanui i ka piko o Wakea*, the highway to the middle of the earth. The east was *Keala ula a Kane*, the red way of the sun; and the west was *Kealanui maaweula a Kanaloa*, the much traveled highway of the Fallen One. In the celestial sphere so bounded moved the stars, *na hoku paa o ka aina*, among them the navigational stars, *na hoku hookele*; and the planets, *na hoku hele*, moving stars. Beyond were strange stars, *na hoku o ka lewa*. Of the planets the Hawaiians knew five; Mars as *Hoku ula*, the Red Star; Venus as *Hoku loa*, the Great Star; Jupiter as *Kaawela*, the Brilliant One; Mercury as *Ukali*, the Sun Follower; and Saturn as *Makulu*.

Of the stars a great many were listed in the old instructions and mele, many not identified today. Besides the North Star and the Southern Cross, Altair, Vega, Sirius, Orion, the Pleiades, the Dipper, Castor and Pollux, and others were known and studied. [page 13]

With this stock of knowledge, the Hawaiians used a calendar based on the moon, knew and corrected its error by reference to the stars, named each month, each night of the month by the characteristics of the moon, and judged the hour closely by the stars at night, or the sun by day.

Thus equipped many brave chieftains of the olden times made the great voyage to Tahiti and back. How they provided sufficient food and water, how they survived storms and calms and submerged reefs and lee shores, is but briefly known from the chants that have come down to us. What captains failed and died unsung will never be known. But we do know of many who succeeded, and brought back new chiefs and priests to Hawaii, new customs and ideas, dances and drums, plants and dresses, and started ferment in Hawaii nei that did not end until Kamehameha the Great ruled supreme over the eight islands.

Of Hawaii specifically, such names as Paoa, Kaulu a-Kalana, Paumakua, and the famous old sea-going family headed by Moikeha and including his foster son Laa, named Laa-mai-kahiki, the son Kila, and the grandson Kahai, have come down to us as great

voyageurs of a later period, when Hawaii and the southerly islands revived the old bond, and exchanged ideas and peoples, after several centuries had been allowed to elapse since the original settlers had come north to “Green-backed Hawaii” as they called it.

The exploits of these Hawaiian Vikings surpass in daring and danger that of the Norsemen. Among those who go down to the sea in ships the ancient Hawaiians hold a high and honorable place; and the seamen’s bent and flavor holds with their children today. [Journal of the Hawaiian Historical Society, 1925:14]

“The Morning Star Rises”

In 1935, Maud Makemson, PhD., at Vassar College, conducted first-hand research and interviews with elder *kama’āina*, in Hawai’i. The purpose of her work, being to collect Hawaiian lore pertaining to stars, and native practices associated with them as manifested in the life of the people. The research was conducted as a part of a larger program of documenting the scope of Polynesian knowledge of the heavens, demonstrating the continuity of such knowledge across Polynesia, and how localized knowledge diverged from that of the larger social group. In her work, Makemson, had access to several elder native Hawaiians—among whom were George Kalama of Moloka’i, David Malo Kupihea (“Kupehea”) of Honolulu, and M.K. Pukui, at Bishop Museum—who still possessed knowledge of Hawaiian skies. She also accessed a wide collection of archival sources—many translated by Mary Kawena Pukui. She cites accounts as those given earlier in this section of the study, and through her combined research, lists the names and character of at least 208 stars and constellations—often giving translations of the Hawaiian names¹⁵, and their corresponding western names—known to the Hawaiian people.

Makemson’s research was published under the title “*The Morning Star Rises*” in 1941, and is a significant work in this field. Selected excerpts follow below, focusing on material not previously cited, or expanding upon such information. Makemson reported that:

Among the Hawaiian stars listed by Kamohoula, Auhaele and Paikauhale were said to patronize beggars, vagabonds, and thieves. Two other stars, *Makaha* and *Makohilani*, situated near the Pleiades, were benevolent toward thieves and murderers. The star *Makahai-aku* informed fishermen of the proper time to go out shark (*aku*) fishing.

Kaukamalama, a so-called “royal star” of Hawaiian astrologers, is said to have shone all night during the month *Ikuwa*, October, and to have disappeared on the first night of the following month. *Kaukamalama* may have been situated so far south in the Hawaiian sky that it enjoyed only a short diurnal path and was visible only for a month, but in that case it could not have shone all night long. At any rate, its appearance was the omen of rain, lightning, thunder, earthquake, wind, high surf, and storm. As a Hawaiian sage explained, “the ancient people said that *Ikuwa* was the husband of *Puaikaiaualewa*, who gave birth to men of loud voice, and contentious.”

Kamalama, the other “royal star” of Hawaiian astrologers, shone nightly during *Hilinehu*, which was a rainy, windy month but not as violent as the previous one, *Ikuwa*, and was [page 139] the sign of abundant fish (*nehu*) which could be caught with the net during the rule of *Kamalama*.

Kane was a star which appeared above the Moon and was listed by Kamohoula as a “star of the third class.” Whether the classification referred to its brightness or its position in the sky was not defined. The interesting fact about *Kane* was that it was visible only at certain times and then only to priests and astrologers. When it was seen, it foreboded the death

¹⁵ We note that readers of Hawaiian will find that some of the translated Hawaiian names may have more appropriate translations. We leave those translations to the readers.

of the king or a high chieftain. The description suggests a variable star such as Mira. [page 140]

Planets or wandering stars were of interest mainly for astrological purposes or as weather indicators, as in the case of Saturn or Jupiter whose misty aspect forewarned of storms. In modern times much confusion prevails regarding the identification of the ancient names with individual planets. *Naholoholo*, for example, was applied to both Venus and Saturn by various Hawaiian authorities, although their natures are quite distinctive. Since the name signifies swift-moving, the identity with Venus is the more logical as Saturn is the slowest of the planets. *Holoholopinaau* was said to be Saturn by one, Mars by another; the name which means “weaving to and fro” is most appropriate to Mars. It is possible, however, that the same name was applied to different planets in the various islands of the same archipelago. [page 192]

Known Hawaiian Names of Planets:

Mercury

Ukali or *Ukali-alii*, Following-the-chief (i.e., the Sun).
Kawela, Radiant.

Venus

Hoku-loa, Great Star.
Hoku-alii, Chiefess-star.
Naholoholo, the Swift-running-one. [page 193]

Mars

Hoku-ula, Red-star; also a name for Alderbaran and other conspicuous red stars.
Holoholo-pinaau, Weaving-to-and-fro.

Jupiter

Ikaika, Brilliant.
Ikiiki, a goddess; a Hawaiian month name and therefore probably a fixed star rather than a planet. [page 194]
Kaawela or *Kawela*, Burning.
Hoomanalo.
Iao, Of-the-dawn; Jupiter as morning star.

Saturn

Naholoholo, Swift-running; not applicable to Saturn.
Makulu, Dripping-water; referring to the planet as a weather indicator. [page 195]

Identifying the sources of her Hawaiian information on stars and lore, Makemson, wrote:

In the following pages are to be found names of most of the Polynesian stars which have been remembered until recent years. The Hawaiian list was compiled from native writings of Kamakau, Kepelino, Malo, Kupahu, and the Kumulipo as translated by Liliuokalani and such foreign authorities as Fornander, Dibble, Emerson, and Thrum, from a star list collected by Mary Pukui and E. H. Bryan, Jr., of the Bishop Museum from Hawaiian newspaper articles and other sources, and from another compilation by Professor Donaghho of the University of Hawaii. [page 197]

Aa, Glowing; a Hawaiian star identified as Sirius by Emory.

Aikanaka, Man-eater; a Hawaiian star of the southern sky named for a legendary figure...

Ke Alii-o-kona-i-ka-lewa, the Chief-of-the-southern-expanse; a very bright star which, with the Southern Cross, acted as a guide to Hawaii-loa and his brother on their voyage of exploration to the far southern ocean where they were turned back by ice barriers. It is probably Canopus or Argo... [page 198]

Anianekalani, a Hawaiian star said to be in the Milky Way, named for the father of Hawaii-loa and Ki [Ki'i]. Both Hawaiians and Tahitians call *Anianekalani* the progenitor of their nations, saying, "In his time, the race had come far from its original homeland."

Ao-hoku, *Au-huku*, and *Au-haku* appear to be variants of a Hawaiian name possibly for Jupiter. [page 200]

Aua is a Hawaiian named for Betelgeuse, according to Emory...

Auhaele is a Hawaiian star, the patron of vagabonds and beggars and associated with *Paikauhale* in the couplet:

There are the eyes of *Hoku-ula* (red Star)
Auhaele and *Paikauhale*.

Hoku-ula was described as a large, bright, beautiful red star visible in the month of *Welehu* and the three were thought by some to be Altair and its two companion stars in Aquila. The identification is incorrect, since Altair is a white star. *Hoku-ula* is probably Antares in this connection and *Auhaele* and *Paikauhale* are its companions, Sigma and Tau Scorpii. [page 202]

Hakalauai, a Hawaiian star associated with *Hanakauluna* in the southern sky. When these stars rose it was an omen of pestilence and other calamities according to Kamohoula.

Haka-moa, Chicken-roost; A Hawaiian constellation important to the astrologers.

Hakupokano, a Hawaiian star, is an example of stars named for islands to which they had served as guides to the mariner, in the past history of the Polynesians.

Haloa, a Hawaiian star probably in the southern sky. Kamohoula said of it: This is a large star between *Kane* and *Iwikauhikaua*, with which it forms one row. *Haloa*, which means "long taro stalk," was the son of Wakea (Atea, Vatea) and Hoohokukalani... The star was thus named because it was one of the stars known to the people who lived about the time of Wakea and Papa." [page 205]

Hanaia-kamalama, Light of the Heavens; a Hawaiian name for the Southern Cross. According to an old story Hina-hanaia-kamalama was the wife of Aikanaka and fell in love with the moon. As she was about to ascend the Moon, Aikanaka pulled off one of her legs...

Hana-kalanai or *Hana-kalani*, a Hawaiian star...

Hana-kalauai may be a variant of *Haka-kalauai*. It is a geographical name which has come to be applied to a navigation star.

Hana-kauluna, a Hawaiian star. See *Hakalauai*.

Hao, a Hawaiian star and also a place name.

Hauna-kelekele; a single star in the Milky Way found in Kupahu's list of Hawaiian stars. [page 206]

Hiki-analia, a Hawaiian star found in several lists. Ninety-one year old George Kalama of Molokai described it to Kelsey as a medium bright star near the equator, visible from April to September. He said that the first evening rising is accompanied by strong winds; but as it rises higher after sunset the winds become favorable for sailing and the star acts as a guide to the mariner and fisherman.

Hiki-au-moana, Swim-the-ocean, enables the shipwrecked sailor to swim home and is said to be the equivalent in Kauai of *Hiki-analia* in Molokai.

Hiki-kauelia (Liliuokalani) and *Hiki Kauilia* (Kamohoula) are variants of a Hawaiian star name which the latter authority gives as one of the numerous names for Sirius, when used as a guide in navigation.

Hiki-kau-lono-meha, Star-of-solitary-Lono; the Hawaiian name for Sirius when observed for astrological purposes according to Kamohoula. [page 207]

Na Hiku, the Seven; Hawaiian name for the Big Dipper. Donaghho gives the full title as *Na Hiki-ka-huihui-a-Makalii*, the Cluster-of-the-seven-of-Makalii. The stars of the Seven are individually designated by numbers: *Kahi*, *Alua*, *Kolu*, *Hana*, *Lima*, *Ono*, and *Pau*, "finished," according to Liliuokalani.

Hilinama is a Hawaiian star and month name...

Hilinehu, contracted from *Hilina-ehu*, is the Hawaiian star and month name which is paired with *Hilinama*.

Hinaia-eleele, is a Hawaiian star and month name...Liliuokalani translated it as "Black Hina..."

Hina-lani, Hina-of-the-sky; a Hawaiian star. [page 208]

Hoeu, Stir-up, is a Hawaiian star. Hoeu was a chief of Kula, Maui, who deserted his wife *Kawaunuiola* for another woman. Thereupon his wife placed a strict *tapu* about her house which prevented interruption of her complete seclusion. At mealtimes, she petitioned her absent husband as a god and asked and answered questions until passing neighbors carried news to *Hoeu* that his abandoned wife had secured a new husband. Whereupon *Hoeu* hastened home and a reconciliation was effected.

Hoku-alii, Chiefess Star; a Hawaiian named for Venus.

Hoku-hookelewaa, Star-which-causes-the canoe-to-sail; a Hawaiian named for Sirius, as star of the mariner.

Hoku-iwa, Stars-of the-frigate-bird, is a Hawaiian constellation which guided Hawaii-loa back to Hawaii after a voyage to the south Pacific and must therefore be situated in the northern sky... *Hoku-iwa* is probably the constellation Bootes which passes overhead in the latitude of Hawaii.

Hoku-kea, Stars-of-the-cross; a Hawaiian name for the Southern Cross. In the legend of Hawaii-loa it was by these stars, *Hoku-kea-o-ka-mole-honua*, Star-cross-of-the-barren-land, and by *Ke Alii-kona-i-ka-lewa*, that the course was shaped for the southern ocean.

Hoku-komohana, Star-of-the-setting-Sun; a Hawaiian name for Venus as evening star.
[page 209]

Hoku-lea, Star-of-gladness; a Hawaiian star, possibly Arcturus.

Hoku-lei, Star-wreath; a Hawaiian name for Capella or the whole constellation of Auriga. We are told that Hoku-lei was chosen by Pualoa, the “people promoter,” and Kawelolani the astrologer from the stars remaining after the people’s stars and those of the steersmen had all been enumerated. *Hoku-lei* was one of the wives of *Makalii* (Pleiades), the other being *Hoku-ula*, Alderaban.

Hoku-loa, Great Star; a Hawaiian name for Venus.

Na Hoku pa, Stars-of-the-palisade; a Hawaiian constellation which Kamohoula’s translators interpreted as Leo. From the statement that the *Pa* stars were sometimes “paralleled” (i.e., lay on the same diurnal path) with Humu, Altair, 8° north of the equator, it is more likely that they form the head of Cetus.

Hoku-paa, Immovable Star; one of several Hawaiian names for the North Star.

Hoku-poho-ka-Aina, is probably a general Hawaiian term for the star seen over the stern of the canoe when land disappears.

Hoku-ula, Red Star, was applied by the Hawaiians to Aldebaran, Mars, Antares, and possibly Betelgeuse. Kamohoula describes *Hoku-ula* as a very bright star of the month *Welehu*. Since the order of the month names varied considerably in different islands and since the time of night is not specified, the statement is of no value in identifying the star. He also says that *Na Kao-Makalii*, the Darts of *Makalii*, are on the same plane as *Hoku-ula*. *Na Kao* is generally accepted as Orion’s Belt which is situated in the same declination as Betelgeuse, a conspicuous red star in Orion.

Hoku-ula is mentioned in the following couplet:

In the month of *Welehu* my child was born;
Born was a star, *Hoku-ula* by name.

In another statement that the stars *Auhaele* and *Paikauhale* [page 210] are called the right and left eyes of *Hoku-ula*, reference is undoubtedly made to Antares and its two companions.

Na Holoholo, Run-to-and-fro; a Hawaiian planet, probably Venus.

Holoholopinaau, a Hawaiian name for Mars. The name may also have been applied to a fixed star since Kaleikupua described it as “a land star, a people’s star, which travels a regular course during the month *Ikuwa* with its leader *Omao*, which the astrologers observe as they proudly enter the winter season.”

Holu, Deep-ocean; a Hawaiian fish god and star of fishermen.

Hoo-kele-ale, Sailing-master; a Hawaiian navigation star.

Hooleia, a Hawaiian star; apparently named for the mother of the famous legendary beauty, Luukia...

Hoo-manalono or *Homanalono*; a name for Jupiter in Hawaii.

Hua, Fruit or Egg; the Marquesan name for Jupiter as well as a Hawaiian star. It is also the name for the day of the full Moon and a personal and geographical name.

Na Huihui, the Cluster, usually stands for the Pleiades [page 211] in the Hawaiian, the full name being *Na Huihui-a-Makalii*. Kalama and Kamohoula also give *Ka Huihui-pa-ipu-a-Makalii* as a variant, referring to the calabash *ipu* in which Makalii stored the food supply, according to one story.

Humu, a kind of fish, is the Hawaiian name for Altair, in Aquila, while *Humu-ma*, the Humu-cluster, probably includes neighboring stars. The astrologers were said to be “under the influence of *Na hoku a Humu-ma*.”

Humu was the name of a Hawaiian navigator known far and wide for his great skill. [page 212]

Ia, Fish; a Hawaiian term for the Milky Way. The phrase *ua huli ka ia*, “the fish has turned,” denoted that the hour of midnight had passed.

Iao, Of-the-dawn; a Hawaiian term for Jupiter as morning star.

Ihuku, Peaked-nose (Liliuokalani); a Hawaiian star which Emory suggests may be the same as *Aohuku*, a planet name. Since, however, *ihu* may mean the “bow of the canoe” as well as a “nose,” and *ku* is to “stand erect,” it is probable that *ihuku* is a general term applied to any guiding star which the steersman in the stern sees standing above the bow.

Ihu-moa, Chicken-nose (Liliuokalani); a Hawaiian star. *Moa* signifies the “stern of a canoe” as well as the domestic fowl.

Ikaika, Brilliant; a Hawaiian name for Jupiter.

Ikiiki, Pinched (for lack of food), is a Hawaiian star and month name...

Iwikauikaua is a Hawaiian star, probably named for the [page 213] son of Makakaualii, although Kamohoula remarked concerning it: “It is not known when this star was first seen and recognized by Hawaiian astrologers, but no doubt it was seen 17 generations ago.”

Kaakaa, Radiant, is a Hawaiian star name... said to be a constellation on the border of the Milky Way.

Kaalolo was the tutelary star of Niihau in Hawaii. Donaghho interprets it as any morning star.

Kaaona, a Hawaiian star and month name, said to be called after a brother of Hawaii-loa.

Kaawela or *Kawela*, Radiant; a Hawaiian name for Venus or Jupiter and possibly also for a fixed star.

Kaekae, Smooth and Plump; a Hawaiian star named for one of the men brought by Paumakua from a distant foreign land. In a legend related by Fornander they are described as “white men and sorcerers.” The time was about A.D. 1100.

Kaelo, a Hawaiian star and month name... The Hawaiian *Kaelo* may stand for Betelgeuse, a brilliant red star, since it “blazes in the *Makalii* or winter season.”

Kahaikahai is the twentieth star in the *Kuamoo* or Milky Way listed by Kupahu and may have been named for the legendary character Kahai...

Kahai-lono is classified by Liliuokalani as one of the Hawaiian “stars of fighting omen.” [page 214]

Kahela; a Hawaiian “people's star,” presiding over the month *Ikuwa*.

Kahiki-nui, a Hawaiian navigation star said to be named for one of the eight steersmen of Hawaii-loa. It was also an ancient geographical name.

Kahoea; tutelary star of Puna, Kauai.

Kaholo, the Coconut-fiber-lashing-of-the-royal-canoe, is a star of Puna.

Kailiula, Red Skin (Liliuokalani); a tutelary star of Kau, Hawaii.

Kakae, a Hawaiian star; possibly a variant of Kaekae.

Kalaniopuu is said to be an alternative name for Kawela. [page 215]

Kalua-okaoko is a star in the Milky Way known to the Hawaiians of old.

Kamahana, a Hawaiian star; probably a variant of *Mahana*, Gemini.

Ka Maile-mua, the First Wreath; a Hawaiian star name.

Ka Maile-hope, Last Wreath. Taken with the preceding name this suggests a pair of bright stars such as Castor and Pollux or Alpha and Beta Centauri. They were patron stars of Oahu.

Kamaio, a Hawaiian star.

Ka Maka-ululau, the Star-of-innumerable-breadfruit...

Ka Malama, the Light; a “royal” star of Hawaii.

Ka Malie, Calmness, or *Ka-malie-mua*, First Calm, is a Hawaiian star, evidently the token of quiet seas...

Kanamee was the tutelary star of King Kaumualii of Kauai. A conjunction between Jupiter and *Kanamee* foretold the fall of Kauai to King Kamehameha. *Kanamee* must thus be a star close to the ecliptic.

Kane is a sacred Hawaiian star name for the great Polynesian deity. It could only be seen by priests and astrologers and then only rarely and its appearance was the portent of great misfortune. The description suggests a variable such as Mira or Algol, or even a nova.

Kanihaalilo, a Hawaiian star.

Kanikaniaula is a Hawaiian star, named for the woman who is credited with introducing the first feather cape from [page 216] Hawaii to Maui. Although descended from a line of chiefs, she concealed her high rank when she settled in Maui and married a lowly man

from the back country who was unaware of her lofty station. Legend also attributes to her, the erection of a unique pyramidal tomb built of poles.

Ka-noe-Makalii, the Eyes of *Makalii*, is a Hawaiian star whose parents were *Hoku-ula*, Aldebaran, and *Makalii*, Pleiades.

Ka-nuku-o-kapuahi, the Land-of-sacred-fire, is the Hawaiian term for the Hyades. Mr. Kupehea of Honolulu believes the name to be modern.

Na Kao, the Darts; the Hawaiian name for the Belt and Sword of Orion, stars much used in inter-island navigation... Liliuokalani translated *Na Kao*, the Goat, an obvious anachronism.

Kaoea, Darts-thrown-upward; a Hawaiian constellation presiding over the destiny of Hanalei, Kauai.

Kaopua, listed by Donaghho as a Hawaiian star, may be a variant of *Kauopua*.

Kapawa or *Kapawe* is found in more than one Hawaiian star list, but is also a term for a period of the night.

Ka-pea, the Cross; a Hawaiian name for Crux... [page 217]

Kapuahi, Sacred Fire; a Hawaiian star possibly Aldebaran in the constellation *Ka Nuku-a:-kapu-ahi*, the Hyades.

Kupua-lalo-a-kalani, Wizard-in-the-lower-heavens; a Hawaiian star name...

Kau, Summer or Dry Season; a Hawaiian star of the northern sky, which served as guide to mariners. "When *Kau* appears we sail." *Kau* was also a name for the Milky Way.

Kau-aka-puu, Dawn-suspended-destiny; a Hawaiian star which presided over the fortunes of Kohala.

Kaua-mea, Sacred Circlet; a Hawaiian constellation, possibly Corona Borealis...

Kau-ano-meha, Standing-alone-and-sacred; one of the many Hawaiian names for Sirius.

Kau-kalia, Sojourning; a Hawaiian star which was the patron of foreigners.

Kau-ka-malama, Suspended Light; a Hawaiian "royal" [page 218] star paired with *Kamalama*. As a month-ruling star it was said to be the cause of *Ikuwa*, being such a "bursting, contentious month."

Kaulana-o-ka-la, Resting-place-of-the-Sun, does not sound like a star name but is found in Hawaiian lists.

Kaulia; a Hawaiian "people's star," serving as ruler of the month *Ikiiki*.

Kaulua; one of the many Hawaiian names for Sirius... It is also a Hawaiian month name.

Kaulua-ihai-mohai, Flower-of-the-heavens (Liliuokalani); a Hawaiian star listed in the Creation Chant; possibly the full name for Sirius.

Kaulua-koko, Brilliant-red-star, is in the same zone of the Hawaiian sky as *Humu*, Altair, and is probably Betelgeuse.

Kaulua-okaoka, Star-dust; a Hawaiian star or perhaps a star cloud.

Kaulua-lena, Yellow Star; a Hawaiian astrological name for Sirius, and also the name of a wind.

Kaulua-mohai; a Hawaiian star, possibly the same as *Kaulua-ihai-mohai*.

Kauopae, Shrimp Star; a Hawaiian name for Sirius as patron of shrimp fishing.

Kauopua; a Hawaiian navigation star.

Kawai, the Sea; a Hawaiian navigation star. [page 219]

Kawa-o-Makali; Precipice of *Makali*; a Hawaiian constellation in the Milky Way.

Kawau; a Hawaiian star.

Kawaunuiola, a Hawaiian star shining in the month Hilinama, named for the wife of Hœu in the legend previously cited. "At the end of its course in benefiting the people, *Kawaunuiola* disappears and *Hookelewaa* (Sirius) then appears."

Kawela, a name for Jupiter in the Hawaiian Islands. See *Kaawela*.

Kaweo, an unknown Hawaiian star.

Ke Ala-kea, the Shining Road; a Hawaiian star probably used in navigation.

Keawe; a star in the southern Hawaiian sky named for an ancient king.

Kehepue; a Hawaiian star name, possibly a variant of Kekekapue.

Kehooea; a Hawaiian star.

Kekai-hili; a star of the southern sky of Hawaii.

Keke-kapue, a Hawaiian astrological star.

Ke-lala-kea; a Hawaiian star; possibly misspelled for Ke-ala-kea.

Keoe or *Keoea*; a Hawaiian name which Alexander believes was applied to Vega; but Kupahu describes it as a group of four stars forming a diamond. Hence it probably stood for the entire constellation of Lyra, in which Vega is situated. *Kehooea* may be a variant of *Keoea*.

Keola; patron star of Lanai in the Hawaiian group.

Kiki-ula, Red Skin; a Hawaiian star.

Kiaha, Radiant; a Hawaiian name for the Big Dipper (Donaghho). [page 220]

Kiopaa, "eternally fixed in the heavens to guide the sea man" (Kepelino); one of the Hawaiian names for the North Star.

Koko-iti, Little Blood (Liliuokalani); the bright star or comet which heralded the birth of Kamehameha I of Hawaii. It was named for a district in the northern part of the Island.

Kona-maukuku, Their Spikes (Liliuokalani); a well known Hawaiian star. See *Kukui-a-kona-maukuku*. [page 221]

Kukui, Torch; a Hawaiian star... *Kukui* may be an abbreviated form of *Kukui-a-kona-maukuku*.

Kukui-a-kona-maukuku; a Hawaiian star or constellation name.

Kumau, Standing-perpetually; a Hawaiian name for the North Star.

Kuaie, a month-ruling Hawaiian star also called *Kahela*.

Kumukoa; a Hawaiian star of the astrologers observed in the morning sky during the month *Hilinehu*.

Kupua-lalo-a-kalani is evidently the same as *Kupua*- [page 222] *lalo-a-kalani*...

Kupuku, Cluster; described by the Hawaiian sage Kupahu as “seven stars placed in a cluster together in one place.”

Laelae, Brightness; a Hawaiian star.

Lalani, the Heavens; a Hawaiian expression for the Milky Way, and also said to be the name of a single star, the patron of Lanai.

Na Lalani-a-Pililua; a Hawaiian double star. Mr. Kupehea interprets *pililua* as “two close friends.”

Lani-kuhana, Sky-standing-erect; a Hawaiian star name.

Lana-kamalama, Floating Light; a Hawaiian star perhaps associated with *Kamalama* and *Kau-kamalama*.

Lealea; a Hawaiian star, named for Lea the goddess of shipbuilders.

Lehua-kona, *Lehua-of-the-south*; a Hawaiian star in the Milky Way. It may stand for Antares...

Lena, Glowing; a Hawaiian star... It is also found in the compound name *Kaululena*.

Lono; a bright star named for the Hawaiian god *Lono* (Maori Rongo). The statement, “When this star is below the Moon it is the night of *Lono*,” indicates that *Lono* may be the name of any bright star below the Moon on the night of *Lono*, when the Moon is in the waning crescent phase, since no single star could regularly enjoy that distinction. [page 223]

Mahana or *Na Hoku-mahana*, Summer or Stars of Summer; a Hawaiian name for Castor and Pollux which are also known as *Nana-mua* and *Nana-hope*.

Maha-pili, Twins; a double star said to have been observed by Hawaiian astrologers...

Mahau, Twins; a Hawaiian name for Gemini.

Na Ma-hoe, the Canoe-paddle-cluster; said to be another name for Castor and Pollux in the Hawaiian Islands. George Kalama declared that when these stars rise in the east a few hours after sundown, the wind is favorable for inter-island voyages. On the course from Kauai to Hawaii, he said, the bow of the canoe was pointed directly between these stars. Since such a course must lie almost due southeast, the bow-guiding stars [page 225] must have been situated far south of the celestial equator and could not possibly have been Castor and Pollux; but these could have served as guide stars over the stern of the canoe, when near the western horizon.

Maiao, Toward-the-dawn; a Hawaiian navigation star said to be named for one of Hawaii-loa's eight steersmen.

Maia-ku, Stand-bravely; Hawaiian name for the Belt of Orion, also called the Darts.

Maka-alohilohi, Sparkling-eyes; a Hawaiian star. Maka found in many compound names as a synonym for *hoku*, "star," had the original meaning of "point," "eye."

Maka-amoo, Twinkling-eyes; a Hawaiian star or constellation in the Milky Way... [page 226]

Makaha; a Hawaiian star which Kamohoula paired with *Makohilani* as the patrons of thieves and murderers. They are situated near the Pleiades.

Maka-hai-aku was the sign to Hawaiian fishermen that it was the season for shark, *aku*, fishing.

Maka-hai-a-waa; a Hawaiian star of the *waa*, "canoe."

Maka-holo-waa, Star-of-the-sailing-canoe; a Hawaiian star in the Milky Way, according to Kupahu. Kalama declared that it was visible after sunset the year round, indicating a position within 20° of the north pole. It is probably another name for the North Star.

Maka-ihu-waa, Star-of-the-bow-of-the-canoe; a Hawaiian navigation star said to appear only at times, and to be accompanied invariably by a long, sharp-pointed cloud. The name suggests the star Ihu-ku. Kalama declared that if the star were above the horizon in the evening or morning sky, its position was an indication of weather conditions. If cloud and star were in the south and west it was a sign of calm weather; if in the east or north, a storm was brewing and the canoe remained on shore. This statement is unintelligible except on the suppositions that *Maka-ihu-waa* could be any bright star accompanied by a long sharp cloud, situated in the direction toward which the canoe-men wished to sail.

Maka-imoimo, Twinkling-eyes; a Hawaiian constellation in the Milky Way.

Makaio-lani, Sacred-star-of-heaven...

Makalii, High-born stars; the Hawaiian form of the common Polynesian name for the Pleiades. Kepelino remarked, [page 227] however, that the chief officer of Hawaii-loa's ship gave his name to several stars or constellations and other authorities attach the name *Makalii* to the Hyades and to Gemini.

Makalu appears to be a variant of Makulu, a Hawaiian name for Saturn.

Maka-unulau, Star of Unulau; a Hawaiian star named for one of the navigators of Hawaii-loa. The following lines are from a chant translated by Fornander:

Arise! Arise! Arise!
Hiki Lii (the Pleiades rise)!
Maka-unulau is up,
The star at the end of the land.

Makea-upea, a Hawaiian star or constellation.

Makohilani; a Hawaiian star coupled with *Makaha*.

Makua-kau-mana, Ancestor-girded-with-power; a star in the great Hawaiian constellation known as the Double Canoe, said to be situated below the Pleiades...

Makulu; a Hawaiian name for Saturn.

Malana, Unsteady (*Liliuokalani*); a Hawaiian star.

Maliu; a Hawaiian star and geographical name...

Malu-lani, Celestial Shadow; a Hawaiian star of the southern sky. *Malu* conveys a sense of the “presence and power of the god.” [page 228]

Mananalo; a Hawaiian name for Venus, according to Alexander. [page 229]

Maui, south of the Pleiades, was a star highly esteemed by astrologers of the island of Maui in the Hawaiian group. The hero Maui has been commemorated in such constellations as the Pukapukan Te Kau-o-Maui, the fishhook with which Maui dragged up innumerable islands.

Maukuku; a Hawaiian star name doubtless related to Kona-maukuku. [page 234]

Melemele is a Hawaiian star, possibly Betelgeuse. Kamohoula states that *Melemele* is a “male” and the neighboring *Polapola* a “female” star. [page 235]

Mohai; a Hawaiian star listed in the *Kumulipo* and also found in the compound names *Kauluomohai* and *Kaulua-ihai-mohai*.

Mulehu is one of three Hawaiian stars forming a [page 236] triangle, the others being *Poloula* and *Poloahilani*. Of the last, which was named for a blind king of Hawaii, Kupahu remarks: “The character of this star is blindness, and it shows a whiteness when observed in the night. *Poloahilani* had two attendants to guide him in and out, one to hold him by the right hand, the other by the left. Through the blindness of this king his misfortune is applied to the heavens and placed with those stars of three names mentioned above. This star applied to Chief Kuakini and his descendants.”

The three stars may well be Alpha, Beta and Gamma Cassiopeiae. Alpha appears a little in advance of the other two as befitting a chief, and varies half a magnitude in brightness, a phenomenon which may have suggested dimness of vision.

In the legend of Hawaii-loa *Mulehu* is given as an alternative name for Venus, the westward guiding star which led that intrepid explorer to the “land of the people of up-turned eyes.”

Naholoholo, Weave-to-and-fro; a Hawaiian name for Venus or Saturn, applying more appropriately to the motion of the former.

Nana; a Hawaiian star name equivalent to the Tuamotuan Ngana and the Tahitian Ana, a “star.”

Nana-hope, Last *Nana*; a Hawaiian name for Pollux.

Nana-mua, First *Nana*; a Hawaiian name for Castor. [page 237] Castor and Pollux together were known as *Nana-mua-ma*. In Molokai, according to information received by Kelsey from Kalama, *Nana-mua* and *Nana-hope* were two names for a single star and testified that it “witnessed the last of night and the first of day.”

Napehe; a Hawaiian navigation star, tenth in the list of thirteen steersmen's stars given by Kaleikupua. [page 238]

Newa, *Newe*, and *Newenewe* are Hawaiian names for the Southern Cross.

Noho-loa, Eternal; a Hawaiian name for the North Star.

Nuu-anu, Frozen land; a Hawaiian star and geographical name.

Ololu; a Hawaiian star listed in the *Kumulipo*...

Omao; a Hawaiian star and a bird of the thrush family.

Omao-ku-ululu was a mystical land “on the borders of the world.”

Paa; a Hawaiian star mentioned by Kamohoula as one of the large group resembling a double canoe. Paa was a famous priest who conveyed a colony from Central Polynesia to Hawaii during the Middle Ages. [page 239]

Pae-loa-hiki, Long-shining-threshold; said to be a Hawaiian star in the Milky Way but it is more likely the name for the entire Galaxy analogous to the Pae-roa-o-Whanui of the Maori.

Pai-kau-hale; a Hawaiian star name... See *Auhaele* with which *Pai-kau-hale* is associated.

In Hawaii the constellation *Na Hoku-pa* appears to be the head of Cetus.

Pauahi; a star of the Hawaiian astrologers which “emerges in the early morn, the morning star being high, during the month *Kaulua*.”

Pili-lua, Two-friends-close-together; the Hawaiian form of Pipiri or Pipili, whose myth is told throughout the Polynesian area. The Hawaiian pair of stars was supposed to bring the *opelu* fish to local waters.

Pipa, Sneak (Liliuokalani); a Hawaiian star.

Pohina, Confusion; an alternative name for *Poloula* in the Hawaiian Islands.

Polapola is a Hawaiian star and geographical name. Kamohoula believed it to be in Orion. Since the name is the same as Porapora in the Society group, *Polapola* may have served as guide star on the voyage from Hawaii to this island, in which case it must be situated much farther south than Orion, page 244] *Polapola* and his companion *Melemele* may therefore be names for Alpha and Beta Centauri.

Poloahilani or *Polohilani*; a Hawaiian star associated with *Mulehu* and named for one of Hawaii-loa's mariners. The name means "shining in the heavens..."

Polo-ula, Shining-red; a star of Oahu also known as *Pohina*. [page 245]

Puana-kau, Suspended-blossom; a Hawaiian name for Rigel, the tutelary star of West Maui.

Puanene; a Hawaiian star of destiny.

Pu-koloa, Wild-duck-overhead; a Hawaiian constellation...

Pulele-hua-kea is the Hawaiian name for the Greater Magellanic Cloud.

Pulele-hua-uli, Dark-scattering-mist; the Lesser Magellanic Cloud in Hawaii.

Pulele-hua-kawaewae; the Hawaiian name for Coalsack. [page 247]

Puwepa, a Hawaiian star. [page 248]

Ukali or *Ukali-alii*, Following-the-chief, i.e., the Sun; a Hawaiian name for Mercury.

Uliuli, Blackness; a Hawaiian star in the southern sky. *Uliuli*, like *Polapola* and *Melemele*, were names of lands formerly occupied by the Polynesians in their long migration (Malo). *Uliuli* was also the name of a *tapu* imposed by King Kualii, the breaking of which was punishable by death.

Ulukoa or *Uluoa*, Associated-with-rejoicing; a Hawaiian navigating star... [page 265]

Unulau, Pull-off-leaves; a Hawaiian star and the name of a wind. The star was said to have been named for one of the eight steersmen of Hawaii-loa. *Unulau* was also a geographical name. [page 265]

Wehewehe; a Hawaiian month-ruling star. Makemson, 1941:268]

Mauna Kea, Pā i ka Lanī ***(Mauna Kea, Touching the Heavens)***

It is noted here, that while conducting this study, no specific archival references to *kilo hōkū* on Mauna Kea were located. The association of the gods and deity whose forms are seen in the heavens and whose names are commemorated at locations on Mauna Kea is noteworthy, and may be viewed as manifestations of the cultural attachment and values placed by Hawaiians on the *Mauna a Kea*, and the *kino lanī* (heavenly bodies). It is very likely that practices of the native practitioners of the *‘oihana kilokilo* and the *kilo hōkū* occurred on Mauna Kea, but, they were either unwritten, or await being brought to light once again.

While today, Mauna Kea is valued as an astronomical center—and this may be rooted in earlier native practices—the ancient Hawaiian practitioners were mindful of their foundation, the *papa honua* (earth) upon which they stood. As noted in the traditions cited above, these islands, the children of the native gods and creative forces of nature, also gave birth to, and life to the *kānaka* (people). Naturally, one could not look heavenward, without first looking down, and being mindful of the responsibility (*kuleana*) that people have to care for the *papa honua*. This is a custom which is of value to all who cherish and touch Mauna Kea.

Native lore and the on-going beliefs of cultural practitioners address Mauna Kea (*Mauna a Kea*) as the *piko* (in this case, not only the summit, but the umbilical cord) that connects Hawai‘i, the first-born child of the creative forces of nature, to the heavens. In interviews conducted by Maly in 1999, with native Hawaiian practitioner and educator, Pua Kanaka‘ole-Kanahele, readers were provided with detailed narratives of the spiritual significance of Mauna Kea—the Mountain of Wākea, in Hawaiian traditions of creation. It was observed that Mauna Kea is considered to be *kupuna* (elder), the first born, and is held in high esteem. In native traditions, Mauna Kea is identified as “*Ka mauna a Wākea*” (The Mountain of Wākea—traditional god and father of Hawai‘i—who’s name is also written “Kea”). Mauna Kea is the source of a high sense of spirituality. It is the *‘aha ho‘owili mo‘o* (genealogical cord that ties earth to the heavens) (MKAC meeting Dec. 1, 1998 and interview of December 11, 1998; in Maly 1999).

Kūpuna, who have been interviewed by Maly between 1999 to 2005, shared the view that Mauna Kea is sacred, and that until the development of the observatories, it was a pure and sanctified place, tied to the heavens. It was for this reason that the *piko* of new-born children were taken to the summit region of Mauna Kea. Collectively, the *kūpuna* lament the changes that have occurred on Mauna Kea since the development of the observatories (cf., interviews with Elizabeth Lindsey-Kimura, Teddy Bell, Elizabeth Ruddell-Spielman, and Irene Lindsey-Fergerstrom).

III. Historical Accounts of the ‘Āina Mauna Recorded by Natives, Foreign Residents and Visitors (1778-1899)

The historic records of native writers share that in the Hawaiian mind, Mauna Kea—from shoreline to the dense forests and lofty peaks—was a source of awe and inspiration. The natural resources and mountain itself, were believed to be manifestations of various creative forces of nature, and were revered. Though on a different level, the natural beauty of Mauna Kea and the *‘āina mauna* also inspired foreign visitors of the eighteenth and nineteenth centuries to wax poetically. In the journals of many eighteenth and nineteenth century visitors, readers can find descriptions of the natural environment and glimpses into the native history of the mountain. Selected narratives penned by a number of early foreign visitors in letters and journals, and the observations of historians, describing first-hand and eyewitness accounts of travel across the mountain lands, and traditions learned from native guides, are cited below. The accounts are presented in chronological order by date of observations and travel to the *‘āina mauna*.

The Journal of Captain James Cook (1778-1779)

The earliest written descriptions of Mauna Kea and the mountain lands, recorded by a foreigner are found in the Journals of Captain James Cook and his officers (Beaglehole 1967). Cook and his crew visited the Hawaiian Islands in 1778 and 1779, though none of them traveled to the interior lands or ascended Mauna Kea. Although brief, the narratives are notable because they describe the mountain slopes and summit, and present us with one of the earliest maps of the island.

[December 1, 1778] ...At 7 PM we were close up with the North side of [O'why'he] where we spent the night standing off and on.

Wednesday 2nd. The 2nd in the Morning we were surprised to see the summits of the highest [mountains] cover[ed] with snow; they did not appear to be of any extraordinary height and yet in some places the snow seemed to be of a considerable depth and to have laid there some time... [Cook in Beaglehole 1967:476]

Mon. 7 . . . There are hills in this island of a considerable height whose summits were continually covered with snow [Mauna Kea and Mauna Loa], so that these people know all the climates from the Torrid to the Frigid Zones... [Cook in Beaglehole 1967:478]

In the same time period, Captain King describes, what is believed to be the summit peaks of Mauna Kea from the northwestern side of the island of Hawai'i:

...the inland country rises gently at first but afterwards abruptly to a mountain, which is broken at the top [presumably Mauna Kea], which must be very high, since we think we can discern a good deal of Snow upon it, some say the appearance is only Clouds hanging on the top, & is also cut into deep Glens. [King in Beaglehole 1967:501]

In March 1779, Cook's officers, Clerke and King, provided additional descriptions of the mountains of Hawai'i. King's narrative is of particular interest, because he makes specific use of the name Mauna Kea (Mouna Kāā) in his narrative. Clerke observed:

...This isle is one continued Mountain on which are Peaks of various heights, particularly two of vast elevation which were covered with snow all the time we were about the neighbourhood [Mauna Kea and Mauna Loa]; the great altitude of these snow Peaks was by no means striking to the eye, I suppose from the vast base they stood upon, for they must have been of great height as we have seen them very clearly at 26 leagues distance, and then they appeared very high and prominent... [Clerke in Beaglehole 1967:591]

King noted:

On the NE side is Amacooa [Hāmākua] & A-heedoo or O’heeroo [Hilo], the Snowy mountain which makes in 3 peaks & is called Mouna Kāā (or Mountain Kāā) separates them... [King in Beaglehole 1967:605].

The Journal of William Ellis (1823)

In 1823, British missionary William Ellis, and members of the American Board of Commissioners for Foreign Missions (A.B.C.F.M.) toured the island of Hawai‘i seeking out community centers in which to establish church strongholds for the growing Calvinist mission. In Ellis’ Journal (1963), we find the first Hawaiian tradition written in reference to Mauna Kea (Mouna-Kea). Following a sermon in the village on Hilo Bay, Ellis learned of a native account of “*kai a kainari*” in which an ocean flood had inundated all land except for the summit of Mauna Kea (Ellis 1963:321; see account earlier in this study).

Ellis also described his impressions of the mountain lands—their breadth, the nature of the forests and summit of Mauna Kea, and he also recorded that the natives traveled to the mountain lands. Ellis (1963) observed:

On approaching the islands, I have more than once observed the mountains of the interior long before the coast was visible, or any of the usual indications of land had been seen. On these occasions, the elevated summit of ***Mouna Kea***, or ***Mouna Roa***, has appeared above the mass of clouds that usually skirt the horizon, like a stately pyramid, or the silvered dome of a magnificent temple, distinguished from the clouds beneath, only by its well-defined outline, unchanging position, and intensity of brilliancy occasioned by the reflection of the sun’s rays from the surface of the snow.

The height of these mountains has been computed by some navigators who have visited the Sandwich Islands, at 12,000, and by others at 18,000 feet. The estimate of Captain King, we think exceeds their actual elevations, and the peaks of ***Mouna Kea***, in the opinion of those of our number who have ascended its summit, are not more than 1,000 feet high. But admitting the snow to remain permanent on the mountains of the torrid zone at the height of 14,600 feet, the altitude of ***Mouna Kea*** and ***Mouna Roa*** is probably not less than 15,000 feet.

The base of these mountains, is, at the distance of a few miles from the seashore, covered with trees; higher up, their sides are clothed with bushes, ferns, and alpine plants; but their summits are formed of lava, partly decomposed, yet destitute of every kind of verdure.

There are few inland settlements on the east and north-west parts of the island, but, in general the interior is an uninhabited wilderness. The heart of Hawaii, forming a vast central valley between ***Mouna Roa***, ***Mouna Kea***, and ***Mouna Huararai***, is almost unknown, no road leads across it from the east to the western shore, but it is reported by the natives who have entered it, to be “Bristled with forests of *ohia*,” or to exhibit vast tracts of sterile and indurated lava... (Ellis 1963:3-4)

Reverend Joseph Goodrich, who accompanied Ellis on part of his journey around Hawai‘i ascended to the summit of Mauna Kea from both the Kawaihae-Waimea route, and from Waiākea. On the first trip from Kawaihae-Waimea, Goodrich commented on the numerous wild cattle found on the mountain lands, and also reported on a “heap of stones” on the summit peak, which he presumed was made by a “former visitor” (Goodrich in Ellis, 1963:290). Goodrich reached the snow line and:

...directed his steps towards a neighbouring peak, which appeared to be one of the highest; but when he had ascended it, he saw several others still higher. He proceeded

towards one, which looked higher than the rest, and bore N. E. from the place where he was. On reaching the summit of this second peak, he discovered a heap of stones, probably erected by some former visitor... (ibid.:290)

In Goodrich's description of the journey by Dr. Blatchely, Mr. Ruggles and himself across the mountain lands of Pi'ihonua and Humu'ula, to the summit of Mauna Kea, he described the various conditions of the landscape at elevational zones, commented on the presence of wild cattle, sheep, dogs and goats. There was also further discussion on traditions associated with Mauna Kea, as "the abode of the gods," and it was observed that it was the custom of natives they encountered, to refuse to travel to the summit of Mauna Kea:

Other Trips to Mauna Kea

...Dr. Blatchely and Mr. Ruggles ascended Mouna-Kea, from Waiakea bay. After travelling six days, they reached the summit of the mountain, where, within the circumference of six miles, they found seven mountains or peaks, apparently 800 or 1000 feet high; their sides were steep, and covered with snow about a foot thick. The summit of the mountain appeared to be formed of decomposed lava, of a reddish brown colour. The peak in the centre, and that on the western side, are the highest.

The following observations respecting a subsequent visit to this mountain from Waiakea, contained in a letter from Mr. Goodrich to Professor Silliman, of New Haven, are copied from the Philosophical Magazine for September, 1826.

Description of Hilo Slope of Mauna Kea

"There appear to be three or four different regions in passing from the sea-shore to the summit. The first occupies five or six miles, where cultivation is carried on in a degree, and might be to almost any extent; but, as yet, not one-twentieth part is cultivated.

The next is a sandy region, that is impassable, except in a few foot-paths. Brakes, a species of tall fern, here grow to the size of trees; the bodies of some of them are eighteen inches in diameter." [Ellis 1963:291]

"The woody region extends between ten and twenty miles in width.

The region higher up produces grass, principally of the bent kind.

Strawberries, raspberries, and whortleberries flourish in this region, and herds of wild cattle are seen grazing. It is entirely broken up by hills and valleys, composed of lava with a very shallow soil. The upper region is composed of lava in almost every form, from huge rocks to volcanic sand of the coarser kind. Some of the peaks are composed of coarse sand, and others of loose stones and pebbles. I found a few specimens, that I should not hesitate to pronounce fragments of granite. I also found fragments of lava, bearing a near resemblance to a geode, filled with green crystals, which I suppose to be augite."

Wild Sheep, Dogs and Goats

"Very near to the summit, upon one of the peaks, I found eight or ten dead sheep; they probably fled up there to seek a refuge from the wild dogs; I have heard that there are many wild dogs, sheep, and goats. Dogs and goats I have never seen. I was upon the summit about 2 o'clock p.m., the wind S.W., much resembling the cold blustering winds of March, the air being so rare produced a severe pain in my head, that left me as I descended."

Legends of Mauna Kea

In the native language, the word *kea*, though seldom used now, formerly meant, white. Some white men, who are said to have resided inland, and to have come down to the sea

shore frequently in the evening, and to have frightened the people, were called *na kea*, (the whites).

The snow on the summit of the mountain, in all probability, induced the natives to call it ***Mouna-Kea***, (mountain white), or, as we should say, white mountain. *They have numerous fabulous tales relative to its being the abode of the gods, and none ever approach its summit—as, they say, some who have gone there have been turned to stone.* We do not know that any have ever been frozen to death; but neither Mr. Goodrich, nor Dr. Blatchely and his companion, could persuade the natives, whom they engaged as guides up the side of the mountain, to go near its summit.

We could not but regret that we had no barometer, or other means of estimating the actual elevation of this mountain, either here or at Waiakea. [Ellis 1963:292]

Mauna Kea and the Mountain Lands Described by J.F. Goodrich (1823-1825)

The October 1826 edition of the American Journal of Science (Series I, Volume XI), published excerpts of letters from Joseph Goodrich, describing travel around the island of Hawai'i, and to Mauna Kea and the mountain lands. Goodrich, a graduate of Yale, with an interest in geology and mineralogy, arrived in the Hawaiian Islands, in April 1823. Shortly after his arrival, he traveled to the island of Hawai'i as a member of the party on the tour of William Ellis. Subsequent to the tour, in 1824, Goodrich settled in Hilo, where he remained until 1836. Goodrich's first ascent of Mauna Kea was made in August of 1823, and the second, in April of 1824. Goodrich provided readers with important descriptions of the landscape, including the extent of the cultivated and forest zones, from the shore to the mountain regions, and the conditions on the higher mountain slopes and summit region of Mauna Kea (Mouna Kea). Excerpts from the American Journal of Science, and his letter to Professor Silliman follow, below:

Soon after the arrival of this second Missionary family, a tour round the island was resolved upon, with particular reference to the great objects of the Mission. Messrs. Ellis, Harwood, Thurston, Stewart, Bishop, and Goodrich, [Page 1] were charged with the execution of this duty, which they performed with zeal and ability. The result of their observations is detailed in a little volume, ably drawn up by Mr. Ellis, and entitled "A Journal of a Tour Around Hawaii, the Largest of the Sandwich Islands." Besides many interesting statements relative to the paramount objects of the enterprise, it contains a great number more relating to the natural history of the island. From this part of the work, we intend to quote the most important passages, and we conceive that we cannot better introduce them than by the following letter from Mr. Goodrich to the Editor, which, although dated a year ago, has been received only within a few days.

Letter from Mr. Joseph Goodrich, one of the American Missionaries in the Sandwich Islands.

Waiakea, (Hawaii) April 20th, 1825.
To Professor Silliman, New-Haven, (CT.)

My Dear Sir,

I confess I have remained silent quite too long, in not answering your kind request on the eve of my embarkation, although I am better able to state facts now than at any former period. The station which I am called to occupy, on the N. E. Side of Hawaii, (Pronounced Harwy,.) at the head of a safe and commodious harbor, yet but little known to foreigners. About forty miles in the interior, in a southwesterly direction, is a burning volcano, that has been in a state of activity from time immemorial. The oldest natives can give no account of a time when it was not burning; they say it is more active now than it was twelve or fifteen years since...

...The summer after my arrival, I spent about ten weeks in making a tour of this Island, in company with several other members of the Mission family. A journal of that tour will probably be published in America. The Island of Hawaii, from the north point to the southern, including all the west side of the Island, is little else than one entire mass or sheet of lava, which has run down from the mountains at different periods. Some of the currents of lava are so recent, that there is no vegetation to be seen upon them; but others are of a much more ancient date, so that bushes and even trees have sprung up among the beds of lava... ...There are four high [page 3] mountains in the Island, one back of Toaehae, and another back of Kairua, upwards of 7000 feet high, called Hualulae [Hualalai]; the two others are vastly higher, namely; **Mouna Kea**, to the northward and eastward part of the Island, estimated to be upwards of 18,000 feet high, and **Mouna Roa**, in the south-western part, probably near the same height.

I have been twice to the summit of **Mouna Kea**. The first time I was at the highest peak about three o'clock at night, in the month of August; the thermometer stood at 27 deg, 5 below the freezing point. I passed over several banks of snow, that lay to the northward of the highest peaks, (this mountain rises much more abruptly than Mouna Roa), and the change was so great in passing from a torrid to a frigid zone, that it was under the necessity of travelling all the time I was up there to prevent freezing. The second time that I ascended was in April last. There appear to be three or four different regions in passing from the sea shore to the summit. The first occupies five or six miles, where cultivation is carried on, in a degree, and might be to almost any extent; but as yet, not one twentieth part is cultivated. The next is a sandy region, that is impassable, except in a few foot paths. Brakes, a species of fern, here grow to the size of trees, the bodies of some of them are eighteen inches in diameter. The woody region extends between ten and twenty miles in width. The region higher up produces grass, principally of the bent kind. Strawberries, raspberries, as large as butternuts, and whortleberries flourish in this region, and herds of wild cattle are seen grazing. It is entirely broken up by hills and vallies, composed of lava, with a very shallow soil. The upper region is composed of lava in almost every form, from huge rocks to volcanic sand of the coarser kind. Some of the peaks are composed of coarse sand, and others of loose stones and pebbles. I found a few specimens that I should not hesitate to pronounce fragments of granite. I also found fragments of lava, bearing a near resemblance to a geode, filled with green crystals, which I suppose to be augite. [page 4]

Very near to the summit, upon one of the peaks I found eight or ten dead sheep; they probably fled up there to seek a refuge from the wild dogs; I have heard that there are many wild dogs, sheep and goats. Dogs and goats I have never seen.

I was upon the summit about 2 o'clock P.M., the wind S.W., much resembling the cold blustering winds of March with you, the air being so rare that it produced severe pain in my head, that left me as I descended. Much more might be said, that I must omit for want of room... [page 5, Goodrich Journal in Collection of Bernice Pauahi Bishop Museum]

Prior to their ascent of Mauna Kea, the party visited Kilauea—where they saw flocks of *nēnē*, and were informed that many geese lived on the higher mountain lands, though they were never seen on the coast. Silliman also reported that when Goodrich ascended Mauna Kea, he found a cairn of stones on the summit peak. The account of the ocean flood, and the survival of two individuals on the summit of Mauna Kea was also recorded by Goodrich—

On the 25th of August, Mr. Goodrich commenced his ascent up Mouna Kea. The soil was formed of decomposed lava and ashes. At noon he dismissed his native companion, and taking his great coat and blanket, began to ascend the more steep and rugged parts. The way was difficult, on account of the volcanic rocks and stunted shrubs that covered the

sides of the mountain. On his way up he found a number of red and white raspberry bushes, loaded with delicious fruit. At 5 P.M. having reached the upper boundary of the trees and bushes, that surround the mountain, he erected a temporary hut, kindled a small fire, and prepared for his night's repose. The thermometer, shortly after sun setting, stood at 43°, and the magnet, though it pointed north when held in the hand, was drawn two or three degrees to the eastward, when placed on the blocks of lava; owing, probably, to the great quantity of iron in the mountain. [page 37]

After a few hours rest, he arose at eleven o'clock at night, and the moon shining brightly, he resumed his journey towards the summit. At midnight he saw the snow about three miles distant, directed his steps towards the place, and reached it about one o'clock on the morning of the 26th. The snow was frozen over, and the thermometer stood at 27°.

He now directed his steps towards a neighbouring peak, which appeared one of the highest, but when he had ascended it, he saw several others still higher. He proceeded towards one which appeared highest, and bore north-east from the place where he was. On reaching the summit of this second peak, he discovered a heap of stones, probably erected by some former visitor. From this peak Mouna Roa bore south by west; Mouna Ruarai, west by south; and the Island of Maui, north-west. The several hills or peaks on the summit of Mouna Kea, seemed composed entirely of volcanic matter; principally cinders, pumice, and sand. Mr. Goodrich did not discover any aperture or crater on either of the summits he visited. Probably there is a large crater somewhere on the summit, from whence the scoria, sand and pumice, have been thrown out. The whole of the summit was not covered with snow. There were only frequent patches, apparently several miles in extent, over which the snow was about eight inches or a foot in thickness. The ocean to the east and west was visible, but the high land on the north and south, prevented its being seen in those directions.

Mr. Goodrich commenced his descent about three o'clock, and after travelling over large beds of sand, and cinders, into which he sunk more than ankle deep at every step, he reached, about sunrise the place where he had slept the preceding evening. The descent in several places, especially over the snow, was steep and difficult, the utmost caution was necessary to avoid a fall. On his way down, he saw at a distance, several herds of wild cattle, which are very numerous in the mountains, and inland parts of the island.

The natives said they were informed by their fathers, that all the land had once been overflowed by the sea, except a small peak on the top of Mouna Kea, where two human beings were preserved from the destruction which overtook the rest... [page 38, Goodrich Journal, in collection of Bernice Pauahi Bishop Museum]

The Journal of C. S. Stewart (1823-1825)

In April 1823, New England missionary, C. S. Stewart (1970) sailed into Hilo Bay. His description of Hilo with the backdrop of Mauna Kea (Mouna-Kea), is reminiscent of the scene described in the accounts of Kūkahau'ula cited earlier in this study:

Friday, April 25. The appearance of Hawaii, this morning was exceedingly beautiful. We were within a few miles of the shore; and the whole of the eastern and northern parts of the island were distinctly in view, with an atmosphere perfectly clear, and a sky glowing with the freshness and splendor of sunrise. When I first went on deck, the gray of the morning still lingered on the lowlands, imparting to them a grave and somber shade; while the region behind, rising into broader light, presented its precipices and forests in all their boldness and verdure. Over the still loftier heights, one broad mantle of purple was thrown; above which, the icy cliffs of MOUNA-KEA...blazed like fire, from the strong reflection of the sun-beams striking them long before they reached us on the waters

below. As the morning advanced, plantations, villages, and scattered huts were distinctly seen along the shore... [Stewart 1970:87]

In the evening Hawaii and Mouna-kea again, at a distance, afforded another of the sublimest of prospects;—while the setting sun and rising moon combined in producing the finest effects on sea and land. The mountains were once more unclouded, and with a glass we could clearly discern immense bodies of ice and snow on their summits... [Stewart 1970:89-90]

In June 1825, Stewart returned to Hilo with Lord Byron, who had returned the bodies of Liholiho (King Kamehameha II) and his wife Kamāmalu to Hawai'i from England where they had died. In viewing the district of Hilo, with the back drop of Mauna Kea, from the deck of the H.B.M. Ship Blonde, Stewart recorded:

The land rose gradually from the cliff, to the distance of ten or fifteen miles, to a heavy wood encircling the base of **Mounakea**. Though in a state of nature, this large district had the appearance of cultivation, being an open country covered with grass, and beautifully studded and sprinkled with clumps, and groves, and single trees, in the manner of park scenery, with a cottage here and there peeping from beneath the rich foliage. The mountains were entirely covered with clouds, or the prospect would have been rendered more delightful from their sublimity... [Stewart 1970:361]

Botanist, James Macrae and Party Travel to Mauna Kea in 1825

In 1824, Liholiho (King Kamehameha II), his wife, Kamāmalu, and a group of retainers and foreign advisors, traveled from Hawai'i to England. Liholiho and his wife died there, and in May of 1825, their bodies were returned to Hawai'i by Lord Byron (Stewart 1970:338). While preparing for the return voyage to England, Lord Byron had the H.M.S. Blonde port in Hilo Bay for refitting. Several individuals from the Blonde recorded important descriptions of localities visited on the island of Hawai'i as a result of the stop over. One of the crew members, being James Macrae, a botanist, penned detailed narratives of the journey from Hilo, along the coast to Laupāhoehoe, and from there up the mountain trail to the summit of Mauna Kea (Macrae, 1922). Through Macrae's writings, we are provided descriptions of the forests on the slopes of Mauna Kea; the native trail leading upland through Laupāhoehoe; bullock hunting being undertaken by natives and foreigners on Mauna Kea and the mountain lands; the first recording of the Mauna Kea Silver-sword; and that wild dogs were driving sheep to the summit region of the mountain.

The following narratives are excerpted from Macrae's longer narratives:

Arrives at Hilo. Prepares for Ascent of Mauna Kea.

June 12. Sunday. Strong E.N.E. breezes and cloudy. At 10 a.m., church service, the queens, chiefs and missionaries present. Shortened sail and came to anchor in 6 fathoms. I got Lord Byron to gain Queen Kaumanna's [Kaahumanu] consent for me to have 7 or 8 natives to accompany me to **Mouna Kaah** [**Mauna Kea**]. After her usual "hesitation to consider," she said I might have as many as I wanted. I also asked her for a hut on shore to which to remove my traps tomorrow, where Mr. Forder will live till I return and where he can dry what plants I may find necessary to send home while on my journey. She desired that I should be informed that she did not know of a hut, but when she went on shore she would enquire of the chiefs.

Rev. Mr. Goodrich, Missionary.

June 13. Went on shore to find the huts of the only two foreigners at this place, besides the missionaries, to procure one of these men as a guide to **Mouna Kaah**. I met Mr. Goodrich, one of the missionaries from Woahoo [Oahu], who told me that both of the persons of whom I was in search had left the place a fortnight ago, to kill wild cattle near

Mouna Kaah, and would probably not return for some weeks. He said that rather than I should be disappointed, he would willingly accompany me. His kind offer I accepted.

It was thought best to go the first part of the journey by canoe, and to save 30 miles of travel over many deep ravines and large rivers. We might return by land if we wished. For this water plan we had again to apply, through Lord Byron, to Queen Kaumanna for a canoe and also extra natives to man it. This Lord Byron, in his usual pleasant manner, promised to do when he found her (Queen Kaumanna) in such humour as likely not to refuse him, she at present being rather sulky from accounts received of some persons on shore having acted wrongly in her absence.

Lord Byron gave Mr. Talbot, fourth lieutenant, and Mr. Wil- [page 45] son, purser, permission to accompany me on my journey, and also acquainted me that Queen Kaumanna had promised me the canoe and natives for the next day. At noon I went on shore to choose a suitable hut, and met Mr. Goodrich, who went with me to look at the huts round the bay, all pleasantly situated under the shade of breadfruit trees, which in places form woods by themselves, and grow to a great height, producing plenty of fruit, although they possess but little variety and are generally of the small kind...

...The whole of the E. side of Owhyee [Hawaii], which is divided into two districts, belongs to Kaumanna and Pio. When at Heddo [Hilo], their place of residence to receive the rents, is near the east side of the bay, and consists of no more than two huts, one of which is given to Lord Byron as a residence while here.

Returning on board, I heard that the canoe and natives would not be ready until tomorrow. Mr. Young this evening gave me some account of Mr. Menzies' journey to **Mouna Roah**,⁴⁵ next highest to **Mouna Keah** to which I am going. During the 26 years that Mr. Young has been on the island, he has never seen **Mouna Kaah** [Keah] free from snow, but has not seen snow on **Mouna Roah** in summer, and on this he bases his theory of the greater height of **Mouna Kaah**. [page 46]

June 14. Went on shore with my traps, taking Mantle and another lad Trounce with me. They both belonged to the ship, and are allowed to me as long as I need them. I found that the hut promised me by Manaware was now refused, and only part of another offered, at the other side of the bay, and inhabited by a chief. My traps and provisions now being landed on the beach and surrounded by crowds of natives who would not have hesitated to make free with what they could lay hold of, I begged to be allowed to put them in a corner of his Lordship's house. Lord Byron told me it would make no difference to him leaving any of my things there if I liked till I returned, but if I wanted a place for them and Mr. Forder, I could have the tent put up near his hut for his servants, and this I accepted.

I went with some of the missionaries to Queen Kaumanna's hut to ask her whether I could depend upon the canoe for tomorrow. I found her, as usual, lying on the floor with her face downwards, and several natives round her brushing the flies away from her body. She hesitated in giving an answer until she had surveyed me from head to foot, and then said when she saw one of the chiefs, she would let me know. So I got Mr. Young, who had more influence with her than the missionaries, to tell her I would pay what money she wanted. This offer had the desired effect, for she instantly sent across the bay to the head chief, and when he came it was settled at once that I should have the canoe and natives without paying at all. I sent word to Talbot and Wilson to have everything ready on board

⁴⁵ Archibald Menzies, a Scottish surgeon and naturalist, was the first white man to ascend to the top of Hualalai and the first white man and probably the first human being to reach the summit of Mauna Loa. For an account of his trips up these mountains, see "Hawaii Nei 128 Years ago," Honolulu 1920.

for the morrow's start when I came alongside in the canoe. I dined at 4 p.m. with Lord Byron, the surgeon, chaplain and painter, who are his usual companions while on shore. Mr. Forder joined me at sunset, and we took up our abode in Lord Byron's servants' tent.

Start for Mauna Kea.

June 15. Fine day after a showery night during which the rain poured through the old tent. Mr. Goodrich arrived at daylight with the double canoe and natives, and we immediately began to embark our provisions, etc., for our journey. It was 6 o'clock, however, before we got alongside the ship, for Messrs. Talbot and Wilson, who were ready waiting for us. There were now 17 on board the canoe, eleven natives and six of ourselves. We started with the well wishes of all on board the *Blonde* for [page 47] our journey of 30 miles to **Lapahoi**⁴⁶ on the E. side of the island.

Favourable light east breezes, which freshened every hour until we landed in a narrow creek at 11 o'clock a.m. The creek was full of rocks, and open to a high surf that is generally found on this coast, and which at all times, except early in the morning, makes landing very difficult and dangerous, as we ourselves experienced. We had the greatest difficulty to prevent our canoe from being dashed on shore, owing to the surf washing over us every minute and filling the canoe with water so fast as to render our efforts in baling it out useless. We got into dry clothes as far as possible and dried our firearms, and then found that the 40 lbs. of salt meat which I had for my share of the provisions was missing, but nothing else.

Laupahoehoe.

Lapahoi [**Laupahoehoe**] is a small stony flat with a few huts and sweet potatoes and taro patches scattered over it. It lies at the extremity of a deep ravine, the declivities on either side nearly 500 feet in height and extending to the sea beach, terminating in a rocky precipice. The coast all the way to **Lapahoi** was intersected by many deep ravines, many of which had large rivers forming beautiful waterfalls that fell over the outward cliffs into the ocean, the angry surf of which broke a long way up upon the rocks underneath.

On the upper part of the inclines a species of pandanus grew plentifully. It is commonly used by the natives for making mats for the floors of their huts. It forms thick plantations here, giving the coast a pleasant appearance with their green bushy tops hanging pendant over the rocks where underneath in many places small subterranean streams fall down at no great distance from each other. This species of pandanus is nowhere so plentiful in the Sandwich Islands as on the island of Owhyee. It is cultivated elsewhere frequently for its leaves for mats and pillows for the natives. The tea tree is also plentiful here in the valleys along the coast.

Climbing Mauna Kea.

By noon we had finished taking some refreshments and dividing our baggage into loads for the natives to carry. We [page 48] proceeded on our journey, leaving behind us six natives with orders to remain four days with the canoe in case we might return in that time and select to go home by water. The other five we took with us, making with ourselves eleven. On the summit above **Lapahoi**, we stopped to draw breath, and then every step became more interesting as we followed the narrow path to the woods above, which were yet four miles away. As we went along, the few native huts on either side were fast disappearing. The whole face of the country from the coast to six miles inland produced various fine prospects which reminded us of home, and if only cultivated, would produce an equal return of crops to any land of similar climate. But it is not even pastured by live stock, being covered with long grass and short stumpy tree ferns belonging to the *Cyathea* tribe, whose roots afford food for the swine about the huts of the natives.

⁴⁶ Laupahoehoe.

These same huts are often inhabited by four generations, huddled together at night time like so many dumb animals, and often without sufficient shelter over them to protect them from the cold heavy dews that invariably fall here at night. We reached the outskirts of the woods between three and four in the afternoon, having on our way crossed three narrow deep ravines, thickly covered with wood, mostly *metrosideros*, *aleurites*, and a species of *rhus*, but without water except during heavy rains.

Our guide (Mr. Goodrich) recommended us to take up our quarters in these huts for the night, as these were the last inhabited ones on our way to the mountain where we had any chance to procure food to eat now and also to take with us, which on account of our loss on landing in the surf, we should now need.

When about to enter the largest of the huts to prospect its condition, Mr. Goodrich was accosted by a smiling young woman, the wife of one of those Europeans who had come to kill wild cattle. She informed us that she had only left the Europeans yesterday morning, and that they had shot two bullocks the day before. We went and took possession of the cleanest part of the hut for our accommodation, without leave, as is customary with these people themselves, while Mr. Goodrich went in search of a young pig or fowls. All that he could procure, in spite of offering money and looking glasses, were a couple of fowls, owing to the price put upon their pigs, being nearly triple their worth.

Mr. Wilson was found in the midst of a crowd of natives, highly amused and viewing them with surprise. I went to the [page 49] wood, while supper was being prepared, to look for plants, and found several species of ferns not seen before, and a few plants. I only got as far as the outskirts of the wood and the trees, which were of moderate size, consisted mostly of *metrosideros* and *aleurites*, with many ferns growing beneath their shade. In addition to the different species of *metrosideros* in variety of colours of the flowers as well as foliage already met with at Woahoo, there still appears in this island many which will add to their number, one particularly with straw-coloured flowers and white underneath the leaves, met with this evening, although sparingly, adds to my former collection.

When I got back, I found my three fellow travellers sitting on a mat, each holding a piece of fowl in one hand a clasp knife in the other, busy eating in the presence of a number of natives, some of whom had in their hands a light made from the kernels of the *kukui* or candle nut tree (*aleurites*) several nuts being passed through on a splinter of bamboo cane which gave a greater light than two or three common sized candles.

At 9 p.m. we retired to rest in a corner of the hut on a clean mat brought with us for the purpose, the rest of the hut being filled with the usual medley of men, women, children and dogs.

June 16. Fine but somewhat foggy. Got up at daylight, took the temperature of the air, which stood at 64. We were all ready to start at 5 a.m. in spite of the heavy dew which was still on the grass and bushes, and we were soon wet through by it up to our knees. We entered the wood about a mile from the edge of a small ravine, by a narrow path, where on either side grew a number of strong, healthy banana trees without cultivation and many of them having large bunches of fruit.

John Young and Isaac Davis's First Battle.

Mr. Goodrich informed us that it was at this ravine that Mr. Young and Mr. Davis had fought their first battle in the service of Tamahamaah [Kamehameha] and defeated upwards of 10,000 of the enemy with only 300 on their own side, before their leader came up to their assistance with the main body of the army. The description related to us of this engagement was that when King Tamahamaah had conquered the south side of Owhyee,

he soon after, with his army, marched round to the opposite side of the island by the east, taking with him Young and Davis for the first time, [page 50] to whom he gave command of the chief part of his army. The chief of the Heddo part of the island was prepared to meet Tamahamaah in order to defend his proportion of the island from being subjected to the other's power, but on seeing the superior force of Tamahamaah, this chief kept retreating to the west till overtaken by Young and Davis, who were nearly a day's journey in advance of the main body of the army. The attack took place early in the afternoon from the opposite sides of the ravine in the wood, when after several hours engagement, it was decided in favor of Young and Davis, who alone had firearms. These two killed the enemy in vast numbers from the crowded manner in which they stood to oppose them, being unacquainted with the destructive effects of firearms.

This battle gave Tamahamaah the conquest of Owhyee.

We halted at 9 a.m. for refreshment, having travelled four miles through the wood, and I had the opportunity to ramble a little out of the path while the others rested. The trees now became more lofty, particularly a species of acacia used by the natives for canoes. Ferns of all kinds and sizes covered the ground beneath the trees, and a good many grew as parasites on the tree trunks. A noble species of *Cyathea*, equally numerous with the rest, often attained the height of 25 feet. *Metrosideros* with red bunchy flowering tops, covered with many red birds sucking their blossoms, were here much larger and taller than any seen on Woahoo. *Besterias* of various coloured flowers, and some of a climbing nature, and a numerous tribe of *Psychotrias*, both shrubby and succulent, as also many lobelias and other plants, aided by their variety to enliven our journey in spite of the many difficulties encountered from trees fallen across the path every other short distance, that had to be scrambled over. The path being slippery from the night rains occasioned many falls.

Wild Raspberries and Strawberries Plentiful.

After travelling another nine miles, we halted to fill our calabashes, this being the last place where we could obtain water till our return from ***Mouna Kaah***. Here again, I took the temperature of the air. It had risen to 69. Towards the end of the wood the path became steeper. Here we found raspberries and strawberries of various kinds covered with fruit which we all ate eagerly to quench our thirst. The raspberries were very large and [page 51] flat at both ends, but round in the middle and not unpleasant in flavour. The strawberries were small and great quantities of fruit grew around us on every side and looked like a neglected garden.

Bullock Hunters.

We reached the end of the wood by 1 p.m., having travelled twelve miles, and above 12,000 feet above sea level. Here we found the two Europeans' temporary hut. They had been killing some of the wild cattle that had originally been introduced by Capt. Vancouver from the N.W. Coast of America and since suffered to remain unmolested for over 20 years. Since the death of King Tamahamaah the government has killed and salted many of the cattle for the supply of its small fleet. In the hut we found both the Europeans at home, asleep, and dressed in the costume of the country. There were also twenty natives, men, women and children outside, some asleep and others roasting pieces of flesh on a stick stuck in the ground slanting over the fire. Both the white men were well known to our guide, and being told of the object of our visit, offered to supply us with what beef we wanted. While the natives were cooking food for us we learned from these two half-naked foreigners, who could speak but little English, although one was a Welshman and the other a Prussian black-smith, and both for some time had been in the English navy, that they had succeeded in shooting several cattle, but with some difficulty, for the cattle often in droves of twenty were always sensible of any person approaching them. If unsuccessful

in killing them with the first shot, it was absolutely necessary to have a place of retreat for their own safety, as they invariably pursued their destroyers with a kind of furious madness while they appear in sight.

Two days before, they had killed an old black bull, which they thought was one of the original number brought from California by Vancouver, from part of the right ear being cut off for a mark. They had been told that this had been put upon the cattle when landed thirty years ago. They have now increased to some hundreds, but it is curious that they have never been seen more than a few miles downwards in the wood from the mountain, and then only in warm weather for the sake of shade and water. Neither has a young one ever been got hold of and [page 52] domesticated, although often attempted, for the mother living with her young, always seeks some retired place till the young ones are old enough to protect themselves.

I placed all the specimens I had collected since the commencement of our journey, in paper to be left till my return, and then went into the wood to look for more. Took the temperature of the air at 3 p.m., and found it was at 69, being the same as at 10 a.m. coming through the wood. Our guide told us we must travel at least 6 miles further towards the mountain to be able to gain the summit at an early hour tomorrow, before the horizon rose to prevent us from seeing the ship at anchor in the harbour. So waking my sleeping companions, we started on our next stage. However, a native unfortunately dropped a calabash of strong brandy and water (two gallons) being the last of my share of the spirits brought on the journey. We had scarcely travelled three miles when a thick fog commenced to roll in over the country which was covered with tufts of dry grass and full of cattle tracks. The soil was chiefly composed of sandy, pulverized lava, with numerous beds of strawberries growing on same. Raspberries grew in great abundance by the sides of the small ravines made by the torrents of water from the melted snow running here at certain seasons. They were of a better flavour than those in the upper part of the wood, being here more exposed to the sun.

By 6 p.m. we had travelled another two miles, when the fog became so thick that we were scarcely able to see ten yards ahead of us, and we were drenched and shivering with cold and almost beyond any vegetation to shelter us for the night. So we cut down boughs of *Acacia* and a species of *Sophora* and erected a hut. This we accomplished in little more than half an hour, and getting plenty of firewood kept a fire burning all night near where we lay. I rambled about till dark among cranberry bushes cutting specimens. The temperature at 7 p.m. was 52.

Too Cold for Natives.

Got up at 2 a.m., started at 3 and began our journey to the mountains leaving the natives behind, who feared the cold and did not want to accompany us. At 5 a.m., daylight began to appear and by then we had travelled three miles over sandy pulverized lava, sinking over our ankles at every step. [page 53]

The Silver Sword Plant.

The last mile was destitute of vegetation except one plant of the Syginesia tribe, in growth much like a Yucca, with sharp pointed sliver coloured leaves and green upright spike of three or four feet producing pendulous branches with brown flowers, truly superb, and almost worth the journey of coming here to see it on purpose.⁴⁷ The majestic clouds rising

⁴⁷ The Silver Sword plant of Hawaii was first brought to the knowledge of the botanical world by Dr. W.J. Hooker, who described it from specimens collected by David Douglas when he ascended Mauna Kea in 1834. See "David Douglas, Botanist at Hawaii," Honolulu 1919. Macrae climbed Mauna Kea in 1825, i.e., nine years ahead of Douglas, and must be credited with having been the first botanist to notice and collect the silver sword plant. Some modern writers persist in stating that the silver sword plant is found on Maui only. This is not the case, as it also grows on the high mountains of Hawaii.

on the horizon at day-break encircled us all round like an immense wall with towers of various forms and sizes on their tops. They lay at unequal distances along the horizon, gradually rising and changing into fresh shapes at every moment that had the finest effect imaginable.

Talbot and Wilson Unable to Proceed.

The temperature had now fallen to freezing point. Messrs. Talbot and Wilson, overcome by the cold, became so sleepy as to be unable to proceed. We waited by them for some time trying to rouse them without avail, so leaving one of the lads with them, my guide and I with the other lad started out afresh so as to reach the summit and see the ship, we having promised Lord Byron to light a fire that he might see through his glasses how far we had got. As we advanced, every step became steeper and more difficult. All vegetation had ceased, even the yucca-looking plant, but we got up the mountain by 6 a.m., and saw the ship looking to us down there like a 50-ton vessel. Here we collected enough stumps and leaves to light a fire, remaining by it for half an hour, and our companions not overtaking us, we kept on our way, at times over hard uneven lava, at others over sandy lava.

Reaches Main Plateau of Mauna Kea.

The mountain now became divided into several high conical sandy hills with several old small volcanic craters on their sides, forced above the sand for some yards in height and bleached nearly white from long exposure. The air became warmer and more pleasant as the sun rose above the horizon, but we had [page 54] constantly to rest from the difficulty of breathing after stopping to rest. At 8 a.m. we saw the lad, left with Talbot and Wilson, coming after us. Thinking he might have a message from them, we waited, but he had left the others still asleep, and only came to beg to be allowed to return, as he had been so cold waiting by the sleeping men. Giving him some refreshment and spirits, we sent him back to try and meet Talbot and Wilson. The temperature had now risen to 46, the sun shining brightly. We resumed our journey by the bottom of the sandy conical hills, the surface over which we travelled constantly changing and more uneven, sometimes being lava sand intermixed with small broken stones about the size of brickbats, and at other places having to scramble over large sharp-edged granite stones of several tons weight, which have beyond a doubt, been thrown up by some previous convulsion. We came in sight of the snow after 11 a.m. Our guide seemed to suffer more than the lad and myself from headache and inclination to vomit, and we had yet two miles to go over a still more rugged surface to reach the snow.

Mr. Goodrich Collapses.

At a quarter mile from the summit where the snow lay, our guide collapsed and begged us to get him some snow for his thirst.⁴⁸ The lad Mantle held out better than I had expected.

Macrae and Boy Mantle Reach Summit.

At 12:30 I reached the snow on the summit, which lay on porous lava of a sponge color, and in places on sand of a red color intermixed with red and black cinders like the conical

⁴⁸ Rev. Joseph Goodrich, who, on this occasion, was unfortunately laid up with mountain sickness, had on 26th August, 1823, reached the summit of Mauna Kea. This is the first recorded instance of the ascent of this mountain, although Mr. Goodrich mentions that on reaching the top of one of the terminal cones that encircle the main plateau of Mauna Kea, he discovered a heap of stones, probably erected by some former visitor. Who this former visitor was is unknown, but he was probably one of the white men that in the early years of the nineteenth century got a living by shooting wild bullocks that roved on the side of Mauna Kea. It is very unlikely that any native had reached the top of the terminal cones on the summit, owing to being unprovided with warm clothing to resist the great cold and also to the fact that the natives had a superstitious dread of the mountain spirits or gods. About six months after the date of the first ascent of Mauna Kea by Mr. Goodrich, the peak was scaled by Dr. Abraham Blatchley and Mr. Samuel Ruggles, both connected with the American Mission.

hills we had passed. Some of these cinders had common quartz and two or [page 55] three other kinds of minerals that I am as yet unacquainted with, very often bedded in one lump of lava. The snow in some parts was about three feet deep, congealed into solid ice, excepting from two to three inches at top of rough particles of loose snow. The whole appeared to be melting fast through the porous lava like a sieve, which prevented our being able to fill our vessels with water. We therefore filled our handkerchiefs with snow, taking mouthfuls at the same time to quench our thirst. I sent Mantle with some snow to our guide, and remained to take the temperature in the sun and in the shade. In the former it was 92, and in the latter, in holes beneath the snow, 44. I stayed about an hour admiring the scenery. For a space of about 12 miles around the top of the mountain, it was dreary to a degree, but below that, the pasture where the wild cattle fed had a pleasing effect. The forest which encircles the island of Owhyee below the pasture land, was hidden in fog, so that I only saw about 20 miles in a direct line, but the high land like Mouna Roa and other hills could be easily distinguished above the fog, although none of them were covered with snow.

Sheep Killed off by Wild Dogs.

I saw many skeletons of some kind of animal, devoid of all flesh, but apparently not long dead, and on rejoining our guide, was informed that the wild dogs had almost exterminated the sheep that Vancouver had brought with the cattle, pursuing them beyond the line of vegetation, where they became bewildered and died for want of food.

Begins Return Journey.

It being now after 2 p.m., and still feeling unwell from the same causes as our guide, we left this interesting place and travelled slowly downwards, finding our few specimens of minerals, etc., almost twice their real weight. In this hobbling manner, scarcely able to drag our limbs for the last four miles, we reached our hut, where we found that the lad sent back in the morning to Messrs. Talbot and Wilson had not met them. So fearing they might have succumbed to the cold in their sleep, and knowing they had no provisions, we much repented having left them; but to our joy, in about half an hour, we heard them calling not far distant. When they came to the hut they did not appear so fatigued as we ourselves, in spite of the want of food. They had [page 56] slept for about an hour, then awoke and tried to follow us, but not finding any of our tracks, they gave up the idea of following us, and made for the first of the highest hills. The snow we had brought with us served us well with water, for the natives left behind had drunk all that we left of the latter article except about a pint. The natives rubbed our thighs and legs for us, a practice they often do for themselves in such circumstances. They call it *lummi lummi* [*lomilom*]. The temperature at 7 p.m. was 50 and at 10 p.m. 48.

We calculated the summit of Mouna Kaah from Byron's (or Heddo) Bay to be about 70 miles by the common path, but in a direct line perhaps only half that distance. We judged the peak could not be under 18,000 feet above sea level.⁴⁹ The land along the sea coast from Byron's Bay to upwards of 40 miles to the west and about 6 miles in breadth, was free from wood excepting by the sides and bottoms of the ravines. The forest that surrounds the central part of the island begins here, at the distance of 5 or 6 miles from the coast, and stretches back for a depth of 12 miles, intersected with deep valleys and large rivers of fine water. The outskirts of the forest nearest the sea are chiefly handsome coloured flowering species which entirely disappear after 5 or 6 miles towards the centre of the wood. The commonest species of *metrosideros* often attains a height of 40 feet and are thick in proportion. The wood is hard and durable.

⁴⁹ Mauna Kea is 13,825 feet high.

The upper parts above the forest resemble pasture land for 7 miles farther, and are thinly covered with low growing shrubs and abundance of strawberries and raspberries. At a higher elevation, vegetation ceases for the last eight miles towards the summit. The clouds generally rise on the mountains of Owhyee and the other islands in the morning and disperse towards evening. Rain often falls at night and also in the daytime some distance from the peaks, while on the coast the sun may be shining and there is no appearance of rain.

June 18. Got up at daylight, being disturbed in the night by the howling of wild dogs which caused us to keep our fire burning. At six set out on our homeward way, and unknown to us, the natives at once set fire to our discarded hut, a common custom our guide told us. At 12 we had travelled 6 miles and reached the Prussian and Welshman's hut. These men had seen no wild cattle since we left them, the only animals observed having been [page 57] a wild dog and cat. The dog seemed to be the same kind as the domesticated native one of which they eat the flesh, and the cat appeared like the European breed. After a breakfast of plenty of slices of roast beef and abundance of water, my companions spread their mats in the shade and slept till noon. I shifted my specimens that had been left here into dry papers, and gathered others, including strawberry and raspberry plants to take with me to England. At 2 the whole camp was on the move for **Lapahoi**, where we had left the canoe and the natives. On reaching the first hut, we found only the two foreigners, the rest having gone on to **Lapahoi**. They promised to have a fire ready for us to dry our clothes at, but although I gave them each a dollar on starting they had nothing ready for us and did not get us any food till 9 p.m.

Natives Object to Sunday Travel.

June 19. Hazy, light showers. Sunday, and on that account the natives refused to accompany me to join the other part of my party with their loads, and said, the missionaries had ordered them not to.

Game of Noa

The blacksmith, however, promised to accompany me with his own people at 11 a.m., but instead of doing so, went and played and gambled at Nooah. This game is one of their most ancient and frequently played pastimes. It consists in placing in a row, five small *tapa* bags stuffed with cotton or the down of ferns, underneath one of which is hidden a stone so as to deceive the parties playing which of the bags it was put under.

The players are seated around in a circle, each armed with a small wand in his hand with which he strikes the bag he supposes the stone to be under. There are generally ten players with different coloured rags tied to their wands. I have been told that at this game they gamble their hogs and all their possessions, even their wives, and are very strict in paying their debts of honor.

Leaving them gambling, I left with the two lads and two natives for **Lapahoi**, and joined my party there about 3 p.m. They were just about to start for home, having expected me in the morning. The canoe had not waited for us as ordered but had returned home the second day after we started for the mountain. We therefore had to go home by land, and took up our [page 58] quarters for the night about 7 p.m. after having crossed a number of deep ravines, wading through rivers, at times up to our middle... [page 59]

...We arrived opposite the ship at 5 p.m. very tired from our many climbs up and down, since we left **Lapahoi** on Sunday, distant 40 miles... [Macrae, 1922:60]

Goodrich's Account of Travel From Hilo Bay to The Mountain Lands in 1829

During Joseph Goodrich's twelve year residency in Hilo, he made several trip across the mountain lands, either to visit the mountain summits, to go bullock hunting, or while traveling between the Hilo mission station, and other stations on the island. In 1829, Goodrich wrote to the mission headquarters, describing activities in which he had participated (some of which were being criticized by other brethren). His letter included a description of the trails taken from Hilo to the mountain lands, and observations of the nature of the landscape around Mauna Kea. Goodrich also reported that the right to hunt bullocks was controlled by Governor Kuakini, at the time:

Saturday, November 22nd, 1829

Journal at Byron's Bay

Joseph Goodrich; to Jeremiah Evarts:

...May 12th, 1829.

By the request of the Gov. together with a desire to ascend the mountain directly from the bay at this place, & also to kill 2 or 3 beef for our own use and that of the Gov., & farther to take up some turnips & set out in a colder climate to see if they would not then go to seed upon the mountains for they do not go to seed down near the shore. Set out about day light to ascend to the higher regions, course about west, the distance from the shore to the woody region is about 5 miles the region that is principally used for the cultivation of *talo*, potatoes, sugar canes, bananas &c. about 3 miles in the woods is one of the highest cataracts in this part of the island. I judge it to be 100 & 90 or 50 feet high in the heavy rains an immense body of water rushes down with tremendous violence at other times the stream of water is quite small, a little farther up the whole bed of the river under ground for about 40 or 50 rods about mid way of which is a dark & dismal hole 30 or 40 feet to the water called by the natives Puka o Maui [page 12] the door, hole or entrance of Maui one of their former gods, the oven of this deity according to the natives is about a mile from the south west shore of the bay it is an old crater 60 or 70 feet deep & about 1/3 of mile in circumference, I now occupy it as pasture for my cows there are 3 craters that are directly back of me another in a right line the lower one is the oven, here he used to cook his food as the natives say.

The road or path more properly lay along the river Wailuku, sometimes it led into the woods, then to the margin again into the woods & back to the river the bed composed entirely of lava, the path was sometimes one side & the other continually crossing & recrossing the woody region, is very timbered many of the trees are 2, 3 & 4 in diameter, the timber consists chiefly of *ohia* & *koa* the former is a species of the apple tree of these islands, the latter seems to be an inferior kind of mahogany, some of makes good furniture, it is also the kind of timber out of which their canoes are made. The ascent in the woody region is very gradual above the woods it is much more abrupt after traveling hard all day with very short spells of resting, about sunset we got through the woods, leaving all the natives behind who did not arrive till the next day. The woods terminate very abruptly they are so thick of trees & under brush that are almost impassable a few rocks only can be seen ahead, on emerging from the woods a wide extended plain presents itself along the side of ***Maunakea***, the plain is 6 or 8 miles wide interspersed with clumps and groves of *koa* trees of stunted growth [page 13] resembling orchards of apple trees with numerous herds of wild cattle grazing in almost every direction. The plain if I may so call it for so it appears at a distance is broken into ridges & valleys, & very stony, the rocks all volcanic, the whortleberry & strawberry here abounds to perfection in the season of them which is from July to Nov or even later especially the whortleberry. In reaching the place of our lodging I found a large fire prepared by Honolii who had proceeded me in opening the path to the mountain, the fire was barely acceptable as I was wet & cold, having traveled most of the way among the clouds which do not commonly extend higher up than the woody region, & are perpetually distilling their water in the woody region below. It was in a cave where we took up our lodgings, in some parts it was quite spacious, in others so

low that we could not sit upright. The place where I laid my head was about 18 inches high, it however was a very comfortable resting place. Early in the morning set out in pursuit of a bullock, they were to be seen in almost every direction. I directed my course toward 2 bulls that were near the skirts of a small grove of *koa* trees, in about half an hour I shot at one who went a few rods & fell dead the other went but a few rods farther & stood watching his fallen companion. I did not succeed in getting near to him but shot at a long distance, the gun being an indifferent one liable of execution & he made off with himself. I sometimes wish that I had a good rifle, as the chiefs had given me [page 14] permission to kill a bull whenever I am so disposed. I have availed myself of the right of killing one or two about twice in the course of a year, the greatest objection to killing oftener is the badness of the road through the woody region, the natives are from a day & a half to two days in coming down with a load of beef. For several succeeding days I was unable to kill any in consequence of the mountain being enveloped in clouds, at length the mountain became clear from clouds I started early in the morning & in about an hours time I was treading frozen ground being near the upper extremity of the region of vegetation, when I soon succeeded in killing a fine cow & towards night I killed another for the Gov. The cows are far better beef than the bull, the latter are uniformly dry or lean, while the cows are almost always as fat as stall fed beef. There is not much danger in killing wild cattle provided I have a good rifle, but with a poor one like the one that I have, it is rather disagreeable shooting & sounding so that they either chase in or I must them & frequently loose them after all. Having spent 4 or 5 days I could not well spare the time to ascend the mountain so we returned having obtained a good supply of beef... [page 15; A.B.C.F.M. Collection, Houghton Library, Harvard]

***Gerrit P. Judd's Account of a Visit to the Summit of Mauna Kea
And Travel Across Plateau Lands between Mauna Kea and Mauna Loa in 1830***

Gerrit P. Judd, was a doctor attached to the Sandwich Island Mission Station, at Honolulu. Because of his medical expertise, he was frequently in the company of the *ali'i* and made tours around the islands. In April, 1830, while on a visit to Waimea, Judd and a native guide, John Honolii, walked to the upper region of Mauna Kea (not reaching the summit). On his return, he brought back snow, which he gave to Governor Kuakini, the first touched by the governor. Later, in June and July of the same year, Judd again traveled across the mountain lands. His narratives describe travel around the Hāmākua-Laupāhoehoe trail to Hilo Bay, skirting the upper forest lands, and travel across the saddle lands between Mauna Kea and Mauna Loa, from the upper region of Keauhou, Ka'ū.

Honolulu, August 19th, 1830

Gerrit P. Judd;

to Jeremiah Evarts, Esqr.

Missionary Rooms, Handover St., Boston:

...[March] 19th. Gov. Adams arrived with all his train, he intends spending some months with us, to catch wild cattle... [page 4]

[April] 4th Sabbath. Gov. Adams having commenced his buildings at Aalii for the sake of being near the wild cattle, & erected large Ranai proposed to hold public worship there. Mr. R. attended today he reports a congregation in the forenoon of 4,000.

[April] 23. Yesterday morning the weather being clear and inviting I set off in company with John Honolii and other natives to visit the top of ***Mauna Kea***. I rode a mule furnished me by the Governor. We ascended until about 2 P.M. when we were overtaken with a violent thunderstorm. We were compelled to take shelter in a cave and the storm continuing to rage, we remained all night. Arose early this morning, left the mule & proceeded on foot. The atmosphere was clear, we had a delightful view of the scenery below, which certainly surpasses anything I have seen before. Clouds soon obscured our sight for the rest of the day. [page 6] Reached the snow about noon, ascended a short distance, but found myself

too much fatigued to ascend the summit. There was indeed little inducement, the prospect was so obscured by clouds. I therefore descended bringing with me a large bundle of snow. Arrived at the cave at 5 P.M. bestrode the mule & reached home about 9 o'clock in the evening. There is little vegetation on this side of the mountain except coarse grass which is plenty, two thirds of the distance. The ascent is not difficult, the cattle ascend to the snow in search of water.

24th. Sent the bundle of snow to Gov. Adams who had never before seen any except on the distant mountain top, he appeared much gratified with tasting & handling it... [page 7]

[July] 3rd. Returned from my visit [to Kilauea]. I left home early on the morning of the 24th travelling towards the eastern side of **Mauna Kea**, my route the two first days was through thick woods frequented only by sandalwood cutters & wild cattle until I arrived at **Laupahoehoe**. I then proceeded along the sea shore to Hilo a distance of about 20 miles. The country here is extremely fertile, but rather unpleasant, on account of the almost incessant rains, that it is well watered you will believe when I tell you that I crossed more than 50 streams with banks from one to five hundred feet high on each side. I was forced to ford many that were 2 or 3 feet in depth at the most shallow part that could be found. In one instance was ferried across in a canoe... [page 9]

[June 31; departing from Kilauea] Parted with Mr. & Mrs. Andrews about noon on Thursday in order to return to Waimea by a direct rout over the unfrequented country between **Mauna Roa & Mauna Kea**. *I found this journey excessively fatiguing. We travelled over rough lava without a path sleeping on the ground & in the huts of sandal wood cutters, without much food or water. The south & western sides of Mauna Kea are altogether unlike the North & East.* The former dry and barren, the latter rich with wooded & susceptible of cultivation one third of the distance upwards... [page 10; A.B.C.F.M. Collection, Houghton Library, Harvard]

The Journal of Hiram Bingham (notes of 1830)

In 1830, Reverend Hiram Bingham and family visited Waimea, and in September they were joined by members of the royal household. It was during the September visit that Kauikeaouli (Kamehameha III) and party, in the company of Bingham, traveled to the summit of Mauna Kea, via the Waimea-Waiki'i-Kalai'ehea route. Bingham's journal includes descriptions of the Waimea region, including the community, industry, and landscape, and also documents the royal visit to Mauna Kea:

...Crossing over to Kawaihae...we ascended at evening to the new inland station [Waimea]. When we had escaped from the oppressive heat on the shore, and reached the height of about 2000 feet, we were met by a slight rain and a chilly wind, which made our muscles shiver... ...as we came within some twenty-five miles of the snows of the mountain... ...The full-orbed moon looked serenely down from her zenith upon the hoary head of **Mauna Kea**, and the ample and diversified scenery around. The babbling brook [Waikōloa], the sound of a small cataract in a glen, the rustling in the tops of the trees, at a little distance, the scattered huts of the natives in the settlement, while their occupants were hushed at midnight, and the hospitable light of a fire and lamp, beaming from a glass window of the missionary cottage pitched near the north side of the plain, over against **Mauna Kea**...

...Riding out one day to call on Gov. Adams, who had done liberally for the station by the erection of the buildings, I was delighted, on my way to his temporary residence, with the grandeur and beauty of the scenery around me. The clear rippling streams that wind their way along the verdant plain, through alternate plats of shrubbery, grass, *kalo*, sugar-cane, bananas, flowering bushes, and wild vines, occasionally crossed my path. Beyond the scattered cottages, the wild cattle were grazing unrestrained on their own unenclosed

territories bordering on the mountain. The green hills and mountains of Kohala, crowned with trees and shrubbery, and their sides partly cultivated and partly covered with grass of spontaneous growth, rose on the north side of the plain. The distant hoary Mauna Loa appeared in the south. Much nearer, on the south-east, the majestic **Mauna Kea** lifted his snowy summit in his ample form, exhibiting his peaks and precipices and piles of scoria and gravel, and his rocks and forests; and in the south-west, Hualalai, another volcanic mountain, with its terminal quiescent crater [page 374], presented no mean height and dimensions, being 9000 feet high, and forty miles long... [page 375]

Ascent of Mauna Kea.

...The king set out with a party of more than a hundred, for an excursion further into the heart of the island, and an ascent to the summit of **Mauna Kea**. To watch over and instruct my young pupil, and to benefit my health, I accompanied him. The excursion occupied nearly five days, though it might have been accomplished much sooner. Crossing in a southerly direction the plain of Waimea, some on horseback and some on foot, the party ascended a small part of the elevation of the mountain, and being in the afternoon enveloped in dense fog, they halted and encamped for the night. The next day they passed over the western slope of the mountain to the southern side, thence eastward along a nearly level plain, some seven thousand feet above the level of the sea, to a point south of the summit, and encamped out again, in the mild open air. In the course of this day's journey, the youthful king on horseback, pursued, ran down, and caught a yearling wild bullock, for amusement and for a luncheon for his attendants. A foreigner lassoed and killed a wild cow.

The next day was occupied chiefly in ascending in a northerly direction, very moderately. Our horses climbed slowly, and by taking a winding and zigzag course, were able, much of the way, to carry a rider. Having gained an elevation of about ten thousand feet, we halted and encamped for the night, in the dreary solitudes of rocks and clouds. When the night spread her dark, damp mantle over us, we found ourselves in the chilly autumnal atmosphere of the temperate zone of this most stupendous Polynesian mountain. Below us, towards Mauna Loa, was spread out a sea of dense fog, above which the tops of the two mountains appeared like islands. We found it a pretty cold lodging place. Ice was formed in a small stream of water near us, during the night. *As the company were laying themselves down, here and there, upon the mountain side, for sleep, I observed that the king and Keoniana, subsequently premier, and a few others, having found a cave about four feet high, ten wide, and eight deep, made by a projecting rock, which would afford a shelter from a shower, and partially from wind and cold, had stretched themselves out to sleep upon the ground in front of it. I was amused to see that their heads protruded somewhat more than six feet from the mouth of the cave, and asked, "Why do you not [page 377] sleep under the rock, which is so good a sleeping house for you?" Keoniana, always ready, replied, "We don't know at what time the rock will fall." Whether the apprehension that the firm rock might possibly fall upon the head of the king that night or their unwillingness that any ignoble foot should walk above it, or some other fancy, were the cause of his declining the shelter, did not appear.*

In the morning we proceeded slowly upwards till about noon, when we came to banks of snow, and a pond of water partly covered with ice. In his first contact with a snow bank, the juvenile king seemed highly delighted. He bounded and tumbled on it, grasped and handled and hastily examined pieces of it, then ran and offered a fragment of it in vain to his horse. He assisted in cutting out blocks of it, which were wrapped up and sent down as curiosities to the regent and other chiefs, at Waimea, some twenty-eight miles distant... [page 378]

...We descended hastily to the north-west, about twelve miles, sometimes taking leap after leap boldly down steep places of fragmentary scoria and gravel, and sometimes advancing cautiously among rocks, shrubs, trees, and wild cattle. Towards midnight we came to the place of the king's party, near the plain of Waimea, and the next day returned to the station there. As we crossed the plain, we witnessed several striking exhibitions of seizing wild cattle, chasing them on horseback, and throwing the lasso over their horns, with great certainty, capturing, prostrating, and subduing or killing these mountain-fed animals, struggling in vain for liberty and life... [Bingham 1969:379]

Bingham's record for 1830 also includes descriptions of visits to Kīlauea, and a subsequent journey overland to the plateau lands between Mauna Loa and Mauna Kea, on their way to Waimea. The trip took the group past Kalai'eha, and in the shadow of "Waihalulu" (Waikahālulu) Gulch where water was found. The narrative then describes travel through the Pōhakuloa vicinity and past Waikī'i, and on out to the Waimea plain:

...After spending about thirty hours at Pele's chief seat, we set off, towards evening, on the 21st, to cross the wilderness to Waimea, which required the time of a little more than two days and two nights. Walking till late, we laid ourselves down where we could find a place. The next day we continued our journey northwardly, towards **Mauna Kea**, lodging out in the wilderness, in the same manner, at night, the majestic mountain being half a day's walk to the north of us.

Rose at four o'clock from our mountain couch, — a day's journey from any human habitation; saw lightning at a great distance at sea — our elevation being 4000 or 5000 feet; packed our sleeping *kapa*; offered our morning sacrifice in these solitudes of the centre of Hawaii, and as the day dawned, set forward on our journey. We passed over several large tracts of lava, of different kinds, some smooth, vitreous, and shining, some twisted and coiled like huge ropes, and some consisting of sharp, irregular, loose, rugged volcanic masses, of every form and size, from an [page 393] ounce in weight, to several tons, thrown, I could not conceive how, into a chaos or field of the roughest surface, presenting a forbidding area, from one to forty square miles in extent, and though not precipitous, yet so horrid as to forbid a path, and defy the approach of horses and cattle. In the crevices of the more solid lava we found the *ohelo*, somewhat resembling the whortleberry, nourished by frequent showers and dew. *At ten o'clock, we halted for breakfast; raised a smoke, as a signal for the horse keeper, at the watering-place, at the south base of Mauna Kea*, to approach, and moved on, till twelve o'clock, when I was very glad to see and mount the horse sent over from Waimea to meet me. Our company having become considerably scattered, and pressing on, under a mid-day, tropical sun, were soon collected together by the loud shout, "Here's water," made by the keeper of the horse, who had very considerably brought us a calabash from **Waihalulu**, cold and sweet, for the refreshment of our weary and thirsty travellers. We drank round, and this gourd bottle soon sounded empty. I mounted and set forward with comfort and revived courage, leaving most of the company to proceed at their leisure.

One of the keepers of the horse wishing to accompany me, girded up his loins, and like Elijah before Ahab, ran cheerfully before me, westward, along the south side of **Mauna Kea**, about ten miles, then northward, over its undulated, western slope, about the same distance. We halted on the ridge, half an hour, then pressed on till six o'clock, when the sun, having finished his daily race, sank with great grandeur and beauty into the western waters of the vast Pacific, sending back a pleasant farewell to the clouds that hung over Hualalai, Mauna Loa, and **Mauna Kea**, the three Hawaiian mountains, and shooting upwards his diverging rays with peculiar beauty, after the last limb of his broad, golden disk had disappeared. About seven, we reached Waimea, thus completing my excursion of about 175 miles, with improved health for resuming the labors of the station... [Bingham 1969:394]

“Hua Hekili” A Hail-storm on Mauna Kea in 1830

In 1830, Goodrich again returned to the summit of Mauna Kea, this time, in the company of natives. On the trip, they experienced a hail storm, the hail being called “*hua ke hekili*” (fruit of thunder). Goodrich searched for, but did not find the pond, Waiau, though they did find a stream fed by the melting snow. Goodrich also reported that on the flat lands between Mauna Kea and Mauna Loa, they found many huts, formerly used by the sandal wood cutters:

Byron’s Bay, Hawaii

December 30, 1830

Joseph Goodrich; to Jeremiah Evarts:

Being favoured with an associate Mr. Andrews & wife who came up here to spend a season to assist in labouring for the good of souls here, having had a previous request to visit the brethren at Waimea. I thought it desirable to improve the earliest opportunity to comply with their request. I left home the latter part of May in company with 7 or 10 natives. We went directly up the mountain till we reached the upper region of vegetation, then turning to the left of the mountain, as we were passing along to the south east of the summit being probably 12000 feet above the level of the sea, we came in contact with a hail storm. Being the first that I had seen since passing Cape Horn. Here it was quite amusing to see the natives to use their endeavors to catch it as it fell, some with their hats & some with the tops of their calabashes held out to catch it, but they were disappointed for some time saying that it went into their hats or calabashes but that it flew directly out again. At last having collected some they commenced eating them or here they expressed surprise, exclaiming, “*huihui eha loa ka niho*” it was very cold & hurt the teeth. They call hail stones, *hua ke hekili*, a fruit/eggs of thunder. One asked me, “*No ke aha la e noho wale no ke anuanu maluna o ka mauna?*” Why does cold dwell or stay only upon the top mountain? One says that he has no hands, another that his feet are thick, another that [page 1] his nose is numbed. *We descended again into the valley between the mountains, having **Mauna Kea** on our right, Mauna Loa on the left. Some part of the way is sandy, interspersed with trees & shrubberies & many huts of the sandal wood cutters, though these inhabitants have previously left them. Their present occupant disputed our entrance and we much preferred to recline out in the sun, than to contend with so many formidable oppressors.*

The valley between the mountains is probably 8,000 or 10,000 feet above the level of the sea. Mauna Loa presents a most appalling aspect scarcely any is to be seen but black & weary looking lava; currents of rough & black looking lava commenced at the top of Mauna Loa, & I should think after running a distance of 50 miles or more, fell into the sea Kawaihae. We arrived at Waimea & found all comfortable; after the sabbath we commenced our return. Designing to ascend the summit in search of the pond of water of which I had frequently heard, we followed the same route very nearly that I pursued the first time that I ascended the mountain. When a tour of the island was made by a deputation from the mission. We discovered nothing very special except a beautiful stream of water murmuring from the mountain, it was occasioned by the melting of the snow & had its head in the pond of water for which I was looking, but having no guide we passed within about a half a mile of it as I afterward was informed we have since seen it. It is 40 or 50 rods in circumference as Mr. Bingham has been up there & seen it, I presume that he has given a particular account of it, it is therefore unnecessary for me to do it. I also saw as below fragments of granite imbedded in lava, this cohesion of almost all of it was very feeble which was probably destroyed by the action of volcanic fires. In traveling on the loose masses & fragments of lava, the sound under foot would very nearly resembles that of traveling over plates of iron; solid mound precipices slags, cinder, scoria & sand [page 2] compose the principal part of the summit of **Mauna Kea**, while Mauna Loa is composed almost entirely of black compact lava of a hard infused mass of jet black appearance, while some inclines to an ebony colour. I find it very interesting to ascend the

summit being afflicted with a severe pain in the head. The natives also complaining of the same, several times, while in the upper regions. I have been attacked with violent vomiting of bilious matter, all these complaints to subside as we descend the mountain... [page 3; A.B.C.F.M. Collection, Houghton Library Harvard]

Mauna Kea and the Mountain Lands Described by David Douglas in 1834

In January 1834, naturalist David Douglas visited the island of Hawai'i, and ascended Mauna Kea. The records of the trip kept by Douglas (published in the Hawaiian Spectator of 1839) provide us with detailed descriptions of the journey from Hilo Bay to the mountain, with discussions on the natural environment, make up of the forests, and changes in the landscape as the elevation was increased. A number of plants collected by Douglas, were subsequently named for him, though his place in history on the mountain lands is more readily remembered by the fact that he died on the mountain while on his second visit to the island. While walking the old mountain trail, skirting the forest zone between Humu'ula and the Waipunalei-Laupāhoehoe boundary, Douglas apparently fell into a dug-out trap meant to catch wild bullocks, and was killed by a trapped animal. The location of this accident was at a place named Keahua-ai, and is in the vicinity of the place known today as "Kaluakauka," The Doctor's Pit, or Douglas Pit (see Register Map No. 667).

Douglas wrote the following account of his first trip to Mauna Kea and the mountain lands:

...On Tuesday, the 31st of December, we stood in for the island of Hawaii, and saw **Mauna Kea** very clearly, a few small stripes of snow lying only near its summit, which would seem to indicate an altitude inferior to that which has been commonly assigned to this mountain.

My object being to ascend and explore **Mauna Kea**, as soon as possible, I started on the 7th January, 1834, and, after passing for rather more than three miles over plain country, commenced the ascent, which was however gradually entering the wood. Here the scenery was truly beautiful. Large timber trees were covered with creepers and species of *Tillandsia*, while [page 399] the Tree Ferns gave a peculiar character to the whole country. We halted and dined at the saw-mill, and made some barometrical observations, of which the result is recorded, along with those that occupied my time daily during the voyage, in my Journal.

Above this spot the Banana no longer grows, but I observed a species of *Rubus* among the rocks. We continued our way under such heavy rain, as with the already bad state of the path, rendered walking very difficult and laborious; in the chinks of the lava, the mud was so wet that we repeatedly sank in it, above our knees.

Encamping at some small huts, we passed, an uncomfortable night, as no dry wood could be obtained for fuel, and it continued to rain without intermission. The next day we proceeded on our way at eight o'clock, the path becoming worse and worse.

The large Tree Ferns, and other trees that shadowed it, proved no protection from the incessant rain, and I was drenched to the skin the whole day, besides repeatedly slipping into deep holes full of soft mud. The number of species of *Filices* is very great, and toward the upper end of the wood, the timber trees, sixty or seventy feet high, and three to ten inches in circumference, are matted with Mosses, which together with the *Tillandsias* and Ferns, betoken an exceedingly humid atmosphere. The wood terminates abruptly; but as the lodge of the cattle hunter was still about a mile and a half farther up the clear flank of the mountain, situated on the bank of a craggy lava stream, I delayed ascertaining the exact altitude of the spot where the woody region ends, (a point of no small interest to the Botanist) until my return, and sat down to rest myself awhile, in a place where the ground was thickly carpeted with species of *Fragaria* [*ōhelo papa*] some of which were in

blossom, and a few of them in fruit. Here a Mr. Miles, part owner of the saw-mill that I had passed the day before, came up to me; he was on his way to join his partner, a Mr. Castle, who was engaged in curing the flesh of the wild cattle near the verge of the wood, and his conversation helped to beguile the fatigues of the road, for though the distance I had accomplished this morning was little more than [page 400] seven miles, still the laborious nature of the path, and the weight of more than 60 lbs. on my back, where I carried my barometer, thermometer, book and papers, proved so very fatiguing, that I felt myself almost worn out. I reached the lodge at four, wet to the skin, and benumbed with cold, and humble as the shelter was, I hailed it with delight. Here a large fire dried my clothes, and I got something to eat, though, unluckily, my guides all lingered behind, and those who carried my blanket and tea kettle were the last to make their appearance. These people have no thought or consideration for the morrow; but sit down to their food, smoke and tell stories, and make themselves perfectly happy.

The next day my two new acquaintances went out with their guns and shot a young bull, a few rods from the hut, which they kindly gave me for the use of my party. According to report, the grassy flanks of the mountain abound with wild cattle, the offspring of the stock left here by Capt. Vancouver, and which now prove a very great benefit to this island. A slight interval of better weather this afternoon afforded a glimpse of the summit between the clouds, it was covered with snow. *At night the sky became quite clear, and the stars, among which I observed Orion, Canis minor, and Canopus, shone with intense brilliancy.*

The next day the atmosphere was perfectly cloudless, and I visited some of the high peaks which were thinly patched with snow. On two of them which were extinct volcanoes, not a blade of grass could be seen, nor any thing save lava, mostly reddish, but in some places of a black color. Though on the summit of the most elevated peak, the thermometer under a bright sun, stood at 40°, yet when the instrument was laid at an angle of about fifteen degrees, the quicksilver rose to 63°, and the blocks of lava felt sensibly warm to the touch. The wind was from all directions, east and west, for the great altitude and the extensive mass of heating matter completely destroyed the Trade wind. *The last plant that I saw upon the mountain was a gigantic species of the Compositae (Argyrophyton Douglasii, Hook. Ic. Plant. t. 75.,) [hinahina, 'āhinahina] with a column of imbricated sharp pointed leaves, densely [page 401] covered with a silky clothing. I gathered a few seeds of the plants which I met with, among them a remarkable Ranunculus, which grows as high up as there is any soil.* One of my companions killed a young cow just on the edge of the wood, which he presented me with, for the next day's consumption.

Night arrived only too soon, and we had to walk four miles back to the lodge across the lava, where we arrived at eight o'clock, hungry, tired and lame, but highly gratified with the result of the day's expedition.

The following morning proved again clear and pleasant, and every thing being arranged, some of the men were despatched early, but such are the delays which these people make, that I overtook them all before eight o'clock. They have no idea of time, but stand still awhile, then walk a little, stop and eat, smoke and talk, and thus loiter away a whole day.

At noon we came up to the place where we had left the cow, and having dressed the meat, we took a part and left the rest hanging on the bushes. We passed to the left of the lowest extinct volcano, and again encamped on the same peak as the preceding night. It was long after dark before the men arrived, and as this place afforded no wood, we had to make a fire of the leaves and dead stems of the species of *Compositae* mentioned before, and which together with a small *Juncus*, grows higher up in the mountain than any other

plant. The great difference produced on vegetation by the agitated and volcanic state of this mountain is very distinctly marked. Here there is no line between the *Phenogamous* and *Cryptogamous* Plants, but the limits of vegetation itself are defined with the greatest exactness, and the species do not gradually diminish in number and stature, as is generally the case on such high elevations.

The line of what may be called the Woody Country, the upper verge of which the barometer expresses 21, 450 inch.; therm. 46°, at 2 P.M., is where we immediately enter on a region of broken and uneven ground with here and there lumps of lava, rising above the general declivity to a height of three hundred to four hundred feet, intersected by deep chasms, which [page 402] show the course of the lava when in a state of fluidity. This portion of the mountain is highly picturesque and sublime. Three kinds of timber of small growth, are scattered, over the low knolls, with one species of *Rubus* and *Vaccinium*, the genus *Fragaria* and a few *Gramineae* *Filices* and some alpine species. This region extends to bar. 20,260 inch.; air 40°, dew point 30°. There is a third region, which reaches to the place where we encamped yesterday, and seems to be the great rise or spring of the lava, the upper part of which, at the foot of the first extinct peak is bar. 20,010 inch., air 39°.

At six o'clock the next morning, accompanied by three Islanders and two Americans, I started for the summit of the mountain; bar. at that hour indicated 20,000 inch., therm. 24°, hydr. 20°, and a keen west wind was blowing off the mountain, which was felt severely by us all, and especially by the natives, whom it was necessary to protect with additional blankets and great coats. We passed over about five miles of gentle ascent, consisting of large blocks of lava, sand, scoriae, and ashes, of every size, shape and color, demonstrating all the gradations of calcination from the mildest to the most intense. This may be termed the Table land or Platform, where spring the great vent holes of the subterranean fires or numerous volcanoes. The general appearance is that of the channel of an immense river heaved up. In some places the round bowlders of lava are so regularly placed, and the sand is so washed in, around them, as to give the appearance of a causeway, while in others, the lava seems to have run like a stream. We commenced the ascent of the Great Peak at nine o'clock, on the N. E. side, over a ridge of tremendously rugged lava, four hundred and seventy feet high, preferring this course to the very steep ascent of the south side, which consists entirely of loose ashes and scoriae, and we gained the summit soon after ten. Though exhausted with fatigue before leaving the Table Land, and much tried with the increasing cold, yet such was my ardent desire to reach the top, that the last portion of the way seemed the easiest. This is the loftiest of the chim- [page 403] neys; a lengthened ridge of two hundred and twenty-one yards two feet, running nearly strait N. W.

To the north, four feet below the extreme summit of the Peak, the barometer suspended, the cistern being exactly below, and when the mercury had acquired the temperature of the circumambient air, the following register was entered: at 11 hrs. 20 min.; bar. 18-362 inch.; air 33°; hydr. 0" 5. At twelve o'clock the horizon displayed some snowy clouds; until this period, the view was sublime to the greatest degree, but now every appearance of a mountain storm came on. The whole of the low S. E. point of the island was throughout the day covered like a vast plain of snow, with clouds. The same thermometer, laid on the bare lava, and exposed to the wind at an angle of 27°, expressed at first 37°, and afterwards, at twelve o'clock 41°, though when held in the hand, exposed to the dew it did not rise at all. It may well be conjectured that such an immense mass of heating material, combined with the influence of internal fire, and taken in connexion with the insular position of **Mauna Kea**, surrounded with an immense mass of water, will have the effect of raising the snow line considerably; except on the northern declivity, or where sheltered by large blocks of lava, there was no snow to be seen; even on the top of the **cairn**, where

the barometer was fixed, there were only a few handfuls. One thing struck me as curious, the apparent non-diminution of sound; not as respects the rapidity of its transmission which is, of course, subject to a well known law. Certain it is, that on mountains of inferior elevation, whose summits are clothed with perpetual snow and ice, we find it needful to roar into one another's ears, and the firing of a gun, at a short distance, does not disturb the timid Antelope on the high snowy peaks of N. W. America. Snow is doubtless a non-conductor of sound, but there may be also something in the mineral substance of **Mauna Kea** which would effect this.

Until eleven o'clock, the horizon was beautifully defined on the whole N. W. of the island. The great dryness of the air is evident to the senses, without the assistance of the hygrometer. Walking with my trousers rolled up to my knees, and without shoes, I [page 404] did not know there were holes in my stockings, till I was apprised of them by the scorching heat and pain in my feet, which continued throughout the day, the skin also peeled from my face. While on the summit I experienced violent head ache, and my eyes became blood shot, accompanied with stiffness in their lids.

Were the traveler permitted to express the emotions he feels when placed on such an astonishing part of the earth's surface, cold indeed must his heart be to the great operations of Nature, and still colder towards Nature's God, by whose wisdom and power such wonderful scenes were created, if he could behold them without deep humility and reverential awe. Man feels himself as nothing—as if standing on the verge of another world. A death like stillness of the place, not an animal nor an insect to be seen—far removed from the hustle and bustle of the world, impresses on his mind with double force the extreme helplessness of his condition, an object of pity and compassion, utterly unworthy to stand in the presence of a great and good, and wise and holy God, and to contemplate the diversified works of His hands.

I made a small collection of geological specimens, to illustrate the nature and quality of the lavas of this mountain, but being only slightly acquainted with this department of Natural History, I could do no more than gather together such materials as seemed likely to be useful to other and more experienced persons. As night was closing and threatening to be very stormy, we hastened towards the camp, descending nearly by the same way as we came, and finding my guide Honori and the other men all in readiness, we all proceeded to the edge of the woody region, and regained the lodge, highly gratified with the result of this very fatiguing day's excursion. Having brought provision from the hill, we fared well.

January the 13th. The rain fell fast all night, and continued accompanied by a dense mist, this morning, only clearing sufficiently to give us a momentary glimpse of the mountain, covered with snow down to the woody region. We also saw Mauna Roa, which was similarly clothed for a great part of its height. Thankful had we cause to be that this heavy rain, [page 405] wind and fog did not come on while we were on the summit, as it would have caused us much inconvenience and perhaps danger.

The same weather continuing until the 15th, I packed up all the baggage and prepared to return. It consisted of several bundles of plants, put into paper and large packages tied up in *Koa* baskets, which are manufactured from a large and beautiful tree, a species of *Acacia*, of which the timber resembles mahogany, though of a lighter color, and is beautiful, and said to be durable: also some parcels of geological specimens, my instruments, etc. At seven A.M. I started, having sent the bearers of my luggage before me, but I had hardly entered the wood by the same path, as I took on my ascent, when the rain began to fall, which continued the whole day without the least intermission; but as there was no place suitable for encamping, and the people, as usual, had straggled away from one another, I resolved to proceed. The path was in a dreadful state, numerous

rivulets overflowed it in many places, and rising above their banks, flashed in foam through the deep glens, the necessity for crossing which impeded my progress in no slight degree. In the low places the water spread into small lakes, and where the road had a considerable declivity, the rushing torrent which flowed down it, gave rather the appearance of a cascade than a path. The road was so soft that we repeatedly sank to the knees and supported ourselves on a lava block, or the roots of the trees. Still, violent as was the rain, and slippery and dangerous the path, I gathered a truly splendid collection of Ferns, of nearly fifty species, with a few other plants, and some seeds, which were tied up in small bundles, to prevent fermentation, and these protected by fresh *Koa* bark. Several beautiful specimens of Mosses and Lichens were also collected; and spite of all the disadvantages and fatigues that I underwent, still the magnificence of the scenery commanded my frequent attention, and I repeatedly sat down in the course of the day under some huge spreading Tree Fern, which more resembled an individual of the Pine than the Fern tribe, and contemplated with delight the endless variety of form and structure that [page 406] adorned the objects around me. On the higher part of the mountain, I gathered a Fern identical with the *Asplenium viride* of my own native country, a circumstance which gave me inexpressible pleasure, and recalled to my mind many of the happiest scenes of my early life.

In the evening I reached the saw-mill, when the kind welcome of my mountain friend, Mr. Miles, together with a rousing fire, soon made me forget the rain and fatigues of the day. Some of the men had arrived before me, others afterwards, and two did not appear till the following day; for having met with some friends, loaded with meat, they preferred a good supper to a dry bed. My guide, friend, and well disposed fellow, arrived in great dismay, having in the dark, entered the river a short distance above a chain of cataracts, and to avoid these, he had clung to a rock till extricated by the aid of two active young men. Though he escaped unhurt, he had been exposed to the wet for nearly ten hours. A night of constant rain succeeded, but I rested well, and after breakfast having examined all the packages, we quitted the saw mill for the bay, and arrived there in the afternoon, the arrangement and preservation of my plants affording me occupation for two or three days. It was no easy matter to dry specimens and paper during such incessantly rainy weather. I paid the whole of the sixteen men who had accompanied me, not including Honori and the king's man, at the rate of two dollars, some in money, and some in goods; the latter consisted of cotton cloth combs, scissors and thread, etc.; while to those who had acquitted themselves with willingness and activity, I added a small present in addition. Most of them preferred money, especially the lazy fellows. The whole of the number employed in carrying my baggage and provisions, was five men, which left eleven for the conveyance of their own tapas and food. Nor was this unreasonable for the quantity of food which a native will consume in a week, nearly equals his own weight! A dreadful drawback on expedition. Still though the sixteen persons ate two bullocks in a week, besides what they carried, a [page 407] threatened scarcity of food compelled me to return rather sooner than I should have done, in order that the calabashes might be replenished. No people the world can cram themselves to such a degree as the Sandwich Islanders; their food is however, of a very light kind, and easy of digestion... [Douglas in Hawaiian Spectator, 1839:408]

Having completed his trek to both Mauna Kea and Mauna Loa, Douglas also visited Kilauea and then returned to O'ahu. In July of 1834, Douglas returned to Hawai'i for a second trip to Mauna Kea. This trip was made via Waimea-Laumai'a mountain trail, and was the last trip he made. Circumstances around his last days and death, were written up by reverends Joseph Goodrich and John Diell, published in the Missionary newspaper, *Ke Kumu Hawaii* on November 26, 1834:

Death of Mr. Douglas.

The following letter has been kindly furnished for publication. It may be proper to remark that Mr. David Douglas, whose untimely and tragical death his friends and the community

sincerely deplore, was born at Perth, Scotland, and had travelled in various parts of the world as a naturalist connected with the Horticultural Society of London. It is supposed his age was about 40 years.

The body was examined at Honolulu, Aug. 3, by a number of medical gentlemen, and from the marks found on it, they were unanimous in the opinion that his death was accidental.

Hilo, Hawaii, July 15, 1834.

To Richard Charlton, Esq., his Britannic Majesty's Consul at the Sandwich Islands;

Dear Sir,—Our hearts almost fail within us, as we undertake to perform the melancholy duty which devolves upon us to communicate the painful intelligence of the death of our friend Mr. Douglas, and such particulars thus far, as we have been able to gather.

The tidings reached us when we were every moment awaiting his arrival, and expecting to greet him with a cordial welcome. But alas! He whose ways and thoughts are not as ours, saw fit to order it otherwise; and instead of being permitted to welcome the living friend, our hearts have been made to bleed as we have performed the offices of humanity to his mangled corpse. Truly, we must say that the ways of the Lord are mysterious, and his judgments past finding out. But it is our unspeakable consolation to know that those ways are directed by infinite wisdom and mercy, and that though clouds and darkness are round about Him, yet righteousness and judgment are the habitation of his throne.

But we proceed to lay before you as full information as it is in our power to do at the present time, concerning, this distressing [page 13] event. As Mr. Diell was standing in the door of Mr. Goodrich's house yesterday morning, about 8 o'clock, a native came up, and with an expression of countenance, which indicated but too faithfully that he was the bearer of sad tidings, inquired for Mr. Goodrich; in seeing him, he communicated the dreadful intelligence that the body of Mr. Douglas had been found on the mountains, in a pit excavated for the purpose of taking wild cattle, and that he was supposed to have been killed by the bullock which was in the pit when Mr. Douglas fell in. Never were our feelings so shocked, nor could we credit the report till it was painfully confirmed as we proceeded to the beach, whither his body had been conveyed in a canoe by the native who informed us of his death. As we walked down with the native, and made further inquiries of him, he gave, for substance, the following relation.

That on the evening of the 13th inst. the natives who brought the body down from the mountain, came to his house at **Laupahoihoi**, about twenty-five or thirty miles distant from Hilo, and employed him to bring it to this place in his canoe. The particulars which he learned from them, were as follows:

That Mr. Douglas left Kohala point last week, in company with a foreigner (an Englishman) as a guide, and proceeded to cross **Mauna Kea** on the north side; that on the 12th inst. he dismissed his guide, who cautioned him, on parting, to be very careful lest he should fall into some of the pits excavated for the purpose mentioned above; describing their location as being near the places to which the cattle resorted to drink. That soon after Mr. Douglas had dismissed his guide, he went back a short distance to get a bundle which he had forgotten, and that as he was retracing his steps, at some fatal moment he fell into one of the pits, into which a bullock had previously fallen. That he was found dead in the pit by those same natives, who, ignorant at the time, of his passing, were in pursuit of bullocks, and on coming up to this pit, found a small hole in one end of the covering of it. At first they conjectured that a calf had fallen in, but on further examination, discovered traces of a man's steps, and soon afterwards saw his feet in the pit, the rest of his body

being covered with dirt and rubbish. They went immediately in pursuit of the guide, who returned, shot the bullock in the pit, took out the body, and hired the natives at the price of four bullocks, which he killed immediately, to convey the body to the sea shore. He himself accompanied them and procured the native who related the affair to us, to bring the body to this place, promising to come on himself immediately, and that he would bring the compass, watch, which was somewhat broken but still going, some money found in Mr. Douglas's pockets, and the little dog, that faithful companion of our departed friend. Thus for the report of the natives who brought the body in his canoe, and who professed to relate the facts to us as he learned them from the natives who came down from the mountain. We do not stop, at present, to examine how far it is consistent or inconsistent with itself, as we have not the means of making full investigation into the matter.

On reaching the canoe, our first care was to have the remains conveyed to some suitable place where we could take proper care of them, and Mr. Dibble's family being absent, it was determined to convey the body to his house. But what an affecting spectacle was presented, as we removed the bullock's hide in which he had been conveyed! We will not attempt to describe the agony of feeling which we experienced at that moment. Can it be he? can it be he? we each exclaimed, can it be the man with whom we parted but a few days before, and who then was borne up with so high spirits and expectations, and whom, but an hour before, we were fondly anticipating to welcome to faithfully contained in the familiar article of dress, in the features, and in the noble person before us. They were those of our friend.

The body, clothes, &c. appeared to be in the same state they were in when taken from the pit. The face was covered with dirt, the hair filled with blood and dirt, the coat, pantaloons and shirt considerably torn. The hat was missing. On washing the body, we found it in a shocking state; there were ten or twelve gashes on the head, a long one over the left eye, another rather deep, just above the left temple, a deep one behind the right ear, the left cheek bone appeared to be broken, and also the ribs on the left side, the abdomen was much bruised and also the lower part of the legs.

After laying him out, our first thought was to bury him within Mr. Goodrich's premises; but after we had selected a spot, and commenced clearing away the ground, doubts were suggested by a foreigner who was assisting us, and who has for some time been engaged in the business of taking wild cattle, whether the wounds on the head could have been inflicted by a bullock. Mr. Goodrich said that the same doubts had arisen to his own mind, while examining the body. The matter did not seem clear; many parts of the story appeared dark. How was it that Mr. Douglas was alone, without any guide, whether foreigner or native? Where was John, Mr. Diell's colored man, who left Honolulu with Mr. Diell, and who, on missing a passage with him from Lahaina, embarked with Mr. Douglas, as we are informed by the captain of the vessel in which Mr. Douglas sailed from Lahaina to Kohala Point, and there left the vessel with Mr. Douglas, on the morning of the 9th inst. in order to accompany him across the mountain to Hilo? How was it that Mr. Douglas should fall into a pit when retracing his steps after he had once passed it in safety? And if a bullock had already fallen into it, how was it that he did not see the hole necessarily made in the covering?—These difficulties occurred to our minds, and we thought it due to the friends of Mr. Douglas, and to the public, whom he had so zealously and so usefully served, that an examination should be made of his body by medical men. The only way to have this effected, was by preserving his body, and it could be examined here. The former method seemed most desirable; accordingly we had the contents of the abdomen removed, the body filled with salt placed in a coffin which was then filled with salt, and the whole enclosed in a box filled with brine. Some fears are entertained whether the captain of the native vessel will carry the body to Honolulu, this will be determined in the morning. After the body was laid in the coffin, the members of the mission family and

several foreigners assembled at the house of Mr. Dibble, to pay their tribute of respect to the mortal remains of the deceased, and to improve the affecting Providence to their own good. Prayers were offered, and a brief address made, and we trust that the occasion may prove a lasting blessing to all who were present. After the services were concluded, the body was removed to a cool native house, where it was enclosed in the box.

16th. As neither the guides nor any other natives have arrived, we have employed two foreigners to proceed to the place where with directions to find the natives who discovered the body, and to go with them to the pit, and after making as full inquiries as possible, to report to us immediately.

So far as we can ascertain, the guide is an Englishman, a convict from Botany Bay, who left a vessel at these islands some years ago; he has a wife and one child with him, and to this circumstance, in part, may be attributed his delay.

There are two native vessels in port, besides the one about to sail to day; by these vessels we shall keep you apprized of all the information we can obtain, and hope that some clear light may yet be shed on a subject now involved in much darkness.

Mr. Goodrich has just returned from the vessel about to sail. The application to convey that remains of Mr. Douglas to Honolulu, we fear will prove unsuccessful, as the vessel is filled with wood, canoes, food, &c. It is barely possible, however, that the captain may yet consent to take the body on board. But if not, it will remain with yourself to determine what course shall be pursued. Should you deem it advisable to come up in person, we think that the body will be in a state of preservation that will admit of it being examined upon your arrival.

In the mean time, until we have advices from yourself, we shall endeavor to procure as full information as it is in our power to obtain. It may be well to mention, that the principal part of Mr. Douglas's baggage, his trunks, instruments, &c. are in possession [page 14] of Mr. Goodrich, who will take all proper care of them, subject to your order.

3 o'clock, P. M. Edward Gurney, the Englishman spoken of before, has arrived. Our minds are greatly relieved as to the probable way in which the fatal event was brought about.

He states, that on the 12th inst. about ten minutes before six o'clock in the morning, Mr. Douglas arrived at his house on the mountain, and wished him to point out the road to Hilo, and to go a short distance with him. Mr. Douglas was then alone, but said that his man had given out the day before; (this man was probably John, Mr. Diell's colored man.) After taking breakfast, Edward accompanied Mr. Douglas about three fourths of a mile, and after directing him in the path, and warning him of the traps, went on about half a mile further with him. Mr. Douglas then dismissed him, after expressing an anxious wish to reach Hilo by evening, thinking that he could find out the way himself.

Just before Edward left him, he warned him particularly of the three bullock traps, about two miles and a half ahead; two of them directly on the road, the other on one side.

Edward then parted with Mr. Douglas, and went back to skin some bullocks which he had previously killed. About 11 o'clock, two natives came in pursuit of him, and said that the European was dead, and that they had found him in the pit in which the bullock was. They mentioned that as they were coming up to this pit, one of them observing some of the clothing on the side exclaimed Lole, but in a moment afterwards, discovered Mr. Douglas within the cave trampled under the feet of the bullock. They went back immediately for Edward, who left his work, ran to the house for a musket and ball, and hide, and on

coming up to the pit found the bullock standing upon Mr. Douglas's body. Mr. Douglas was lying upon his right side. He shot the animal, and after drawing him to the other end of the pit, succeeded in getting out the body. His cane was with him, but the bundle and dog were not. Edward, knowing that he had a bundle, asked for it. After a few moment's search, the dog was heard to bark, at a short distance ahead, on the road leading to Hilo. On coming up to the place, he found the dog and the bundle. On further examination it appeared that Mr. Douglas had stopped for a moment and looked at the empty pit, and also at the one in which the cow had been taken, that after passing on up the hill some fifteen fathoms; he laid down his bundle and went back to the pit in which the bullock was entrapped, and which lay on the side of the pond opposite to that along which the road runs, and that whilst looking in, by making a mis-step, or by some other fatal means, he fell into the power of the infuriated animal, who speedily executed the work of death.

The body was covered in part with stones, and probably this circumstance prevented his being entirely crushed. After removing the body, Edward took charge of the dog and bundle, and also of his watch and chronometer, (which is injured in some way,) his pocket compass, keys, and money which was in his pockets; and after hiring the natives to carry the body to the shore, (a distance of about 27 miles,) came on in company with them, and then came directly to this place.

This narrative clears up many of the difficulties which rested upon the whole matter, and perhaps it will afford a pretty satisfactory account of the matter in which Mr. Douglas met with his awful death. We presume, however, that it would meet with your wishes if the body were to be sent down, and as the vessel is still detained by a calm, we hope to receive a favorable answer from the captain. If we should not, perhaps it may be well to inter the body, and then in case you should wish to have it examined, it might easily be disinterred.

We have thus, dear sir, endeavored to furnish you all the particulars which we have been able to gather concerning this distressing event. It is no common death which has thus called forth our tears and sympathies, and it is one which presents a truly affecting comment on the truth, that in the midst of life we are in death, and how forcible the admonition, to all of us whose privilege it was to be acquainted with him who has thus been snatched from us, to prepare to meet our God, for the son of man cometh at an hour that we know not of.

You will be pleased, dear sir, to accept for yourself and family, the expression of our kindest sympathies under the afflictive dispensation, and allow us to subscribe ourselves with sincere regard,

Your friends and obediently servants,

JOSEPH GOODRICH.
JOHN DIELL.

Note. The black man mentioned in the letter probably lost his way and perished in the mountains, as he has not been heard of since. [*Ke Kumu Hawaii*, November 26, 1834:15]

Road Constructed Across the Mountain Lands in 1834

In December 1834, Goodrich again wrote to the mission headquarters, about his duties, including his trip to the mountain lands to hunt for bullocks. He also observed that Governor Kuakini had ordered the construction of a road through the mountain lands, in order to facilitate travel across the island. The letter also alerts us to troubles in the mission station itself, among the brethren, and informs the headquarters of the death of naturalist, David Douglas:

Byron's Bay, Hilo, Hawaii
December 8th, 1834

Joseph Goodrich; To Rufus Anderson:

As the mission have complied with your directions in respect to myself, perhaps it is not necessary for me to enlarge, as their proceedings will doubtless be received long before you will receive their recommendation. Agreeable to Mr. Bingham's request & suggestion, I may be allowed to make some statements to which may serve in some measure to explain what is past.

What I have done as a missionary it may be difficult to relate all. When this station was first taken it was some time before schools could be set in operation... [page 1] ...When schools became numerous it required an unserviceable portion of my time to select teachers, & examine them, give them proper directions to give out books & receive such compensation as they make, & turn it to the Depository. Wood, *kapa*, & arrowroot, were the principal, such was the state of things & they continued increasing till the fall of 1831, when the scholars amounted to 7,587 that exhibited at the last examination that I had before I left for Oahu... [page 2]

Respecting bullock hunting only in one instance have I been for that object only [page 5] & that was when this station was first taken & that was with the appropriation of those who were with me; the main object then was to take a young calf & bring it down & raise it that we might have a cow at some future time. I succeeded in taking a calf, it did not live a great while, all the other times that I have been about not exceeding half a dozen times, & always had some other object in view either to go through Hilo & preach going & returning are to go up directly through the woods from here in order to find out a suitable place to make a road to Waimea, as it is now & has been heretofore to go from here there. *I also acted in compliance with the Gov.'s request, so that a road is now making through the woody region from here to Waimea which when it is done it will only be a days journey from here to W. Now it is 3 or 4 days journey between us...* [page 6]

You will doubtless have heard of the lamented death of Mr. David Douglas, a distinguished naturalist sent out by the horticultural society [page 13] of London who has been exploring the North West regions of America. He came to these islands last fall & spent about 3 months here in my family, after which he went to Oahu but not finding an opportunity to leave the islands he set out to return here in July and in crossing over **Mauna Kea** he by some fatal step, fell into a pit in which was a wild bull, & was soon killed, as he was found dead shortly after by some natives passing that way. There was no person with him when he fell into the pit, that is we have no knowledge of any person being with him, as he parted with his guide a few hours previous... [page 14]

Narratives from Trips to Mauna Kea in 1840 and 1841

In 1840, J.J. Jarves, editor of the Hawaiian Government Newspaper, The Polynesian (printed in the English language), accompanied "Mr. Cushingam," a lead member of the United States Exploring Expedition (see Chas. Wilkes, 1970, below) on a journey to the island of Hawai'i. On June 26th, Jarves, Cushingam, and another associate landed at Kailua, Kona, on the Clementine. After procuring the assistance of Governor Kuakini, the party traveled from Kailua to Kawaihae, and then on to Waimea. Guided by "Honoa," who was reported as knowing all of the trails of the island, the party departed from Waimea (passing Kemole Gulch, by description of the landscape) and traveled up the slopes of Mauna Kea to Waiau, which he described as appearing "green and slimy." From the summit, the party then descended to Humu'ula, crossed the Humu'ula plains to Keawewai at Keauhou (Ka'ū), and then went on to Kilauea.

In July and August of 1840, Jarves published detailed notes describing the sites seen, and experiences while along the way. The narratives below, are excerpted from the larger series of articles written by Jarves. In his account, Jarves noted that at Waimea—

...It was with great difficulty that men could be procured for our route, which was to ascend **Mauna Kea, Mauna Loa**, thence to the volcano, new streams of lava and Hilo. After considerable negotiation, twelve were procured from the headman, and a guide named Honoa, who professed to know every path and route upon the island... The trip to occupy fourteen days... By twelve o'clock the thirtieth day of June, we were mounted and on our way, for we had taken horses to ascend the mountain as far as it was practicable to go with them. The plain remained quite level for twelve miles, broken occasionally into crater-like hills; our course at first was E.S.E., then diverged to S.E. by E. until we reached the mountain. The first portion of the ascent was gradual; through scanty forest. At sunset, we stopped at a cave, about seven thousand feet up, where we were to pass the night... Scarcely had we set foot within its precincts, before we were literally felled alive. Our clothing was immediately lined with them, and such stout ones; their very kick was painful...

July 1. — Started early, our course being directly for the summit, the shortest but steepest way. After a few hours of slow progress, we passed the line of vegetation, excepting a species of fern, and a few stunted grasses, and came upon a bed of scoria, and rough lava. This led to a large crater, apparently the great terminal one of **Mauna Kea**. The side towards the N.W., through which we entered was torn away, and here the lava apparently had discharged itself. Including the numerous sand and scoria conical shaped chimnies, which have an elevation of from five hundred to one thousand feet, and appear to have been as it were blown up, by the expansive force beneath, its circumference was not less than six miles. The basin was broken up into lakes, crested waves, cones, and all the distorted shapes of an active crater, rendering traveling exceedingly rough; our men giving out every few rods. On these chimnies, were herds of bullocks which scampered off at our approach, and plunged down their rugged sides with a rapidity that defied pursuit. Their only object in frequenting this region, where there is no trace of vegetation, is to avoid the pursuit of the hardy hunters, or to lick the snow. After pushing our way until within two thousand feet of the summit, our horses gave out and were sent back. This was the bed of a large lava lake at the south eastern extremity of the crater. Here we found a series of minerals, such as we had not noticed before. They were augite, hornblende, olivine, etc. Leaving the lava, we struck upon volcanic gravel, loose and slippery to the footing. At this height, my respiration was sensibly affected, lips cracked, eye balls inflamed, with a dizzy, swimming sensation in my head. Some of the natives were similarly attacked. By the time we had reached the foot of a sand hill, about three hundred feet above us, which the guide insisted was the highest peak of the mountain, these symptoms had increased to such a degree, accompanied by faintness, that I could not walk without assistance, and but a few rods at a time. Some peppermint and brandy, mixed with water, relieved me a little. My companions were not so much affected. It was now sunset, and we were on the highest visible point but one, surrounded by a scene of infinite grandeur. To the south lay Mauna Loa, with its dome summit, on which we could distinctly trace the great crater of Douglas, now at rest, for no smoke was visible; Mauna Hualalai rose precipitously on our right, and such was the clearness of the atmosphere, that they both appeared close upon us, though thirty miles distant.

On this side we had an adequate conception of our elevation; thirteen thousand feet. The great plain between the two mountains, which is two days walk across, appeared but a mere valley, while immediately beneath us, **Mauna Kea** descended so precipitously that its base could not be seen. The sky was cloudless, and of the most perfect transparency. Looking back, from whence we had ascended, our gaze rested upon an ocean of clouds, piled in gorgeous and dense masses, or lying like drifts of the whitest snow. The last rays of the sun played upon this airy sea with the most dazzling brilliance, giving it those ethereal shades, which are beyond description and no artist can catch. This belt of clouds shrouded all beneath from our view, but in the background, sixty five miles distant, rose in

bold relief, like some ocean island, the dark blue peaks of Maui; for they had that tinge. Their appearance, at once drew from all, one sympathizing burst of delight and astonishment. Though they were actually three thousand feet below us, with more than two thirds of their height enveloped in vapor, there they were, seemingly rising for miles in perpendicular height above, and with a proximity that appeared fearful...

Here we were on the summit of one of the sublimest of God's own works, shut out from earth, and around us the mighty pinnacles of nature's glorious temple; the beautiful, grand, terrific and sublime commingling in most perfect harmony... The shades of night, caused us to leave, and we hurried our reluctant steps downward, and after a descent of about eight hundred feet, we found an overhanging rock, just large enough for three to creep under, affording some slight protection from the keen mountain air. This was to be our couch. From the dampness of the ground it was evident that the snow had not been melted long from here... Thermometer 40°. Mauna Loa bore s.w. true from us.

We found it impossible to sleep, the rarification of the atmosphere still causing faintness, until we drew our blankets over our heads. Up at sunrise, Thermometer 30°, and a fine bracing morning it was. My companions, not having seen the snow, disbelieved the guide's statement the evening previous, and started themselves to seek the summit. Having ascended the hill which the guide had pointed out, they found another arising two hundred or more feet above that, which after great labor they scaled. These hills are composed of loose sand, into which one slips knee deep at every step. The second one was frozen hard. This they found to be the highest point; it was composed of slag, lava, and gravel. The snow or rather ice lay in the chasms, in spots in masses ten feet deep, fourteen wide, and three hundred long. About five hundred-feet down, in a southerly direction, lay the pond of water [*Waiau*], the existence of which has been often doubted. It lies in the basin of a small crater, *and at a distance appeared green and slimy*. Having piled a cairn as a monument to their success, they returned in all haste to the camp. [Jarves, in *The Polynesian*, July 25, 1840]

In the issue dated August 1, 1840, Jarves continued his description of the trip to Mauna Kea, and discussion on varying accounts regarding the elevation of the summits of Mauna Kea and Mauna Loa; including the letters of Dr. David Douglas from 1833-1834. Jarves then described his party's descent to the Humu'ula Plains. It appears by the description of the route taken, that the party descended along Waikahālulu Gulch, as they describe a spring visited on the way down the slope of Mauna Kea:

Travelers have differed greatly in their estimates of the elevation of **Mauna Kea**. Some raising it even to 18,000 feet, while others reduce it to 13,615. Capt. Wendt, in 1831, makes it 14,055 feet. Considerable discrepancy seems to exist in regard to Mr. Douglas's measurements. In a letter to a friend in London, dated May 6, 1831, and published with his journal, he gives **Mauna Kea** an altitude of 13,851 feet. Mauna Loa 13,517 feet... Being unexpectedly disappointed in obtaining a barometer, we were not able to add any scientific measurements to the list given, and here as at other places on our route, were obliged to depend upon the dicta of others, or upon calculations as could be obtained from simple calculations paces, lines, &c., which was a source of great vexation to us...

Douglas speaks also of the "apparent non diminution of sound," as being a matter of astonishment to him. The case and distinctness with which we heard voices, and even conversation at long distances, was frequently noticed by us, also, the rapidity with which sound was transmitted.

Before my friends reached the camp, I had started with our men, to descend the mountain, zigzagging in a southerly direction. They were quite benumbed with cold, and it

was not until the sun had been up some hours, that they became sufficiently thawed to proceed with any vigor. The descent was exceedingly steep and toilsome. This side of the mountain was nothing but a vast pile of compact volcanic rocks, of all sizes, broken in every variety of shape, all presenting sharp sides, and jagged points, and thrown at random into a loose, sliding bed of gravel, which slipping from under our feet at every step, endangered our limbs by avalanches of rocks which it carried with it. After a few miles of such slope, the men discovered a spring [perhaps at Waikahalulu] of clear, cold water gushing out of the mountain to which we all hastened, having been upon an allowance of that article for the last twenty-four hours. Here the missing ones rejoined our party. Mr. C. had brought with him a handkerchief filled with snow, with which we turned too, and had a fine snow balling, while it lasted, pelting each other right merrily. Our Honolulu friends, puffing and panting with heat and dust, no doubt, would have envied us the occupation. The declivity proved equally steep, the whole way down, with soil enough to bear a few grasses, and a small species of *cassia* with a yellow blossom. Herds of bullocks were frequently seen, some of which were quite tame, and did not run until we approached within pistol shot. Before reaching the plain we were exceedingly annoyed by a strong wind suddenly springing up, which drove the sand in dense clouds before it, cutting our faces and blinding our eyes by its violence. The plain, bounded by **Mauna Kea** on the north, Mauna Loa on the south, and Mauna Hualalai on the west, and embracing nearly a third of the superficial extent of the whole island, appears to have been to most persons a “terra incognita.” On some of the earlier charts a swamp or morass is delineated as occupying much of this area, and even to this day it is but seldom visited, except by bullock-catchers. It is mostly a table land, gradually swelling from both sides of the island, until it attains an elevation of four thousand feet. On the south and east it is cut up by streams of lava, apparently of not very ancient date, which have flowed from the adjacent mountains. *Numerous small conical craters of exceedingly regular shape, and composed of slag and sand, dot these streams. As they approach Mauna Kea, vegetation commences, on a soil composed of sand and ashes, through which the volcanic layers occasionally show themselves, but not frequently enough to prevent a tolerable cart-road from running along by the base of the mountain. On this side, the plain, hills, and small craters, for many miles are beautifully diversified with groves of an elegant laurel, which we noticed no where else on the island, or indeed on any other of the group.* It grew in clusters of from thirty to forty feet in height, with small dark green leaves, delicate white blossoms, and branches that nearly swept the ground. Their foliage formed a graceful dome, impervious to the sun; while beneath was a green sward, free from all underbrush. Upon the whole they were decidedly the prettiest trees that we met on the island. The plain is too dry ever to become fertile, or of any value to the agriculturist, being like a sponge, so porous that water cannot remain upon it.

After leaving the mountain we traveled at a rapid rate for nine miles, the latter part through a driving rain, until we reached a bullock-catchers hut. It was a mere temporary shelter, thrown up by them while in their hunting excursions, but it proved a welcome haven to us. Having built a fire, dried our clothes, and supped on pork, which by this time had become quite lively, we laid down upon a bed of leaves, and enjoyed a sound night's rest.

July 3. — Rose at five o'clock. Thermometer 48°. Started our natives immediately. A mile's more traveling and the s.s.e., carried us clear of the laurel trees, and we found ourselves upon one of those mc'adamized tracts of Hawaii, yeleft “clinkers,” or in other words, volcanic streams, which in cooling have slit, cracked, tumbled, and burst into every jagged and irregular shape of which nature is capable. Here came the tug of war for our shoes, which soon gave out, but having four pair apiece in our baggage, we reshod ourselves, and hastened on. The native wore sandals made of raw hides, which requiring continual renewing, greatly delayed our progress. However, the “clinkers” were interspersed with some tracts of smoother lava, which at any other time we should have

thought bad enough, but now proved a most agreeable change from their rougher neighbors. *We occasionally came upon wild geese, which were very tame, and met with abundance of rain water in the hollows of the rocks.* At one o'clock we reached a tract of "clinkers," two miles across which was the very "blackness of desolation" itself. Just imagine the slag from all the forges and glass factories which have been in existence since the commencement of time, dropped in masses from the size of a small house to that of a marble, upon a plain like this; every mass being all points, every point sharp and cragged, and all uppermost, and you can form some faint idea of this highway. After pitching, twisting and tumbling over it, for two hours, to the eminent danger of our necks, and dislocation of our ankles, we came to better footing. We were now crossing the eastern spur of Mauna Loa, through a forest of dwarf *ohia* trees. The rain, which had been lowering all the morning, now began to pour, and soon thoroughly drenched us. At four o'clock we passed on our left, quite a lake of water, but owing to the storm could not stop to examine it. At five having found a cave, we concluded encamp for the night, having been on foot twelve hours, though owing to the badness of the road, we had not advanced more than fifteen miles. The cave was but three feet high, and a couple of rods in depth... [Jarves, in *The Polynesian*, August 1, 1840]

Ascent of Mauna Kea Recorded in Records of the United States Exploring Expedition

In 1840-1841, Charles Wilkes, Commander of the United States Exploring Expedition, traveled around the islands documenting various aspects of the natural and cultural landscape of Hawai'i. In 1841, members of Wilkes' party traveled to the summits of both Mauna Loa and Mauna Kea. The narratives below (Wilkes, 1844, reprint of 1970), describe the approach to Mauna Kea via the trail from Hilo, passing through Pi'ihonua, to the upper reaches of the Wailuku River; across Humu'ula, and on to the summit of the mountain. Wilkes' narratives also include observations made by the traveling party of the nature of the forest at various elevations; native practices associated with bird catching on the mountain lands; the danger presented by wild cattle on the mountain lands, and the residence of cattle hunters in the Humu'ula-Keanakolu vicinity mountain lands, and the saw mill of James Castle, formerly situated at Kapahukea in the Pi'ihonua forest, near the boundary with Humu'ula:

...During the time of our residence on Mauna Loa, Dr. Pickering and Mr. Brackenridge volunteered to make the ascent of ***Mauna Kea***. They were furnished with guides, among them Sandwich Jack, our bullock-driver, whose true name I believe was Dawson, though he went by the sobriquet of Billy Lilly. They set out on the 8th of January, attended by natives from Hilo, belonging to Kanuha, having agreed to pay each of them fifty cents a day. Their first stage was to the sawmill erected on the Wailuku, distant about seven miles from Hilo, and three miles within the verge of the forest: here they stopped for the night with a man by the name of Simons, who is the occupant of the mill, which belongs to a Mr. Castle. The mill, as I understand, had proved but a bad speculation: it is now out of repair, and there is not sufficient demand for boards to make it at all profitable...

...On the 10th of January they resumed their journey, and followed the "Long Road" for about two miles, which is the whole distance to which it extends; the removal of the chief who was engaged on it had put a stop to its further progress. They were now fairly in the forest, [Wilkes 1970:199] which was thought by our gentlemen to be a fine one; it consisted altogether of two kinds of trees, the *ohea* (*Callistemon*), and *koa* (*Acacia*); they also met with several species of the tree-fern, which seem to vie with each other in beauty. Many of these were of genera and species that had not before been met with, one of which afforded the silky down before spoken of, and another, the edible fern, a drawing of which will be seen at the end of this chapter. On reaching the bed of the stream, which is one of the routes through the wood, the guides led them upon it. *As they proceeded, they overtook one of the boys who had preceded them, endeavoring to catch a large bird. He had armed with bird-lime one of the pendent branches of a small ohea tree that overhung the stream and was in full flower. As they were passing, the bird was seen*

hovering about, while the boy was slyly watching its movements. When they had passed it a short distance they heard the scream of the captured bird, but by some mishap it afterwards escaped.

Their encampment was under an *ohea* tree, where the natives built a hut for them with boughs and the fronds of ferns. From the prevalence of heavy rain they found all the wood wet, and could not succeed in making a fire: they consequently passed a miserable night; for in almost any climate, when encamped in the open air at night, a fire seems to be necessary for comfort, particularly when the weather is wet.

Conglomerates were the most frequent rock in the bed of the stream. This rock had not been met with on the trip to Mauna Loa; and on diverging from the stream, the compact rock of that mountain seemed to prevail.

Their guide, Dawson, during the morning showed much alarm at their starting some young cattle, lest the old cows should be near, who he thought might be troublesome: the cattle, however, were discovered afterwards to be tame. *At the forks of the stream they took the left branch, and after a walk of two miles, came to some huts occupied by natives who had been bullock-hunting. In this illegal practice they seem to have been extensively engaged, judging from the quantities of jerked meat they had on hand.*

The cattle have been tabooed for five years, from the year 1840, in consequence of the slaughter that had been made among them. Upwards of five thousand hides, I was told, had been procured in a single year, and when this became known to the government, it interdicted the hunting of the animal. I heard no estimate of the number of the wild cattle, but they are believed to be very considerable, and all from the stock left by Vancouver in 1795.

From these natives they procured some jerked beef, and were told [Wilkes 1970:200] that ice had formed there the night before. The effects of frost on the foliage was evident, and yet the elevation did not exceed five thousand feet.

They encamped at night in an open space in the woods, near *some shallow pools called the Duck-Ponds [Wai-koloa]*, from the quantity of these birds frequenting them. The ground was chiefly covered with tufts of a small *Carex*. The trees now began to appear gnarled and covered with moss, resembling oaks in habit. The ground had become much drier, and the brushwood was gradually disappearing.

On the 12th, they started at sunrise, and by eleven o'clock found they had cleared the forest. Their altitude was about six thousand feet. The woods had become for some time previously much scattered. They passed also a distinct lava stream, of no great size. The ground was frozen, and the pools of water were covered with a thin ice.

This upper part of the forest afforded a greater variety of trees, though of smaller dimensions: here they met with the false sandalwood (*Myoporum*); the *koa* was, however, still the principal tree.

To the forest succeed the plains; but why this region should be so termed, our gentlemen were at a loss to conceive, for there is an ascent, although gradual, towards the base of the higher peaks; and there are, besides numerous conical hills, varying in height from two to eight hundred feet: even between these the surface is undulating, and cut up by ravines.

This district is famous, according to report, for the number of wild cattle found on it, and from that circumstance would be supposed to produce fine pasturage; but this is far from

being the case, for there is nothing but a few scattered tufts of grass, and a species of *ranunculus*, which is of so acrid a nature that the cattle will not eat it. The prevailing feature of the country is aridity, and concealed rocks cover a great part of it. Shrubs seem to be almost absent, but the scattered *mamane* trees are every where conspicuous.

It was now evident that their guide had taken them a wrong route, having pursued that leading across the island; they therefore changed their course, and took a direction to the northwest, crossing the country for an eminence, where Mr. Castle, (the proprietor of the mill,) formerly had a station. When they reached it, they enjoyed a fine view over the distant forest, with the bay of Hilo and the sea beyond; the day being clear, the whole extent was distinctly visible; even a small vessel, which had sailed for Oahu, was seen going out of the bay.

They chose their encampment just above this eminence, under a [Wilkes 1970:201] projecting ledge of lava: close by there were several pools of water. Such pools form in the compact lava; and where this rock occurs, water is to be met with at intervals, while in the porous lava none is to be found.

On the 13th, they set out at an early hour, and passed a belt where the vegetation became very rich, and the variety great, particularly on the sheltered banks of the ravines. Among the plants were several Compositae, two or three with decussate leaves, *Pelargonium Douglasii*, five or six species of ferns several *Rubiaceae*, grasses and other small plants.

About three miles beyond this, they reached a cave, where they intended to leave the natives and baggage. It was difficult to induce the former to come up even thus far, on account of the cold; but being here in the vicinity of wood, they were enabled to have a fire to keep themselves warm; water was also at hand. This cave was a convenient rendezvous, and sufficiently near the top to allow them time to reach it and return in a day. Some of the natives had gone down to a larger cave, three quarters of a mile below.

A few wild cattle were to be seen in the distance; but, according to the report of Dawson, their guide, they ought to have heard from this position cattle lowing in every direction.

On the 14th, one of their guides was sent off after a bullock; Kanuha, the chief, having granted permission to the party to shoot one.

Dr. Pickering, Mr. Brackenridge, and Billy Lilly, set out for the summit. When about three miles above their rendezvous, and having the high hill of red scoria to the south, they entered upon a plain, of many miles in extent. On reaching this, the vegetation of temperate climates almost at once disappeared, and an Arctic flora succeeded. This plain is made desolate by stones, gravel, sand, scoria, and boulders; a few scanty blades of two sorts of grasses (*Aira and Panicum*), and one or two stone-mosses, were all the verdure, if such it may be called, that was seen. The whole plain resembled the dry bed of some great river over which the water had passed for ages. There was no appearance of lava streams or clinkers, as on Mauna Loa. In the distance rose six peaks, around whose bases were rough blocks of lava, while towards their tops scoria of a red colour, with gravel, prevailed.

On their way, they passed through a gap to the southeast of the three terminal hills, where stood the stone pen, said to mark the place where the Rev. Mr. Bingham was once lost. The terminal peaks were found steep and very fatiguing to ascend; and when they reached the [Wilkes 1970:202] summit, they took shelter under a pile of stones – the same that Douglass speaks of...

The highest peak of **Mauna Kea** is the southernmost; but our gentlemen did not visit it, proceeding to the western side of the mountain, until they obtained a view of the slope to the northwest and north. The lake spoken of by Mr. Goodrich, which lies in the direction of the highest peak, was not visited.

Mauna Loa and **Mauna Kea** differ essentially, both in form and apparent composition. Mauna Loa, as has been seen, is one mass of lava streams for the distance of four or five thousand feet from its summit; while **Mauna Kea** is found to consist almost entirely of scoria without any craters, unless the conical hills spoken of can be so considered; which is probable, for they are represented as cup-shaped on top. Vegetation on the one ceases at about seven thousand feet; while on the other it is continued to twelve thousand, and a few scattered plants may even be found within a few hundred feet of the top of **Mauna Kea**. The plants also differ; the *mamane* occupies a belt eleven thousand feet high, while none of this plant is to be found on Mauna Loa.

On their return, they determined to proceed to the lower cave, where the natives had taken refuge.

On the 15th, they concluded to descend, after making a tour on this same level, where they found the ground as barren as on the route by which they had ascended. Small herds of cattle were seen, but at a great distance apart; these have now become shy, from having been hunted by Spaniards with horses from California, which were imported for the express purpose of carrying on systematically the business of killing the cattle for their hides. These hunters would soon have exterminated them. [Wilkes 1970:203]

The golden plover is very abundant on the plain, as every where else; but is said to quit the islands in the breeding season. No geese were seen on this mountain; but many small birds appeared as high up as the mamane trees. They also saw hawks, which, by a perversion of language, are called "crows."

They then went towards "Ned's House" (now deserted), and took the path leading in a southeast direction, along the margin of the woods. This was the route that Douglass followed, when he left Ned's House, on the morning of his death. In about three quarters of an hour, they arrived at the pits; in one of which he was found dead. They are situated in an open clearing, in the centre of which is a low marshy spot, sometimes containing water, which the cattle come in search of. The annexed diagram [Figure 7] will give an idea of the locality. These pits are covered with raspberry and other fragile bushes; which are covered again with soil, and the hoofs of cattle imprinted on them, to deceive.

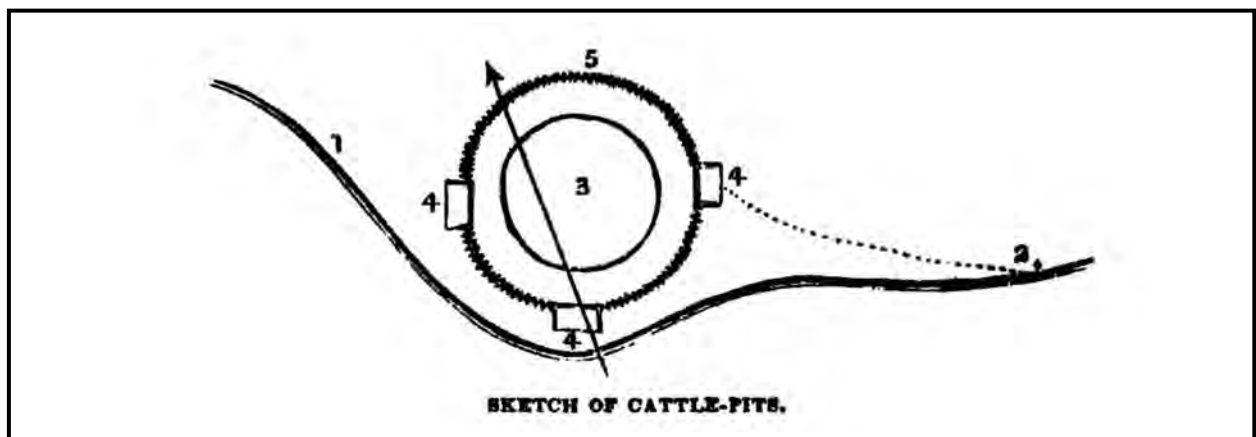


Figure 7. Sketch of Cattle-Pits – Keanakolu Vicinity (Wilkes 1970:204)

[Notes to Sketch]

1. Path leading from Ned's House.
2. Place where Mr. Douglass left his bundle and dog. Track towards the pit in which he was found with the bull, gored to death.
3. The pool of water.
4. The three pits.
5. The fence which surrounds the pool and compels the cattle to pass over the pits.

The locality of these pits is in a dell, with banks sloping on both sides; the one to the northwest is about twenty feet high, while that to the southeast is about thirty feet. On each side, both above and below, thickets close the dell.

These pits are about seven or eight feet long, and four feet wide, and are walled up; they are placed broadside to the water.

There were many circumstances attendant upon the death of Douglass, leading to the suspicion that he had been murdered by Ned, at whose house he had breakfasted. The general character of Ned gave rise to a feeling that such was the fact, he having been a runaway convict from New South Wales. It seems somewhat singular that Mr. Douglass should have laid down his bundle and returned after passing the pits; and it is remarkable too that his servant, who had parted from him the same morning, should also have perished. [Wilkes 1970:204]

Ned's conduct afterwards was not a little suspicious, for he mentioned he had warned Mr. Douglass against the dangers of these pits, and had accompanied him to within a short distance of them. So strong were the suspicions against him, that a post-mortem examination took place by Drs. Judd and Rooke; but nothing could be elicited, for all the wounds were such as Mr. Douglass might have received from the animal. Few deaths could be more awful than that which he is supposed to have suffered.

Bullock-hunting seems to partake somewhat of the dangers of the chase of wild beasts, and has much of its attraction. Many stories are related of natives having been tossed, gored, and carried on the animal's horns for hours, and from these reports the natives are easily alarmed with the appearance even of a half-tamed animal, as we had abundant reason to observe on our way up Mauna Loa.

A story was related of a native, who, having prepared a pit, succeeded in entrapping a large bull, but became so excited at his success, that he slipped and fell in himself; however, being armed with a knife, he succeeded in killing the animal; when discovered both were dead.

Mr. Castle had three ribs broken, and Ragsdale, our old guide, a leg fractured, while hunting; and many other rencontres, partaking too much of the marvelous to be repeated here, were told me.

They encamped for the night in an old bark hut, in the line of woods. The 16th was rainy, but they continued their way down the mountain in a north-northeast direction, passing through the woods. The path was wretched, and full of mud and mire. The last part of the way the trees became more numerous, and consisted, besides the *ohea* and *koa*, of the *Ilex*, *Aralia*, *Myoporum* (false sandalwood), several *Compositae*, a *Silene*, and four or five species of *Lobelias*, with handsome flowers, mostly blue. *Lower down, near a deserted*

hut, they unexpectedly found a mamane tree, which they were told had been painted for the purpose of enticing the birds.

From scrambling over roots and through mire, they were much fatigued before they reached Puahai [Puuohai]. This village contains a few straggling houses on the table-land; it is distant about two miles from the sea and twenty-five miles to the northwest of Hilo. The natives here appeared to be much more primitive than they were in other places, and had had but little intercourse with strangers. It was with some difficulty that provisions could be procured; a dollar was demanded for a turkey, and four needles for a chicken. No more than three of the latter could be found in the village. Their guide met with considerable delay in getting the necessary quantity to supply the [Wilkes 1970:205] party. At Puahai they were permitted to occupy the school-house, and remained over Sunday... [Wilkes 1970:206]

The Mauna Loa Eruption of 1843

Titus Coan, who replaced Joseph Goodrich at the Hilo mission station, traveled across the mountain lands between Mauna Kea and Mauna Loa in 1843, and visited the Mauna Loa eruption vent. In his letter of April 5th, 1843, we are provided a description of the region:

April 5, 1843

Hilo, Hawaii

Titus Coan; to Bro. Armstrong:

...I am touring in these days & have little time to write. Just returned from Hilo & am off day after tomorrow to Puna, if the Lord will.

I have also been to Mauna Loa with Bro. Paris, & explored the new eruption. We went up through the forest, directly in rear of our station, and came out at the foot of M. Kea. The eruption has flowed from the summit of M. Loa to the base of M. Kea, where it separates into two [page 2] broad streams, one flowing towards Waimea & the other towards Hilo. Another great stream has flowed along the base of M. Loa towards Hualalai in Kona. These streams are still flowing, & their progress is 25 or 30 miles from the crater on the top of the Mt. The quantity of lava, is immense. Many miles wide and the whole scene is wonderful. We followed the stream to the top of the Mt. through cold, snow etc. etc. Two great active craters in close contiguity — near the summit. Lava does not flow over these craters now, but is conveyed down the side of the mountain in a subterranean duct from 50 to 100 feet below the surface at the swift rate of 15 or 20 miles an hour. We saw this awful river of fire by looking down through openings in the surface. We also crossed & redressed it several times & travelled up the mountain directly over it for a long distance, like ascending a river on the ice. Peril [page 3] exposure & indescribable fatigue attended our way, and I go slip-shod, carrying the mark of the journey in my body to this day, 3 weeks later. But what we saw amply renewed us for all & to God be ascribed the promise of our safe return. I have only hinted at the matter here. Cannot describe it now... [page 4; A.B.C.F.M. Collection, Houghton Library, Harvard]

Ascent of Mauna Kea and Travel Across the Mountain Lands (1845-1848)

In 1845 and 1848, Titus Coan again wrote to the mission headquarters, providing them with detailed descriptions of travel to Mauna Kea and the nature of the landscape on the adjoining mountain lands. Coan seems to have been truly inspired by the natural beauty of the land, the grandeur of the scene from the summit of Mauna Kea, and provided readers with significant descriptions of the forests, travel through the various regions of the mountain; and the growing presence of wild cattle:

Hilo Sand. Islands

April 17, 1845

Titus Coan; to Rev. D. Greene:

Yours of Apr. 29, 1844 is before me... My last report to your Committee, was embodied in a letter of 4 sheets, addressed to yourself, & dated May 3, 1844. An unusual length of time has lapsed between my last & the present date; but I have been so fully & pressingly occupied during the year as hardly to mark "the flight of time," and it is only by a recurrence of dates, that I can be persuaded that so long time has past since I last wrote you... [page 1]

During the last 10 months I have made six tours among the people of my charge, all of which have been blessed, & some of them richly so. My former practice of frequently calling the role of the Chh. & of enquiring after each individual member, has been continued with profit. Besides these tours I have visited the stations of Waimea & Kohala in company with Brothers Paris & Hunt, who, with their families spent a few weeks with us at Hilo. *On returning from this tour we passed over the summit of **Mauna Kea**, making a straight line from Waimea to Hilo. Our first day from Waimea brought us 2/3 of the way up the mountain, where we slept in a gorge among the rocks, the precipices sheltering us from the winds. On our way we saw numerous wild cattle roaming on the sides of the mt. We also, in addition to the bones which lay every where bleaching in the sun, saw many dead carcasses of bullocks which had fallen & perished in the ravines while searching for water among the gorges of the mountain. These carcasses were strewn all the way from the foot of the mt. to its snow clad summit, far from the region of vegetable or animal life. On the second day we reached the summit & surveyed the sublime & boundless [page 30] prospects which opened around us. At our feet lay the high & broad plain of Waimea sprinkled with its plantations & villas. Just rear of this, rose the green wooded mountains of Kohala, & still farther north & over topping the latter swelled the dark & lofty dome of East Maui. On the west slept the quiet waters of Kawaihae Bay, and while we were looking down upon them, a little schooner spread her white wings to the zephyr & moved off like a swan upon an unruffled lake. On the south the towering summit of Mauna Loa, rose in majestic & peerless grandeur mantled at its base in a drapery of fleecy clouds, from whose undulating & convolving folds, it lifted its lofty elongated, curvated & ebonised summit, like a vast whale from the bosom of the deep. A little to the right of this, & like a stripling beside his hoary sire, stood Hualalai, the loftiest mountain of Kona. On the east, & just under our feet, slept the quiet waters of Hilo Bay, with the little mirroring lakes, the silvery creeks & the dashing cascades, sparkling like so many gems amidst the dark, the soft, the bright green foliage, & adding fresh charms to the inimitable beauties of this brilliant landscape. Encircling us on every side, as with a silver girdle, were the wide waters of the illisuitable sea. [page 31]*

Upon these lofty heights, under the vaulted heavens & amidst these awful & eternal solitude, unbroken except by the moaning winds, the howling tempest or the roaring thunder, when the cloudy chariots of Jehovah roll sublimely over these mountain tops. I say, here we stood, & gazed upon the awful, the sublime & the over-powering grandeurs above, beneath & around us. Here we stood, and amidst these inspiring scenes, contemplated the wonders of that skill & the majesty of that power whose right hand spanned & garnished the heavens, laid the foundations of the earth, reared up the everlasting mountains & measured the waters of the great deep. Here we stood, amidst these eternal snows & these everlasting solitudes, untrodden by the foot of any living thing, & unbroken by the voice of song, & surveyed the wondrous works of Him who is mighty in Power, and felt how impotent, how insignificant is man.

But an oppressive headache, a labored respiration & an almost insupportable languor, arising from the great rarity of the atmosphere, admonished us to seek a lower place

among the works of our Creator, & reminded us of the folly & danger of attempting to climb too giddy heights, and also of the calm, severe joy, & the true wisdom of the lowly minded.

The summit & sides of this mountain are thickly [page 32] studded with conical hills from 100 to 600 feet elevation. On the sides of the mountain, below the line of snow, these hills are covered with vegetation & animated with wild cattle & birds. On the summit they are naked & composed of scoria, sand, pumice stone & earthy matter, mostly of a red color, & under the rays of a morning sun appearing as if highly ignified. Besides the various volcanic productions of the mountain, such as scoria, slog, ashes, cinders, sand, pumice stone, earth, vitrifications &c. &c., we also saw considerable quantities of primitive rock on its very summit.

At evening we descended a little distance on the eastern side of the mountain & slept upon the rocks in a ravine, once occupied for the same purpose by the enterprising & lamented Douglass. Here we found a little wall built by Mr. D. to break the wind, & also a quantity of wood which had been carried to this height of the mt. for his use, & which was a cheering sight to us, as it enabled us to keep up a good fire all night, which added greatly to our comfort in this region of bitter cold. The next morning we had a splendid view of the valley of Hilo, covered at first with fleecy clouds, & appearing like a sea of foam, which, as the sun rose upon it, glowed with prismatic tints. Near the base of the mountain we regaled ourselves with delicious [page 33] strawberries, ohelos, & what I had not before seen since leaving America, genuine N. England whortleberries. Leaving the mountain, we entered the forest, & following the bed of the stream by which Bro. Paris & myself ascended to view the great eruption of Mauna Loa in 1843, the next day at 8 P.M. we arrived safely at Hilo... [page 34; A.B.C.F.M. Collection, Houghton Library, Harvard]

March 15, 1848

Hilo. Sand. Islands

Titus Coan; to Rev. R. Anderson:

...In my last I gave you some account of the recent volcanic eruption on Mauna Loa. The present communication, is designed as a continuation of the same subject; as a subsequent visit to the mountain, & a pretty thorough exploration of the scene described, will furnish some additional facts of interest. On Mond. the 6th Bro. Paris & myself, set off for the mountain at 3 P.M. We did not take the usual rout, taken by Capt. Wilkes & others, via Kilauea, but bent our course directly for the stream of lava, as it was seen flowing on the high plains between Mauna Loa & **Mauna Kea**. Our general course was W.S.W. and our path lay through a mighty forest, so interwoven with jungle as to render it impenetrable in most places.

As the season was peculiarly dry we chose for our path the rocky bed of a river, called the river of destruction [Wailuku], from the quantity & the fearful rage of its waters, during seasons of great rain. The stream was now so low that we could pass up its bed & under its banks by leaping from rock to rock, frequently crossing from side to side, & now & then, ascending its banks & beating our way for a short distance through the brush wood, to avoid deep water, perpendicular precipices, or the accumulated masses of drift wood, consisting often of majestic trees, which had been torn violently from their places, & with roots, trunk & branches, carried down the stream to some narrow pass, where their [page 1] progress was arrested by the approaching banks, by vast rocks or by a sudden bend in the stream, and thus leaving them as impregnable *chevaunx defrise* against the traveller. On the first day of our journey we advanced but 7 or 8 miles as we started near evening and slept in the out skirts of the forest.

On the second day we entered the bed of the stream and pursued our romantic course along its serpentine and rocky channel & between its precipitous & often overhanging banks which sometimes presented frowning battlements of dark, naked lava, and sometimes retreated in graceful hopes of luxuriant soil, adorned with trees, shrubs, vines, & parasitical plants, or spread with a splendid carpet of soft velvet moss. In this lofty & deep forest, & amidst these everlasting solitudes, unbroken except by the gurgling of the watered stream, the dashing of the cascade, or the mighty rush & the deep thunder note of the mountain torrent, and I should add, by the enchanting notes of the ten thousand songsters whose jocund strains, seemed to fill every leaf, & shrub & tree with animated joy. I say, in these deep & spirit soothing solitudes, we pursued our quiet way, till the out stretching shades of evening admonished us, to prepare for repose. Our whole party consists of nine, viz. 7 natives, Mr. Paris & myself. We halted, &, on a little terrace or niche in the bank of the river, we soon formed a booth of branches & ferns, where, after partaking of our welcome repeat and blessing Him who is ever present, ever felt...

...Early the next morning which was Wednesday, we pursued our way up the stream, and at noon found [page 2] ourselves fairly out of the forest with the lofty summit of **Mauna Kea**, rising in hoary grandure before us. We were now at its base, & in the high open country occupied by herds of wild cattle. We now went our course S.S.W. over a beautiful rolling country, sprinkled here and there with clumps of low, spreading trees, which looked like orchards in the distance. Our way was along the upper skirts of the forest, having **Mauna Kea**, with its numerous peaks and lateral craters, on our right. At evening we came in full view of Mauna Loa, bearing S. by W. from us. We pitched our tent under an ancient crater, 400 feet high & now covered with trees & grass. Here we had a splendid view of the great terminal crater on the summit of the mountain, about 25 miles distant, and also, of the vast flood of lava which had flowed down the northern side of the mountain to the plains below, some part of which, lay burning at our feet, say distant 4 or 5 miles.

We were now 7000 or 8000 feet above the level of the sea, and, as we stood upon these elevated hills, we could see the dark clouds gather & the lightening blaze below us, while the deep toned thunder rolled at our feet. At the same time a storm of hail spread along the shore, & fell upon the station at Hilo. This was the first hail seen at our station since we have been at the islands. The same evening, at twilight a smart shock of an earthquake, which lasted 30 seconds, added to the sublimity of the scenes around us, while a blazing comet hung over us in the vaulted sky. As darkness gathered around, the lucid fires of the volcano began to glow with fervid heat, & to gleam upon us, from the foot of **Mauna Kea**, over all the plain between the two mountains, and up the side of Mauna Loa to its snow covered summit exhibiting [page 3] the appearance of vast and innumerable furnaces, glowing with intense vehemence, & throwing out a terrible radiance around them.

During the night we had thunder & lightening, and in the morning both mountains, were beautifully mantled in snow, from their summits nearly to their bases. It was now Thursday, and we left our encampment & proceeded 3 or 4 miles toward the new stream of lava, and again pitched our tent on the side of an old crater 200 feet high, & covered with trees & shrubbery to its summits but surrounded at its base by a vast field of naked scoria of the most jagged character, the deposit of some former eruption which had flowed around the little fertile hill, & left it like an island in the ocean, or like an oasis in the desert. Leaving our natives, to prepare our encampment & to collect fuel, water &c. we set off for the nearest stream of active lava, distant about 2 miles. Our road was over through jagged lava, thrown up in tumultuous confusion, but we soon made our way to the molten stream, & thrusting our steps into the viscid mass, took out & cooled specimens which we brought home with us.

You will understand that we were now on the great plain between Mauna Loa & **Mauna Kea**, about 7000 feet above the level of the sea, not having yet commenced the direct ascent of the mountain. On this plain, between the bases of the two mountains, we spent the day in traversing, & surveying the immense streams of fresh scoria & slag which lay smouldering in wild confusion farther than the eye could reach. Some cooled, some half cooled, & some still in a state of igneous [page 4] fusion. The scoriform masses, which formed the larger portion of the flowings, lay piled in mounds, & extended in high ridges of from 30 to 60 feet elevation above the subterranean on which it rested, & forming a barrier so indescribably jagged & rough as to be nearly intraversable. It seems as if this vast sea of earthy & rocky fusion, had been suddenly solidified while in a state of the most tumultuous action. Besides these high & broad ridges of scoria, there were parallel streams of slag, solidified on the top like ice on a river. This was smooth, of lustrous black, & in viscuscent state, forming the superincumbent crust to a river which rolled beneath, and which betrayed its burning course at innumerable cracks & seams & blow holes in which the fiery fluid was seen, or through which it was vomited in gory jets. We spent the whole day in exploring this vast sea of lava, and were astonished at its immense area. In rolling down the side of the mountain, one broad stream, had that off in a westerly direction towards Kona. Another mighty river had flowed northward till intercepted by the base of **Mauna Kea**, when it divided into two branches, one, flowing in a north west direction towards the plains of Waimea, & the other arm, stretching N.E. & flowing towards Hilo. These three main branches united, would probably form a river 5 or 6 miles broad, & the most extended of them cannot I think, have progressed less than 25 or 30 miles. They are all still flowing, but their progress, at present, is slow, as they are on a vast plain, and as their velocity is retarded by fissures & caverns & by fields of old scoria which covers those high regions... [page 5; A.B.C.F.M. Collection, Houghton Library, Harvard]

The New Mountain Road Being Constructed in 1849-1850

In 1849, Coan informed the mission headquarters that improvement on roads of the island were being made, including construction on a road that would more directly connect Hilo to Kona:

Hilo, Hawaii

August 4th, 1849

Titus Coan; to Rev. Anderson:

...On my last tour I was delighted to see the improvements recently made in the roads. In Hilo, steep, rugged & almost impassable precipices, have been cut into zigzag roads that may be safely traveled on horse back. The sides of nearly all the ravines in the district (70 or 80) are thus wrought and the comfort of travelling is thus greatly increased. But bridges are yet wanting in times of great rain, the rivers still rush madly on defying the passage of horses and challenging man to attempt it at his peril.

Roads have also been constructed through some parts of Puna. When completed as is contemplated the whole line of villages on the shore may be visited on horse back, a thing which has never yet attempted to do. Other roads are being opened in different parts of the island. *Besides these above labors, a grand road is contemplated across [page 11] and commenced, leading directly from Kona on the west, to Hilo on the east side of the island. On passing over the high regions between **Mauna Kea** and Mauna Loa, a distance of about one hundred miles.* When these public improvements will be completed we cannot predict but we rejoice to see them commence with a good degree of zeal & energy.

A beautiful volcanic eruption took place in April in one of the deep craters on the summit of Mauna Loa. For a long time it rose from the top of the mountain, " a pillar of cloud by day & a pillar of fire by night." From its great depth & amplitude of the crater the fumes never rose above its rim and consequently did not flow off. It is now nearly extinct. Old

Kilauea also, has been restive of late. For several months the fire goddess slumbered but it was only to renew her strength. There has been times during the past months when her awful throes shook the earth; when her burning mouth & nostrils vomited forth fiery streams; when her deep mutterings & infernal hissings, startled the passing traveler, & when her explosive thunders, were heard at the distance of 15 miles... [page 12]

August 7th. The King which has been at Hilo several days. They have been touring on the island for a number of weeks, have visited Kona & Kau, Kilauea & the summit of Mauna Loa, & they will spend two or three weeks at Hilo. A large concourse of people assembled today & were addressed by the King, the Minister of finance & the governor of Hawaii. Admirals Tromeline & Suit were present on the occasion, attended by his whole Band of musicians who entertained the company with "God save the King," "Hail Columbia," and a number of such airs... [page 14; A.B.C.F.M. Collection, Houghton Library, Harvard]

Hilo Sand. Isl.

May 6, 1850

T. Coan; to R. Anderson:

...It is encouraging to witness the progress which is being made in the construction of roads through out the islands. *A high way, is now being brought from Kailua to Hilo across the centre of the island, the greatest elevation of which will be some 10000 feet.* A horse road, encircling the island is also being constructed near the shore. [page 6]

Besides these, local & shorter roads, are being made or improved at many points in and around villages etc. Comparatively easy roads have been cut, zigzagging, or on the principle of inclined planes united by angles, up and down nearly all the precipitous banks of our gorges in Hilo. This work has greatly lessened the toil & the danger of travellers in passing through our district. The improvement on the old, torturous, rough, precipitous, slippery, exhausting & dangerous foot paths, is truly great & cheering. But the rivers! These still remain. And they often rush, & roar, and rage & leap their awful precipices as fearfully as ever. Four bridges—all which had been constructed in Hilo—were totally swept away by a recent freshet with their abutments & all that pertained to them. This is an unpropitious beginning. Whether any but suspension bridges, can be made to stand over our main streams, is a question... [page 7]

The Mountain Lands Visited During the Eruption of 1852

In 1852 another eruption broke out of Mauna Loa. Titus Coan visited the lava flow and eruption site, and provided graphic descriptions of the activities and changes in the landscape resulting from the lava flows. Coan's accounts are of particular interest as he describes the route taken to the uplands, as an old one, and observes that he was in the company of several native guides, whom he named. The foremost guide, Kehau, was an old bird catcher and bullock hunter, who frequently traveled in the uplands. Coan also described the plateau lands between Mauna Kea and Mauna Loa, and experiences with bullocks on the trail.

March 3, 1852

Hilo, Hawaii

Titus Coan; to Rev. R. Anderson:

You will be patient with my repeated communications. On the 30th of Jan. I wrote you 2 sheets & on the 12th of Feb. 2 sheets more.

Another theme will accompany this.

The trumpet again calls our attention to the mountains.

At ½ past 3 on the morning on the 17th Ult. a small beacon light was discovered on the summit of Mauna Loa. At first it appeared like a solitary star, resting on the apex of the Mt. In a few minutes its light increased and shown like a rising moon. Seamen keeping watch on deck in our harbor, exclaimed, "What is that? The moon is rising in the west!" In 15 minutes the problem was solved. A flood of fire burst out of the mountain & soon began to flow in a brilliant current down its northern slope from the same points in the same line with the great eruption which I visited in 1843. In a short time immense columns of burning fusion were thrown up apparently 300 or 400 feet heavenward, flooding the summit of the mountain with light and gilding the firmament with its radiance. Streams of light came pouring down the Mt. flashing through our windows & lighting up our apartments, so that we could almost see to read fine print. When we first awoke so dazzling was the glare on our windows, that we supposed some building near us must be on fire, but as the light shined directly into our dormitory & upon our couch we soon perceived that it proceeded from a volcanic eruption. In two hours the molten stream had rolled down the side of the mountain, as we judged about 15 miles. The eruption was one of terrible activity & surpassing splendor. But it was short, in about 24 hours all traces of it seemed extinguished.

While it was in action, I felt intense desire to visit it & was actually making arrangements to that effect but when it stopped all my interest left with it.

Our slumbers however were soon broken. At day break on the 20th were again startled with a rapid eruption bursting out laterally about half way down the mountain, & exactly facing Hilo, so that we could again see it through the windows of our dormitory. This crater seemed equally active with the one on the summit, and in a short time we perceived the molten river flowing from its orifice direct towards Hilo. [page 1]

The action became more & more fierce from hour to hour; floods of molten lava were poured out of the orifice in the side of the mountain, & the burning river soon reached the woods at its base, a distance some 20 miles. Clouds of smoke ascended & hung like a vast canopy over the mountain, or rolled off upon the wings of the wind. These clouds were murky blue, white, purple or scarlet as they were more or less illuminated from the fiery abyss below. Sometimes they assumed the figure and the hue of a burning mountain inverted with its apex pointing to the orifice over which it hung; & sometimes after shooting up several degrees vertical the illumined pillar made a graceful curve & swept off like the tail of a comet farther than the eye could reach. The whole atmosphere of Hilo assumed a lucid appearance, & the sun's rays fell upon us with a yellow silky light. Clouds of smoke covered over the ocean, carrying with them ashes, cinders, etc. which fell upon the decks of ships approaching our coast. Ashes & filamentous vitrifications, called "Pele's Hair" fell thick in our streets & upon the roofs of our houses; while I write the atmosphere is in the same sallow & dingy state, & every object looks pale & sickly. As the vibescent filaments are falling around us, & our children & the natives are gathering them up.

So soon as this second eruption broke out I determined to visit it. Accordingly, arrangements having been made & Dr. Wetmore having consented to go with me, we set out at 5 P.M. on the 23rd of Feb. and went up to a little village 5 miles distant, & in the outskirts of the great forest which separates Hilo from the mountains. This we did in order to take an early start on the next morning. Our party consisted of Dr. W. & myself, and 4 natives, viz. Kekai (the Sea), Makuaole (no parent), Hau (Dew, snow, iron, or robbery) & Puaa (Swine) alias Keakuamanaole (God not Almighty). *Kehau was an old fowler in the woods & bullock hunter in the mountains. Accordingly he was our guide.* We took a track different from the one we pursued in 1843 and one which I never travelled before. It was through a dark and dense forest of 30 miles breadth and so completely intertangled with ferns, vines, brambles, and every species of tropical jungle that no animal but now had

ever attempted to penetrate it & he only by cutting & beating his way, yard by yard with axes, long knives & clubs. In former years a winding Indian trail had been beaten through this thicket, but by 12 or 15 years neglect it had grown up with jungle so that most traces of the old path were nearly obliterated.

However, early on the morning of the 24th we plunged into the thicket with sword knife, hatchet, clubs etc. and with incredible labor & fatigue we beat our way about 12 miles during the day, or about one mile an hour. Though wearied & retarded we were nevertheless delighted with the variety & luxuriance of vegetable life in these wild regions. Many of the trees were enormous, & the shrubs & plants were of gigantic size among their species. One fern measured nine feet in circumference & we judged it to be 40 feet high & holding its size remarkably to the height of 30 feet. But we must beat the bush & not stop to describe it. At night we made a little vault of bushes & ferns & slept; the roar of the distant & now invisible volcano constantly sounding in [page 2] our ears.

On the 25th we were early on our feet beating our way through jungle & dell, & amidst by a break all distant prospect being shut out by the lofty & dense forest.

At noon we joined a narrow elevated ridge from which we could overlook a portion of the woods, & to our surprise saw that the igneous river from the Mt. had already swept half through the forest towards Hilo, & was now exactly opposite us on the left, distant about 6 miles. The fiery flood was rolling steadily on sweeping the forest before it & sending up volume after volume of lucid smoke. Like an immense fiery serpent it moved relentlessly along its sinuous way, overcoming all obstacles & devouring all forms of life in its track. We halted—deliberated, Dr. W. determined to return immediately to the station, chiefly on account of Mrs. W. who was in feeble health... Taking one native with him, & leaving 3 to proceed with me, the Dr. returned, while I pushed my way through the thicket, sometimes mounting a jagged & crested ridge whose top was not wider than a horses back, & again plunging into a deep dell or dark gorge into which day light could hardly penetrate. At night we again slept in the forest but on an eminence where we could distinctly see the light of the volcano & listen to its awful roar and startling detonations.

At noon on the 26th we emerged from the forest into a more open country some 20 miles from the proper base of **Mauna Loa**; but the whole country was engulfed in fog so that no object could be seen at the distance of a few rods. We moved on however toward the Mt. until evening & encamped on a rough bushy hill, where our guide said the mountains might be seen in clear weather. A little before sundown the fog rolled off & both **Mauna Kea & Mauna Loa** stood out in bold and sublime grandeur. The former in a heavy mantle nearly to its base, & the latter vomiting our floods of fiery fusion with noises which might shake an iron nerve. All night long we watched the fantastic play of these fires & listened to these unearthly sounds with the exception of an occasional doze which nature would have. We were now about 20 miles from the crater.

We left our mountain abode early on the 27th, determined if possible to reach the seat of the eruption on that day. Taking the pillar of fire & smoke as our mark, & having the great river of fire on our left, we pushed onward... [page 3]

[Having visited the eruption site, Coan then reported] At day break on the 28th we retraced our steps down the Mt. rejoined the two men we had left behind, & by a forced march, reached the confines of the forest at 4 P.M. It was Saturday, where we determined to rest on the Sabbath according to the commandment there being an abundance of wood & water in this place.

There are vast rough plains lying around the bases of these mountains, traversed only by herds of wild cattle & dogs. Tens of thousands of [illegible] dotted by the foot prints & checkered with the paths of these cattle. As we passed over the plains we started up numerous droves of these bullocks, numbering [page 6] from 5 to 30 in a drove. On our return on Saturday we were overtaken in a thick fog; & coming suddenly upon a herd, as they were lying in a sheltered place under the lee of a forest, they all started & flew before us except one enormous, black bull which roared like a lion from his lair, roared upon us like a strong bull of Bashan, shook his head in defiance & stood firm in our path. Even our old bullock hunters were intimidated at the bold front, the lofty horns & the determined aspect of this lord of the hills. We approached within pistol shot of the monster, but he remained firm though alone, every bullock of the herd having fled. We had no arms, & what could we do? To flee would provoke pursuit. At length we armed ourselves with stones and advancing boldly in [illegible], we shouted upon him & let go our volley of stones. Upon this he turned, slowly trotted off about 2 rods, & then faced boldly about with a defiant look, as if determined to dispute every inch of ground. We moved steadily forward, repeated our shout & assault, he again retreated two or three rods, faced about, took up his position & again offered battle. This he did three times; when he, with a low grunt turned, trotted slowly before us in our path, & at length was lost in the fog... [page 7; A.B.C.F.M. Collection, Houghton Library, Harvard]

***Kalai'eha-Humu'ula-Ka'ohe and the Mauna Kea Mountain Lands
Described in Letters of Charles De Varigny (1855-1868)***

Charles De Varigny, Secretary of the French Consulate, resided in Hawai'i for fourteen years (1855-1868). In that time he made at least two trips to Mauna Kea. On November 18, 1857, De Varigny passed through Humu'ula on the Laumai'a side of Mauna Kea, and upon reaching the 7,000 foot elevation, he reported:

Here the atmosphere of these uplands plateaus has an exceptional power to carry the sound of the human voice, making ordinary tones audible a mile away; but there are no traces of inhabitants. Only some great wild cattle, recognizable by their curly hair, trouble the silence of these solitudes when during their wanderings a dead branch is broken... *Halemakule* [the native guide] was struck by the unfortunate idea of *testing the effects of his Hawaiian chanting as it reverberated among the mountain echoes.*

Still one more point on which we failed to agree. We preferred the song of the native birds to his slow, monotonous *melopoeia*... [De Varigny in Korn, 1981:86]

De Varigny later wrote about arrangements made between himself and Jack Purdy—known to be very knowledgeable about the trails and mountain region of Mauna Kea—for a trip to the summit, made from Kalai'eha. The following excerpts from De Varigny's narratives describe the journey, and offer an explanation of the depletion of *nēnē* population and high numbers of introduced feral animals that roamed the mountain:

...As dawn was breaking, we left for ***Kalaieha***, situated between ***Mauna Kea*** and Mauna Loa. From that approach the ascent of the mountain presented less difficulty. Our horses were fresh, the plain was level...

The cloudless sky and the clear, transparent atmosphere made objects appear so close that our undertaking seemed an excursion for a party of children... At five o'clock in the evening we reached ***Kalaieha***, where we were planning to camp. ***Kalaieha*** is neither a town, nor a village, nor even a huddled corral of grass huts. It is an immense plain which sprawls between two mountains. At certain periods of the year, especially in July and August the plain abounds in wild geese attracted by the *ohelo*, small red berries with a rather insipid flavor. The shrub bearing this fruit is more plentiful at ***Kalaieha*** than

anywhere else. More over, during the period of our excursion, sportsmen and amateur hunters looking for game pay frequent visits to **Kalaieha** for the pleasure of shooting.

Unfortunately, the wild geese begin to spoil very quickly and cannot stand being shipped to Honolulu... The plain was entirely deserted and the bushes were stripped of their fruits. In compensation, though the geese were missing, the wild bullocks, boars, and stray dogs who had reverted to a state of nature were present in hoards. The place swarmed with wild boars... [De Varigny in Korn, 1981:90-91]

De Varigny also provided readers with a significant account of the vegetation and environment at higher elevations:

...As we continued to climb, the trees became more scarce, more thin and stunted, until finally they ceased altogether. Bushes took their place, at first vigorous and close-growing, later puny and sparse. The ground was carpeted with strawberry plants covered with their fruit, which our horses crushed at every step, sending up a perfume that reminded us of Europe. Grass became rare and short; after it appeared the *Ranunculi* [*Ranunculus hawaiiensis*, the native buttercup, *makou*]. Our horses sank down in to the cindery soil or stumbled upon small stones that rolled under and behind them... We climbed and continued to climb. *At 10,000 feet we began to note the first tufts of Ensis argentea* [*Āhinahina*, the silversword (*Argyroxiphium sandwicensis*)], *a last but marvelously hardy vestige of plant life. This spectacular creature which I have never observed elsewhere except on the high mountain tops of Hawaii, is a veritable miracle. Clinging to the ground by its very deep roots, in form it resembles the aloes. Its sword-shape leaves are whitish gray, covered with light down. They glitter brilliantly as they catch the rays of the sun. From the center rises a stalk reaching as much as ten feet high, which bears a silky plume similar to that of sugar cane during its blossoming period.*

At last we sight snow. The summit seems to retreat before us, to escape all our efforts. But we are climbing, always climbing, and snowfield follows upon snowfield. At last we reach the final plateau. The glare of the sun reflected on that great white expanse dazzles us. The solitude and silence—how deathlike everything is! No sound is heard, no living creature stirs...[De Varigny in Korn, 1981:91-93]

The party departed from Kalai'eha at 5:00 a.m., and arrived at the summit plateau at 2:00 p.m. After eating lunch and resting a couple of hours, De Varigny, Purdy, and party returned to Kalai'eha (De Varigny in Korn, 1981:93).

A Trip to the Mountain Lands of Hawai'i (1859)

The Pacific Commercial Advertiser, a newspaper of the Hawaiian Islands, printed in English, published a series of letters in 1859, penned by an individual who wrote under the penname of "Hualalai." Hualalai described the mountain lands of Hawai'i, and the work of bullock hunters; and his journey across the slopes of Hualālai Mountain; across the 1859 lava flow of Mauna Loa; and then across the plateau lands towards Waiki'i. The party then traveled to, and camped at Pōhakuloa; and then continued on to Kalai'eha. The first two of Hualalai's narratives provide us with an early description of the Kalai'eha environs, and the party's subsequent attempted trip to the summit of Mauna Kea (thwarted by a heavy fog); and the third letter, provided readers with an eyewitness account of bullock hunting, the round-up of wild cattle and pigs, and the hunter's camp, on the slopes of Mauna Kea. The following narratives are excerpted from the accounts of "Hualalai" —

July 21, 1859

Mr. Editor—Having just returned from a trip to **Mauna Kea**, it has occurred to me that in this dull season of the year, a short account of our jaunt might perhaps prove sufficiently interesting to find a place in your journal.

Our party consisted of six, on horseback, with blankets and guns, followed by three natives with pack bullocks, carrying a canvas tent and the provisions and other necessary outfits for a ten days' absence from the haunts of civilization. We were also provided with a cook, in the person of a dapper little Chinaman, who was by no means an unnecessary part of the inventory. One of our party, whom I shall call "The Mountain" —he being an old ranger among the wilds of Hawaii and fond of relating his adventures—started early on Monday morning, June 27, for the lava flow, in order to ascertain whether it was passable for animals, while the rest were to follow on Thursday... At 8 o'clock on Tuesday morning, we were aroused by "The Captain," and saddling up in the dark, cold morning, we were well into the woods which extend from the base of Hualalai before daylight...

Just before emerging into the open plain we passed a number of young sandalwood trees, with their oval, bright-green leaves, standing amongst a young growth of *koa*, while here and there were seen the charred remains of huge trees lying scattered about. In reply to our inquiries, "The Captain" said, a number of years ago, when sandalwood was in great demand and the chiefs forced the people to work like slaves in gathering it, here it grew very abundantly. The people at last rid themselves of the burden by setting fire to the forest, which was mostly consumed—sandalwood and all. These half burned trunks were once stately *koa* trees. The old story of the goose that lay the golden egg, thought I. About nine o'clock, we got sight of the smoke rising through the still air in a perpendicular column from the crater, whence issued the late eruption of Mauna Loa. Pele had apparently exhausted her materials, or was resting herself, and the comparatively small show of smoke led us to argue that there was but a small supply of fire.

At noon, after a long ride over a sandy plain, barren of everything but stunted ohelos, and past the old *heiau* or heathen temple called "**Ke Ahu a Umi**," we came to Waikapee, where we halted and lunched... After resting our animals an hour, we started again and soon came up with the late flow or rather flows, for there have been two... We crossed the flow in a northeast direction instead of going straight over, and thus we traveled five miles over the flow instead of three, which is about its breadth... It was quite sundown when we reached the farther edge of the flow and touched again what we felt was terra firma. Here we camped for the night on the old *pahoehoe*, —perhaps hundreds of years old,—and were fortunate in finding in a little hollow plenty of *pili* grass for our animals and wood for a fire. Scarcely had we halted, when the "honk" of a goose was heard and we shot three fat fellows, which made us a delicious supper. Building up a rousing fire, more for the cheering light than for warmth, we spread blankets on the ground and with our saddles for pillows; slept soundly till daylight... [Pacific Commercial Advertiser; July 21, 1859]

July 28, 1859

...The next day was a hard day's travel for our animals, over about fifteen miles of clinkers, until we came to the rolling hills above Puakou [being in the Waikii vicinity]. A worse piece of road it would be hard to imagine. Fancy that distance of country terribly cut up into ravines and gullies, and the only path or semblance of a road made of equal parts of broken bottles and slag from a blacksmith's forge, and you will get some idea of the plain between Mauna Loa and **Mauna Kea**. All these beds of clinkers—for we passed four or five—have come from the former mountain, while **Mauna Kea** appears to have discharged scarcely anything, latterly, but sand and ashes. On reaching the open ground we found our horses were much cut up and bleeding about the feet, while one bullock was so exhausted and worn down that we were obliged to take off his load and leave him to shift for himself. Pushing along, we arrived at sundown at our camping ground in "the big gulch" [Pōhakuloa] among the hills which form the base of **Mauna Kea**. This was a beautiful spot, the grass growing luxuriantly in the valleys, and the ravines being lined with *mamani* trees. Wild hogs were plentiful; we disturbed a drove of forty or fifty as we entered

the gulch, and they went scampering up the mountain. Cattle too, were seen in droves, but very shy. Unfortunately, however, there was no water in the gulch, and, after stopping one night, we started on Thursday morning for **Kalaieha**, an elevated point on the east side of **Mauna Kea**, where report said that water and game were to be found in plenty.

From the “big gulch” to **Kalaieha**, a distance of some fifteen or twenty miles, the road lays over a beautiful rolling country, made up of wash from the conical hills which so frequently occur along the base of **Mauna Kea**, with here and there patches of sand. This would be a magnificent country for sheep farms, or for wheat growing, but for one drawback—the want of water. There is ample evidence, however, in the numerous water courses with which the face of the country is seamed, that at times there is “too much of water.” Huge boulders are seen scattered about, brought from the hills and carried far out on the plains by the streams; but at the time of our visit not a drop of water could be found in any of the gulches or ravines. We reached our camping ground [Kalai‘eha] a little after noon, and pitched our tent at the foot of a hill in a magnificent grove of *koa* and *mamani* trees. We found the country here equally parched up with that on the other side, there having been no rain for months. *Here the clinkers from Mauna Loa came up within a short distance of the base hills of Mauna Kea, and just on the edge of these ragged rocks, in the last place one would have thought of looking for it, we found a hole, just large enough to insert a quart pot, containing about half a barrel of delicious water, as cold as if it had been iced. This was the first supply of water, we had obtained since leaving Kona, and as our kegs were quite empty, it came just in time.* The long ride from the big gulch was made without water and our throats were well parched. Those who have never known the actual want of water cannot appreciate the blessing of a constant supply. I found the sense of thirst, much alleviated by carrying one or two small pebble stones in my mouth.

At **Kalaieha** we remained until Tuesday, the 5th instant, employing the time in rambling about the country, shooting wild hogs, geese and ducks. The latter were not very plentiful, but the hogs were in countless numbers. The ground for miles about our camp was ploughed up in every direction by them in their search after the roots upon which they feed. Our party consumed sometimes four or five small pigs of a day, such as you could buy in Honolulu for \$1.50 each, besides a proportionate quantity of taro, crackers and butter, pickles and coffee. Our appetites, however, in this keen mountain air, (about 7000 feet above the sea,) were prodigious, and digestion never failed to “wait on appetite.” Two of us demolished a whole goose at a sitting, besides et ceteras—one was a supposed sick man, who six weeks before in Honolulu could scarcely walk, and was sent up to Kona by his physician as a last hope of recovery. He is now as strong and hearty as could be desired. On Monday the 4th, we essayed the ascent of **Mauna Kea**, and would doubtless have succeeded but for an envious fog—farther down it would be called cloud—which completely enveloped us, and the fear of getting lost, turned us back to grope our way to camp... [Pacific Commercial Advertiser; July 28, 1859]

August 11, 1859

...The imported vaqueros of Hawaii have disappeared before the march of time, and their perilous adventures in pursuit of the wild cattle among the gulches and over the hills and plains of **Mauna Kea** are only remembered and rehearsed by some of the old residents. In their place has sprung up a class of Hawaiian mountaineers, equally skilled as horsemen as their foreign predecessors, but leading a vagabond sort of life, alternating between hardships and privation on the mountain and plenty of lavish expenditure on their return to the settlements. During a recent trip to **Mauna Kea**, I came across a camp of some thirty of these bullock hunters, and accompanying them on one or two of their expeditions, was no little interested in their somewhat romantic and exciting mode of life.

The government conjointly with the King, I believe, are the owners of the unmarked wild cattle on Hawaii, and have sold or leased the right to slaughter to private parties, upon

what precise terms I am unable to say. An agent resides at Waimea, who engages the hunters, agreeing to pay them at the rate of \$1.25 for each bull hide and \$1 for each cow's hide, properly dried and delivered at a certain point on the mountains. From thence they are conveyed to Waimea in carts, salted and shipped to Honolulu. During the first half of 1859, 222,170 lbs. of hides were exported, mostly, I presume, to the United States, where a fair quotation per last mail, would be twenty-five cents per lb., giving us an export value of \$55,542, wherewith to help pay our debts in New York and Boston...

The wild cattle are now hunted almost solely for their hides, and they possess the advantage over those of the tame herds for the purposes of commerce that they are not mutilated with the branding iron. Under the present indiscriminate and systematic slaughter of these cattle, by which young and old, male and female, are hunted alike for the sake of their skins alone, they have greatly diminished in numbers, and a few years only will suffice to render a wild bullock a rare site where they now flock in thousands.

The country through which they roam is in many parts composed of fine grazing lands. Thousands of acres could be devoted to wheat growing, being composed, to a good depth, of a light, sandy soil, capable of being plowed with facility. The only drawbacks to this as an agricultural country, would be, — first, the great scarcity of water, second, the depredation of the wild hogs. As to the first, water no doubt could be found in plenty by digging; and the hogs would have to be exterminated. I wonder that some one has not, ere this, purchased the government right in these hogs, and set up a lard factory on the mountain. Why would not it pay at 12 ½ cents per lb., — or even for soap grease?

But I started to tell you something about the life of the hide-hunters. First, for their camp. This was situated on a side hill, in a grove of *koa* trees, that sheltered them somewhat from the trade winds, which here blow fresh and cold, and furnish them with firewood — no small consideration at this elevation. The hut was built of three walls of stone, open to the south, the roof formed of *koa* logs, plastered on the outside with dry grass and mud. The floor was the ground covered with hides for a flooring, and perfectly swarmed with fleas of enormous size and bloodthirsty dispositions. In front, within a few feet of the sleeping places, a large fire was constantly kept burning, and all around, for an acre or so, the ground was covered with drying hides.

In the hut, within a space of about 15 by 20 feet, some twenty-five or thirty native vaqueros found a sleeping place by night, and a place to play cards in by day when not engaged in the chase. Near by was their “corral,” and enclosure of sticks and hides, containing some sixty horses, all owned by natives, and which had been collected for a grand “drive in,” to take place on the morrow... ..The pen which generally encloses a half an acre, is built square of strong posts and rails, and from the narrow entrance a long line of fence gradually diverges like the upper half of the Y, extending its arms out towards the mountain from which cattle are to be driven...

...We spied a great cloud of dust some three or four miles up the mountain side, and here came at a full gallop several hundred head of cattle of all sizes, closely pursued by semicircles of vaqueros, driving the game right down for the corral. As they rapidly approached the arms of the trap, the ground shook beneath their hoofs, and they wedged crowded each other into a compact body to avoid the dreaded horsemen...

...Mixed up with the cattle, and driven along with them, were probably not far from a thousand wild hogs, who, disturbed in their interior haunts, had got into the trap designed for nobler game. Their piercing squeals as, kicked and tossed by the frantic cattle, they rolled over in the dust, added no little to the amusement of the scene... [Pacific Commercial Advertiser, August 11, 1859]

Waimea and the Mountain Lands Described by Isabella Bird (1873)

Isabella Bird, an English woman ahead of her time, traveled solo about Hawai'i, and in the company of native and local guides, and explored many of the remote regions on the Island (Bird 1964). Her narratives are colorful and filled with important descriptions of landscape, practices and conditions on the island. Of particular interest to this study of the *'āina mauna* on Hawai'i, are Bird's narratives of Waimea, and travel past Waiki'i (via the Waimea-Waiki'i Trail, coming out near Pu'u Lā'au), to the Pu'u Ke'eke'e-Pōhakuloa flats, then on to Kalai'eha and up to the summit of Mauna Kea.

Bird included important descriptions of the sheep and cattle industry in 1873, and observed that the mountain lands were remote, and in all but a couple of areas, unpopulated. She also observed the conditions and operations of Kalai'eha; and discussed the adze quarries situated a short distance below the summit of Mauna Kea.

Having arrived in Waimea village, Bird described her approach to, and reception at the home of Francis Spencer (the Spencer house at Pu'uloa – still standing today), and her journey across the plains to the *'āina mauna*:

...Mr. S. [Spencer] is a Tasmanian, married to a young half-white lady... Sheep are the source of my host's wealth. He has 25,000 at three stations on **Mauna Kea**, and, at an altitude of 6000 feet they flourish, and are free from some of the maladies to which they are liable elsewhere. Though there are only three or four sheep owners on the islands, they exported 288,526 lbs. of wool in 1872'. Mr. S— has also 1000 head of cattle and 50 horses.

The industry of Waimea is cattle raising, and some feeble attempts are being made to improve the degenerate island breed by the importation of a few short-horn cows from New Zealand. These plains afford magnificent pasturage as well as galloping ground. They are a very great thoroughfare. The island, which is an equilateral triangle, about 300 miles in "circuit," can only be crossed here. Elsewhere, an impenetrable forest belt, and an impassable volcanic wilderness, compel travellers to take the burning track of adamant which snakes round the southern coast, when they are minded to go from one side of Hawaii to the other. Waimea also has the singular distinction of a road from the beach, which is traversed on great occasions by two or three oxen and mule teams, and very rarely by a more ambitious conveyance. There are few hours of day or night in which the tremulous thud of shoeless horses galloping on grass is not heard in Waimea.

The altitude of this great table-land is 2500 feet, and the air is never too hot, the temperature averaging 64° Fahrenheit. There is mist or rain on most days of the year for a short time, and the mornings and evenings are clear and cool. The long sweeping curves of the three great Hawaiian mountains spring from this level. The huge bulk of **Mauna Kea** without shoulders or spurs, rises directly from the Waimea level on the south to the altitude of 14,000 feet, and his base is thickly clustered with tufa-cones of a bright red colour, from 300 to 1000 feet in height.

Considerably further back, indeed forty [page 132] miles away, the smooth dome of Mauna Loa... Nearer the coast, and about thirty miles from here, is the less conspicuous dome of the dead volcano of Hualalai... To the south of these plains violent volcanic action is everywhere apparent, not only in tufa-cones, but in tracts of ashes, scoriae, and volcanic sand. Near the centre there are some very curious caves, possibly "lava-bubbles," which were used by the natives as places of sepulture... [Bird 1964:133]

* In 1875 the export of wool had increased to 465,469 lbs.

Journey to Mauna Kea

...A few days ago I was so fortunate as to make the acquaintance of Mr. W. L. Green (now Minister of Foreign Affairs), an English resident in Honolulu... He asked me to make the ascent of **Mauna Kea** with him, and we have satisfactorily accomplished it to-day.

The interior of the island, in which we have spent the last two days, is totally different, not only from the luxuriant windward slopes, but from the fiery leeward margin. The altitude of the central plateau is from 5000 to 6000 feet, there is not a single native dwelling on it, or even a trail across it, it is totally destitute of water, and sustains only a miserable scrub of *mamane*, stunted ohias, *pukeawe*, ohelos, a few *compositae*, and some of the hardiest ferns. The transient residents of this sheep station [Kalai'eha], and those of another [at Kealapū'ali] on Hualalai, thirty miles off, are the only human inhabitants of a region as large as Kent. Wild goats, wild geese (*Bernicla sandvicensis*), and the *Melithreptes Pacifica*, constitute its chief population. These geese are web-footed, though water does not exist. They build their nests in the grass, and lay two or three white eggs.

Our track from Waimea lay for the first few miles over light soil, destitute of any vegetation, across dry, glaring, rocky beds of streams, and round the bases of numerous tufa cones, from 200 to 1500 feet in height, with steep, smooth sides, composed of a very red ash. We crossed a flank of **Mauna Kea** at a height of 6000 feet [around Pu'u Lā'au], and a short descent brought us out upon [page 231] this vast tableland [the Pu'u Ke'eke'e-Pōhakuloa region], which lies between the bulbous domes of **Mauna Kea**, Mauna Loa, and Hualalai, the loneliest, saddest, dreariest expanse I ever saw.

The air was clear and the sun bright, yet nothing softened into beauty this formless desert of volcanic sand, stones, and lava, on which tufts of grass and a harsh scrub war with wind and drought for a loveless existence. Yet, such is the effect of atmosphere, that Mauna Loa, utterly destitute of vegetation, and with his sides scored and stained by the black lava-flows of ages, looked like a sapphire streaked with lapis lazuli. Nearly blinded by scuds of sand, we rode for hours through the volcanic wilderness; always the same rigid *mamane* (*Sophora Chrysophylla*) the same withered grass, and the same thornless thistles, through which the strong wind swept with a desolate screech.

The trail, which dips 1000 feet, again ascends, the country becomes very wild, there are ancient craters of great height densely wooded, wooded ravines, the great bulk of **Mauna Kea** with his ragged crest towers above tumbled rocky regions, which look as if nature, dis- [page 208] gusted with her work, had broken it to pieces in a passion; there are living and dead trees, a steep elevation, and below, a broad river of most jagged and uneven *a-a*. The afternoon fog, which serves instead of rain, rolled up in dense masses, through which we heard the plaintive bleating of sheep, and among blasted trees and distorted rocks we came upon **Kalaieha**.

I have described the "foreign residences" elsewhere. Here is one of another type, in which a wealthy sheep owner's son, married to a very pretty native woman, leads for some months in the year, from choice, a life so rough, that most people would think it a hardship to lead it from necessity. There are two apartments, a loft and a "lean-to." The hospitable owners gave me their sleeping-room, which was divided from the "living-room" by a canvas partition. This last has a rude stone chimney split by an earthquake, holding fire enough to roast an ox. Round it the floor is paved with great rough stones. A fire of logs, fully three feet high, was burning, but there was a faulty draught, and it emitted a stinging smoke. I looked for something to sit upon, but there was nothing but a high bench, or chopping-block, and a fixed seat in the corner of the wall. The rest of the furniture consisted of a small table, some pots, a frying-pan, a tin dish and plates, a dipper, and some tin pannikins. Four or five rifles and "shot-guns," and a piece of raw meat, were

hanging against the wall. A tin bowl was brought to me for washing, which served the same purpose for everyone. The oil was exhausted, so recourse was had to the native expedient of a jar of beef fat with a wick in it.

We were most hospitably received, but the native wife, as is usually the case, was too shy to eat with us, or even to appear at all. Our host is a superb young man, very frank and pre-possessing looking, a thorough mountaineer, most expert with the lasso and in hunting wild cattle. The "station" consists of a wool shed, a low grass hut, a hut with one side gone, a bell-tent, and the more substantial cabin in which we are lodged. Several saddled horses were tethered outside, and some natives were shearing sheep, but the fog shut out whatever else there might be of an outer world. Every now and then a native came in and sat on the floor to warm himself, but there were no mats as in native houses. It was intolerably cold. I singed my clothes by sitting in the chimney, but could not warm myself. A fowl was stewed native fashion, and some rice was boiled, and we had sheep's milk and some ice cold water, the drip, I think, from a neighbouring cave, as running and standing water are unknown.

There are 9000 sheep here, but they require hardly any attendance except at shearing time, and dogs are not used in herding them. Indeed, labour is much dispensed with, as the sheep are shorn unwashed, a great contrast to the elaborate washings of the flocks of the *Australian Riverina*. They come down at night of their own sagacity, in close converging columns, sleep on the gravel about the station, and in the early morning betake themselves to their feeding grounds on the mountain. [page 209]

Mauna Kea, and the forests which skirt his base, are the resort of thousands of wild cattle, and there are many men nearly as wild, who live half savage lives in the woods, gaining their living by lassoing and shooting these animals for their skins. Wild black swine also abound.

The mist as usual disappeared at night, leaving a sky wonderful with stars, which burned blue and pale against the furnace glare on the top of Mauna Loa, to which we are comparatively near. I woke at three from the hopeless cold, and before five went out with Mr. Green to explore the adjacent lava. The atmosphere was perfectly pure, and suffused with rose-colour, not a cloud-fleece hung round the mountain tops, hoar-frost [page 233] whitened the ground, the pure, white smoke of the volcano rose into the reddening sky, and the air was elixir. It has been said and written that there are no steam-cracks or similar traces of volcanic action on **Mauna Kea**, but in several fissures I noticed ferns growing belonging to an altitude 4000 feet lower, and on putting my arm down, found a heat which compelled me to withdraw it, and as the sun rose these cracks steamed in all directions. There are caves full of ferns, lava bubbles in reality, crust over crust, each from twelve to eighteen inches thick, rolls of lava cooled in coils, and hideous a-a streams on which it is impossible to walk two yards without the risk of breaking one's limbs or cutting one's boots to pieces.

I will not weary you with the details of our mountain ascent. Our host provided ourselves and the native servant with three strong bullock-horses, and accompanied us himself. The first climb is through deep volcanic sand slashed by deep clefts, showing bands of red and black ash. We saw no birds, but twice started a rout of wild black hogs, and once came upon a wild bull of large size with some cows and a calf, all so tired with tramping over the lava that they only managed to keep just out of our way. They usually keep near the mountain top in the daytime for fear of the hunters, and come down at night to feed. About 11,000 were shot and lassoed last year. Mr. S— says that they don't need any water but that of the dew-drenched grass, and that horses reared on the mountains refuse to drink, and are scared by the sight of pools or running streams...

The actual forest, which is principally *koa*, ceases at a height of about 6000 feet, but a deplorable vegetation beginning with *mamane* scrub, and ending with withered wormwood and tufts of coarse grass, straggles up 3000 feet higher, and a scaly orange lichen is found in rare patches at a height of 11,000 feet. [page 210]

The side of **Mauna Kea** towards Waimea is precipitous and inaccessible, but to our powerful mountain horses the ascent from **Kalaieha** presented no difficulty.

We rode on hour after hour in intense cold, till we reached a height where the last stain of lichen disappeared, and the desolation was complete and oppressive. This area of tufa [page 234] cones, dark and grey basalt, clinkers, scoriae, fine ash, and ferruginous basalt, is something gigantic. We were three hours in ascending through it, and the eye could at no time take in its limit, for the mountain which from any point of view below appears as a well defined dome with a ragged top, has at the summit the aspect of a ridge, or rather a number of ridges, with between 20 and 30 definite peaks, varying in height from 900 to 1400 feet. Among these cones are large plains of clinkers and fine gravel, but no lava-streams, and at a height of 12,000 feet the sides of some of the valleys are filled up with snow, of a purity so immaculate and a brilliancy so intense as the fierce light of the tropical sun beat upon it, that I feared snow-blindness. We ascended one of the smaller cones, which was about 900 feet high, and found it contained a crater of nearly the same depth, with a very even slope, and lined entirely with red ash, which at the bottom became so bright and fiery-looking that it looked as if the fires, which have not burned for ages, had only died out that morning.

After riding steadily for six hours, our horses, snorting and panting, and plunging up to their knees in fine volcanic ash, and halting, trembling and exhausted, every few feet, carried us up the great tufa cone which crowns the summit of this vast, fire-flushed, fire-created mountain, and we dismounted in deep snow on the crest of the highest peak in the Pacific, 13,953 feet above the sea. This summit is a group of six red tufa cones, with very little apparent difference in their altitude, and with deep valleys filled with red ash between them. The terminal cone on which we were has no cavity, but most of those forming the group, as well as the thirty which I counted around and below us, are truncated cones with craters within, and with outer slopes, whose estimated angle is about 30°. On these slopes the snow lay heavily. In coming up we had had a superb view of Mauna Loa, but before we reached the top, the clouds had congregated, and lay in glistening masses all round the mountain about half-way up, shutting out the smiling earth, and leaving us alone with the view of the sublime desolation of the volcano.

We only remained an hour on the top, and came down by a very circuitous route, which took us round numerous cones, and over miles of clinkers varying in size from a ton to a few ounces and past a lake the edges of which were frozen, and which in itself is a curiosity, as no other part of the mountain "holds water." *Not far off is a cave, a lava-bubble, in which [page 235] the natives used to live when they came up here to quarry a very hard adjacent phonolite for their axes and other tools.* While the others poked about, I was glad to make it a refuge from the piercing wind. Hundreds of unfinished axes lie round the cave entrance, and there is quite a large mound of unfinished chips. [page 211]

This is a very interesting spot to Hawaiian antiquaries. They argue, from the amount of the chippings, that this mass of phonolite was quarried for ages by countless generations of men, and that the mountain top must have been upheaved, and the island inhabited, in a very remote past. The stones have not been worked since Captain Cook's day; yet there is not a weather-stain upon them, and the air is so dry and rarified that meat will keep fresh for three months. I found a mass of crystals of the greenish volcanic glass, called olivine, imbedded in a piece of phonolite which looked as blue and fresh as if only quarried yesterday.

We travelled for miles through ashes and scoriae, and then descended into a dense afternoon fog; but Mr. S is a practiced mountaineer, and never faltered for a moment, and our horses made such good speed that late in the afternoon we were able to warm ourselves by a gallop, which brought us in here ravenous for supper before dark, having ridden for thirteen hours... [Bird 1964:212]

Report of the Royal Commissioners on Development of Resources (1877)

In 1876, King David Kalākaua appointed a commission “to aid in the development of resources in the Kingdom” (Act of September 25, 1876). In 1877, the Commissioners toured the Island of Hawai‘i, assessing needs, development potentials, and meeting with residents to discuss the general nature of the resources.

The commission’s description of the Waimea plateau and forests, and the significant impacts that grazing animals had on the land and community—having overrun residences and agricultural fields, and making the land almost impossible to live on—is dramatic, and in some cases proved to be prophetic. The primary concerns for which action in 1877 was called, centered around reducing the herds of wild cattle on the Crown and Government Lands of Ka’ohe and Humu’ula; protection of forests and watershed; the already noticeable shifts in climatic conditions; and occurrence of droughts.

The commissioners landed at Māhukona, and visited North Kohala, praising its resources and potential. Departing from Pu’uhue, the commission then traveled to Waimea and offered the following report:

The route lies around the slopes of the Kohala mountains through Kawaihae-uka. The forests on the Kohala mountains are dying rapidly. The land is mostly for grazing purposes, though on the mountain, potatoes of fine quality can be raised in large quantities. In sheltered places, coffee would doubtless grow, but owing to the sparseness of the population and the superior attractions to other parts of the district, this part will hardly soon be settled. The once fertile and populous plain of Waimea looked sterile and desolate when visited by the Commission—a painful contrast to Kohala loko on the other side of the mountain.

The complaint of the people is well founded. The water they use is fouled in many places by cattle, horses and other animals, and as the stream is sluggish it has no chance to free itself of impurities, and the water used by the people in their houses must be a cause of disease and death, especially to the children... It is little wonder that with his crops trodden out by the sheep or cattle of his stronger neighbors, his family sickened perhaps to death by the polluted waters, that the small holder should yield to despair, and abandoning his homestead seek employment in some other district, usually without making another home...

The plains of Pukapu and Waimea are subject to high winds, aggravated by the loss of the sheltering forests of former days. The soil however is very good in many places for sugar cane and other products. To develop its best resources, efforts must be made to restore the forests and husband the supply of water at their sources to furnish a supply for agricultural purposes. At present the lands are used almost exclusively for grazing purposes. Although the proprietors and lessors are probably not averse to the establishment of agricultural enterprises, it is to be feared that the denudation of the neighboring mountains and plains of the forests will render the climatic conditions unfavorable to success.

It would seem that a wise appreciation of the best interests of this district, even of the grazing interests themselves, would lead to the decrease of the immense herds which

threaten not only Waimea but even Hamakua with almost irreparable disaster. It is to be feared that they will in time render a large part of the land of little value even for grazing purposes. Owing to the increasing frequency and severity of droughts and consequent failure of springs. Some thousands of cattle are said to have died this last winter from want of water, and the works erected in Waimea for the purpose of trying out cattle have been idle for months for want of water.

The commission do not propose here to discuss fully the vexed questions of the causes of the diminution of the forests, but in view of the fact that they are diminishing and the streams and springs diminishing at corresponding rations, also that with the cattle running upon the lands as at present, any effort to restore them must be futile and any hopes of their recuperation vain, the Government, if it would wish to preserve that part of the island of Hawaii from serious injury, must take some steps for reclaiming the forests.

In this connection we would say that it is unfortunate that large tracts of Crown and Government lands have been lately leased on long terms for grazing purposes, without conditions as to their protection from permanent injury, at rates much lower than their value even as preserves for Government purposes or public protection. The commission deem this a matter of grave importance, challenging the earnest attention of the Government, and involving the prosperity of two important districts.

There are large quantities of fallen trees in the forests, whose removal would doubtless be of benefit to the forests and it would seem could be profitably taken to Honolulu for sale as firewood..... [Pacific Commercial Advertiser – May 5, 1877]

George Bowser's "Directory and Tourists Guide" (1880)

George Bowser, editor of "The Hawaiian Kingdom Statistical and Commercial Directory and Tourists Guide" (1880) wrote about various statistics and places of interest around the Hawaiian Islands. In the following excerpts from "An Itinerary of the Hawaiian Islands..." (Chapter IV Hawai'i), Bowser described the Waimea region, ranching interests, and the journey between Waimea, Kalai'eha, and the summit of Mauna Kea. From Waimea, Bowser went to Kalai'eha, traveling via the Waiki'i route. His narratives describe springs on the side of the mountain—presumably Houpo o Kāne (Hopukani) and Wai hū a Kāne, the lake of Waiau, and Kaluakāko'i. Bowser also reported that Francis Spencer had "made" the road from his sheep station at Kalai'eha to Waiau—

...On my road returning to Waimea [from a visit to North Kohala] I had before me at every turn of the road the great **White Mountain** of Hawaii, for such is the translation of the native name, **Maunakea**. From all appearances, as described by those who have ascended it, this mountain has ceased to be an active volcano long before the more southern ones began to show signs of expiring efforts. Its surface is not composed of lava, as is the case to so great an extent with Maunaloa and Maunahualalai, but is almost exclusively of scoria, deposited, no doubt, in the last final effort of the volcano. *High up on Maunakea there is a singular lake, to which a road has been made by Mr. F. Spencer through his sheep station of Kalaieha. This gentleman and a party of friends, when visiting this lake, upon one occasion made an attempt to fathom it, without success. They had no proper appliances for sounding, but, having tied their horse-ropes together, they succeeded in constructing a line fifty-five fathoms long. With this, however, they found no bottom. The excursion to this lake is well worth making, and can be accomplished by ladies as well as gentlemen, on horseback, the incline of Maunakea being exceptionally gradual for so high a mountain. A day will have to be devoted to the trip, as it takes about five hours to reach the lake from Waimea, although three will suffice for the return. From the elevation thus reached a wide expanse of country and of ocean can be seen, including the distant Haleakala on Maui. On the way between [page 544] Waimea and Kalaieha the traveler will be able to refresh himself with the water of a spring which bursts out just at*

the base of **Maunakea**, beautifully clear and cold, as if it came direct from the ice. There is another inducement to make this journey. It is on **Maunakea** that the silver sword plant, peculiar to these islands, grows in the greatest perfection. It is to be found also on **Haleakala**, and on **Maunaloa** and **Maunahualalai**, but not so fine as on the southern side of **Maunakea**. This plant grows to the height of from four to six feet; its leaves being arranged so as to resemble a fan of silver, each blade separate from its fellows. At the top of the stem it branches out in a circular form, each branch producing an egg-shaped flower of a delicate dove color. It is in full flower in the month of November. The tourist will also be well repaid for making a visit to a place called **Kaluakakoi**, which is not far from the lake. Here there is a quarry, whence all the stone axes which used to be in use among the natives were procured from time immemorial, until their intercourse with the foreigner taught them the use of iron. This is the only place in the islands where this black flint-like stone has been procured.

The district surrounding Waimea is capable of producing most of the ordinary crops of a temperate climate, such as wheat, barley, oats maize, beets, turnips, mangel-wurzel, onions, potatoes and all sorts of vegetables. In the neighboring district of Hamakua, coffee, tobacco and cotton may be grown. In no part of the Kingdom does the guava grow to such perfection as in the Hamakua district. Its fruit is there quite as large as an orange. Three varieties of it are grown—the sour, the sweet and the strawberry guava.

No better opportunity can present itself throughout my journey than when speaking of these rich districts of Kohala and Hamakua, to enumerate for the benefit of the tourist the different fruits that grow wild in the Hawaiian Islands, and give some account of them, and of the seasons at which they ripen. I must give the first place to the mountain strawberry, which is very plentiful all round the three lofty mountains of Hawaii and on Haleakala. It is ripe in June, July and August. The mountain apple grows all over the Islands, at about 800 feet from the sea level... [page 545] To this list I have to add the more familiar forms of the mango...the orange, lime, citron, lemon and bananas, in great variety. Add to these the bread-fruit, tamarind and the rose-apple...

...I returned to Waimea before finally setting out on my journey through Kona and the southern portions of the island. I made my start from the house of Mr. Frank Spencer, leaving the Kohala district, I must say, with much regret. Fifteen miles of a miserably rough and stony road brought me to Puako, a small village on the sea-coast, not far from the boundary between the Kohala and Kona districts. There was nothing to be seen on the way after I had got well away from Waimea except clinkers; no vegetation, except where the cactus has secured a scanty foothold... [Bowser 1880:546]

Queen Emma's Ascent of Mauna Kea (1882)

One of the significant historical accounts of travel to Mauna Kea is associated with a journey made by the Dowager Queen Emma (Rooke) Kaleleonālani, in 1882. It is an important account as it is still discussed by the descendants of participants in the trip, some of whom carry names commemorating the journey, and because it is also celebrated in a number of *mele* (chants).

The trip of Queen Emma to Mauna Kea, to see (actually to conduct a ceremonial bath in) Waiau, is one of significant symbolism. It is believed that the Queen sought to demonstrate her lineage and godly connections, and to perform a ceremonial cleansing in the most sacred of the waters of Kāne. The *mele* composed as a result of the trip refer to Mauna Kea as the *piko* (summit, symbolically, the cord which connects Hawai'i to the heavens) of Wākea, and also reference a number of named places on this cultural landscape.

A short article published in the native newspaper *Kuokoa* on October 14, 1882, documenting the trip made by Queen Emma to Kohala, in the company of Princess Likelike (sister of King David Kalākaua and then Princess Lili'uokalani), announced completion of the trip:

“Emma Kaleleonalani Ma Kohala”

Ma ka Poalima o ka pule i hala, ua malamaia he papaina nui ma Halawa, ma ka hale noho o H. Hook, no ka Moiwahine Emma Kaleleonalani, a mahope o na hooihalaai ana, ua kamoe aku la ka huakai alii ma ia ano liula a moe ma ia po ma ka home noho o James Kaai. Ua nui na hooihahiwa a na makaainana oia apana ma ia po. Ma ka Poaono ae ua moe ma kahi o J. Kekipi, elua la ma ia wahi, a ma ka Poalua ae, ua kamoe hou ka huakai alii, a moe ma kahi o Kamauoha opio. Ma ia po ia haawi ia he papaina nui loa i hiki aku ka huina nui o na \$1,000 e kekahi mau keiki lalawaia oia apana.

Ma ka Poakolu ae, ua kamoe hou ka huakai alii no Waimea, a hooluolu ma ia po ma ka home noho o J. Parker. Ma ka auina la Poaha, ua hele hou ka huakai no ka mauna, a moe ma Mana, ma kekahi la hoi hou no kai o Waimea, a no kahi la ae, kamoe hou ka huakai no Waiau, ma ka mauna. He oluolu ke ola o ke ‘Iii, a me na hoahale, ua huipu keia huakai alii me ke kama alii Likelike, ma keia huakai makaikai. J.K.

“Emma Kaleleonalani at Kohala”

Last week Friday, there was a large banquet at Halawa, at the residence of H. Hook, for Queen Emma Kaleleonalani, following the pleasantries, the royal party proceeded to, and spent a pleasant night at the home of James Kaai. There were many displays of affection give at that place that night. On Saturday, next, they slept at J. Kekipi’s, spending two days there, and on Tuesday, next, the royal procession went to the place of Kamauoha, Junior. On that night there was a great banquet given, where was gathered \$1,000 from some of the fishermen of the district.

On Wednesday, next, the royal procession went on to Waimea, and was made comfortable in the home of J. Parker. On the afternoon of Thursday, the procession went on towards the mountain, and rested at Mana. On the next day, they went again to Waimea for the day. The procession then set out for **Waiau**, on the mountain. The health of the queen and her traveling companions is good. This royal site-seeing procession was joined by the Princess Likelike. J.K. [*Kuokoa*, October 14, 1882:2; Maly, translator]

Around the time of Queen Emma’s trip to Kohala, Mauna Kea, and the waters of Waiau, *haku mele* (composers of chants and songs), recounted the events, scenery, and significance of the journey in a series of *mele*. A number of these *mele* are housed in the collection of the Bernice Pauahi Bishop Museum, and have been recently published in “*He Lei no ‘Emalani*” (2001). Selections from the collection of *mele*—one, directly from the museum collection (translated by Maly in 2000), and the others published in 2001—focusing on places visited on and around Mauna Kea, follow below. The translations from “*He Lei no ‘Emalani*,” were prepared by Mary Kawena Pukui, Theodore Kelsey, and M. Puakea Nogelmeir (2001). We have also added annotations at a few lines where place names of Mauna Kea and the ‘*āina mauna* occurred, that were not recognized as such at the time of publication of “*He Lei no ‘Emalani*.”

1882

**He Inoa Pii Mauna no Kaleleonalani
(Na Kaniu Lumaheihei o Kapela i haku)**

Kaulana ke anu i Waikii
Oo i ka ili o ka Lani
E aha ana la Emalani
E walea a nanea ae ana
I ka leo hone o ka Palila

**In the Name of Kaleleonalani, Ascending
the Mountain (Composed by Kaniu
Lumaheihei Kapela)**

Famous is the cold of Waiki‘i,
Piercing the skin of the Chiefess.
What is it that Emalani is doing?
Relaxing and enjoying,
The sweet voices of the *Palila*,

Oia manu noho Kuahiwi

Kikaha o ka Iwi-Polena

*Ko Hoa ia e like ai
Hoolulu Kapena Kaulani*

*Ina ae hoi kakou
Kaalo ana Ahumoa mamua
A kau i ke one heehee*

A imua, a i hope o ka Lani

He ihona loa ana Kilohana

*Noho ana o Pumauu i ka lai
Au mai ana o Puukapele
Kaala i kuu maka ke aloha
Komo i ka olu o Kalaieha
Eia mai ke Kuini Emalani
Ua wehe i ka pua mamane*

*E o ke Kuini Emalani
Kaleleonalani he Inoa*

Hau kahiaka nui 'o Kalani

*I ka huaka'i māka'ika'i
Inā kākou e 'apa nei
Nā ukali o ke Kuini Emalani
A kau i Kala'i'ehā pu'u
'Alo mai huikau [Huikau¹⁶] i ke anu
Huikau ka helenā, e Kalani
A kau i Pu'uho'okomo
Kā'alo ana 'o ka 'ōnū
Molemole o ka'e koa
Li'u nā keiki o ke anu
Ho'olale ke kaula 'ili pipi
Ka helenā o ku'u kīpuka
Hāwele pa'a i ka 'ōkumu
E ake aku ana 'o Kalani
'O ka 'ike maka iā Waiau
Kau pono i ka piko o Wākea
I ka hena o nā kuahiwi*

Those birds that dwell upon
the Mountain.

The *'iwi-polena* soars
overhead,

It is like your companion.
Captain Kaulani called us
to shelter,

If we should continue.
We then passed before Ahumoa,
Rising to the sliding cinders
(Onehehe'e).

The Chiefess moved forward
and backwards.

Descending the length
of Kilohana.

Pu'u Mau'u sits in the calm,
Pu'ukapele juts out,
My eyes rise up with love.
We entered the cool of Kalaieha,
Here is Queen Emalani
The blossom of the māmane
has opened.

Respond Queen Emalani
Kaleleonalani is the name.
[BPBM Archive, *Mele* Collection;
call # fHI.M50; Maly, translator]

The Royal One rises like an early
morning dew
On a journey to tour and visit
We who are dallying should get in motion
The attendants of Queen Emmalani
And rising on the hill, Kala'i'ehā
Huikau is there in the presence of the cold¹⁷
The travel is uncertain oh Royal One
Until we rise onto Pu'uho'okomo
The rise has passed on by
Lingering along the fringe of the koa¹⁸
The children of the cold are slow moving
The cattle whip urges us on
My lasso is flying
Lashed tightly to the pommel
Her Highness has a great desire
To see Waiau with her own eyes
There at the navel of Wākea, the sky father
In the hollow of the mountain peaks

¹⁶ Huikau is the name of a prominent *pu'u*, a short distance east of Kalai'eha *pu'u*. So named because when the mists settle on the ground, travelers are easily confused by the contours of Pu'u Huikau, and have been known to wander about in confusion.

¹⁷ The translation of this line is modified from the 2001 text to take into account the place name of Huikau.

¹⁸ The translation of this line has been modified from the 2001 text to fit more in the context of the region. Humu'ula being the land on the fringe of the sheltering koa trees.

*E ō ke Kuini Emalani
Kaleleonālani he inoa.*

*A Maunakea 'o Kalani
'Ike maka iā Waiau
Kēlā wai kamaha'o
I ka piko o ke kuahiwi
Huli ho'i mai 'o Kalani
I ke ala kāpekepeke
A he ala nihinihi ia
A hiki a i ka mole [Kamole or Kemole¹⁹]
Ui a'e nei o'o Kalani
"E 'uleu mai 'oukou"
"He ihona loa ana ia"
"A hiki i Wahinekea"
'Emalani nō he inoa
Ke ali'i 'a'e kuahiwi.*

...Ō mai 'o Emalani ke ali'i nona ia inoa

Ia hana i Waimea i ke kapa a ka ua

*I kukua mai e Lilinoe
I humu 'ia mai e Kūkahau'ula
E ka piko lālāwai o nā mana'o ā
E ka wai māpuna o ke kuahiwi
I hū nō piha i luna o Paliahu [Poliahu]...*

...Ka helena a Kalani 'imi pono

Ua wehe mai nā kumu lanī

*Ua ahuwale ka pae 'ōpua
Ua kāla'e nā kualono*

*Ua lono Hawai'i a puni
I ka huaka'i māka'ika'i
Uluhūa 'o Kalani i ka lono
Ke kaulana o Kawaihū
Ia wai ia ka lo'u pali o ka pali*

Respond, oh Queen Emmalani
Kaleleonālani, a name song. [page 112]

The Royal One is at Maunakea
To see the lake, Waiau
The amazing body of water
At the very peak of the mountain
The Royal One turned to come back
Along that unwieldy path
And it is a narrow, treacherous trail
To reach Kemole²⁰
And the Royal One offered encouragement
"Be lively, all of you"
"It will be a very long descent"
"To reach *Wahinekea*²¹"
For Emmalani indeed, a name song
For the chiefess who traverses the
mountains. [page 115]

Emmalani responds, the chiefess for
whom is the name
That activity at Waimea in the blanket of
the rain
Beaten out as a coverlet by Lilinoe
Sewn together by Kūkahau'ula
By the fertile center of the thoughts, ah
By the upwelling waters of the mountain
Which gushed forth to overflowing atop
Poliahu... [page 180-181]

...On the journey of Her Highness
who strives for goodness
The foundations of the heavens
have opened
The banks of the clouds are in clear view
The mountain ridges are prominently
visible
Throughout Hawai'i, all have heard
Of this famous sightseeing tour
Her Highness is vexed at the rumor
Of the fame of Kawaihū
That water on the hanging brink
of the cliff

¹⁹ Kemole (Kamole), a *pu'u* and gulch near the boundary of the forest and open mountain lands, on Mauna Kea, towards the Waimea side of the mountain. Kemole also marked the path taken by Queen Emma on her ascent of Mauna Kea.

²⁰ The translation of this line has been modified from the 2001 texts to take into account the place name Kemole.

²¹ Wahinekea is a generally flat land area, with scattered hills, between Kemole and Mānā, where J. Parker's house was situated.

*Ka houpo o Kāne²² ka i luna
'O ka lua kā ko'²³ ka i lalo.*

*Ka houpo o Kāne lies there above
Kaluakāko'i lies below²⁴. [page 201]*

Accounts of Queen Emma's Trip to Mauna Kea Recorded in Interviews with James Kahalelaumāmane Lindsey and Kalani Ka'apuni Phillips

At a meeting of the Mauna Kea Advisory Committee (MKAC; December 1998), Larry Kauanoe Kimura provided me with a copy of a tape recording with portions of two interviews he had conducted with elder members of his family. In the course of the MKAC meeting, Kepā Maly was asked to provide the committee members with an overview of the documentation recorded as a part of the then ongoing interview process. Among the accounts discussed, were those associated with Queen Emma's visit to Mauna Kea and Wai'au (as pronounced) in 1882, and the source of the family name, Kahalelaumāmane. In sharing the interviews conducted in 1966 and 1967, Larry Kimura provided readers with further details about family attachments to Mauna Kea, and of the events surrounding Queen Emma's visit to Mauna Kea and Waiau. It was also from the interview with James Kahalelaumāmane Lindsey, that the term "*Ka piko kaulana o ka 'āina*" (The famous summit of the land), as an expression of love for Mauna Kea was recorded.

Excerpts from the two historic interviews follow, with a detailed account of the Queen's visit to Mauna Kea in 1882.

James Kahalelaumāmane Lindsey October 24, 1966

JKL: These are the children [of William Miller Seymour and Kaluna Ha'alo'u Ka'inapau-Lindsey] — Tom; Keone; Emma; Keoki, and then me, James Kahalelaumāmane Lindsey [Oct. 5, 1882 to Oct. 8, 1972].

About this Hawaiian name Kahalelaumāmane—Queen Emma came to Waimea and stayed with Sam Parker, the family of John Parker them. Queen Emma wanted to ascend to the top of **Mauna Kea**, to go and see Wai'au [as pronounced]. John Parker called my father, William Lindsey, can you take this visitor to see **Wai'au, Mauna Kea**? My father said "yes." At that time, there was very much mist, fine rain fall. You don't know where the trail, there was no true trail to that place. Go up the cliff, steep, steep. Going up zigzag. Well, it came about time to make ready to stop for the night. My father said, "We'll sleep for the night." They were up Kemole, they made a big, big fire from the twigs and branches, and slept. It was warm, it wasn't cold with that fire. They got up early in the morning, the people made ready, and my father got the horses ready. They finished breakfast and continued their ascent to the top of **Mauna Kea**. By ten 'o clock, they reached top, [slaps his hands] "*Piko kaulana o ka 'āina*" [The famous summit of the land].

One is wearied in traveling to **Wai'au**, "*Ka wai kaulana o ka 'āina*" [The famous water (lake) of the land]. [voice filled with emotion] Queen Emma ascended to this place. Many of the people born in Waimea, have not seen **Wai'au**, have not ascended the summit of **Mauna Kea**. No, it's too hard to climb, and they don't know how they are going to get up there when the mist descends. You stay on the mountain for many days, and then you die. It's cold eh! Some people say, maybe we should go to the mountain, "Ahh, we don't want to go, it's too cold." But my father and me, he took them and they returned in good condition.

²² Ka-houpo-o-Kāne (literally, The-bosom-of Kāne), is the sacred region of Mauna Kea (between the 10,000-11,000 foot elevation), in which are found the springs fed by Ka-wai-hū-a-Kāne; by a rivulet from Waiau to the head of Pōhakuloa Gulch.

²³ Ka-lua-kā-ko'i (the adze makers quarries), covering a region around Mauna Kea, extending from around the 10,000 to 12,000 foot elevation, and covering some seven miles of the mountain landscape.

²⁴ The translation has been modified from that given in the 2001 texts, to take into account the place name, Kaluakāko'i.

So they [Queen Emma's party] returned to Mānā, not Waimea. They returned to Mānā. They stayed at Mānā. John Parker was very grateful to my father, and gave him some money. Later on, my father told me—I was pretty big already, and adept at riding horse — “I want you to go to Pu'u Kau so you can see the trail that goes to the mountain. If I should die, there would be no people who could take the visitors.” My older brothers, they only knew the lowlands, half of the mountain, but not on top. So the visitors will get into trouble. The pilot (guide) has to be smart.

So later, Mr. Carter called my father, “Can you take these *haole* visitors to the top, **Wai'au**?” My papa said “Yes.” To get to the top of that place, Wai'au, in my father's thoughts, “You got to ride a horse that is swift, tough, strong, you can't take a weak horse. Cannot! A fat horse, cannot, it'll die.” So my father told Mr. Carter, “Any time you get people who want to go, let me know one week ahead of time. Give me a week to work the horses.” Some times, four, five, six people, or more. Like when Queen Emma them went up, I think there were twelve. There was a lot of work for my papa and the workers. And he had to look for the horse that could go up, it's hard for the horse to go up. There was much work.

So this time, there were five foreigners. I went behind, my father looked about for the nature of the mountain. And at about the 10,000 foot elevation, there are many hills. Yeah, many, many hills. All *pu'u*, all over, the same, when you look, and then, when mist settles, this *pu'u* looks like that *pu'u* [chuckles]. I don't know if we're on the right road. Me, I'd go all around. But my father, no, you got to...don't go below. Us, we're going here, the path is here on this *pu'u*. Otherwise these visitors are going to have trouble. There's not enough to eat, we only brought lunch. From Waimea, we go and sleep at **Kemole**, then, we get up early in the morning and go up. Then we get by Waiki'i...there were many times that my papa went by Waiki'i side. And from **Keanakolu** you can too. And from **Humu'ula**, also. But the Waimea way, **Kemole** way, the ascent isn't too good, it's very steep.

But at this time, there had been a house made below **Wai'au**. About six miles, it had a name...

LK: Hale Pōhaku?

JKL: That's it!... By about ten 'o clock, you can see the sugar plantations at Hilo and Hāmākua, Honoka'a. You can see Ka'ū side. When you get on top, the piko of **Mauna Kea. Piko kaulana o ka 'āina**. Yeah, that's what they say...

LK: How about your name, Ka-hale-lau-māmane?

JKL: Yeah.

LK: How did you get that name?

JKL: About that. Well, that time before, when Queen Emma went to the mountain, **Wai'au**, she told my father that she wanted my mother to go as well. My father told her, she was pregnant, pregnant with me [chuckles]. But she wanted a woman to accompany her. So she asked Mrs. Davis, a big shot, before. But these women, same thing, these two women were pregnant, and could not go to **Wai'au**. So [afterwards] Queen Emma told my father, “If a son is born, name him Ka-hale-lau-māmane.” [chuckles] And she told my father, tell Mrs. Davis, “If you have a son, name him **Wai'au**. Because **Wai'au** is where we are going.”

But **Wai'au** is the one that died first, though we were born at about the same time. October. Wai'au died about ten or fifteen years ago, now.

LK: What is the meaning of that name Ka-hale-lau-māmane?

JKL: Ka-hale-lau-māmane. Well, there was a lot of *māmane* at this place you went up. **Mauna Kea**, that's only the tree, bush *māmane*. When you look today, *māmane*. They broke the

māmane branch, and made a house. You can go hide underneath, and you don't get wet. Yeah. So I have given that name to one of my grandchildren... Carry on the name so that it won't be lost... [end of recording]

Kalani Ka'apuni-Phillips (January 30, 1967)

(Note: audio quality poor, much of the interview is difficult to hear)

KKP: [speaking to Larry Kimura] ...Your *kupuna kāne* [in this case - great great grandfather] William Lindsey. They were equally well known to all their acquaintances. He was well known in the work of the cowboys along with John Parker, the foreigner who came here to this land of Waimea... Your elder came after him, and he was a well known *pailaka* [pilot or guide for Mauna Kea]. Queen Emma, came to Hawai'i Island, and your elder was the guide. He took Queen Emma up to reach the top at **Wai'au**. Yes. Queen Emma went into the **pūnāwai o Wai'au** (spring of Wai'au), she went upon the back of Wai'au Lima. He was a man of Kawaihae. He is a relative. She went upon his back, Wai'au's back, and he swam across this spring, Wai'au. He carried Queen Emma and set her upon a stone on the other side. The people were startled by this, to see them swimming there, Queen Emma swimming there. When your elder came back he was praised...

LK: They rode horses?

KKP: They rode horses...

LK: This was a difficult task.

KKP: Queen Emma was a good horsewoman... She could choose which ever horse she was interested in. Waimea had many horses to choose from. They went up to this place called **Kahalelā'au (Pu'u Lā'au)**, that's the name of this place. At that time, there was great rain, and no shelter. So these people with your renowned elder, they broke the leafing branches of the *māmane*. They made a house for Queen Emma. This work of your elder and the people with him brought him honor. When this house was made for Queen Emma, Queen Emma said to your grandfather, William Lindsey, "In living with your wife, if she should give birth..." That is Kaluna. "Name the child, Ka-hale-lau-māmane."

LK: Oh, that is the name of Ka'aluwea [i.e., James (Ka'aluwea) Kahalelaumāmane Lindsey].

EKP: Yes. That name was from Queen Emma... from when Queen Emma swam across **Wai'au**, on the back of the man, Wai'au Lima. He was from Kawaihae. He was of chiefly class (*kaukau ali'i*), he was not a servant (*kauwā*). Kawaihae is a land that adorns the chiefs. The chiefs were there in early times...

Geological Survey Trip To Humu'ula, Kalai'eha, Ka'ohe, and the Summit of Mauna Kea (1882)

During the summer of 1882, Captain Clarence E. Dutton, of the United States Ordinance Corps conducted a geological survey of the Hawaiian Islands. His first stop on the island of Hawai'i was the district of Ka'ū, then on to Kilauea, and the Puna District. He then traveled into Hilo, and via the old Hilo-Kalai'eha trail, on to the slopes and summit of Mauna Kea. Dutton described the summit plateau, and the presence of workshops where stone was quarried and made into tools and weapons; though he did not comment on Waiau. He then returned to the Humu'ula area, by the route ascended, and went to Kalai'eha, where his party stayed at the sheep station. Dutton and party then departed from Kalai'eha, crossed Mauna Kea, on the western slope, below the summit plateau, and traveled to the Waimea region.

Duttons' report to the Secretary of the Interior in 1883, was published in the Fourth Annual Report of the United States Geological Survey (1884). Excerpts from the report, describing the mountain lands, are cited below:

CHAPTER VII. FROM HILO TO MAUNA KEA.

...From Hilo I decided to make an advance at once upon *Mauna Kea* and to visit the interval between that mountain and Mauna Loa. *Mauna Kea* may be approached from many directions, the easiest lines of access being from the northwest and north. The approach from Hilo is the most difficult of all, because it involves the necessity of traversing the belt of forest which lies between the middle slopes of the mountain and the sea. No one can imagine the density and exuberance of tropical vegetation until he has seen it. In truth, the forest can be penetrated only by hewing a way through it or by traversing a route which has already been cut by main force.

It is well to point out here that the forest region of this island is regulated by the precipitation. The windward side has very heavy rainfall, and a portion also of the western side is similarly favored. Most of the region under the lee of the island is arid, and in many places extremely so. Although vegetation upon the windward side is very abundant, even down to the margin of the sea, it never has that close impenetrable character near the sea-coast which it assumes further inland. The reason for this is not difficult to discern. The windward coast of the island is for the most part very abrupt, and the water which falls upon it rapidly drains away. The trade-wind striking the shore is deflected upward by the gradual ascent of the land, and at heights varying from 1,000 to 4,000 or 5,000 feet the clouds envelop the land in fog and yield an almost constant rain. The effect of this upward deflection producing a condensation of moisture is not so fully felt at altitudes below a thousand feet, and thus we have near the sea-coast a margin of land which enjoys a great deal of sunshine, and even long periods of drought sometimes occur along the immediate neighborhood of the coast, while a mile or two inland it rains almost incessantly. The forest has its maximum density in the region of clouds.

The rainfall upon the windward side of Hawaii is phenomenally great. The mean annual precipitation as shown by the records extending through eighteen or twenty years ranges from 150 to 240 inches. This, however, is the result of measurements made near the sea-coast. Further inland it must be still greater, and may even attain more than 300 inches. Hardly a day passes at Hilo without a copious shower, and in the winter time long continuous rains always occur.

There are two routes leading from Hilo to *Mauna Kea*. One extends along the coast northwestward for about 30 miles, then turns abruptly upwards, striking the northeastern flank of the mountain. The other [page 152] leads directly inland, and passing through the forest belt reaches the southern base of the mountain and the interval between it and Mauna Loa. Each route has difficulties peculiar to itself. The first one leading along the coast strikes into a country which is deeply scored with very abrupt ravines and ridges. Here the land terminates in a cliff from 300 to 500 feet in height, plunging down into deep water; and against the base the heavy swell of the Pacific, driven before the trade wind, is constantly breaking. Along the front of this cliff near the water's edge no pathway is possible. The country can be traversed only by going up and down the walls of the ravines which at frequent intervals score the platform above. The sides of these ravines are very steep, and in many places have all the abruptness of canyons. With much labor, very fair trails have been cut zigzag in the sides, and sure-footed animals may go up and down with perfect safety, but with great labor. Within a distance of less than 30 miles there are upwards of 60 of these ravines of varying depths, and steadily increasing in dimensions as we go northward. The two last ravines into which the trail has been built are very impressive and picturesque. One of these, known as the Waipio gorge, has a northern wall about 1,400 feet high, the slopes probably exceeding 40 degrees. The beauty of the scenery consists more in the richness and luxuriance of tropical vegetation than in anything else, although the boldness and magnitude of the rocky walls are important elements in the picture. Many of these gorges carry living streams which are subject to frequent floods and which inundate very rapidly after the prodigious bursts of tropical rain.

In going from Hilo to **Mauna Kea** I declined the coast route across the gorges, and chose the much more direct line of approach passing through the forest. For two or three miles from Hilo the trail, if such it may be called, for scarcely any trail was visible, led through a country which was quite open and densely clothed with high grass. This grass is worthy of some little mention, for it is an exotic plant. Several accounts are given of the manner in which it was imported. Some describe it as a native of Holland, others as a native of Italy, and still others as coming from the Cape of Good Hope. It is said to have been brought to the island by accident; that the dried grass containing the seeds was used as the wrapping of bottles containing wine or oil; that the seed accidentally scattering at once took root, and finding the soil and climate specially adapted to its growth, spread with marvelous rapidity, and flourished with such vigor that in the moist districts of the island it has almost exterminated all other grasses. In its green state it is hardly fit for pasture. The cattle and horses eat it, but apparently get very little nourishment from it; for leaner and more cadaverous-looking horses and horned cattle it would be difficult to find than those which are pastured in the vicinity of Hilo. So dense and high is this grass that a passage through it on horseback is attended with extreme labor. It looks very green and inviting, but its very inferior [page 153] character as a food for animals is abundantly demonstrated. It is said, however, to be very much better in the form of hay than when green. A dry climate is not well suited to it, and in such localities other grasses appear to hold their own. Perhaps the best variety is one which was brought from Mexico early in the century, about the time that horses were first imported. It is called, locally, *maniana* grass, and wherever it grows forms the richest and most velvety award imaginable. It is highly nutritious and animals are very fond of it. It flourishes best in a medium or very slightly arid climate. It was once universal all over the island, but the Hilo grass in all the wet districts of Hawaii has completely exterminated it.

Upon the outskirts of the village of Hilo we find the end of the great lava-stream which flowed the year before my visit. It is typical *pahoehoe*. From a convenient standpoint in the vicinity we can see the last 3 or 4 miles of this stream, spreading out with a width of nearly a mile over the broad, open, grassy plain which lies just west of Hilo. The view of it is at length lost where it emerges from the forest. So flat is the country just here that by a common optical delusion the lava seems to have flowed up hill, though in reality the descent from the forest to the end of the stream may be anywhere between one and two feet per hundred. The slope, however, is exceedingly small. Within a half mile of the termination the thickness of the lava sheet appears to be very small, not exceeding, I imagine, 20 feet, and generally less. The numberless mounds or bosses of *pahoehoe* were all formed in detail in the manner already described, by repeated outshoots of streamlets from underneath the hardened crust behind. As these belches of lava cool they exclude the occluded steam, and the mass swells up by the formation of myriads of vesicles, and often also by the formation of great hollow blisters underneath. The supply of fresh lava during the last part of the eruption seems to have been quite copious, for the advance of the stream was nearly 300 yards per day.

The people of Hilo had concluded that there was no hope for the preservation of their beautiful village. The advance of the lava straight towards the town had been uniform for several months, and it was possible even to compute the number of days which would be required at this constant rate of progress to accomplish the destruction. As it drew near all portable property was packed up for removal, and many people would have sold valuable realty for a few dollars if purchasers could have been found. At length the end of the stream approached within about two days' march of the upper street. Already two long arms had begun to reach out divergently from the end of the flow, one extending as if to reach around the southern part, the other as if to reach around the northern part of the town, and finally to clasp the whole in its fiery embrace. Suddenly, without premonition, the movement ceased and was not renewed.

This eruption began, as before remarked, in November, 1880, and lasted [page 154] until October, 1881. The eruptions of 1852 and 1855 broke out near the same point on the upper dome of Mauna Loa as that of 1880, and pursued closely adjoining and parallel courses. That of 1855 was much larger and that of 1852 a little smaller than this one. The length of the last flow (1880-'81) was nearly 50 miles, but its course is somewhat tortuous.

Three miles of travel through tall Hilo grass growing in a muddy soil brings us to the verge of the forest. Years ago a trail leading from Hilo up into the central wilderness of the island was cut through the forest and corduroyed. The trees used for the corduroy were trunks of the great tree ferns which form a large part of the undergrowth of the forest. These are soft, spongy, and perishable, and lasted but a very few years. They quickly became rotten, and wherever they were laid the trail has become worse than it would be if they had never been put there. The effects of the incessant rain are now abundantly visible, and that to our great discomfiture. The trail is a mixture of rocks, mire, and fragments of rotten fern-trees. Progress is difficult and extremely harassing. Every few rods some poor animal sinks his fore legs or hind legs into tough, pasty mud, and must be unloaded and pried out. Four miles of this kind of travel was accomplished in the space of about six hours. Suddenly and without warning a sharp turn of the trail brought us upon a wide expanse of naked *pahoehoe*. The relief was indescribable. Nobody would pretend that *pahoehoe* is pleasant traveling. It is good only in comparison with clinker fields and forests. The exchange is that of misery which is intolerable for misery which can be borne readily by the exercise of patience. The animals being exhausted by the desperate struggle, we at once made camp upon the lava rock, finding a pool of swampy water hard by.

We had landed upon the termination of the great flow of 1855, the grandest of all the historic eruptions of Mauna Loa. The next day we had an opportunity to observe and appreciate its immensity. Our route lay upon the upward course of this flow, which soon widened out on either hand until the forest was miles away from us in both directions. Already a few straggling ferns and other humble plants have begun to take root upon its surface, but without a vestige of soil. Except for these stragglers all is now bare rock, rolling in heaps and mounds, twisted ropes and huge wrinkles, with now and then a network of cracks rifting the mass into fragments, and large holes where the arch over some great lava pipe has fallen in. One characteristic of this great flow is the exceptional unevenness of it and the large size of the mounds and hills formed by the *pahoehoe*. It seems to lie very much thicker than in most other eruptions. In many places it has formed high hills or ridges, and everywhere there are abundant indications that sheet after sheet of lava was piled up to form its final mass. The width of it a few miles above its extremity could only be estimated roughly by the eye, and seemed in many places to exceed six miles. In the course [page 155] of an hour the forest was dim in the distance on either hand, the tall *ohia* trees appearing like mere shrubs.

As I looked over this expanse of lava I was forcibly reminded of some of the great volcanic fields of the western portion of the United States, where the eruptions are of such colossal proportions that they have received the name of massive eruptions. Richthofen, after studying many of these lava fields in California and Nevada, was led to the conclusion that they had burst forth from great fissures, inundating large areas of country with fiery seas of basalt. He was led to contrast the immense volume of these rocks with the comparatively insignificant streams which have emanated from Vesuvius, Aetna, and other modern volcanoes, and concluded that the incomparably grander overflows of Western America must have occurred under circumstances differing widely from those of ordinary volcanic eruptions. Although the volcanic rocks of Western America may be considered as very well exposed as compared with rocks of equal antiquity in other portions of the world, they would be regarded as relatively obscure by anyone who has

had an opportunity to inspect carefully the recent lavas of Mauna Loa. I am by no means certain that Richthofen's conclusions are wrong. But here is a lava flow, the dimensions of which fully rival some of the grand Pliocene outbreaks of the West, which demonstrably differs in no material respect, excepting in grandeur, from the much smaller eruptions of normal volcanoes. The flow lasted for thirteen months without interruption, and in that period it is easy to see that an enormous volume of fluent lava could be disgorged from an orifice of no very extravagant proportions. In estimating the volume of materials composing this flow there is one unknown factor, namely the thickness. Probably this can never be ascertained with a satisfactory approach to accuracy. It is extremely variable, and the configuration of the country which it deluged is wholly unknown in detail. The surface of the flow has not as yet been accurately surveyed, and its horizontal dimensions have been subjected only to eye estimates, which are extremely untrustworthy. The want of proper data, therefore, makes it unwise to venture an estimate of its mass. Some impression, however, of its grandeur, may be derived from the statement that for a distance of 20 miles from its termination the average width of the flow cannot be less than four or four and a half miles. The axis of the main stream from its source to its termination is a little more than 45 miles in length. The thickness of the stream in many places is very great, probably exceeding 250 feet, while the average may not exceed 100. Its final solidification has left the general surface extremely irregular, being piled up frequently in ridges or hillocks 50 feet high or more. By far the greater part of this mass is *pahoehoe*, and it was formed no doubt in detail after the manner which has already been described.

Between Mauna Kea and Mauna Loa

A little more than 20 miles from the end of the flow we found ourselves confronted by a high barrier of clinkers stretching far out towards [page 156] the base of Mauna Loa on the left and plunging into the forest on the right. Turning sharply to the right the trail crosses several spurs of this ridge of clinkers and at length leaves the lava field and enters the forest. The character of the forest is now greatly changed. It is no longer a swamp and jungle. We have gained an altitude of about 5,500 feet, and although we are not wholly above the wet region we are in one which is considerably dryer than that which is occupied by the main forest belt. The soil in the summertime is generally dry, and the undergrowth is so moderate that it offers little obstruction to progress. Winding through the forest we come frequently upon open parks densely clothed with mountain grass. The trail ascends slowly but steadily, and as we progress the trees become fewer and the parks larger and more numerous. Numberless trails of wild or half wild cattle traverse the country in every direction. The soil is abundant, but so too are the ledges of lava and fragments of clinker which project through it. Ascending a rocky shelf, ***Mauna Kea*** discloses its magnificent mass in close proximity on the one hand, while Mauna Loa, more distant and yet more grand, rises sublimely upon the other. The prospect towards Mauna Loa is desolate in the extreme. The wide interval between the two mountains is an enormous expanse of ominous black lava, mostly aa and clinkers which seem to bid defiance to all access. The sides of the mountain are everywhere streaked with descending tortuous bands indicating the positions of more recent lava flows. Where these strike the plain below they spread out into wide fields of clinkers. The fact is a significant one, and the explanation does not seem difficult. Upon the mountain slopes the lava runs with great velocity, and the streams are correspondingly narrow. But when it strikes the nearly horizontal plain below its velocity is checked and the liquid accumulates in great volume, becoming viscous by cooling. Its flow is greatly retarded and yet the mass is sufficient to enable it to move with a slow motion analogous to that of a glacier. When the viscosity of the lava becomes very great it is in a condition which enables it to yield to strains of a certain amount, but if that strain is exceeded it is crushed and ground up. The movement which takes place at this stage is partially a plastic yielding, more particularly of the interior and hotter parts, and partly a shattering and grinding up of the outer stiffer and colder parts. This glacier-like motion, however, is possible only with very large masses of

the lava which still retain a sufficient quantity of heat to maintain a plastic condition. Persons who have witnessed the movement of a clinker field in the last stages of an eruption describe it as being so slow as to be quite imperceptible until it has been watched for a long time, and as being attended with a cracking noise which comes in volleys like the report of musketry.

Turning around with Mauna Loa at our backs, the majestic pile of **Mauna Kea** rises immediately before us. The contrast is very great. The eye is instantly caught by the large number of cinder cones which [page 157] everywhere stud its surface, from the summit where they cluster thickly, down its flanks to the plain below. All of them are symmetrical and normal in their outline, and in an admirable state of preservation. They are truncated at their tops, showing the existence of regular craters within the truncated portions. Some of these cones, by a careful eye estimate and comparison with known magnitudes, appear to be more than 1,000 feet in height and more than three-fourths of a mile in diameter. The number is too great to be easily counted. They are most numerous upon the summit platform, but they are very abundant, not only upon the immediate base of the mountain, but at all intermediate zones, and they ramble away far beyond the base like a crowd dispersing from a common center. The general form of the whole pile of **Mauna Kea** is notably different from that of Mauna Loa. Its slopes are much greater. And yet they are very far from being so abrupt as those which are found in the majority of the grander volcanoes of the world. Nowhere do they appear to exceed fifteen to eighteen degrees, except upon the flanks of the cinder cones, and the average profile upon the side here in view is about twelve degrees. The northern front of the mountain, which is not visible, has a slope considerably greater. Comparing this with Mauna Loa, we find that the average slope on the steepest flank of the latter mountain nowhere exceeds seven degrees, and in the longer ones it is only four degrees. Yet, in comparison with other great volcanoes, **Mauna Kea** is rather flat and obtuse.

Its composite character is disclosed at once. It has no dominant central peak or cone like Etna, Shasta, and Teneriffe, which completely overpowers any other features, but it has been accumulated by eruptions from numberless vents, which are spread out over a very large area and cluster most thickly at the central and highest part. Upon the summit are many large cinder cones grouped closely together and planted upon a well marked summit platform. But it is impossible to select anyone out of a dozen of these cones which can be confidently pronounced largest, nor is it possible to say which out of half a dozen is the highest. Cones even larger than those upon the summit are seen at varying altitudes upon the flanks.

Glancing back once more at Mauna Loa, not a single cinder cone of normal type is anywhere visible upon all its mighty expanse. Far up towards the summit are two or three minute pimples, which, upon examination with a strong field-glass, convince us that they were originally intended for cinder cones, but that the attempt was abandoned in a preliminary stage of the experiment. All of that stupendous pile, so far as visible, is built of streams of flowing lava. But **Mauna Kea** consists largely of fragmental material. What proportion of its mass is thus composed of fragmental matter can only be guessed. But the percentage is no doubt great.

The lavas of **Mauna Kea** will be alluded to more in detail hereafter. At present it may be remarked that nowhere in this part of the mount- [page 158] ain are its lavas well exposed. The volcano has been extinct for many centuries, and although the degradation on this side of the mountain has made comparatively little progress, we shall soon find reason for believing that the epoch of final cessation, historically speaking, is quite ancient. The impression produced is that the period which has elapsed since the last sign of activity should be reckoned by thousands of years rather than by hundreds. Soil is everywhere

abundant, and no fresh looking rocks are known. The dense forest comes up only to the level where the steeper part of the mountain begins its ascent; that is, to altitudes varying from 5,000 to 6,000 feet. Above that are many scattering groves with a gradually increasing proportion of open spaces. Up to an altitude of nearly 10,000 feet the mountain is clothed with long mountain-grass, which has a pale yellowish color. The cinder cones have that faint reddish cast often assumed by basaltic *lapilli* which has long been exposed to weathering.

Winding onward by a rough stony trail, where old rotten clinkers and slabs of weathered basalt project up out of the soil, we at length reach a pool of stagnant water, where we make camp. Just before reaching camp the way was somewhat obstructed by a thicket of thorny bushes which at once aroused the keenest interest. They were apparently raspberries, but such raspberries! The bushes were gigantic and the fruit equally so, the berries being over two inches in length and an inch in diameter. Conceive our ordinary pale red garden raspberries magnified two and half to three times in linear dimensions whether in stalk, leaf, or fruit, and we shall have a very good idea of its appearance. Its flavor, however, was somewhat inferior, though by no means unacceptable. The taste of the fruit is almost exactly the same as our common Lawton blackberry. The abundance of fruit was remarkable. For two or three miles the banks and hillsides were covered with them and they could have been gathered by thousands of bushels. They were growing at an altitude of about 6,000 feet, where snow frequently falls in winter and where the climate probably does not differ greatly from that of the coast range of California; though I presume this climate is rather the more equable of the two, being cooler in summer and perhaps a trifle milder in winter.

The journey from Hilo had been a very long and arduous one. Unpleasant as was the struggle with the forest, the journey of twenty miles over *pahoehoe*, so coarse and rough as that of the flow of 1855, proved in the end to be almost as harassing to the animals. The foothold upon the rocks is all that could be desired, but the constant ascent and descent of the smooth rounded hummocks produced an incessant lurching and strain upon the animals the effects of which were now manifest in the shape of sore and scalded backs. Two days' rest was deemed absolutely necessary to recuperate the sore, weary, and half-starved brutes. I occupied the time in tramping over the rolling hills and half-concealed lava beds around the base of **Mauna Kea**, and in exploring three or four [page 159] long caverns or ancient lava pipes, which are quite as common here as they are upon Mauna Loa. No results of any importance attended the investigation. Many specimens of rock were picked up and examined superficially. They have no great variety, but at the first glance they show a well-marked difference as compared with those from Mauna Loa. Olivine is abundant, but is never seen in such excessive quantities. On the other hand, the feldspars are present in great quantity in well-marked tabular, crystals, and many large crystals of augite occur. The groundmass in the majority of cases inclines to bluish gray instead of being greenish black, as in most of the lavas of Kilauea and Mauna Loa. In short, they are true basalts, approaching more nearly the normal type than those we have hitherto seen. The methods of flow are apparently quite similar to those seen on Mauna Loa. The two forms, *pahoehoe* and *aa*, are as distinctly represented and yet there is some difference, especially in the case of *aa*, but a difference which I should find it extremely difficult to define.

Mauna Kea

After two days' rest and recuperation the ascent of **Mauna Kea** was determined upon. The summit is easily reached from the southern side, so easily in fact that no great precaution is necessary in the choice of routes. Still, some routes are much easier than others, and it was thought best, in view of the long and tedious character of the ascent, to take a guide familiar with the mountain. I found a native who had been to the summit

many times and who had hunted sheep, cattle, and goats all over its southern flanks. At daylight the party was in motion with three pack animals carrying photographic apparatus, provisions, and also blankets, in case it should be found necessary to spend the night upon the mountain top. The guide went afoot from preference, a most unusual thing for a *kanaka*, while the rest of the party were well mounted.

Our camp was situated at an altitude of about 5,670 feet, and the top of the mountain was more than 8,000 feet above us. Two hours were spent winding deviously among the foothills and cinder cones around the base of the mountain before the principal slope of the mass was reached. The platform consists of lava beds in a somewhat advanced stage of decay and having much the same character originally as the lava fields which make up the gentle slopes descending away from Kilauea. There are the same alternations of *pahoehoe* and *aa*, but the roughness has been greatly mollified by weathering and by the formation of soil. In many places, especially at the foot of steep slopes, the soil has accumulated to a very considerable thickness, having been washed down from above, and lies in heavy banks. Erosion also has begun its work. Here and there we crossed sharply cut ravines of small depth scoured in the rocks by the torrents. As yet no perennial stream exists on this side of the mountain, but the evidences of frequent spasmodic floods of great power and volume are often encountered. As we reach the principal slope the ascent becomes very rapid, but by no means uniform. Here for a few hundred feet it rises so rapidly that the animals struggle and strain. There it is so gentle that we may jog along at a trot. With increasing altitude the slope becomes greater, and at last we dismount to ascend on foot a continuous slope at an angle of more than twenty degrees. We do not leave vegetation behind us until we have attained an altitude of nearly 11,000 feet.

Most of the route lies through an alternation of rugged fields of lava [page 161] which show less and less soil the higher we ascend, and the fine *lapilli* of the cinder cones, into which the feet sink deeply. The flanks of these cinder cones are never excessively steep, but owing to the very loose character of their component materials the ascent becomes toilsome and very protracted. The cones also become more abundant as we approach the summit. They show no signs of decay as yet, except, possibly, a little weathering of the *lapilli* in the upper layers, which have turned red and brown, while at some little depth the color is still black. It is worthy of note that the *lapilli* of basaltic cinder cones are sometimes red when first ejected, though more frequently they are black, the color depending, I presume, upon weathering. The iron constituents have the form of protoxide or peroxide. Weather usually converts the iron sometimes to peroxide, sometimes into the hydrated form. Many cinder cones, however, preserve, for an indefinite period, even until they are half obliterated, their original black color. In the cones of **Mauna Kea** the *lapilli* as originally ejected were, no doubt black, but have superficially changed to red or brown. All of it is comparatively fine and no large pellets are seen.

About one o'clock, after seven hours of travel without a halt, we reached what may be termed the summit platform, which has an altitude varying somewhat with its inequalities, but averaging probably 12,500 feet. This platform is about five miles in length and two miles in width, with a slightly pronounced ridge running along its axis. Upon this platform stand about a dozen large cinder cones, from 700 to 1,000 feet in height, carrying the extreme apices of the mountain very nearly to 14,000 feet. It is difficult to judge which of these cinder cones stands highest. But it soon becomes apparent that this distinction belongs to one of a group which are clustered thickly together near the western end of the platform. Towards these we direct our steps.

The aspect of the lavas beneath our feet now becomes somewhat different from those seen lower down the mountain. They are lighter colored and some of them are much more compact. A fragment when struck rings like clinkstone, and on being broken shows

a dark, but very compact fracture and an entire absence of the vesicles which are universal in the lavas which we have hitherto seen. Some are vesicular, others glassy or obsidian like. It is interesting also to note the effect of weathering upon the summit. These lava beds have evidently lain for a long time exposed to the action of the elements. In a few places are to be seen traces of running water. But for the most part the weathering simply amounts to a slow decay and dissolution of the rock in place. Some of the sheets have been broken up into small fragments, and by the gradual dissolution of the exterior portions the angles have become rounded and the fragments smoothed off. In one place we crossed what was once probably an old sheet of lava. This is now reduced to a mass of rounded stones separated by considerable intervals.

As we approach the western end of the platform we gain notably in [page 162] altitude, and at length find ourselves in a spot where in almost every direction we are hemmed in by large cinder cones towering to a considerable height above us. Here we halted for a midday camp. We brought up a few sticks of wood to build a fire, and enjoyed a cup of coffee, a few slices of bacon and some bread. The guides suffered somewhat with mountain sickness, and the animals betrayed the effects of the unaccustomed altitude, for we were more than 13,000 feet above the sea. There is no difficulty in ascending the summit cones which are composed of fine loose *lapilli* and about 800 feet in height. The prospect was a total disappointment. The country below was completely buried in clouds, out of which the mountain rose like a great island. But to the southward was the mighty dome of Mauna Loa, rising above the clouds which floated about 6,000 feet below the summit. It seemed very near, though in reality it was about twenty miles distant. The great caldera was distinctly seen with portions of its encircling wall. There is a partial opening or gap in this caldera towards the north which enables the observer from **Mauna Kea** to look into it. And so clear is the atmosphere at these high altitudes that with a good field glass many details of the rock faces are easily discerned. To the southwestward and rising about 2,000 feet above the clouds was the summit of Hualalai, presenting an aspect quite similar to the summit of **Mauna Kea**, but upon a smaller scale. To the northwestward the dome of Haleakala, about eighty miles distant was in full view. By means of a field glass it was possible to discern easily the cliffs inclosing its vast caldera, and one or two of the cinder cones within it. A purer atmosphere than that which prevails here at high altitude, it is impossible to conceive. Even the summit of Haleakala is seen in its natural colors without any of the adventitious tints usually imparted to distant objects by a hazy atmosphere. Now and then a glimpse is caught of some small portion of the country below from momentary openings in the clouds. Upon the leeward side of the island short stretches of sea coast are here and there disclosed, but from so great an altitude they have a strange visionary aspect.

Several hours were spent in photographing and in rambling about the platform in search of whatever might be found. Hard by the noon-day camp is a mass of very light-colored lava which seems at first to have a constitution notably different from the very black almost ultra basalts to which we have thus far been accustomed. It is exceedingly compact and fine grained and has a very light gray color. The fresh fracture, however, is notably darker than the smooth weathered surfaces. It has been called a feldspathic rock, meaning, I suppose, a rock more nearly allied to the trachytes than to the basalts. Other observers have called it phonolite, probably because it is highly resonant when struck. But the term phonolite is now used by lithologists to indicate a special and limited group of rocks having a tolerably definite chemical constitution and possessing nephelin as its most characteristic [page 163] mineral. This light-colored rock of **Mauna Kea**, however, is undoubtedly a basalt possessing an abundance of triclinic feldspar in exceedingly minute crystals and without olivin. It appears to be identical with a very large proportion of the basalts occurring in the western portion of the United States. This rock was used by the primitive Hawaiians for making their stone implements, for which it is very well suited,

being very hard, tough, fine grained, and free from vesicles; and it flakes readily. Hard by are abundant vestiges of the work of manufacturing weapons and tools; and incomplete products in all stages of manufacture, with large quantities of flakes, lie scattered about.

No signs of any recent volcanic activity are to be seen. All the lava beds look old and greatly weather-worn. In some of them the decay and disintegration are so far advanced that they are reduced to mere heaps of weather-beaten fragments. How these lava sheets have thus been torn to pieces, as it were, and reduced to piles of moldering ruins I can explain only by suggesting the action of frost and ice filling the cracks and wedging the pieces apart by expansion. To this, however, should be added the wasting away of the pieces by the solvent action of the rains. A few hundred yards from our noon camp is the head of a ravine which has been scored to a considerable depth by the unmistakable action of running water. Thus erosion has made a good beginning here, and under circumstances where its action is undoubtedly slow and spasmodic. This ravine has at one part a depth of nearly 70 feet, and is exceedingly rough and much obstructed by fallen fragments. The cinder cones, however, do not appear to have suffered much from the ravages of time. Their preservation is no doubt due to their open, porous character. The rain can never fall fast enough to start a torrent or even a minute rill upon their surfaces, but sinks into the interstices at once. Everything indicates that a long period has elapsed since these vents became silent.

The temperature at the summit in the daytime was rather mild, being about 50° F. The air was calm, only a very light breeze blowing. But we knew quite well that the temperature would fall greatly during the night time; and the lightly-clad *kanaka* is not fond of cold. As a minute exploration of the summit promised little of special interest beyond what had already been seen, I decided to seek a lower altitude to pass the night. As we started, the day was drawing towards its close, and as we reached the verge of the summit platform the sun was near the horizon. Meantime the clouds to the southward had dispersed, revealing the whole northern side of Mauna Loa, which rose in indescribable majesty before us. Through the clear, pure atmosphere every detail was visible. Innumerable recent lava streams could be seen stretching their tortuous courses from the upper dome down to the plain below, spreading out in enormous fields of blackness and roughness. Three long streaks in particular attracted the attention. One upon the northwestern side, starting from a point a little below [page 164] the summit, reached down the slope into the broad interval between **Mauna Kea** and Hualalai, and vanished away in the distance towards the sea-coast. This I had no doubt was the flow of 1859. Far to the left, upon the northeastern slope of the mountain, could be seen two streams which had flowed out from a year to a year and a half before. The one emanating from the point east of the mountain was the stream which first broke forth in November, 1880, and rushed rapidly down the slope directly towards **Mauna Kea**. The other, which was the last of three distinct streams from this eruption, started from a point lower down the mountain, flowing northeasterly then turning towards Hilo. Many other streams were distinctly visible, wearing an appearance of recency. Down the main slopes of the mountain these floods are comparatively narrow, having widths which might be from half a mile to a mile. But as they reached the plain between the two great volcanic piles they spread out into immense floods, which are mostly *aa*. The appearance of the plain thus deluged by the frequent outpours from Mauna Loa is black, desolate, and horrid in the extreme. They end very abruptly upon a sinuous line, where they meet the ascending slope of **Mauna Kea**.

The sun disappears and the brief twilight follows. At length we enter the clouds and move on in the mist and darkness, reaching camp a little before midnight.

In the afternoon of the day following the ascent of **Mauna Kea**, I moved camp about five miles further westward, to a locality called **Kalaieha**. This point is now used as a sheep

station. The pasturage upon the slopes of **Mauna Kea** is very abundant and rich, but there is no water. At first it was a mystery to me how these animals could flourish with nothing to drink. It appears, however, that the fog is so abundant that a night rarely passes without more or less rain or a condensation of vapor sufficient to thoroughly saturate the grass, and the animals thus obtain sufficient moisture from the grasses they feed upon. They seem to thrive very well, and I have never heard of any serious loss arising from want of moisture.

Kalaieha is situated near the summit of the pass between **Mauna Kea** and Mauna Loa, at an altitude of about 6,900 feet. Both to the eastward and to the westward there is a very gentle slope towards the ocean, so gentle in fact that from here it appears to the eye like a broad level plain. The lavas from Mauna Loa have flooded it again and again, and are now outspread over a vast expanse in fields of black, ominous, naked aa. These lava floods stretch all the way up to the very base of **Mauna Kea** and find a sharp line of demarkation upon its lowest slopes. The base of **Mauna Kea** is well covered with soil and volcanic sand, giving life to an abundant herbage and no inconsiderable number of trees, thus offering a strong contrast to the desolation and blackness of the lava fields beyond. Around us are very many cinder cones, some of noble proportions, and from the summit of any one [page 165] of them we may obtain an overlook of these Phlegrean fields. The sense of desolation which they awaken is exceedingly impressive. In the preceding chapter I have already mentioned how the descending lava streams from Mauna Loa spread out over wide areas when they strike the comparatively level platform below. It is often difficult to distinguish one field from another, so intimately are they blended together and so faint is the distinction of color. Only when some field of extreme recency has been spread out like that of 1881, disclosing a superlative blackness, is it possible to comprehend its full extent and individuality, by its contrast with fields a little older and just beginning to show the first effects of weathering. The entire prospect conveys to the mind the idea that these flows succeeded each other at very brief intervals and that all of them are of great magnitude. The portion of any coulée which is comprised in its course down the mountain slope invariably bears a small ratio in respect of mass to the quantity spread out upon the lower plain. Nor do these currents by any means stop always at the base of the mountain, but deflect sometimes to the eastward, sometimes to the westward, according to the slope of the land. They stretch onwards towards the sea for a distance of many miles, and not a few of them have entered the ocean. This was the case with the great eruption of 1859, which entered the sea upon the western coast of the island, while the last eruption of 1881 came within about a mile of the sea at Hilo upon the eastern coast.

Several days were spent at **Kalaieha** searching for varieties among the lavas and for such other facts of interest as might present themselves. Very little, however, was discovered. The lavas of **Mauna Kea**, especially around the base of the mountain, show but little variety, and those of Mauna Loa are even more homogeneous.

Leaving **Kalaieha**, my next objective point was the valley of Waimea, on the northern side of **Mauna Kea**. To reach it, it was necessary to go over the mountain. This was not a serious undertaking, for it presents no difficulty except the length of the journey, and this is readily overcome by dividing up the march between two days. The mountain was crossed upon its western flank by an easy trail and our camp was pitched near the summit of the ridge. From this point a fine view of Mauna Loa and Hualalai is presented. The huge lava streams descending from Mauna Loa to the northwest between **Mauna Kea** and Hualalai are distinctly visible and present a most suggestive aspect. The best defined among them is the great flow of 1859, which is visible in all its extent, reaching from a point near the summit to the sea, a distance of about 35 miles. The interval between **Mauna Kea** and Hualalai, which, reckoned from base to base, is about twelve miles, has been traversed by

a great number of such lava floods within a very recent period in the history of the mountain. Viewed from a lofty standpoint on **Mauna Kea**, the general grouping of these beds and the long flowing profile which they have generated are presented to the eye most vividly. [page 166]

It is easy to imagine how, step by step and by flood after flood, this part of the island has been built up by the simple superposition of numberless lava streams.

Plains of Waimea

Descending the northern slopes of **Mauna Kea** the plains of Waimea at length are reached. These plains are bounded by Kohala Mountain on the north and **Mauna Kea** on the south, and form a moderately elevated pass hardly 3,000 feet high between the east and west side of the island. The western declivity of this pass is arid, hot, and barren, suggesting the desert plains of Nevada. The comparison is strengthened by the occurrence of cacti, which seem to be very closely related to some of the opuntias of southern Nevada and Arizona, and the first impression is that they are merely varietal forms of the common prickly pear which have here attained a considerably larger size, but without any other change of habit. But the ubiquitous sage (*Artemisia*) is wholly wanting and seems to be about all that is needed to complete the similarity of the picture. In place of it are many low, sickly, stunted shrubs having the air and habit of desert plants quite as distinctively as the American sage. As we approach the summit of the pass there is a gradual but rather rapid increment and freshening of vegetable life. From the summit to the eastern coast the descending slope is clothed with abundant vegetation, which soon becomes a tropical jungle similar to that which we traversed in passing from Hilo to the base of **Mauna Kea**. Thus in the course of a very few miles the journey from west to east over the plains of Waimea will lead us from a region as truly desert as Nevada to a region where the ground is muddy by incessant fog and rain and incumbered with the densest of tropical forests. The cause of this extreme contrast is easily discerned. The perpetual trade wind striking the eastern coast is thrown upward nearly 3,000 feet in the course of about fifteen miles, and is depleted of a great portion of its moisture. It then descends as rapidly to the western coast, and of course becomes very dry. Through the Waimea pass a powerful breeze is always blowing from east to west. Its effects may be seen in many ways, some of which are sufficiently striking. All of the cinder cones, and there are many of them scattered around the base of **Mauna Kea**, are deformed, being built up more upon their western than upon their eastern sides. The steady wind has caught the showers of *lapilli* as they were projected upward and caused them to fall in much greater quantity upon the western sides, so that the vents are situated upon the eastern sides of the cones, giving them all a uniform aspect of deformity. The effect of the wind is also seen in the steady drift of the sand dunes, and even the clinkers scattered about upon the plains show a marked wearing upon their eastern sides by the ceaseless action of the sand blasts.

The little village of Waimea is situated upon the southern base of Kohala Mountain, a little west of the summit of the pass. It is a beautiful spot, seeming as we approach it from the south or from the west [page 167] like an oasis in the desert. It lies just upon the verge where the arid region passes into the moist. A stream of delicious water, and perennial, comes down from Kohala Mountain, and flowing towards the western sea gradually sinks into the earth long before it reaches it. Like most other Hawaiian towns it is but a faded remnant of a population which was once considerable. There is still some thrift here, arising from rather exceptional advantages for pasturage. Curiously enough, horses and cattle seem to thrive best in a desert country when left to their own natural ways and devices. This is as true of these tropical islands as it is of Western America.

From Waimea we obtain a superb view of the northern flanks of *Mauna Kea*. As compared with the southern portion of that mountain there is one notable difference. This is in the amount of erosion, which is at once seen to be very much greater upon the northeastern or windward side. Several huge ravines are visible, commensurate in their proportions with the magnitude of the mountain. An observer viewing these gorges from the northern and eastern sides would be apt to conclude that a very long period of time has elapsed since eruptions of lava and cinders have ceased to exercise any appreciable effect in building up the mountain pile. Viewing it upon the opposite sides, he would be equally apt to infer a relatively brief period since the cessation of volcanic action. The difference in the effects of erosion upon the two sides is certainly very great; but I can hardly doubt that it may be fully accounted for by the difference in the precipitation alone. In noting the effect of atmospheric degradation upon the rocks of these islands, as well as in other countries, I have been most forcibly impressed at all times with the enormous disparity in the rates of weathering, where the only variable factor is the amount of atmospheric moisture. Wherever the climate is moist the lavas decompose with great rapidity, so that a very few years are sufficient to produce a very appreciable amount of superficial disintegration, and to start the vegetation growing upon the rocks. Wherever the climate is dry rocks of identical character—nay, even identical streams, passing from a wet to a dry region—preserve their freshness for probably a century or more. Many instances may be seen here of lava flows which descend through a belt of moisture to some of the driest regions along the western coast (most notably in Kona), and as a general rule the portions which are situated in the moist region will simulate very great antiquity, while the portions in the arid belt upon the coast will look extremely recent. We should of course expect to find the degradation of rocks much greater in a wet locality than in a dry one, but the difference is considerably greater than might be at first supposed. [Dutton, 1884:168]

Surveyor's Ascent of Mauna Kea (1889)

E.D. Baldwin, Kingdom surveyor, and author of the Mauna Kea and central Hawai'i mountain lands Register Map No. 1718, traveled from Hilo, across Pi'ihonua, to Halealoha and Pua'ākala; then across Humu'ula, and past Kaupakuhale (identified by typographical error in the Hawaiian Annual as "Kaupaloihale"), to the summit of Mauna Kea in August 1889. In the Hawaiian Annual of 1892, he provided readers with an account of the journey, including interesting descriptions of the mountain lands, vegetation, and the occurrence of wild cattle:

A Trip to the Summit of Mauna Kea (1889).

Mauna Kea, so seldom visited by any one, yet claiming universal admiration, as it looms up gradually and beautifully decked in its shroud of snow is truly named the "White Mountain." What wonders there were to be seen thereon, amongst its numerous cones, which looked like so many mole hills from the distance, could only be ascertained by actual ascent. Thus, with expectations rife to aid the arduous duties of an advance surveying party—consisting of six—we left Hilo at eight o'clock A.M. of August 6th, 1889. We followed the Hitchcock road to near Bougainville—a distance of about four and one-half miles—where the road enters the woods. They call it a mile and three-quarters by measure through the woods. We believed the distance correctly measured; but some of the party thought it the longest mile and three-quarters ever traveled. We sympathized, however, with them and wondered if it could be possible for the chain to have stretched. Evidently the road through the woods had not been used very lately. The *oi* bushes and ferns had interlocked across the road, hiding from view the numerous mud holes. Our animals were not very fond of mud, or of pushing through the *oi* and fern jungle—though some of them came from Hilo. But for all that they plunged bravely through the *oi*, only to land in a "slough of Despond;" into one of such places one of our pack mules became so firmly imbedded that we had to unload him, and pull him out by main force. Many quizzes about this time came from down along the line, "Was there any end to the woods?" "Were

we ever going to get out?” But the woods suddenly ended, and what a contrast! As we emerged from those beautiful Hilo woods, where the *ieie* and *iiwi* vines vie with each other in their attempt to wreath the trees with beautiful garlands. Before us lay a bleak waste.

We were at the end of the 1855 flow, at a point where the 1881 flow had overlapped it a little. To our left, the 1881 flow stretched out like a huge glossy black monster. To our right, thinly covered with stunted *ohia*, ferns and numerous *ohelo* bushes, stretched the great 1855 flow. After refreshing ourselves on some boiled eggs, which one of the party had considerably, brought, and resting the animals a little, we proceeded on our trail over this older flow. For about half a mile it was very narrow; from thence it had banked up fully between 200 and 300 feet above the surrounding country, and spread out over two miles in width. One could only imagine what [page 54] consternation this great flow, directly above and only seven miles from Hilo, must have caused its residents as month after month it banked itself up here, extending even to the Wailuku river; then broke out near the center of the embankment with a sudden rush, and made directly for Hilo, but only to reach a distance of about a half mile, where it ended its mad career.

Our advance over the flow was slow and tedious. The trail, marked every few hundred yards by piles of stones, being very rough and hardly visible in places. Bleaching bones of many poor animals lay strewn all along the trail. Night overtook us before we reached a suitable camping place, but as it was moonlight we pressed on to the *aa* part of the flow, some twenty miles from Hilo. The flow at this point is not more than a mile in width. Our trail then turns to the right and enters the woods again, where a short distance brings us, about eight o'clock P.M., to **Halealoha**, our camp for the night. Our barometer gave this point an elevation of 4,050 feet, being nearly the same elevation as the Volcano House.

The next morning two of the party started on ahead with the rifles. The trail leaves the woods about two miles from **Halealoha**, thence skirts along over *pahoehoe*, mostly near the edge of the woods. Many sheep paths cross and recross this section of the trail, making it very difficult at times to keep the right trail. We are now nearing the main base of **Mauna Kea**, which looms up in its full majesty before us. A sudden turn in the trail to the right carries us off from the Mauna Loa lavas through a narrow belt of woods to Hitchcock's camp, **Kipukahina** [Kipuka-āhina], about five miles from **Halealoha**. We are now on the slopes of **Mauna Kea**. The whole character of the surrounding country has changed. Instead of a bleak waste of lava there are open fields of fine pasture land. A short way below **Kipukahina** two wild young bulls were shot, which gave us plenty of meat for several days. Leaving **Kipukahina** we stayed off on a sheep trail, but headed for **Puu Oo**, where we found the trail leading around the mountain towards Waimea, which we followed, reaching **Puakala**—Hitchcock's mountain house—at five o'clock P.M. This house is sixteen and a half miles in a direct line from Hilo, but about thirty-five by the trail. The Hitchcocks had kindly invited us to make this point our headquarters. What a surprise it was to find, at this distance, such a large comfortable house, built of solid *koa*, all of which had been sawed out by hand! It was surely mountain luxury to lay off in [page 55] comfortable rocking chairs before the large, open, old-fashioned fireplace. The elevation at this point is 6,325 feet.

The rest of the week was spent getting out poles for the **Aahuwela** trigonometrical point. A fire had evidently passed through the woods some time ago, killing all the *ohia*, so that we had to go about a mile below **Puakala** for suitable poles. These we dragged up the hill with our mules, setting up a large tripod signal which was clearly seen from Hilo later. We lived high and well at **Puakala**; neither did our six cooks spoil the broth; but a specialty from each one helped to swell the bill of fare each meal. One made such fine biscuit, another such soup, another veal pies, another oyster fritters, and another still hit the climax by making *akala* (wild raspberry) pies.

Monday was set as the day for making the ascent of the mountain. We all rose before daylight, but found some of the horses gone, which were not found until noon. This necessitated our giving up the trip for that day.

Tuesday, after an early breakfast, four of the party made the start of the summit. Two of the party were rather overcome by too high living, and did not feel well enough to make the ascent. There is no regular trail to the top. Numerous cattle trails traverse up the flanks of the mountain. We followed some of these main trails up to two sand cones called **Kaupaloihale** [**Kaupakuhale**]. To this point the ascent is very gradual, passing mostly through a scattering grove of *mamane* trees, which, with the exception of a few *koa* trees, seems to be the only tree that grows above the regular forest line. Numerous small gulches cut the sides of the mountain. The soil is very sandy, the sides of the mountain being made up mostly of disintegrated *aa* flows and sand cones, the latter being especially numerous. Leaving Kaupaloihale the cattle trails soon terminate and vegetation grows very scarce, the tree limit ending at the foot of Kaupaloihale. We now had to pick our way over loose blocks of scoria, which were more or less rounded, and in many places the blocks had been packed in smooth even layers by the action of the snow.

Over such places the animals easily picked their way. On reaching the top plateau, the ascent became much more gradual. About three miles from the top one of our mules gave out; so left him behind, securely tied to a large rock, with a feed of oats near by. We headed for a group of cones, which seemed to be near the center of the plateau. The last part of the climb, up between two of these cones, was very steep and rough. The texture of the scoria is somewhat different [page 56] here, being of a light bluish gray color; rings when struck and splits in regular smooth layers; the feldspars being present in large quantities. Looking toward the space between Mauna Loa and **Mauna Kea**, a grand sight presented itself to our view; this space was filled in with immense banks of spotless white clouds, which we looked down upon from our elevated point of view.

Passing the cones we pressed on some two miles further west, in hope of finding lake **Waiau**. Camp was pitched in a sand hollow while two of the party further looked for the lake, which was found quite a distance above us, among the central cones. Our camp was fully 13,000 feet in elevation, and distant from **Puakala** about ten miles. The air at this elevation becomes very rare, and any over-exertion is liable to tell on one not used to it, to which two of the party can well testify. The wood for our use was packed up in bags from **Puakala**. The animals were very uneasy during the night, clawing up large holes in the sand, chewing off and breaking their ropes. One mule persisted in hanging around the tent all night, barking all of our wood and tearing up a horse blanket and enamel cloth.

Shortly after daylight we struck camp and started back, visiting the lake on the way, which we found to be about 200 feet long by 150 wide. It occupies a small crater between two sand cones, about half a mile directly west from the central cone. The shores of the lake are composed of sand and rock, the sand being very compact. The water was muddy and very stagnant. Selecting the cone which looked the highest we made the ascent, packing the four-inch transit and a flag pole up on horseback. The transit level showed this cone to overtop all the others considerably. This cone is fully 800 or 900 feet higher than the main plateau, and composed of sand and cinders, with here and there masses of loose slag cropping out. The view from this elevation of 13,805 feet above the sea level was grand beyond description. Mauna Loa's smooth outline was only broken by the view into its crater, its side towards **Mauna Kea**, blackened and streaked by the numerous eruptions, was desolate in the extreme; the later flows could be easily traced down the mountain side by their shining surfaces, and through the woods toward Hilo. These flows are very narrow on the steeper slopes of the mountain, where the lava has run with great speed. On reaching the plateau between **Mauna Kea** and Mauna Loa the flows have turned,

some to the right toward Hilo, and others to the left toward South Kohala. The speed of the flows, being retarded [page 57] they have spread out in width, in many places covering immense tracts of country.

The central group of cones consists of four; about three miles further to the north another group of several very prominent cones stands on the northeastern edge of the main plateau; also, at the same distance south towards **Kalaieha** there are a large number of sand cones. With the exception of a few the cones had small craters at their summits, having the appearance of being cut off on top and being very regular in shape. Their state of regular preservation is owing to the loose character of the cinder and *lapilli* that form them, which slide and roll, quickly filling up any crevices which may be formed in their sides. The top plateau slants gradually in all directions from the central cones; its greatest width, about eight miles, extends in a north-east to south-west direction. It has a very desolate appearance, and with the exception of a very few clumps of a hardy grass there is nothing growing. The whole formation and texture of the mass of **Mauna Kea** is very aged, there being no signs of any late volcanic action.

Our descent was slow and tedious. We found our played-out mule gone. Fog set in thicker and thicker as we descended; only a short distance was visible around us. We pressed steadily on down, crossing our **Puakala** trail several times without recognizing it. Night set in, but the fog did not lift; it became intensely dark, and we almost despaired of finding the house, when all of a sudden our headway was stopped by a fence. Recognizing it as the inclosure of the **Laumaia** pasture, and that we were on the lower side of it, we followed the fence back—about a mile—to the road, and trusted the rest of the guidance to our animals, who carried us safely back to the house, which we reached at eight o'clock P.M.

A trip to the top of the mountain can not be said to be one of very great pleasure. The rarity of the atmosphere takes away one's energies in a most surprising manner, but the after effects of the trip are very exhilarating. As you descend from the summit life seems to come back again, slowly at first, but at about 10,000 feet elevation you feel almost like a new man, and as hungry as a bear.

The intention of the party was to make a rapid topographical survey of the summit plateau with the stadia. This was given up for the present; but it is hoped that such a survey can be made in the near future with the assistance of photography. [E.D. Baldwin, in the Hawaiian Annual, 1892:54-58]

Pendulum Party's Ascent of Mauna Kea (1892)

In June 1892, W.D. Alexander, Surveyor General of the Kingdom; E.D. Preston, astronomer with the U.S. Coast and Geodetic Survey; W.W. Chamberlain, L. Koch, and W.E. Wall, traveled to the Island of Hawai'i to ascend Mauna Kea—the journey undertaken between June to July 1892. At Kalai'eha, the party was met by A. Haneberg, of the Humuula Sheep Station, and also joined by surveyor, E.D. Baldwin, and J.J. Muir. The purpose of the trip to Mauna Kea and the *'āina mauna* was multi-faceted, with interests of the Hawaiian Government Survey (perfecting the survey of the mountain lands); and the U.S. Coast and Geodetic Survey (collection of magnetic readings and determining the mean density of the earth).

Communications between Alexander and Preston, representing the governmental interests in the Mauna Kea work began as early as 1889. Various letters, articles, maps and photos, found in the collections of the Hawai'i State Archives (HSA), State Survey Division, NOAA National Library (NOAA), National Archives and Records Administration (NARA), and the Hawaiian Historical Society Library (HHS), provide us with some of the most significant documentation of cultural features, the historical landscape, and historical land use, found to date.

Through the combined accounts, we learn of several important cultural and historical activities, including, but not limited to: the traditional practice of burials being interred at Lilinoe, and at other locations in the summit region; that an *‘ahu* (cain) was erected to commemorate the visit of Dowager Queen Emma to the summit of Mauna Kea; and of the adze quarries. Alexander also reported that by June 1892, the gorse, an unwanted introduction to the Humuula Sheep Station lands, was becoming a pest, and that eradication efforts were being employed by the lessees of the land.

The letters and accounts that follow below, dating from 1889, are among those reviewed, describing—planning for, and the purposes of the trip; the landscape of Mauna Kea in 1892; and the work of the Pendulum Survey Party:

Washington D.C.

August 12, 1889

E.D. Preston; to Professor W.D. Alexander

(Proposing a “Pendulum” survey trip to Mauna Kea):

...In view of the fact that there is now under consideration the making of pendulum and meteorological observations* at the summit of **Mauna Kea** early next summer, I would like to ask you for an approximate estimate of the cost of occupying two stations on Hawaii; one at the sea level and one between thirteen and fourteen thousand feet higher. Can you tell me also what the occupation of Haleakala in 1887 cost the Hawaiian Survey? Is the summit of **Mauna Kea** reasonably accessible, and on which side is the best approach & I think the sea station for gravity should be on the lee side, somewhere near Puako if it is not always cloudy there. The best time would probably be June or July. Would the Hawaiian Survey lend an aid as assistant observer if it were necessary for a few weeks? I doubt if money enough can be had to pay the expenses of an assistant from Washington.

The plan has not yet taken definite shape. The general outline of the scheme, however, is for the Bache Fund of the National Academy of Sciences, with possibly some help from the Elizabeth Thompson Science Fund, to furnish the money, and the Coast Survey to lend the instruments and let me have a leave of absence to do it. I write this merely in anticipation of what may happen. Professor Dana takes great interest in the project; in fact if it is done it will be entirely due to his influence.

By this same mail I send you a proof of my Bulletin three maps will appear with it, but I cannot send their proofs.

Washington, D.C.

June 20, 1890

E.D. Preston; to W.D. Alexander:

(Regarding proposed “Pendulum” survey trip to Mauna Kea):

...I find your two letters here on my return... I have neither seen the Sup't. nor heard from Professor Dana since my return, but I hear that we cannot undertake the **Mauna Kea** work before next summer. I want to get out my report on the African work as soon as possible – and the full report on the Hawaiian work is now passing through the press & they want me to do the proof reading. How many copies would you like to have for the use of the Hawaiian Gov't survey & I will write to Prof. Dana today to see if the appropriation will be available for 1891 as well as for 1890. When I know definitely how we stand I will write you again. I congratulate you on having Mr. Dodge again... [HSA – ID Survey, 1890]

* Probably some magnitude obs. may also be made.

**April 7, 1892
Honolulu, H.I.
E.D. Preston;**

**to Professor T.C. Mendenhall, Sup't Coast & Geodetic Survey, Washington D.C.
(Regarding preparations for the Mauna Kea Survey, and status report on work
undertaken in Hawai'i to the date. Preston also reported that there was political
unrest in the Kingdom, and fear for Queen Lili'uokalani's position):**

...Until quite recently we have been unable to say just how long it would be necessary to observe at Waikiki. It was once thought that possibly we could double up a little on the last part of the program making the connection between Groups VIII and Group I and probably extending the observations to include Group II, finishing sometime in May. The weather however has been so bad that this part of the series cannot be made as complete as others without going on through June. Dr. Marcuse tells me that Professor Hilmut desires him to make the connection up to Group II which will furnish one more conditional equation in the final adjustment, and more over June is about the time when we may look for a recurrence of the motion brought at the beginning of the observations here last summer; so that it may be said definitely that the work will close on or about July 1st.

There then remains the gravity and magnetic work outlined in your instructions of 22 March 91. The observations on **Mauna Kea** which are the most important will be made first. This work must be done in the late summer or early fall as the summit is only accessible during this period on account of snow. It is therefore my intention after closing the observations here, to determine gravity in Honolulu at the base station of 1877 and then leave immediately for the windward islands, landing probably first on the leeward side of Hawaii. This will enable us to put in the gravity and magnetic station at the sea level, while making preparations for the ascent, and if there is unavoidable delay in getting the requisite number of pack animals, help, &c, the time can be employed in the magnetic observations at the other stations on this island. Kealakeakua Bay (Captain Cooks station) is on the same side of the mountain and can be reached on mule back in a day. The road is simply a trail over lava and carrying any thing by cart is entirely out of the question.

There would no doubt be difficulty in working at an altitude of 14 thousand feet soon after leaving the sea level, and as some reconnaissance will be necessary to find a suitable station, it is proposed to stop just above the cloud line, and where grass and water may still be found for the animals, and make a determination here while selecting a place at the top. This point which is at an elevation of about 8000 feet, will be our base of supplies while up in the crater. Of course at the summit there is no subsistence and all animals and packers must be sent back to await the completion of the observations. Vegetation ceases I think at about 9000 feet and wood as well as water must be packed up to the camp every few days.

This gravity station on the mountain flank will be interesting in showing whether the law of change is the same for the lower and upper half of the cone. Besides the gravity and magnetic work on the top I want to determine latitude; partly to see if there is any deflection of the vertical, but principally because Surveyor General Alexander wishes this done for his triangulation and has promised to aid my work in the matter of transportation and the services of one or two aids. After the completion of the **Mauna Kea** work there will be magnetic observations on several of the other islands, especially at Lahaina on Maui where Dr. Freycinct observed in 1819 and at Waimea on Kauai where the Russians were in 1815.

In regard to your question (letter of 29 February) as to how long I shall be able to stay without more money it is impossible on account of the nature of the mountain work to make a very close estimate of the expense. At the end of the International observations,

here at Waikiki there will be left something over 400 dollars. This is to be expended in the gravity work in Honolulu, the **Mauna Kea** observations and the magnetic work on the other islands. I had hoped not to ask for more funds and still trust that it may not be necessary but as it is uncertain yet how much help may be coming from the Island Government, it would be wiser to leave the matter in reserve for two or three months. I should feel easier and it would facilitate the shaping of the end of the work of the expedition if it could be known before hand whether a few hundred dollars more would be available in case it were needed. Could you inform me on this point by return mail. I shall not ask for it unless it seems for the best interests of the work to continue the observations to a certain extent.

My uncertainty in regard to help from this Government comes from the unsettled condition of political affairs. You probably know that the McKinley bill has had the effect of decreasing the revenue of the islands by about 5,000,000 dollars during the year. This has made times hard; the natives are becoming dissatisfied and a change of government is openly talked of. The people arose one morning recently to find sand bags piled around the Palace. This was done during the night in anticipation of an attack the next day, and everybody seems to think that without the presence of the U.S.S. San Francisco and Iroquois the present government would be immediately overthrown. The trouble is that the kanakas want to tear down without having any definite idea of what they are going to build up, or how they are going to do it. I think a suppression of Queen Liliuokalani and her government, by the elements now laboring to that end would introduce chaos into the country and be a great misfortune. The abuses at the Palace are grave and should be corrected but not in the way the adventurers want to do it, and although the withdrawal of American men of war from the harbor of Honolulu would no doubt be the signal for an uprising soon after, there would probably not be much bloodshed and I don't think foreigners would be molested at all unless they took a hand in the play.

This slight discussion will indicate why there is some uncertainty as to the amount and kind of help to be expected from the government for our scientific work. I feel sure of some help but whether it will be enough to complete the observations without a little more from Washington, I shall inform you later. This letter is already long, and that it may not be too composite I will start a separate one, the subject of which will be the International Latitude Observations... [Coast & Geodetic Survey, NARA Collection]

June 15, 1892

Honolulu, H.I.

E.D. Preston;

to Dr. T.C. Mendenhall, Sup't. Coast & Geodetic Survey, Washington D.C.

(Regarding Preparations for the Mauna Kea Trip; and a Visit by Queen Lili'uokalani to the Waikīkī Observatory):

So we shall probably leave in the course of two weeks for **Mauna Kea** I give here an outline of the status of the work and what is proposed to be done. I have told you in a previous letter that the latitude work at this place would close about July 1st, Dr. Marcuse having intended to take the boat of July 2d for Japan. Rather suddenly however he decided not to wait so long and sailed about a week ago for Australia, I had already, in conjunction with Professor Alexander, made arrangements to undertake the mountain work about July 1st – and as the help of the Government Survey will be necessary both for guides and transportation, it will be best not to start until the time decided on. The interval however can be profitably and fully occupied – for the last letter I received from you (a week ago) contained a memorandum from Mr. Schott suggesting that at least five more series be obtained for micrometer. Parenthetically I may remark here that I had already computed the micrometer values and that the results sent me from the computing division through you, agree with mine within one or two hundredths of a second, so that I have not thought it worth while to change my computations of latitude on this account.

Besides these additional micrometer determinations there are several other things to be done. We are getting our longitude from Honolulu by exchanging chronometer beats, utilizing the telephone by tapping on the box. The signals are distinctly received and noted at the office in town. There is the trigonometrical connection of our station with the triangulation of the Government Survey, so that all doubt as to finding the station at some future time may be removed. I have made one connection myself and the Survey will make another independent one as a check. Considering that the observatories are to be removed and the piers demolished above ground this precaution seems advisable. Again, before starting to the other islands a determination of gravity should be made in Honolulu to connect the Waikiki work, with that done in 1883 and 1887 and indirectly with all other work done by the C. and G. Survey.

All these odd pieces of work will be accomplished, I think, within two weeks, including several days necessary to pack the instruments and settle accounts in order to leave a clean score behind should anything happen on the mountain.

The magnetic work is now all finished on Oahu. This was done at the same time as the latitude observations. It was an easy matter to do Waikiki, and attend to the time gravity and latitude at the same time because I was here on the ground night and day, but Honolulu just concluded was more difficult for it was necessary to work late at night here and rise early in order to get into town (three miles) for the morning elongation. I am so anxious to get all the data attainable bearing on the latitude question that I am going to leave the zenith telescope up as long as possible, and have dismounted the pendulum apparatus and chronograph and taken them in town, and go in every morning to set up the instruments, run the wires, and make other arrangements, and returning here in the afternoon am ready for stars at night. When the pendulum work begins I think I will get time in the early evening in Honolulu and returning here about 9:30 or 10 o'clock get the second group of the latitude list the same night.

Everybody is very ready to help me in the work. Here is an instance – I wanted wires run from the government building across a vacant lot to the observatory, and then I wanted a few cells of gravity battery for temporary use – a few days only. The manager of the telephone company is interested in scientific work and it appears that when I was here in 1883 I took the trouble to show him the methods of work and the instruments. I had forgotten the incident, but he had not, and now he not only had the wires run for me and loaned the battery but said that if I wanted anything else to call on him and there would be no expense. The Superintendent of Public Works came out to see the observatory at Waikiki one day and when I told him we were going up on **Mauna Kea**, he said, “Why, we have two splendid pack mules and a house at the foot and you might just as well use them to pack your instruments to the top – it will be no expense and I will write by next mail to have them ready for you.” I accepted gladly on that it will make so much less outlay from the fund.

We will leave about July 1st. From the nature of the mountain work it is impossible to give a very close estimate of the time required. I should think that in July the stations at the sea level, the one half way up, and the summit could all be occupied. As there has never been any magnetic observations made on these islands in which the declination, dip, and horizontal force have all been measured the Government Survey is anxious to have one or two stations made on each of the principal islands, (see accompanying map), and although I am getting tired of this continual hot weather and am quite ready to turn my face homeward, I think that once here, it would always be a matter of regret later, if the work was left incomplete. The occupation of eight or nine stations does not require much time if one is on the ground but the trouble is in getting to the place. After the mountain trip is over I shall be able to give a better estimate of the time required to finish.

I send herewith an account of the Queen's visit to our observatories. The chronograph sheet on which Her Majesty placed her signature is No. 61 (Roll also sent by this mail). The translation of the phrase "Na ko kakou moi i kilo i na hoku i keia po" is, The Queen observes the stars tonight.

I send also a photograph of the observations, one of our residence and one of the Queen's Hospital grounds in Honolulu. I have made many more negatives but have had no time to do printing. I shall have to leave this part of the work until I return to the states. [Coast & Geodetic Survey, NARA Collection]

July 10, 1892

Waimea, Hawaii

E.D. Preston;

to Dr. T.C. Mendenhall, Sup't Coast & Geodetic Survey, Washington D.C.

(Regarding Activities of the Mauna Kea Trip):

I have just received your letter with check for \$500.00 to be expended, if necessary, for gravity work in Hawaii. It is impossible to say at present how much of it will be needed as the bulk of the expense for climbing **Mauna Kea** is still to be incurred. We left Honolulu a few days before the time mentioned in my last letter (July 1st) and have already determined gravity, magnetism and latitude at Kawaihae which was selected as the station to be occupied at the sea level. We are now at Waimea on the plateau just north of the foot hills and have risen from sea level 2600 feet. A stop of several days is made to get animals and to put in two magnetic stations for the Government Survey. One is where they have observed in 1852 and 1872 & the other is one they want as a base station. We hope to leave day after tomorrow for the intermediate station, **Kalaieha**, which is just above the cloud line, 8000 feet elevation. Unfortunately last night three of the party were suddenly taken sick with something like cholera and are not able to be about today, I hope they will be able to leave at the appointed time. The cause of the trouble is probably in bad water or change of food. At Kawaihae all our drinking water had to be carted twelve miles. Even here at Waimea they have an exceptionally dry summer and at the sea level where at best there is not enough rain to start much vegetation of any sort during this dry season there is absolutely no water fit to drink.

We are here in full view of the summit, and although it is mid-summer and in the tropics many patches of snow can be seen in the valleys around the topmost peaks. We shall no doubt experience some discomforts on the summit, consequent upon our changing from an atmosphere where the barometer reads 30 in to one where it stands at 18 in, to say nothing of passing from a temperature of 93° which we had at Kawaihae to one which produces ice every night. When this work is concluded on the mountain I expect to send the instruments down this side to be shipped back to Honolulu, and taking a guide, cross the lava flow of 81 and get to sea level on the opposite side of the island. This will enable me to get in a magnetic station at Hilo before the return trip of the steamer. The *aa* species of lava is so rough and sharp that no horses can traverse it without being heavily shod and instances are known where the shoe coming off and the rider having no means of replacing it the animal was necessarily left to perish on the flow. I was told yesterday that colts arrive at Hilo with double mittens of bullock hide drawn over their feet and tied above to save the soft hoof from being cut away. The lava flow of 81 (year of eruption) is only two miles wide at the point where it must be crossed so that it probably does not require more than an hour or so to get over this part of the road, but I have seen some flows on this island that I do not think, to save ones life, more than two or three miles per day could be made... [Coast & Geodetic Survey, NARA Collection]

“The Ascent of Mauna Kea, Hawaii”

Report of W.D. Alexander on the Mauna Kea Trip of 1892

In the Pacific Commercial Advertiser of September 14, 1892, W.D. Alexander published an important account of the Mauna Kea survey trip. The narratives identify the locations of several significant cultural features on the mountain landscape. These features include, but are not limited to—trails on Mauna Kea; an “axe maker’s cave” (location where the wooden image found by Dr. Hillebrand in 1862 came from); a possible *heiau* and burial site; the *ahu* “pillar” erected to commemorate the trip made by Queen Emma to Mauna Kea and Waiau in 1882; named localities; and the landscape of Waiau (crater and lake). Alexander also reported that gorse had been identified as an undesirable weed on lands of the Humuula Sheep Station by the time of the 1892 survey.

Field Book No. 429 (in the collection of the State Survey Division), kept by Alexander and his assistant, J.M. Muir, includes several important sketches depicting the sites described in the following article (selected illustrations are included here in addition to the article):

Although the ascent of **Mauna Kea** presents no great difficulty and has often been described, yet a brief account of a late scientific expedition to its summit may be of interest to your readers.

The results of Mr. E.D. Preston’s work on Haleakala in 1877 were so highly appreciated by scientific men, that the American Academy of Sciences recommended that a similar series of observations should be made on **Mauna Kea**. It was also decided to include in the plans a series of magnetic observations at a number of important points in the islands.

The U.S. Coast and Geodetic Survey agreed to grant Mr. Preston leave of absence for the purpose, and to lend the necessary instruments, while the trustees of the Bache fund of whom Prof. Dana is one, offered to apply its income to the same object... ..The party left Honolulu for Kawaihae June 25th, consisting of Mr. E.D. Preston, astronomer, Mr. W.E. Wall, his assistant, Prof. W.D. Alexander, surveyor and quartermaster for the party, and Messrs. W.W. Chamberlain and Louis Koch.

The first station occupied was in the village of **Kawaihae**, near the sea, in a lot belonging to His Ex. S. Parker, to whom as well as to his agent, Mr. Jarrett the party are indebted for many repeated kind and generous acts... ..Our next move was to the grassy and wind-swept plain of **Waimea**, 2600 feet above the sea, where we enjoyed a complete change of climate, and had glorious views of the three great mountains of Hawaii... Here we engaged our guide, hired our horses and part of our pack mules, and had our freight, (“impedimenta,” as Caesar appropriately called it,) carted thirty-five miles farther, half-way around the mountain to the **Kalaieha Sheep Station**. We made this our base of operations in attacking the mountain, in order to dispense as much as possible with the use of pack mules, on account of the heavy and costly instruments which we were obliged to carry. A wagon road made by the owners of the **Humuula** Sheep Ranch leads from Waimea around the western and southern sides of **Mauna Kea**. On the western side of the mountain it passes through a region which only needs more rainfall to make it a superb grazing country. The ancient forests here, as at Waimea, have been nearly exterminated, but a fine grove of *mamane* trees still survives at the **Auwaiakeakua** Ranch.

The *manienie* grass is gradually spreading and will in time add immensely to the value of the land. At the half-way station, called **Waikii**, water tanks and a rest house have been provided for teamsters. After turning the corner we skirted the desolate plain studded with volcanic cones that lies between the giant mountains of Hawaii, riding through loose volcanic sand amid clouds of dust. Occasional flocks of quails or pigeons were the only living creatures to be seen.

At length the vegetation began to be more dense, the patches of *pīpīi* grass and the groves of the beautiful and useful *mamane* or *sophora* tree more frequent, as we approached the Hilo district. Barbed wire fences showed that we were approaching civilization, and at last we came in sight of the **Kalaieha Sheep Station** with its neat buildings, its water tanks and telephone lines, and general air of thrift, all testifying to the energy and foresight of its manager, A. Haneberg, Esq.

Nearly every afternoon this region is enveloped in dense fog which pours in from the east, driven by the trade wind. At night, during our stay, the thermometer generally fell below 40° Fahr., and frost is not uncommon. The elevation, according to the barometer, is about 6700 feet.

Quails abound, and the mountain geese and wild ducks are found in the “Middle Ground.” The mongoose has not yet arrived there. Wild cattle and boars are still numerous on the slopes of **Mauna Kea**, and the former supplied the best beef we have tasted in these islands. The present manager has been at much labor and expense in extirpating two pests, which are said to have been accidentally introduced from New Zealand, viz., the Scotch thistle and the gorse.

Here Mr. Preston established an astronomical and pendulum station, and made a complete series of observations, as at Kawaihae, while surveys were made to connect it with the primary triangulation. The party was then joined by Mr. E.D. Baldwin, from Hilo, who brought two pack animals and a muleteer, and by Mr. J.J. Muir, from Mana. Mr. Baldwin had visited the summit in 1890, and had afterwards made a valuable map of the central part of Hawaii [Register Map No. 1718].

[from the base camp at **Kalaieha Sheep Station** – July 20th] ...The fog cleared early, and a finer day for the ascent could not be imagined. Mr. Haneberg now took command of the pack train, and had the caravan loaded and set in motion by 7:45 a.m., the guide riding in front, followed by eleven pack mules and as many men on horse back. One sturdy brute carried the pendulum receiver, weighing about one hundred pounds, on one side, balanced by bags of cement on the other.

After riding nearly two miles due east from the ranch, we turned to the north, gradually ascending through a belt of country thickly covered with groves of *mamane*.

We crossed a shallow crater just east of a conspicuous peak called “**Ka lepe a moa**,” or cock’s comb, and began to ascend the mountain proper. After climbing a steep ridge through loose scoria and sand, the party halted for lunch at an elevation of 10,500 feet. The upper limit of the *mamane* tree is not far from 10,000 feet. The *Raillardia, apiipii*, extends a thousand feet higher. *The beautiful Silver Sword (Argyroxiphium), once so abundant is nearly extinct, except in the most rugged and inaccessible localities.*

*The trail next turned to the east, winding around an immense sand crater called “Keonehehee,” 11,500 feet in elevation, which stands on the edge of the summit plateau. Further to the southeast we were shown a **pillar of stones** which was raised to commemorate Queen Emma’s journey over the mountain to Waimea in 1883 [the trip was made in 1882]. [Figures 8a & 8b]*

The summit plateau which is perhaps five miles in width, gradually slopes up from all sides toward the central group of hills. It is studded with cones (most of which contain craters), composed of light scoria, like those in the crater of Haleakala. The surface of the plateau is strewn with blocks of light colored, fine grained, feldspathic lava, interspersed with patches of black sand.

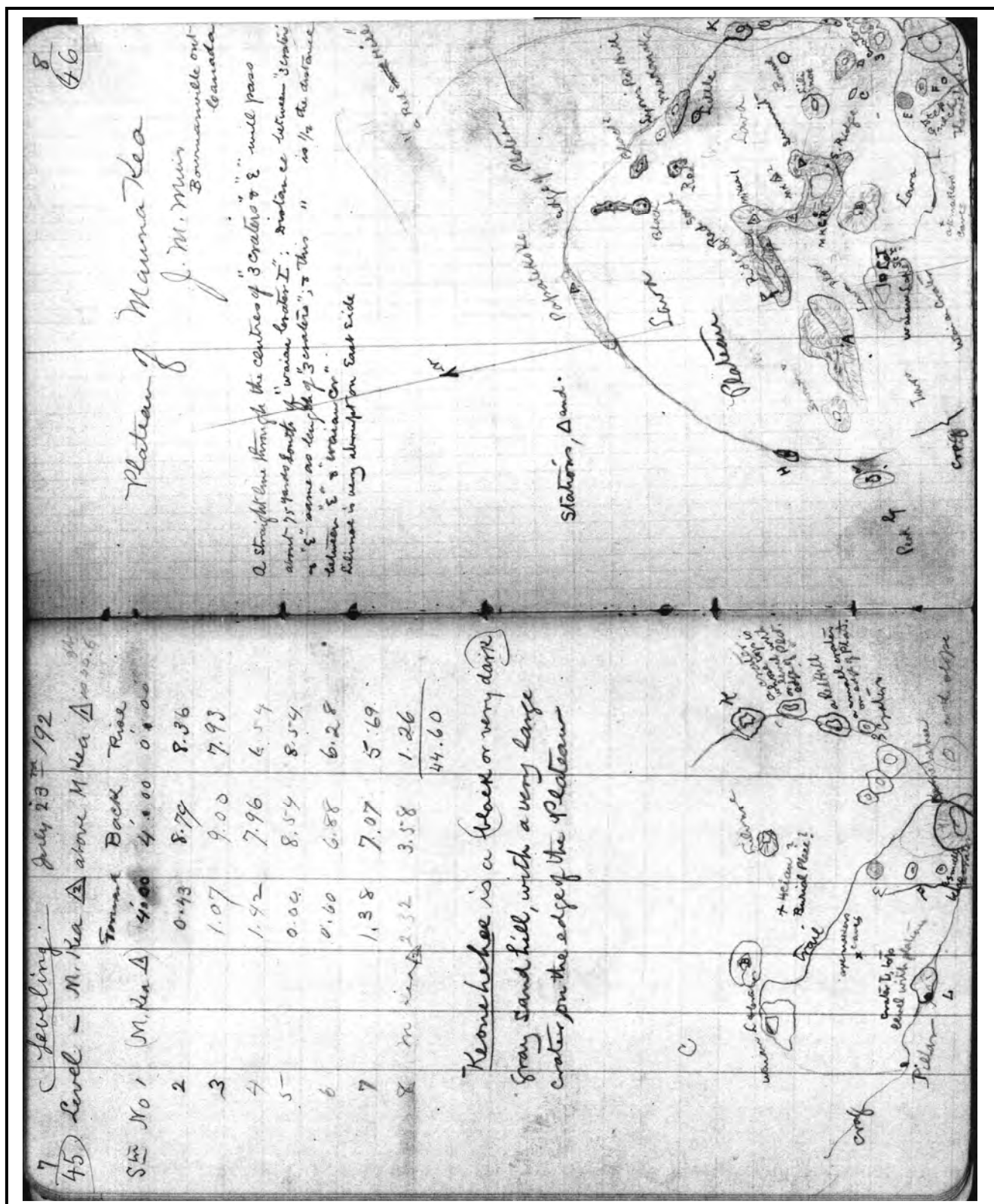


Figure 8a. Sketch of the Mauna Kea Summit Region – Depicting Trail, “Axe Maker’s Cave,” “Pillar” of Queen Emma, Heiau and Burial Place and other Cultural Features (J.M. Muir, July 23, 1892. Field Note Book, Reg. 429:7-8)

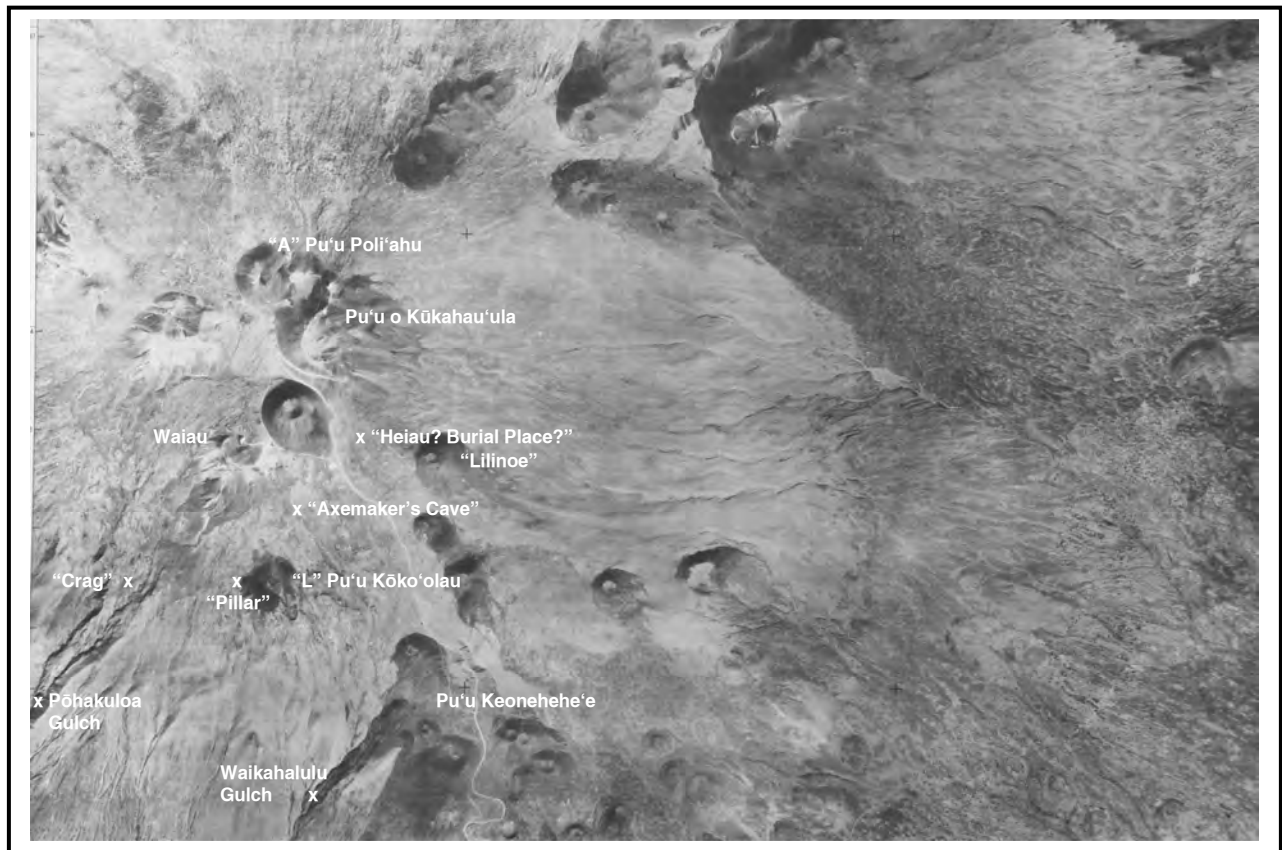


Figure 8b. Annotated Aerial Photo – Portion of Mauna Kea (1978 Advance Print); Depicting Approximate Locations of the “Pillar” of Queen Emma, “Crag,” “Axemaker’s Cave,” “Heiau” or “Burial Place,” and Named Pu‘u Described by W.D. Alexander in 1892. (From Notes Prepared by John P. Lockwood, Ph.D., March 29, 2005)

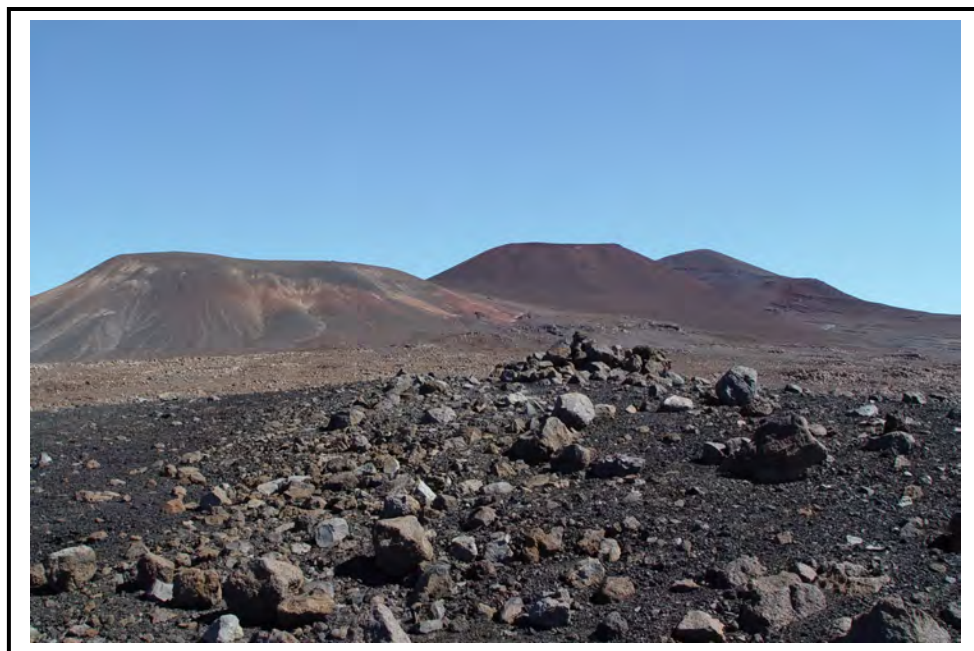


Figure 8c. Remains of ‘Ahu on Pu‘u Kōko‘olau (area indicated by Muir’s sketch map of July 23, 1892. Alexander’s Field Book No. 429; see Figure 8a) (Photo KPA-S2526)

The rarity of the air was now felt by both men and animals, and it required forcible arguments to make the laggards keep up with the column. *At last, about 3 P.M., we clambered over the rim of a low crater west of the central cones, and saw before us the famous lakelet of **Waiau**, near which we camped. It is an oval sheet of the purist water, an acre and three quarters in extent, surrounded by an encircling ridge from 90 to 135 feet in height, except at the northwest corner, where there is an outlet, which was only two feet above the level of the lake at the time of our visit. The overflow has worn out a deep ravine, which runs first to west and then to the southwest. A spring on the southern side of the mountain, called "**Wai Hu**," is believed by the natives to be connected with this lake.* The elevation of **Waiau** is at least 13,050 feet, which is 600 feet higher than Fujiyama. There are few bodies of water in the world higher than this, except in Thibet or on the plateau of Pamir. No fish are found in its waters, nor do any water-fowl frequent its margins. Its depth was not sounded, as it was proved by experiment that we had not adequate means for navigating it. Small tufts of grass and delicate ferns were found growing among the rocks around the lake. [Figure 9]

After the pack train had been photographed, the large tent was pitched close to the shore of Waiau, and all the animals were sent back to the ranch except for one unfortunate mule, which was to be treated to a feed of oats and blanketed for the night... During each of the six nights which we spent on the summit the temperature fell much below the freezing point, registering 25 deg., 18 deg., 14 deg., and even 13 deg., Fahr., and considerable ice formed around the margin of the lake. During the day the maximum of the thermometer in the shade was generally 60 deg., and 63 deg., but when exposed to the sun on the rocks it rose to 108 deg...

A solid pier of masonry was built for the meridian circle, and a flat rock moved into position to serve as a stand for the pendulum apparatus. Such was the clearness of the air that star observations were usually commenced before 5 p.m. Contrary to expectation we found the trade-wind blowing as strong on the summit as it did below at **Kalaieha**.

Of Mr. Preston's work it may briefly be said that it was entirely successful. The opportunity was great and he made the most of it. Complete series of magnetic, latitude and pendulum observations were made, besides the observations of the barometer and thermometer, and a large number of interesting photographs were taken from different points of view. In the meantime a topographical survey of the summit plateau, in which Mr. J.J. Muir's assistance was most opportune and valuable. On the 22nd a short base line was measured with a steel tape and a minute survey made of the lake and its neighborhood. On the same day two of our men came up with two pack mules, bringing the Honolulu mail, a load of fire-wood and some fresh provisions.

The next day, the 23rd, Mr. Muir and the writer together with the guide ascended the central hill, about a mile and a half from our camp and 800 feet higher. It encloses two small craters. The scramble up that huge pile of cinders in the rarefied air is a severe strain on weak lungs. The pulse rose in one case to 120, and in another to 150 per minute. The old trig. Station, which had formerly been sighted from several points below, was now occupied with an instrument for the first time. The difference in height between this station and the next summit was found by leveling to be about 45 feet, as it had been estimated in 1872. The highest point is probably not less than 13,820 feet above the sea. [Figure 10]

The view from the summit was sublime beyond description, embracing, as it did, the three other great mountains of Hawaii, and the grand old "House of the Sun," 75 miles distant, looking up clear and distinct, above a belt of clouds. Mauna Loa was perceptibly a trifle lower than the point where we stood. Without casting up any loose heaps of sand and

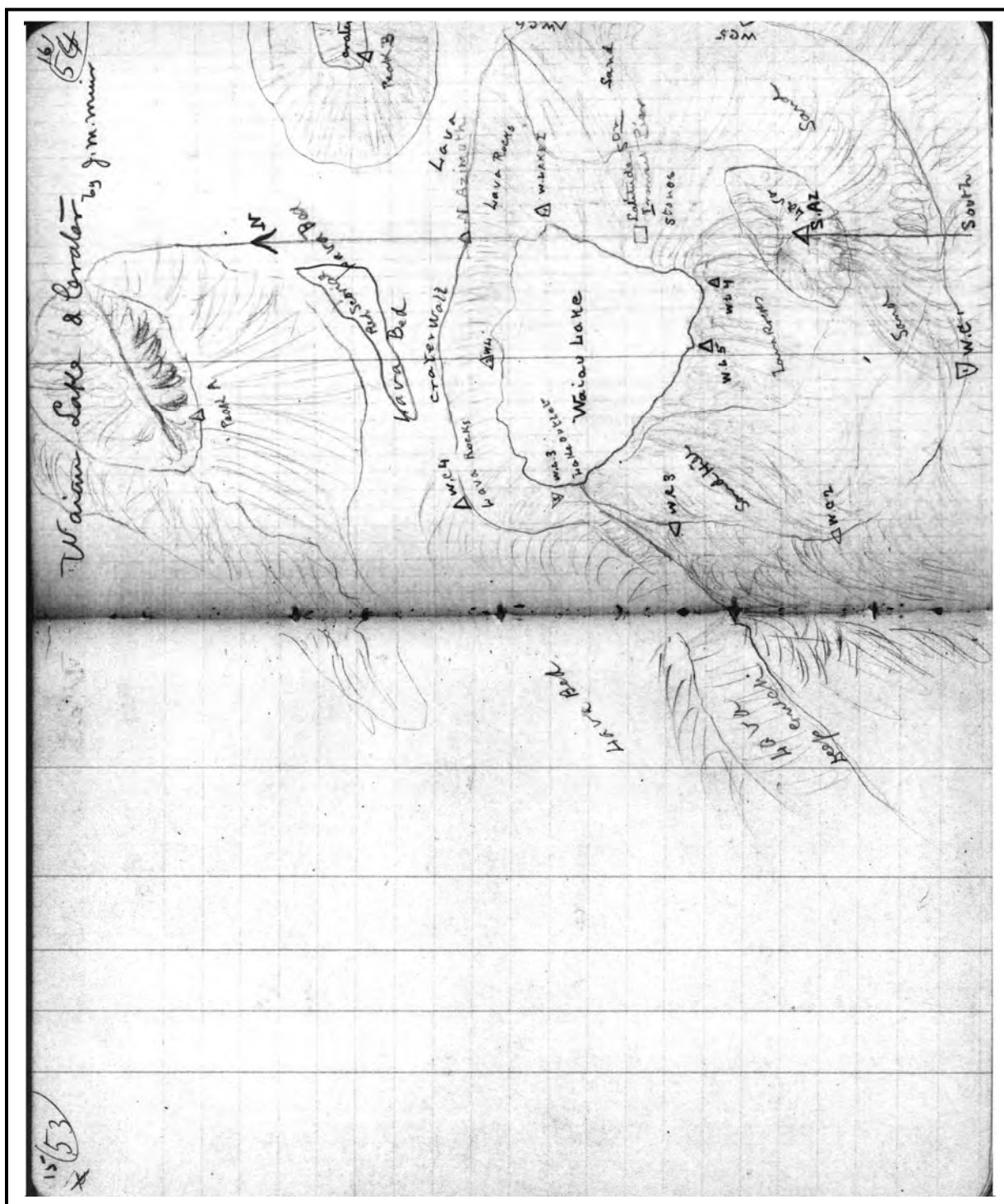


Figure 9. Sketch of Waiau Lake and Crater (J.M. Muir, Field Note Book, Reg. 429:15-16)

scoria, its majestic dome has risen within 150 feet of the highest point reached by its rival. Its surface was streaked by numerous recent lava streams, while a deep cleft, which breaks the smooth curve, gave us a glimpse into the vast terminal crater of Mokuaweoweo.

On the windward side of the summit ridge and in the craters were several large patches of snow, two or three feet thick, composed of large crystals, like coarse salt. While eating our lunch on the summit, we were surprised to see carrion flies at that altitude, attracted by it.

After surveying and sketching at several stations [Figure 11], we returned, sliding down a steep slope of sand and cinders, 700 feet in height, to our camp, where a repast awaited us, that reminded one of the Hamilton House. It is enough to say that our worthy chef de cuisine was Louis Koch, well known to former guests of the Hamilton and later of the Volcano House.

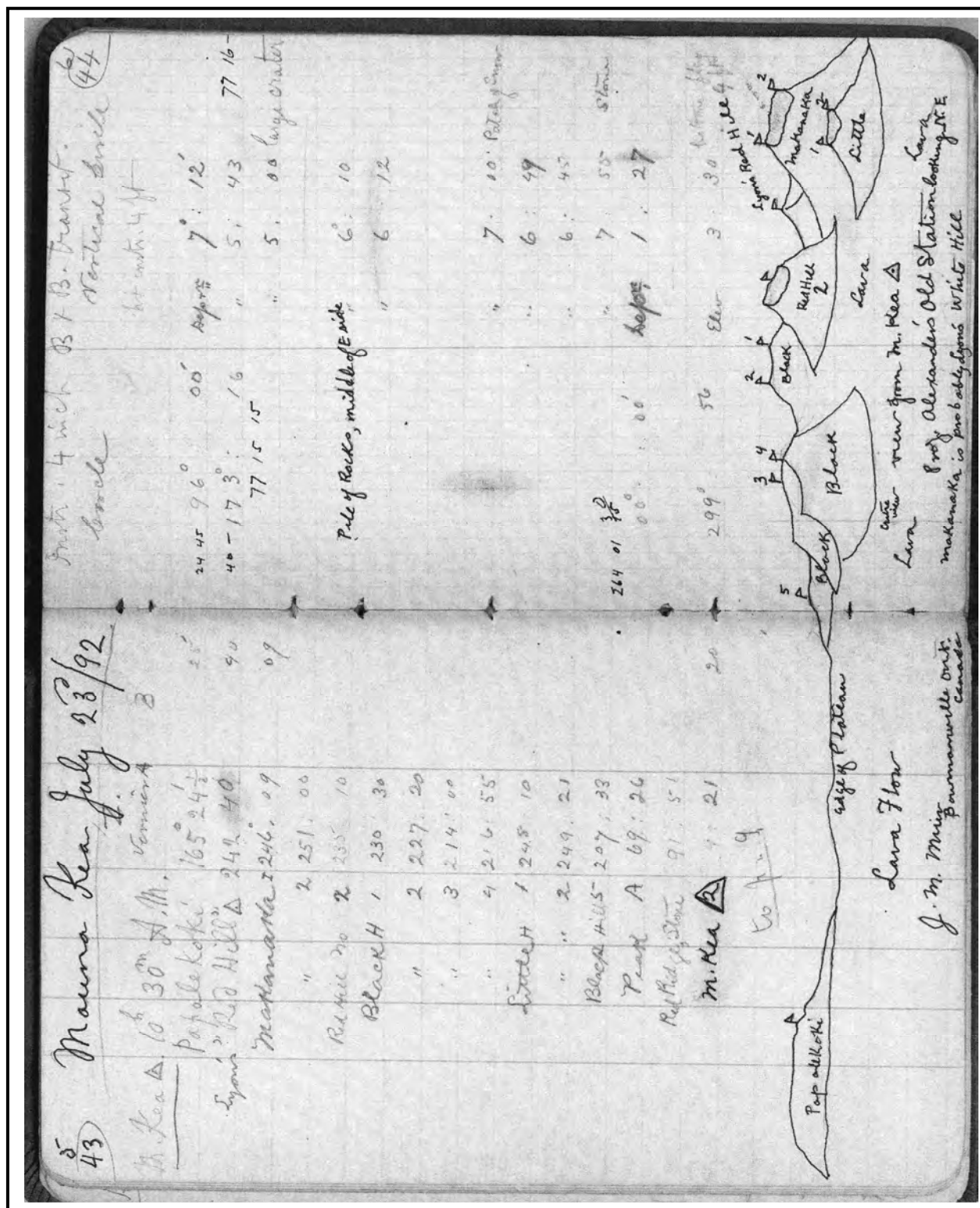
During the following night the thermometer fell to 13 deg. Fahr. We did not, however suffer from cold, although the confinement of the blanket bags became rather irksome. A small kerosene stove was kept burning all night, which no doubt helped somewhat to keep up the temperature of the air within the tent.

On Monday, the 25th, the thermometer stood at 20 deg. at sunrise. Messrs. Muir and Alexander ascended the second highest peak on the northwest, overlooking Waimea, 13,645 feet in height to continue their survey. *In the cairn on the summit a tin can was found, which contains brief records of the visits of five different parties from 1870 to the present time, to which we added our own.* A party of eight girls from Hilo, “personally conducted” by Dr. Wetmore and D. H. Hitchcock, Esq., in 1876, must have been a merry one. Capt. Long of H.B.M.’s Ship Fantome had visited this spot in 1876, and Dr. Arning with several Kohala residents in 1885.

*The same afternoon the surveyors occupied the summit of **Lilinoe**, a high rocky crater, a mile southeast of the central hills and a little over 13,000 feet in elevation. Here, as at other places on the plateau ancient graves are to be found. In the olden time, it was a common practice of the natives in the surrounding region to carry up the bones of their deceased relatives to the summit plateau for burial. [see Figure 8a]*

During the following night the thermometer fell to 14° and stood at 18° at sunrise. After breakfast the surveying party ascended a third peak, east of **Lake Waiau**, and about 420 feet above it, where they took the closing sets of angles, and connected the latitude pier with the scheme of triangulation [Figure 12].

On their return the tents were struck, and instruments packed up in readiness for the pack train, which arrived about 11 a.m. Soon afterwards the fog closed in around us, and lasted till nightfall. We bid farewell to the lake about 1:30 p.m., and arrived at the **Kalaieha** Station before 6 p.m., without any mishap, having stopped half an hour at “**Keanakakoi**,” the Axe-makers’ cave. [see Figure 8a] *This is situated about a mile south of **Waiau**, and a hundred yards west of the trail, in a ledge of that hard, fine grained kind of rock, which ancient Hawaiians preferred for their stone implements. Here we saw the small cave in which the axe-makers lodged, their fire place, and remains of the shell fish which they ate. In front of it is an immense heap of stone flakes and chips some 60 feet across and 20 or 30 feet high. Near by several hundred unfinished axes are piled up just as they were left by the manufacturers, when the arrival of foreign ships and the introduction of iron tools had ruined their trade. Around the entrance of the cave the native dandelion or pualele (*Sonchus oleraceus*) was growing at an elevation of 12,800 feet. It was here that the late Dr. Hillebrand found a curious idol, which is still in the possession of his family [see article of October 25, 1862, in this study].*



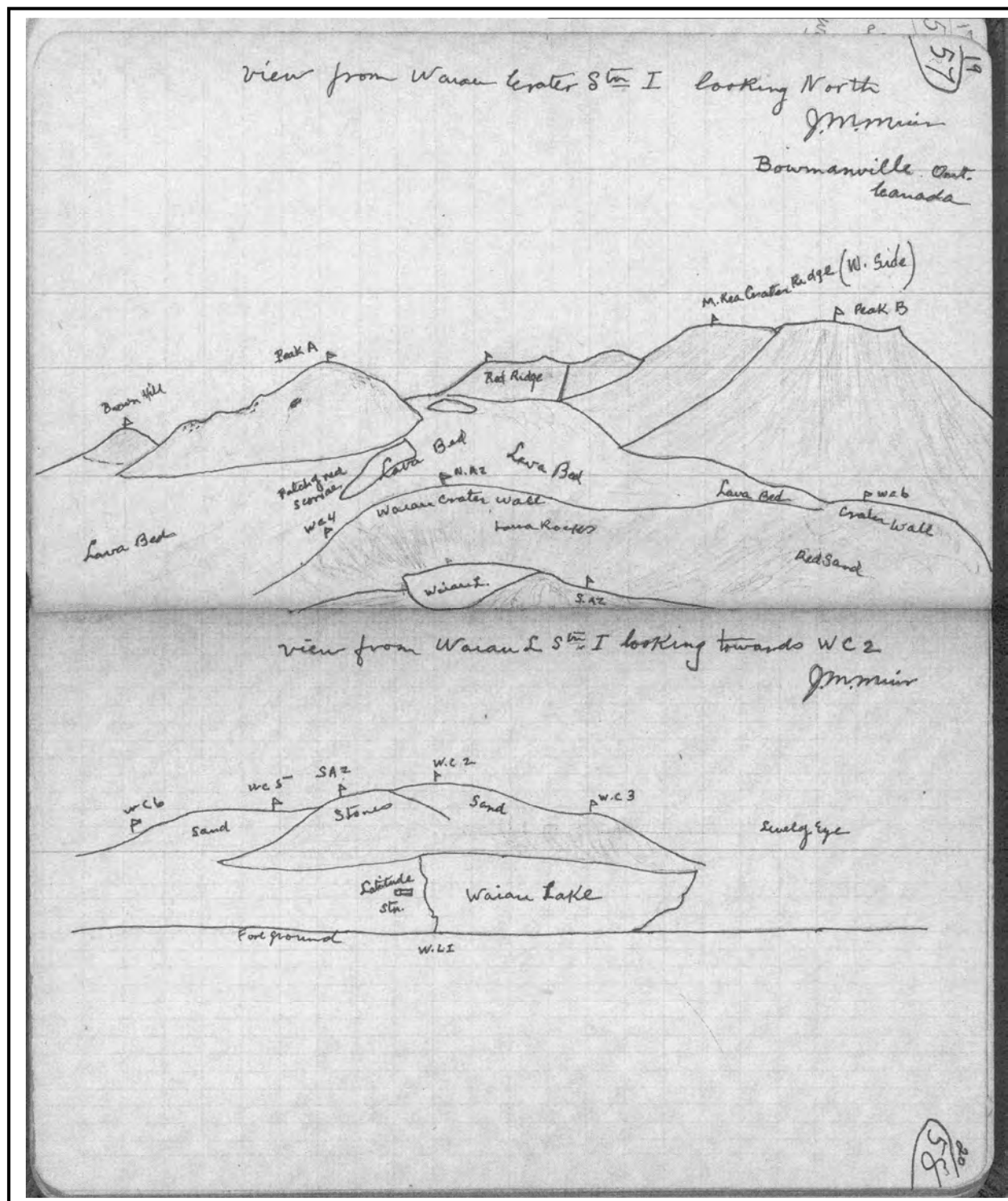


Figure 12. Sketch — View from Waiau Crater Looking North
(J.M. Muir, July 25, 1892. Field Note Book, Reg. 429:19-20)

On arriving at **Kalaieha** we learned that the pack mules had preceded us, and were already unloaded. None of the costly and delicate instruments employed had received the slightest injury. All the objects of the expedition had been successfully attained. I know of but one other instance on record when gravity measurements of precision have been made at so great a height.

Mr. Preston's final report will be looked for with interest by the scientific world, and will add another laurel to his well-earned reputation as a physicist and astronomer. [Alexander in *Pacific Commercial Advertiser*, September 14, 1892]

August 8, 1892

Honolulu, H.I.

E.D. Preston;

to Dr. T.C. Mendenhall, Sup't Coast & Geodetic Survey, Washington D.C.

(Reports on the Completion of the Mauna Kea Survey; and Descent from the Mountain Lands to the Town of Hilo):

After thirteen and a half consecutive hours in the saddle, over the roughest road I ever saw, we reached sea level again at Hilo on the windward side of the island. *Five days and six nights were passed in camp by the side of a lake at an elevation of between 13000 and 14000 feet. This, if I am not mistaken, is one of the few high bodies of water in the world.* At this altitude about two fifths of the atmosphere was left below us and we had the novel and rather uncomfortable experience of a range of temperature of nearly 100° F in twenty four hours, the lowest registered being 13° at night and the highest 108° at noon. The thermometer having the same position at both readings. Ice and snow are not familiar objects in the tropics yet we had both of them in abundance on the summit of **Mauna Kea**.

It was impossible for us to quite reach the highest peak with the instruments. It was something of an undertaking to get ourselves there with barometers and camera, but it was quite beyond the pack animals strength to climb those cones of scoria at an angle of say 40°, and where one sinks ankle deep at every step. An unloaded mule might possibly get up, but an animal with the pendulum receiver on one side and 100 lbs of cement on the other would certainly fail in the attempt. Our train consisted of eleven mounted men. The party was made up of Professor Alexander, the Surveyor General, and two associates from the Government Survey Staff, one volunteer observer & general helper, a steward, a guide (for no one ever runs the risk of being lost on that great barren plateau of the summit which is studded with cinder cones from 500 to 1000 feet high) several drivers and myself. Professor Alexander's idea in accompanying the party was to make a topographical survey and triangulation of the plateau. His part of the party far from increasing the expenses, has had the contrary effect for he had aided me, in transportation, in assistants, and in funds to such an extent that I feel under very great obligations to them – and I feel this all the more that they are now passing through a very critical period where the appropriations have been cut down so that he has been obliged to dispense with the services of several much needed assistants. Unfortunately however for his part of the work, his two assistants were prostrated by mountain sickness and after passing two wretched days utterly unable to do any work, they were obliged to come down to about 7000 feet elevation (our starting point) and wait until the party returned.

All three pendulums were serving, three days observations being made, declination dip & horizontal force were determined for magnetics, and more than fifty measures of the latitude were secured. Of course we had no difficulty getting time for the gravity work. The sky was so clear that I began star observations an hour before sundown, and the nights were suspect if we leave out of account the fact that they were to us, accustomed to the tropics, bitterly cold.

When we reached the halfway station after having finished on top, I discovered that by riding to Hilo about 35 miles I could get in three or four days magnetic work there and take the same steamer that would a day later pass around to the other side of the island and pick up the rest of the party and the instruments; so with an aid I started and one more station was accomplished at almost no expense and we all came back to Honolulu together.

There now remains magnetic observations at Kealahou Bay (Captain Cook's Station) and at Lahaina (De Freycincts station of 1819). The first steamer leaves in about a week and I will be back here in Honolulu 10 or 12 days later. This will probably close the work. They wanted to have one or two magnetic stations on Kauai but it looks doubtful if this can be realized on account of funds... [Coast & Geodetic Survey, NARA Collection]

August 15, 1892

Honolulu, H.I.

E.D. Preston;

to Dr. T.C. Mendenhall, Sup't Coast & Geodetic Survey, Washington D.C.

(Transmits Documents of Surveys):

I have the honor to transmit you by this same mail the following records:

Package IX

1 Vol. duplicated magnetic observations at Kawaihae, Waimea, **Kalaieha**, **Waiau** and Hilo.

1 Vol. duplicate pendulum obs. for Kawaihae, **Kalaieha** and **Waiau**.

1 Vol. duplicated pendulum obs. for Waikiki and Honolulu.

Package X

1 Vol. dup. time observations Honolulu.

1 Vol. dup. observatory notes & time for Honolulu, Kawaihae, **Kalaieha** and **Waiau**.

1 Vol. dup. latitude observations for Kawaihae, **Kalaieha** and **Waiau**.

Package XI

5 duplicated magnetic observations at Kawaihae, Waimea, **Kalaieha**, **Waiau** and Hilo.

Package XII

1 Roll chronograph sheets for Honolulu Time observations... [Coast & Geodetic Survey, NARA Collection]

August 15, 1892

Honolulu, H.I.

Dr. T.C. Mendenhall, Sup't Coast & Geodetic Survey;

to Professor W.D. Alexander, Surveyor, General Hawaiian Islands

(In appreciation of help rendered by Hawaiian Government Survey to U.S. Coast and Geodetic Survey):

...During the recent visit of one of our officers to Hawaii the Government Survey under your direction has rendered valuable and repeated services in furtherance of the work. I desire to thank you for the substantial aid given, not only during the International work at Waikiki, but throughout all the observations made to determine the force of gravity at the base and summit of **Mauna Kea**.

Mr. Preston speaks especially of your assistance in the location of the observatories, in setting a meridian mark on Makiki ridge, and in the longitude determination of Waikiki. In the mountain work your experience was particularly valuable, and the help given both in observers and in funds contributed greatly to the successful completion of the project.

For all these kind offices please accept the acknowledgments of this service... [Coast & Geodetic Survey, NARA Collection]

Washington, D.C.

January 5, 1893

E.D. Preston; to W.D. Alexander

(Reporting on results of Pendulum Survey on Mauna Kea):

...Yours of Dec. 13 is at hand and I thank you for the data in regard to the connection of the Waikiki Observatory with your triangulation. I will have my own observations worked up here at the office and the two determinations will check each other.

I have been unable to find among my instruments a little box of electric lamps (dimensions about 10 in x 6 in x 6 in) and think that in repacking they may have been left in your storeroom in the (Kapuaiwa Building). Will you please have some one look for them? It is a wooden box. If found please advise me when you write (no hurry).

We are still engaged on the latitude computations and expect to turn out some results shortly. The pendulum work at Honolulu, Kawaihae, **Kalaieha and Mauna Kea (Waiau)** has been completed and I will send you the results as soon as I speak with the Superintendent to ask his permission. The pendulum work at Waikiki will not be done for some time as the computation of 200 nights time observations is quite an undertaking and we want to dispose of the latitude first.

Relative forces of Gravity
(Determinations of 1892)

Washington	980.1000 dynes
Honolulu	978.9364
Kawaihae	978.8035
Kalaieha	978.4905
Waiau	978.0599

These do not take into account any change in the pendulum during the trigs. The observations after the return may necessitate a slight correction as far as the ratios between Washington and the others are concerned, but the ratios between all the island stations will probably be unchanged. The Hawaii ones indicate a very great density for the lower half of **Mauna Kea** and a marked difference between the upper and lower half. The result being – upper half 2.1 and lower 37... [HSA – ID Survey, 1893]

Washington D.C.

February 15, 1893

E.D. Preston; to Professor W.D. Alexander:

(Reporting on results of Pendulum Survey on Mauna Kea):

...Yours of January 31 has just come and I thank you for the information about the box of electric lamps – I will write you again shortly in regard to them. For the present will you please label the box and let it remain in your store room.

I have to thank you for the papers kindly sent. Everything at present is very eagerly read, coming from the Islands.

*Professor Dana is going to publish the results of the **Mauna Kea** work in the next Journal of Science.*

I have met several times the Commissioners, especially Mr. Carter & Mr. Castle with whom I am better acquainted than the other three. Neuman has not yet arrived and is expected in a few days. I was glad to hear from your family – You speak of Judge Hartwell's little children worshiping their teacher – That does not surprise me in the least.

Some months ago I gave a talk on Hawaii before our French Club. As soon as I have a copy made I will send you one... [HSA – ID Survey, 1893]

Report of E.D. Preston on the Mauna Kea Trip of 1892

In 1893, E.D. Preston, prepared his report on the Mauna Kea Trip, which was subsequently published in 1894, in the “Report of the Superintendent of the U.S. Coast and Geodetic Survey, for the Fiscal Year Ending June 30, 1893 (Part II, Appendix No. 12).” Preston’s account further confirms the occurrence of cultural resources in the summit region of Mauna Kea, and documents the experiences of the Pendulum Party on the mountain lands. Importantly, a number of photographs shot by Preston, and used to illustrate this account, were found in the collections of the NOAA National Library and the collection of the Hawaiian Historical Society. These photos provide us with a valuable view of the landscape of Mauna Kea, as seen from Waimea, Kalai’eha, and at various locations in the summit region. We include below, Preston’s introductory texts, providing readers with the scope of his project and work conducted at various locations in the islands, and the detailed accounts of work leading to, and on Mauna Kea:

Appendix No. 12—1893.

Determination of Latitude, Gravity, and the Magnetic Elements at Stations in the Hawaiian Islands, Including a Result for the Mean Density of the Earth. 1891, 1892. [Figure 13]

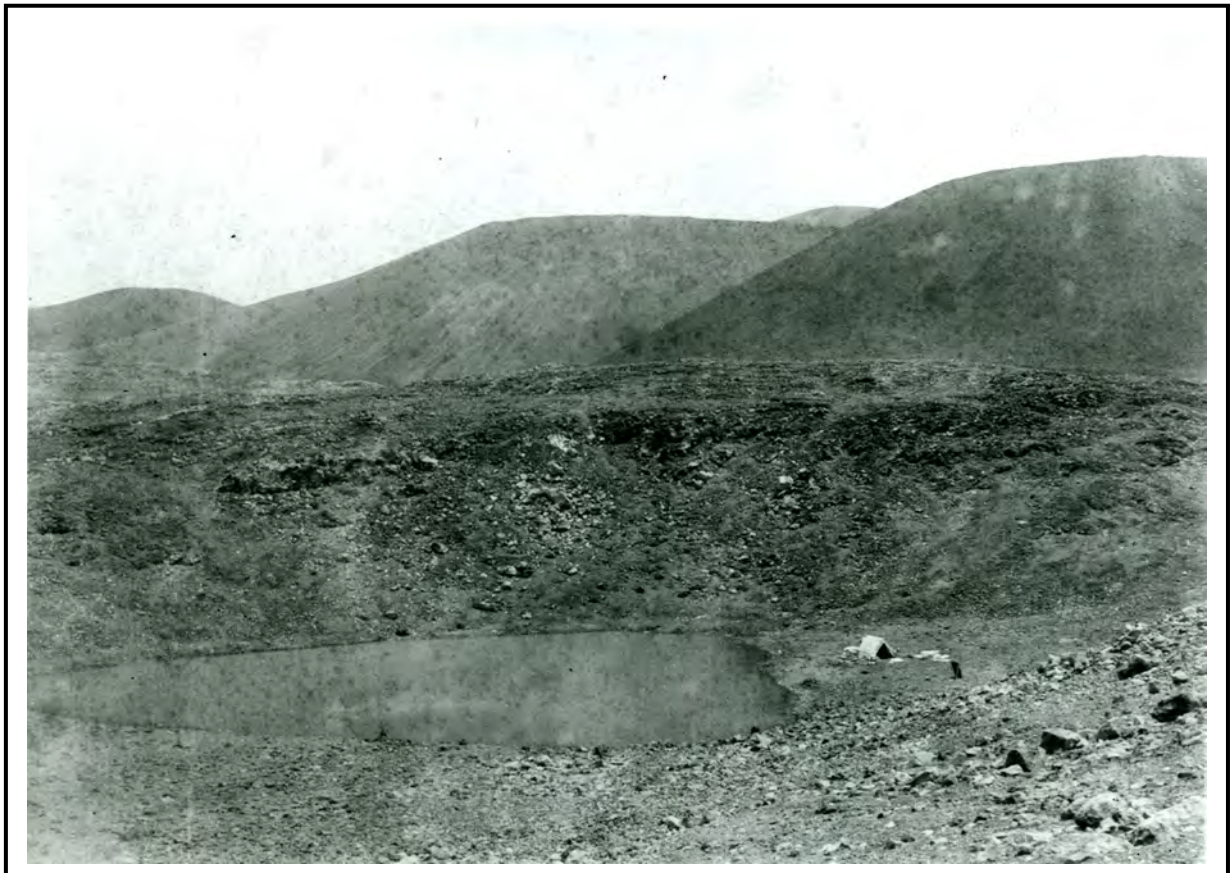


Figure 13. Gravity, Latitude, and Magnetic Station at Waiau, Looking Northeast. Elevation 13,060 Feet (3,981 meters). Plate No. 22 (E.D. Preston, 1892). (Photo No. 976, in Collection of the Hawaiian Historical Society.)

***A report by E.D. Preston, Assistant.
Submitted for publication June 30, 1894.***

While engaged in astronomical observations in the Hawaiian Islands in 1891-92, in cooperation with the work of the International Geodetic Association, occasion was taken to make a continuous study for one year of the force of gravity at Waikiki.

After the work had been completed at this place an expedition was undertaken to the summit of ***Mauna Kea***, an extinct crater, having an elevation of 13,825 feet. The object of this trip was the determination of the force of gravity at the base and summit, from which the density of the mountain and the mean density of the earth might be deduced. Availing ourselves of the occupation of this unique station, magnetic, latitude, and hypsometrical observations were carried on, besides making a trigonometric and topographic survey of the great plateau at an elevation of about 12,500 feet. When this was done, some magnetic observations were made at other points of the group, notably at Napoopoo, Kealahou Bay, on the lee side of Hawaii, where Captain Cook made similar observations in 1779, and at Lahaina, Maui, where De Freycinet had an observatory in 1819. For an account of other work done in the Hawaiian Islands in 1891-92 the reader is referred to Appendix No. 12, Coast and Geodetic Survey Report, 1891 (Transit of Mercury); Appendix No. 13, Coast and Geodetic Survey Report, 1891 (Preliminary note on the occupation of stations in the Hawaiian Islands); Appendix No. 2, Report for 1892 (On the variation of latitude at Waikiki, near Honolulu, from observations made in connection with the International Geodetic Association), and Bulletin No. 28, on the Constant of Aberration. [page 513]

The following report has to deal with—

- I. Gravity observations at Waikiki.
- II. Gravity observations at Honolulu, Kawaihae, ***Kalaieha***, and ***Waiau*** (summit of ***Mauna Kea***).
- III. Latitude-observations at Kawaihae, ***Kalaieha***, ***Waiau***, and Lahaina.
- IV. Magnetic observations at Kahuku, Waikiki, and Honolulu, on Oahu; at Kawaihae, Waimea, ***Kalaieha***, ***Waiau***, Hilo, and Napoopoo, on Hawaii; at Lahaina, on Maui; at Waimea, on Kauai, and at Nonopapa, on Niihau.
- V. Hypsometrical observations at Honolulu, Hilo, Kawaihae, Waimea, ***Kalaieha***, and ***Waiau***.

The location of these stations is shown in Illustration No. 23 [figure not reproduced here, see original manuscript].

The gravity observations at Waikiki were made in connection with the International Geodetic Association work. The subsequent determinations were carried on with the cooperation of the Hawaiian Government Survey. The greater part of the expense was borne by this Bureau, and the personnel of the party was largely composed of members of the staff. Prof. W. D. Alexander, the accomplished surveyor general of the islands, accompanied the expedition to the island of Hawaii and remained with us at all stations except Hilo. During the occupation of the summit of ***Mauna Kea*** he assumed the difficult task of making a trigonometrical survey of the plateau. The peaks have an altitude of nearly 14000 feet and are composed largely of scoria and red volcanic sand, which makes the ascent one requiring extraordinary endurance. In this work he was assisted by Mr. J. M. Muir, who voluntarily accompanied the expedition without compensation and whose services were of great value. The other members of the party were Mr. W. E. Wall, Mr. E. D. Baldwin, and Mr. W. W. Chamberlain, of the Government Survey staff. Mr. Louis Koch

performed the duties of steward, a service of some difficulty and of great importance to a party encamped above the clouds, and Kauwe, an intelligent *Kanaka*, acted as guide both during the ascent and on the return. In the computations I had the help of Mr. C. C. Yates during the latter part of the work.

PRELIMINARY AND CONCLUDING OBSERVATIONS AT WASHINGTON.

The gravity work of 1891-92 was entirely of a differential character. The continuous determinations at Waikiki simply required that the pendulums should receive no accident during the year of occupation, while the observations for the density of *Mauna Kea* only made it necessary to guard against accident between the times of swinging at the base and summit of the mountain. It is evident, however, that if the periods of oscillation of the three pendulums are determined in Washington before leaving on the expedition and again on the return an agreement of these two determinations will give increased confidence in all the work executed during the trip... [page 514]

Kawaihae.

Island of Hawaii.

Leaving Honolulu in the afternoon of June 28, on board the *Kinau*, we arrived at Kawaihae on the evening of the 29th. The party consisted of Prof. W.D. Alexander, surveyor-general; Messrs. W.E. Wall, W.W. Chamberlain, Louis Koch, and myself. The first observations were made on the 30th... The station was situated on the property of the Hon. Samuel Parker, to who, as well as to the general superintendent, Mr. Paul Jarrett, our thanks are due for many acts of kindness... The general location of the property is between the boat landing and the *Heiau* of Kamehameha I, and about one-third the distance from the *Heiau*. [page 587] At this station are the remains of an ancient temple, famous in early Hawaiian history as the scene of the first steps by which all the islands were consolidated under one government. It was here that Kamehameha betrayed and murdered his rival, Keoua, baked his body in an oven as a last indignity, and finally deposited it in the temple on the altar of the war god. He was henceforth recognized as master of Hawaii. A sketch of this interesting *Heiau* from actual measurements has been furnished by Professor Alexander and is given here as a matter of curiosity [Illustration No. 28.].

A remarkable feature of it is that although the early Hawaiians had no metal tools, and are today poor mathematical reasoners, their temples furnish examples of quite accurate right angles. One tested with a theodolite at Napoopoo was surprisingly near the truth.

Magnetic observations were made on July 1, 2, and 3. The pendulums were swung on the 3d, 4th, 5th, and 6th, and time and latitude were observed during the entire stay. We left on the morning of the 7th. The weather was generally favorable for work with the exception of one or two occasions when we had a sudden gust of wind from the mountains. (These storms are called *mumuku* in the native language, in contradistinction to the storms from the southeast, which received the name of *kona*.)

At this point preparations were made for the ascent of *Mauna Kea*. Packers and horses were engaged and the services of a guide secured... [page 589]

Determinations of Latitude.

The latitude work at the three stations occupied for gravity was only of secondary importance. Only a limited number of pairs were selected for observation, and at *Kalaieha* the weather was so unfavorable that but three latitudes were obtained. The instrument used was a meridian telescope of 31 inches focal length, 2 ½ inches aperture, and magnifying power of 77. One revolution of the micrometer gave an angular value of 65" .85. One division of the latitude level is equal to 1" .66, and that of the striding level is 2".21. The instrument is known as Meridian Telescope No.2. In making the observations

only one bisection was made, and the level was not read more than once, generally after the measurement with the micrometer. The results are not comparable in point of accuracy with those made at Waikiki with the zenith telescope, partly on account of the inferior accuracy of the instrument, but principally because the pier was generally constructed under poor conditions of stability. At Kawaihae and **Kalaieha** only a wooden pier was available, and at **Waiau** the great difficulty of trans- [page 592] portation and labor made it necessary to construct a very small substructure... [page 593]

Waimea.

(See Illustration No. 29 [Figure 14])

On Thursday, July 7, 1892, Waimea was reached. At this station only magnetic observations were made. One station was at the west end of the base line of the Government survey and the other was identical with the station occupied in 1872 by Mr. C. J. Lyons. Additional horses and pack mules were engaged here for the ascent of **Mauna Kea** and preliminary arrangements made for the trip. Throughout our stay the work was much facilitated by Mr. W. L. Vredenburg. Our camp was established in his yard. The party was also recipient of other favors at his hands. Waimea is situated at an altitude of 2600 feet: above the sea level, with a moist atmosphere. Nearly every afternoon, the trade winds bring in rain, so that the observations were made with difficulty. With so much regularity does the rain appear that it becomes to some extent a timepiece. In reply to the question, asked by one of our party, as to when school was dismissed for the day, the answer was that the school closed generally a quarter of an hour before the rain set in. The climate is well adapted to fruit, and the grazing land is of the best quality.

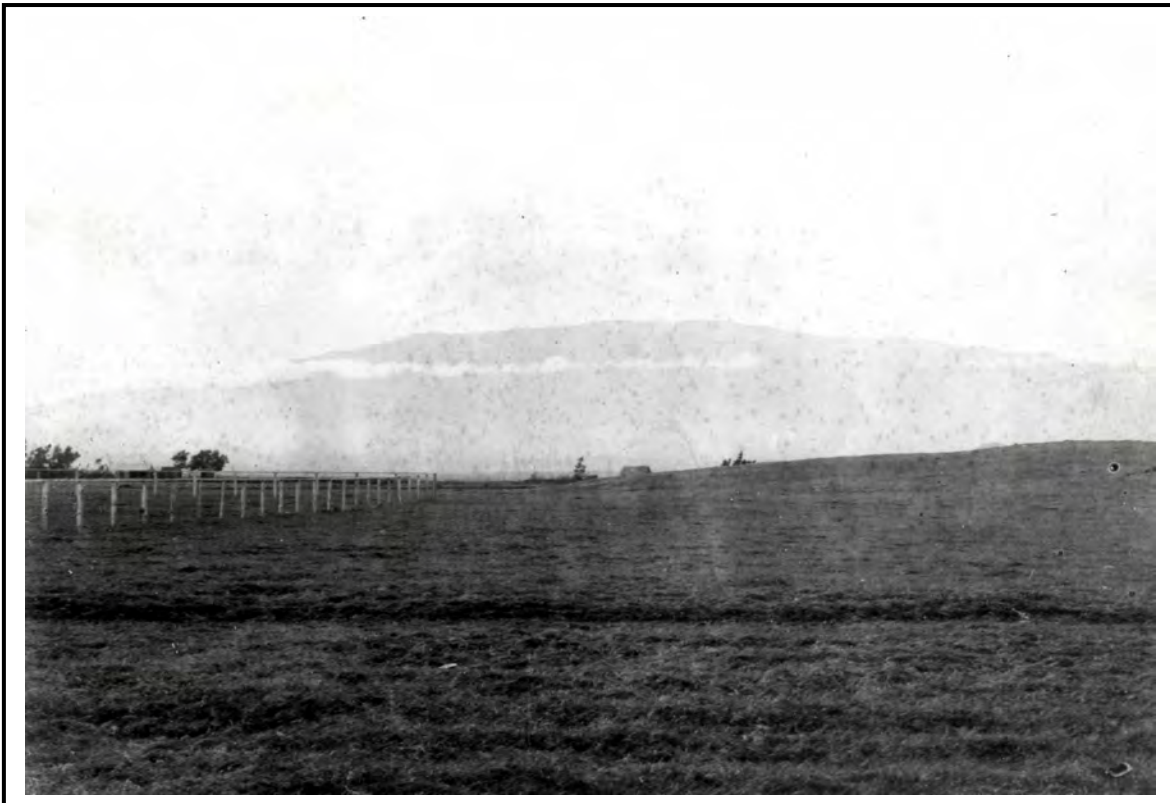


**Figure 14. Mauna Kea, as seen from Waimea, Distant 15 Miles, Looking Southeast.
Cloud Belt at 10,000 Feet Elevation. Plate No. 29 (E.D. Preston, 1892)
(Photo No. 1016, in Collection of the Hawaiian Historical Society)**

The following plants were noticed in one of the gardens: Figs, wild tomatoes, bananas, coffee, pineapples, taro, mangoes, cauliflower, and sugar cane. The following is a sketch of the magnetic station occupied by Mr. Lyons in 1872; the other one is at the west end of the base line and needs no further description... [page 594]

Kalaieha.

Leaving Waimea at 7.25 a. m. on July 12, we arrived at ***Kalaieha*** at 5 o'clock in the evening, having passed the entire day in the saddle. The distance is about 30 miles. The road is not steep, as the elevation to be overcome between the two places is only 4,000 feet. This gives an average rise of 1 in 40, or an inclination of about $1\frac{1}{2}^\circ$. On the road specimens of lava were gathered at designated points in order to form a basis for estimating the average density of the rocks of the island. The route taken, as well as the points from which specimens were obtained, is shown in illustration No. 31 [Figure 15; Map in Collection of the Library of Congress]. ***Kalaieha*** is situated on the ***Humuula*** ranch, which contains 237000 acres, including a part of Hamakua. The tract runs down to the sea on the windward side and extends from the summit of Mauna Loa on the south to

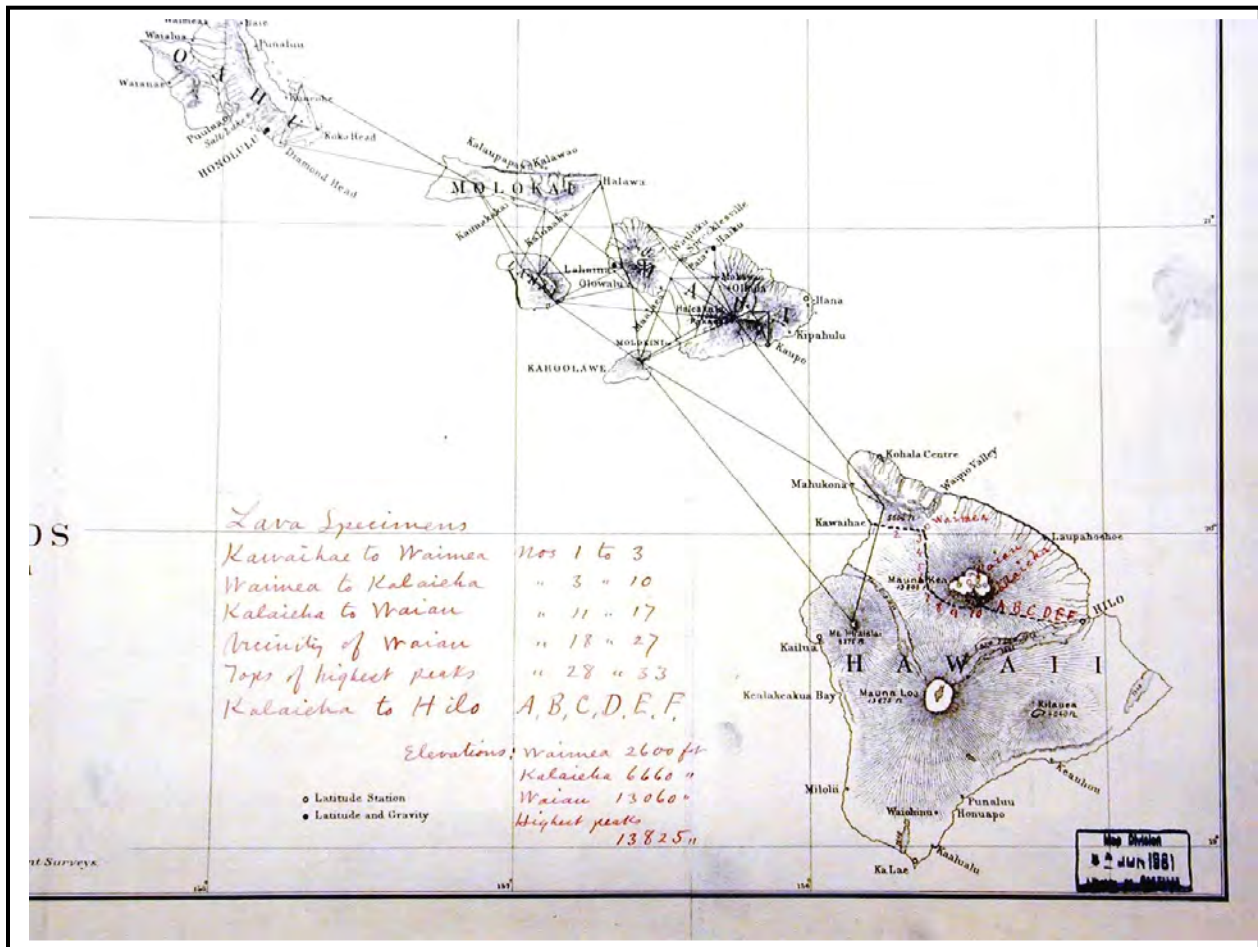


Figure 15. Preston's Map of Route to Mauna Kea, and Locations Where Specimens were Collected (Library of Congress; Copy Photo, KPA-N043)

Mauna Kea on the north. At its widest region it is 20 miles broad. Its longest dimension is about 45 miles. On July 13 the stations were located and the tents and instruments put in position, and on the following day work was begun. The pendulum receiver was mounted on a large rock about 100 feet west of the house farthest to the west, and the latitude pier was within 2 or 3 feet of the pendulum in a southeast direction. The magnetic station was 200 feet due north of the pendulum. A general view of **Kalaieha** is shown in illustration No. 32 [Figure 16]. The prominent peaks along the path to the summit are identified by rectangular coordinates. [page 595]

Location of Prominent Peaks on Mauna Kea (Elevation, 13,825 feet).
 The important points on this mountain are to be found in Illustration No. 32 [Figure 16] at the intersection of vertical and horizontal lines as follows:

- w = Waiau. Location of gravity and magnetic station.
- b = Poliahu*.
- a = Ku-ka-hau-ula. Highest peak; trigonometric station is near this point.
- c = Ke-one-he-he'e. Trail to summit passes right of this hill.
- e = Ka Lepe a Moa. Trail passes between this and c.
- k = Omahulua... [page 596]

* "Poliahu is a poetical name, being that of the demigoddess with snow mantle who haunts Mauna Kea. See Legend of Laieikawai. I therefore propose to attach it to this nameless peak. The rest are the genuine native names." [W.D. Alexander.]

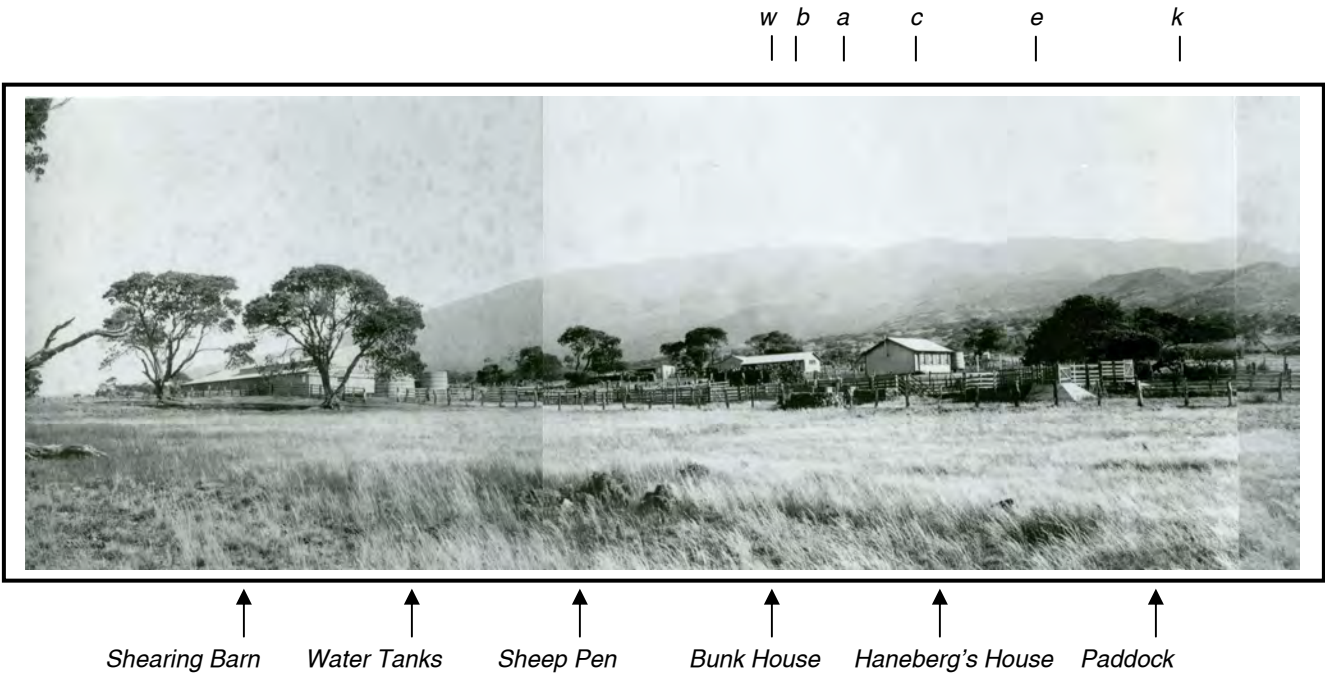


Figure 16. Mauna Kea viewed from Kalai'eha, the Humuula Sheep Station Headquarters Viewed in Foreground, E.D. Preston (1892). (Portion of Tryptic Photo Combined by E.D. Preston; compiled here from Photo No.'s 1008, 1019 & 1018, in the Collection of the Hawaiian Historical Society)

...The latitude observations at this station were made with great difficulty. During the entire stay not more than four pairs could be obtained. The evenings were always either foggy or rainy, and as the telescope was mounted in the open air, it was often necessary

to lift it from the Ys and take it inside the tent to be dried. The latitude was always made to give way for the time observations, as these were necessary for the success of the gravity work, which was the real objective point of the trip... [page 600]

The instruments were dismounted at **Kalaieha** on July 18 and packed for the final ascent. The distance to the summit, in an air line, is about 7 miles, and the difference of elevation about 7,000 feet. The path, however, was about 12 miles in length, and **Waiau** is 700 feet below the summit, so that the average rate of rise was 1 in 11 , or an angle of about $5\frac{1}{2}^{\circ}$. The amount of material to be transported to the top of the mountain was very great. Besides the astronomical, gravity, and magnetic instruments, and the provisions required to maintain the party on the summit long enough to complete the work, it was necessary to carry fuel, tents, and blankets, and enough cement to build a pier for the meridian telescope. The whole outfit was packed on 11 mules, and the party consisted of 11 persons, including 3 packers. Everything being in readiness, a start was made on the morning of July 19. Before getting well under way, however, a fog set in. Some of the pack animals became difficult to manage, and soon it was noticed that the mule carrying the magnetic instruments, probably the most delicate ones of the outfit, was missing. A halt was made and eight of the party started in search, but as the fog was now dense, our efforts were of no avail. After a couple of hours of delay it was decided to abandon the journey for the day. We all returned to **Kalaieha**, the animals were unpacked, and the day given up to hunting the lost instruments. The mule was found about 3 p.m. at the foot of the **Omaokoili** hills, some 3 miles distant.

Waiau. [Figure 17; illustration No. 33.]

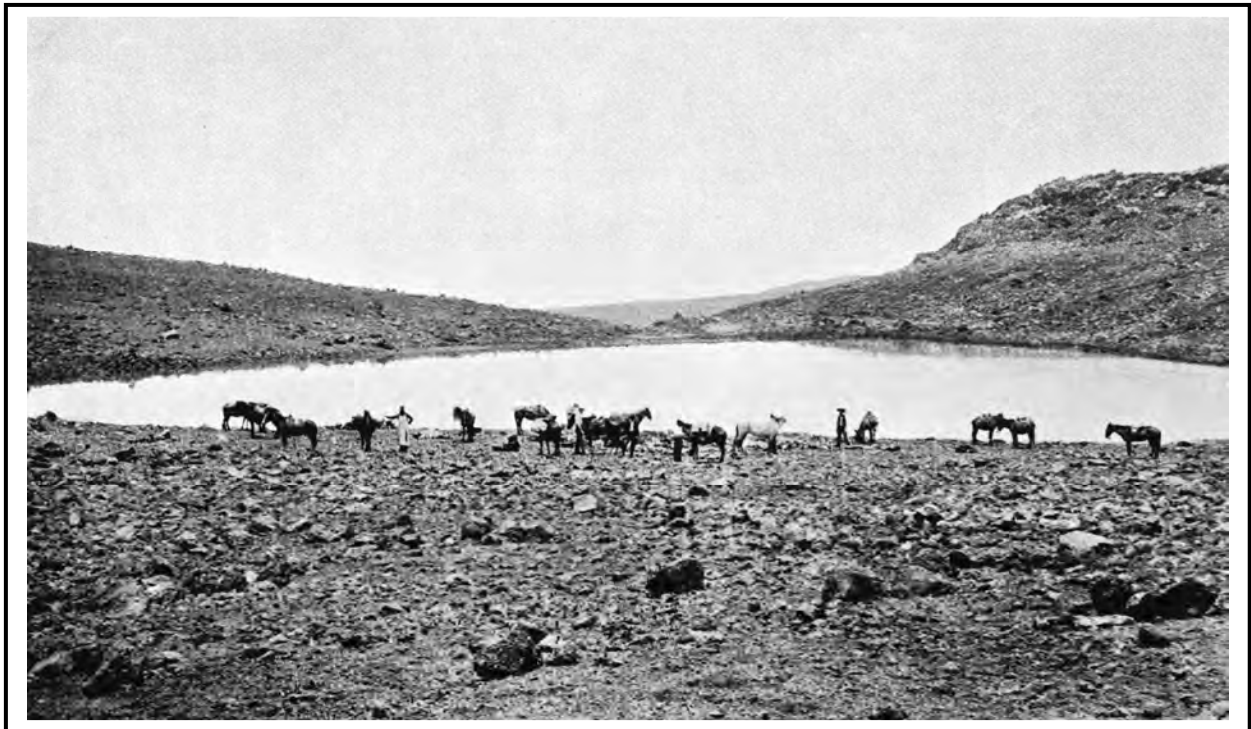


Figure 17. Waiau Lake, Near Summit of Mauna Kea. Elevation over 13,000 Feet. Plate No. 33 (E.D. Preston, 1892) (Copy Photo KPA-N078; in collection of NOAA Central Library Silver Spring, Maryland)

On the following day we again set out at 7:40 a.m. At 11:40, a stop was made for lunch. The route passed between **Lepe a Moa** on the left and **Kole** on the right, and we now found ourselves at an altitude of about 10,000 feet. Continuing in the direction of **Keonehehee**, and climbing this cinder cone in a northeast direction (see illustration No. 34 [Figure 18]), we arrived at the plateau level at 2 p.m. The elevation of this point is 11,600 feet. The *mamane* trees were not seen above 10,000 feet, and the *raillardia*, the only remaining sign of vegetation, disappeared at 11,500 feet. From this point on, the path was over an unbroken landscape of lava. *Some interesting pyramids of stone, built to commemorate Queen Emma's visit, were seen on the edge of the plateau, and at an elevation of 12,000 feet was found Keanakakoi, a famous quarry opened by the natives many centuries ago for the manufacture of battle axes. At an elevation of nearly 13,000 feet, near Lilinoe, a burying ground was found, where the ancient chiefs were laid to rest in the red volcanic sand.* Before reaching the plateau the animals suffered considerably from the rarity of the atmosphere. On the flank of **Keonehehee** it was with great difficulty that they were driven—with tongues out and sinking ankle deep in the soft scoria at every step, they presented a pitiable picture indeed and seemed [page 601] utterly regardless of the drivers' urging, whether with noise or whip. Although heavily laden, they repeatedly lay down, profiting by even a few minutes, when unobserved, to snatch a few moments' rest. Some were unable to reach the destination and had to be unloaded three-quarters of a mile from **Waiau** and turned loose to descend to the plains below. Their loads were repacked on stronger mules, which were sent back from the summit. The endurance of these mountain animals is remarkable. On the leeward side of the island, where it seldom rains, it is a common occurrence for them to pass eight days without water, and cases are on record where two weeks have elapsed between drinking times. Our camp was established on the banks of the lake known as **Waiau**. This is a body of water formed by the melting snow and gathered from the sides of an extinct crater. It is one of the

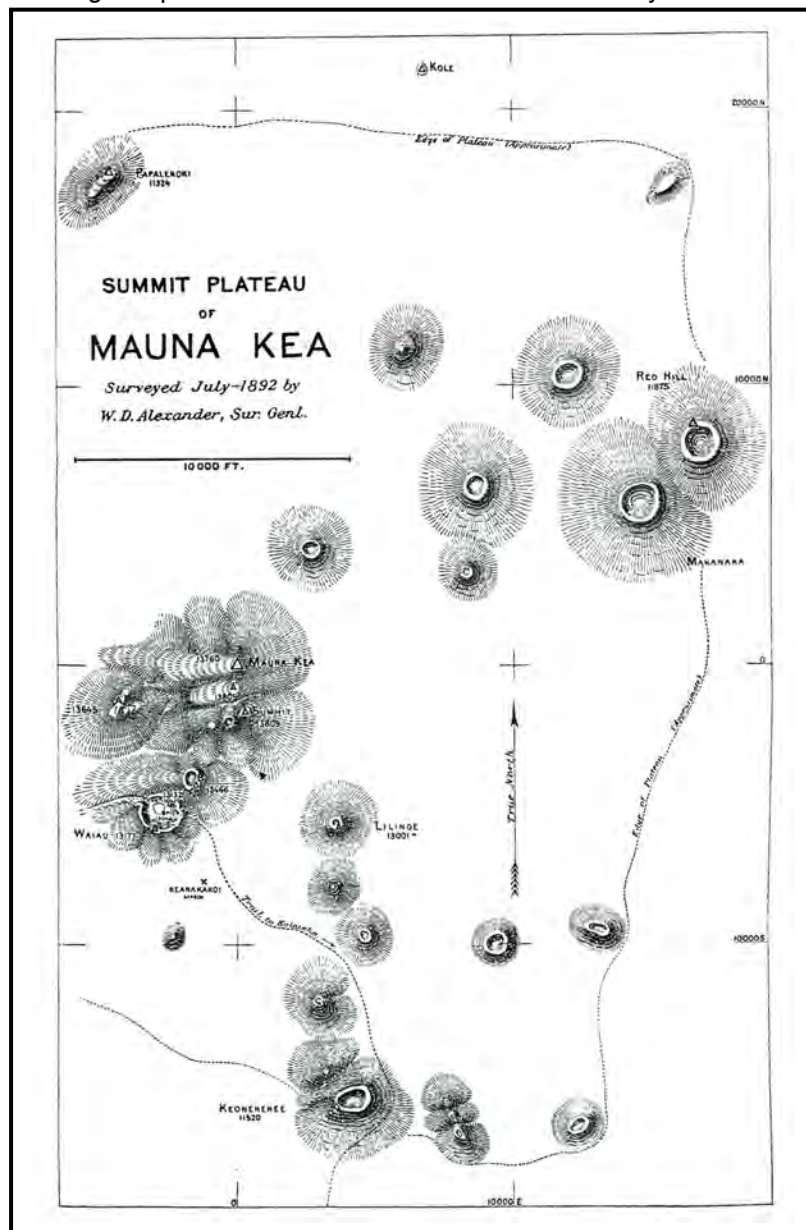


Figure 18. Summit Plateau of Mauna Kea (Surveyed July, 1892, by W.D. Alexander). E.D. Preston's Plate No. 34

highest bodies of water in the world, being at an elevation of over 13,000 feet. At 4 p.m. the baggage was all at the station and the animals were sent back to **Kalaieha**, as there is no provender within many miles of the place.

The boiling point of water on the summit (illustration No. 35 [Figure 19]) is about 186° F. The ranges of temperature during our stay were from 13° F. at night to 108° F. in the daytime, the thermometer having the same position at both times. The barometer stood at 18.30 inches at 54° F. We found the trade winds blowing at the summit, although the anti-trades are supposed by some to appear much below 14,000 feet elevation.

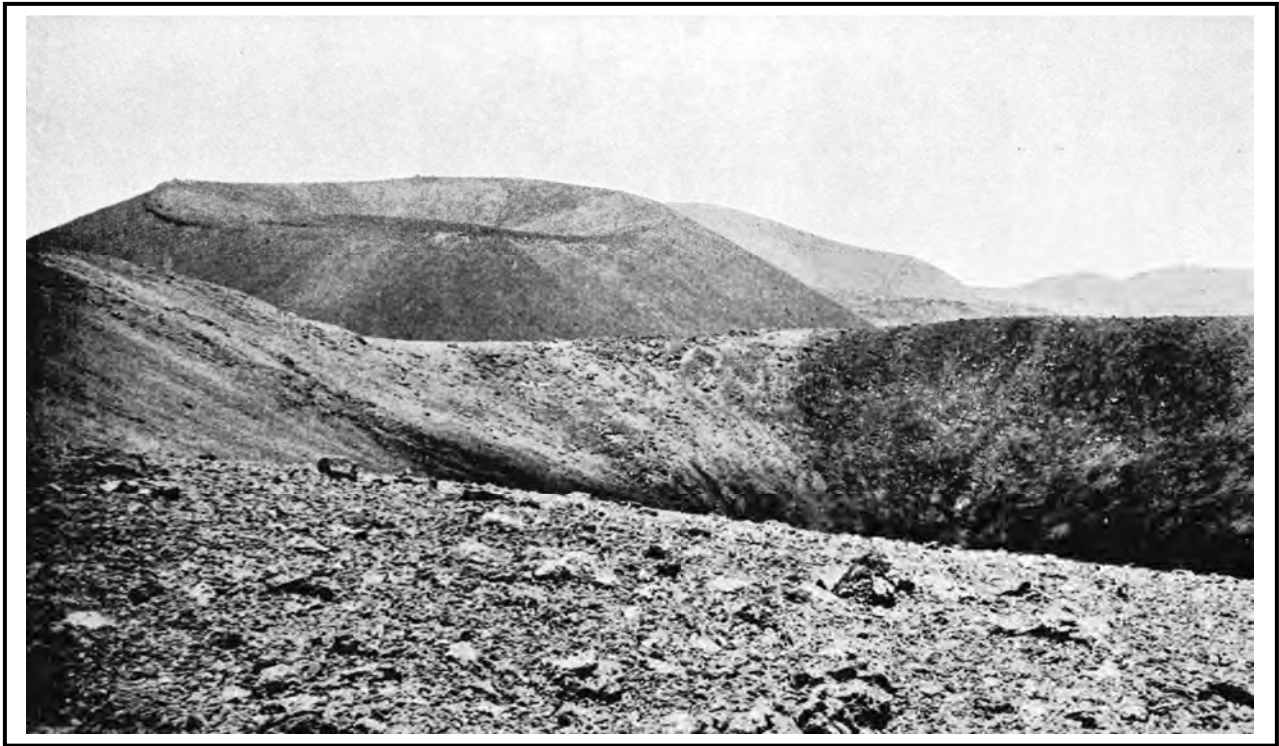


Figure 19. View from Ku-ka-hau-ula, the Summit of Mauna Kea, Looking Southwest. Elevation 4,214 Meters (13,825 Feet). E.D. Preston, 1892. Plate No. 35. (Copy Photo KPA-N093; in collection of NOAA Central Library Silver Spring, Maryland)

The atmosphere was very clear. *Many stars were observed before sundown with a small telescope.* We had, of course, ice every night on the lake. With such extreme ranges of temperature there was much discomfort. Sleeping cots were not taken, as it was entirely too cold at night to lie off the ground. It was found necessary to make sleeping bags by sewing blankets together. Although for miles in every direction around **Waiau** there is an unbroken landscape of lava, and apparently nothing to support life, we saw spiders, butterflies, and flies during the stay.

Around the shores of the lake the following plants were found growing, although the lake itself is several thousand feet above the last limit of vegetation. They were submitted to President D.C. Gilman, of the Johns Hopkins University, who kindly forwarded the list, as follows:

Cystopteris fragilis Beruh.
Trisetum glomeratum Trin.
Poa annua L., *forma vel vaz.*
Deschampsia australis Nees.²⁵

The first specimen was determined by Mr. John Donnell Smith, and the last three by Dr. George Vasey. All the above plants were found growing near the same locality, at an elevation of about 13,100 feet above sea level. See illustration No. 35 for summit view... [page 602]

From Waiau to Hilo.

The last observations were made at **Waiau** on the evening of July 25. The next morning the animals arrived from **Kalaieha**. They were packed during the forenoon of the 26th, and at 1.30 p.m. we started down. We reached the **Humuula** ranch (**Kalaieha**) at 5:45 p.m., having stopped an hour at **Keanakakoi**. On the 27th the instruments and baggage were all repacked. The party separated at this place, some going down the windward side of the mountain to Hilo, and the others returning to the sea over the same route taken in the ascent. This course was necessary because magnetic observations were to be carried on at Hilo, and as it was impossible to transport the baggage to the steamer on this side of the island, it was sent to Waimea and then to Kawaihae. We left **Kalaieha** at 6 a.m. on July 28th with a small pack train and a guide. The path is about 30 miles long, very rough, and much of the way over sharp lava. We were supplied with horseshoeing implements. This is a requisite to everyone making the trip. The lava is so hard and sharp that if a shoe is lost the horse's foot is badly cut in a few minutes, and neither persuasion or force will induce him to continue the route unshod. Many carcasses were seen along the road, of animals that had been killed or left to die, as there is nothing by the wayside to support life. Just before arriving at Hilo we passed through 1 $\frac{3}{4}$ miles of swampy woods, which consumed two hours in crossing. Hilo was reached at 7.30 in the evening, after having spent thirteen hours in the saddle.

The photographic plates exposed on the mountain were developed the next day, and on Saturday, the 30th magnetic observations were begun... [page 607]

²⁵ *Trisetum glomeratum*. Hawaiian name, *he'u pueo* (apparently a name for this species on Hawai'i, while elsewhere in the Hawaiian islands it is referred to as *pili uka*). Endemic to the Hawaiian islands. It occurs at high elevations on Mauna Kea, Mauna Loa, and Haleakalā. It is a major constituent of the alpine grasslands that occur around 13,000 ft.

Poa annua. No known Hawaiian name. Introduced and naturalized, by ca. 1871. Annual bluegrass.

Deschampsia australis (new scientific name, *Deschampsia nubigena*). No known Hawaiian name. Endemic to the Hawaiian islands, generic name for this genera of grass is "Hairgrass." It occurs in the subalpine dry forests and up into the alpine *Trisetum* grasslands.

Cystopteris fragilis (new scientific name, *Cystopteris douglasii*). An endemic fern, threatened in the upper region of Mauna Kea.

(Above information provided through the courtesy of DLNR-DOFAW Biologist, Lyman Perry (Feb. 4, 2005); and notes compiled by Patrick Aldrich, Intern at Office of Mauna Kea Management (2005).)

U.S. Coast and Geodetic Survey

June 21, 1894

E.D. Preston; to W.D. Alexander

(Regarding photos of Mauna Kea; and information on Plant Species

Encountered on Mauna Kea Trip):

...I am in receipt of yours of 20 June and have to thank you for it as well as for the papers you have so kindly sent from time to time. The news has always been extremely interesting to me. I feel almost as much interest in the Hawaiian Islands as I do in my native land, indeed in some respects even more.

The report on the latitude gravity and magnetic work done in the islands after June 1892 is very nearly ready for the printer. It has gone slowly on account of many unavoidable interruptions and even now within a few days I have been taken off to work up a new value of the observation constant from Davidson's San Francisco observations. I hope to be able to send you the principal results with this which I will hold for a few days on that account.

In my memorandum kept during the progress of the office computation I find the enclosed list which indicates a few points on which information was desired. If you can answer any of the questions without inconvenience it can be inserted in the proof when it returns from the printer which will probably not be for some months yet. But it is hardly worth while to make any special effort to get the data.

By putting three of my photos together & having them again photographed I have succeeded in getting a good outline of **Mauna Kea** in which the principal peaks can be identified by means of rectangular coordinates. **Ku-ka-hau-ula** and **Poliahu** have been slightly exaggerated by hand before reproducing in order that they may be easily made out after reduction. I enclose both prints & you will see the amount of exaggeration.

The plants found at the summit were identified to be:

Nos 1, 2, 3, & 4

Cystopteris fragilis.

Nos 5, 7, 10 & 11

Trisetum glomeratum.

Nos 6 & 8

Poa annua L.

No 9

Deschampsia australis.

We were both delighted to receive your *Aloha olua* and we each return *Aloha oukou* for you all... [HSA – DAGS 6, Box 8]

Washington, D.C.

August 25, 1894

E.D. Preston; to W.D. Alexander

...Your letter of recent date came to hand yesterday and I take the first opportunity to thank you for the information it contained in regard to heights and azimuths at Waimea Hawaii.

I am glad you thought well of the photograph of **Mauna Kea**. A copy of it is the front piece of a paper published by the Phil. Soc. of Washington. I send you a copy tonight and will shortly send you a number of copies, and will also send some to other friends in the Islands... [HSA – DAGS 6, Box 8]

IV. Historical Accounts of the ‘Āina Mauna Recorded After 1900

Following the advent of the 1900s, travel to the summit of Mauna Kea and the mountain lands became more frequent. Travelers included the adventurous, curious, and those of a scientific interest. Selected articles, journals, letters, and reports describing travel to the mountain lands, and observations of both cultural and natural resources are cited in this section of the study. The narratives describe travel conditions; forest resources; introduction of plant and animal species to the landscape; cultural and historic resources; ranching activities; proposals for road development and land use activities; forestry and hunting programs; the results of scientific surveys covering historical resources, the geology and glaciation of Mauna Kea, and botanical surveys; and the development of skiing interests on Mauna Kea.

Pertinent excerpts from the articles and papers are given verbatim, and presented in chronological order, by date of visit to Mauna Kea and the neighboring *‘āina mauna*; or, when given as general accounts of the mountain lands, by date of publication.

“Hawaii Rdeivivus” Orchards of the Keanakolu Vicinity Planted in ca. 1885:

by Lillian Shrewsbury Mesick

Paradise of the Pacific, September 1909

An article in a recent number of the Advertiser written by the Rev. Mr. J. M. Lydgate has made me wonder whether or not the dream of the so-called visionary who favors the coming of the small farmer and fruit-raiser is indeed “as a dream of a night vision” or a foresight of what actually is to come.

Mr. Lydgate visited an abandoned fruit orchard at **Keanakolu**, which is situated on the southern slope of **Mauna Kea** on the Island of Hawaii at an elevation of about five thousand feet. This orchard was planted about twenty-five or more years ago close to where the **Humuula** Sheep Ranch house was then situated. The headquarters at **Keanakolu** were afterward abandoned and the fruit orchard was left uncared for.

Very fortunately, however, a fence strong enough to prevent cattle, wild goats, and other animals from damaging the trees had been erected, and it is because of this that we are enabled to judge of what results might have been obtained in other places had the same condition prevailed. The trees at **Keanakolu** were overrun with such a growth of weeds and underbrush as might naturally be expected in a location which has been uncared for during a period of twenty years. The trunks and limbs were covered with the long gray moss so common to neglected trees and shrubbery, but the fruit—several varieties of which were ripe—were all that could be desired, and far more than could well be expected under the circumstances.

Mr. Lydgate found apple, plum, pear, apricot, cherry, and peach trees, and several varieties of each. He states that the apple trees run mostly to whips, causing a meager crop of fruit, but Mrs. Lydgate claims that those she saw were of excellent quality. The fine crop of Bartlett pears and the cherries and peaches were, at the time of their visit, too green to eat, though the cherries, which were few, are probably ripe by this time. There were but few peaches, but those seen were of good size. The plum and apricot crops had already matured and there was no fruit left by which one might form an opinion, but it is

said that the fruits have been gathered by those who have visited the orchard during the past few years, and have been found equal to those grown on the mainland.

One peculiarity that Mr. Lydgate could not explain was the ripening of the apricots long before the cherries. The opposite condition prevails in California, apricots coming into market there some weeks after the close of the cherry season. Mr. Byron O. Clark tells me, however, that he has known apricots to ripen in Southern California in April, so the unusual condition at **Keanakolu** may be due to a very early variety of apricots and a late variety of cherries having been planted there. This is not entirely a satisfactory theory, however, as cherries in California usually have disappeared entirely when the first apricots come into market.

Mr. Lydgate states that he found a considerable number of Loganberry bushes in the enclosure on which the fruit was just beginning to ripen. The bushes were in a very thrifty condition—so very thrifty that the fear was expressed that they might in time become such a pest as the common Jamaica thimbleberry, which is said to have been imported fifteen or twenty years ago, is now on the Island of Hawaii.

The trees and bushes in the orchard at **Keanakolu** are reported to be entirely free from all disease and in a surprisingly healthy condition, considering the neglect of something like a quarter of a century. This is surprising to one who knows the fate of abandoned orchards on the Coast. There, without some care, the trees become dwarfed and stunted and the fruit scarce, small, and of inferior flavor and grain. [page 21]

“Mauna Kea, The Highest of Island Peaks” (1911)
by Solomon Sheridan with photos by Alonzo Gartley
Mid Pacific Magazine, December 1911:403-411

Mauna Kea, on Hawaii, is the highest island peak in the world. It rises so gently from the ocean side that, although its base is in the tropics and its crest in the snows, the eye is deceived, and it seems but a gentle slope of no great final altitude, yet a plumb line dropped from the summit of **Mauna Kea** to the sea level would have to be nearly three miles in length. It might be possible for a good horseman to ride in a day from the seaside to the summit of **Mauna Kea**. Usually a day is spent on the trip to a ranch within eight miles of the summit, where the night is spent, and an early start made so that the summit may be reached within a couple of hours and a return made for lunch at [page 403] the ranch house. It would be easy to walk the eight miles but for two obstacles—fog and wild cattle. The fog causes the wanderer to lose his way, for there is no regular trail—you just keep your eye on the highest level of the gentle slope and walk. The cattle are unaccustomed to men who are not on horseback; they invariably approach out of curiosity, and if the tramp shows the white feather and runs, and sometimes if he doesn't, they charge, and out alone on the mountain chased by wild cattle is more thrilling and dangerous sport than climbing the Matterhorn.

Then, too, there are wild dogs, that live on sick cattle that they worry to death. The dogs hunt in droves and afford as good shooting sport as do goats on some of the craggy mountains of Hawaii.

From the summit of **Mauna Kea** its sister mountain Mauna Loa, but a few feet lower in height, is seen a few miles away, and sometimes smoke is seen issuing from its crater summit. It is possible to ride and walk from one mountain peak to the other, but those who have crossed the high, desolate lava flow, nowhere less than 8000 feet above the sea level, tell tales of hardship that would deter any but the fool-hardy.

Sol. N. Sheridan has given a good account of an ascent he made of **Mauna Kea** on horseback from the ranch station:

“We had started in pommel-slickers from **Humuula** sheep station.” He tells us, “riding in a little drizzle of rain that would have soaked us to the skin if we had ridden in other garb. As we rose through the forest line we rode into the body of the cloud itself, and the rain changed to a mist that was dense, but not cold.”

“Slowly the cloud seemed to break. We were riding out through the top of it, but that did not appear all at once. Then the sun broke out, flashing, and we rode out upon a high cone of ash and looked down upon the valley between the peaks of Hawaii as upon a rolling mass of white wool with a tinge of silver upon it.”

Ahead, the jagged cones of **Mauna Kea** arose all about us. To the south- [page 404] ward the sweep of the blue dome of Mauna Loa stretched in a splendid curve above the clouds, broken at its apex by the jagged edge of its central crater, and wearing small ones at intervals, strung like the jewels of a woman’s necklace. To the westward, farther away, the less lofty top of Hualalai pierced the clouds sharply—a jagged peak.

Up and still upward we rode, our horses feeling the great elevation seemingly as little as we did ourselves. Now the formation changed, and from riding up cinder cones we began a steeper climb along a ridge marked by an old lava flow broken by the action of frost and snow into jagged boulders. There was no snow, here, but traces of its action were very apparent on all parts of the mountain above 10,000 feet elevation.

Presently there appeared, far ahead of, and still a long distance above, us, what seemed in the distance a dump-pile from an abandoned mine.

“There,” said Rawhide Ben, “is where the natives used to come in the old days to chip out the rude forms of their stone adzes from the hard rock of the mountains, carrying the implements down into the lowlands to perfect and polish them afterwards.”

We rode on, still climbing, and presently took off our hats to the shades of the men of the Stone Age. *Here they had lived and wrought in a time that is fading very fast into the past—that is, the past of our own race. It is not many centuries ago that these men of Hawaii were at the stage that our own forbears reached and passed ten thousand years ago. Here were the caves in which they dwelt, with rude stone walls built up in front to shelter them from the cold winds of the mountain. Here were the ledges of hard, black, basaltic rock which was the material most prized in the making of their implements—of war, of fishing, of agriculture, for the service of gods and the chiefs. Here, covering several acres in different places, were piles of sharp chips from the tough stone, beaten off through many a weary day of patient labor. Here, where each workman had sat in the quarry, there was a little depression around which he had slowly built up his own pile of [page 405] chips. ‘How long, oh Lord, how long!’*

To climb to this height, to delve and dig and chip at hard stone through the long days, to carry down the masses of stone for the polisher and to carry up food and wood and even, it might be, water to the quarrymen, to live and even to die, as some must have died, there above the clouds while the warm rains were marching across the sunny isles far below and lazy plenty waited on the happy

dweller by the fragrant beaches! Surely that was a fate that was filled with bitter pain.

It is said that slaves, taken in war, worked these quarries. Let us hope that it was so. A slave taken in war would have felt something in his life, at least, when the hot lust of battle ran in his brain, and the sun shone red through the red blood of the foes of his hate. And he could still beat in the skull of his enemy while he beat out his own life upon the black basalt. A slave taken in battle has had his chance.

The old quarries are at an elevation of 12,500 feet. From here the highest point of the mountain comes plainly into view, rising beside a cone that is an absolutely perfect circular crater. It looks, this little crater, as though it might have shot out its vomit of cinders and red ash but yesterday, before going to sleep. It is sleeping most profoundly now, and little dots of white snow nestled at its feet feels none of the heat that must have radiated from it in its waking days.

From the quarries it looks an easy ride to the highest summit through a gentle valley that seems to lead right to the top. It is really very hard—the hardest stretch of all. The summit cone in reality a double cone—is steep and is of red cinders; and the horses, beginning now to feel the great elevation, even as we ourselves do a little, find the footing difficult and the climbing steep. We zigzag backward and forward, each rider following in the guide's steps, and make many stops in the last 500 feet—more, indeed, than in all the climbing that has gone before.

And then, we are at the summit—and through the clouds that have partly broken away below us we catch glimpses of the sea and of the distant sunny vales of Hawaii. At our feet, almost, the [page 407] plains of Humuula lie spread out like a map, and beyond, above the clouds, are Mauna Loa, with its yawning mouth open to heaven, and Hualalai and, far in the distance, the blue outline of Haleakala. It must be a magnificent view on a clear day. It was rarely beautiful, in its sweep and in its coloring, on the day that we saw it.

At the highest point, an elevation of 13,825 feet, a mound of rocks is built, and in this a can lies that contained lists of the names of those who, in recent years, had climbed the mountain, and deposits of silver money made toward a fund for a monument there, and divers articles, the leaving of which had suited the taste and fancy of the depositor. One had left a small compass, another a bunch of sulphur matches, another a brass button, another a penny.

We copied the names of those who had been there before us, and left our own and gave each a bit of silver for the Summit Monument. Then we bethought ourselves that as the sum in the can had reached the amount of \$4.05, it was time some steps were taken looking to the carrying out of the purposes of the contributors. And so we then and there perfected the organization of the Mauna Kea Association, Limited, and elected Joseph G. Pratt president, Eben P. Low secretary and collector, and A. L.C. Atkinson treasurer. The amount of the collection was turned over to the treasurer, and it was determined that any person who has made the ascent of Mauna Kea, the highest point in the Hawaiian Islands, shall be eligible for membership upon proof that he has been on top of the mountain, and that each member contributing to the monument

fund shall receive a certificate stating the date of his ascent and acknowledging the amount of his contribution.

After the organization of the association, we mounted our horses and rode to the top of the twin cone, at a little lower elevation than the summit proper and looked down upon a field of snow having a front of several hundred yards in length. Of course, we rode to it. It was so white and beautiful that we had thought we would have ridden into it—but we found, upon approach, that it was caked hard—a frozen mass of glacial snow, each tiny, beautiful flake a gleaming crystal. It was difficult to break off bits to eat from the hard [page 408] points into which the winds and the sun had shaped it, but how good it was! Fancy eating snow here in Hawaii in July, and blowing upon your pallid fingers afterward to thaw them out!

The face of that snowbank was higher than the head of a man on horseback, and presumably it is there the year around. At such an elevation, at all events, it can melt but slowly.

From the snow we rode down to *the Crater Lake, a clear green pool covering an area of two acres, perhaps, and sheltered in a cup-shaped depression at an elevation of 13,000 feet. It was once said of this, as of all other crater lakes, that it is bottomless. Like all such sayings, too, this one has been proven a fallacy. I do not know the figures, but men have come with long lines and shattered the former faith.* Men with long lines are the iconoclasts of old beliefs.

We had no lines—but we lunched at the lake and the Secretary and the Postmaster would have shied stones across it. They failed ignominiously. So did Jimmie, who had vaingloriously boast- [page 409] ed, all the way to it, that he would swim the puddle. But Jimmie has the artistic temperament, and so was expected to be long on promise and short on performance. All those artist fellows are like that.

“Now,” said Rawhide Ben, as we rode away from the lake, “we will try a little rough riding.”

And Rawhide Ben, when it comes to finding rough country, is short neither on promise nor performance. He can find and ride through more rough country than any man I ever saw. That is all right, if he likes it. When it comes to finding it and leading me to ride through it—well, that is different. I did not know before how many kinds of an idiot I could be. To be perfectly frank, I do not know now—but I added a large assortment to the collection of a long life in that ride down Mauna Kea.

If Rawhide Ben had taken us down by the way that we came up, it would have been easy enough. He took us down by a way that was one long and hard scramble over great masses of loose and rotten lava, and slipping sand, and once, in the middle of this, he led us across a gulch where I did not think anything could go without wings. I have more faith in my horse since seeing him cross that place—but I own I did not have faith enough in him before. I got off and walked. So did the Postmaster. And that is plenty good company for me.

Afterwards, when we had had the coldest drink I have ever taken in these islands, from a mountain spring at an elevation of 10,500 feet that is probably

seepage from the Crater Lake, Rawhide Ben and the Secretary went off to shoot wild bullocks, leaving the balance of us hanging in the air on a pinnacle just above the forest line, to which we had descended by a series of long slides. They did not get the bullock, of which I was very glad. I had, at the moment, a great and abiding sympathy for all hunted and tortured wild things. And I was pretty wild, too. [page 410]

However, I grew tamer as we neared the plain which is the saddle between the mountains, and I galloped to Humuula at least as fresh as a green man could be after such an experience—and with enough of glory achieved for one day. A mighty few men have conquered **Mauna Kea**. Fewer have come down it, as I did, by a kind of wobbly tobogganing that leaves a man with a sense of uncertainty, for a night and a day, as to whether he is really alive from the waist down.

From Honolulu it is a day and a night by steamer to Hilo on the Island of Hawaii. From Hilo a visit may be made in a day by coach to the coffee plantation of the Louisson brothers on the slopes of Mauna Kea, and the next day the horseback ride made to the sheep ranch.

There is an alternative route; from Honolulu a steamer trip may be made in a day to the Kona side of the Big Island and from the port of Kawaihae it is but a two or three hour stage ride to Waimea, the village headquarters of the Parker Ranch, that extends from the sea to the summit of Mauna Kea. From Waimea to the sheep ranch is a day's ride, or the summit may be reached in a day and the return made the next day to Hilo.

In Hawaii there is every conceivable kind of mountain climbing, but for an easy horseback ascent of nearly 14,000 feet, Mauna Kea offers one of the most surprising mountain climbs in the world—from the eternal tropics to the eternal snows in a single day. [Mid Pacific Magazine, 1911:411]

Trails of Mauna Kea and the 'Āina Mauna Originally built in the Time of 'Umi

In October 1912, Sol. Sheridan, wrote again of a journey taken by the mountain trails around the island of Hawai'i, and included an account related to him by Eben Low of the adze makers who traveled to Mauna Kea—following trails from the lowlands of Kona to the summit region. In the following excerpts, Sheridan described the section of the trail crossing from Mauna Kea, over the Pōhakuloa flats, and across the 1859 lava flow to Ahu-a-'Umi:

The road by which we went down into Kona from our dry camp in the lava is a road that has been traversed by few men now alive. Long ago, before the history of these Islands began to be written, *it is said that the natives went that way to get stone forms for their adzes from the hard rock of Mauna Kea*, but that is a tale only.

All that is known is that the natives did get their rock from there for their stone implements—and there are in places in that wild region that lies between the peaks of Mauna Loa and Hualalai the traces of a trail so old that in some parts it has been covered by lava flows whose date is forgotten, and in other places trees have grown up in it that are as large as the body of a robust man.

"Umi's Trail," they call this road. How few white men in these islands have ever even heard of Umi's Trail, although most may have read the story of Umi as it is told in Alexander's history... [page 331]

Eben Low and a native assistant went that way once, and marked the way. It was by this marked way that Rawhide Ben led us out again... We have traveled several hours from

our dry camp when we struck Umi's trail, plainly marked across an old *a-a* flow upon which a forest had grown up. The trail was plain, and showed that much work had been done upon it. Like all Hawaiian roads of the olden time—or most of them—it ran straight away toward the point that it was desired to reach, regardless of the topography of the country. Umi was a trail builder, up to this date. Where the *a-a* was level, his men marked their way across it by smooth going. Where there were depressions in it, they were filled up to the general level, much as a modern engineer would fill them. Where there were hillocks to be crossed, they were cut away if not too high and passed over in a straight line if their altitude forbade grading.

And this road, as smooth and as easy as though built yesterday, was constructed so long ago that in the center of it, through the rotten lava, *lehua* trees had grown up, having the girth of a strong man. *Umi's slaves marched this way to the quarries of Mauna Kea*, and his couriers went this way and his armies marched this way, it is probable, to battle with the men of the Waimea and Kohala country... This road, or maybe another, ran from [page 332] Kailua, straightaway to Hilo, and old tales are that the kings living at Kailua would have millet caught for them in the ponds of Waiakea in the morning, and would eat them at night, relays of swift couriers carrying them across the island.

We lost Umi's road, as we went on, a little before we reached the great flow of 1859... Over this flow Eben Low and his native man had marked the road with dabs of white paint upon the smooth surface of the black lava, and for miles we went by these white disks—not crossing the flow directly but following it down so that we might make the point for which we were aiming on the table land of Umi... [October 1912:333]

A Visitor's Guide to the "Mountain Country" (1913)

In 1913, H.W. Kinney, prepared a visitor's guide for the island of Hawai'i. His guide included a short section on the "Mountain Country" of the island, and described the various approaches to Mauna Kea, Mauna Loa and Hualālai. Notably, at the time of writing, the Hilo-Pu'u 'Ō'ō route was the primary one used, and the Pu'u 'Ō'ō Ranch served as the base camp for those wishing to travel to the summit of Mauna Kea. Kinney wrote:

The mountains of ***Mauna Kea***, Mauna Loa and Hualalai and the highlands surrounding them are comparatively seldom visited, as the journeys to the summits are attended with difficulties, unless the traveler can depend on the ranch stations for assistance. The map shows the trails and stations. The ***Puu Oo*** ranch is ordinarily the starting place for the summit of ***Mauna Kea***, though this mountain may be ascended from almost any side. From Hilo or the Volcano House to the ranch is a good day's ride. From Hilo one follows the Kaumana road to the end of the wagon road at the big flume. Here one should take the first trail left of the last house on the road and take the trail across the lava flow. At about 3500 feet elevation is a cave at the left of the trail with drinking water. The last part of the trail is across grass. From ***Puu Oo*** one must take a guide to the summit, the trip from that point to the top and back being made in a day. Near the summit is a lake, as well as a quarry where the old Hawaiians made stone implements. Snow is generally found near the top.

The ascent of Mauna Loa is more seldom made as it is more arduous, and as the top can be gained only from a few directions. At this writing the Volcano Stables Co. is preparing a trail, with a camp, which will start near the gate which crosses the Volcano-Kau road east of Kapapala. When this is finished, the trip can be made by autoing to the camp in an afternoon, making the trip from camp to summit and back to camp in a day, returning the following day. It is also possible to make the trip from the Pualehua Station, in Kona, to the summit and back to the station in a day.

The Hualalai mountain is more accessible. The Judd road, which was intended to lead in a straight line from Kona into Hilo, but was abandoned, leads to the **Ahua o Umi**, where King Umi held the first census. He had the population from each district make a pile of stones, each person depositing a stone, the size of the piles indicating the relative size of the population of the districts. A better trail to this point leads from the Pualehua station. It was formerly a wagon road, used for carting wool to the beach. A short distance below the **ahua**, N. of the Judd road, is a cave with an unfailing water supply. Another trail leads from Kainaliu, crossing the Judd road a few miles *mauka* of the upper road, to the Hualalai summit. It passes several craters. On the N. side of the summit is a blowhole, [page 15] known as the "bottomless pit." Still another trail runs from the Judd road to the summit. It passes a sandy plain which was used by the old Hawaiians for races and other sports. A trip covering all the points mentioned, can be made in a day. Hawaiian guides can be had at Kainaliu, from \$2.50 to \$3 a day. All the summits offer splendid views of the entire island, as well as of the other islands in the distance. [Kinney, 1913:16]

"Large Party Makes Mauna Kea Climb"

Eighteen Persons, Including A.M. Cabrinha and E. Vierra, Enjoy Ascent.

Hilo Tribune, June 29, 1915

Probably the largest number of persons to make the ascent together of **Mauna Kea** since the days when troops of Hawaiian warriors went there to hew out battle axes climbed to the summit of the mountain on Monday, June 24. In the final stage of the ascent the party numbered eighteen.

Superintendent A.M. Cabrinha and Deputy Auditor E. Vierra planned and organized the party, which was guided by Ikua Purdy, one of Hawaii's champion ropers, who is now manager of the **Keana Kolu** ranch.

Leaving Paauilo Sunday afternoon, Cabrinha and Vierra rode to **Kukaiau**, accompanied by John de Ponte, where joined by J.S. Ramos and Manuel Nikola. From **Kukaiau** the first stage of the climb was started. In one hour and a half, they reached **Umikoa** ranch where Joaquin Pistona and five cowboys joined the mountain climbers. At 8:30 o'clock Sunday evening the party started for **Keana Kolu** ranch, making the ride by 10 o'clock. Here they remained over night until 4:15 o'clock the next morning when the steepest and last part of the mountain climb began.

Before leaving **Keana Kolu** the original party was added to by Purdy and six of his cowboys who he permitted to make the ascent. Six hours were required to make the climb from Keana Kolu to the extreme summit which was reached shortly after 10 o'clock Monday morning. As the day was an especially clear one, the mountain climbers were able to get a good view, it is possible to see the ocean in the direction of Ookala. When the party left the summit they rode down to the lake where a stop was made for lunch. While there was much snow on the mountain and traces of ice in the lake most of those in the party were more inclined to complain of the heat than cold.

One of the diversions of the trip was the rounding up of a number of sheep which had strayed up as far as **Makanaka**. Although there were eighteen horsemen in the party the sheep were so wild that it took all of them to get the sheep back within the range of Keana Kolu ranch.

Besides Purdy, there were only two others in the party who had ever been to the summit of **Mauna Kea** before, although all of them had been raised on this island and most of the cowboys have been making their living for years above the 8,000 foot level.

One of the surprises of the trip to the members of the party from sea level was the vast acreage of level, rich soil, which in the form of tableland, from ten to twelve miles wide and

thirty-five to forty miles long, lies between the lava land above the plantation cane fields and the beginning of the steep slopes of the mountain. Like many who have never made the ascent they had supposed that the mountain sloped up from the sea to the summit as it does through the coast cane fields.

All of the party were enthusiastic about the beauty, and fertility of the land, much of which is covered with good timber or grazing grass. They believe that on account of its elevation this land will produce almost any fruit or vegetable raised in the temperate zone, if only some means of getting produce to market could be devised in order to make cultivations of the high tableland profitable. As it is now, the only possible method of transportation is by horse or mule back.

Both Cabrinha and Vierra were much pleased with their mountain trip and expect to make the ascent again, if for no other reason than to get the change of climate. [Hilo Tribune, June 29, 1915:1]

“Ke Alanui Mawaena o Na Mauna”

Ka Hoku o Hawaii, September 30, 1915

(Proposal to Build a Road between Hilo and Kona, Across the Mountain Lands):

In these days, there is much talk about building a rest house a little below the summit of Mauna Loa, as a benefit to those people who ascend and sightsee on the mountain, it will indeed be a good thing, but only for a few. Perhaps as a result of this conversation, there has arisen again talk of opening a road between the two Mountains, beginning in Hilo and going to Kailua, in North Kona. This road being spoken of these days, would not only be of benefit to the people who ascend the mountain, but also a great benefit to the people of the County of Hawaii, and a benefit to the people who come here from around the world to sight-see. It would be a road on which all visitors would travel.

But that is not the main reason that we support the idea of opening this road, it is that the road will lie between several thousand acres of Government Land, very good lands for the cultivation of excellent crops for our markets. There are only a few years remaining to the lease on the land from ***Piihonua*** to ***Puuoo***, and such a road across the mountain should be opened, then these fine lands could be made ready for homesteading, and they could plant the crops that will do well in such a place with the cold air.

We learned that someone knowledgeable about soil came to look at the land, and as he looked at the different soils between these Mountains, he reported that the soil was very good for planting the *ailiki* sweet potatoes, strawberries, corn, and the grass eaten by horses; that is the grass that's brought in for the feeding pens from other lands. There are between twenty and forty thousand acres of good Government Land in these places, that is in the Government Land of ***Humuula***, and if these lands are opened up for those people adept at cultivating, then the money shall be returned for the construction of this road across the mountain. This road across the mountain shall carry the produce of the planters to the market in Hilo which can also perhaps send it to Honolulu, and if it is also taken to Kailua, then there will be two good ports at which to take the goods grown on these fine lands. Thus the County of Hawaii shall move forward. Deputy County Attorney Heen has said that there are several simple ways to seek money to build this road without putting great pressure upon those who pay the taxes to the County of Hawaii. We shall speak again with Deputy County Attorney Heen about this and explain it to you further. [Maly, translator]

“A Great Land and Road Plan on this Island”

Hilo Tribune October 5, 1915

Direct from Hilo to Kailua, and Opening of Thousands of Acres of Agricultural Land.

The biggest road building and land opening project ever undertaken in the islands is one

which Representative Norman K. Lyman is contemplating and proposes to bring forward in the next session of the legislature. It is over land from Hilo to Kailua, by prison labor or otherwise, and the opening of twelve or fifteen thousand acres of mountain land which lies on a four to six thousand foot level, between the two peaks of Mauna Loa and **Mauna Kea**.

The land which Lyman says should be opened to settlement is largely in the Parker and Shipman ranches. It is above the rain belt, and is declared to be good agricultural land. Corn, potatoes and other products of the temperate zone have been successfully grown on this land and it is thought that if it is once opened to settlement and a road constructed so that its occupants have easy access to a market, homesteaders will be able to make profitable use of it.

Thousands of Settlers.

"There is a Honolulu market for almost an unlimited amount of the products that can be raised on this land," said Lyman, "and Hawaii County ought to have the biggest agricultural community in all the islands if this land is offered to settlement. The construction of a road from Hilo direct should begin as soon as possible, as a preliminary to opening the land. Honolulu imports every month thousands and thousands of dollars of stuff this land will produce and as the army needs are constantly growing the demand is getting bigger all the time."

"The great, nearly level stretch between the two mountain peaks is good land and has a fine climate. It is about like that of the Volcano House in temperature and has not too much rain, like some of the lower regions. It is splendid land for many of the products of the temperate zone, which Hawaii is importing from Australia and the American Mainland."

"A big community of successful farmers settled on this land would make Hilo a great deal bigger and something to be worked for, and the first step is to build a road. That should be done I think by convict labor and I hope to work for it in the legislature."

The over land distance from Hilo to Kailua is 132 miles by the present road. The new road as planned would take a direct route *mauka* from Hilo and cut across the middle of the island, passing between **Mauna Kea** and Mauna loa and covering a distance of sixty or seventy miles. *Much of it might follow old native trails which crossed the island by this route.* Kailua, though reached by auto road by a circuit of the island now, is almost due west of Hilo across the north and south center of the island.

The land opening projected by Lyman is far bigger than any other one ever undertaken by the Territory of Hawaii, and if he is right in supposing that the lands can be successfully worked by settlers, the region back of Hilo might have more, many times more homestead farmers than all the other islands put together. [Hilo Tribune Oct. 5, 1915:1]

The project proposed by Representative Lyman failed in the Territorial Legislature, in part due to the interest of ranches in maintaining leases on the mountain lands.

"Sets Mountain Climbing Record, Prof. Bryan Ascends Four Volcanoes within Nine Days." (1916)

Hilo Tribune, August 30, 1916

All records for mountain climbing in Hawaii were broken last week when Prof. William A. Bryan, of the College of Hawaii, ascended three of the big mountains of this island within the period of one week. Prof. Bryan returned to Honolulu on the **Mauna Kea** from Hilo Monday afternoon and expressed his gratification over the success of his trip.

Prof. Bryan left Waimea to climb **Mauna Kea**, 13,825 feet high, on Thursday, August 17. Then he climbed Hualalai, Mauna Loa and later Kilauea. While on **Mauna Kea** he verified his former discovery of the fact that once upon a time, probably in the later glacial age, the mountain bore an ice cap from which there was glacial action. Speaking of his trip Prof. Bryan said:

I left Honolulu on Wednesday in the **Mauna Kea** and reached Waimea Thursday morning, where I made arrangements for horses and guides and started up the same morning. We camped Thursday night at the timber line and reached **Waiau** Lake, near the top of **Mauna Kea** just before two o'clock Friday afternoon.

Night on the Mountain Side.

It was late when we started back, but we hope to make our old camping grounds. However, we were caught in a dense fog and rain and had to spend the night on the mountain side and sleep standing up, moving about every little while to keep warm. We could not see to negotiate the dangerous trail. We got back to Waimea on Saturday and I immediately transferred my headquarters to Puu Waawaa...

...The trip was undertaken principally to compare the formations of the four mountains. All are volcanic. But Hualalai is the oldest of the four, while the top of Mauna Loa above the 9,000 feet limit is much more recent than the top of **Mauna Kea**. The upper part of Mauna Loa has been built up since the glacial age of **Mauna Kea**. The trip was in every way a most satisfactory one.

In an article titled "Forestry in the Hawaiian Islands" C.S. Judd, Superintendent of Forestry included a photo of a camp at Waiau (*Figure 20*), in which he reported that it was the goal of the forestry department to plant pine trees in order to provide fuel to travelers (Paradise of the Pacific, December 1921:84)



Figure 20. In Midsummer Waiau Pond, near the summit of Mauna Kea [White Mountain] at 13,014 Feet, has Some Water, Some Snow and Some Ice. In Winter it is all Snow and Ice. Pine Trees will be Planted Here to Furnish Fuel for Travelers. (Copy Photo, KPA-N810)

“A Christmas Holiday Mountain Trip” (1922)

L.W. Bryan

Paradise of the Pacific, December 1922:73-74

(Ascent of Mauna Kea from Umikoa Ranch; Description of Vegetation and Topography):

Much has been written on the ascent of **Mauna Kea**, from the time of the early explorers, who sometimes took a week to make the trip, up to the present when it can be made in one day.

As we look over the records of explorers and read their accounts, a century or more old, we find that this country has undergone a radical change. Now, instead of the wet and mud of the jungles that they describe, we pass through, first, about three miles of waving sugar cane, followed by almost open ranch land, which was at one time thick jungle, but the cattle have reduced it to a few scattering groves of *Ohia* (*Metrosideros polymorpha*) and *Koa* (*Acacia koa*).

Our actual start, December 29, 1921, is made from the little village of **Kukaiau** on the Hamakua coast. From here we ride *mauka* through the cane lands and part of the ranch to **Umikoa**, headquarters of **Kukaiau** Ranch. **Umikoa** is beautifully located at 3,500 feet, surrounded by tall Blue Gums, and here we spent the night as the guests of Donald Macalister, ranch manager, who is to accompany us on our trip.

At about three in the morning we are awakened and crawl out of our warm blankets into the cold morning air. For it is quite cold at this season, even as low as 3,500 feet. And to those of us who have been living at sea level it is quite noticeable.

We enjoy a hearty breakfast and by four o'clock we are in the saddle and ready for the climb.

The morning is clear and cold, but there is no moon, and we start off, six of us, hardly yet awake. The horses are used to this country and make good time, so that by sun up we have passed **Puu Kihe** and are out of the ranch lands into the **Mauna Kea** forest reserve. The growth here is entirely different. The *Ohia* and *Koa* are left behind and we now find ourselves in the *Mamani* belt (*Sophora chrysophylla*). This reserve of 66,000 acres extends from about 8,000 feet elevation to the top of the mountain.

Our horses have all made this trip several times, as has our cowboy guide, so that there is no time lost in searching for the trail.

At about 10,000 feet the *Mamani* becomes scattering and shortly ends. Here we find very little growth. A few bunches of grass, Silver Sword, a silver leaf geranium, and a few other plants.

The numerous herds of wild cattle so often mentioned by the early explorers have practically disappeared and it is only once in a while that we see any, and then only at some distance.

At about 11,500 feet we find the “terminal moraines,” showing the extent of the great glacier which at one time covered the top of **Mauna Kea**. These piles of “Blue Stone” are very interesting. They seem to prove that the Island of Hawaii is not nearly as young as was formerly supposed.

Mauna Kea (White Mountain) is rightly named. We are now in the snow, and the summit, seemingly not far away, is white and glistening in the sun.

The long time since breakfast and the keen mountain air have combined to give us a good appetite, so we find a sheltered spot and have lunch. When we finish there is not enough left for a hungry sparrow.

From here we push on through the snow and about noon we arrive at the top, an elevation of 13,825 feet. The day is still clear and the view is wonderful. On one side is snowcapped Mauna Loa (13,675 feet), and the wind coming across to us from that direction is sharp and cold. Turning a little, we see Hualalai (8,269 feet), and then, a little more to the north, the Kohala Mountains, and just beyond, above the clouds in the channel, we see the top of Haleakala (10,032 feet).

Many cinder cones can be seen, now filled with snow, that at one time were as hot as they are now cold. Hilo is not visible as the clouds have settled on that part of the island. But Hamakua is clear. The trip is more than well worth the view.

After leaving our names in a bottle at the Summit we start the down trip, via the cinder slide on the south side. It is very steep and the horses slide most of the way in the loose cinders and snow.

At 13,025 feet we come to Lake **Waiau**, tucked away between two Puus. This is a large pool of water about eight feet deep, with no outlet, and very greenish in color. The ice has formed and we enjoy a few slides, wishing that we had brought some skates with us. After playing around a while, and taking a few snaps, we again start down. Our sun glasses have protected our eyes against the glare of the sun but our faces have turned a deep red, and a few days later the skin peels.

On the way down we stop to see a few patches of "Silver Sword" (*Argyroxiphium sandwicense*). There are only a few remaining of this strange looking plant on **Mauna Kea**. It is more plentiful on some of the other island mountains.

About dusk we run into the fog, but we are now on the ranch again, and by seven o'clock we are back at **Umikoa** after 15 hours in the saddle. We are all dead tired and hungry, and ready for a dinner cooked by the best cook on the island. A roasted wild mountain turkey is 14 pounds when we start, and about 14 ounces when we finish our meal.

It is a long hard trip, but well worth the effort, and it is something to look back upon in time to come. No mishaps all day; not one of the party was mountain sick, except one of the horses.

A day well spent and one I hope to have the pleasure of repeating.

**"On Arctic Peaks 'Neath Tropic Skies Afoot Over
Mounts Hualalai, Mauna Kea and Mauna Loa on Hawaii's Largest Isle" (1922)
by Lawrence Hite Daingerfield²⁶**

Paradise of the Pacific, December 1922:80-90

[From the summit of Hualālai] ...Far down the slope toward Kaalapuali ranch house, the cones stood forth beneath the mottling clouds, a rare and splendid vista, never to be forgotten. In the distance stretched the far-reaching groves of sandalwood, carpeted with nodding, golden-eyed flowers, far a field from their mainland home.

²⁶ Trip made by Lawrence H. Daingerfield, T.R.L. McGuire, Max H. Carson, and William (Willie) "Let's Go" Meinecke.

That afternoon we descended through this realm of sylvan beauty and solitude, to camp at Kaalapuali. Long before the first golden rays of the sun crept over the north flank of Mauna Loa, a bovine chorus, with a mynah bird obligato from a monster eucalyptus, performed the part commonly done by the alarm clock. Many mama cows and a like number of their healthy offspring were the causes of all the “confusion worse confounded.” The outcome of it all was, perhaps, a fortunate early start into the realm of the unknown.

Bidding our solicitous friends *aloha*, with packs aback, we proceeded, Indian style, single file, up the Judd trail, to the land of fascination and adventure. Some five miles toward the rising sun, out on the arid southeast slope of Hualalai, we beheld **Ahua Umi**, standing a half-mile to our right, lonely and forsaken in all its ancient, although somewhat dissipated glory.

Story of the Good King Umi

Here, it is said, Umi, the good King of Hawaii, about the year 1500, had a great *heiau* or temple built. It was then his pleasure to have called together all his people from Kau, Puna, Hilo, Hamakua, North and South Kohala, and North and South Kona districts, that a census might be taken and a great festival might be held. The people from the various districts piled stones, each one a rock according to his or her strength. Eight great ahus or pyramids were erected thus, each oriented from the central temple or *heiau* [page 82] in the direction of the several districts of the Island of Hawaii. In the midst of his *heiau*, sat the good King Umi and his high chiefs and priests, viewing the taking of the strange, first census of Hawaii.

To this day the place is called “**Ahua Umi**” (rock heaps of Umi or Temple of Umi, as you like), and people speak of the place as the “Plain of Numbering.”

But strange, sad things have happened to this ancient “Plain of Number.” The central *heiau* fell in time, no one seems to know just when or how, to the lowly estate of a goat corral; thus the genus *capra* came with profane bleatings to the place made sacred in the days of old, by Umi and his followers. “How have the mighty fallen!”

But we must hasten, for both time and water are fleeting. To our left rose Hualalai, just conquered; to our right, with deceptive easy curves, Mauna Loa loomed in all its majesty; straight ahead, in the blue and hazy distance, **Mauna Kea** beckoned. All about us was a barren waste of lava gravel.

The Region of the Waterholes

A little way up the Judd trail, perhaps a quarter of a mile, we branched off to the left and a thousand paces brought us to Waikapae, the region of the luawais or waterholes, deep down in the *pahoehoe*. We had been told of this place and the guiding ahus or tiny rock heaps. A little searching brought us to a deep cleft in the *pahoehoe*, the bottom of which was covered with thin, flat rocks—true evidence of the work of Hawaiian hands. Beneath these slabs we found the cool, sweet water—the only water in a forty-mile strip of lava desert, sparsely clad with trees. Here we ate our lunch by the *luawai* beneath the thin shade of a friendly *lehua*. Absorbing all the water we could, we filled our canteens (two quarts) to the brim, and four tin buckets, holding a quart or more each, used for cooking, were also requisitioned—most fortunately.

Then we returned to the Judd trail, with heavy packs on our backs, canteens about our necks, and each carrying a bucket of water into the region of the unknown and perhaps never before traversed by the feet of men. The Judd trail ended as suddenly as it began—about two miles farther on. We were then in a low forest of *lehua* and decided to go on in the general direction of the trail, toward two reddish hills in the dim distance—**Na Puukulua**—with the **Waimea-Humuula** road at the base of **Mauna Kea** beyond.

Soon we came out on the black, shiny, fresh surface of the 1859 lava flow from Mauna Loa. It was not difficult going here, although the *pahoehoe* (smooth lava) was somewhat shelly and brittle. Two miles of this brought us on to old lava. Then it was that mile after mile we crossed these ancient fields, practically following the 6,000-foot contour. Here were mingled inextricably *aa* and *pahoehoe* in utmost and uncharted confusion. We passed through many oases-like kipukas, with their friendly trees and unfriendly brush—*ohia lehua* and *puukeawe* [*pukiawe*], mostly. We qualified as first class balancers with our burdens—never spilling our precious water.

That night we camped in a little sink in the *pahoehoe*, where a tiny bit of soft earth, rootage for the *puukeawe*, was found. Goats and birds were our only neighbors. Reduced to the water in our canteens, we proceeded on our way with the early dawn, ever 20 degrees north of east by our compass, when landmarks failed.

In mid afternoon, we passed a strange lava platform, some hundred feet in length, six feet through, and five feet in height. It stood on an open plain of smooth lava, three or four miles to the southwest of **Na Puukulua**, ever looming bigger in the foreground. [page 83]

We ate our lunch, with our fast vanishing water, beneath a fine *lehua*, growing apparently from pure ancient lava. What soil it had for rootage was invisible. We were then beside the last of the twin **Na Puukulua**.

Walking on Jagged Glass-Rock

By early afternoon, after crossing some extremely rough ancient lava, we came to the edge of the real nightmare of the land of great adventure—the Mauna Loa lava flow of 1843. Before us, in mighty ten-twenty-thirty foot windows extended, it seemed in endless confusion, the gray black horror of loose, clinkery, glass-edged *aa*. To step on a large piece of the stuff was hazardous in the extreme. Light in specific gravity, the wobbly mass slipped and slid, ever threatening to throw us down the glassy slopes into the lava ravines. Here was a place to make shoemakers happy, for the jagged glass-rock virtually cut our shoes to pieces.

It was a wonderful experience, however, navigating over the wobbly, clinkery field of *aa*; but the most delightful part of it was the finale, when we arrived in the midst of a transient shower at a group of red-gray hills, the home of many wild sheep, in the midst of a *kipuka*. The devilish 1843 lava seemed to spread in an endless stream beyond the hills, toward Keamuku, in the direction of the sea. McGuire, happily, climbed up one of the sheep hills, looked out toward **Mauna Kea**, and, blissful joy!—ancient lava lay just around the turn of the hill—the right arm of the 1843 flow had reached here and gone no farther—only the left branch had proceeded on its way to Keamuku.

Two miles walking through delightful bunch grass over heavenly soft earth now brought us to the **Waimea-Humuula** road. We now had about a quart of water, and eleven more miles to go along the dusty road. But that was nothing. The earth was soft and the approaching night air cool on the shoulder of **Mauna Kea**. Resting and eating a dry supper, we hurried on to **Kalaieha**, the ranch house of the **Humuula** Sheep Ranch.

The wonderful red, crimson, and purple colors of the sunset glow that evening awoke some of the waning enthusiasm for the wonders of nature. There seems to be always a system of balances in this old world—for every great effort we make there seems to come some compensation. In the last light, **Mauna Kea** and Mauna Loa seemed to glow like happy beacons to us, their struggling devotees far below.

Hilo's Lamps, Like Stars Below

That night, rather late to be sure, Henry Kahalewai, the best cook on the slopes of **Mauna Kea** (it seemed to us) brought forth hot biscuits, hot tea, stewed wild pig, and gallons and gallons of the finest mountain water for our edification and refreshment in the sheltering kitchen of **Kalaieha**, thanks to the wonderful hospitality of the ranch management. That was Saturday night and the next day, being Sunday, and we being tired, we rested at the foot of our [page 85] shrine—**Mauna Kea**. At night we could see the glowing lights of Hilo to the southeast, twinkling like myriad stars, far down on the long slope of **Mauna Kea** and Mauna Loa.

The morning found us trekking upward through great open groves of splendid *mamani* trees, with round, handsome crowns, like huge apple trees, the south slope of **Mauna Kea** ever growing steeper and rougher as we ascended.

Timberline was passed in mid-afternoon at an elevation of over 9,000 feet. Down below us stretched a long series of cones and groves of *lehua* and *mamani* trees. In the distance, like a tiny oasis, the cypress-lined square of **Humuula** sheep station ranch house—**Kalaieha**—smiled up to us from the gray plain. The trade wind, coming in from the Hilo coast, soon brought in the white cumuli, which drifted lazily below us across the plateau between Mauna Loa and **Mauna Kea**. Far to the southwest, the tips of other white clouds nosed over the horizon, forerunners of the Kona clouds, that never quite met the trade wind clouds over the plain below.

Terminal Glacier Moraines

Climbing over much old *aa* lava, we came out at last on the weathered and eroded side of the old volcanic mountain, with its multitude of cones. Between 10,000 and 11,000 feet, we arrived in a field of thousands of rounded boulders, all size and shapes, arranged in tiers and phalanxes, true terminal glacier moraines. Another thousand feet up, we found great polished table-like rocks, over which the ancient glaciers had ground their way, leaving striations as indelible hieroglyphics—Nature's writing made by passing glaciers.

In this same zone of thin, cool air, we found our first pile of adze chips—thousands of them heaped where the ancient adze makers had worked and made their implements of stone at the mouth of their sleeping cave in some forgotten time.

The next thousand feet or more was tedious going in the extreme, through the sliding, weathered lava and cinders, to the pass to the right of the summit cone, and down the slope of the shoulder of the mountain wherein nestles the surprise of **Mauna Kea**—Lake **Waiau**. Here, as the sun dipped behind the blue waters of the Pacific, curving up to meet it, we gazed with astonished eyes upon a tiny emerald gem, glacier made in some past time, set in a niche in the arid side of **Mauna Kea**.

In an Arctic Zone Under Tropic Skies

We pitched our tent hurriedly by the green, cold lake, built a fire in the whipping trade wind, with its chilly bite, ate an early supper, and retired like packed sardines between our blankets. We were in an arctic zone under a tropic sky. Taking our last look across the lake, we saw the image of fair Venus, streaming in white and shimmering light across the tiny, rippling waves. A thousand jewels glittered in the reflected phantom light of our neighbor planet.

The next morning, ice over a half-inch thick was found in the gravel bar about the lake. Above us, just a little way, snow banks lay, chilled and white and permanent. Reaching the summit, at 13,825 feet, we found great drifts of frozen whiteness, two hundred yards or more in length and thirty or more in width. Here we indulged in **Mauna Kea** pie, composed of frozen cakes of snow and chocolate bars.

But Mauna Loa, across the vast abyss of lava plateau, beckoned us onward. Hence we rambled down the wild, strange slope of the volcanic pile, stopping that night in the bunk house in the midst of the tall, nodding cypress trees, to continue on the next day, over the **Puu Oo-Volcano trail**, to Keawewai. This is an old cattle trail across many lava flows, including the 1880-81 flow that nearly reached Hilo. Many delightfully cool kipukas rested our weary feet from the hard lava, and when we reached the forests of great [page 86] koas, we knew that rest and water were near. Here it was we rested for the night, refreshed for the great climb of the next day... [page 87]

“Hiking Hawaii’s Highest Heights” (1923)

In the account below, author, Thomas McGuire (Paradise of the Pacific, September 1923), tells of a journey made by himself, Marie C. Neal and a party of five others to the summit of Mauna Kea in 1923. The route to Mauna Kea, was taken from Kuka’iau, to ‘Umikoa, and then to the summit past Kaupō on the ‘Umikoa-Mauna Kea Trail. The return trip was taken past Pāpalekōkī, towards Waimea, and out to Pali Ho’oukupapa. They then conducted a hike around Mauna Kea, past Hanaipoe, Keanakolu, Laumai’a, and on to Pu’u ‘Ō’ō, and then traveled across Humu’ula, Kipuka ‘Āina Hou, and out to Keawewai, in Keauhou:

...Sunday, May 13, entrained at Waiakea for **Kukaiau**, arriving at noon after a delightful scenic-railway trip. We hiked to the sugar plantation where Mr. J. James kindly furnished us a pack mule to carry our provisions and camping outfit up to **Umikoa**. We trudged through two miles of canefields, mighty warm going, then two miles through the homestead lands where apple trees were beginning to bear, and other fruits; then a mile through the *ohia lehua* forest, helping ourselves from the abundance of thimble-berries; then a half mile of open ranch land—and **Umikoa**, where the Sumners tucked us in for the night.

Morning in a Wrap of Fog.

At four next morning the ranch bell tolled in the fog-veiled dawn, the ranch dogs howling an accompaniment. With this melodious awakening were we divorced from our beds. Following a camp breakfast, a pack mule was purchased by each member of the party taking a seventh interest, at \$7.15 per person. Mr. Sumner told us that we were heading for party unknown to him. We traveled through green pasture land, where wild flowers bloomed, and soon we were above the clouds on the 8,000 foot contour. Looking north, we beheld Haleakala, Maui Island’s 10,000-foot extinct crater, standing in beautiful tranquility.

“If” is the Mule’s Name.

We named the pack mule “If,” so doubtful was his dependency. At each brief rest he wanted to lie down and roll. We discovered that the animal needed at least a month’s training in mountain climbing. Camp was made at the 10,000 foot elevation.

The second day’s dawn found If as silent and non-committal as a mummy. Replenishing our water supply at the forester’s camp site, we followed a course south-by-east to avoid the jagged *pahoehoe* (one of the various lava formations), climbing perspiringly over loose *aa* and cinders between cinder cones, gradually ascending the massive slope. On reaching the 12,500 foot elevation, If, the pack mule, was again exhausted, and we were forced to camp in *aa* and cinders, with a frigid wind upon us. Coffee was prepared and we ate a dinner of canned salmon, beans, raisins, prunes, and crackers. If got his portion of rolled barley sprinkled with water.

Mount’s Shadow on the Clouds.

Huddled in our blankets we sat gazing east, over the clouds 6,000 feet below us and extending to the far horizon. Delineated by the setting sun on this phantom-scene was the shadow of **Mauna Kea**. We shivered to sleep beneath the cold canopy of stars and the

Milky Way. During the night one of the party thought he had been awakened by an earthquake, but the shake was within himself.

Jack Frost was anxious to nip us on the third day, but old Sol's coming frightened him away. Breakfast consisted of hot rolled oats and coffee, by sterno heat. A handful each of raisins, prunes, dried apricots, and peanuts, was pocketed to serve our hunger during the day.

The Snow Bosomed Goddess.

With a sigh from If, we started entering the portals of ***Poliahu***, the snow-bosomed goddess. Passing between cinder cones, like giant sentinels guarding the arid mesa, we soon came upon Poliahu's throne resplendent. We passed many large bare cinder cones, covered in winter, before reaching the central and highest cones which were entirely shrouded with snow. The snow continuing down the western side of the mountain to the 12,000-foot line.

Highly enthused, we started to climb an arctic cone 'neath a tropic sun. Reaching the frozen apex, 13,825 feet above sea level, we could scarcely stand against a penetratingly cold wind from the northeast. Here Dorothy Phillips found a little *iiwi* bird frozen in the snow (which was brought back for the Bishop Museum).

After frolicking in the snow we started on a 300-foot slide down the northwest end, for Lake ***Waiau***, where the guide was vainly trying to coax and pull If, who had fallen three times in the drifts and was beginning to think his transgressions were too heavy to permit him to pass through the realm of ***Poliahu***. Not being Eskimos, we realized we could not camp here without shelter from the wind. Changing our course, we descended westward to the 12,000-foot line, where we found a sheltering rock ledge just before the sun sank beneath the sea of clouds. After a chattering chow, with hot lemonade made from melted snow, we turned in for the night, making the best of the two blankets and wishing they were two dozen, our dauntless guide "hitting the hay" under his lone blanket.

25 Mile Sun-Kist and Hungry

Our guide was up with the sun on the 17th, melting two pails of snow from which he prepared coffee and rolled oats. These we partook of with raisins, wishing there was a cafeteria in the immediate neighborhood. If had eaten his last morsel of rolled barley and was observing us with his democratic air. Hastily packing, we refilled our canteens with snow and descended north-west, out of the snow region, through the sweltering arid section of loose *aa* lava below, that gnawed our shoes distressingly, then into the scrubby *mamani* and *koa* forest at the 8,000-foot elevation, with the cooling fog enveloping us; then down to the Parker ranch land, stretching out its green meadows for miles ahead. The equilibrium of the descent with If helped us to cover 25 miles that day, from the snowy region to the Pali Hooukupapa (lumber-shipping-hill), where we arrived shortly before six o'clock, tired, sun-kist, thirsty and hungry. Here, through the kindness of Alfred Carter, little Ishi had a dinner that we did ample justice to. Steaming rice was set out in a huge, deep pan, with a wooden paddle, and there were repeated calls for "Another paddle of rice please." Later in the evening we indulged in a refreshing cold bath and then crawled into bunk-house beds.

And Now for the Other Mountain!

On the morning of the 18th, after a hearty breakfast, two of our party, Katherine McGregor and E. Herrick Brown, who had planned only for the ***Mauna Kea*** trip, bid the rest of us an *au revoir* and left for Mana to meet an automobile from Hilo. The rest of us started on the long transverse trail, via the 6,000-foot contour of ***Mauna Kea***, to ***Puu Oo***. After tramping two hours over low rises of pasture land, seeing large herds of bellowing cattle, which

seemed delighted to look at us close up, we came to the lonely station of Hanaapoe [**Hanaipoe**] (evenly stacked). Here, in picturesque setting, we saw an apple tree in full bloom. On a log we ate our lunch of four soda crackers and a hunk of cheese, with plenty of cool water, while If chewed the green grass. Impelled onward, we soon stumbled into a patch of luscious *akala* berries (like blackberries) on which we feasted while our guide was trying to route us out for the long journey ahead.

We passed through fascinating country, where roamed numerous wild turkeys, quails, and pheasants. At four o'clock we stepped into patches of beautiful wild daisies, then into an immense *koa* forest where our souls were enraptured by the quilted sunshine through the tops of the forest monarchs. We took shelter in a little dell, as darkness approached. We called Dead Man's Gulch, since it is not a safe camp in stormy weather. There we build our first camp-fire and prepared a limited meal, then spending two bewitching hours watching our thoughts flitting among the burning embers. As the sparks grew dim our eyes followed suit.

A Stove Without Dinner.

Rolled outs, hotcakes, honey, and coffee were served on the morning of the 19th, while If received his portion of the whole corn on the cob, with green grass. Thus stimulated, we rambled south by east, enjoying the bracing atmosphere, the trees, and the meadows with their pretty wild flowers, and occasionally stopping to pick thimble-berries. We arrived at **Keanakolu** (three caves) early in the afternoon, where the ranchmen treated us to hamburger steak, pork chops, rice, hot cakes, milk and coffee. Loosening our belts, we proceeded southeast for seven miles, reaching Apuwai [**Hopuwai**] (drinking cup) at 5:30. Here was a two-room cabin with stove, and two full tanks of rain water. We got busy! One swept; another cleared the smoke stack of bird nests; one gathered grass for bedding; another gathered and chopped dry wood for the stove. Then, alas, our guide informed us that our rations were low, and, as we had two meals in one, three hours before, we were to get no more that evening. With a rueful look at the stove, we sat down to enjoy its warmth. Then we hear a grunt from If, and presto! his half bag of whole corn flashed on our minds. Soon we were popping corn in a double pan. This we ate in contentment, chatting until we were sleepy.

...Sunday morn, the 20th, the sun rose from a sea of clouds. After breakfast on oats, hot cakes, honey, and coffee, we bade farewell to "Rustler's Retreat" and hiked on southward over opening grazing land, for nine miles, arriving at noon at **Laumaia** (banana leaf). Though hungry as bears, we were allowed for lunch but one slice of bread with minced veal. Plodding onward we followed our guide for four miles through a dense fog and light rains, seeing huge owls on nearby mounds at intervals, which proved to be cattle when we got closer.

Passing through many gullies and between numerous cones, at two o'clock we arrived at **Puu Oo** (home of the *o-o* birds, long extinct). We could not see Mr. Shipman's ranch houses on account of the fog, until we were within fifty feet. Mr. Hunter of the ranch, invited us in to dry our shoes and clothing, while hot tea was served with biscuits. At five o'clock W.H. Shipman arrived from Hilo with Senator Robert Hind. We were welcomed to stay the night, and after a hearty dinner we gathered around the fire-place, when Senator Hind related interesting reminiscences of life on his ranch at Puuwaawaa (corrugated hill).

On the 21st we awoke refreshed by the first warm beds of the journey. The air was crisp. The Kentucky blue grass, growing here, was coated with crystal dew. There were gardens blossoming in a variety of beautiful flowers. Southward, over blue grass meadows, with lava slopes between, loomed the summit of Mauna Loa, with shining snow patches.

Sandal Wood is Still Found.

After breakfast our food supply was replenished with a roast leg of mutton and crackers. In the meantime, If had been shod (not shot) at sunrise, his hoofs needing reinforcing for the lava trail ahead. With deep appreciation of Mr. Shipman's hospitality, we sallied forth on the 32-mile hike to Kilauea volcano, where our supplies for the Mauna Loa climb awaited us at the military camp. *Mr. Hunter escorted us through the ranch lands to the 1899 lava flow, showing us along the way a number of sandal wood trees, from which the o-o birds obtained their food; also a corral of split sandal wood from dead trees.*

Reaching the boundary gate, we took a farewell look at **Puu Oo**, nestling serenely between cones on the 6000-foot elevation of **Mauna Kea**. Heading south by south-south-east, we trailed over the first *aa* flow from Mauna Loa; then *pahoehoe*; through scanty thickets of *ohia lehua* growing in this desert waste, stopping at noon for lunch in one of these thickets. After hiking 22 miles over this zone of oases, inhabited by wild goats, we entered a large *koa* forest, with tree molds (in the lava) for a mile, arriving at Keawewai at 5:30, as the mist was rolling in. Here was a stone cabin, with a fire place, corrugated iron roof, and tank of rain water adjoining. We took shelter for the night, eating a good supper of cold roast mutton, beans, crackers, and hot tea, then sitting around the fire until slumber invited.

"The Lone Man's Trail" Ascent of Mauna Kea in 1925

Fred Truman, a resident of O'ahu, determined in 1925, to walk to the summits of Mauna Loa and Mauna Kea. He published an account of his journey in the *Paradise* of the Pacific magazine (December, 1925), describing his journey from Mauna Loa, across the lands and lava flows that make up the Kipuka 'Āina Hou section of Humu'ula, towards Pu'u 'Ō'ō, from where he would make his ascent of Mauna Kea. Of the trip, Truman wrote:

Tuesday, August 11, 1925.

...As I continued my descent, small patches of scrub *lehua* and *ohelo* shrubs began to appear. Beside one of these clumps of *lehua* I came upon a mountain sheep. I stopped in surprise, nor would it move, being equally surprised, no doubt, to see me on that lava waste. I saluted the sheep and said, "My friend, have no fear of me for I am as far from my kind as you are from yours and we meet and part in peace; for, are we not in the same predicament in this desolate wilderness."

I passed islands of trees surrounded by lava and there were blind alleys that ended abruptly in the thick of a wood, causing me to retrace my steps and pick another way. There were white trunks of large trees, charred their base where hot lava had mown them down, and there were bones bleached white by the sun.

I marveled at the desolation about me and unconsciously quickened my step. Thus I came upon a dimly outlined lava trail crossing my path. Though it was late in the afternoon and though clouds were thick around me, yet I laughed gaily, such was my joy in finding a trail. Over this trail I moved rapidly in the direction of **Mauna Kea**, and thereon I saw six wild Hawaiian geese, which I was later informed, are very rare. There were more lava flows to be crossed, hills to be climbed and woods to be penetrated. These were quickly disposed of and an hour before dusk found me in a hilly grazing land wherein were many steer.

Here were innumerable trails and I knew not where the ranch house was located nor what trail to follow in order to reach it. Thus I climbed many grassy hills while the clouds hung low and a drizzling rain fell. At last, when the flow of the setting sun was reflected on the higher clouds and, as I was preparing to spend a cold and wet night in the open, a shining rectangle on a distant hillside attracted my attention. It disappeared immediately, because the clouds had moved between us, but I took this to be the sheet iron roof of a house and

immediately lined my compass in that direction. Again I set forth to climb more hills and gulches in the rain...it took almost two hours to reach the ranch...

Ioane Haa, a Hawaiian cowboy, 73 years of age and with a beard like a patriarch, guided me out of the cattle lands. He directed me, but his Kona English was a little beyond me, so I got few of the details. Nevertheless I learned there was a lake just below the summit called **Waiau** where water could be gotten.

Up and out of the clouds I climbed, but I had to move rapidly for those clouds followed close behind me. I did not relish a climb by compass, which would mean going over obstacles that otherwise could be avoided, so I worked diligently over the first few miles. Soon the clouds became stationary, permitting me an easier gait.

Wherein Mauna Loa is a huge mound of lava, **Mauna Kea** is a heap of ashes and boulders sprayed liberally with cinder cones both large and small. Dust from these volcanic cinders and ashes rose about me, for there was no breeze upon the higher slopes, and when I ventured among the rocks and boulders I found them to be hot as stones from primitive bake ovens. Over scorching slopes I moved, slowly, and the air I inhaled was hot in my nostrils.

During the late forenoon I became very thirsty, but on opening my canteen I found it entirely empty. I had forgotten to fill it. No water! Heat waves danced the merrier, the sun beat down on bleak boulders and there was no sign of a breeze while here and there among the rocks were white bones bleaching in the sun. There was disgust within me for my neglect, and I called myself a brother to the jackass which is known as a Kona nightingale. But in spite of all that there was no water and water I must have. I dug with my trail knife in the damp ash of mountainside gulleys but none was there. I explored each hole and crevice, tramping back and forth and across. If there were heat waves I did not see them, nor did I know there was heat, nor was I conscious of the lack of breeze. Nothing mattered; I was looking for water. Somewhere among the cinder cones was **Waiau**, the lake, and I was seeking it. I came upon a few spots that looked like the bottoms of small and dried up lakes, but nowhere did I find water.

At last, in the middle of the afternoon, I sat down upon a rock for rest and thought. I had not yet found water, so to myself I said, "You are an idiot and a fool. You waste precious time and strength in frenzied racing around looking for a lake, when, with systematic searching among boulders and rocks you might find water in narrow and deep crevices, for it surely cannot evaporate very rapidly at this altitude."

A search revealed one such crevice but the opening was so narrow that I had to soak the water up with my handkerchief. After this I laid all of my equipment, excluding my canteen and trail knife, upon a high rock and set out in search of more crevices. I found not a few of them, half-filled with gravel and water, and by placing my teeth against the gravel I could strain the precious liquid into my mouth and then transfer it into my canteen. It surprised me that in spite of the heat the water I found was ice cold. My teeth became sensitive to the cold but in an hour and a half I had filled the canteen. Then, before I could spot my equipment, clouds drifted up between two cinder cones, and filled the slope. Now began another mad search. I traveled back and forth among the rocks for an hour, vowing that should I ever find my roll of blankets and knapsack they should nevermore leave my shoulders while I traveled. Fortunately for me the clouds lifted and shortly after I espied my things. Now, that the excitement was over and that everything had turned out better than I could have expected, in spite of my assininity, I continued my interrupted journey.

I climbed three cones, but as the ones ahead always seemed higher, I gave it up as a man killing job. With dusk a cold wind began to blow while the clouds remained stationary at about the 12,000 foot level. I stood below a high crater with a smaller one adjoining it, awed by the vista before me. The mountain seemed a barren island set in a sea of gray bubbles. Here and there were larger bubbles and these were dark purple. The sun was sinking into that sea, the world was somewhere below, far, far away, and there was nothing above but the wind singing its ancient song among lone boulders, gaunt rocks and brooding cinder cones and craters that stood guard above this ash heap of the world.

The clouds were tinted a moment and then became a darker gray. The wind, sharp as a knife and cold, crept beneath my skin, so I could not watch overlong but rolled into my blankets and lay shivering and watching the sky. Darkness came swiftly. The cold stars came out; so close they were and so bright that among the boulders there were shadows. And that night I slept not at all but rubbed my hands and arms and limbs for the cold was so intense that sleep was not possible.

Friday, August 14

Umikoa—My Descent of Mauna Kea

Before dawn I slept, but upon waking I could not move, because each joint in my body was stiff and sore. I rolled out of my blankets and lay almost three hours on a flat rock in the sun, dozing and rubbing my joints in turn. The water was so cold that I could not take it into my mouth and the canteen froze to my lips.

There is an element in majestic altitudes that awes one. I can plow my way through a bog, cleave my path through a fetid jungle until my trail knife is hot and I sob under my breath for the pain in my muscles, and I laugh and thrill in the exertion in spite of the discomforts. But this aloneness and vastness, with only a cinder top above a sea of clouds that stretches into the infinite horizon, strikes deeply to the core of a man's being. Alone! Alone! The world is buried below that sea and you are all alone. Even the wind chants the rhythm of the solitude.

Of a sudden I wanted to be below those clouds. I would go down under that sea and into a world that was familiar to me. Had anyone else been with me I should have climbed that tall cinder cone under which I had slept. I should have found ***Waiau***, the lake. I should have spent the day exploring and another night above those silent clouds. But I was alone and wanted to get down quickly as possible.

My compass lined for the closest point to the coast, I started at a jog over a long, rock-strewn plain that lay before me. Boulders and rocks and cinders were about me, and again those infernal green serpents, the heat waves, were dancing before my eyes. Yet lower and lower I went, sliding and stumbling down steep cinder slopes until the dust arose in a huge cloud behind me. Ever the clouds seemed to retreat, yet the air grew humid as I neared them. Then, of a sudden, they were all around me, their clammy fingers in my hair and at my throat, but it was hot even in the clouds.

The land changed as I descended. No longer lava cinders were underfoot. Jagged rocks lay piled in fantastic ridges and these were sprayed with grass, scrub *lehua* and shrubbery. In my mad descent I stumbled on three wild pigs and frightened a half dozen wild turkeys. My shoes were torn so badly by this time that I discarded them and donned my third and last pair. Passing under the clouds, I followed many sheep trails and soon came upon cattle lands with their many fences and cow trails, but these I did not follow, for I was traveling by compass to the coast.

In the middle of the afternoon I arrived at **Umikoa**, homestead of the **Kukaiau** Ranch Company. Here I was made welcome by Mr. and Mrs. Macalister. I learned that if I had gone a scant half mile to my right I should have found their trail; also, that **Waiau**, the lake is a short distance beyond the cone near which I passed the night. It took me five and a half hours to reach **Umikoa** from the summit of **Mauna Kea**.

After the comforts of a hot shower I was guest at an excellent dinner, and spent the night in a bed under warm blankets.

Saturday, August 15

Umikoa is a beautiful spot. The ranch house is hidden in the shade of tall eucalyptus trees whose fragrance is very noticeable. After a hearty breakfast, I bade my pleasant host and hostess farewell, and set forth along a newly built road to the town of **Kukaiau**, where I had to wait until noon for a train to take me along the gorgeous Hamakua coast to Hilo.

There were many people on the train, but of a sudden I had a dislike for crowds, the clatter of the wheels and the smoke from many cigarettes. Things were clean and big and silent up there, where I had been. There was space for one to move in physically and mentally; therefore, I had been afraid, for my small physical self and my microscopic mentality had been lost in the vastness of that region. Now, that I was returning to crowded things, where the elbow of one man's thought brushed against the rib of another's, I felt a twinge or regret at losing the thing I had but begun to find and appreciate... [Truman, 1925:55-58]

Geologist's Survey of Mauna Kea by Jerome Kilmartin (USGS) in 1925-1926

In 1926, the United States Geological Survey (USGS) sponsored surveys in Hawai'i. Jerome Kilmartin of the USGS was sent to Hawai'i, and spent five months on Mauna Kea. While reviewing records in the Denver collection of the USGS, a detailed journal of Kilmartin's work on Mauna Kea was located. The narratives refer to photos, unfortunately they were not kept with the handwritten journal, and could not be located in the USGS collection. The journal and photographs were published in the *Honolulu Advertiser* on April 18, 1926 (page 9), with a note that photos were by L.W. Bryan. The quality of the microfilm does not allow for adequate reproduction, and the photos are not included with the following narratives. *Figure 21* is a photo of Kilmartin's annotated Mauna Kea Quad Map, showing the routes traveled, and points of reference cited during his field work.

The accompanying photographs were taken by J.O. Kilmartin during the course of the detailed topographic mapping of **Mauna Kea** lasting over a period of five months during the past winter, from early October, 1925, until early March of the present year.

The party consisted of, in addition to the engineer, three Japanese, one Portuguese and one Chinese as assistants. The photograph (No. 1) shows the start from the base camp, **Puu Kihe**, the use of which was extended through the country of the manager of the **Kukaiau Ranch**. **Puu Kihe** afforded the nearest water supply for both mules and men and all water had to be packed by mule back sometimes a distance of 12 miles and a vertical distance of 6000 feet. One mule could pack only 20 gallons of water and once each week the pack train would come to the camp on the mountain to bring water, usually 80 gallons, as a weeks supply and a small quantity of food. Each man was allowed two gallons of water per day and this had to cover all of his uses for water, water for tea, washing, soup and rice, and his dishes. It was often necessary to use dish water several times straining and boiling it until used up. In addition to packing water all of the food, fuel, and equipment had to be transported. In fact every article that was used had to be brought from **Kukaiau** by pack train.

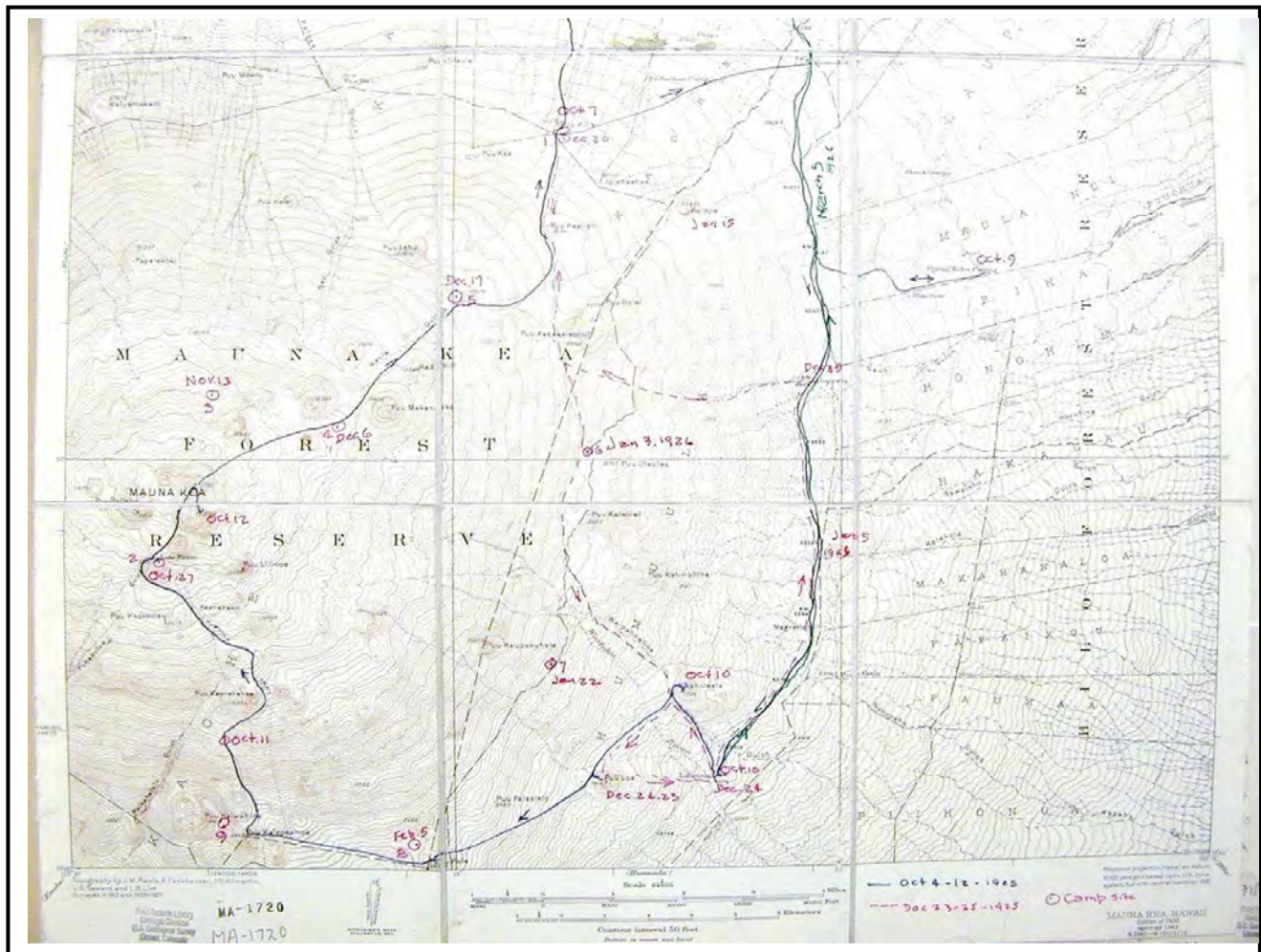


**Figure 21. Portion of Mauna Kea Quadrangle, Annotated by J. Kilmartin, 1925-1936;
 Depicting sites Visited and Survey Points on Mauna Kea
 (Original in Collection of USGS Library, Denver; Copy Photo, KPA-N171)**

From **Puu Kihe** camp the party moved to the summit lake of **Mauna Kea**, Lake **Waiau**, where it camped for almost three weeks. The mules were, of course, returned to the base camp for the region above timber is only a barren field.

On the trail to the summit (No. 2), the sharp peak in the middle foreground is one of the most prominent on **Mauna Kea**, Red Hill. It has an altitude of 11,854 feet above sea-level. The surrounding country appears to be good for walking or riding over but one traversing it in either manner grows tired easily due both to altitude and the nature of the cinder surface. The country in the immediate foreground is on the lower slope of the glaciated area.

(**Kanakaleonui**) The crater in the picture No. 3 is the largest on **Mauna Kea**. Its greatest diameter is about 1800 feet across and its longitudinal distance is approximately one-half mile. It has a depth of about 400 feet in one place. Just at the upper side can be seen a new crater found probably after the main crater became extinct. On the inner side of this new crater there are lateral streaks of a yellow substance so uniform in direction that they appear as the work of a human hand. The lower side of the older crater has a lateral vent which has emitted lava and is yet quite evident.

*The name of the hill is **Puu Kanakaleonui** and according to legend an aged Hawaiian lived once in this vicinity and possessed of a very powerful voice, would go to the summit of this crater and speak to his fellowmen in Hilo and villages along the coast. There is ample evidence to support the legend of human habitation in this immediate vicinity for several platforms were found. Two just on the upper side of this crater and several below to the northeast.*

The camp at Lake **Waiau** is shown in picture No. 4. Contrary to the belief of many the lake is not on the summit of **Mauna Kea** but about a mile to the southwest and at an elevation of 13,000 feet above sea-level. **Mauna Kea** does not have the central crater significant of Mauna Loa nor does it possess a single cone as a summit. It does have, however, a series of cones. Also contrary to general belief the lake is neither very large nor very deep. *In shape it is triangular and in color green. Late in the evening it is a beautiful jade-hue.* The size is very small being about 360 feet long by about 300 feet wide. It is reported to be of various depths, some infer that it is bottomless and some that it is only about 30 feet deep. Though no actual measurements were made at this time, it is reasonable to infer from measurements made on the depths of all the craters on **Mauna Kea**, and the deepest crater being about four hundred feet deep, that Lake **Waiau** is comparatively shallow.

The geological formation of Lake **Waiau** crater is widely different from anything yet found on **Mauna Kea**. For instance in this picture just behind the camp and on the crater rim can be seen a distinct line, indicated by a cross, that divides the crater into two entirely different sections geologically. To the left the crater rim is of a heavy basalt lava while to the right is of ash.

The climatic conditions of the summit plateau are varied and reach probably both extremes in temperatures in so far as the Hawaiian Islands are concerned. The lowest thermometer reading for early morning, 6 o'clock, was 13 degrees above zero, Fahrenheit, while the highest reading for afternoon was 103 degrees at about one o'clock. About 4 o'clock the thermometer registers around 90 degrees and immediately after sundown one and one half hours later, about 35 to drop steadily during the night.

The water at Lake **Waiau** is unfit for continual drinking. The taste is decidedly disagreeable even when used for making tea and coffee.

The only heat to be had in camp was from a small Rayo lamp which afforded more heat than the oil stove. During blizzards one could spend his time comfortably only in his bed roll.

The summit of **Mauna Kea** in No. 5 as seen from Red Hill. The main top is indicated by a small cross is 13,782 feet above sea level. The summit cones are arranged in a right angular formation, the longest side being in a north south direction. The arrow indicates the old summit of **Mauna Kea**. At least it is the highest lava outcrop to be found on the mountain. The lava area in the foreground is entirely unlike that to be found on **Mauna Kea** and travel over it is easy compared to that on Mauna Loa. ...According to the records of an old surveyor, "the skin and bones of a defunct cow." The bones and skin are in a good state of preservation though having been exposed for many years. The cone to the right in the picture bears the skeleton of several wild cows and whether these cows have wandered there and died or were shot by cowboys is uncertain.

Looking down from the summit towards Red Hill which is the second hill from the extreme right of No. 6 picture, as seen in the picture, is literally pitted with cinder cones and when

this area was active must have been a very wonderful scene beyond comparison to that which is seen today. In the distance, barely discernable, the fog is slowly coming in. To stand on the summit of **Mauna Kea** at sunset and see only Haleakala, Mauna Loa and Hualalai with their crests protruding above a solid cloud mass is a pleasure enjoyed by only a few. Colors change so rapidly and in almost a flash of a second they are gone. One evening the writer had the pleasure of seeing one of the most gorgeous sunsets that one could even hope to behold. Twenty craters were counted above the clouds and all were above 12,000 feet, each one a peculiarly in itself and remarkably well cast in relief by the golden accent of a setting sun. Fantastic clouds appear and are blown about by ever shifting winds to be caught in the rays of a dying sun. It all happens in the flash of a second but leaves mental pictures not soon to be forgotten.

***Keanakakoi**, the cave of the adzes is shown in No. 7. It was here that the Hawaiians obtained the stone (with which) to make their implements. In the foreground can be seen many old adzes discarded probably on account of being faulty. The cave seen in the lower right is where the men lived while fashioning stone. Inside it is very warm as it is well sheltered from the winds. Investigation showed that on their expeditions to the mountains they carried a variety of food, evidences of such being pigs, fowl, banana, coconut, and for light kukui was used. The quarry is at an elevation of 12,400 feet above sea level.*

The glacial evidence as shown in photograph No. 8 on **Mauna Kea** is very striking even though it be only numerous striations made when the ice cap melted to slide down the mountain. The grooved appearance of the rocks in this picture is a fair sample though there are many striations on the south side of the mountain much deeper. This photograph was taken on the northwest side at an elevation of 12,000.

The crater in the foreground of No. 9 is named **Papalekeoki** and just on the north edge of the summit plateau. To the left is one of the last flows of **Mauna Kea** beyond the ice cap. On the summit of this crater is the carcass of a wild boar and at the time it was observed last November, it was in apparently good condition, skin and bone well preserved. It is interesting to note the different places and altitudes at which these remains of animals are to be found. Besides the two aforementioned cases there was found on **Puu Makanaka** (elevation 12,400) the carcass of a tiny mouse and well preserved. On **Puu Poliahu**, elevation 13,600, the carcass of a ram, and just below the summit crater on the west side, the skeleton of a mongoose. Wild horses and sheep were seen at an elevation of 13,000 probably going to the lake for water.

General conditions as regard exploration on **Mauna Kea** are liking of a bed of roses when compared to those of the writer's associate on Mauna Loa where everything used in connection with the work has to be packed by man's back, food, water and blankets being the heaviest items. The above picture No. 10, shows the method of pack transportation on **Mauna Kea**.

Snow on **Mauna Kea**, as shown in No. 11, is one of the most beautiful sights to be seen in Hawaii. It lends such a strong contrast to the tropical jungles below. During the past winter there were only two snows. This being the minimum amount in 26 years. [USGS, Denver Library Collection, Item No. NO-8248, Folder # 1]

The Mauna Kea Expedition of 1935

The Hawaiian Academy of Science, in association with the Territorial Division of Forestry, the Hawaiian Department of the United States Army, the Civilian Conservation Corps, the University of Hawaii, the Hawaiian Sugar Planter's Association, the Bernice Pauahi Bishop Museum, the Parker and Kukaiau ranches and other parties, conducted a survey of cultural, geological and biological resources on Mauna Kea. A report remains in manuscript form in the collection of the Bernice Pauahi

Bishop Museum (C.K. Wentworth, et al., ms. 1935), though several reports and articles published subsequent to the trip are available. These published accounts include descriptions of cultural resources in the context of archaeological studies; botanical accounts, including a detailed description of the biological resources of Lake Waiau²⁷; an overview of historic land use, covering the ranching period through 1935; the topography and geology of Mauna Kea; and detailed accounts of the glaciation of Mauna Kea²⁸. For published extracts of the work conducted as a part of the Mauna Kea Expedition (1935), see articles that follow in this section of the study.

“Climbing Hawaii’s Highest Mountain” (1935)

by E.H. Bryan, Jr.

Account of “The Mauna Kea Expedition of 1935”

Paradise of the Pacific, September, 1935:17-18

Editor’s Note: The Honolulu Academy of Science has been conducting an expedition into the higher reaches of **Mauna Kea**. Hawaii’s highest mountain, whose summit tops 13,784 feet. The advance guard of the expedition recently scaled the great cone to make a reconnaissance of the summit, and to establish camps on the way up. The experience is related by E.H. Bryan, Jr., curator of the Bishop Museum, the article containing material of unusual interest. Because of its timeliness and scientific angle, it is reprinted herewith from the Honolulu Advertiser.

Having established a base camp at **Humuula** sheep station, the next step for the advance party of the Hawaiian Academy of Science’s **Mauna Kea** expedition was to make a reconnaissance of the summit of **Mauna Kea** and the rout up, and to start to establish a camp at Lake **Waiau**, 13,007 feet elevation, located about a mile from the great cinder cone which marks the 13,784 foot summit. This was begun August 1 six days before the main party was due to arrive.

Through the cooperation of the C.C.C., a string of a dozen mules had been obtained, and had arrived the evening before, in charge of John Harvey and Tom Lindsey and Tony Cruz, tired after a 33-mile trip from the camp near Waimea. Early in the morning William A. Hartman, project director for the C.C.C., and Alfred K. Bell, camp superintendent, both graduates of the University of Hawaii, class of 1926, arrived in a Ford station wagon, to help the party on their way.

Humuula is located in an area of grassland on the sand and bare lava-covered saddle between Mauna Loa and **Mauna Kea**, at an elevation of 6,700 feet. The slope of **Mauna Kea** begins immediately to the north of this little group of barns and houses, which are enclosed in a square of tall cypress trees, making it a conspicuous landmark.

To the north and west the slope is studded with great cinder cones, which rise from 100 to 400 feet above the surrounding land. To the south, toward the long slope of Mauna Loa, on the side of which numerous lava flows stand out plainly in the clear air, rises a single wooded cone, **Puu Huluhulu**, marking the edge of a broad sheet of rough, bare lava.

²⁷ In 1940, Constance E. Hartt and Marie C. Neal, members of the 1935, Mauna Kea Expedition, published a paper titled “*The Plant Ecology of Mauna Kea, Hawaii*” (Ecology, Volume 21, No. 2. April 1940:237-266), in which they described the environmental zones and plants found on Mauna Kea, and also described the biology of Lake Waiau in some detail.

²⁸ For a detailed account of glacial activity on Mauna Kea, see H.E. Gregory and C.K. Wentworth, “*General Features and Glacial Geology of Mauna Kea*” in the Bulletin of The Geological Society of America, Volume 48, pp. 1719-1742 (Dec. 1, 1937).

Both grassy meadows and cinder slopes are dotted with *mamani* trees. Further west, toward the **Pohakuloa** C.C.C. camp, these grow thicker and are interspersed with *naio* or false sandalwood, with here and there a tree *Euphorbia*. The only other vegetation consists of weeds and grasses, conspicuous among which are purple thistles, the downy, white *pappi* of which float like snow flakes in the air high overhead. Higher on the slopes, above the 9,500 foot level where the *mamani* trees reach their upper limit, grow scattered *pukeawe* bushes. Bird life consists of numerous skylarks, a few mynahs, an occasional migrant plover or turnstone, and a plump little native olive green creeper. At 6:45 in the morning our party of six started out from **Humuula** with Bill Hartman in his specially-gearred station wagon. It consisted of Sgt. Austin Collins, Sgt. Sumner Griffin, Sgt. Clifford Poutre, Plc. Clarence Raine, Robert T. Aitken, and the writer. A rout (hardly a road) runs up the slope to a house and water tank constructed by the C.C.C. at an elevation of 8,000 feet, just above the great red cinder cone of **Hookomo**. Up this rough slope we went, winding in and out among rocks and trees to an elevation of about 7,600 feet, where the car, even in super low refusing to haul the load, we hopped out and took to the trail. For another two miles this trail parallels a fence, to an elevation of about 8,700 feet, just below **Puu Kalepeamoe**, another great cinder cone.

Passing through a gap between this and another cone, we traversed a series of sandy basins, edged on the west by a line of cinder cones. Here the *mamani* trees become more scattered, with many dead limbs, and soon they cease to grow altogether, leaving only a few low *pukeawe* bushes to break the slope of jagged rock and cinder cone. Here [page 17] at 9,500 feet the real ascent begins, rising to an elevation of 11,000 feet in less than a mile (in a straight line), with soft sand or pieces of broken lava which roll under foot.

One begins to think that one will never reach those dark gray cones, high on the skyline, which mark the top of this steep slope. But having reached and passed them there are still three miles to go, across soft cinder and jagged broken rocks. The top of the great dome is covered with cinder cones. The trail skirts the foot of a great red one at 11,500 feet. Ahead to the right are three, to the left two, and far away, where these two lines intersect, an enormous double cone, the tip of which reaches an elevation of 13,784 feet above the sea, the highest elevation between California and New Guinea.

Now we have reached an elevation of 12,000 feet, and the lack of oxygen in the atmosphere is beginning to tell upon us. We stagger fifty paces and have an overwhelming desire to stop and rest. We dare not sit down even on convenient and tempting rocks, for then we would have no desire to get up again and go on. Fortunately the mile of trail from 11,750 to 12,500 feet elevation is much less steep than what we have just gone over, with one stretch almost level, so we manage to keep going, panting for breath the while.

*Ahead now rises the low bluff of **Keanakakoi**, and for the moment we forget the scorching heat of the sun, the drag of our feet, the dryness of our throats and the pounding of our hearts, as we search the slope for signs of the piles of basalt chips discarded by ancient Hawaiian adz makers, and the low caves in which they took refuge while on these adz making expeditions. Evidence of their work is easily to be seen, and we wonder why these hardy artizans of long ago came all this distance to obtain rock for their tools.*

The last half mile before reaching Lake **Waiau** is the hardest of all. One crosses an area of broken rocks and then makes a sharp little rise up the slope of the cinder cone within which the lake is located. Topping the crest we look down, not upon a clear blue mountain lake, such as one is accustomed to see in the high Sierras, but a little gray green puddle, only a hundred feet or so across. The margin is bordered with green scum, and the whole is suggestive of thin pea soup. It is icy cold, however, and although a little moldy to the taste, is, we are assured perfectly good to drink.

The first of our party reached the lake at about quarter of four, after nine hours of steady going, that is, intermittently steady, for we stopped to rest a dozen times in the last two hundred yards, and proportionately often below. All had assembled by five o'clock, but where were the mules? At last we espied a cloud of dust far down the trail and two persons on mule back appeared. Finally the two riders dismounted and approached to within hailing distance of Sgt. Collins, acting as lookout on the crest, and he saw that they were Bill Hartman and Alfred Bell. "Bad news," they sang out. The mules have run away; bucked all the packs off. You'll have to get started right away if you want to get down to timber line before dark."

Hartman and Bell had come all the way up, coaxing, urging and dragging the mules, in about four hours, to save us from freezing and starving on the shelterless summit. It was now ten minutes of six, and nearly exhausted with the trip up, shivering with the cold, now that the sun had sunk behind the cloud banks, and with no hot food since breakfast, we were faced with a most difficult situation.

*We quickly filled every container in sight—with water from the lake, and staggering over the crest of Lake **Waiau** crater, set out across country for the red cone which marked the start of a followable trail down.* We had one gasoline lantern, and Bell had a flashlight. We stumbled on, the night growing darker and darker, with only a slender crescent of moon in the western sky. How we made it in the darkness without an accident will remain a mystery. In places Bell, who had made some twenty previous trips up the mountain, set a course entirely by compass. Usually we could feel some semblance of trail under foot, although we hit every rock in it. Kept going, under the urge of necessity, by some strange reserve of strength, we made it back to the waiting Ford truck at **Hookomo** in about four hours, and we back in **Humuula** by 10:30, ready for a fine hot meal which had been prepared for our return.

The mules, it seemed, had staged a kind of rodeo. The supplies and equipment destined for the summit camp had been picked up over an area of several square miles. Our stay on top was off for the present, and as Aitken and I would have to return to Honolulu before we would have time to make another attempt, we decided that we might as well try to catch the S.S. "**Humuula**" the following day. We did, but only after adventures almost as exciting as those of the day before.

From **Humuula** to Kawaihae is some 42 miles, 25 of which should be classed as motorists' nightmares. After being up until midnight the night before, no one felt like getting started until about nine in the morning. We thought the steamer would not get away from port until after 2:00 p.m. but calling up Parker Ranch on the phone we learned that the boat was due to leave at 12:30. Then the fun began.

Piling into the Chevrolet sedan, driven by Plc. Wilson, Aitken, Porteus and I, with our baggage piled all over us, held on for dear life as the car raced down the bumpy road. The first setback occurred when we got stuck in the sand and had to dig out. Then at Waikii, going thru the "cornfield" detour the timer became filled with dust and refused to time. Finally getting the car going again about a mile down the road we had a flat tire. Then we discovered that the spare tire was soft and ready to go any moment. So we crept down over the bumps until we reached the paved road.

Racing to Kamuela, the storekeeper got a phone call through for us just in time to have them hold the boat, and thirty minutes later, despite timer and tires, and thanks to Wilson's skill we were safely aboard the S.S. "**Humuula**," bound for Honolulu. [page 18]

“Mauna Kea, The White Mountain of Hawaii” (1935)

Account of “The Mauna Kea Expedition of 1935”

by Chester K. Wentworth²⁹

Leader, Hawaiian Academy of Science’s Mauna Kea Expedition

Mid Pacific Magazine, October 1935:290-296

The uplands of Hawaii remain to this day but little known. Above the 4,000-foot contour, an elevation which only the highest peaks of the other islands of the Hawaiian group attain, we find a largely uninhabited upland region on Hawaii into whose area all the other islands of the group could be stowed without squeezing. A large part of this area consists of the mountain masses of Mauna Loa, Mauna Kea, and Hualalai. These three domes, although topographically surveyed, and although they have been sporadically visited by scientific parties for more than a century, are still virgin territory to the scientist.

The native Hawaiians avoid these high regions. They showed great reluctance about accompanying early exploring parties from the visiting ships who wanted to see what was above the forests. Trails, which started mauka in such numbers from the populous sea-coasts, soon ended when they reached the limits of native gardens, the haunts of pigs, and the area in which koa logs suitable for making canoes, and kauila trees for spears, flourished. Only the venturesome and hardy guild of feather gatherers, and a few adz quarriers, ventured far afield.

With the coming of white men all this changed. Their clothes and foot-gear were more favorable for making such journeys; and they were not hampered by superstitions. The first ascent of Mauna Loa was that made by Archibald Menzies, botanist with Vancouver, who set out around the south side from Kona on February 5, 1794, and attained the summit on February 16. The summit of Mauna Kea was not reached for nearly thirty years after that, the first recorded ascent having been that of Goodrich in August, 1823. James Macrae, botanist with H.M.S. *Blonde*, ascended Mauna Kea in 1825, remaining on top from June 15 to 17. After that the summit was visited by a number of scientists, including David Douglas, botanist, on January 10, 1834, and Dr. Pickering and Mr. Brackenridge from the U.S. Exploring Expedition, in 1841. This same expedition, under the command of Commodore Wilkes, with the aid of over 200 porters, camped in Mokuaweoweo crater on the summit of Mauna Loa from December 14, 1840, to January 23 1841. [page 291]

As a result of these various reconnaissance trips, the part of Hawaii above the 10,000-foot level became almost as well known by 1841 as it was down to ten or fifteen years ago. Although occasional parties, traveling on horseback, have ascended to the summits, there has in recent years been but little systematic addition to the published knowledge of these regions. Lack of practical occasion, the expense involved, and difficulty of traveling and camping above the timber line have discouraged detailed or systematic observations by individual naturalists. Many of these have made hurried trips to the summits in the hope of adding to impressions gained around the fringe of the high zone. But in nearly all cases they have, upon their return, found themselves asking more questions than they have been able to answer, and regretting that they had not had time and means to study the summit in more detail. In August, 1935, the Hawaiian Academy of Science, to celebrate ten years of existence, thought that it would try to assist a group of Hawaii’s scientists in adding to their knowledge of high-level geology, meteorology, entomology, zoology, botany, and archaeology, by sponsoring an expedition to the summit of Mauna Kea.

This mountain was chosen, rather than Mauna Loa, because its summit is so much older, and its natural features so much more maturely developed than on Mauna Loa, where the surface is even now in process of building by volcanic outpourings. The presence of a

²⁹ With substantial assistance from E.H. Bryan, Jr.

periodically active volcano on Mauna Loa has also caused its upper slopes to be a little better known than those of Mauna Kea. As a result of its greater age and more diversified surface features, Mauna Kea offers a greater variety of geological, botanical and zoological problems, to say nothing of archaeological sites, while displaying a similar climatic contrast to the typical conditions of the surrounding lower slopes. Here is a mountain summit where water freezes every night in the year, overlooking palm-fringed beaches of coral sand where moonlight swimming is enjoyed in midwinter. Snow falls abundantly in winter at the summit and lies in banks on the north and west slopes into early July. In a region with the mild and uniform climate of Hawaii, such contrasts are startling and intriguing, and furnished impetus for the 1935 expedition.

A small group of members of the Academy laid the initial plans for a summit camp. When the enterprise had been endorsed by the Academy and had been assured of cooperation by the Bishop Museum, the University of Hawaii, the Sugar Planters' Experiment Station, and other scientific groups, application was made to the Hawaiian Department, United States Army, for assistance in the practical operations of pack train transport, camp maintenance, and management of the mess. This re- [page 292] quest was granted by Major General Hugh A. Drum, Commanding the Hawaiian Department, and Lieutenant (now Captain) H. A. Meyer was assigned, with nine enlisted men, to take full charge of these matters.

No army mules were available on Hawaii, and accordingly the cordial cooperation of the Hawaii unit of the C.C.C. in furnishing a dozen mules and three packers was greatly appreciated. The Parker Ranch, through the courtesy of Alfred Carter, Trustee, and his son, Hartwell Carter, Manager, gave every assistance to the expedition, including the use of the sheep station houses at Humuula. Besides transportation facilities furnished by the army, the expedition was also greatly aided by almost daily carrying of goods in trucks of the Parker Ranch and C.C.C., traveling from Waimea to the camp of the latter organization at **Pohakuloa**, six miles from **Humuula**.

The chief difficulties met by the expedition were those of transportation. Much of the road above Waikii was very difficult for automobile travel because of the thick layers of powdery volcanic dust. An even greater difficulty was met in the uncertainty of transport by imperfectly trained mules. Several of the early pack trains came to naught because the mules went on a rampage and bucked off all the equipment with which they had set forth. There was much labor and confusion in gathering up the widely scattered articles of bedding, wearing apparel and culinary supplies and equipment.

Seventeen blankets and a tent were "lost" in this way, and in the course of operations there was much spirited radio discussion between the summit camp and the Humuula base camp as to the blanket tally. These seventeen missing blankets were not at the base camp; and no one who witnessed the nightly partition of blankets at the summit into what seemed before morning like very meagre allotments could believe that anything remotely like a blanket was overlooked at **Lake Waiau**. The distress of the bookkeeping department was relieved just as camp was breaking up by the revelation that one of the packers, after one of the mule rodeos, had placed the 17 blankets and the tent in a tree for safe-keeping, and had forgotten about the incident in the press of other matters.

Fortunately, some skeptics among the army men at base camp had withheld all instruments and delicate equipment from inclusion in the first packsaddle bundles, and much loss and damage had been avoided thereby. A few pots and pans, and a stove or two, were [page 293] most amazingly tangled by the mules in their annoyance. but no serious loss was incurred.

The effect of the lowered atmospheric pressure at **Lake Waiau** on the boiling point of water was of both scientific and practical interest. At a pressure corresponding to less than 19 inches of mercury the boiling point of water was reduced to about 189 degrees Fahrenheit. At this temperature about one and a half hours were required to boil potatoes of moderate size, and coffee, hot off the stove was not hot enough to allow the addition of any liberal amount of cream.

The addition of a pressure cooker to the equipment effected a very great convenience in speeding up the cooking operations and in providing means for baking, which had previously been lacking. With it cooking could be done as rapidly as at sea level and with much less water loss. At first the difficulty in cooking had been anticipated by planning the use of a large proportion of canned goods. Later, because of the difficulties of pack train transport, the mules injuring their feet on the rough rocks of the upper slopes, an effort was made to use lighter and more concentrated foods which was possible because of abundant water supply from Lake Waiau and its marginal springs. The use of dried fruits and cereals, with provisions for pressure cooking to save both time and fuel, would clearly be best for any extensive camp operation at Lake Waiau.

Although the bracing air would have made it most agreeable, there were none of the roaring campfires which one associates with camping in many regions, because of the complete lack of fuel. The forest ends at or below the 10,000-foot level, and to transport wood three or four miles up to **Lake Waiau** at 13,007 feet would be both costly and laborious. Within a few minutes after sundown the air temperature dropped each night to a few degrees above freezing; and before morning ice was forming on quiet pools and the edges of the lake. Partly because of the cold and partly because of the fatigue of daily toil at the high altitudes, all members of the party were ready to take to their bed rolls or sleeping bags soon after sunset. Cooking was carried on very satisfactorily on two portable gasoline stoves, using about two quarts of gasoline per day to cook for an average of eight persons.

Most members of the party noted some physiological effects of lowered atmospheric pressure between Humuula and the 10,000-foot level, and all suffered an increased shortness of breath in the summit area. Some suffered either a slight nausea or considerable headache; but most of these effects tended to wear off after a day or more at the summit camp. All those remaining at the summit camp were able to carry on reasonably effective work, although over lesser areas and with more fatigue than would have been felt at sea level.

The high part of **Mauna Kea** is a great dome with steep slopes from the 8,000 to 11,000-foot levels, and flatter slopes above 11,000 feet. It is marked by scores of red or black cinder cones, each a few hundred feet high, and usually with a central bowl a few scores of feet deep. Surrounding the cinder cones in the region above 10,000 feet, which has an area of more than 50 square miles, are broad expanses of glacial moraine, or of ice-scoured lava flow ledges strewn with boulders perched by the ice. In its simplest aspects, barring certain exceptions, we may say that **Mauna Kea** was first built as a lava dome to nearly its present height. It was then the site of numerous explosive eruptions which produced the numerous cinder cones. After that a change in climate that was world-wide brought about an increased precipitation of snow on the mountain top, and as it accumulated an ice cap, or calotte, was formed which spread outward and gave rise to several radial glacier tongues.

Although the former existence of glaciers on **Mauna Kea** had been recognized and announced by Daly in 1910, evidences of them seen by various geologists since then, and a particular study of them made by Dr. Herbert E. Gregory, Director of the Bishop

Museum, several years ago, the 1935 expedition made possible a more nearly complete study. Through the observations of the various members of the party it was made clear that more than 25 square miles of the summit area was covered by glacial ice and that the ice reached a thickness of at least 300 to 400 feet in places. All were struck by the freshness and clarity of the glacial markings on rock which must have been exposed to the elements for at least 20 to 30 thousand years.

There were probably several periods of glaciations, as in North America, and the last of these gave way to the interglacial epoch now prevailing. At present, and for some thousands of years, the rocks of the summit area have been subject to marked frost action, and some of the ledges previously smoothed and striated by glacial action have been very notably split and quarried into characteristic frost-formed spalls.

The rock debris and soil cover due to glacial erosion as well as that due to modern frost action is notable for its light gray and cream colors, in contrast [page 295] to the deep red and brown colors of Hawaiian soils and weathered rocks near sea level. The latter colors are due chiefly to chemical weathering in a warm, moist climate, a process typically called lateralization. On the contrary, at the high levels on Mauna Kea even today the temperatures are so low, with freezing every night in the year, that the rock — breaking and soil — forming processes are chiefly physical rather than chemical, and of a type found typically in Alaska, the northern Scandinavian countries, and Siberia. Here, as on the summit of Mauna Kea, the products of weathering are light in color. Apparently the red colors of the higher cinder cones are due to the original heat of the eruptions, and were developed immediately after the eruptions took place and only on the surfaces of the cones. The inner parts of most of the cones which were not exposed to the air are black, the natural color of unweathered basaltic rock or glass.

A report on the expedition will be presented at the fall meeting of the Hawaiian Academy of Science; and the more technical results of collecting and research will be forthcoming from various members of the expedition or specialists to whom the specimens have been submitted for study, in appropriate scientific publications.

Thanks to all the cooperation which was received from scientists, the Hawaiian Department of the Army, the Coast Guard Cutter *Itasca*, which carried the advance party and equipment from Honolulu to Hilo, the C.C.C., the Parker Ranch, and many individuals, this first expedition of the Hawaiian Academy of Science was a success, and sets a creditable precedent for future similar undertakings. [Wentworth, 1935:296]

“Snow Storm in Hawaii” (1937)

By L.W. Bryan, Associate Forester

Paradise of the Pacific, February 1937

Late in December, 1936, the first real snow of the season fell on **Mauna Kea** and caused local skiing enthusiasts to take their skis out of storage and go over their equipment preparatory to a trip to the snow fields.

The first party of the season to make the attempt started out from Hilo on Monday, December 28th and spent the first night at **Pohakuloa** 6,500 feet elevation. E.E. Tillett, Jack Bryan, Manuel Pimental and the writer made up the party. Early on Tuesday morning we drove by car to **Hookomo**, 8,000 feet, where a start was made at about 7:00 a.m. Unfortunately, the sky was overcast and shortly after we started out it began to rain, a real cold rain that turned into snow at about 10,000 feet elevation. The snow continued growing more heavy as we proceeded upward so that by the time we reached **Lake Waiau**, 13,000 feet, we were in a real snow storm, my first since 1920.

In addition to skiing we had planned to do a little ice skating on **Lake Waiau**, which freezes over during the winter months sufficiently thick to bear the weight of several people. We had borrowed our skates from the **Humuula** Sheep Station. We found the Lake frozen over but the ice was covered with about one foot of newly fallen snow and was not very thick for it began to crack as soon as we walked on it.

Skating being out of the question we tried to ski but were not very successful in this due to the extreme cold and the fact that the snow was fresh and not very well packed.

After a short stop at the Lake it was decided to return to a lower elevation for food and warmth. Excellent time was made going down and we reached the Rest House at **Halepohaku** at exactly noon. A good fire was soon underway and with hot coffee (from our canteens), and toasted sandwiches, we soon forgot the cold.

All except Jack who had spent all of his eleven years here in sunny Hawaii and had never seen a real snow storm or experienced such cold and so did not realize that it is necessary to keep the blood circulating by hard rubbing if needed. Upon his return he found that a spot under his chin was unusually sore. Examination by a doctor brought out the fact that he had been frost-bitten, a strange experience for Hawaii.

In spite of the heavy fall of snow the new trail to the top was easy to follow. This trail was built by CCC boys during the early part of the year and is well marked by ahus, or piles of stones, placed every few feet along the trail. This makes the trail very easy to follow in any kind of weather.

At present it is possible to drive a car to a point about one half mile beyond **Hookomo**. On one occasion a specially [page 18] equipped station wagon made the trip right up to Halepohaku at 9,500 feet elevation. Perhaps in the not too far distant future it will be possible to construct a secondary road as far as the Rest House so that cars may be driven right up to the snow line. Then when the "between the mountain road" is built it will be possible to drive direct from Hilo to **Mauna Kea's** snow fields in less than two hours. A road to Halepohaku would be a great asset to Hawaii and would open up a new winter playground on the Big Island. [page 19]

"Wild Sheep in Hawaii" (1937)

By L.W. Bryan, Associate Forester

Paradise of the Pacific, March 1937

Towards the end of the eighteenth century the first sheep were brought to Hawaii by the English and liberated on the different islands. A tabu was immediately placed on them and they were permitted to multiply without interference. In some sections they have been running wild for many years and are now quite plentiful in several sections particularly so on the slope of **Mauna Kea** on the Big Island. Conditions in Hawaii have been most favorable for the natural development of animals of this kind. Ample forage, few natural enemies (only man and wild dogs), and twelve months grazing season have made these islands a veritable paradise for this species and as a result they have increased enormously and, together with wild goats, have been responsible for considerable damage done to our native forest cover.

Within the **Mauna Kea** Forest Reserve wild sheep are quite common (estimated population of 40,000) and do much damage to tree growth and prevent any natural reproduction of the native species particularly the native *Mamane* (*Sophora Chrysophylla*). In some sections they have prevented any natural reproduction for many years past, and if this state of affairs was allowed to continue it would only be a matter of time before our mountains would be without a protective covering.

Realizing this the Territorial Division of Forestry has been attempting to rid this reserve of these pests in order to assist nature in her program of natural reforestation. This reserve area contains nearly 100,000 acres of rough mountainous country, extending from about 7,000 feet to the top of the mountain, which is nearly 14,000 feet high. The work of eradicating these animals had been proceeding slowly up to two years ago when the Federal Government offered to assist us in our conservation work through the Civilian Conservation Corps. Since then this work has gone ahead more rapidly and is now a recognized project. During the past year a total of 15,875 wild animals have been killed on the Island of Hawaii and of this total 9,167 were killed by the CCC who expended 865 man days on this work project. Many of these animals were shot and the meat utilized in our different CCC camps but by far the largest number have been captured in organized drives which are held in cooperation with adjacent land owners and ranches.

In order to successfully conduct these drives good fences are necessary and during the past year and a half the CCC boys have been busy building a sheep and goat proof fence around the entire boundaries of this reserve area. This fence is now almost complete and when finished will be over fifty miles long. This is the longest fence in the Territory and is well built of woven wire strung on strong posts cut from the native *Mamani* trees. This wood is very durable and will last for years. With this fence to work with the killing off of these sheep should prove much easier.

Recently a large drive was held above Waimea in cooperation with the Parker Ranch which furnished thirty cowboys and all riding animals needed. This drive covered an area of between ten and twelve square miles along the reserve boundary between **Puu Laau** and **Puu Kemole**. About forty men took part with only one lady, Mrs. Ernest H. Podmore of Honolulu, who was the only one of her sex to participate. The cowboys left Waikii at 4 a.m. under the leadership of foreman William Kaniho, and six hours later had driven the last of the sheep into the corral located near **Puu Nanahu**. Thus the actual drive required only six hours but they were all full hours of hard riding over rough country that only trained men and horses can travel over and still keep up with the sheep. Much credit is due to "Willie" Kaniho and his well trained cowboys for their excellent work. Twice during the drive it appeared as though the animals would break back and once they seemed to succeed but the boys were after them and soon out-flanked them and gradually turned them up hill again towards the corral. And again, just before the last big flock had been driven into the pen, one old ewe became suspicious of what was in store and started off down the mountain with about one thousand of her followers behind. However the boys were on the watch and just managed to turn her back and with her went the rest of the flock. Once safely in the corral our troubles were over.

The actual killing of over 3,000 sheep is quite a problem. It must be done quickly and in a humane manner. Shooting is out of the question on account of the expense and danger to those around. It is not a pleasant job at best but a sharp knife, properly handled, is one good method. The animal is captured by driving small numbers into an inner pen, quickly stunned by a sharp blow on the head and then dispatched. Many of the animals are old ewes and rams that are worthless for food and so are thrown away. With [page 19] the good meat it is different, an attempt is always made to save and utilize the best of it and during the recent drive over three hundred carcasses were saved and given away to such organizations as the Salvation Army, Father Louis' Boys' Home, Waiakea Settlement, W. P. A., Puumaile Home, etc. The skinning and packing out of this meat was done by CCC boys from the Waimea Camp after their usual working hours. They gave freely of their own time as a donation to those less fortunate than themselves. This drive was conducted under the direct supervision of Mr. A. Hartwell Carter, Manager of the Parker Ranch and the killing was done under the direction of Forest Ranger Duke Kawai and the CCC Project Superintendent W. A. Hartman. It took twenty-five boys two long days of 13 hours each to complete the killing and disposal of the dead sheep.

The results of our attempts to rid our forest areas of these injurious animals have been most encouraging in certain sections which we have fenced off and removed all animals. These areas are now growing up with native trees and other plants and indicate what can be accomplished once we rid this reserve of most of the wild animals. Many of the large rivers, which feed the agricultural lands below, rise in this area and it is essential that we have a good forest cover. By getting rid of these animals we can expect considerable assistance from nature in reforesting these slopes. [page 31]

“The Big Fence on the Big Island” (1937)

By L.W. Bryan, Associate Forester

Paradise of the Pacific, April 1937

On the 29th of January, 1937, the longest fence in the Territory of Hawaii was completed by CCC boys. It is around the entire boundary of the ***Mauna Kea*** Forest Reserve—the second largest reserve in the Hawaiian Islands. This project, which is part of the Territorial Division of Forestry’s conservation program, was done under the direction of Project Superintendent W. A. Hartman. He was ably assisted by foremen Duke Kawai, Manuel Adrian, John Liana, J.J. Ignacio and Manuel Pimental. Much credit is due all these men, and to the enrollees who worked under them, for the fine accomplishment.

This fence is made of extra-heavy galvanized stock wire. It is fifty-five inches high and is stretched tightly on large posts of *Mamani* wood. All openings are stock proof and it will turn all kinds of stock very effectively.

Actual construction work was started in June of 1935. A total of twenty months was required to complete the work on the fence which has a total length, including necessary corrals, of fifty-five and one-half miles. Eighteen thousand five hundred and thirty-six man-days were expended on all work connected with this project. The total cost, including an allowance of \$2.50 per day for enrollee’s time, amounted to about \$72,000 or \$1,300 per mile.

A great deal of preliminary work was required before the actual construction of the fence began. First, it was necessary to build many miles of horse and truck trails and tractor roads. In connection with the fence line alone nearly sixty miles of horse-trails were constructed. This trail was used to pack in the fence wire and other supplies. It was made permanent for future use in fence patrol and wild animal eradication work.

Most of the fence work was above the eight thousand foot contour. Camp locations had to be selected, shelters constructed, and water tanks installed. These camps were located as close to the fence lines as possible and placed at intervals around the mountain approximately four miles apart. This made the maximum distance from camp to work about two miles each way. At each camp site it was necessary to construct a corral for the work animals. Practically all feed, and part of the water, for these animals, had to be transported to the camp site.

Nine line camps were used [Figure 22]. Seven of them had to be constructed in advance. These camps were made on the same plan; one small building with water-tanks alongside in which could be stored between six and eight thousand gallons of water. The building was used as a cook-house and store-room. The boys lived in tents.

During the winter months it becomes quite cold on ***Mauna Kea*** and it was found that seven blankets per boy was not too much cover. Frequently the thermometer registered below freezing and at the ***Puu Loa*** Camp last February it was necessary to stop work for three days due to an exceptionally heavy fall of snow which covered the ground in that section and prevented work on the fence line. This was the first time most of the boys had

ever seen snow close at hand, but in spite of the cold they seemed to enjoy the experience. During the winter months each tent was furnished with a small oil heater that made the evenings more comfortable.



Figure 22. Kemole Camp of the CCC Fence Gang (Copy Photo KPA-N841 (2)).

The completion of this fence concludes one of the most important conservation projects attempted by the CCC in the Territory of Hawaii. It completely encloses and protects a reserve area containing approximately one hundred [page 15] thousand acres [Figure 23]. The important Wailuku River—which furnishes the water-supply for the City of Hilo—as well as several other large streams that supply water to Hilo and Hamakua Districts, have their source within this area.



Figure 23. New Fence above Puuloa (Copy Photo KPA-N840).

This reserve has, for many years, been overrun with wild sheep, there being an estimated population of about forty thousand. These animals do much damage and of recent years have effectively prevented any natural reproduction of the predominating tree growth—*Mamani*. With this new fence completed it is now possible to conduct drives and reduce the number of these animals to a minimum. In a recent drive, held since the fence was completed, over three thousand wild sheep were captured and killed in a single day.

After these animals are exterminated we can expect considerable assistance from nature in our reforestation work. On a small scale this fact has already been demonstrated so we

feel assured of ultimate success. In some sections, where seed trees are lacking, it will be necessary to assist nature with reforestation; but where seed trees have been left we can expect to see a new generation of plants occur naturally. [page 30]

“Wild Cattle in Hawaii” (1937)

By L.W. Bryan, Associate Forester

Paradise of the Pacific, September 1937

Captain George Vancouver brought the first cattle to Hawaii from California in 1793-1794. They were landed and liberated at Kealahou, South Kona on the Big Island. As with other introduced animals of the same period, a rigid “*kapu*” was placed on them in order to permit them to multiply. This they did with a vengeance and within a comparatively short span of years they became quite common on all the islands, particularly on Hawaii where they found many hundreds of acres of good pasture lands.

Over a period of many years they were slaughtered by men employed for this purpose by the King, principally for their hides, which at one time formed one of the principal articles of export from Hawaii. Experts were employed by the King to go into the mountains to shoot and rope these animals. Only a small amount of the meat was used, some of it being salted and sold to the whaling ships that wintered in these waters at that time. Many of them were trapped in “pitfalls” similar to the one which David Douglass lost his life on the slopes of **Mauna Kea** in 1834. I have heard old Kamaainas tell of the vast herds of these wild animals that were once so plentiful and of how they used to rope and shoot them not so many years ago.

*Within my time however wild cattle have never been plentiful. The last of them were killed on the upper slopes of **Mauna Kea** about six or eight years ago. There yet remains a few head on the lower slopes within the heavy rain forest. Here they live under such wet conditions under foot that their toes grow long and they leave behind them a foot print that gives the impression that some animal of about the size and weight of an elephant has passed that way. They are hard to get at and success usually depends upon chance and good dogs.*

The last real stand of wild cattle is being made on the southeast slopes of Mauna Loa above the 5,000 foot contour. In this almost inaccessible section, small bands of these animals can still be found and offer thrilling sport to the hunter with either rope or gun. The “Long-horns” of the early Mexican cattle have gradually disappeared until today there are none to be found except as mounted trophies of the past. The present strain of wild cattle is a mixture of practically all the breeds ever introduced here and the result is often a queer looking animal. The Bulls are usually Red or Black and apparently have good blood for they are big fellows and offer plenty of fight when cornered or wounded. Except in dry weather, these animals are usually in good condition and the meat is well worth packing out.

In hunting them it is necessary to stalk them with considerable care and silence. They are easily alarmed and are off at the first sign of danger. They live in a rough, lava strewn area, over which a horse or man makes slow progress and once they start to run it is difficult to catch them even with dogs. We find that a 30-30 is a little too light for these animals particularly the bulls which are very hard to kill. I recall hitting a full grown bull between the eyes with a 30-30, hi-speed bullet and afterward (when he was dead from other shots), picking it out of the hair on his forehead where it had lodged without penetrating his thick skull. I prefer a 45-70 and one of our rangers uses a .405 that kicks like a mule every time it is fired. However these heavy [page 9] guns are very effective and will usually stop an animal even though it is not hit in a vital spot. Recently we were

on the trail of a band of these animals and suddenly came upon them resting in a small “*Kipuka*” under some large *Koa* trees. One fine cow was laying down and apparently did not see us. However a big black bull, who was on watch, must have seen or heard us for he became suspicious and just as the gun was fired the cow arose and the whole band, of eight animals, were off on the run. A second shot failed to stop any of them and we thought that they were gone for good when one of the boys noticed blood on the ground at the spot where the cow had been lying and so we knew that the first shot had found its mark. To follow the track was not hard and within a quarter of a mile we found the wounded animal hiding in a dense thicket of ferns. Fortunately we had approached with caution, for a wounded cow, particularly one with a young calf, is dangerous and not to be treated lightly. A third shot was a complete miss due to lack of breath from running. The fourth shot however did the trick and the animal was soon skinned and cut up and loaded on the mule and we found we had about four hundred pounds of prime beef.

It is estimated that about two hundred of these wild animals yet remain on the slopes of Mauna Loa, where they range, live and die, and seldom see man. Their days are numbered for a new forest fence, eighteen miles long, is being built along the upper boundary of the Kau Forest Reserve by the CCC boys working under the direction of the Territorial Division of Forestry. When completed this fence will aid in confining these animals and eventually they will disappear as they have from other sections of the Island. In the meantime they will furnish many a good, juicy steak and stew for the CCC boys. [page 30]

“New Discoveries Made on Mauna Kea.

Big Island Volcano Site of Worlds Largest Stone Age Workshops” (1937)

On November 6, 1937, D. Billam-Walker, a writer with the Honolulu Star-Bulletin, reported that Kenneth Emory of the Bishop Museum, had conducted an archaeological survey of the Mauna Kea Adze quarries and shrines. This being the first formal archaeological investigation on Mauna Kea. Through the article Emory provided readers with a view into the history of traditional practices on Mauna Kea. *Figure 24*, accompanied the article, and depicts one of the quarry and shrine complexes.

***Ethnologist K.P. Emory Finds Extensive Evidence While on ‘Busman’s Holiday’
The worlds largest stone age workshops probably exist in Hawaii.***

Announcement of this discovery was made today by Kenneth P. Emory, ethnologist of the Bishop Museum, following recent studies by him at the summit region of **Mauna Kea** on the Big Island.

Located on the western slopes of the Pacific’s highest mountain, some 14 to 15 workshops have been found along the 12,000 foot contour and over a distance of two miles.

Each workshop is represented by a huge mound of stone chips—millions of flakings, the work of adz-makers over many generations.

In addition to the millions of chips, hundreds of adzes in the rough can be found. At one mound Mr. Emory found at least 500 roughly finished adzes. A typical mound of chips was 40 feet in diameter at the base, rising to a height of 8 or 10 feet.

“The area littered by the quarried stones,” said Mr. Emory, covers a good many acres.”

Although the existence of these mounds just below **Lake Waiau** has been known since the earliest times and the site visited by hundreds of persons, Mr. Emory is the first archeologist to have made a study of them.



**Figure 24. Adze Quarry on Mauna Kea (Hawaii Tourist Bureau Photo, 1937)
(Copy Photo KPA-N614)**

"I believe these were the largest workshops in the world for making of stone tools," said Mr. Emory today.

Coincident with Mr. Emory's study of the workshops, he found five shrines in the vicinity of the workshops. The shrines are similar to those found on Necker Island 300 miles to the northwest of Niihau.

Following his study of the Necker shrines in 1924, Mr. Emory predicted that similar shrines should be found in Hawaii. In 1931 A.E. Husdon of the Bishop Museum staff, following a lead given him by Dr. Thomas A. Jaggar, director of the Kilauea volcano observatory, found such a shrine at the source of the Alike flow on Mauna Loa.

Dr. Jaggar had discovered and photographed this shrine in 1919 but had not means of realizing its significance.

Each shrine found on **Mauna Kea** consists of five to 15 stone uprights in alignment. The uprights are slabs of dike basalt from two to four feet high. Some of the uprights stand on stone platforms. Mr. Emory believes the shrines were those of the adze makers. He found adz chips had been built into the platforms and others laid on them as if they had been offerings.

"The shrines are basically related to the earliest form of *marae* (simple form of temple) known to have been set up by the Polynesians," said Mr. Emory, "and doubtless are a survival into historic times of the early type of structure."

An Adzemaker's Guild

The adzemakers, skilled artisans, perhaps formed a guild—handing knowledge of their technique from father to son and at the same time observing the rites of the ancient Hawaiian religion. Religion in Hawaii underwent a reformation with the introduction of new ideas from Tahiti about the 12th and 13th centuries A.D.

Hawaii was peopled by two distinct groups, although from the same source — Tahiti. The menehunes were the aborigines, while the *alii* represent a later invasion, introducing at the same time the comparatively elaborated *heiau* form of temple.

Finding of these shrines indicates that the adzemakers were aborigines, that they kept their religion from being absorbed into the late *alii* culture.

In connection with each workshop was found a cave. M. Emory believes the adzemakers did their work during the summer, making their homes just below the forest line at 10,000 feet, going up daily to the workshops. The caves would serve as a refuge during storms and as against the intensely cold winds likely to spring up at any moment.

The adzemakers obtained their material from great outcrops of dike basalt. Although similar quality basalt is found in many other places in the islands, no such extensive use was made anywhere else.

Frost is experienced every night at these workshops and Mr. Emory believes the Hawaiians made use of this phenomena, letting the frost do most of the work for them.

Dike basalt when touched by frost splits into slabs of just about the right thickness for adzes.

Enjoying a busman's holiday, Mr. Emory did his work on ***Mauna Kea*** during his recent vacation.

He spent about a week on the summit. With him were his wife and two nephews, Richard and William Emory; Dr. Chester K. Wentworth, board of water supply geologist; C.S. Judd Jr., son of the chief territorial forester, and Dick Stafford, son of Judge H.E. Stafford. [Honolulu Star-Bulletin, November 6, 1937:1 & Sec. 2:2]

“Ski Aloha” (1937)

by C.H. Martin

Paradise of the Pacific, December 1937:7-8

(Assessment of Mauna Kea's Ski Slopes):

In answer to a challenge from ***Mauna Kea***, an intrepid group of skiers and sportsmen determined last February to find out by first hand experience whether or not skiing in Hawaii could be developed into one of the major attractions of the Islands. The results exceeded the expectations of the most critical winter sportsman, and complete reports have already been submitted to the U.S Eastern Amateur Ski Association, The National Ski Association, and several others.

In order that our readers may appreciate what lied a few thousand feet above the beaten path on the Island of Hawaii, we invite your attention to the accompanying photographs which may be considered fair close-ups of ***Mauna Kea's*** well-known white crest [Figure 25]. Realizing that, until adequate transportation facilities were developed, only a fortunate few would be able to enjoy Hawaii's Winter Paradise, the party, consisting of local business and professional people, set out, not to do something spectacular, but to observe carefully and reconnoiter terrain which might well be opened to the skiing world.

The mere subject of skiing in Hawaii seems rather fantastic to many people, but to any sportsman who has observed the unprecedented spread of the party to all corners of the slope, it is not so unbelievable. Of the three major mountains in the Hawaiian Group, Haleakala on Maui, Mauna Loa and **Mauna Kea** on Hawaii, the latter seemed to be the most inviting. However, despite the fact that snow usually makes its appearance on these mountains as early as the second week in December, our party did not gather itself together until the week before February 22.

Upon the arrival in Hilo of the major portion of the party, it was considered advisable to divide into two groups, each of which climbed up the sides of the mountain, thus permitting twice the area to be covered in the limited time available, and facilitating comfortable housing for each group. Those who climbed the southern slopes were very ably led by L.W. Bryan, Associate Forester. This party consisted of his son (Jackie), two experienced skiers from Honolulu, Dudley Lewis and Harold Dillingham, Jr., George Armitage of the Hawaii Tourist Bureau and his photographer, M.A. Robinson, Charles W. Herbert, representative of the "March of Time," Gordon H. Scruton of Hilo, and several others. In anticipation of possible better skiing conditions on the northeastern slopes, the other group set out simultaneously. It consisted of Dr. Nils P. Larsen, Richard Black, field representative of the U.S. Department of Interior, Dave Larsen of the Hamakua Mill Company, Jerry Denslow, Helen Herman, Nina Cooper and Prince Ross of the Big Island, three Hawaiian cowboys—and the writer.

Mr. Lewis, in last June's issue of the "Paradise of the Pacific," described the experiences of those who skied on the southern face of **Mauna Kea**. We now welcome an opportunity to describe our experiences on the northeastern slopes, and later to elaborate on skiing in general.

According to weather reports, the year was not a good one for snow, and although we found abundant depths at elevation 11,000 feet, had we been two weeks earlier, we would have enjoyed open rolling terrain from 13,784 feet to approximately 8,800 feet—almost a mile vertical descent. Before reaching the snow line, however, it was necessary to pass through country which, until comparatively recent years, was the abode of wild cattle and horses. Beyond this, close to the timber line, we passed innumerable wild pigs, goats and sheep. Looking backwards toward the sea from above the last traces of timber we could see Haleakala rising majestically to its elevation 10,025 feet on the Island of Maui.



Figure 25. L.W. Bryan, Harold Dillingham, Jr., Dudely C. Lewis and Gordon Scruton Skiing on Mauna Kea (A. Robinson, Photo; Copy Photo KPA-N839)

Once on the snow we felt all the exhilaration that [page 7] the Alps or the Canadian Rockies may give to one who skis in the Springtime. All that may be considered typically Hawaiian was lost completely in the endless rolling open slopes that stretched out before us. Of the various forms of snow one of the most delightful is known as “corn” snow, which is usually found at the end of the winter season, and normally in the higher altitudes. The particularly desirable feature of this corn snow is its ability to provide fast skiing, whether wet or dry, comparatively regardless of temperature. It was a distinct pleasure to realize that here in Hawaii we have seemingly endless miles of this type skiing.

Tremendous vertical descents can be made with no fear of running into rocks or gulches, because the normal depth of snow was found to be more than adequate for the terrain. Of the four essential elements heat, cold, rain and light, the latter gave us most concern. Temperatures were those of the Springtime in temperate climates, the rain was not at all bothersome, but the intensity of ultra-violet light at that elevation was found to be extremely high. Unusually dark glasses are necessary and faces had to be blackened, but not until several cases of herpes or lip-burn appeared did we realize that ordinary lipstick became a valuable accessory.

It was expected that much of the upper country exposed to the trade winds would be hard packed, with wind ripples that are generally unpleasant to the skier, but nowhere did we find anything but the most perfect open slopes. Unlimited possibilities exist for slalom and down hill ski races of the highest order.

For further guidance of those who may plan to visit Hawaii's Winter Paradise, it must be mentioned that such a trip is definitely a vacation or long week-end proposition. With the limited transportation facilities available, it is impossible to enjoy skiing over the ordinary week-end. Moreover, it was definitely learned that skiing must be done in the morning since the mountains frequently cloud in at one or three o'clock in the afternoon.

Encouraged by the fact that our introductory glimpse of the snow country proved to be a wholesome success, the more enthusiastic winter sportsmen have recently formed the “Ski Club of Hawaii.” Although the Club plans are in a nebulous state, the underlying purpose of the organization is to offer assistance to the local transportation companies, the Territorial Government, and the Federal Government, in a sincere effort to develop facilities which will make one of the greatest, and one of the simplest, sports in the world a comfortable reality for many instead of a happy retreat for a few.

Surveys were made last February to aid future skiers, and next January a much larger party will attempt to explore further in the direction of the summit. Tentative plans have been made to camp in the snow at elevation 10,000 feet and, if conditions permit, a complete survey of the snow area as well as the various methods of approach, will be made. Plans are also being made for a combined slalom and downhill tournament in the vicinity of the **Humuula** Sheep Station so that the interested public may have an opportunity to observe Hawaii's winter sports under the most favorable conditions.

If we were to judge by the overwhelming reception which was received by the eastern “Snow Trains,” the Atlantic Ski Excursions, Union Pacific developments in Sun Valley, Idaho, and even such things as the phenomenal popularity of skiing in the Atlas Mountains of Morocco, would it not be reasonable to expect within the near future Inter-Island “Snow Boats” or “Snow Planes” —a special highway to the choicest location on **Mauna Kea** or even a government subsidized chalet close to the snow line? These things seem all the more reasonable when we consider that last year the actual ski season in Hawaii was six weeks longer than that of New England.

If the winter games of the 1940 Olympiad are held in Japan, the Hawaiian Islands may, if the facilities are developed, offer considerable attraction en route to those who may travel to the Orient as spectators. Tournaments and exhibitions might easily be arranged. At the present writing we have already had two such requests.

And so, while many of our friends wait patiently for the volcano Kilauea to pour forth her warnings, an ever-increasing group of people, young and old, male and female, look forward this season to a heavy blanket of snow on **Mauna Kea** so that it too, though dead for centuries, may come to life with a new activity. [page 8]

Visitor's Guide to Mauna Kea and the Mountain Lands (1937)

William R. Castle, Jr., son of James Castle, who started a lumbering business (with the mill situated at Kapahuakea, near the Humu'ula-Pi'ihonua boundary), and bullock hunting operations on Mauna Kea and the neighboring mountain lands in the 1830s, published a book titled, "Hawaii Past and Present" (Castle, 1937). A part of the book was meant to serve as a guide to various localities of interest to visitors, and in it, Castle wrote about the ascent of Mauna Kea, and the other mountains of Hawai'i. Castle observed:

...For those able and willing to take long, rough horseback trips there are at least three excursions which are well worth while. First is the ascent of Mauna Loa. There are two old trails, one from Pahala, Kau, on the south side of the mountain, and one from Napoopoo, Kona, on the west side, but although these are both interesting excursions, the best and easiest way to go is certainly by the new trail, starting from the Volcano [page 216] House. This is a trip of about sixty miles. The first twenty miles takes one through some of the most interesting forests in the Islands, woods that contain some of the really old *koa* trees that are ten to twelve feet in diameter; the last ten miles are over rough lava flows, through a country that is superb in the desolation of its high, wind-swept places. At an altitude of nearly 14,000 feet it must be remembered that the nights are always, and the days sometimes, very cold. The sight of the great crater of Mokuaweoweo, at the summit of the mountain, is a fit reward, however, for any hardship.

The ascent of **Mauna Kea**, an excursion less often taken, is, perhaps, the finest in the Islands with the exception of the trip to the top of Haleakala. Although there has been no recent activity from **Mauna Kea**, the visible evidences of violent eruption, the yawning caverns, and the wildly fantastic lava flows are as spectacular in their way as are the fire fountains in Kilauea. The best point of departure is from the Parkers' sheep ranch, which is situated thirty-five or forty miles from Waimea on the great upland plateau between the three mountains. **Mauna Kea**, which is the highest island mountain in the world, has a summit platform five miles long and two wide, and it is the huge cinder cones on this platform, which from below look like peaks, which make this mountain [page 217] higher than its greater neighbor. On this platform, 12,000 feet above sea level, is an ancient quarry, where the natives in olden times made their stone adzes and weapons. There is also a small lake fed from the melting snows. From the Parkers' ranch it is possible to go to the top and back in one long day, and through the courtesy of the Parkers two nights may be spent at the ranch. The ascent may also be made from Mana on the northwest side, from **Keanakolu** on the north, or from Hilo on the east, where arrangements for the trip are made. Any one of these routes leads through the native forests, here quite untouched, as well as over the rocky region above the forest line, but any one takes more time than the first.

Another most interesting and almost unknown horseback trip is that from **Kalaieha** to Kilauea. This trail leads through magnificent and quite unexplored forests and across lava flows most fantastic in their formations. It takes one through some of the most beautiful country on Hawaii, through regions that are practically unknown, and where one can see

the virgin tropical forests as wild and tangled as they were before the discovery of the Islands.

These three trips, although perfectly practicable for good riders, are seldom taken by tourists, who think that when they have seen Kilauea [page 218] certainly when they have made the circuit of the Island, they have seen all that there is to be seen. Only by going off the beaten track, however, can one get a true impression of the country; only in this way an idea of the natural scenery unaffected by civilization—scenery which happens to be of supreme natural beauty. Only by taking such trips as these, moreover, can the tourist realize that Hawaii is fully in the tropics, a land of superabundant, huge-leaved, multi-coloured growth. Tourists who wish to see these things should remember that notice of at least two or three days should be given so that arrangements can be made.

Even if it had no volcanoes, Hawaii, with its magnificent mountains and its endless variety of climate and scenery, would well repay a visit of several days. It is, however, the volcanoes, and especially the great active volcano of Kilauea, which make the crossing to the Island imperative and which would make worth while a journey half-way around the world... [Castle, 1937:219]

Civilian Conservation Corps in the Hawaiian Islands (1937)

In December 1937, Everett Tillett, Field Supervisor, Emergency Conservation Work (of the National Park Service, Department of the Interior), published an article in *Paradise of the Pacific*, describing work being undertaken by the Civilian Conservation Corps (CCC) in Hawai'i. The CCC began its work in the Hawaiian Islands on April 1, 1934, under the direction of the Territorial Division of Forestry. The mountain lands on the island of Hawai'i were among the significant working fields of the CCC, with work on Mauna Kea extending from the summit to the forest lands. Fencing projects, planting trees, habitat restoration or stabilization, eradication of undesirable ungulates, and road and trail work were all programs undertaken by the CCC on Mauna Kea. In the following article, Tillett provided readers with an overview of the program:

The present authorized strength of the Civilian Conservation Corps for all the Hawaiian Islands, including the Camp in Hawaii, is eight hundred enrollees.

Work of the CCC in the Territory is meeting a real need in the form of forest conservation. Enrollees have performed a great variety of tasks since they started their work in the Islands. These include tree planting and maintenance, collection of tree seeds, fence building and maintenance, trail building and maintenance, fighting forest fires, construction of fire breaks and lanes, erosion control, and eradication of wild range animals that destroy the natural forests, and many other forms of forest conservation. This constructive work is being done on five islands—Kauai, Oahu, Molokai, Maui and Hawaii.

Since the introduction of the CCC in the Territory of Hawaii, the enrollees have planted approximately 4,595,000 trees on 12,000 acres of forest reserve land; cultivated or maintained 11,000 acres of trees where the grass and vegetation have hampered the growth of the young trees; constructed approximately 350 miles of foot, horse and truck trails; repaired over 700 miles of trails; built about 100 miles of fences to protect the forest reserves; repaired approximately 60 miles of existing fences and about 25 miles of telephone lines; created several miles of fire lanes for the protection of forests; and performed a considerable amount of other conservation work. The enrollees in the various camps have performed missions in elevations ranging from sea level to the top of **Mauna Kea** which is 13,784 feet.

Building of trails has materially assisted in the proper patrolling and protecting of the forest reserves, and planting of trees. The trails also have encouraged hunters to aid in the

elimination of wild sheep, pigs and goats. The trails are very popular with the members of the hiking clubs and other individuals who enjoy trips through mountain forests.

Our CCC enrollees may well be proud of the success of their efforts. The forests will stand as living monuments to the enrollees who planted the trees and the conservationists who conceived the plan of utilizing the unemployed to perform such useful work while providing relief to the needy. I think that it can be truthfully said that the accomplishments in the entire United States during the past four years have been far beyond the most sanguine hopes of conservation organizations.

While the enrollees have been executing the tasks described above, they have been furnished food, [page 79] clothing, quarters, medical care, educational and recreational direction, and afforded every practical assistance and encouragement to better themselves for the future.

One of the requirements is that each enrollee allot at least \$22.00 of his pay per month to a needy relative. Several enrollees have increased the amount of their allotments. It is estimated that approximately seventy-five to eighty percent of the money that is earned by the enrollees finds its way into the homes of needy relatives for the purchase of the necessities of life.

Regular enrollees receive \$30.00 per month plus food, clothing, and all the accommodations mentioned above. A certain number of the enrollees, who have proved their ability, are designated leaders or assistant leaders. The monthly pay of the leaders is \$45.00 and that of the assistant leaders \$36.00. Several enrollees, who have by their work proved themselves capable of assuming greater responsibilities, have been promoted to foremen and other positions, and receive higher pay. A large number of the enrollees, after a short term in CCC Camps, have obtained employment in the commercial world.

In the Territory of Hawaii the U.S. Army does not participate in the administration of the CCC Camps to the extent that it does on the Mainland. On the Mainland the Army is in charge of the housing, feeding, clothing, educational and recreational activities, medical care, direction of the enrollees while in camp, and the disbursing of all funds. The only participation of the Army in CCC work, in the Hawaiian Islands, is the disbursing of funds.

In reporting the above accomplishments of the CCC, due acknowledgement must be given to the many organizations and persons in the Territory cooperating in this work. To name the individuals personally would require more space than is here available. The U.S. Army, U.S. Navy, Bureau of the Budget, Territorial Board of Agriculture and Forestry, FERA and WPA, the University of Hawaii, Public Health Service, several of the ranches and plantations, and many other organizations, have cooperated splendidly with the CCC. The CCC salutes them all. [page 80]

“Mauna Kea” (1938)

By L.W. Bryan

Acting Territorial Forester

(Paradise of the Pacific, February 1938)

The trip to the summit of ***Mauna Kea*** is more easily made on the south slope. Starting at Kamuela, 65 miles from Hilo and 13 miles from the closest seaport, Kawaihae, it is possible to drive in a car to 8,000 feet in elevation and then walk the remaining distance of eight and a half miles to the summit.

Leaving Kamuela the prospective mountain climber follows the main road towards Kona for a distance of about 5 miles to the old Keamuku Prison Camp. Here the road branches off to the left and goes through several of Parker Ranch Paddocks past Waikii. From here the road leads the hiker up the side of the mountain, past the CCC camp at **Pohakuloa**, then through **Humuula** Sheep Station (**Kalaieha**), towards **Puu Oo**. About one and a half miles past the **Humuula** Sheep Station the road again branches off to the left where it turns and goes up the mountain to **Hookomo**. The distance from Kamuela to **Hookomo** is approximately 36 miles and as the road is rough it requires about two and a half hours running time. The grade is steep in sections so ample gas, oil and water should be secured at Kamuela. Water can be had at Waikii, **Pohakuloa**, and **Humuula** but there is no chance to secure either gasoline or oil after one leaves Kamuela. After the main road is left behind, the secondary road passes through Parker Ranch and Forest Reserve lands. A large part of the road is the private property of the Parker Ranch and care should be taken not to damage any of the ranch property.

There are 17 gates to open and close on the way up and the same number on the return trip and it is important that they all be closed and hooked.

No hunting is allowed on either Parker Ranch or Government lands without permission first being obtained.

At **Hookomo** there is a small Ranger Station where water can be obtained. This station is always locked except when a Forest Ranger is present. It is never open for use of the general public. Cars can be taken a short distance beyond this station, as far as the forest gate, where the road ends and hiking begins. From this point to the top of the mountain is only eight and a half miles but it is all up hill and it usually takes the average hiker about four hours to reach the summit.

At 9,500 feet, timber line, there is a small stone house (**Halepohaku**), 16 x 20 feet, equipped with a large stove and a 2,000 gallon water tank. This house is always open and is for use of the general public. Aside from a stove, a table and benches, this building is unfurnished. Firewood is plentiful and wood from dead trees may be taken, but the cutting of live trees is prohibited. **Halepohaku** is only two miles from where the car is left and makes an excellent stopping place for the night. From this station to Lake **Waiau** is only five and a half miles with the summit about one mile beyond the Lake.

Lake Waiau is a small body of water located at 13,000 feet. It is less than an acre in size and about eight feet deep. While the lake contains many algae they are not harmful and the water is good to drink. There is very little vegetation at this elevation and all fuel must be carried up from below. The Lake freezes over with a heavy cover of ice during the winter months and even during the summer a thin film of ice forms most every night. During the cold months of the year the ice will hold considerable weight and it is possible to enjoy "ice skating" even in Hawaii.

*The trail from **Hookomo** to the summit is well marked and clearly defined with small "Ahus" or piles of stone placed at frequent intervals. At 12,250 feet the trail passes close to **Keanakakoi**, the old Adz Quarries of the ancient Hawaiians. Here the natives spent considerable time in years past getting a particularly hard stone for their Adz and other stone implements. It becomes quite cold at this elevation and of course water freezes quite readily. It may be that these natives had discovered the powerful force exerted by freezing water and that they made use of this force, in their work of breaking off slabs of blue rock, seems possible. The fact that they were limited in their selection of clothing makes one wonder how they ever were able to live at this high elevation. Times have changed however and heavy winter clothing should be worn on a trip to this mountain.*

Mauna Kea (White Mountain), is called the highest island mountain in the world. It is 13,784 feet above sea level being slightly higher than its 13,680 feet neighbor, Mauna Loa. The entire top of the mountain from about 7,500 elevation up is within the **Mauna Kea** Forest Reserve which is one of the largest forest reserves in the Territory having an area of 88,000 acres. This reserve is under the control of the Territorial Division of Forestry and is not to be confused with the Hawaii National Park which is charged with the administration of a part of the adjacent mountain of Mauna Loa. Forest Ranger Duke Kawai, is in charge of this section of the reserve area, with headquarters at Kamuela and any information required can be secured through him or from the office of the Division of Forestry in Hilo.

As the name implies, **Mauna Kea** is covered with snow during the winter months, and even during the summer it is usually possible to find small patches of snow on the north slope where the sun has not reached it.

During the recent years skiing has been taken up in a serious way by the followers of this sport. Experts who have tried it, pronounce the skiing on this mountain equal to that of other sections of the world.

*Two Ski Clubs have been formed, one on the Island of Hawaii and one on the Island of Oahu. It is expected [page 10] there will be large turn-out of members this winter. Situated as Hawaii is at the Crossroads of the Pacific, it is quite possible that **Mauna Kea** may someday become a central meeting place where ski enthusiasts from both hemispheres may gather in competition. Practically any degree of slope may be had for the mountain is covered with large and small cinder cones that rise up sharply to a height of 500 feet above the plain of the surrounding slope. For beginners there are more gradual slopes and even practically level areas to practice on.*

The first snow usually falls about November and comes down on the mountain to about the 11,000 foot contour and can readily be reached in a few hours by skiing enthusiasts.

Occasionally it comes down considerably lower, as it did in 1936 when it was possible to enjoy winter sports at 8,000 feet near **Hookomo**, where the cars are usually left.

Even during the winter months the sun is quite strong, and its reflection from the snow is very hard on the eyes. Last year there were a number of cases of snow-blindness. Dark glasses should be worn at all times and a heavy coating of anti-burn preparation should be applied to the face and lips to prevent burn and subsequent peeling and cracking.

*The ease with which it is now possible to ascend this mountain has been made possible by the road and trail building activities of the CCC boys and much credit is due to the organization of the secondary road and trail which they have constructed from Waiki [Waikii] to **Hookomo** and on to the summit. Due to their efforts **Mauna Kea** has become accessible and during the past two years had been visited by thousands of people. Last winter it was not uncommon for over one hundred people to climb up to the snow line and beyond in a single day. As time goes on it is hoped that the road will be continued so that cars may be taken up to the Rest House at **Halepohaku**. [Paradise of the Pacific, February 1938:38]*

“Maui ‘Silversword’ for Big Island” (1938)
(Haleakala Silverswords planted on Mauna Kea)
Paradise of the Pacific, March 1938:32

“The Silverswords and their relatives are for the most part native in the high mountains of Hawaii,” explained Dr. David D. Keck of the Carnegie Institute, last year. “It is an Alpine

plant in a tropical land, for it is confined to the slopes above 7,000 feet on Mauna Loa, **Mauna Kea** and Hualalai, on the Island of Hawaii, and to Haleakala, on Maui, the four highest peaks in the Islands.” Among “plants with popular interest, the Hawaiian Silversword is one of the world’s rarest species. On none of the four peaks is it abundant.”

“Although this Island has a silversword of its own, and a few varieties of it are found in inaccessible regions where the wild goats can’t get at it,” explained Acting Territorial Forester L.W. Bryan, on the Island of Hawaii, late last November, “the plant does now have the striking of the Maui one. Here it is dwarfed and lusterless.” The silversword seed from Haleakala has germinated successfully in our nursery and we have planted it in various places on the Island.” *Silversword plants from Maui’s Haleakala are doing well on Mauna Kea at the 8,000 foot elevation. They have been fenced off to protect them from wild sheep and goats.* [Paradise of the Pacific, 1938:32]

“The Adz Makers of Mauna Kea” (1938)

By Kenneth P. Emory

(Paradise of the Pacific, April 1938)

In the bare and silent regions where **Mauna Kea** rises above the trade-wind clouds, thick ledges of compact basalt, warmed through the day by their southern exposure, follow the 12,500-foot contour for several miles. Before canvas sails formed white puffs on the sea far below, bringing to these shores the iron which took the place of the hard stone of the Hawaiian cutting tools, a maker of stone adzes wandering into this region must have been driven by the penetrating wind to seek shelter under the ledges. Here he would have found natural caves large enough to shelter himself and several companions. Building a wall to deflect the wind, he would have observed that the loose stones which lay about in such abundance were mostly in thin pieces such as he had sought far and wide when he had occasion to replace a broken adz or make a new one for exchange purposes. From the time of their discovery until the coming of the white man these ledges of compact basalt on **Mauna Kea**, shedding under the action of nightly frost an excellent grade of fine-grained basalt in a most convenient form for working, drew adz makers into this solitude. The number of generations this went on can only be guessed by the immense quantity of chipped stone.

When the air is clear and still at this altitude, words spoken in an ordinary tone are audible for several hundred yards. How the air must have rung with the blows of the hammer stones and the clink of broken pieces of bell-like rock sliding down the talus slopes of flakes! A person passing by on an August day in the year 1750 would probably have heard hallooming across from one work shop to another and, if he had come close enough, the banter and laughter with which the Hawaiians made light any tedious task.

*Visiting this region in the summer of 1937, we located seven caves, and seven shelters formed by the overhanging of bluffs and protected from the wind by stone walls erected by the ancient Hawaiians. Here the adz makers turned out adzes in the rough, that is, finished except for grinding and polishing. Alongside the present main trail from **Humuula** to the summit cones is located the most important of the work shops known as **Ke-ana-ka-ko’i** (The cave of the adzes). The chips and unfinished adzes at this site cover an area of roughly fifty feet long by twenty feet broad, and the thickest part of the pile rises approximately ten feet above the sloping ground. Some of the other piles are nearly as large. Nowhere else in Polynesia are there such accumulations of chips and rejects. So far as I am aware, these are the largest, so far recorded, anywhere in the world. Several hundred nearly finished adzes ranging from two to twelve inches in length, and a few chisels, lay on the pile of chips at **Ke-ana-ka-ko’i** site. The ordinary discoidal hammer-stones, which we saw scattered about, were not more numerous than spherical stones of the same vesicular basalt, flattened slightly on one side. These spherical stones puzzled*

us until we discovered that a number of the rejected adzes had been smoothed and shaped by pecking so as to be gripped comfortably in the hand. We figured that these shaped rejects must have been gripped in the left hand like a stone chisel, one end placed on a stone block to be chipped, and the other end struck a smart blow with the flat face of the spherical stone mallet held in the right hand. Such a [page 21] method has not before been described but no other has been suggested which would explain these two tools certainly employed in the manufacture of the adzes. The use of the mallet-stone and of the chisel-stone, would be effective in the first rough chipping of a large block, but the discoidal hammer-stone would be necessary for the final chipping.

Large slabs and blocks of stone had been carried to the work shops from the quarries nearby. The quarries are simply places along the ledges of hard rock where quantities of slabs have been broken off by the scraping of the glacier which once covered **Mauna Kea** and by the freezing of water penetrating into cracks. There is evidence that the Hawaiians broke some of the stone from the bluffs themselves but generally they simply broke loose slabs into pieces to be carried to the work shops. Acres of ground are strewn with the dark blue, freshly broken rock contrasting with the dull grown surface of the weathered stone. In many places, the rock of the ledges is quite reddish, owing to the oxidation of its iron minerals, and this has led to the supposition that the Hawaiian built fires against the bluffs to split off the stone. But this redness is equally marked on inaccessible parts of the ledges, and is therefore due to weathering.

The floors of the caves and shelters contain grass-padding and some fragments of sea shells, but no accumulation of shells or bones such as would indicate use as living quarters. On calm nights the temperature drops well below freezing. On rainy and windy nights, water drips through the roofs of the caves. During the winter months, snow frequently covers the ground, and the bitterly cold winds sweeping over the work shops would be unendurable to the workers. In two hours of easy walking one may reach the work shops from timber line. So, it is my conclusion that the adz makers lived at warmer altitudes, walking daily to their work during favorable weather in the summer months.

In the immediate vicinity of the work shops and quarries we discovered shrines consisting of single upright stones, and lines of upright stones planted in a low platform. Dr. T. A. Jaggar, in 1919, photographed on the west slope of Mauna Loa, an alignment of upright stones, which he called Umi's altar, near the head of the Alika lava flow, at 7,800 feet elevation. Such structures have much in common with the prehistoric altars, or shrines, of lonely Necker Island, about three hundred miles northwest of Kauai, and belong to the earliest type of sacred structure in the Tahitian region of Polynesia from which we are quite sure the Hawaiians came. The adz makers, clinging to the ancient form of shrine at which to approach their patron gods, have preserved a most important link with their ancestral home. Each upright stone at a shrine probably stood for a separate god. The Hawaiian dictionary describes, 'eho as "a collection of stone gods" and this is the term which the Tuamotuans, the neighbors of the Tahitians, used to designate the alignment of upright stones on the low and narrow platform at their maraes, or sacred places.

The shrines at the adz quarries of **Mauna Kea** indicate that the work carried on here was in the hands of a group of skilled adz makers. They were able to create a stone-tool industry on a scale unequalled in the stone-age because of the superior social organization of the Hawaiian people. [page 22]

“CCC on Island of Hawaii” (1938)

***By L.W. Bryan, Acting Territorial Forester
(Paradise of the Pacific, May 1938)***

On April 1, 1933, the Civilian Conservation Corps was first started but it was not until one year later, April 1, 1934, that the first units of this Corps began work here in Hawaii under the direction of the Territorial Division of Forestry.

We started, on the Island of Hawaii, with a total of 57 enrollees who lived at home and did work in the forest reserves in different sections of the island. This number was later on increased to 123 men all working out from their homes for it was not until June of 1935 that our first camp was opened with a total enrollment of 250 boys. This number was increased later on to 285 boys which, with the men working from homes, gave us a total enrollment of 408. This is the largest number we have had at any one time. Two years ago we were instructed to reduce our force to its present strength of 210.

During the four years, since the CCC began on Hawaii, we have enrolled a total of 920 boys and in addition we have employed 41 skilled workmen and 65 supervisory and facilitating personnel; thus making a total of 1026 persons who have been given employment and paid out of Conservation funds.

During this same period we have operated our cars for a total of 727,000 miles using 168,000 gallons of gasoline for same. In round numbers the Federal Government has spent a grand total of \$800,000.00 on this Island most of which has been in the form of salaries and wages. Each boy is obliged to make an allotment of at least \$22.50 of his monthly wage of \$30.00 to some dependent relative so it is easy to see that the money paid out is well spread around and reaches a large number of needy people.

In addition to the good done to the youth of this Island through giving them an opportunity to earn money we have tried to teach them to live together, to work, to learn some useful trade, to continue their education, to improve their health and to become better citizens. We feel that a large number of these boys have left our camps in a much better condition to go out in the world and earn their living and be better citizens. This, we feel, has been a worth-while accomplishment.

The work projects undertaken by the boys in our camps (of which we have had a total of 23), have been all along conservational lines, projects that will prove of lasting benefit to this Island in particular and to the Territory as a whole. Our entire program has been laid out and carried through with the idea in mind of increasing the usefulness of our forest reserves. The following shows just what has been accomplished along these lines during the past four years:

Tree planting, 5,296 acres, 45,438 m.d.; planting, maintenance, 7,771 acres, 26,258 m.d.; truck trails, construction, 90 miles, 26,248 m.d.; truck trails, maintenance, 81 miles, 3,326 m.d.; horse trails, construction, 159 miles, 11,550 m.d.; horse trails, maintenance, 105 miles, 2,279 m.d.; fences, construction, 82 miles, 28,615 m.d.; telephone lines, construction, 42 miles, 2,487 m.d.; firebreaks, construction, 8 miles, 1,140 m.d.; firebreaks, maintenance, 30 miles, 1,373 m.d.; minor roads, construction, 1 mile, 75 m.d.; foot trail, construction, 0.1 mile, 102 m.d.; tree seed collection, 2,873 pounds, 1,475 m.d.; eradication of exotic plants, 8 acres, 372 m.d.; elimination of wild animals, 22,814 animals, 3,699 m.d.; shelters, construction, 11 each, 1,254 m.d.; fire fighting, 217 m.d.; nurseries, produced and shipped, 2,777,496 trees, 11,837 m.d.; a total of 167,745 m.d. [page 16]

“Ka Pua Mamane” (1938)

Ka Hoku o Hawaii (November 23, 1938)

Many years have passed by since we have published anything about the flowers from the trees of Hawaii, that grow on the mountains of **Mauna Kea** and Mauna Loa, and this is perhaps the first year in which this type of flower is made known.

As a result of the setting of forests under protection by the government, people have a desire to know about the various trees and birds of Hawaii. Thus, we speak of this tree which grows here. It is the *Mamane* tree. Its trunk is rather short, and does not grow tall like the *koa* trees, but it has a very hard wood. Its flower is yellow, and when it blooms, everything around it appears yellow to the sight. This was recalled in ancient times by certain *mele* (chants) about these blossoms. There are two lines of a *mele* recalled the author, from his childhood, they are:

*Aia i ka lai o Keanakolu,
Kuu lei mamane lu‘a i ke anu.*

There in the calm of Keanakolu,
Is my garland of *mamane* blossoms
that droop in the cold.

The generation of these days, perhaps does not know the types of Hawaiian trees, and they do not know of their blossoms. Those people who travel from the volcano, ascending Mauna Loa, will see this type of flower, for it is blooming, and yellow as one sees it. [Maly, translator]

“Lake Waiau of Hawaii” (1939) [Figure 26]

By L. Bryan, Associate Forester

Paradise of the Pacific, February 1939

Lake **Waiau**, located at 13,000 feet on **Mauna Kea**, is perhaps one of the highest lakes in the world. It is located not far from the summit peak of the world’s highest Island Mountain, the top of which is 13,784 feet above sea level. The name “**Waiau**” has several meanings, for example, “water to swim in.” However, it is questionable whether much use was ever made of this water for swimming or whether this exact meaning was intended by the Hawaiians when they named it. It could mean, “the place of the water.”

Lake Waiau is a small body of water, about one acre in extent, and about eight to ten feet deep. In times of freshets and high water it overflows to the south and escapes down the slopes, finding its way through a series of springs into the **Pohakuloa** Gulch. These springs, several in number, occur on the south slopes of the mountain above timber line at near 11,000 feet. Part of their supply of water probably is taken from this lake through underground channels. These springs have never been known to go dry and furnish a continuous supply of pure water to the **Pohakuloa** CCC Camp. The lake contains a large number of Algae, which give it a “greenish” color. However, this plant life is not harmful and the water can readily be used by man or beast.

During the winter months the lake is usually covered with ice and frequently with snow. Even during the summer months a thin film of ice usually forms during the night but disappears when the sun comes up. In the winter the ice is often thick enough to hold the weight of several people and it is possible to enjoy ice skating thereon.

During the past few years this lake has been visited by increasingly large numbers of visitors. Three years ago the Civilian Conservation Corps reconstructed an old trail from near the **Humuula** Sheep Station (**Kalaieha**), past **Hookomo** and **Halepohaku** to **Lake Waiau** and thence to the summit. This trail is well made and carefully marked on the ground with Ahus or piles of stones and the trip to the lake and on to the summit can easily be made by strangers without the assistance of a guide. The distance is not great,

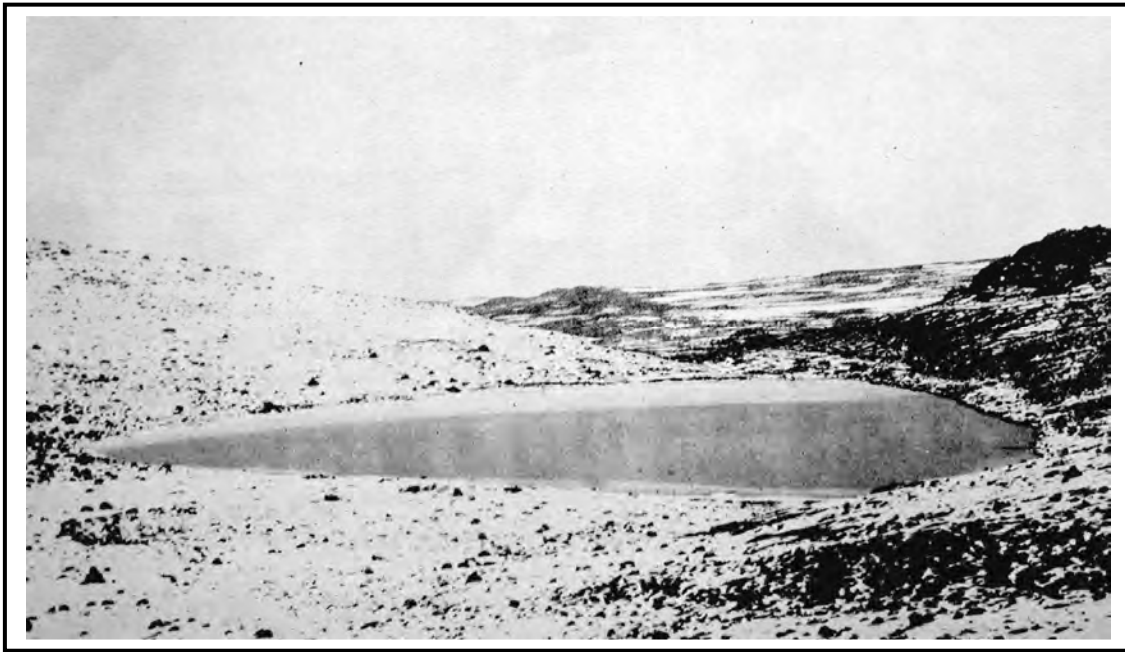


Figure 26. Photo of Lake Waiau, 13,000 Feet, Mauna Kea, Island of Hawaii (Copy Photo, KPA-N868)

for most automobiles can be driven to the forest fence above **Hookomo**. From the point to the rest house at **Halepohaku** it is only two miles and from there to the lake an additional five miles, making a total distance of seven miles to hike, from the point where the cars are usually left, to the shores of the lake.

Visitors usually remain overnight at **Halepohaku**. This, as the name implies, is a "Stone House" which was constructed by the CCC about three years ago. It consists of a 10 x 20 stone house with water tank attached. Inside is a large stove, table and benches. The stove has a firebox three by five feet so that even on very cold nights this building is quite comfortable with a fire going. This station is open for the use of anyone making the trip and there is ample dry wood in this section to furnish fuel. From here to the lake and return by way of the summit is an easy day's hike and one well worth taking.

Just before reaching the lake the trail passes by a number of the "Stone Adz Quarries" of the ancient Hawaiians. Here can be seen large piles of stone chips greatly resembling old "stone crusher" sites. The stone in this section is very hard and apparently made excellent stone implements. Just how the native Hawaiians withstood the intense cold while working and living there is somewhat of a mystery. How they kept warm, particularly at night, without modern clothing, is something yet to be solved. [page 11]

"Vegetation of Lake Waiau, Hawaii" (1939)

By Marie C. Neal

Paradise of the Pacific, October 1939

Remarkable for being the highest body of water in the Pacific, Lake **Waiau**, near the summit of **Mauna Kea**, was a center of interest for an expedition during an eleven-day encampment on its shore in August 1935. Located at an altitude of 13,000 feet, it is always there, in warm seasons mirroring the sky, in cold seasons covered with ice and snow. One is puzzled when standing on the rim of **Waiau** Crater and looking down at Lake **Waiau** filling its bottom to see so large a body of water, one and a half acres in expanse, in that dry, barren waste of rocks and cinders. The black cinder bowl holding it looks 100 per cent porous; but, to repeat, the lake is always there. At the time of the

expedition the water was fifteen feet deep at its deepest point, and it was probably then at its low-water stage. The weather man of the expedition found that during the eleven days the temperature of the air ranged from 57 degrees to 19 degrees. Every morning around the lake's margin we found a thin layer of ice, which melted during the day.

We wanted to see what plants if any grew on the lake's damp beach. There certainly were no plants on the dry slopes of the crater above, and very few over the whole mountain top. *Careful examination revealed hardly any vegetation near the lake and that mostly weeds: two kinds of chickweed, two kinds of grass, one thistle plant, a few plants of fleabane and dandelion; also a kind of fern, said to have world-wide distribution, and growing at higher and lower altitudes on **Mauna Kea**. The weeds may have grown from seeds brought from time to time in feed for pack animals. A few mosses and lichens also found there may be native to Hawaii. Near the lake a fenced area about forty paces square showed what might result by protection from wild and tame grazing animals. It enclosed approximately 800 plants, mostly chickweed, grasses, dandelion, and sorrel. Three tiny planted pine trees were merely existing.*³⁰

We wanted to know, too, what plants were growing in the water. *In August 1935 the lake was muddy and greenish-yellow, as it probably is at other times. Submerged and floating in shallow water near the margin, especially on the north side, were luxuriant masses of threadlike, green-colored algae. We took samples of these by spreading them on paper and allowing them to dry in the air. To find out what was in the water, we dredged the lake with a scoop net, and after filtering out the water, placed the muddy residue in bottles to be examined later.*

Analysis of these collections made clear the reason for the muddy appearance of the water. Besides enormous quantities of a few kinds of minute animals, including a crustacean, a few kinds of microscopic plants were found. Not only the living organic matter but also the accumulation of debris resulting from the succession of generation by generation clouds the water of the lake. All plants identified are widely distributed over the world.

Bacteria were abundantly represented and were one of the chief causes of turbidity. Blue-green algae were found to have made up much of the green-colored marginal mass, where the water froze and thawed every day, and one of the simplest forms present was a rounded colony of several football-shaped cells held together by gelatin. Magnified 600 times, one colony would measure about half an inch in diameter. Mixed with it were three species of another genus of blue-green algae, all three of which grow in unbranched threads of single rows of cells covered with a thin layer of mucilage. Mixed with them was a slightly larger blue-green alga, differing from them in having its cells not so closely joined, resulting in a beaded appearance.

In the bottles containing dredged matter were some diatoms, that curious group of one-celled plants of world-wide range, estimated to include about 10,000 species. Though single plants are microscopic, they are easily [page 7, continued on page 32] visible to the naked eye when grouped in uncountable numbers in chains or in gelatinous colonies, and they are so abundant in spots on the surface of the ocean as to supply food for whales. They have a two-valved siliceous shell, like a box with a cover.

³⁰ In 1940, Neal and Hartt, expanded upon their discussion of plants found around Lake Waiau, observing:

"More species of plants were found in Waiau Crater than elsewhere in the summit area, probably because that is the chief destination of pack animals and because of the moisture from melting snow." (Hartt and Neal, Ecology, Vol. 21, No. 2; April 1940:237-266)

Another microscopic single-celled alga collected with the blue-greens was a so-called desmid, which also has a box-and-cover shell, but which differs from diatoms in enclosing a green body.

Three different kinds of green algae, all microscopic, were identified in the green mass fringing the shore of the lake, one kind consisting of a single cell with two hair-like processes, by means of which it swims actively in water like an animal later, perhaps, dropping the hairs and becoming quiet. It is called "rain alga," and is related to the "red snow" of Polar regions. Dredged with the diatoms was an immobile green alga growing in colonies of two to eight cells bearing large or small hornlike processes. The third kind of green alga was a long unbranched thread made up of a single row of cells.

One fungus, called a water mold, was growing on the dead crustaceans. Compared with the algae collected, the mold is a large plant, one species growing as long as one-seventh of an inch. It has no green color, and so being unable to manufacture its own food, it depends on dead or living organisms for sustenance, by means of threadlike branched processes inserted in the host. This mold and related ones are found in many parts of the world living on dead insects and sick fish, as well as on dead crustaceans. [page 32]

"Suncups in Hawaiian Snowbanks" (1939)

by Chester K. Wentworth [Figure 27]

Paradise of the Pacific, December 1939

"To sit on a tropic beach, and gaze on a snow-clad mountain," as someone phrased it, is a fairly common experience for visitors on the Island of Hawaii, and to see and to feel the gleaming white snow fields of **Mauna Kea** is the good fortune of an increasing number of ski enthusiasts who visit the summit area in proper season. But still more rare is a view of the astonishing suncups and sunpeaks which occasionally form by evaporation of the snow in the dry air of that polar desert. Since many of the visitors to the summit area indulge in tobogganing or skiing, hardly possible on a suncupped surface, it must be assumed that a good job of suncupping is done only rarely. All the more luck in chancing on superb suncupping of the remnant snowbanks as did the writer on July 24, 1939, while engaged in geologic studies as a member of the Northwestern University **Mauna Kea** expedition.

Figure 27.

Suncups and Sunpeaks; C. Wentworth photo (1939); (Copy Photo KPA-N 887)



These deep pits on the soires which stand between them were arranged in striking rows, oriented east to west, in the path of the sun, as shown in the pictures, and were from two to four feet high. They are here almost exactly vertical when formed late in July, but in higher latitudes, up to about forty degrees, they lean with the angle of the sun toward the equator, southward in the northern hemisphere and northward in the southern. They are formed chiefly at high elevations where solar heating is strong, where the air is dry, and where the temperature rises little, if any, above freezing at the time. In most temperate areas of human settlement such forms are comparatively rare though occasionally seen. The suncups have been seen as much as fifteen to eighteen feet deep on high mountains in the Andes, and are known on high mountains in low latitudes in Africa...

Because of the lack of melt water, the lack of means of escape from the bottoms of the pits, and the sub-freezing temperatures during much of the time when they are formed, all observers agree that the suncups are chiefly formed by evaporation of the snow. The constancy of their position and orientation in spite of differences of [page 47] steepness and direction of slope on which they stand is most striking, and clearly due to the orderly march of sun from east to west. It so happens, too, that the pits and spires seen by the writer were formed when the sun was as almost precisely overhead at noon, and the day on which they were photographed was the exact day of the vertical sun for the latitude of **Mauna Kea**. No wonder the spikes stood strikingly vertical, on their narrow bases, and no wonder the rows were remarkably straight under these conditions.

Apparently, when conditions are right, only a few days are required to produce these wastage forms, since they were not noted in early and middle July by other parties going to the summit, including the writer's colleagues. Since it is perhaps only occasionally, and not necessarily every year, that these suncups and sunspires are formed to mark degree, and only by chance that any observer sees them, it will be particularly interesting and informative if others who have seen them on **Mauna Kea** or Mauna Loa, will put their impressions on record... [page 48]

"Glacial Ice of Hawaii" (1941) [Figure 28]

Paradise of the Pacific, November 1941

The summit of **Mauna Kea**, highest point in the entire Pacific, is 13,784 feet above sea level. It is a little higher than Mauna Loa, which is 13,680 feet.

Come geologists to confirm the opinion of Daly and others that **Mauna Kea**, within the proverbial stones throw of tropical Hilo, has passed through a glaciation period. The phenomenon, if such it can be termed, is described in detail by Chester K. Wentworth and William E. Powers in their bulletin. "Multiple Glaciation of **Mauna Kea**, Hawaii," published recently by the Geological Society of America, New York.

In their introductory remarks, the authors say: "Although the summit of **Mauna Kea** was first visited by a European in 1823, and was subsequently studied and described by numerous observers of note including geologists C. E. Dutton and C. H. Hitchcock, the former glaciation of this mountain was not recognized until 1910. Since that time the bolder moraines, striated ledges, and other unmistakable glacial features of the summit area have been observed by numerous persons, including geologists, topographers, and foresters. The first systematic account of the glacial features was presented in 1937, following an expedition in 1935 by the Hawaiian Academy of Science, but based in part on earlier studies by Gregory and Wentworth."

The authors then describe a second investigation, extending over a period of five weeks during the summer of 1939 [the first being in 1935]. They add: "Although further details of the latest glaciation were mapped in the summit area lying mainly above 11,000 feet, most attention was given to the zone between 8,000 and 11,000 feet on the south side." [Figure 27]

Here, they say, are abundant exposures of the older drifts interstratified with lava flows and bearing various evidences of antiquity. Here also were found two of the three deepest gulches on Mauna Loa [Mauna Kea]. They are **Waikahalulu** and **Pohakuloa**. Although only a few hundred feet deep, both exhibited excellent sections of the older drifts of interstratified lavas. A base camp was established on the south side of the mountain at **Hale Pohaku**, near the timber line at about the 9,300 foot level.



Figure 28. Skiers on the Snow-banked Slopes of Mauna Kea (ahu in foreground, Mauna Loa in background). Arthur Robinson, Photographer (Copy Photo KPA-N869)

From here the south, southwest and southeast slopes below 12,000 feet were carefully studied by foot traverse, and all drift areas were mapped. By use of pack train and temporary camps, the less accessible northern, [page 27] northwestern and northeastern slopes were examined, though less carefully than the south.

The expedition was convinced beyond doubt of glaciation evidences. The statement of the geologists continues: "The evidence. . . is widespread above 11,000 feet where there are striated and plucked ledges, rounded roches moutonnees, moraines and erratics. Glacial abrasion was generally rather feeble. In a few places the striated surfaces are sharply grained or even polished, but in the main they are only rudely grooved without conspicuous smoothing. . .

Large faceted blocks on the more recent moraines generally show only faint striations. Nevertheless, over wide areas the results of glaciation are evident in the irregular terrain strewn with angular, somewhat faceted black, gray and tan blocks of various sizes. During the latest glacial stage, designated the **Makanaka**, ice covered approximately twenty-six square miles of the summit area and its margin lay generally at 10,750 to 12,000 feet. Where retarded by cinder cones, the margin remained above 12,000 feet, but where valleys aided concentration of flow, the **Makanaka** glacier descended lower and in the Pohakuloa gulch reached about 10,200 feet. . . [Figure 29]

The geologists concluded that the maximum thickness of the ice during the **Makanaka** stage was about 350 feet, with an average of more than 150 feet . . . The form of the mountain affected glacial movement. On the summit plateau gentle slopes favored accumulation of snow and its transformation into ice, but below 11,000 feet the generally steeper slopes must have greatly facilitated spreading and dissipation of such ice from upper margins. . ."

How the glaciers played hide and seek with lava flows is hinted by the geologists. Lava

flows, they point out, have always tended to fill the radial valleys and thus heal erosional scars. This tendency of flows to follow and fill radial valleys on composite volcanic cones like **Mauna Kea** is so universal that few ravines show identical stratigraphic sections in both walls.

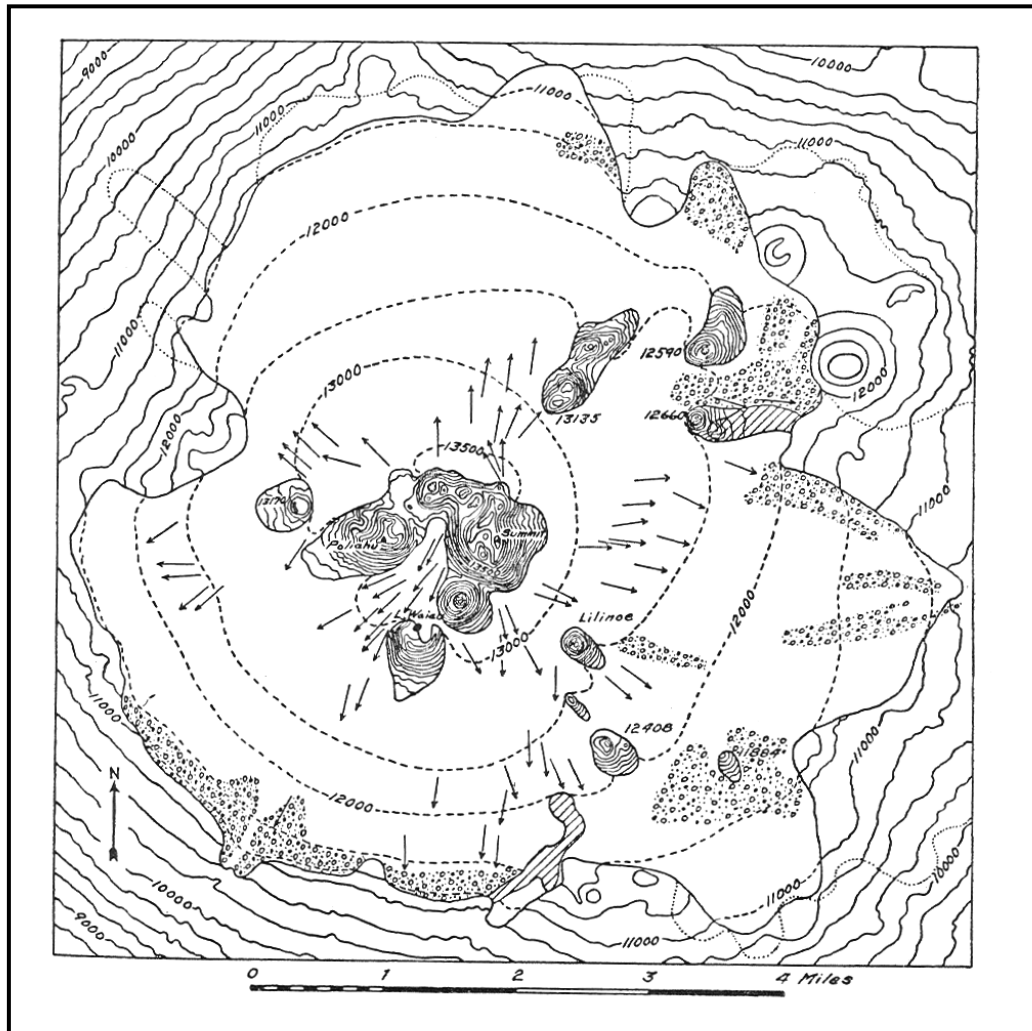


Figure 29. Map of the Glaciated Area on Mauna Kea (Gregory & Wentworth, 1937:1731)

Snow is common on **Mauna Kea** above 10,000 feet during the winter months, and occasionally occurs in summer. During winter storms the snow frequently mantles the mountain above 8,000 to 9,000 feet. In 1936 the white drift swept down to the 7,000-foot level.

“That an oceanic island lying within 20 degrees the equator could be glaciated down to the 7,000 level is extraordinary,” the authors observe. “Its implications regarding Pleistocene world climates are important.” Nevertheless, the geologists are of the opinion—in the absence of a continuous record of temperatures at the summit—that mercury registers below freezing practically every day in the year.

A side glance at Mauna Loa, twin mountain, and still active as a volcano, is interesting. The authors say, “A comparison with Mauna Loa is instructive. The latter’s fresh, almost uneroded form and immaturity of soils and forest reflect its steady upbuilding by lava

outpourings up to the present time. During the last 100 years Mauna Loa has extruded lava at the rate of 5,000 to 10,000 million cubic meters per century. That amounts to an average growth over the entire area of the dome of three to six feet per century. If this rate has been sustained for the entire period of the post glacial period of, let us say, 30,000 years. Mauna Loa must have been 1,000 to 2,000 feet lower than now at the end of the ice age, and presumably lower still during that period.” [page 28]

“Skiing on Snow-Capped Peak of Mauna Kea” (1948)

Paradise of the Pacific, March 1948:4-5

The Majestic slopes of Mauna Loa and **Mauna Kea**, volcanic mountains on the Big Island of Hawaii, are covered with snow during the winter months. **Mauna Kea**, the highest island mountain in the world (13,825 feet), this year has had snow reaching down to the 9,000 foot level. (Her record snow fall came down to the 7,500 foot level in 1936.)

Island residents and visitors climb **Mauna Kea** for the novelty of seeing snow in a sub-tropical area and to enjoy skiing and sledding. *In ancient times Hawaiian adze makers climbed the slopes to obtain a valuable hard stone for their tools. An adze-making pit, **Ka lua ka koi**, lies on top of **Mauna Kea**. Even when the trip was made in the summer months the men wore ti-leaf cloaks, or ahu ua, to keep out the chilly mountain winds. They also brought several extra pairs of ti leaf sandals to protect their feet from the sharp lava rocks on the tortuous climb to the top.*

These sandals were tied around the waist and were used as each pair wore out.

Present-day climbers frequently find valuable relics of the adze-making era. [page 4]

The Mauna Kea Hunting Program of the Territory of Hawaii (1948)

“Hunting on the big island of Hawaii – Sheep, wild goats and pigs by thousands create hunters’ paradise”

Paradise of the Pacific, May 1948:26-27

The rugged slopes of **Mauna Kea**, on the “big island” of Hawaii abound in wild sheep, goats and pigs, making them a hunters’ paradise. Sheep hunters usually gather at **Pohakuloa**, the lodge maintained by the Hawaiian Board of Forestry and Agriculture. Here they spend the night under piles of blankets (because of the 6,500 foot elevation, the nights are almost always cold) and start out before sunrise for the mountain ridges.

They climb to the ten thousand foot elevation, where wild sheep and goats are in abundance. The Board of Forestry encourages hunting, as the animals have caused serious erosion by eating vegetation, and some authorities believe that the sheep and goats will never be entirely exterminated. In its desire to provide hunting facilities, the Territory maintains not only **Pohakuloa** lodge, with its bedding accommodations for fifty people, but smaller lodges at **Kemole** and **Kahinahina**. The latter is located near the headwaters of the Wailuku river.

There are twenty ranger stations located throughout the vast Hawaii Island forests, which cover an area of some six hundred thousand acres. There are more than three hundred miles of forest fences to be patrolled and maintained by the six Big Island rangers.

Three guides are stationed at **Pohakuloa** to lead organized parties into the best sheep regions. Hunting parties are expected to bring along their own food and to pay a nominal fee for sleeping facilities and guide service. [page 27]

MO‘OLELO ‘ĀINA: A CHRONOLOGICAL HISTORY OF LAND TENURE, ACCESS, RANCHING, LEASEHOLD INTERESTS, AND CONSERVATION ON THE ‘ĀINA MAUNA (1842-1963)

Land use records from Kingdom and Government collections for the lands of Humu‘ula, Ka‘ohe, and the neighboring *‘āina mauna*, date back to at least the 1840s. Early communications describe the taking of wild cattle, sheep, goats, and pigs from the region, through rights granted by, or on behalf of the King. By the 1850s, formal leases of the Crown and Government land holdings were granted to ranchers on the mountain lands—while plantation interests were granted leases, and in some instances, fee-simple interests on the lowlands.

As described in the historical journals and communications cited in this study, by the 1820s, populations of wild cattle (bullocks), sheep, goats, pigs, and dogs, increased to a point where they were causing impacts on the landscape, and at times, even harassing travelers. Between the 1830s to 1850s, the Kingdom established a program, which it managed through local agents, for taking wild cattle, sheep, and other stock from the mountain lands as needed for hides, tallow, and meat, or in payment for services rendered. Following the *Māhele ‘Āina* of 1848, which established a system of fee-simple property rights in Hawai‘i, individual *ali‘i* and the government began entering into leasehold agreements with parties for vast tracts of land throughout the islands.

While John Palmer Parker’s, Parker Ranch, is most generally associated with activities on the mountain lands, his early competition, in the name of Francis Spencer, and subsequently the Waimea Grazing and Agricultural Company, was at one time the largest lessee of Government and Crown lands around, and on Mauna Kea. As a part of his operations, Spencer’s activities included the entire mountain lands of Ka‘ohe and Humu‘ula, including the summit of Mauna Kea, and lands up to the summit of Mauna Loa. He also held leases on large tracts of the Waimea plain lands, and by the 1860s, leased the entire *‘ili* of Waikōloa (more than 90,000 acres), and a short time later, also leased the *ahupua‘a* of Pu‘u Anahulu and Pu‘u Wa‘awa‘a. During that time, Spencer had a monopoly on all sheep and wild cattle on Mauna Kea and the mountain lands, including uses of the Kalai‘eha, Laumai‘a, Keanakolu, Hānaipoe, the Pōhakuloa plateau lands, and smaller stations in between these areas. It wasn’t until 1870, that John Palmer Parker began to work his way into leasehold interests in Ka‘ohe, and not until 1914 that A.W. Carter, trustee of the Parker Ranch, secured a lease on the land of Humu‘ula, including the sheep station at Kalai‘eha, and other smaller stations.

The following section of the study provides readers with a chronological history of land use activities and leases on the *‘āina mauna* between 1842 to 1963. The records include a wide range of documents found in the collections of the Bureau of Conveyances (BoC), the Crown Lands Commission, Interior Department, Survey Division (of the Kingdom and subsequent government bodies), Land Division, Parker Ranch-Paniolo Preservation Society documents, and the Hawaii State Archives (HSA); describing the lands, permitted uses, restrictions, and later, removal of tracts of land from the leases for conservation purposes. The documentation cited in this section of the study is organized chronologically in several primary categories, including:

- I. Land Tenure and the *Māhele ‘Āina* (1842-1855).
- II. Mauna Kea and the Neighboring *‘Āina Mauna* (1790s-1890s): Traditional Customs, Practices, Resource Collection, and Land Use Described Before the Boundary Commission.
- III. Land Use and Leasehold Interests on the *‘Āina Mauna* Following the *Māhele ‘Āina* (1850-1963).
- IV. *Nā Ala Hele o ka ‘Āina Mauna* – Native Trails to Government Roads.
- V. Historical Surveys of the Lands of Humu‘ula, Ka‘ohe, and the *‘Āina Mauna*.

While a detailed collection of records is cited in the following sections, readers should note that more records exist, the review of which may answer questions about particular features, or aspects of history. Also, cross referencing the records below with those from the Kingdom and Territorial Survey records; historical journals; and oral history interviews, cited in various sections of this study, will add further details to historical background. Readers also please note that the use of bold and italics print in quoted material has been employed to draw readers attention to specific place names, and descriptions of features and land use activities.

I. Land Tenure and the Māhele ‘Āina (1842-1855)

In pre-western contact Hawai‘i, all land and natural resources were held in trust by the high chiefs (*ali‘i ‘ai ahupua‘a* or *ali‘i ‘ai moku*). The use of lands and resources were given to the *hoa‘āina* (native tenants), at the prerogative of the *ali‘i* and their representatives or land agents (*Konohiki*), who were generally lesser chiefs as well. In 1848, the Hawaiian system of land tenure was radically altered by the *Māhele ‘Āina* (Division of Lands). This change in land tenure was promoted by the missionaries, the growing Western population, and business interests in the island kingdom. Generally these individuals were hesitant to enter business deals on lease-hold lands.

In the years leading up to the *Māhele ‘Āina* the primary references to the mountain lands were in regards to the right to take cattle from the mountain, and the enforcement of a *kapu* on them. Among the earliest letters were two, dating from March 1842—

Lahaina

March 26, 1842

Kamehameha III and Kekauluohi; to John Davis Kuakini:

...This is our communication to you. George Bush is going up to Hawaii for the purpose of taking cattle on the mountain, to the amount of three hundred. These three hundred cattle are to settle the difficulty with Bill, formerly spoken of. These are what we have given him for the settlement of that difficulty.

When those three hundred are taken, then the kapu shall again be put on the cattle, according to the former charge... [HSA ID Misc. Box 141]

Lahaina

March 26, 1842

Kamehameha III and Kekauluohi; to William Beckley:

...This is our charge to you. George Bush is going up there to take cattle to the amount of three hundreds, and when those hundreds are taken, then they are to be kapu again, according to the former charge.

Furthermore, you are to aid George Bush by yourself and horses in all his business and necessities... [HSA ID Misc. Box 141]

In 1848, the *Māhele ‘Āina* defined the land interests of Kamehameha III (the King), the high-ranking chiefs, and the *Konohiki*. As a result of the *Māhele*, all land in the Kingdom of Hawai‘i came to be placed in one of three categories: (1) Crown Lands (for the occupant of the throne); (2) Government Lands (to support public works and government programs); and (3) *Konohiki* Lands (for the chiefs associated with the Kamehameha lineage and rise to power). Subsequently, the *hoa‘āina* (native tenants), were granted the right to claim parcels of land for their personal use from lands situated in the three categories of land listed above. The “Enabling” or “*Kuleana Act*” (formally submitted to the King in December 21, 1849, and approved on August 6, 1850) laid out the framework by which native tenants could apply for, and be granted fee-simple interest in “*Kuleana*” lands, and confirmed their rights of access to, and collection of resources necessary to their life upon the land in their given *ahupua‘a*. The Act reads:

August 6, 1850

An Act confirming certain resolutions of the King and Privy Council passed on the 21st day of December 1849, granting to the common people allodial titles for their own lands and house lots, and certain other privileges.

Be it enacted by the Nobles and Representatives of the People of the Hawaiian Islands in Legislative Council assembled;

That the following sections which were passed by the King in Privy Council on the 21st day of December A.D. 1849 when the Legislature was not in session, be, and are hereby confirmed, and that certain other provisions be inserted, as follows:

Section 1. Resolved. That fee simple titles, free of commutation, be and are hereby granted to all native tenants, who occupy and improve any portion of any *Government land*, for the land they so occupy and improve, and whose claims to said lands shall be recognized as genuine by the Land Commission; Provided, however, that the Resolution shall not extend to Konohikis or other persons having the care of Government lands or to the house lots and other lands, in which the Government have an interest, in the Districts of Honolulu, Lahaina and Hilo.

Section 2. By and with the consent of the King and Chiefs in Privy Council assembled, it is hereby resolved, that fee simple titles free of commutation, be and are hereby granted to all native tenants who occupy and improve any *lands other than those mentioned in the preceding Resolution, held by the King or any chief or Konohiki* for the land they so occupy and improve. Provided however, this Resolution shall not extend to house lots or other lands situated in the Districts of Honolulu, Lahaina and Hilo.

Section 3. Resolved that the Board of Commissioners to quiet Land titles be, and is hereby empowered to award fee simple titles in accordance with the foregoing Resolutions; *to define and separate the portions belonging to different individuals; and to provide for an equitable exchange of such different portions where it can be done, so that each man's land may be by itself.*

Section 4. Resolved that *a certain portion of the Government lands in each Island shall be set apart, and placed in the hands of special agents to be disposed of in lots of from one to fifty acres in fee simple to such natives as may not be otherwise furnished with sufficient lands at a minimum price of fifty cents per acre.*

Section 5. In granting to the People, their House lots in fee simple, such as are separate and distinct from their cultivated lands, the amount of land in each of said *House lots shall not exceed one quarter of an acre.*

Section 6. *In granting to the people their cultivated grounds, or Kalo lands, they shall only be entitled to what they have really cultivated, and which lie in the form of cultivated lands; and not such as the people may have cultivated in different spots, with the seeming intention of enlarging their lots; nor shall they be entitled to the waste lands.*

Section 7. *When the Landlords have taken allodial titles to their lands the people on each of their lands shall not be deprived of the right to take firewood, aho cord, thatch, or ti leaf from the land on which they live, for their own private use, should they need them, but they shall not have a right to take such articles to sell for profit. They shall also inform the Landlord or his agent, and proceed with his consent. The people shall also have a right to drinking water, and running water, and the right of way. The springs of water, and running water, and roads shall be free to all should they need them, on all lands granted in fee*

simple. Provided, that this shall not be applicable to wells and water courses which individuals have made for their own use.

Done and passed at the Council House, Honolulu this 6th day of August 1850. [copied from original hand written “Enabling Act”³¹ – HSA, DLNR 2-4]

The lands awarded to the *hoa’āina* (native tenants) became known as “*Kuleana Lands*.” All of the claims and awards (the Land Commission Awards or L.C.A.) were numbered, and the L.C.A. numbers remain in use today to identify the original owners of lands in Hawai‘i.

The work of the Land Commission was brought to a close on March 31, 1855. The program, directed by principles adopted on August 20, 1846, met with mixed results. In its’ statement to the King, the Commissioners to Quiet Land Titles (George M. Robertson, March 31, 1855) summarized events that had transpired during the life of the Commission:

...The first award made by the Commission was that of John Voss on the 31st March 1847.

The time originally granted to the Board for the hearing and settlement of all the land claims in the kingdom was two years, ending the fourteenth day of February, 1848.

Before the expiration of that term it became evident that a longer time would be required to perform a work... Accordingly, the Legislature on the 26th day of August 1847, passed an Act to extend the duration of the Board to the 14th of February, 1849, adding one year to the term first prescribed, not however, for the purpose of admitting fresh claims, but for the purposes of hearing, adjudicating and surveying those claims that should be presented by the 14th February, 1848. It became apparent to the Legislature of 1848 that the labors of the Land Commission had never been fully understood, nor the magnitude of the work assigned to them properly appreciated, and that it was necessary again to extend the duration of the Board. An act was accordingly passed, wisely extending the powers of the Commissioners “for such a period of time from the 14th day of February 1849, as shall be necessary for the full and faithful examination, settlement and award upon all such claims as may have been presented to said Board.” ...[T]he Board appointed a number of Sub-Commissioners in various parts of the kingdom, chiefly gentlemen connected with the American Mission, who from their intelligence, knowledge of the Hawaiian language, and well-known desire to forward any work which they believed to be for the good of the people, were better calculated than any other class of men on the islands to be useful auxiliaries to the Board at Honolulu...

...During the ten months that elapsed between the constitution of the Board and the end of the year 1846, only 371 claims were received at the office; during the year 1847 only 2,460, while 8,478 came in after the first day of January 1848. To these are to be added 2,100 claims, bearing supplementary numbers, chiefly consisting of claims which had been forwarded to the Board, but lost or destroyed on the way. In the year 1851, 105 new claims were admitted, for Kuleanas in the Fort Lands of Honolulu, by order of the Legislature. The total number of claims therefore, amounts to 13,514, of which 209 belonged to foreigners and their descendants. The original papers, as they were received at the office, were numbered and copied into the Registers of the Commission, which highly necessary part of the work entailed no small amount of labor...

...The whole number of Awards perfected by the Board up to its dissolution is 9,337, leaving an apparent balance of claims not awarded of say 4,200. Of these, at least 1,500

³¹ See also “Kanawai Hoopai Karaima no ko Hawaii Pae Aina” (Penal Code) 1850.

may be ranked as duplicates, and of the remaining 2,700 perhaps 1,500 have been rejected as bad, while of the balance some have not been prosecuted by the parties interested; many have been relinquished and given up to the Konohikis, even after surveys were procured by the Board, and hundreds of claimants have died, leaving no legal representatives. It is probable also that on account of the dilatoriness of some claimants in prosecuting their rights before the Commission, there are even now, after the great length of time which has been afforded, some perfectly good claims on the Registers of the Board, the owners of which have never taken the trouble to prove them. If there are any such, they deserve no commiseration, for every pains has been taken by the Commissioners and their agents, by means of oft repeated public notices and renewed visits to the different districts of the Islands, to afford all and every of the claimants an opportunity of securing their rights... [Minister of Interior Report, 1856:10-17]

It is reported that the total amount of land awarded to *hoa'āina* equaled approximately 28,658 acres (cf. Kame'eleihiwa 1992:295).

Disposition of Selected Lands of the 'Āina Mauna During the Māhele

As described above, in the period leading up to the *Māhele* of 1848, all the land was held by Kamehameha III and the *ali'i* who had supported his father and he, in the formation of the kingdom. During that time the lands were held by one or more chiefs. The *Māhele 'Āina* clarified those interests, and disposition of the primary lands which rest upon the *'āina mauna* of Hawai'i, or bound Humu'ula and Ka'ohe was resolved on the following dates:

Humu'ula, Hilo

Relinquished by Victoria Kamamalu to Kamehameha III on January 27, 1848 (*Buke Mahele*, 1848:5-6). Retained as a part of the Crown Land Inventory (*Buke Mahele*, 1848:186-187). *One native claim registered, not awarded.*

Kalōpā, Hāmākua

Relinquished by Victoria Kamamalu to Kamehameha III on January 27, 1848 (*Buke Mahele*, 1848:5-6). Retained as a part of the Crown Land Inventory (*Buke Mahele*, 1848:190-191). *No native claims registered.*

Ka'ohe, Hāmākua

Relinquished by Victoria Kamamalu to Kamehameha III on January 27, 1848 (*Buke Mahele*, 1848:5-6).

Given by Kamehameha III to Government Land Inventory on March 8, 1848 (*Buke Mahele*, 1848:191). *Four native claims registered, one awarded.*

Kapāpala, Ka'ū

Relinquished by Kamakee Piikoi to Kamehameha III on January 28, 1848 (*Buke Mahele*, 1848:19-20). Retained by Kamehameha III as a part of the Crown Land Inventory (*Buke Mahele*, 1848:182). *No native claims registered.*

'Ili of Keauhou, in Kapāpala, Ka'ū

Retained by Victoria Kamamalu on January 27, 1848 (*Buke Mahele*, 1848:5-6). *No native claims registered.*

Koholālele, Hāmākua

Retained by Kailakanoa, on February 3, 1848 (*Buke Mahele*, 1848:81-82). *Six native claims registered, six awarded.*

Kūka‘iau, Hāmākua

Retained by Pehu, on January 31, 1848 (*Buke Mahele*, 1848:37-38). *Three native claims registered, two awarded.*

Makahanaloa, Hilo

Retained by Wm. Lunalilo, on January 28, 1848 (*Buke Mahele*, 1848:19-20). *Two native claims registered, one awarded.*

Nanue, Hilo

Retained by Kawai, on February 4, 1848 (*Buke Mahele*, 1848:95-96). *No native claims registered.*

Pā‘auhau, Hāmākua

Retained by A. Keohokalole, on January 28, 1848 (*Buke Mahele*, 1848:9-10). *No native claims registered.*

Pāpa‘ikou, Hilo

Retained by Kealiihonui, on February 9, 1848 (*Buke Mahele*, 1848:130-131). *Seventeen native claims registered, thirteen awarded.*

Pi‘ihonua, Hilo

Relinquished by Kalaeokekoi to Kamehameha III on January 28, 1848 (*Buke Mahele*, 1848:35-36). Retained as a part of the Crown Land Inventory (March 8, 1848). *Twenty native claims registered, fourteen awarded; all for lands within one mile of the shore on Hilo Bay.*

Waiākea, Hilo

Relinquished by Kaunuohua to Kamehameha III on February 4, 1848 (*Buke Mahele*, 1848:90-91). Retained as a part of the Crown Land Inventory (March 8, 1848). *Thirty-four native claims registered, twenty-five awarded; all within one mile of the shore on Hilo Bay.*

The ‘ili of Waikōloa, Waimea

Retained by G.D. Hueu, on February 12, 1848 (*Buke Mahele*, 1848:165). *No native claims registered.*

Waipunalei, Hilo

Retained by Poka, on February 2, 1848 (*Buke Mahele*, 1848:67-68). *No native claims registered.*

Disposition of Livestock on the ‘Āina Mauna

In the years leading up to, and through the *Māhele* ‘Āina, all livestock was considered the possession of the King. Following the *Māhele*, the livestock was divided between the King and the government, and individuals who were granted private interest in the same. The livestock held by private parties was required to be branded. While the policy of the Kingdom was clear in the procedure of the government, it is also recorded that individuals were also taking up illegal hunting of livestock. Among the communications documenting control over such livestock, are those below, from 1850 to 1856.

Honolulu, Oahu

June 10, 1850

Public Notice—Charles Gordon Hopkins, Land Agent of the King:

...Know all me by these presents, that we, the undersigned Agents of the King and the Government, hereby appoint G.D. Hueu, as Keeper of the Cattle at ***Waimea & Mauna Kea and surrounding districts***, or *wherever the cattle may roam, the cattle in the woods and the Government*; those are the ones he is to keep and run in places where the food is

good; to brand and perform other duties as are usually performed by a cattle herder, always looking after the interest of both parties; until such time as the King and Government may send for them, and to deliver the cattle only upon receipt of an order. In case any trouble should happen to the cattle, whether stolen or feloniously branded, the said G.D. Hueu is empowered to bring law suits in the courts, in the names of the persons who own the cattle. He to speak the word, and the management and other powers usually given to a cattle herder. [HSA ID Ltr. Book 2. Pt. 2]

Honolulu, Oahu

June 15, 1850

Keoni Ana [to Wm. Beckley]:

...With regretful feeling am I writing this letter to you.

I have to inform you that you are no longer to continue in the employ of the Government as manager of the cattle ranch.

You are therefore required to file a statement showing properties belonging to the Government and the King in your keeping.

Lapaula (Jarrett) is the new manager, to whom you will turn over everything. [HSA ID Ltr. Book 2. Pt. 2]

Kailua, Hawaii

May 15, 1851

Isaac Y. Davis; to Keoni Ana:

...I again ask you, and you let me know right away, so that I may be able to put more strength to the peace of the Government at ***Maunakea*** mountain, because, of the great number of people going up the mountain to chase wild pigs, and I have many times warned them about this matter. But, they have paid no attention, therefore, I have thought of asking you first, and then tighten up, I might go ahead, and they fall down. That's that, so please let me know soon what the right course is for me to do.

But, what I am sure about is this, that the wild pigs belong to the Government, and that the people have no right there, and because of having been told that this right was given to Moluhi by Z. Kaauiwai, that is why I was doubtful about enforcing my rights on ***Maunakea*** on behalf of the Government, and if I should receive a letter from you or from some of you, then, those that chase wild pigs will be stung by me. I am really put out because they pretend that they too have a right in the mountain, (foolish)... [HSA ID Misc. Box 144]

Hilo December 4, 1852

T. Metcalf, Superintendent of Public Works;

to A.G. Thurston, Interior Department Clerk

Reports on inspection of Government livestock in the region

from Waimea to Laumaia (Laumaea), Kalaieha (Lae eha), and Keamoku (Aamoku); recommending development of pens on the mountain lands.):

...I have taken an account of stock at Waimea and it results as follows viz:

One Bull; 10 old cows; 87 young cows; 89 Heifers; 25 heifer calves; 84 oxen steers; 25 Bull calves; 43 sheep in all; 3 goats; 6 horses in all; and 32 *Bipi Kanawai*. The last being Bullocks received for fines. I did not count, not knowing the fact until after the act. was taken, but take Davis' act. for the number.

I should advise the sale of these Bullocks at once. They have been so neglected of late that they have become nearly wild, not herding them sometimes for months. Besides I don't think bullocks will ever be worth more in Waimea than at the present. I have heard no one say he would give more than 50 cts. per head for them as they run. *All Bullocks (except the Governments) are increasing at a frightful rate about Waimea.* August 5th 1850 there were 267 bullocks; in June 7, 1852 there were 288. And at November 29th ult. the day I took the a/c, there were, as you will see by looking up, 391. Aside from the *Bipi Kanawai*. Then look at the number of cows & account the increase with natural laws if you can.

I have been up about the mountain a little and made inquiries of all the foreigners and natives that I have seen who have been among the wild bullocks of late. And the result is this:

That the bullocks are very poor at present especially those on the windward side of the mountain. They are decreasing rapidly. The causes are – first, Stealing; second, Dogs; third, by far the most destructive, the great majority of Bulls over that of the cows. The cows being the weaker have more easily fallen a prey to the wild Dogs. The Bulls in their greater numbers now completely worry the cows out of all power to breed.

*I propose the following, that His Majesty & the Govt. divide the Bullocks as they now are on the mountains, one party taking all from Nauhi around windward to **Laumaia** inclusive; the other party taking the balance – see sketch [Figure 30] – as near as I can ascertain those boundaries will divide the bullocks in about equal shares. Those at windward being more condensed but farther from market and in a more tedious climate. The others are more sparse but in a milder climate, nearer market, and my informants say much fatter than those at the windward of the mountain.*

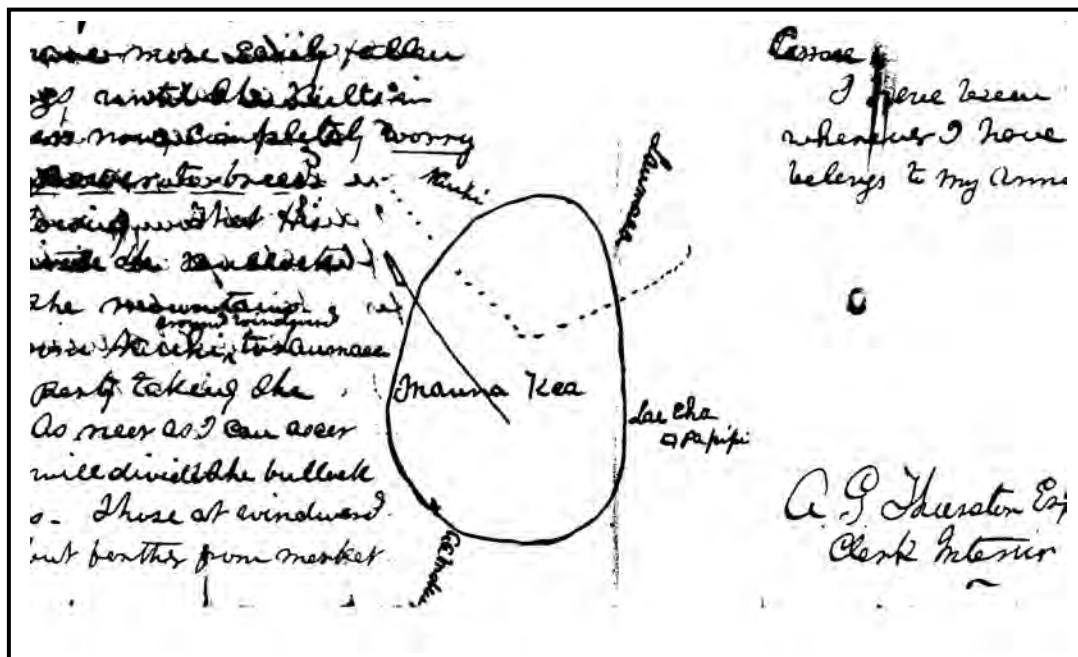


Figure 30. T. Metcalf's Sketch of Proposed Division of Mountain Lands – Aamoku (Keamoku), Lae Eha (Kalaieha), Laumaia (Laumaia) and Nauhi

*After the decision is made, I should advise the building of pens where necessary & castrate all the males & mark the whole, and so continue to do yearly, until finally disposed of. Or otherwise sell the whole at once. One or the other plan must be accepted immediately or the wild bullocks will be of no account. I propose to go back to Waimea again and take a route through the woods from **Makahānaloa** to Maunakea in order to ascertain the practicability of making a road through the woods around the north side of the mountain to Waimea. But I am apprehensive the rains will defeat my project as it now pours down in torrents and bids fair to continue to do so for a long time.*

I have been examining the work upon the roads wherever I have been, but as this road subject belongs to my Annual Report, I will close... [HSA – Interior Department Misc. Box 145]

Waimea Hawaii

November 1, 1856

Isaac Y. Davis, to Keoni Ana, Minister of the Interior

(Describes depredation of forest and grazing lands around Mauna Kea, as a result of the herds of wild sheep):

...I now have a good time to write to you with Aloha, and tell you my thoughts about those things pertaining to the Nation of our King. Aloha is the foremost, and I dwell here with Aloha for all of you.

*First, let me tell you about the Sheep of the attorney, Mr. Montgomery, dwelling at Puupueo, on the Mountain. Five or perhaps six miles above the place of J.P. Parker, Esq. E. Sparke Esq., is the one who tends to said Sheep, the Land, and the houses, and many acres of land purchased by Mr. Montgomery. I do not know the number of acres of Land, but I have heard that it is Five hundred (500) Acres, that is all. But the Sheep roam all about, from one area here, to another area over there. The Sheep roam from Puupueo³² to Puuhuluhulu [on the Waimea plain], and to the Gulch of **Kemole**. That is half of **Mauna Kea**, and many thousands of Acres that the Sheep roam across. The land is cut down, there is no place that anything will grow. The grasses are gone, and there is only dirt on the Land, just like Waimea, and because of this, the cattle are also no more on this section of the Mountain, having been routed from one place to another.*

As a result, I inquire of you, has this thing been agreed to by you, that the Sheep could simply roam about this place? Because I do not know, and am unaware of it, I inquire of you.

If the Sheep are allowed to stay for long, as they presently do, all the grass and forest of the place shall be consumed. It will be an evil thing, for these Sheep have exceedingly poisonous teeth.

Here is what I know, the sheep were not numerous before, and there were many animals of other varieties in those 20 or more years past. There has been no evil seen upon the land as at the present time.

Give my Aloha to C.T.B. Rooke, Kamaikui, and Aloha to all of your household as well.

I am with thanks... [HSA – Interior Department, Misc. Box 146; Maly, translator]

³² Pu'upueo is situated in Pā'auhau, above the Makahālau section of the ranch.

The “Right” to Hunt on Mauna Kea and the Mountain Lands not Held as a Public Interest in 1861

In 1860, a dispute regarding the hunting of wild “mountain” cattle arose between the lessee of the Crown and Government lands on Mauna Kea, and the owner of Waikōloa. This dispute focused on the “right” to hunt, and clarified the position of the Government in this matter—that no one had the right to hunt on the public lands, except for those who had acquired leasehold interests or special permission to do so. The entire case centered around Mauna Kea, and included important documentation on tenants and developments on the mountain lands. It is also reported that between 1826 to 1841, 40,000 wild cattle were taken from Mauna Kea and the surrounding mountain lands by licensed hunters, on behalf of the King. Up until that time, the cattle had become so numerous, that they overran vast tracts of land and the gardens of the native tenants (Hawaiian Reports, 1861:369).

The following excerpts are taken from the Hawaii Supreme Court, “*Hawaiian Reports, 1861*,” in the case of George Hueu Davis, the plaintiff, and owner of Waikōloa; and William L. Green, on behalf of Robert C. Janion (partner of Francis Spencer), the defendant, and lessee of the Crown and Government lands on Mauna Kea:

*...The law regulating the brands and marks of private owners, is not intended to apply to the wild herds roaming on the sides of **Maunakea**, which are universally recognized the “mountain cattle of the King and Government.”*

These cattle cannot be regarded as animals *ferae naturae*, and therefore do not belong to that class recognized by the law as not being the subject of property in any person until reduced to possession by the captor.

The grantee of those unbranded mountain cattle from the Government, can not be allowed to enter upon the lands of private parties for the purpose of capturing these cattle, without the consent of the owners of such lands; nor can he convert the cattle of private owners because found *unbranded* upon lands leased by him.

The owners of private lands have no right to convert the said unbranded cattle of the King and Government because found upon their lands. [page 367]

Justice Robertson delivered the judgment of the Court as follows:

This is an action of trover, brought by the plaintiff to recover from the defendant the value of twenty-nine bullock hides, alleged to have been wrongfully taken and converted by certain agents of the defendant, at Waimea, Hawaii...

The plaintiff is the proprietor of an extensive tract of land, called the *Ahupuaa* of Waikoloa, on the north-western slope of **Maunakea**, and running down to Waimea, Island of Hawaii, where he also possesses a large herd of cattle. The *Ahupuaa* of Waikoloa adjoins, for many miles, the lands upon which run the herds of cattle, usually known as “the wild cattle of the King and Government.” The twenty-nine hides, the value of which is sued for in this action, were taken from unbranded animals, said to have been found and captured on the plaintiff’s land, and were in his possession, or in that of his servants, when taken away by the defendant’s agents.

*The defendant sets up a title to the hides in question, as agent for, and on behalf of, Mr. Robert C. Janion, who it is claimed, is the lessee of the lands of the King and Government, upon which the wild unbranded cattle run about **Maunakea**, and the grantee of the herds of cattle themselves, so that he stands not in the position of a mere wrong-doer. It is therefore necessary that the plaintiff should show something more, [page 368] to enable him to recover, than his bare possession. Accordingly he claims the general, or absolute, property in the hides, upon the following grounds, viz: first, that the animals*

having been captured upon his land, must be presumed, although unbranded, to have been his own cattle; secondly, that the wild unbranded cattle, on and about Maunakea, are animals *ferae naturae*,—not the property of any person, until he has taken them into possession, and may be lawfully captured by any person who finds them upon his own land; thirdly, that if the animals in question belonged to the herds called “the wild cattle of the King and Government,” plaintiff had the right, by custom, to capture them if found upon his own land, and to convert them to his own use.

As a matter of history, it is known to the Court that the first cattle placed upon these Islands were landed at Hawaii, in the years 1793 and 1794, by British navigator Captain Vancouver, by whom they were intended as a prospective boon to the inhabitants, and to those who should visit the Islands for purposes of trade or of refreshment. *King Kamehameha the First had, at that time, attained the ascendancy over the whole Island of Hawaii, and, at the suggestion of Vancouver, he proclaimed a strict taboo, or prohibition, against the killing of the cattle or their offspring, for a period of ten years, the cattle were numbered by thousands, and in course of time the herds over-ran a large part of the Island.*

It is in evidence before us, by the testimony of William Hughes and others, that, about the year 1826, when the late Chief Kuakini (John Adams) was Governor of Hawaii, he employed Hughes to catch and kill cattle out of the roaming herds, for the purpose of obtaining their hides and tallow, as a source of income for the Government, or rather for his late Majesty Kamehameha the Third, no Constitutional Government having been established at that time. The King subsequently engaged the late Joaquin Armas, with a small party of Californians, to prosecute the same business. Hughes estimates the number of cattle captured and killed by himself and his party at forty thousand. In the year 1841, the cattle were again placed under [page 369] *taboo*, all persons being publicly prohibited from capturing or killing them. Mr. J.P. Parker testifies that, up to that time he was the only person who had the privilege of shooting cattle on the mountain; while Mr. Haalelea, who lived with Governor Adams, mentions one or two others, who, he thinks, had a like privilege from the Governor. Dr. Judd testifies that, after the taboo of 1841, no person had the privilege of taking any of the cattle, except some foreigners who pursued the business of sawing timber in the forest, and who were permitted by the government to take cattle for food. The charge of the cattle on the mountain, after Hughes' time, was given to Mr. William Beckley, and after him to Mr. Isaac David, as son of the plaintiff, who acted as agent for the King and Government. In the year 1850, the following petition was presented to the King in Council, by the late James Young Kanehoa, viz:

Honolulu, Oahu, April 6, 1850.

His Majesty Kamehameha, in Privy Council:

Sire:—Your Majesty is most probably aware, that on the arrival of Captain Vancouver at these Island, he presented you illustrious Sire and my father some cattle, from which have propagated the numerous herd of wild cattle that now roam on the mountains of Hawaii. So long as these cattle were appropriated to your Majesty's private use, your petitioner appreciated that manner in which they were disposed of, but as they are now become a portion of public revenue, your petitioner most humbly begs that your majesty will be graciously pleased to order, that a portion of these cattle may be given men, my brother and sisters, as the heirs of John Young, the faithful companion of your Majesty's father, and as in duty bound your petitioner will ever pray. J.Y. Kanehoa.

On the 18th of April, 1850, the following resolution was passed, in Council, toughing the foregoing petition, viz:

Resolved, That one thousand of the wild cattle of Hawaii be and are hereby given to the heirs of John Young, Senior, for their portion of said cattle; and that the shepherd of those cattle is hereby authorized to select and deliver to or permit said heirs to take such cattle, whenever it shall please them so to do; Provided, however, that said heirs shall take said cattle within two years from this date, without their increase. [page 370]

On the 10th of June, 1850, the following resolution was passed by the King in Council, viz:

Resolved, That the arrangement hitherto existing between his Majesty and the Government, with regard to the cattle in Waimea, Hawaii, be herby confirmed so far as the joint ownership of said parties is concerned, and that in future the net proceeds of all said cattle be divided equally between his Majesty and the Government, and that neither party shall sell or remove any of them without the concurrence of the other party; said cattle furthermore to be left in charge of an agent to be chosen mutually by the King and the Minister of the Interior for the Government; Provided always, that it be understood the cattle running in the joint herd, but belonging to one or the other of the parties exclusively, be not affected by the resolution.

In a General Appropriation Bill of the year 1854-5, the Legislature made an appropriation of two thousand dollars, for the construction of a road from Waimea to Hilo, "to be paid out of the avails of wild cattle," to be sold for that purpose.

On the 8th day of April, 1857, the Minister of the Interior conveyed to Mr. Edward P. Adams, by an instrument in writing, "all and singular the wild cattle, to wit, bulls, oxen, cows and calves, unmarked and unbranded, now running on the Island of Hawaii, in the District of Hilo, Hamakua, and South Kohala, and on or near the mountains of **Maunakea** and **Maunaloa**," excepting so many of such cattle as had been previously sold to other parties, and then remained undelivered, "together with the privilege of pursuing, taking, driving and slaughtering the same, wherever they may be found upon lands belonging either to the King or the Government, without charge for pasturage while they pasture on the portions of the lands over which they have heretofore and now range, and with the right of entry upon the said lands, (the King's land of Puukapu excepted,) for and during the term of three years from and after the first of July next."

On the 24th of January 1858, the Minister of the Interior issued a public notification, which appeared in the Government Gazette, calling upon all parties who had purchased wild cattle of the King and Government, previous to the 1st of January, [page 371] 1857, to take and remove their cattle before the 1st day of May, 1858, and warning all other persons against taking any of the wild cattle.

*On the 16th of November, 1859, the Minister of the Interior acting on behalf of his Majesty, and of the Government, entered into a written agreement, under seal, by which he leased to Mr. Robert C. Janion, his representatives and assigns, "all that part of those lands belonging to his Majesty and to the Government, on the mountain of **Maunakea**, lying above the forest, on the Hilo side of the mountain and on the Waimea side of the mountain. above the lands of Paauhau and Waikoloa," (excepting certain lands specified in the instrument," "with the privilege of catching and killing the said wild unbranded cattle on any other lands belonging to His Majesty of to the Government in the Districts of Hilo,*

Hamakua and South Kohala (excepting his Majesty's land of Puukapu,) for and during the term of five years from and after the first day of August, A.D. 1859..." [page 372]

...The evidence is conclusive that the King and Government have continually asserted and maintained their exclusive ownership of these cattle, with the exception of that portion of them which was set part for the King in Council , the year 1850, as the private property of the heirs of John Young. The action of the Privy Council upon the petition of James Young Kanehoa shows clearly that at that time the Government did not regard the mountain [page375] cattle as animals *ferae naturae*, at the disposal of the captor, but as having always been the subject of property, not only in the King or Government, but in private individuals, the heirs of one of the original donees. And it is in evidence, by disinterested witnesses , that, up to within a few years back, when any of the mountain cattle happened to be penned with the cattle of private owners, during a general "drive in," they were treated as the property of the Government, and held at the disposal of its agents... [page 376]

Decision rendered March 28th, 1861 in favor of the R.C. Janion, lessee of the Government lands. [Hawaiian Reports, 1861:378]

II. Mauna Kea and the Neighboring ‘Āina Mauna (1790s-1890s): Traditional Customs, Practices, Resource Collection, and Land Use Described Before the Boundary Commission

In 1862, a Commission of Boundaries (the Boundary Commission) was established in the Kingdom of Hawai‘i to legally set the boundaries of *ahupua‘a* that had been awarded to *Ali‘i*, *Konohiki*, and foreigners during the *Māhele*. By the middle 1860s, land owners and their lessees were petitioning to have the boundaries of their respective lands—which were the foundation of ranching interests on Hawai‘i—settled. The mountain lands on the Island of Hawai‘i, including those completely surrounding Mauna Kea, made up the heart land of the largest ranch in the Hawaiian Kingdom. As a result, Commissioner G.M. Robertson began taking testimonies from native residents by 1865, for lands of the Waimea-Waikōloa region. Following Robertson’s death, brothers, Rufus and Fredrick Lyman continued the work and collection of detailed testimonies for the Third Judicial Circuit (Island of Hawai‘i). Those testimonies of *kama‘āina* (native) witnesses and resident foreigners, described the lands which rest upon Mauna Kea, and make up the *‘āina mauna*, across the Districts of Hilo, Hāmākua and South Kohala.

In 1874, the Commissioners of Boundaries were authorized to certify the boundaries for lands brought before them (W.D. Alexander in Thrum 1891:117-118). The primary informants for the boundary descriptions were old native residents of the areas being discussed, generally born between the 1780s to 1830s. The native witnesses usually spoke in Hawaiian, and their testimony was translated into English and transcribed as the proceedings occurred.

The narratives cited in this collection have been excerpted from the testimonies given by native residents, or those given by surveyors who recorded the boundaries based on the testimony of native guides. The testimonies include descriptions of the land, extending from ocean fisheries to plateau lands, and mountain peaks. They also describe a wide range of traditional practices, travel, land use, resource collection, and changes in the landscape witnessed during their life time. Of interest to cultural practices and beliefs, the witnesses observed that—numerous *kauhale* (residence-shelters) were made in the forest lands by bird catchers and canoe makers; trails were known across the mountain, extending from the shore, through the forests, and around the mountain; cave shelters and water sources were known; *heiau* and places of worship existed; knowledge of the boundaries of *ahupua‘a* were known in order to protect resources and gathering rights; and many burial sites were used on the mountain slopes, particularly from the forest to upper mountain region.

Readers will note that there are significant inconsistencies in spelling of various words, including place- and people-names, and features on the landscape. This is problematic, but with the help of maps produced as a part of the surveys to establish boundaries, and other period maps, many of the locations described can be identified. Unfortunately, not all of the maps associated with the Commission proceedings could be located in public collections. There are several maps which contain place names, and site and feature references made in the testimonies and decisions cited below. Among the maps are — Register Map No. 522 (J. Lydgate, 1874), Register Map No. 528 (S.C. Wiltse, 1869), Register Map No. 667 (D.H. Hitchcock, 1875), Register Map 668 (S. C. Wiltse, 1862); Register Map No. 1080 (C. Lyons, 1885) Register Map No. 1641 (C. Lyons, 1891); Register Map No. 1718 (Baldwin, 1891); and Hawaii Territorial Survey Maps No. 613 and Plat 5.0-HH.

We have also observed that in some testimonies, when the original translator-transcriber used two of the same vowels, it indicated that he heard a lengthened pronunciation of a particular vowel. This emphasis of pronunciation is now indicated by a macron mark—for example, the word “*neenee*” (for *nēnē*), the native goose hunted in the mountain lands of Humu‘ula and Ka‘ohe; and the place name, “*Kaluakaako‘i*” (for *Kaluakāko‘i*), where adzes were made on Mauna Kea. While in the modern context of the language, two of the same vowels are generally both pronounced, and broken by an ‘*okina* or glottal mark. In the case of the two examples above, we know that the words are not “*ne‘ene‘e*” for the goose, or “*Kaluaka‘ako‘i*” for the adze quarry.

In the following section of this study, testimonies and proceedings from selected lands which make up the *‘āina mauna*, including the summit of Mauna Kea are given verbatim. We have used bold and italics print to highlight references to place names, features, and practices, to draw readers attention to these important parts of the narratives. Among the practices, sites and locations described on Mauna Kea and the neighboring *‘āina mauna*—those lands surrounding Mauna Kea—described in the testimonies below are:

- *Ahupua‘a* boundaries pointed out so as to prevent trespass into other lands, while gathering resources. If caught taking resources from *ahupua‘a* other than your own, the items would be taken away.

Ahupua‘a tenant rights to collect birds were enforced. Forest birds such as native honeycreepers (the *‘ō‘ō*) were caught; *ua‘u* (*uwa‘u*) and *nēnē* were hunted.

- Bullock (Cattle) hunting was undertaken on mountain lands, for the *ali‘i*, *konohiki* and lessees of lands.
- Burial sites situated at Pu‘uokuka‘iau, Pu‘uokihe, Keahuonaiwi, ‘Iolehaehae, and other unspecified areas.
- Cattle documented as killing forest; the woods do not extend as far *mauka* as they did prior to the 1850s.
- Cave of Poli‘ahu where Lilinoe (Lilinoi) used to live.
- Dense forests described in reference to boundaries between Humu‘ula and smaller *ahupua‘a* towards the *makai* region.
- *Heiau*, altars and places where prayers offered mentioned at Ahuapo‘opua‘a, Huikaula, Ka‘akōlea, Koikapue, Mākanaka and Pu‘u Kole.
- *Kauhale* (formal residences), and cave shelters identified in forest and mountain lands.
- *Koa* trees were harvested for canoe making; and trails for hauling canoes *makai* existed. *Koa* trees also used to mark boundaries by surveyors.
- Koikapue, named as a stream gulch where *mele* (chants) were offered.
- Kaluakāko‘i – stone was collected for adze making, through the childhood of witnesses born in the 1780s-1790s.
- *Mamani* (*māmane*) forests described in reference to boundaries of Humu‘ula and Ka‘ohe.
- *Pili* lands described in reference to boundaries of Humu‘ula and Ka‘ohe.
- Poli‘ahu, a known location at the summit of Mauna Kea.
- Pu‘u o Kūkahau‘ula known as the highest peak of Mauna Kea.
- Sandalwood and *pulu* collected on the mountain lands.
- The *ua‘u* population was “destroyed by wild cats” (by the 1840s).

- Trails and roads described in testimonies, as extending from the shore to the mountain zone; used to travel between districts, and for practices such as collection of stone for adze making, bird catching, bullock hunting, and collection of other resources.
- Waiau known as a pond atop Mauna Kea.

Ahupua‘a in the District of Hilo

Hilo May 1st 1873

R.A. Lyman; to J.O. Dominis, Agt. of Crown Lands

(Regarding hearings for Crown Lands before Boundary Commission):

I have set the 2d of next June for the hearing of testimony for the settlement of the boundaries of Punahoa, ***Makahanaloa*** & Pepekeo in Hilo, Keaau & Keahialaka in Puna, Honuapo & Pakaniiki in Kau. I will have the hearing at Hilo. The Crown Com. are interested in the lands of ***Piihonua & Humuula*** joining ***Makahanaloa*** & Pepekeo, Ponohawai [Ponahawai] joining Punahoa 1st; ***Waiakea*** & Olaa joining Keaau in Puna.

Please to authorize some one to appear at the hearing and look after your interests. The Est. of M. Kekuanaoa are interested in Pakininui joining Pakini ike.

I can then settle Pakininui at any time from Kahuku boundaries & Royal Patents... [HSA – ID Lands]

Humuula Ahupuaa

The earliest detailed map of Humu‘ula was produced in 1862, and recorded as Register Map No. 668 (*Figure 31*). At the time of its survey by S.C. Wiltse, Humu‘ula reportedly included a portion of the summit of Mauna Kea—taking in Kaluakakoi (Keanakāko‘i) and Pond Poliahu (Lake Waiau). By the time the Commissioners of Boundaries were authorized to certify the boundaries for lands brought before them in 1874, disputes over the boundary of Humu‘ula and Ka‘ohe had arisen, by the time of settlement in 1891, the boundary of Humu‘ula was taken down to around the 9,000 foot elevation, with Ka‘ohe taking in the entire summit region.

Humuula Ahupuaa

District of Hilo, Island of Hawaii

Boundary Commission, Hawaii, Volume A No. 1:238-240

Honolulu, July 7, 1873

R.A. Lyman, Esquire, Hilo

...Mr. F.H. Harris is authorized by the commissioners of Crown lands to make application to you as commissioner of Boundaries to have the boundaries of all Crown lands on the Island of Hawaii defined. He has a list of the lands with him.

I have also authorized Mr. F.H. Harris to make application to you for the settlement of boundaries of all lands belonging to Estate of His late Majesty and Her Excellency, R. Keelikolani.

I expect to be in Kona by the trip of the “Kilauea” which leaves here on the 28th instant. Can’t you make it convenient to come round as the steamer goes to Hilo on that trip.

I wish also to apply for the settlement of the boundaries of Honohina.

I remain, Yours respectfully
Jno. O. Dominis

Honorable R.A. Lyman, Boundary Commissioner for Island of Hawaii, Hawaiian Islands:
The undersigned would herewith make application for the settlement of the boundaries of the following named *Ahupuaa* or lands belonging to the Crown, viz.:

Waiakea in the District of Hilo bounded by Keaau, Olaa, Kapapala, Humuula, Piihonua.

Piihonua in the District of Hilo, bounded by Punahoa, Waiakea, Humuula and Puueo, Paukaa & Alae and other lands names not known.

Ponahawai in the District of Hilo bounded by Punahoa, Kukuau & other small lands.

Hakalauike in the District of Hilo, adjoining lands unknown [Volume A No. 1 page 238].

Humuula in the District of Hilo bounded by Kapapala, various lands in Kona and Kohala and Hamakua, and Hakalau, **Makahanaloa**, Papaikou, Paukaa, Piihonua and Waiakea in the District of Hilo.

Lalakea in the District of Hamakua, adjoining lands unknown.

Kalopa in the District of Hamakua, adjoining lands unknown.

Honokaia in the District of Hamakua, adjoining lands unknown.

Kaohia in the District of Hamakua, adjoining lands unknown.

Waimanu in the District of Hamakua, adjoining lands unknown.

Pohakumauluulu, *lli* of Waipio in the District of Hamakua, adjoining lands unknown.

Muliwai, *lli* of Waipio in the District of Hamakua.

Pololu in the District of Kohala adjoining lands unknown.

Aamakao in the District of Kohala adjoining lands unknown.

Iole in the District of Kohala adjoining lands unknown.

Kaauhuhu in the District of Kohala adjoining lands unknown.

Waimea in the District of Kohala adjoining lands unknown.

Puukapu in the District of Kohala adjoining lands unknown.

Kawaihae in the District of Kohala adjoining lands unknown.

Puuwaawaa in the District of Kona bounded by Puuanahulu, Government, Kaupulehu Estate Kamehameha V.

Haleohiu in the District of Kona bounded by Government lands & Kaupulehu, Estate Kamehameha V.

Honomalino in the District of Kona bounded by Omokaa & Okoe, Government & by Kahuku, G.W. C. Jones & Co.

Puaa in the District of Kona adjoining lands unknown.

Onouli in the District of Kona adjoining lands unknown [Volume A No. 1 page 239].

Manoloa, District of Hilo.

Hiaananaloli [Hianaloli] II in the District of Kona bounded by Hiananaloli, Government & Hiaananaloli, R. Keliikolani.

Waiohinu in the District of Kau, bounded by Keaau, Government, Kahilipalinui and Kahuku, G.W.C. Jones & Co.

Kapapala in the District of Kau bounded by Kahuku, G.W.C. Jones, Keauhou, Estate Kamehameha V, Waiakea, Hilo & other lands unknown.

Olaa in the District of Puna, bounded by Keaau, Wm. C. Lunalilo, His Majesty, Waiakea & Kapapala.

Apua in the District of Puna. Bounded by various lands in Puna.

Waiakolea, *lli* of Kalapana, District of Puna adjoining lands unknown.

Kaimu in the District of Puna adjoining lands unknown.

Gehena [Kehena] in the District of Puna adjoining lands unknown.

Your Honor will therefore please appoint a day for the hearing the evidence in the foregoing named lands and having decided upon the same to grant a certificate to that effect to the undersigned.

(Signed) Jno. O. Dominis, Crown Land Agent,
by F.H. Harris, attorney at law,
Hilo Hawaii, August 16th A.D. 1873

Humuula Ahupuaa
District of Hilo, Island of Hawaii
Boundary Commission, Hawaii, Volume B:28-59

The Ahupuaa of **Humuula**, District of Hilo, Island of Hawaii, 3d Judicial Circuit

On this, the 3d day of November A.D. 1873 by adjournment from the 30th October, the Commission of Boundaries for the Island of Hawaii, 3d Judicial Circuit met at the Court House in Hilo, on the application of J.O. Dominis, Agent of Crown Lands for the settlement of the boundaries of **Humuula**, situated in the District of Hilo, Island of Hawaii.

Notice personally served on owners or Agents of adjoining lands, as far as known. Also served by publication in the Hawaiian Gazette of [left blank] and *Kuokoa* of [left blank].

Present, E.G. Hitchcock for applicant, for Mrs. L.K. Dominis, Her Excellency, R. Keelikolani, the Estate of Kamehameha V, C.R. Bishop and self, D. Kamai for Hawaiian Government Lands in Hilo, and D. Alapai.

For Petition see Folio 238, Book A.

Testimony

J.A. Simmons^K, Sworn:

I have lived on Hawaii for forty two years and in Hilo District about half of that time. I shot wild cattle on **Humuula** for eight years. This was soon after I came into the Country, but I have been there since. *I used to live with Ned Gurney at Lahohino [Lahohinu], a place above the woods on Humuula. He had lived there a great many years, and was kamaaina of the place. He and others pointed out to me the boundaries between Humuula and the lands of Maulua, Hakalau, Makahanaloa and Piihonua.*

Makaulaula^K and Opukeike^K, old bird catchers of Piihonua, also pointed out the boundaries to me, when I lived at Pahukea, saw mills on Piihonua.

Humuula is bounded on the east side by **Kahoahuna**, the boundary is at the bottom of **Kawalii** gulch, where water sometimes runs; thence up the gulch, through the woods. **Kahoahuna** only extends a short distance and I do not know the names of the lands above **Kahoahuna** (Mrs. Halelea's). [Volume B page 28]

The boundary as pointed out to me above the woods runs towards Hilo. The mamani &c being on Humuula until you come to Maulua. I do not know what lands bound it before you come to the land of Maulua. The boundary between Humuula and Maulua (as pointed out to me) is at the edge of the woods makai of the mamani; the boundary of Maulua on the Hamakua side is at a gulch called Kaiaike; thence along the edge of the woods crossing two or three awaawa to an awaawa at the junction of Maulua and Piha. I can go and point this place out, but I do not remember the name. Thence along the edge of the woods across the head of Piha to Naohe [Nauhi] gulch, at the junction of Hakalau, with Humuula and Piha (This is what I have always been told); thence along the head of Hakalau to Palauolelo gulch, the boundary runs to a pile of stones, on the Hilo side of the gulch, and about two hundred yards above the edge of the woods; thence along the head of Makahanaloa to Nukupahu gulch, the boundary running on the makai side of the

mamani; thence (I was told) the boundary runs along the *mauka* edge of the woods along the land of **Piihonua**. There may be other lands between **Makahalanaloa** and **Piihonua** for I do not know how far **Piihonua** bounds **Humuula**, but I do know that *the boundary of Humuula runs along the mauka edge of the woods*. I do not know as **Waiakea** bounds it. I have heard that the land reaches to **Kapapala**, but I do not know it to where. Have heard it reaches to **Pohakuhanalei**, a big stone near the top of **Mauna Loa**, on the slope toward **Mauna Kea**.

Humuula is cut off on the Kona side by **Kaohe** of Hamakua; have never heard that it joins Kaalaala of Kau. **Kaohe** bounds it on **Mauna Kea** and I do not know the boundaries of **Mauna Loa**.

On **Mauna Kea**, **Humuula** (was pointed out to me) as extending up the mountain as far as the *mamani* grows. I do not know the names of the points on this boundary, but I could point them out if I went there. It comes over towards Hamakua to **Iolehaehae**; thence to **Kaula** gulch, where it enters the *mauka* edge of the forest. I do not know the boundaries through the [Volume B page 29] woods. The land of **Kaala** bounds **Humuula** just above the woods. The boundary at the Government road *makai* is at a small gulch on the Hamakua side of **Kawalii** gulch. I do not know the names of the gulch or lands that bounds it there.

CX'd.

The boundary (as pointed out to me) after it runs through the woods, did not run *makai* into the woods again, but took the *mamani* above the woods. The lands *makai* run through the woods to *mamani*, there may be a tree or two of *mamani* in woods. *A great deal of the forest has been killed out by the cattle barking the trees and destroying the underbrush. Therefore the woods do not extend so far mauka as they did twenty years ago.*

Know the place called **Puuoo**, a big hill on the plains of **Humuula** is now called by that name, but the original **Puuoo** is a hill covered with *ohia*, and was told it was on the land of **Waiakea**. It is *makai* of the hill on **Humuula**, and I am certain it is not on that land. I now live at **Laupahoehoe**.

Nainoa ^K. **Sworn:**

I am a kamaaina of Hamakua, at the time of Aipala, know a part of the boundaries of Humuula, as they were pointed out to me by people who are now dead. Li. Kauwila (his father) and Pali, who were kamaainas of Humuula showed me the boundaries, and told me not to go to certain places.

The boundary at shore is at **Kawalii** gulch and is bounded by **Kahoahuna**, thence *mauka* along the gulch to **Waipunalei**, do not know where **Kahoahuna** ends. Thence along **Waipunalei** to **Kihalei**, **Puu Mamake**, a point in the woods on **Kawalii** gulch; thence along **Maulua** to a place called **Kaiaike**, a *kauhale* on **Humuula**, at the *mauka* edge of the woods. *The mamani is on Humuula and the woods are on Maulua.*

At **Kihalei** the boundary leaves the **Kawalii** gulch, and runs to the Hilo side of it along the land of **Maulua**, leaving [Volume B page 30] the gulch on **Humuula**. From **Kaiaike** the boundary runs towards Hilo to **Heenui** a place where we used to catch birds, and the junction of **Piha** with **Maulua** and **Humuula**. Thence along **Piha** to (**Naohe** [**Nauhi**]) **Pohohona**, and *awaawa*, at the edge of the woods, *makai* of the *kauhale* of **Naohe**. Thence along the *mauka* edge of the woods to **Kaloaloo**, the junction of **Hakalau** with **Humuula**. (The old people did not know what lands were between **Piha** and **Hakalau**). **Kaloaloo** is a *kauhale*, and pond of water. Thence along **Hakalau**; *makai* of the *mamani*,

to **Palauolelo** a *kauhale* above the woods, on **Humuula**. Thence (I have heard) **Papaikou** joins **Humuula** and **Hakalau**; thence crossing the head of **Papaikou** to the *kahawai* **Kapuakala** which I have heard is a branch of the **Wailuku** gulch. The boundary runs to **Waipahoehoe** gulch, above the woods, the *mamani* being on **Humuula**. Thence to **Laumaia** along **Piihonua**; thence to **Aama**; thence to **Waikē** gulch. Thence to **Puuoo**, a hill above the woods, the boundary on the *makai* side. There are small trees on the hill and there is a pond of water called **Kaelewa** [**Kaelewai**] this side of it, above the woods, and towards **Mauna Loa** of **Puuoo**, it belongs to **Humuula**. **Humuula** and **Piihonua** people used to go after water there.

This is as far as I know the boundaries and as far as I went with the *kamaaina*. They told me that **Humuula** was bounded by Kapapala of Kau, Keauhou of Kona, and **Kaohe** of Hamakua. I have never heard that Kaalaala of Kau or **Waiakea** of Hilo joined **Humuula**. The old trail from **Humuula** towards **Piihonua** used to run along the *mauka* edge of the woods, near the boundary, not in the woods.

*The **Humuula** and **Piihonua** people used to go after water at **Kaelewa**.*

Humuula is bounded by the sea to **Keahuonaa**, bounded by the land of **Kuohaoha** on the Hamakua side; the boundary running in the center of **Poololo** gulch. I do not know the boundaries through to the outside of the woods. Know it is bounded by **Kaala** at **Lahohinu**. The boundary above the woods is at **Kaula** gulch, said gulch runs *makai* but there are several lands between it [Volume B page 31] and **Humuula**, *makai* of the woods.

Lahohinu is on **Humuula** near **Kaula** gulch. Thence *mauka* to **Ahupoopuua** (an *ahua puu*), along **Kaala**; at this point **Kaohe** joins **Humuula** and cuts **Kaala** off. This is as far as I know the boundaries.

CX'd – Do not know what lands bound **Humuula** in woods on Hamakua side. I went after birds on **Humuula** for seven years and have often been there since. The line of the woods is in the same place now as in olden times. I have always heard that **Maulua** and other lands run through the woods to the *makai* side of the *mamani*. When I went after birds on **Humuula** Li told me not to catch the birds in *koa* and *mamani*, as they belong to the *makai* lands, and would be taken away by the people of those lands if I caught them.

J. Parker^K. Sworn:

I have lived on Hawaii nearly fifty years, *used to live on the mountain, and shoot bullock for Kamehameha III at the time that natives were gathering sandal wood*. I have been on **Humuula** after bullock and have heard the natives talking about the boundaries; they said that wherever the *mamani* grew, above the woods was **Humuula**, and the land below the *mamani* belonged to the *makai* lands. *I have heard this from men who were old and gray headed then. In those days the *mamani* did not reach near to the *koa*, there used to be plains between, and I always understood that the tall forests belonged to the *makai* lands and the *pili* and *mamani* to **Humuula**.* Hemahema's father (now dead) and **Paakai**, who was killed in a pit on the mountain were two of the ones that told me the above. I have always heard that **Humuula** commences at shore and runs up *mauka*, through the woods but I never heard that it runs back into the woods again. Have been up **Maulua** road and always understood that **Maulua** did not run through the woods, but I do not know whether **Piha** on **Humuula** cuts it off.

CX'd. [Volume B page 32]

Kahue^K. Sworn:

I was born at **Humuula**, am seventy three years of age, and a *kamaaina* of the land and know its boundaries. Kalaimaka, Mohaiku, Eekamoku (all dead) were *kamaaina* of **Humuula** and pointed out the boundaries to me. **Kahoahuna** bounds **Humuula** on the East side, the boundary beginning at the seashore in **Kawalii** gulch, thence *mauka*, along the center of the gulch to **Mauiana gulch**. At the *mauka* corner of **Kahoahuna** (said gulch is a branch of the **Kawalii** and enters it at this place.) Thence along the lands of **Auliilii** 2nd and **Auliilii** 1st across to **Waiopae** gulch (another branch of the **Kawalii**), the boundary running towards Hilo.

Kahoahuna runs into the woods, but *where the oo [native honey creepers] are, is Humuula*. From **Waioape** the boundary runs in the woods to **Waipahoehoe gulch**, where **Waipunalei** joins **Humuula**. *Waioape is a large pool of water in the gulch.* **Waipahoehoe** gulch runs clear through the woods and Waipunalei bounds **Humuula** to **Piha-helei** about three miles below the *mauka* edge of the woods. Thence towards Hilo, to the land of **Laupahoehoe** at **Puukole**, a *kuahu manu [altar or ceremonial site for bird catchers] and kauhale [house or shelter], this place is away in the woods as far makai as Pihahelei, it is on Laupahoehoe*. Thence to **Puukoa**, a hill covered with *koa*, on **Kaiwilaihilaihi** and **Kapehu** and at the junction of Kaiwilaihilaihi and **Humuula**. The boundary here runs *mauka*, and I think this point is a mile or more below the *mauka* edge of the woods. Thence along **Kapehu** to **Puulehu** a *kauhale* on **Maulua**, a mile or more from the edge of the woods. Thence along **Maulua** towards Hilo, to **Kawelu**, said place is near **Heenui**, and there is a *mamani* grove a short distance off. This place **Kawelu** is about a mile *makai* of the *mauka* edge of the forest. (**Kaiaiki** is *mauka* of **Puulehu**) Thence along the land of **Piha**. **Kaluaalu** *mauka* of the woods on **Humuula**, and **Kumukawau**, on **Piha**; directly *makai*, and about a mile below the edge of the forest. Thence along the land of **Piha** to **Kaumuhapu** [**Kaumuhapuu**], this place is directly *makai* of **Naohe** [**Nauhī**]. [Volume B page 33] This place is a *kualapa* [ridge], and is where the people of **Naohe** used to go after *hapu* [**hapuu**]. Thence **Hakalau** joins **Humuula** at **Naohe** gulch at the *mauka* end of **Umauma** gulch. **Kaumuhapu** is above this gulch. Thence along **Hakalau** to **Kupuna**, a water place directly *makai* of **Hopuwai**, outside of the woods. **Kupuna** is about a mile *makai* of the *mauka* edge of the woods. Thence to **Makewai**, a place where there is no water.

Na Waiahe is a *kauhale*, outside of the woods near **Hakalau** gulch. From **Makewai**, the boundary runs through the woods to **Kapahee**, *he mau wai koloa* [where there are several duck ponds]. **Kaloaloe** is a *kualapa* above the woods. Kapahee is about a mile below the edge of the woods. Thence along **Hakalau** to a large water place called **Kapohopaele**, *makai* of **Palauolelo**, which is above the woods; thence along **Makahanaloe** to **Waikaloe**, a large pond of water on **Papaikou**. The point above this place is **Kaaimana**, a *kauhale* on **Humuula**. Waikaloe is about a mile *makai* of the *mauka* edge of the forest. Thence to **Kumukawau**, a *kauhale* on **Papaikou**. It is *makai* of **Kapuakala**; a *kauhale* on **Humuula**; and near the boundary of **Paukaa**. Thence to **Kalapapainiu**, a *kauhale* on **Kualapa** on **Paukaa** land and where **Piihonua** joins **Humuula**. There is no gulch here. **Kapuakala** is on the Hamakua side of this place, and the point of *koa* and *ohia* woods running out onto the plains; just *mauka* of these places is **Lai** [³³]. (I went there a short time since with you and Hitchcock and we placed a marked rock at this point called **Lai**).

Thence along the land of **Piihonua** to **Paakainui**, a *kauhale* on **Piihonua** in the woods and *makai* of **Waipahoehoe**, a cave in **Wailuku** gulch, above woods (it is a mile *makai* of the edge of the forest). Thence to **Kumunaio**, *makai* of **Laumaia**, the cave called **Kanuha**

³³ The place name **Lai** is written as Lae on most of the Register Maps, and in surveyor's communications.

is at **Laumaia**. The boundary runs parallel it with the *mauka* edge of the woods. **Kumunaio** is where the road runs out of the gulch that runs from the *mauka* edge of the forest. Thence to **Ohiakanio**, this place is directly *makai* of the *kahawai* [stream - gulch]; and cave of **Aama**, thence to **Nahuina**, the junction of the branches of the **Wailuku**. The boundary is a mile *makai* of this place. I think this place is a mile or more from the *mauka* edge of the forest, above the same [Volume B page 34] distance as the other places I have mentioned.

Puuoo is a hill *mauka* of **Nahuina** above the woods, thence to **Elekalua**, a *kauhale* in the woods, *makai* of **Kahiliku**, a *lae laau* [a section of forest that extends out from the surrounding forest on to an open area], outside of the woods. Thence to **Mawae**, a crack in the woods that runs from *makai*. I have heard that **Waiakea** joins **Humuula** here, but I do not know which side of the lava flow of 1854 or 1855 the lands join. Thence the boundary of **Humuula** runs to **Kawauwauwai** a *kauhale*; the boundary running to this point in scattering bush. The forest ends at **Elekalua**.

I have never seen the boundaries beyond **Kawauwauwai**. From thence (I have heard), it runs to **Puuoo**, a hill covered with trees *mauka* of **Hoaa**; thence to **Keanaokauakii**, a cave above the woods. Thence to **Puumanu**, a hill on the *aa* way above the woods (I have been there). Thence to **Pohakuloa**, an *ahu* [cairn] of stones, now called **Keahu o Kuakini**, as Kuakini built a new *ahu* there. **Kapapala** is said to cut **Humuula** off to **Pohakuhanalei**. Boundary runs near **Puuonioni** on **Humuula**; the boundary is a little beyond. **Wekahuna** [Uwēkahuna] is a hill on **Humuula**. **Waiakea** ends at Pohakuloa, and from there **Humuula** is bounded by Kapapala to Pohakuhanalei (I do not know whether Kapapala extends to Pohakuhanalei). From Pohakuhanalei to Koahe it is bounded by Kaalaala of Kau. I have been to Koahe after sandalwood, it is a point on the road running over **Mauna Loa**. Pohakuhanalei is a large rock high up on the side of **Mauna Loa** towards **Kalaieha**.

Koahe is on **Mauna Loa**, a *koa* there, **Kaohe** joins to **Puualala** a cave. Thence to **Puuulaula** a red hill on the side of **Mauna Loa** near its base. Thence along the land of **Kaohe** to **Omaokoili**, two hills. The boundary running between them. Thence to **Kaiwaiwa** a hill on **Humuula** near boundary, near the base of **Mauna Kea**. Thence to **Kahawai Koikapue**, a gulch where mele were sung. Thence up the mountain to **Waiau** (half of the water in the gulch belonging to **Kaohe** and half to **Humuula**). Thence to **Puuokukahauula**, the highest peak of **Mauna Kea**. Said hill is on **Humuula** and the boundary runs to the foot of said hill on the side towards Waimea. Thence to a large *ahu* called **Makanaka**, said *ahu* is [Volume B page 35] on **Humuula** and is higher than a man.

The boundary runs very near it. Thence to **Kamakahalau**, a hill on **Humuula**, from the top of which you can see **Waiakea**. Thence to **Puukaliiali**, a hill on **Humuula**, the boundary at the base. Thence *makai* to **Iolehaehae**, a hill on **Humuula**, boundary at the base. Thence down to **Ahuapoopuaa**, a *kuahu* [altar] and hill on **Humuula**, the boundary at the base. Thence down to **Kaiwiholiholi**, an *ahua pohaku* [stone mound] there. Thence to **Ahuamoa**, along the land of **Kaohe**. **Kaala** was surveyed by Lyons and cuts into **Humuula**, and takes in **Iolehaehae**, **Ahuapuaa** and **Ahuamoa**.

Humuula is bounded by **Kaala** to where **Kaula** gulch enters the woods. In olden times, **Kaohe** used to bound **Humuula** to Papaalepo.

Note on the side of the page records that:

The session adjourned, and Kahue was too ill to appear at the next session. Kimo Waiki

was deposited, and then Kahue returned to finish his testimony following Waiki's testimony.

Commencing at **Ahuamoa**, the boundary runs *makai* to **Keanalepo** a *puu mamake* [hill of *pipturus* growth] in the woods, in **Kaula** gulch, along the land of **Kaohe**. Thence along the land of Manawaileinui, along the gulch to Kalauonaki, the *mauka* corner of Ookala. There the boundary leaves the gulch and turns towards Hilo, along the head of the land of Ookala to Paiopu which is the junction of Kaohaoha with **Humuula**. Thence the boundary runs to Nihoamoa where Ulukanu joins **Humuula**. Ookala bounds **Humuula** first and then comes Kaohaoha, other lands do not reach the boundary of **Humuula**. Ookala bounds **Humuula** from Kalauonaki to Paiopu, a banana grove, and Kaohaoha bounds **Humuula** from here to shore. From Paiopu the boundary runs to Pukoleamahuna *kauhale*, thence to Kanekiki, an *awaawa* [gulch] where the *kahawai* commences. Thence to Kailama *kahawai* and *mahina Aina* [cultivated fields]. The same *kahawai* [stream] as at Kanekiki. Thence down the gulch to shore. The sea bounds **Humuula** on the *makai* side. The mouth of the gulch is called **Kukuiuea**. **Kapuna** is an *ili Aina* [land parcel] of **Humuula**. Pauahi is below Kanekiki.

CX'd.

I went with Wiltse one time when he surveyed the land of **Humuula** [Register Map 668]. Kimo Waiki and Naaikauna *oopa* and others went also. We went from **Humuula** to **Hapuuai** [**Hopuwai**]. Slept, went outside of the woods and then [Volume B page 36] to **Kaelewa** above the woods and slept there, then to **Kaleieha**. The chain was not used. Wiltse asked us where the places were and we pointed them out but he did not go to the boundaries or have flags set on them. He sighted with compass and asked where lands joined **Humuula**, and we told him. Flags were not set up at any of the places I have mentioned on the boundary of **Humuula** in the woods. We could not see the points of the boundary from above the woods so as to distinguish them as being in the right places. We told him that the boundary was in the woods and not at the *pili* [place where *pili* grasses grew]. At that time, I was not working for Waimea people. I afterwards went as witness on Waikoloa. The boundaries I have testified to are the ones my *Kupuna* told me. *The Waimea Grazing Co. rents Humuula.*

Know the hill called **Kole**, it is on **Humuula**.

Puuulaula is higher on the mountain, on the boundary of **Kaohe** and **Humuula**.
Puuokalau is way in **Humuula**.

Lanikapue is a *kahawai* on **Humuula** near the boundary.

Kaluakaakoi is on **Humuula**.

The boundary of Kaohe is on Waiau.

Poliahu is this side of the mountain on **Humuula**, near the boundary.

I have never heard that **Nanue** bounds **Humuula**.

Have heard that **Kapuakala** gulch runs into the Honolii, and not into Kapue, it is on the Hamakua side of the place pointed out to Hitchcock Brothers as **Lai**. Not the first, but the second *awaawa*, on the Hamakua side.

I do not know the places called Punaluu (on **Mauna Loa**), Kaamaumauloa, Puuulaula and **Puukulua**, **Puunioni** and **Wekahuna**.

I have not seen, but have heard that they are on the boundaries. **Humuula** does not reach to Kulani.

Puiki is by the boundary of **Humuula** and **Waiakea**. I have not seen **Waipahoehoe** at junction of **Waiakea** and **Piihonua**.

I have heard that **Mawae Kapahee** is the junction of **Makahanaloa** and **Hakalau**. Thence to between **Pohopaele** and **Palauolelo mauka** there **Papaikou** commences and bounds it to **Waikoloa**, and **Kaaimana**, outside then to **Kumukawau** and **Puakala** outside. [Volume B page 37] Thence to Paukaa to Kalapapainiu. **Lai** outside **Hakalau** bounds **Humuula** from Kapahee; **Kaloloa mauka** of the woods on **Humuula** to **Makewai** in the woods and **Na Waiāhehu** outside on **Humuula**. **Nukupahu** is on **Kapuakala** gulch, it is a cave and **kahawai**. Papaaloa joins **Humuula**, also **Kapehu** and **Kaiwilaihila**.

Adjourned to November 1873

Hilo, November 4 1873 Commission met according to adjournment, Kahue not appearing, and being told he was unable to appear, sent to see and proceeded to examine. See note Folio 36 of this book.

Waiki^K Sworn:

I live at **Humuula**, was born there after the battle of Kekuakalani [1819], and know the boundaries of the land. My parents told them to me. Eekamoku was my father and Koapunini my grandfather, they were bird catchers and canoe makers. Kalaimaka, father of my wife pointed out the boundaries and told them to me.

He Ahupuaa [pig altar - *ahupua'a* boundary marker] is the boundary at seashore, bounded by **Kahoahuna**; a pile of stones on the Hamakua side of the stream in **Kawalii** gulch, is the boundary. Thence *mauka* along the stream, passing Kahanapehau grove and Piinau, breadfruit on **Kahoahuna**. Thence up the *kahawai* to Waiolomea, a pool of water in the gulch. Thence to **Lapalapa** where a gulch of **Humuula** comes in from that land. **Lapalapa** is on **Humuula** by the boundary of **Kahoahuna**. Thence to Kaleina a large waterfall (*Pailihi*). Thence up the gulch to Alanaio, thence to Kapualei, in the gulch in the woods. Thence to **Mauiana**, the *mauka* corner of **Kahoahuna**. Thence along **Aulii** 2nd and **Aulii** 1st, and leaving *kahawai* at **Mauiana** and going up on the Hilo side of the gulch. At Alanaio, the boundary leaves **Kawalii** and runs up a branch gulch to **Mauiana**, from **Mauiana** the boundary leaves the gulch and runs along **Aulii** 1st and **Aulii** 2nd to Kahuahookolo land at Lainakaonohi *kauhale*. Thence to **Waiopae**, a water hole in *Kahawai* of **Waikaloa**, a branch of **Kawalii**. Kahuahookolo bounds **Humuula** from **Lainakaonohi** to **Waiopae**, the corner of **Na Kapaa**. Thence along the land of **Kapaa**, following the gulch to **Olohe kahawai**, where the land of **Waipunalei** cuts Kapaa off and bounds **Humuula**. [Volume B page 38] Thence along **Waipunalei** running up the gulch to **Waipahoehoe kauhale manu** [a bird catcher's house]. Thence up the *kahawai* and *awaawa* to **Pihahalei**, a *kauhale manu* on **Waipunalei**. Here **Waipunalei** ends and the land of **Laupahoehoe** bounds **Humuula**. Thence along **Laupahoehoe** to **Puukole** a *kauhale manu makai* of **Palipali**.

Puukole is on **Laupahoehoe** 2nd near the *mauka* edge of the woods. Thence along **Laupahoehoe** 1st to **Puukole** a place where there used to be a *kauhale manu* of **Laupahoehoe** 1st, about one half mile below the *mauka* edge of the woods. **Pihahalei** is about the same distance. **Maulua** land joins **Laupahoehoe** and **Humuula** at **Puukole**. (I should have said Papaaloa land joins here at this place.) Thence along **Papaaloa** to **Puulehu**, a *kauhale* at the junction of **Maulua** with **Humuula**. No other lands join

Humuula between **Papaaloo** and **Maulua**, to my knowledge. **Puulehu** is about the same distance from the edge of the woods as **Puukole**. From **Puulehu**, the boundary between **Humuula** and **Maulua** runs to **Uhakunou**, *makai* of **Heenui** on **Humuula** about the same distance in the woods as **Puulehu**.

Thence along the land of **Piha** to **Kawau**, *kauhale manu* on **Piha** *makai* of **Kalapaohelo**. Thence along **Piha** to **Kaluaalu**, *makai* of **Nahuaapaakai** on **Humuula**. **Kaluaalu** is a cave in the *kahawai*. The boundary runs close to the cave and near to the edge of the woods, about as far from the edge of the woods as from here to the sea shore. **Piha** ends here and **Nanue** joins **Humuula** here. Thence along the land of Nanue to **Hopuwai** gulch. The gulch *makai* of the woods is called **Naohe** [**Nauhi**]. The tall trees are on Nanue, and the trees growing in the *pili* are on **Humuula**. Thence along Nanue to **Kapunawai**, a swampy place where there is always water. **Kupuna** is the name of the place *mauka* of the woods. *Mauka* of this place, at **Kapunawai**, the land of **Hakalau** joins **Humuula**. Thence along **Hakalau** to **Puwai**, a pond of water. A point of woods [Volume B page 39] extends *mauka* into **Humuula**. Place on **Humuula** *mauka* of the woods is called **Na Waiaheu**. Thence along **Hakalau** to **Kanepu**, and **Palauolelo** *mauka* of woods. Kanepu is a *kauhale* by **Palauolelo** gulch.

The boundary runs along here, leaving the *pili* with points of woods extending *mauka* on **Humuula**, and the dense forest on lands *makai*. **Makahanaloo** joins **Humuula** at **Palauolelo** gulch. Was told that **Palauolelo** is the *mauka* end of **Waiaama** gulch, or Kanepu in the woods. Thence along the land **Makahanaloo** to **Puakala** a *kauhale* by gulch of same name. Have heard it is the *mauka* end of **Kapue** gulch.

Pohopaele in the woods is on **Makahanaloo**. The forest is on *makai* land and the *pili* on **Humuula**. Kanepu is on **Makahanaloo**. Tall forest on *makai* lands. The boundary runs on the edge of the woods. Thence along **Papaikou** to **Nukupahu**. **Lai** [point of Koa on **Humuula**. **Paapalepo** *kauhale* is on *makai* lands. There is a *Lae pili* [point of *pili* grass] running way into the woods and *Lae koa* [point of *koa*] running to **Kilohana**. **Papaikou** extends to **Nukupahu** gulch, there the land of **Paukaa** joins, and bounds **Humuula** to **Waipahoehoe** gulch. **Kilohana** is an *ahua* [mound, hillock] on **Humuula**, where Paukaa ends and **Piihonua** bounds **Humuula**. Thence along **Piihonua** to **Laumaia kahawai**, the boundary runs along the *mauka* edge of the forest. Thence along **Piihonua** to **Laumaia** and a cave on the gulch.

Thence to **Aama** gulch near **Hanamauloo** where Kuakini built a bullock pen. The forest is on **Piihonua** and the *pili* on **Humuula**. Thence to **Waikē**, a branch of the **Wailuku**. Thence to where the *aa* commences. Thence to **Kahiliku**, *makai* of **Puuoo**, near the woods, **Kahiliku** *kauhale manu* [a bird catcher's house is at **Kahiliku**]. Thence to **Kaelewa**, where there is now water. Thence to **Kawauwai** by the edge of the forest. Thence to **Kaieie**; **Waiakea** and **Piihonua** join **Humuula** between these two places. Thence along the edge of the forest to **Kalapaohelo**. I have been there with my parents, on old lava ground. Thence to **Pohakuloo**, a large rock where Kaehu Paki laid down on the side of the mountain towards Kau of Kalapaohelo. There I [Volume B page 40] staid with my *kupuna* and they said the boundary runs from here up the mountain to **Pohakuhanalei**, a rock on the slope of the mountain towards **Kaleieha**. **Waiakea** bounded it to **Pohakuloo**, but they did not tell me what lands bounded **Humuula** from there to **Pohakuhanalei**. We went to **Kaleieha** and to **Omaokoili**, they there pointed out a red hill called **Kole**, below **Pohakuhanalei**, and they said **Kaohe** bounded **Humuula** from **Pohakuhanalei** to this hill. Can see this hill from **Omaokoili**, hill near **Kaleieha**. They said the boundary runs from **Kole** to **Omaokoili**, the hill *makai* of the cart road to Waimea from **Kaleieha**. Thence to base of **Mauna Kea**, to **Puuokalau** a hill bounded by **Kaohe**.

Thence along **Kaohe** to **Lanikepue**, a pali. Thence to **Kaluakaakoi**, a cave where they used to get stone adzes out. Thence to **Poliahu**, a cave where Lilinoi [**Lilinoe**] used to live. Thence to **Kamakahalau**, a hill on the Hamakua side of the mountain. Thence down to **Iolehaehae**, a hill near the base of **Mauna Kea**. **Puupapa** and **Pukaliali** are on **Kaohe**. Thence to **Ahua Poopuaa** a hill with koa trees growing on it, the boundary runs to a pile of rocks on said hill, on the Hamakua side of the hill. Thence to **Puuloa** where the boundary enters the woods. **Puuloa** is a hill in the woods which can be seen a short distance below the mauka edge of the woods. Thence to **Keanalepo**. **Kaula** gulch and **Kaala** bounds **Humuula** from **Puuloa** to **Kahaleloulou**, where natives used to live, in Palm trees. There, Kaiwiki bounds **Humuula** to Keanalepo, there the boundary runs *makai* in **Kaula** gulch, along Kaiwiki to Okolehi. There Manawaileinui joins **Humuula**, and bounds it to **Puupilau** on **Kaula** gulch *Kauhale kalaiwaa* [canoe maker's house]. Thence *makai* along **Kaula** gulch to Kaleiike, *kauhale manu*. Thence along the gulch to **Oina**, where **Humuula** boundary leaves the gulch and runs onto Hilo side of the gulch at a large banana grove. There, the land of Ookala bounds **Humuula**. Thence along Ookala *makai*, along the land towards the sea, to Kalauonaki, a pool of water in a gulch which is a branch of the [Volume B page 41] **Kaula** gulch. Thence across the gulch and along the land of Kaohaohanui to Palapu, passing Kaailama banana groves. Thence the boundary runs straight *makai* along Kaohaoha to Kainakiki, an *awaawa*, that as you go *makai* to Pauahi, becomes a gulch. There the boundary between Kaohaohanui and **Humuula** runs *makai* in the gulch to the sea shore.

Kapuna is the name of the mouth of the gulch. The sea bounds it on the *makai* side.

CX'd.

Kahoahunanui bounds **Humuula** from shore into the edge of the woods. **Kahoahunaiki** does not reach to **Humuula**. Na **Auliilii** reach into the edge of the woods to the boundary of **Humuula**. The lands of **Laupahoehoe** reach further *mauka* than Waipunalei. **Papaaloa** used to extend on to the mountain, but in the time of Kamehameha I the boundary was established at the points I have mentioned. **Papaaloa** joins **Maulua**.

CX'd.

I went with Wiltse and Blodgett [1863]. We commenced to survey from the seashore. I marked KIV. on a rock at He Ahu Puaa, the compass was set on the top of the *pali*. They surveyed up the Hamakua side of the land to Kamakahalau. Blodgett surveyed this line. I went through the woods, Naaikauna then went. I went on the Hilo boundary of the land and Naaikauna went there also. Aipala and Kahunanui (now dead) also went with Blodgett. Wiltse did not go this time.

At **Kalaieha**, went with them, sighted to **Poliahu**, **Pohakuhanalei**, and surveyed across the land. Thence went to **Hopuwai**. There chained to between Kumukawau and Kalualu. Thence to Uhakanou, marked in both places K. IV., thence to **Puulehu**. Thence along the edge of the woods to Pihalei, passing *mauka* of **Puukole** etc. At Pihalei, *mauka* corner of Waipunalei, we stopped surveying. *From Kalaieha we did not chain it, only pointed out places without going to them, and did not set up flags there. A flag was not set up at Pohakuloa. At Kaleieha hill we set up flags and the Haole surveyed these. The flags were set up a short distance ahead of the compass and sighted to. Flags not set up on top of hills [Volume B page 42] in woods.*

We pointed out boundaries at the edge of the forest on that day, to **Piha**. *The road in olden times, ran from Lahohinu to Laumaia, above the woods. No road from Humuula to Lai, along through the woods.* My Kupuna told me the birds on *mamani* and *pili* belonged to **Humuula**, and the birds in the forest to *makai* lands. I went with Henry and

F.S. Lyman when Henry surveyed the land of **Hakalau**. I told him **Makahalanaloa** was surveyed too far *mauka* and that the *pili* belonged to **Humuula**. They chained along the road above the woods. I and a *kamaaina* of **Hakalau**, pointing out the boundaries to them.

A flag was set up at the boundary between **Makahalanaloa** and **Hakalau**, and on the boundary between **Hakalau** and **Nanue**. My *kupuna* told me **Kapuakala** was at the *mauka* end of **Kapue** gulch and **Nukupahu** at *mauka* end of Honolii gulch. I have never followed them down to know.

I went with Wiltse, Naaikauna and Kahue to survey **Humuula**, we went around, above the woods and sighted to different places. The flags were set up close to the compass and not sent to the different points on the boundary. We pointed out the boundaries on the edge of the forest the same as before; and I did not hear Kahue tell Wiltse that the boundary was in the forest. Kahue did not say that we did not point out the right boundaries. I have testified today as the boundaries were told me by my *Kupuna*, and as he pointed them out to me without being influenced by anyone.

They told me **Kaohe** bounded **Humuula** from Pohakuhanalei down **Mauna Loa**, on the Kona side. I never heard my parents say that Kaalaala joined **Humuula**. *The pond of water called Waiau is on Kaohe and not on Humuula. My parents told me Humuula went to Kaluakaakoi and Poliahu. We used to go there after adzes for Humuula people.*

At close of Waiki's testimony Kahue appearing, he was again put on stand, see folio 36 & 37 & 38.

Commission adjourned until November 6th at 10 o'clock a.m. 1873 at the close of Kahue's examination, see folio 38.

R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit [Volume B page 43].

Hilo, November 6th 1873

Commission of Boundaries opened according to adjournment.

Present. E.G. Hitchcock, D. Kamai and S. Kipi for Estate of G.M. Robertson and D. Alapai.

Kapou^K. Sworn:

I was born at **Hakalau** and have always lived there. Have always heard that **Hakalau nui** extends through the woods, and is there cut off by **Humuula**. Have never been there. Kupuoli (now dead) told me. He was a bird catcher and *kamaaina* of **Hakalau**. My father came from another place.

I did not hear the names of places on the boundary of **Hakalau** and **Humuula**. Did not hear from anyone while he was living that **Humuula** cut **Hakalau** off in the woods, did not hear about other lands.

Kupuoli and Auau, his son (now living), went with Henry Lyman when he surveyed **Hakalau** and were his *kamaaina*.

CX'd.

Haniao^K. Sworn: (Pretty old man and quite deaf)

I was born on Na Kapaa, at the time of the building of Mailikini [Mailekini *Heiau*, ca. 1791], the *heiau* at Kawaihae. Have always lived in the district of Hilo. Used to go on to **Humuula**

after birds and know a part of the boundaries. My parents told me the boundaries. Kauhiahiwa, Pau & Kameai (all dead) were bird catchers and knew the Hamakua, Kona and Kau boundaries. **Humuula** commences at **Kawalii kahawai**, bounded by **Kahoahuna** at the stream in the gulch, at Kaahupuaa, **Kahoahuna**. I cannot give the boundaries in the woods, after two **Kahoahuna**. Papaaloa runs through the woods and joins **Humuula**. The *mamani* and *pili* are on **Humuula**, the woods on *makai* lands. One of the Pihās runs through the woods and **Laupahoehoe** lands at **Puukole**. Heard that **Maulua** did not run clear through the woods. In olden times **Hakalau** ran clear through the woods, to the *pili*, and the lands of **Makahalanaloa**, **Papaikou** and **Alakahi** [Volume B page 44] did the same. I always heard that the *pili* with trees growing on it was **Humuula** and the forest was *makai* land. I used to go there to catch birds. *The road from Humuula to Piihonua runs along on the pili, and not in the woods. The roads in the woods were only bird catchers roads.* Papaaloa joined **Humuula** at **Kaiaiki**. Kihalani ends in the woods and does not reach through the woods. **Kaiaiki** is an old *kauhale manu* at the edge of the *pili* and forest and *awaawa*. Papaaloa bounds **Humuula** to **Heenui**, *kauhale manu*. *If folks from the makai lands came after birds in the mamani, the Humuula people would take them from them, and if we went into the bush after birds the people of the makai lands would take them away from us.*

From **Heenui** to **Kalapaohele**, **Maulua** bounds **Humuula**. Kalapaohele is a *kualapa* in *pili*, by the edge of the forest. **Hakalau** bounds **Humuula** from **Waikalua** at **Kanepuu**, to **Palauolelo**. The boundary of **Humuula** runs along the edge of the forest along **Makahalanaloa**, **Papaikou**, and **Piihonua** etc., and not in the woods. It did not go to **Nahuina o Wailuku**. The boundary runs to **Kaelewa**, a water place, and *kauhale*, along **Piihonua**; thence to **Mawai** [Mawae], out to *pili*. **Pohakuhanalei** is on Kapapala.

Puuhuluhulu is the place where Kau, Kona and **Humuula** join; and I was told by my parents that it is the boundary of **Humuula**. **Omaokoili** is on **Humuula**. I was told **Puuiki** was on **Kaaumana** or **Piihonua**. Know **Pohakuloa**, it is beyond **Puuiki** on Kau. I used to go there from **Humuula**, and steal birds. I do not know of **Wekahuna** and **Puonioni**. **Humuula** does not reach to the top of **Mauna Kea**, it extends only as far as the *mamani* and *pili* grow (*Kaaumana* is only a road in the upper edge of the woods) and is cut off by **Kaohe** at the *mauka* edge of the *mamani*. (I do not know the boundaries between **Kaohe** and **Humuula** well)

CX'd. [Volume B page 45]

Kalua ^K. **Sworn:** (Rather an old man)

I was born at Puumoi, at the time of **Akahai o Mookuokai** and have always lived there. I do not know the boundaries of **Humuula** and have never been above the woods.

CX'd.

Kuhipono ^K. **Sworn:** (Rather an old man)

I was born at **Papaikou** and have always lived there. Do not know the boundaries outside of the woods. I have always heard that the *pili* and *mamani* above the woods are on **Humuula**, and the forest on **Papaikou** and other *makai* lands. I do not know what lands join **Humuula**. What I have stated, I heard from old bird catchers of **Papaikou**. (now dead) I have never been through the woods myself.

CX'd.

Paele^K Sworn:

I was born at Alakahi at the time of building the *Heiau* at Kawaihae [ca. 1791]. I used to go and catch birds in the woods, always heard that the forest is on *makai* lands, and the *pili* and *mamani* above the woods is on *Humuula*. *Palauolelo* is on *Humuula*, and *Makahanaloa* and *Papaikou* join *Humuula* near this place. The head of Kolikoli [Kolekole] gulch is at the head of *Makahanaloa* and *Hakalau*. I have heard *Palauolelo* is at the head of *Waiama* gulch. *Piihonua*, *Paukaa*, *Papaikou*, *Makahanaloa* and *Hakalau* run through the forest to the *makai* edge of the *pili*. This is what I have always been told. Have heard that *Kaaimana* is the boundary between *Humuula*, *Papaikou* and *Paukaa*. *Kapuakala* gulch is the boundary between *Paukaa* and *Piihonua*, on the boundary of *Humuula*. Alakahi does not run through the woods. *Palauolelo* is the boundary between *Makahanaloa* and *Papaikou*, on the boundary of *Humuula*.

Cx'd. [Volume B page 46]

Wahamu^K Sworn:

I was born at Kulaimano, Hilo, and have always lived in Hilo. Have heard from old people where *Makahanaloa* and *Hakalau* join *Humuula*, it is at the *mauka* edge of the forest, and the *pili* and *mamani* are in *Humuula*. Was told *Maulua*, *Piha* and *Hakalau* join *Humuula*, and that *Hakalau* bounded *Humuula* from *Naohe* [*Nauhi*] to *Palauolelo*. I have heard that *Papaikou* joins *Humuula* above the woods, and I have since heard that *Paukaa* reaches through the woods to *Lai*. I have heard this for about thirty years. Have heard that *Piihonua* runs through the woods to the *makai* edge of the *pili*. *I lived on the mauka part of Piihonua for five years, catching birds. It was when Castle had the saw mill at Kapahuakea.* At that time *Humuula* did not claim to *Keanalepo*, at *Wailuku*. *Papaikou* and *Makahanaloa* join *Humuula* at *Kaaimana* 2nd the one towards Hamakua. There *Papaikou* bounds *Humuula* to Kahawai *Kapuakala* Waiole; thence *Paukaa* bounds it to *Kapuakala wai*, near *Lai*; it is called *Nukupahu* gulch above the woods.

In olden times I heard from one *kamaaina* that *Lai* is on *Piihonua* and from another that it is on *Paukaa*. The boundary is at *Kapuakala*, on *Nukupahu* gulch. I have not heard definitely about the boundaries of *Humuula* adjoining *Waiakea* and *Kau*. *Have heard that Kaohe cuts Humuula off, on the slope of Mauna Kea, above the pili and mamani, leaving the side of Mauna Kea on Kaohe.* When Palai was shooting bullock; Namakaokaia, a man from *Humuula* told me this. Li, a bird catcher of *Humuula*, told me the boundaries of *Humuula*, *Makahanaloa* and other lands (they are now dead). They said *Piha* joins *Humuula* and *Hakalau* at *Naohe* gulch, a little below the edge of this forest. He is now dead. I don not know the other corner of *Piha*, and *Maulua*.

CX'd. [Volume B page 47]

Kamohaiulu^K Sworn.

I was born at *Laupahoehoe* at the time of the building of the *heiau* at Kawaihae, and have always lived there. Know the boundaries of *Humuula* on the Hilo side at shore, but do not know them on the Hamakua side. The boundary at shore is at *Kawalii* gulch at Kaahupuaa, bounded on *Kahoahuna*; thence *mauka* along the gulch to Piinau, *kauhale*; thence to Lapalapa, a cultivating ground. Thence the boundary runs up the *kahawai* to *Mauiana* gulch, a branch of the *Kawalii*. There *Kahoahuna* is cut off by *Humuula*. *Thence along the land of Kahoahuna 1st to Lainakaunohi, a spot in the old canoe road of Humuula at Mauiana.* The boundary leaves the gulch at Lainakaunohi, the boundary runs towards Hilo. At this place *Auliilii* 2nd and *Auliilii* 1st join *Humuula*. Thence to *Waiopae* a *kahawai*, at the high waterfall, *Auliilii* ends, and *Kahuahokolo* bounds *Humuula* to *Olohe Kahawai*, a gulch, a place where we used to live and catch birds, and

make canoes, [a] canoe road. Pana 2nd and Pana 1st bound it from this point, but the land is very narrow. Then **Awaawaiki** bounds **Humuula** to **Waipahoehoe** a gulch branch of **Kawalii**, and there **Waipunalei** bounds **Humuula**. Thence the boundary runs up an old trail **Pihahelei**, a puu mamake (ground), the mauka corner of **Waipunalei**. This is as far as I know the boundaries.

I have heard that **Laupahoehoe** bounds it to Pukoa, and there Papaaloa bounds it. Pukoa is just inside of the mauka edge of the woods. I have not heard that in older times Kaiwilaihilaihi, **Piha** on Nanue reached to **Humuula**. Have heard from old people that in olden times **Maulua**, **Hakalau**, **Makahanalua**, and **Piihonua** reached to **Humuula**. Have not heard about **Papaikou** and Paukaa joining **Humuula**. I have heard that in olden times if **Humuula** people caught birds in the ohia woods, **Piihonua** took them away, and if **Piihonua** people caught birds on mamani, **Humuula** people took them away from them. [Volume B page 48]

I have heard this from the bird catchers of **Humuula** and from our place. Have never seen the boundaries on the Kau side of **Humuula**. **Kaohe** bounds **Humuula** on the mauka side. Heard in olden times **Kaohe** cut **Humuula** off at the upper edge of the mamani on **Mauna Kea**, but I do not know about it.

CX'd.

S. Kipi^K Sworn.

I was born in Hilo, Hawaii and have always lived there. I have heard about the boundaries of **Humuula** and makai lands, from old people. Have always heard that **Humuula** cuts off makai lands at the mauka edge of the forest; at makai side of pili land, (ku ana iloko) and that the points of woods running mauka are on **Humuula**. The only road I have heard of from **Humuula** runs along the pili land mauka; through the points of woods that run mauka.

Kamanu (now dead) an old man who used to live on Honomu, and other places, was one of those that told me this; he was a kamaaina, and may have been the one who went with Henry Lyman. I heard from him that **Hakalaunui**, **Makahanalua**, **Papaikou**, **Paukaa** and **Piihonua** run through the woods to **Humuula**. When I was picking pulu on **Humuula** in 1868, I sent men after bullock for meat and they said they got them on **Maulua**. Keola^K (now dead) who went with the party who surveyed **Humuula**, said Papaaloa, **Maulua** and **Piha** went through the woods.

CX'd. When I was living in Hamakua on the 5th of December, Kahue^K piloted myself and twenty others on to the mountain, and he then told me **Humuula** extended up on the side of **Mauna Kea** as far as the upper edge of the mamani, and pili, and was there cut off by **Kaohe**. We went to **Waiau**. Kahue could not find it, but Aikanaka found it. Kahue did not then say that **Humuula** extended to **Waiau**. [Volume B page 49]

Naaikauna^K Sworn.

I was born at **Humuula** and have always lived there. Born at the time of Kiholo [ca. 1810] know a part of the boundaries of **Humuula**. My father Eekamoku and his father Kaapunini told them to me. **Humuula** is bounded at shore on the Hilo side by **Kahoahuna** 2nd at Kaahupuaa the kahawai is on **Kahoahuna**, **Kawalii** gulch. The ahu is in front of the houses. Thence up the gulch to Nohoaokaakau, a cave thence up the gulch to Lapalapa; there the gulch branches. Waikoloa on **Kahoahuna**, thence up the north branch Alanaio to Kapualeiapana; thence up to **Mauiana**, a pali and waterfall.

Humuula is above the falls, there **Kahoahuna** is cut off, and the boundary leaving the gulch runs across land towards Hilo to **Kahoahuna iki** at Lainakaonohi; thence across the head of **Kahoahuna** to the bank of Waiopae gulch; there is a waterfall there and Waiopae is at the foot of it. **Auliilii** 2nd and **Auliilii** 1st corner in this gulch and Kahuakolo and Awaawaiki bound **Humuula** from Waiopae to Olohekahawai, a branch of Waiopae. From *makai* of the waterfall the boundary runs towards Hilo at Olohekahawai; Waipunalei joins **Humuula** at the waterfall. Thence up across the land to the Hamakua side of **Waipahoehoe**, a gulch with water in it; thence up the road to **Pihahoelei** a *kauhale* near the *mauka* edge of the woods, and the *mauka* corner of Waipunalei, where it is cut off by **Humuula** and **Laupahoehoe** runs toward Hamakua, and bounds **Humuula** to **Puukole**; *mauka* of hill can be seen the *pili* from the hill. **Palipali** of **Humuula** is *mauka* of the woods. There Papaaloa bounds **Humuula** to **Puukoa**, a hill in the woods near the *mauka* edge. There **Maulua** joins **Humuula** and bounds it to the *mauka* side of **Puulehu**, a hill in the woods, *makai* of **Kaiaiki**, a *kauhale* on **Humuula** close to the *mauka* edge of the woods (about as far as from the Court House to the shore). The *pili* and *mamani* run an open spot close to this hill. There are points of *ohia* that run a good ways *mauka* there on **Humuula**. [Volume B page 50]

If we went from **Kaiaiki** to **Puulehu** and were caught we had to give the birds to *mauka* people. **Maulua** extends from **Puulehu** to Uhakunou a *kualapa* running from the *pili* into the woods. Thence I was told that **Piha** bounds **Humuula** to **Kawauwauwai** water holes in and close to the *mauka* edge of the woods; it is also a *kauhale*. **Kalapahelo** is a point on **Humuula** above the woods. Thence along **Piha** to *makai* of **Kaluaalu**, on **Humuula** at **Ohiamalumalu**, an *ohia* tree. Was told that Nanue bounds **Humuula** to Kupunawai, outside of the woods; the boundary is at Waikalua in the woods. There **Hakalau** bounds **Humuula**. Nanue bounds it to **Naohe** [**Nauhi**] gulch, and then **Hakalau** to **Na Waiahehu** gulch. **Kapahee** is on this gulch. **Kaloaloa** is just on Puna side of the gulch. (you cannot follow these *mauka* gulches all the way to the sea shore) There **Makahanalua** joins **Humuula**. I have heard it ends at **Kaaimana** and from there **Papaikou** bounds it to **Kapuakala** where there is water. I do not know where the land of Paukaa comes. I have heard that it bounds **Humuula** from **Kapuakala** to **Nukupahu**. I was told that the tall woods are on *makai* lands but the points of *pili* running into the woods and the points of trees running *mauka* are on **Humuula**. Paukaa bounds **Humuula** from **Kapuakala wai** to **Nukupahu** and **Lai**. **Nukupahu** gulch is the *kahawai* on the Hamakua side of **Lai**. Thence along **Piihonua**, along the edge of the forest, crossing a branch of the **Wailuku** to **Kaelewa**, a place on **Humuula**; thence to **Kahiliku**. **Kalapahapu** is on **Piihonua**; thence to outside **Mawae**; I have been to **Kahiliku** but not to Mawae. I have heard it runs to **Puuike**, **Pohakuloa**, **Wekahuna**, **Puonioni** and **Pohakuhanalei**. Thence down the mountain to **Puukole**; thence to **Puupapa**; thence to **Omaokoili**; thence to **Kanoa**.

I heard from Moolau at the time of the jury (two years ago) that Napu [Napuu] of Kona bounds **Humuula** at **Omaokoili**. I do not know what lands bound it towards Kona and Kau. My parents told me **Kaohe** was at **Lanikepu**. Thence the boundary runs to **Poliahu**; thence to **Kamakahalau** hill; thence to **Iolehaehae**; thence to **Ahua Poopuaa** a *heiau*, high hill of stones. [Volume B page 51]

Thence along **Kaohe** to **Kaula** gulch, where the boundary enters the woods; thence down the gulch to Keanalepo a cave in the Hamakua side of the gulch, and along Manowaialee. Thence along the gulch to **Kahauloa** a *kawa* [leaping place] in the side of the woods where the boundary leaves the gulch and runs toward Hilo, across the head of **Ookala** to **Oina**, a banana grove; thence along Ookala to Paiopu a banana grove at the *mauka* corner of Kaohaoha; thence *makai* to Pauahi a *punawai* at the commencement of **Poololo** gulch (this place is marked). Thence down said gulch to sea shore. **Humuula** is bounded *makai* by the sea.

CX'd.

Oina is in the woods. **Kahoahuna** 1st joins **Humuula** in the edge of the woods; also **Aulilili**, Kahuahokolo, Awaawaiki and Waipunalei, and one **Laupahoehoe** only. I never heard from my parents that **Humuula** cuts **Piihonua** off at **Nahuina** of **Wailuku**. I have heard that Kahue says that **Humuula** cuts it off there. I went with Blodgett and surveyed to **Kamakahalau**, on the mountain, and from **Naohe kahawai** to **Pihahalei**. We surveyed from **Kalaieha** to **Omaokoili** and Blodgett sighted from there to **Naohe** but as it was foggy it did not show the boundary. *When Wiltse went, the second time, Kahue pointed out the boundaries. I did not point them out because he did not ask me. Wiltse sighted without going to the points or setting up signals and he did not use a chain.* I did not hear from my parents that the boundary of **Humuula** runs to **Pohopaele**; heard this from Kahue. I heard from my parents that **Kanepu** and **Puuwai** are on **Makahanaloa** and **Hakalau** and that the water of **Waikoloa** is on **Hakalau**. **Kapunawai** is on **Humuula**, water holes close to each other. In olden times the road from **Humuula** to **Laumaia** went along on the *pili* and not through the woods. I used to go into the woods a short distance catching birds, and then go back outside again. [Volume B page 52]

Commission adjourned until 10 o'clock a.m. November 7th 1873.

R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit

Boundary Commission met according to adjournment. At the Court House at Hilo November 7th 1873

Present: E.G. Hitchcock and D. Alapai.

Waikililili^K. Sworn.

I was born at or near **Humuula**, district of Hilo, and have always lived in said district. I have often been on the mountain catching bullock, and know the boundaries of **Humuula** at shore. *When I was on the mountain I was told that the boundary on Mauna Kea between Kahohe and Humuula was where the mamani ceases to grow, and that the pukeawe is on Kahohe. Was told that Humuula extends to Pohakuhanalei. I have not heard where Kahohe ceases to join Humuula, as you go towards Mauna Loa. Have never heard that Humuula extends to Waiau. I have not heard in olden times what land Poliahu is on. Have always heard that Humuula takes the pili and mamani. I have been told that if our kupuna caught birds on ohia trees, Piihonua people took them away; and that if Piihonua folks took the birds from the mamani, our kupuna would take them away from them.* In olden times we did not hear of **Humuula** cutting off Hilo lands in the forest, but at the edge of the forest. Never heard of any road running from **Humuula** to **Piihonua** through the woods in olden times.

The old road has never been pointed out to me. I have not been with *kamaaina* along above the woods, and had the lands pointed out to me.

CX'd.

Hemahema^K. Sworn.

I was born in Hamakua at the time of Oku [ca. 1804], moved to **Piihonua** before I was married and have lived in Hilo ever since. [Volume B page 53] Have been catching birds on **Piha** and am a *kamaaina* of that land. I heard where the boundaries were from Kulaipahu, Kililili and Koie, they were bird catchers, but are now dead. They told me **Piha** ended at **Kawauwauwai**, a *kauhale manu* and *oioina* and swampy place. The place on **Humuula** near here is **Naohe** gulch. **Kawauwauwai** is on the gulch about as far *makai* from the edge of the forest, as from Hilo Court House to the beach. I do not know whether

Nanue extends through the woods or not. Was told **Maulua** joins **Piha**. **Kawauwauwai** is on **Piha** and **Puulehu** is on **Maulua**.

CX'd.

Kalaualoa^K Sworn.

I was born at Opea, Hilo, at the time of Hulupi and have always lived in Hilo. I am a bird catcher and canoe builder. My brother Koie and Waikane told me boundaries. Hoolualani my *kupuna*, bird catchers, told us boundaries. **Piha** is cut off by **Humuula**. Nanue also at **Kawauwauwai**. **Maulua** joins **Piha** at Kulipalapala, I do not know about its junction with **Humuula**, have heard it is at **Puulehu**. Nanue bounds **Humuula** to **Kapunawai**, a water place in the woods, in the *awaawa* above Nanue gulch. Commencement of Nanue gulch, I do not know what land bounds **Humuula** on the Hilo side of Nanue.

CX'd.

Kamaipialii^K Sworn:

I was born at **Maulua**, and now live there. **Maulua** is cut off by **Humuula** and I have always been told that it joins **Piha**.

Was told by old people that **Maulua** is cut off by **Humuula** at Kapulehu. I have been there once. Do not know how wide **Maulua** is *mauka*. I do not know where **Piha** joins **Humuula**. CX'd. [Volume B page 54]

Kaaua^K Sworn.

I was born at **Waiakea** Hilo, at the time of Akakai of Mokuokai. I have always lived there, and know where **Waiakea** joins **Humuula**. I was told by Olaa *kamaaina*, Opulua and others (whose names I have forgotten) at the time Webster surveyed **Waiakea**. I have always heard that **Waiakea** joins **Humuula** from **Puuhuluhulu** to **Mawai**. Webster set flags on **Puuhuluhulu** when he surveyed **Waiakea**.

CX'd.

Kamai,^K, sworn:

I was born at Honolii, Hilo, at the time King Kamehameha I was young; long before the Peleleu. I was a bird catcher and used to go all through the woods. Saw Captain Cook's vessel come into Hilo. I have forgotten where the lands join **Humuula**, as I am too old to remember. Kikala runs through the woods on the bank of Honolii. Paukaa is on the Hamakua side of said gulch, and comes out to **Palauolelo**.

CX'd.

E.G. Hitchcock, declines to examine the witness, as he is so old, that his memory seems to have failed him.

L. W. Kainoa^K Sworn:

I was born in Hilo in the year 1820. I used to live in the upper part of the woods at **Waipahoehoe**, and heard from Maa and Makaulaula about the boundaries. They said **Waiakea** and **Piihonua** joined on the **Humuula** boundary. **Piihonua** joined **Papaikou**, and **Papaikou** joined **Makahanaloa**. **Makahanaloa** joined **Hakalau**, and **Hakalau** joined **Piha** on the boundary of **Humuula**. They said all these lands run through the woods, and the *pili* and *mamani* are on **Humuula**. They told me **Humuula** extended up the side of **Mauna Kea** as far as the *mamani* grow; and that it was cut off by **Kaohe** of Hamakua; and that it extended over to Kapapala and Kahuku, but they did not tell me where.

They said **Piihonua** joined **Waiakea** at **Mawai** [Volume B page 55] and that the pahoehoe, **Kipuka Ahina** are partly on **Piihonua** and partly on **Waiakea**. We used to dry hides at this place. It is pahoehoe with not many trees on it. They did not say where Paukaa and **Piihonua** joined. They said there was no road from **Humuula** to **Piihonua** running along through the woods. The ancient road runs along outside of the woods.

CX'd.

Note: E.G. Hitchcock admits the evidence of Kamalo given on **Piihonua**. See Folio 20, 21 and 22.

No more witnesses on hand.

Case continued till further notice to all interested parties.
R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit

For journal of trip on **Humuula** boundaries See folios 174, 175, 176 and 177.

Case continued at Hilo Court House, Hilo Hawaii, December 8th 1873, before Honorable R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit.

Notice given to all parties interested in **Humuula** or adjoining lands.

Present L. McCully and E.G. Hitchcock.

Peleioholani^K. Sworn:

I was born at **Piihonua**, now live at Puueo. I know the land of **Makahanaloa** and have lived there. Aalamanu (now dead) was my father. My *kupuna* Puniawa was *Konohiki* under Hoapiliwahine, and had charge of the land. I lived at **Makahanaloa** from the time I was a baby until 1848. I was born at the time Kaahumanu dedicated the churches on Hawaii [ca. 1825], and I was a school boy when I left **Makahanaloa**.

I do not know what land is on the Puna side of **Makahanaloa** in the woods, but have heard that **Humuula** cuts it off on the *mauka* end. I have never been to the upper end of **Makahanaloa** with my *kupuna*. Have been to the *mamake* patches in the woods.

CX'd.

The *mamake* patches are near Uluku hill. I have not heard about the *mauka* boundaries of **Makahanaloa**. [Volume B page 56]

Kapua^K. Sworn.

I was born at **Makahanaloa** shortly before the collection of sandalwood [ca. 1812]; I do not know the *mauka* boundaries of said land of **Makahanaloa**. I do not know, but I have heard that **Humuula** cuts it off *mauka*. I do not know what bounds it *mauka*, on the Puna side or what bounds it on the Hamakua side. I have been to the mountain to bring down beef, and have seen piles of sawed boards in the woods. No one has ever told me of the boundaries of **Makahanaloa**.

CX'd.

Case continued until further notice to all interested parties.
R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit

Hilo, December 9th, 1873

Case opened after due notice was served on all interested parties.

Present: L. McCully and E.G. Hitchcock.

F.S. Lyman, sworn:

I was with Henry Lyman most of the time while he was surveying the land of **Hakalau**. Was with him while he surveyed the upper part of it. I think it was in 1853 or 1854, I do not remember names of *kamaaina*. He had *kamaaina* at that time. If I remember right, old Waiki was the *kamaaina* on part of **Humuula**. I accompanied my brother as he was teaching me surveying. Neither line was cut through the woods.

My brother had already surveyed **Makahalanaloa** bounding **Humuula** on one side. He cut through the woods on that survey. The lands **Makahalanaloa** and **Hakalau** bound each other most of the way through the woods; do not join at the lower edge. This is the Puna side. The Hamakua side was along the Kamaee gulch. Do not know as it was measured all the way. It was measured below the woods. I was not with him all the time. The line on the Puna side of **Hakalau** was measured from shore to woods, and the [Volume B page 57] distance from this line to a prominent hill in the woods on **Makahalanaloa** was measured by triangulation. The *kamaaina* said there was a certain point in the woods where **Hakalau** joined **Makahalanaloa**, that he had got on a previous survey of **Makahalanaloa**. Being no natural boundary on that side he made a straight line to that point from the lower edge of the woods. From the other side adjoining **Humuula**, we went to the upper side of the woods, Kapou was the man who had charge of **Hakalau** at that time. He went with us and took other men who he said were *kamaaina*, as he was not well acquainted himself. Kapou tells me these *kamaaina* were Kupouli and *Manu*. Waiki went with us from **Humuula**, we went through the woods. James Castle and two men to carry the chain went along with my brother and myself. We went to a pile of stones on a little hillock above the woods. I should say it was on the *pili* grass about a quarter of a mile from the thick forest, among scattering trees, *mamani*, *koa* and some *ohia*. I was told that that pile of stones was at the western corner of **Makahalanaloa**, *mauka* end, as it had been surveyed by my brother. The *kamaaina* said that was where **Hakalau** joined **Makahalanaloa** and **Humuula**. There was no dispute about it among the *kamaaina* at that time. We measured from that pile of stones, along the land of **Humuula**, towards Hamakua as the *kamaaina* pointed out; keeping just about as far from the thick forest as when we started from **Makahalanaloa**, until we came to a gulch; which the *kamaaina* said was the Kamaee gulch. I do not remember the name they gave to it, they said it was the gulch that went clear to the sea, and that it was the boundary below, between Kamaee and **Hakalau**. I have with me notes made by my brother. It is not a very wide gulch, but it is quite deep. If I remember right, we built a pile of stones on the Puna side of it. The line where we measured was given as the *mauka* boundary of **Hakalau**, and nothing was said about the boundaries elsewhere. The *kamaaina* took us [Volume B page 58] to the corner of **Makahalanaloa** and said that was the point where the lands joined.

My brother took Castle along, as he wished to be certain, that he found the same pile of stones as he built when surveying **Makahalanaloa**.

At that time Castle was shooting on the mountain a great deal of the time, and said he had seen the pile of stones and could point it out.

Notes read.

"**Hakalau uka** commences at **Puakala**, four courses straightened into one. N. 3^o W. 117.10 chains to stream of Waiahu."

I can swear that is the original notes of survey as made by my brother. The survey was made for Haalelea.

Papaikou was surveyed by Henry and David surveyed Paukaa. **Papaikou** corners with **Makahalanaloa**; the survey of Paukaa overlaps **Papaikou** and **Makahalanaloa**.

CX'd.

Papaikou was surveyed by Henry and David surveyed Paukaa. **Papaikou** corners with **Makahalanaloa**; the survey of Paukaa overlaps **Papaikou** and **Makahalanaloa**.

Cross-examined.

Case continued until further notice to all interested parties.
R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit

Continued on Folio 174, [Volume B page 59]

Humuula Ahupuaa
District of Hilo, Island of Hawaii
Boundary Commission, Volume B:174-177

The Ahupuaa of **Humuula**, District of Hilo, Island of Hawaii, 3d Judicial Circuit

Continued from Folio 59

Notes from the journal of the Honorable Commissioner of Boundaries taken while visiting the upper boundaries of **Humuula**.

November 28th 1873.

Left J. Parker's, Mana Hamakua, Island of Hawaii in company with L. McCully, H.B. Montgomery, and R. Folsom, and proceeded to **Kalopa**, Hamakua. There met with D.H. Hitchcock and E.G. Hitchcock. Found that Peleioholani had gone to Hilo, and that James Castle was too sick to come.

November 29th 1873.

Left **Kalopa** and proceeded to **Kaala**, there went through the forest onto the foot of the mountain and went along the road to **Laumaia**, the road runs a short distance above the woods. Above the woods, we passed a good many of the points mentioned by Kahue, Naaikauna, Waiki, and others in their testimony and camped after dark at a place called **Hopuwai**.

Naaikauna and Kahue joined the party at **Kaala**. L. McCully and H.B. Montgomery left us at the upper edge of the woods. Heard of James Castle's death when halfway through the woods.

November 30th 1873.

Started at daylight and went along the upper edge of the forest, passing **Nawaiheu** gulch to **Kaloloa**, there left the trail to **Laumaia** and went into the woods for some distance on the **kualapa**; boundary between **Hakalau** and **Makahalanaloa**, to opposite **Puuwai**, a hill on **Hakalau**. There we left the boundary and went onto **Makahalanaloa**, crossing the **Aama** gulch, and camped on **Makahalanaloa** some distance *makai* of Puuwai.

Kahue says Puuwai is a long distance [Volume B page 174] of the point he claimed as the boundary between **Humuula** and **Hakalau** and **Makahalanaloa**.

December 1st 1873.

Left camp and walked up to where we struck the ridge that runs into the woods from *makai* of Kaloloa. We went onto the ridge a good way *mauka* of Puuwai. Left D.H. Hitchcock at camp.

After a good deal of persuasion Kahue pointed out a hollow on the top of the ridge as **Pohopaele**. At this point the *kualapa* is quite high and slopes off rapidly toward the shore. It is impossible for this point to be seen from Kaloloa as it is lower than the edge of the woods. *It took us twenty minutes to walk from this point to what is now the upper edge of the forest. The boundary between Humuula and Makahanaloa as pointed out by Kahue is a hollow commencing on the ridge between these two lands, this ridge is the one on which the road from the beach, through Makahanaloa lies, thence the hollow runs down the west side of Aama Gulch. (no water in it)*

Puuwai is on the next ridge Westward. The upper portion of the forest is full of dry trees, laying all over the ground. We then proceeded to **Palauolelo** gulch. *Kahue pointed out to us where the woods used to run, it was close to Laumaia Road.* We then went to **Kapukalawaiole**. Kapukalawaiole is near **Lai**, said to be the **Nukupahu** gulch. Then went to a point of woods called **Lai**, a long sharp point of woods extending to some distance above the woods. Then went on across **Waipahoehoe** and **Laumaia** gulches, and the **Aama** branch of the **Wailuku**. From thence we went to Mr. Kirchoff's house, where L. McCully rejoined the party. We then proceeded to **Kalaieha**.

Kahue states that the **Nahuina** of **Wailuku** is not where the **Laumaia** and **Waipahoehoe** branches unite, but that it is about the same distance *makai* of the *mauka* edge of the woods as Pohopaele; that the gulches **Aama**, **Waikae** and **Kalapahelo** unite at **Keanalepo**, and that Keanalepo is not at the *makai* junction of **Laumaia**. He states that [Volume B page 175] Keanalepo is a place that he dug.

Arrived at **Kalaieha** a little before dark.

December 2nd 1873. Kalaieha

On asking Kahue to point out **Pohakuohanalei** he pointed out a hill a good ways down the slope of **Mauna Loa**, below what we had always understood to be Pohakuohanalei. Kahue said other people had always pointed out the upper hill or rock as Pohakuohanalei, but that he corrected them when the survey was made. He then proceeded to point out other points on the Kona and **Kaohe** boundaries of **Humuula**, until he began to point out places near the top of **Mauna Kea**. He then hesitated, and said he could not remember the names of the places on **Mauna Kea**. Said that he was not well, that he had not slept any the previous night, and that he was ill.

After a while he again pointed out Pohakuohanalei, this time it was the upper hill, and he said he had made a mistake in pointing out the lower one.

Our party left **Kalaieha** in company with Ashford Spencer and others, and went down across the *pahoehoe* to a point on the *pahoehoe* that was shown us as **Kawauwauwai** and said to be on the boundary of **Humuula** and **Waiakea**. This point is a long distance *mauka* of **Mawae** and the forest. We then proceeded towards **Laumaia** to the edge of the forest, to **Kahiliku**, thence to **Puuoo**, meeting with H.B. Montgomery and Kirchoff. Between **Kahiliku** and the base of **Puuoo** we passed a pond of water called **Kaelewa**, this pond is in a hollow above the woods. At **Puuoo** we could not get Kahue to point out any places, he said he was *pupule*, and Naaikauna said that at two different times in former years, he had known him to be crazy.

The fog began to set in and so we returned to **Laumaia**, and there leaving Mess. McCully, Montgomery, and others, we proceeded to camp on the edge of the woods by **Kapuakala** 2nd. Kahue was raving all afternoon and most of the night. [Volume B page 176]

December 3rd 1873.

Kahue was somewhat better than the night before. We left camp and proceeded to a pile of rocks near the gulch. Mr. McCully rejoined us here and the Hitchcock Bros. remained at **Kapuakala**. *We then proceeded along the road from **Laumaia** to **Waimea**, as far as **Kaala**, when we struck through the woods to shore.* Could not get much information from Kahue about different points as he persisted that he was crazy. Naaikauna pointed out the locality of points in the woods, from the hills on **Hakalau** until you near the boundaries of **Maulua** and **Laupahoehoe**, when we could see the hills **Puukoa** and **Puukole** in and a short distance from the *mauka* edge of the forest.

As we neared the lower edge of the forest, Kahue began to tell about boundaries again and by the time we stopped at Amina's, a place near the boundary of Hilo and Hamakua, he was ready to tell all the boundaries between **Humuula** and the adjoining lands.

Reached Hilo December 4th 1873.

Continued until further notice to interested parties.

R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit

Costs: 6 days traveling on mountain 60.-; & 6 days hearing 60.-; 120.-
recording 123 folio 30.50,
advertising hearing 4.-; 34.50
Paid to July 20 1874, 154.50. [Volume B page 177]

Humuula Ahupuaa

District of Hilo, Island of Hawaii

Boundary Commission, Volume D:52-57

In Re: Boundary between **Humuula**, District of Hilo and **Kaohe** and other lands, District of Hamakua, Island of Hawaii

Hilo, Hawaii, August 20, 1891, Court house, J.F. Brown, appears in behalf of the Hawaiian Government; C.P. Iaukea, Crown Land Agent, for Crown Lands; Armin Haneberg, Lessee of **Humuula**; E.D. Baldwin, Government Surveyor [see Register Map No. 1718]; and others, present.

The application of J.F. Brown, in behalf of his Excellency, The Minister of Interior, for the Hawaiian Government, being on file, and notice having been given to interested parties, also filed a map, shewing location of the lands in question.

Hilo, August 14th, 1891

Honorable F.S. Lyman, Boundary Commissioner
for 3rd Judicial Circuit, Hawaiian Islands

Sir: On behalf of His Excellency, The Minister of Interior, I beg to apply for a settlement of the boundary line between the Crown land of **Humuula** and the adjoining government tract, extending from Pohaku Hanalei on **Mauna Loa**, to the head of **Kaala** in Hamakua, known principally as the Government land of **Kaohe**.

The boundary as claimed by the government is along yellow tinted portion of the accompanying map, from Pohakuhanalei to head of **Kaala**.

By setting an early date for the hearing of this case you will greatly oblige your obedient servant,

J.F. Brown. [Volume D page 52]

Evidence

Hoakimoa ^K. **S.** – Name Hoakimoa, 54 years old, am *kamaaina* in mountain lands. I lived there with my father shooting cattle. In 1859 I left that place. I know boundary of **Humuula** and **Kaohe**. Commence at **Puukea**, on **Mauna Kea**, boundary of **Koholalele** and **Kaohe**, **Puukea** is one corner and **Puu o Kihe** the other, are the corners of **Koholalele** and **Kaohe**; and on to **Iolehaehae**, along **Kukaiau** and **Kaohe**, then to **Keahunaiwi**, many things there. **Iwaiwa**, **Puuhinahina**, &c. then to **Kole**. I know **Kaupakuhale**, on from **Kole**, and to **Kalepe a Moa** near **Kalaieha**. I was very well acquainted there. At **Kalepe a Moa**, look down to **Omaokoili**, that is as far as I know; along the line I have given, is **Humuula** below and **Kaohe** above. I know **Kaula** Gulch. **Waikulukulu** is the name below, and **Kaula** gulch above.

The boundary up from the Government road to **Puukalepa**, is **Humuula** on one side and **Kaala** on other side of the line. From **Iolehaehae** to **Puukalepa** the **Kaula** gulch has always been the boundary between **Kaala** and **Humuula**.

*I know places called **Keonewakiu** and **Kamakahalau**, on **Kaohe**, we used to lasso cattle there. **Humuula** does not go to the top of **Mauna Kea**, in olden times only three men ran after Uau on the mountain, along the side, was **Kaohe** above, **Humuula** below, and **Piihonua** at foot of mountain.*

CX'd. – **Kaala** is the ancient name of the land below **Kanakaleonui** and **Iolehaehae**. The land above line from **Iolehaehae** to **Puukalepa** is **Kaohe**. The boundary of **Humuula** is the **Kaula** gulch.

Paakaula ^K. **S.** – I was born in 1847, am *kamaaina* on **Mauna Kea**. My father, Nainoa, was *kamaaina* in mountain, and my knowledge came from him when I was young.

Commence at end of **Kaohe** on the mountain [Volume D page 53] "**Puuokihe**," a place called **Keahunaiwi**, between **Puuokihe**, and it is the boundary to **Iolehaehae**, and to **Kanakaleonui**, a long distance between – several lands and names between, that I do not know. Just below **Kanakaleonui** is **Keahunaiwi**, the point where **Humuula** and **Kaohe** join, a hill there. **Keonewakiu** ahead of that, and Kahenahena [**Kahinahina**] and **Kaiwaiwa** are just above the hills, the boundary; then to **Puuhuluhulu**, above **Ahuwela**, the boundary is between **Kaupakuhale** and **Puuhuluhulu** hills; then to **Puuloa**, above it an old cattle pen called "**Kulaka**," above **Puuo**, then to **Kole**, there sighted by compass to **Kalepe a Moa**, then to **Puuhuluhulu**, that is as far as I know.

I do not know, on one side of gulch is **Kaala**, and **Humuula** the other side of **Kaula** gulch. So my father said. Know **Kamakahalau**, on **Kaohe**.

CX'd.

The boundary is ¼ or ½ mile perhaps, above **Puuloa**. **Lahohinu** is on **Humuula**, near **Kaula** gulch. **Kaula** gulch is the boundary between **Humuula** and **Kaala**. My father, Nainoa, told me so, he was formerly a witness before the Boundary Commissioner and he went with Curtis Lyons in surveying the boundaries of these and other lands.

It was said the *Mamane* belonged to **Humuula**, but some *mamane* is on **Kaohe** also. I did not go on **Humuula** with my father. He belonged to Hamakua. Kahue and Naaikauna are kamaainas of **Humuula**. I went with my father in surveying.

Amina, S.: – Think I am over 50 years old. Know the mountain. **Puukea** and **Puukihe**, along **Kaohe**, and to **Iolehaehae**, **Kaohe** above and below **Kukaiau** has some and **Kaala** some, and to **Ahuopopuaa** below, and then to **Puukalepa** by **Kaula** gulch, then gulch runs to **Keahunaiwi** and **Makahalau**, above is **Kaohe**. [Volume D page 55] “Keahunaiwi” is near “**Kanakaleonui**,” here **Kaohe** and **Humuula** join, and **Kaala** is below this point. Then on sand, “**one o Akiu**” [**One o Wakiu**] to hill called “**Kaiwaiwa**,” and to “**Kahinahina**.” The *mauka* side of those two hills is **Kaohe**, and *makai* is **Humuula**. Then to “**Ahuwela**,” and “**Puuhuluhulu**” hills, and on to **Puuloa**. The boundary is at “**Kaupakuhale**,” above **Puuloa**. “**Kaupakuhale**” is on **Kaohe**. Then to “**Kulaka**” *cattle pen, to drive wild cattle*; then to “**Kole**” hill, then to another hill “**Huikau**,” then to “**Puuhuluhulu**,” then to “Mokolii” [**Omaokoili**] that is as far as I know. I know **Kaula** gulch from the sea to the mountain. It runs up large below and small above. From the mountain road to “**Puukalepa**,” the **Kaula** gulch is between **Humuula** and **Kaala**.

CX’d. – The boundary from **Iolehaehae** to **Poopuaa**, a hill below, then to **Puukalepa**, at **Kaula** gulch. I know **Lahohinu** on **Humuula**, near the road, a small road, the Government road is above that. **Lahohinu** is near **Kaula** gulch; then up to **Puukalepa**. **Poopuaa** is on **Kaala**. I gave names of the lines of hills.

The testimony of Nakupuna, *kane*, taken before Judge E.W. Barnard, at **Laupahoehoe**, North Hilo, the witness being too old and feeble to come to town. August 14, 1891, produced by Government agent, and allowed by Crown Agent.

Nakupuna^K being duly sworn, said:

Commencing at **Puukihe**, **Koholalele** joins with **Kaohe**. **Kukaiau** *makai* **Kaohi** [**Kaohe**] *mauka*. **Ahuapuaa**, **Kaohi** *mauka* **Kukaiau** *makai*. At **Waikulukulu**, **Kaala** and **Humuula** join; **Kanakaleonui** is the next point. **Humuula** is *makai* and **Kaohi** is *mauka*. **Wakiu** sand is on **Kaohi**. **Puhinahina** next with **Humuula** *makai* and **Kaohi** *mauka*. **Puuloa** with **Humuula** *makai* and **Kaohi** *mauka*. **Kalepeamoa** with **Humuula** *makai* and **Kaohi** *mauka*. **Puhuluhulu** next point. **Kaohi** extends over to Kau and Kona. **Kaala** joins **Humuula** at **Lahohinu**. [Volume D page 56]

I am old and an old resident and went in the mountains with the kamaainas.
(Signed) “na Kupuna”

Subscribed and sworn to before me this 14th day of August 1891.
The above witness is a very aged man, said to be 100 years of age.

E.W. Barnard, Notary Public, III Judicial Circuit.
(L.S.)

Witnesses of Crown Agent.

A. Haneberg, S.:

I am lessee of **Humuula**, residing at **Humuula**, mostly at **Kalaeaha**, about four years. Know the boundaries of **Humuula**. Had a man in my employ, A.P. Deverill, who had been on the mountain over 22 years. He pointed out the boundaries to me.

Commencing on **Mauna Loa**, at a prominent stone called **Pohaku Hanalei**, runs from there to “**Omaokoili**” hill, then *mauka* to **Kalepeamoa**, then to prominent hill called “**Kole**,”

then following edge of vegetation to **Kaupakuhale**, from there to **Kanakaleonui**, thence to **lolehaehae**; but from **lolehaehae** he was not certain to give the boundary definitely. In his opinion, part of **Kaala** belonged in reality to **Humuula** and **Humuula** boundary adjoins **Kaula** gulch.

CX'd. – Deverill told me after I went to **Humuula**; he was then in my employ.

He brought **Kaala** higher up, but I cannot remember the exact points, as I was not acquainted then, and lived at Kalaeaha.

Crown produces Book A of the Boundary Records, the testimony taken regarding **Humuula**, page 28, &c.

Crown Rests

J.F. Brown asks to continue the hearing to Honolulu, for further testimony, [Volume D page 56] which request is declined, for want of Jurisdiction out the Illrd Circuit.

Continued by request of the Government agent and assented to by Crown Agent, until return mail from Honolulu, to file briefs of the testimony.

F.S. Lyman, Commissioner of Boundaries

Briefs filed, and case submitted.

Decision

It is decided that the Boundary between the Crown Land, **Humuula**, District of Hilo, and **Kaohe**, and other lands of the Hawaiian Government, District of Hamakua, Island of Hawaii, is as follows:

Commencing at the South corner of **Kaala**, as surveyed, Land Commission Award 9971 at a point in the **Kaula** gulch near "**Lahohinu**," by the upper edge of the forest, and run up the main branch of the **Kaula** gulch called "**Waikulukulu**," between **Humuula** and **Kaala**, to a point near "**Puu Kalepa**," thence along the **Waikulukulu** gulch, between **Humuula** and **Kaohe**, to "**Kanakaleonui**," thence in direct lines along the boundary between **Humuula** and **Kaohe**, to "**Kaupakuhale**," thence to "**Kole**," thence to "**Lepe a Moa**," thence to the west side of "**Omaokoili**" hills, thence to "**Pohaku Hanalei**," on the North slope of **Mauna Loa**. Surveys to be made and filed before certificates of Boundaries are issued.

F.S. Lyman, Commissioner of Boundaries, 3d Judicial District, Hawaiian Islands
Hilo, Hawaii, October 3, 1891

October 17, C.P. Iaukea, Agent for Crown lands, notes appeal to the Supreme Court.

Costs 2 days employed on case \$20.00

16 folio record at .25 c. 4.00

\$24.00

Return of appeal 1.00

Bond filed for Costs on appeal \$25.00 Paid.

Makahanaloa Ahupuaa
Volume A No. 1:175-176
District of Hilo, Island of Hawaii

...Petition read as follows:

Honolulu, April 26th 1873.

(copy) R.A. Lyman, Esquire, Commissioner of Boundaries for Hawaii
&c &c., Hilo

Dear Sir:

Your letter of 14th instant was received this morning, and in answer to your suggestion about settlement of the boundaries of His Majesty's lands in Hilo and Puna, I now apply in his behalf to you to settle and define the boundaries of the following named lands, viz.

Makahanaloa and Pepekeo in Hilo. They are bounded on the North by Kaupakuea belonging to Afong & Achuck and ***Hakalau*** belonging to W.L. Green, on the South by ***Piihonua*** belonging to the Crown, Papaiko [***Papaikou***] belonging to D.H. Hitchcock, E.G. Hitchcock & C.N. Castle. Onomea belonging to S.L. Austin; Kawainui belonging to the Hawn Government. [page 175]; *mauka* by ***Humuula*** belonging to the Crown and *makai* by the sea.

Keaau in Hilo and Puna. This land is bounded on the East by ***Waiakea*** and Olaa, belonging to the Crown, on the west and *mauka* by Waikahekahe, belonging to Kaea *wahine*, and Kahaualea, belonging to the King and *makai* by the sea.

Keahialaka in Puna, Hawaii. This land is bounded on the North by Kapoho belonging to C. Kanaina, and Pohoiki, belonging to the Government; on the South by Malama and Kaukulau, belonging to the Government and *makai* by the sea.

Honuapo, Kau, Hawaii. This land is bounded on the North by Hionaa belonging to the Government, and on the South by Kioloku, also belonging to the Government and *makai* by the sea.

Pakiniiki in Kau, Hawaii. This land is bounded on the West by Pakini nui belonging to Estate of M. Kekuanaoa, on the east by Keaa, belonging to the Government and by Kamaoa, belonging to R. Keelikolani, and *makai* by the sea.

Maps and notes of survey of each of these five lands, are enclosed herewith.

If any of my descriptions of adjoining lands or ownership are incorrect, please correct them.

If you should not have time to give the necessary notices, according to law, so as to have the settlement attended to while Mr. Judd is with you, you will please employ some suitable person to attend and protect the rights of His Majesty. Of course, all must be done according to law, so that it will stand forever.

Very truly Yours,
C.R. Bishop, Acting for the King

Makahanaloa
Volume A, No. 1:182-190
The Ahupuaa of Makahanaloa, District of Hilo,
Island of Hawaii, 3rd J.C.

At the Office of the Boundary Commissioner in Hilo; On this third day of June A.D. 1873 by adjournment from the 2nd instant; the application of Hon. C.R. Bishop for the settlement of the boundaries of **Makahanaloa** and Pepekeo came on to be heard before the Commissioner of Boundaries for the 3rd J.C., after due notice of the hearing having been given in the Hawaiian Gazette of May 7, 1873 and the *Kuokoa* of May ____ 1873, for the 2nd instant and notice personally served on owners of adjoining lands as far as known.

Present: G.W. Akao Hapai for Hon. C.R. Bishop; W.P. Ragsdale for Crown Commissioner; J.H. Nawahi for Hawaiian Government; D.H. Hitchcock for self. Surveys of Onomea and **Hakalau** filed.

For Petition see Folio 175.

Testimony
Kahulanui, ^K, Sworn.

I am a *kamaaina* of **Kaupakuea**, was born on that land during Kamehameha I reign; was formerly a canoe builder and used to go up in the woods. I know the place where Kaupakuea joins **Makahanaloa**. It is called **Nahuina** on *Kahawai* of Aliia; the boundary between Kahua and **Makahanaloa** follows up the *kahawai* of Aliia to **Nahuina** junction of Kaupakuea; there the boundary leaves the *kahawai* and runs up the old road; crosses the gulch **Nahuina** and thence runs up the *pali* to Kaekuapuaa, on the hill of Uku [**Kauku**] where they used to let canoes down; thence mauka along road to pali Kapoohoohua on Uku hill; thence down along the road; **Makahanaloa** mauka and Kaupakuea makai, down to the foot of the hill to Mahiakala, old *kauhale*; Kalawai was on **Makahanaloa** and Kaupakuea towards Hilo; thence turn mauka and up to *kahawai* Waiaka; **Makahanaloa** on this side, Kaupakuea on the other side; thence up the gulch, which belongs to **Makahanaloa**, mauka to Puhimoku, here [page 182] *Honomu road comes in, at the end of Kaupakuea, and Honomu joins the road on Makahanaloa, runs up between this gulch and Waiama*; thence the boundary runs mauka along Waihaka gulch to Keopuewa.

This is as far as I have been shown boundaries. Have been told by my parents that the boundary runs up the gulch Waihaka to Kaleilehua; thence to Kahoolana, a place on Waiama gulch; follow said gulch to end thence up along Waiama gulch to Kapuulepo; thence to Kawaiulaula, end of Honomu; thence along Waiama gulch **Hakalau** on one side and **Makahanaloa** on the other side to **Kaukoa** (end of tall *koa* trees); thence to **Kapuuakala** where **Makahanaloa** is cut off by **Humuula**.

The *mamani* grows on **Humuula**, the water is called **Kapuuakala**. I have been up the road on **Makahanaloa** with John Pilot and saw a place called **Kapuuakala**; this was before the land was surveyed. Kamanu ^K. and Kapoumooakea ^K. were his *kamaainas*. Kamanu was an old bird catcher from Kaiwiki near Wailea, and lived on Kahua. Kupouli was a **Hakalau** man; my Father was a canoe maker.

CX'd.

Kapuakala is not entirely through the woods, but is above the *koa* trees. There are a few scattering *mamani* below the appendage of *koa*. The place called Kapahu is some ____ Waikoloa, on the mauka boundary of **Hakalau**.

Wahamu,^K, Sworn.

I belong to **Makahanaloa** and Pepekeo, and now live on Kawainui. Was born at **Makahanaloa** before the first missionaries arrived. My Father was a bird catcher and used to go up on these two lands to catch birds. The boundary on the North side is at *kahawai o Aliia*; thence up the *kahawai*, and into the woods, to a short distance below a place called **Nahuina**, which is the end of Kahua; thence along Kaupakuea along the old road to Uku hill; thence the boundary runs over the side of said hill $\frac{3}{4}$ of it belonging to **Makahanaloa** and down to Waihaka *kahawai* (branch of the Waiama); thence along said gulch to *makai* of Kaholopohaku; thence follow up Honomu road, Honomu [page 183] joins **Makahanaloa**, where Waihaka gulch ends; thence follow up the road. I do not know where Honomu ends. *Laa,^K, father of Hanauna went up mauka with me; he was a Humuula man; we went up the road and camped where they were killing bullock on the mountain. While we were on the mountain we came to a gulch which he said was Kolekole gulch, and the boundary between Makahanaloa and Hakalau. Found bird catchers catching mamo. We went up the hill Puuwai, on Hakalau, in the woods, went to Kanepuu on Hakalau. Makahanaloa is very near this place. Slept there. Laa said he was kamaaina here.* We went on to Waikoloa and to Kapahu, thence we went further up to Kapahunui, a water pond, about as big as Kalepolepo. He said both of these ponds were on **Hakalau**. Thence we went out of the woods to **Palauolelo**, a water spring in the *kahawai*; *kauhale maluna kualapa* there; he said **Palauolelo** was on **Makahanaloa**. We saw the *pili* down below, said to be the end of **Makahanaloa**. A few days after we saw Kahue,^K, at **Palauolelo**, but he did not say anything about the boundaries. I have been up there about four or five times since, and have always heard that was the boundary. Have been up since the land was surveyed; saw a pile of stones on the *mauka* corner of **Palauolelo** near a place called **Kaloloa**. Laa said the tall *koa* and *ohia* were on *makai* lands, short *koa* and *mamani* on **Humuula**.

The boundary at shore between Pepekeo and Kulaimano is a *kahawai*, Waimaauau; thence up said gulch to a place called Keanakekea; thence leaving the gulch the boundary runs up an *awaawa* to the Government road; thence *mauka* to a stream (Here Henry M. Lyman surveyed it); thence follow up stream some distance to *awaawa*, up the *awaawa*, between hills to a grove of bamboo. (Wailani is on the Puna side a short distance from the bamboos); Thence up a ridge to the top of small hill called Puupulololuu, between the large hills; thence *mauka* to Waiama gulch, some distance above the hill *mauka* of where water is taken out onto the land, Holoinopii is the name of the place there. Kulaimano ends and Pepekeo reaches to gulch. Kawainui on Puna side of the gulch; thence up [page 184] along Puna side of **Waiama** gulch to *Pawai* where water was taken out for making a bullock pen. The name of this *pawai* is *Waiku*; thence *mauka* into a branch of the Waiama on Puna side, called *Niau*; thence the boundary runs along Kawainui to where *Niau* joins Waiama again; thence *mauka* to a second water head on Pepekeo called *Nau*, where water was taken out for a sugar mill on **Makahanaloa**; thence *mauka* along Puna side to Kukailimu, an old rock that used to be worshipped in the woods opposite Uku; here Pepekeo ends. The woods commence at *Nau*, where **Makahanaloa** cuts Pepekeo off; thence the boundary of **Makahanaloa** runs along Kawainui to Waimana, where two gulches of Kawainui meet and where the water is taken out for Onomea Plantation; thence *mauka* along *kahawai o Kapukou*, on the Puna side, *mauka* to Kumuohia, on **Makahanaloa**, where bird catchers used to live. There *Kahawai o Piikai* comes in and the boundary runs up this gulch; Onomea on the Puna side of *Piikai*.

CX'd

My parents showed me the boundaries of the lands. I am one of the lessees of Kulaimano.

J. Ili, ^K, Sworn

I knew Henry M. Lyman; went with him to survey **Makahalanaloa**. He surveyed the land as Kapounooakea and Kamanu pointed out the land. They were both quite old men at that time.

Kamanu went first, about one third way through the woods; then returned, I. Kapela, now dead, Keawehawai and Lua, then went with him. Also two kamaainas and a man whose name I do not remember. We went up on the land to a place above, and Puna side of Uku, where canoes were got out; went up still further till we came to a gulch; thence went up a road cutting cross lines to places on the boundary, as the *Kamaaina* pointed it out; worked several days and came to *kahawai* of Kolekole and was told **Hakalau** was on Hamakua side of this gulch. Before we came to this gulch we came to **Nahuina**, where **Hakalau** road comes in. Above this we came to a [page 185] water fall, as we went up I did not hear the names of any points on the boundary, about one quarter of the way from the upper edge of the woods we came to bullocks, then we came to a hill, think the name was Puuwai; they said it was on **Hakalau**; thence we went to what was called out of the woods (*puka iwaho*) where small *koa*, *mamani* and *pili* were growing; we were on Puna side of a place called Kaloloa, where tall and small trees were growing, this place was pointed out to me as the boundary between **Humuula, Hakalau and Makahanaloa**. We put up a pile of stones there. From this pile of stones we surveyed across to old *kauhale* called **Palauolelo**; **Humuula** mauka and **Piihonua** on the South side of **Palauolelo**. The kamaainas only said **Piihonua** joined there; the tall trees were said to be on **Makahalanaloa** and the small woods on **Humuula**.

We put a pile of stones near the place where **Piihonua** joins. This is as the kamaainas told us.

CX'd.

I recognized **Palauolelo** when I went up with the party that surveyed Paukaa. There is a *loko wai* near the **Hakalau** boundary, but I do not know the name.

Kamalo, ^K, Sworn

I know the *mauka* boundary of **Makahalanaloa**; was born on Punahoa at time of Kanihonui. I am a bird catcher and have lived on **Piihonua** and on the mountain. Makahiki a **Humuula** man pointed out the boundary to myself and others at the time we were catching cattle on the mountain. He said **Palauolelo** was the boundary of **Makahalanaloa** and **Piihonua** and **Kaloloa** was on the other corner and **Humuula** mauka. Above these places small *koa* and *mamani*, makai of there, tall trees and *pili*. **Palauolelo** is an *kahawai*. The *koa* and *mamani* are on **Humuula**; in dry times there was water there in holes about the time of the death of Leleiohoku [Leleiohoku] in 1848 or 1849.

CX'd. [page 186]

Kahue, ^K, Sworn

I was born at **Humuula** a little before the Okuu [ca. 1803]. My parents belonged there, the boundaries of lands joining **Humuula** have all been pointed out to me. I know the boundaries between **Humuula** and **Makahalanaloa**. They join at Kapahee, which is on **Hakalau**; this land joining **Makahalanaloa** at this point also; thence to **Pohopaele**, an old village on **Makahalanaloa**, at a swampy place, above this swamp, **Humuula** people had their houses, below here **Makahalanaloa** people took our feathers away. At **Kapahee** **Hakalau** people took our ducks away; thence along **Humuula** to **Waikoloa**, where **Papaikou** joins **Makahalanaloa** and **Humuula**.

I met Kamalo, ^K on the mountain where we were killing cattle. Makahiki came from Kau, he is now dead. He used to go with me when I went after bullock. I have lived all over the mountain. Kapahee is on **Hakalau**, near **Makahanaloa**; it is in the woods, probably not a mile from the upper edge of the woods. It is not a mile from Kapohokele to the upper edge of the woods.

Waikoloa is a round water hole not a mile from the edge of the woods.

CX'd.

The *mamani* do not grow near these holes, said holes being in the tall woods of *Ohia* and *Koa*; know a place called **Kapuakala**, it is on **Humuula** out on the *pili*, where our houses used to be. **Humuula** people used to go and catch birds on *Ohia* trees.

CX'd. By Commissioner.

Wiltse was first shown the boundaries by Waiki *ma* and afterwards by myself. We pointed them out to him from above the woods. Did not go to the *mauka* boundaries of **Hakalau** and **Makahanaloa**, and we could not see for certain where these localities were from our position above the woods as there were not any flags put up at these places. **Palauolelo** is above the woods, above **Makahanaloa**; and **Hakalau** is near the woods and near to Kapahee. It is about as far as from here to Kupahai gulch. Palaualelo is about as far as from here to Waipilopilo (Sam Guess' _____ place) from Pohopaele. [page 187]

It is about as far from **Palauolelo** to **Kaloaloa** as from Hilo court House to the church in Puueo; from **Palauolelo** to **Waikoloa** it is about the distance between Hilo Court House and Wainaku, *Mamani* and *koa* grow at **Palauolelo**, where the water hole is. I have never told any one that this place is on **Hakalau**. **Kapuko kahawai** is on the boundary of **Paukaa** and **Piihonua**, and is called **Nukupahu** in the woods.

Note:

Pii, ^K, was allowed to go home yesterday on account of the illness of his wife, other witnesses not here.

Case continued until further notice to all parties.

R.A. Lyman, Boundary Commissioner, 3rd J.C.

Hilo, June 20, 1873

The Commission of Boundaries, after due notice to interested parties, met at the Hilo Court House.

Present: G.W. Akau Hapai, L.W. Kaainoa in place of W.P. Ragsdale.

Nahale, ^K, **Sworn**

I was born at Onomea, at the time of Namakeha's death [1798], at **Piihonua**, and the last war of Kamehameha I. I always lived at Onomea till after Austin moved there, when I moved to Paihaloa; know the lands of **Makahanaloa** and Pepekeo; am a *kamaaina* and know the boundaries. *Each one of Hilo lands used to have its Konohiki and in those days each Konohiki used to point out the boundaries of their lands.*

The Aliia Gulch is the boundary between Kahua and **Makahanaloa**, from the sea shore into the woods on the *makai* side of Uku hill, at a sort of swamp, which I do not remember the name of. There Kaupakuea joins **Makahanaloa**, the whole of the gulch belongs to **Makahanaloa**, and the level land on the North side to Kahua. Thence along Kaupakuea to Waiaama gulch, on the South side of Uku.

Do not know about boundaries of **Makahanaloa** above this point. On the North side, **Makahanaloa** and Pepekeo lay side by side from sea shore to where Pepekeo ends in the woods. They are bounded *makai* by the sea and had ancient fishing [page 188] rights extending out to sea. Kulaimano bounds Pepekeo on the South side. Waimaanau Gulch is the boundary between these two lands at the sea shore; thence the boundary runs *mauka* in the gulch to a place called Pohoula, a good way *makai* of the Government road (old *kauhale* on Kulaimano); there leaves the gulch and runs up *awaawa* to Government road; thence the boundary runs onto the Northern part of Puuokanoa; The bamboos at a place called Wailani are on Kulaimano. From Puuokanoa, *mauka* to Waiama gulch, a short distance *mauka* of the Kulaimano water head, where Kulaimano ends and Kawainui joins Pepekeo, a large flat rock in the stream, covered with green moss such as grows in the sea, is at this point and is called Pohakupakaiea, said stream belongs to Pepekeo and Kawainui is on the south side of the gulch; the boundary follows up the South side of the gulch into the woods to place called Kukailimu where Pepekeo and Kawainui end, and **Makahanaloa** runs toward the South, cutting off Kawainui; having left the Waiama at a place called Waimana, where Kapuko gulch empties into it; thence the boundary runs *mauka* on the south side of Kapuko gulch; where the akolea (fern) grows in on Onomea; the rock and water is on **Makahanaloa**; thence *mauka* to Kumuohia, an old village on Onomea; thence *mauka* along the gulch to Kapeke, where running water ends; thence up along the land to Kauwauapoho, a swampy place, where bird catchers and canoe makers used to live. Thence *mauka* to Waimana gulch at a place called **Nahuina**, where **Makahanaloa** and Papaikou join, and cut Onomea off. From **Nahuina** the boundary between **Makahanaloa** and **Papaikou** runs *mauka* along the old road, in Waimana gulch, to *Mauka* of Popolo, a short distance above **Nahuina**; there water ends and the *awaawa* runs *mauka* to the end of the tall woods. *The small trees, grass and mamani are on Humuula*. I do not know what land **Palauolelo** is on. Have been to that place. Only the road belongs to Alakahi, not the land.

CX'd.

I used to go bird catching; knew Kapoumoaakea. He was a *kamaaina*, and bird catcher of **Maka** [page 189] **hanaloa**. I knew Kamanohe lived on Pepekeo and Kulaimano, who was also a *kamaaina* and bird catcher. Have not heard if they were the ones who pointed out the boundaries when the land was surveyed.

Commission adjourned until further notice to all parties.

R.A. Lyman, Commissioner of Boundaries, 3d J.C.

Volume B:170-173

**The Ahupuaa of Makahanaloa, District of Hilo,
Island of Hawaii, 3rd J.C.**

Continued from Folio 190, Book A.

Extract from the Journal, taken while on the upper boundaries of **Humuula**.

Hopuwai, Hilo, H.I.

November 30th, 1873

Started at daylight and went along the upper edge of forest passing **Nawaiheu** Gulch to **Kaloloa**; there left the trail to **Laumaia**, and went into the woods for some distance on the Kualapa boundary between **Hakalau** and **Makahanaloa** to opposite Puuwai, a hill on **Hakalau**; there left the boundary and went onto **Makahanaloa** crossing the **Aama** gulch, and camped on **Makahanaloa** some distance *makai* of **Puuwai**. Kahue says Puuwai is a

long distance *makai* of the point he claims as the boundary between **Humuula, Hakalau and Makahanaloa**.

December 1st, 1873

Left camp and walked up to where we struck the ridge that runs into woods from *makai* of **Kaloloa**. We went onto ridge a good way *mauka* of **Puuwai**.

After a good deal of persuasion Kahue pointed out a hollow on the top of the ridge as **Pohopaele**. At this point the *Kualapa* is quite high and slopes off rapidly towards the shore. It is impossible for this point to be seen from **Kaloloa** as it is below the edge of the woods.

It took us twenty minutes to walk from this point to what is now the upper edge of the forest.

*The upper portion of the forest is full of dry trees laying all over the ground. Kahue pointed out to us where the woods used to run, it was close to **Laumaia road**. We then proceeded to the **Palauolelo** gulch. [page 170]*

Decision

Given at Hilo, this 19th day of May A.D. 1874

After carefully examining the testimony taken as to boundaries of **Makahanaloa** at hearings for settlement of boundaries of **Makahanaloa** in June A.D. 1873, and at the hearings for settlement of Boundaries of **Humuula** the following November, and from going onto the ground with Kahue, December 1st 1873, and waiting from that time for any new evidence that might be offered in relation to *the boundary between Makahanaloa and Humuula*. There appears to be no dispute as to the boundaries of either side of **Makahanaloa**, until you come to the boundary of **Humuula**. There the question comes; whether **Makahanaloa** and **Hakalau** corner with **Humuula** at **Kaloloa** or at **Pohokaele**, in the woods?

We have it in evidence that the survey of **Hakalau** made in 1853 and **Makahanaloa** in 1852 were made to extend to the upper edge of the forest.

Waiki, a *kamaaina* of **Humuula** and the **Hakalau** *kamaaina* pointed the boundaries out to the surveyor at the *mauka* edge of the forest.

And it is admitted by most of the witnesses that Kamanu, and Kapoumoakea^K were bird catchers, and *kamaaina* of these lands, and that *the boundary between this land and Humuula was surveyed as pointed out by them. And at that time the wild unbranded cattle on the mountain and in the forest, were all the property of the Hawaiian Government, and leased by one party, and the hope of getting a few wild cattle for their land, could not have been an inducement for these men to point out wrong boundaries. The bird catchers and old residents of this District, with one exception, state on their oath, that in olden times the birds caught in the forest were the property of the shore lands and were claimed by the owners of those lands if taken by Humuula people, [page 171] and those captured on the mamani were the property of Humuula people.*

It is unfortunate that the boundaries were not settled, when these bird catchers were all living, as in olden times, the feathers were more thought of than the wild cattle are now; but in 1852 and 1853, when these surveys were made, there were a good many of them still living and if any of them had attempted at that time to make new boundaries, the others would have very quickly complained to their *Konohiki* about it.

The boundary seems to have been quietly accepted until the survey of **Humuula** was made, when the boundary was pointed out by a **Humuula** man from the *mauka* edge of the woods, as being some where in the forest, and he states on his oath, that none of them went to the point he considered as the boundary between these two lands, and after going into the woods with this man, he points out with great reluctance **Pohopaele** as the boundary.

I am forced to the conclusion that this point cannot be seen from the upper edge of the woods, and that that survey cannot be correct.

The evidence on **Makahanaloa** is clear that the survey was made as pointed out by the *kamaaina*, commencing on the north side, at the mouth of Aliia gulch, and following up that gulch, to the edge of the woods, and thence cutting through the forest, cutting lines across the land, to points on the boundary of the land, as pointed out by the *kamaaina*, and so on through the woods to the Puna side of Kaloloa; thence to **Palauolelo**, the other corner of the land above the forest.

*It appears that this survey of 1852 was correctly made, and that at that time **Makahanaloa** extended to the upper edge of the forest. It also appears that the forest, at that time, extended further up the mountain than now. [page 172]*

Anyone going there can see that the upper edge of the forest is dieing off leaving these points further out on clear ground, so that what was the mauka edge of the forest in 1852, is now in clear ground.

I therefore decide the boundaries of **Makahanaloa**, to be as given in notes of survey filed by applicant, and will issue a Certificate of Boundaries accordingly, with costs.

R.A. Lyman, Commissioner of Boundaries, 3rd J.C.

Costs in full including Certificate paid May 27, 1879; 59.-

For Certificate of Boundaries see No. 36, Folios 18 & 19, Liber I.

For Costs see Folio 19, Liber I.

Volume 1, No. 3:18-19

For Testimony see Folio 170, Book B.

No. 36

Land Boundary Commission, Hawaii 3rd J.C.

**Certificate of the Boundaries of Makahanaloa,
District of Hilo, Island of Hawaii, 3rd J..**

Upon the application of C.R. Bishop, and by virtue of the authority vested in me by law, as sole Commissioner of Land Boundaries for the Island of Hawaii, 3rd J.C., I hereby decide and certify the boundaries of the *Ahupuaa* of **Makahanaloa**, situated in the District of Hilo, Island of Hawaii, to be as hereinafter set forth.

Given under my hand at Hilo, Hawaii,
this nineteenth day of May A.D. 1874

R.A. Lyman
Commissioner of Boundaries, 3rd J.C.

Boundaries of Makahanaloa & Pepekeo.

Beginning at the sea shore, on the Northern *makai* corner of the land, at the mouth of the Aliia gulch, and running *mauka* in the gulch along the boundary of Kahuwa South $67\frac{3}{4}^{\circ}$ West 6.31 chains; South $58\frac{1}{3}^{\circ}$ West 10.96 chains; South $68\frac{3}{4}^{\circ}$ West 13.50 chains; South $39\frac{1}{2}^{\circ}$ West 60.90 chains; South 60° West 23.24 chains to a point in the government road. Thence still along the gulch South $58\frac{2}{3}^{\circ}$ West 98.20 chains; Thence South 76° West 181.00 chains along to the South peak of hill (called Uku) in [page 18] the woods; Thence along Kaupakuea and Honomu South $75\frac{3}{4}^{\circ}$ West 512.40 chains to a water fall in the Kolikoli gulch; thence along boundary of ***Hakalau*** South $67\frac{3}{4}^{\circ}$ West 362.00 chains to upper edge of forest to South side of Kaloloa near Kolikoli gulch; thence *along the road from Waimea to Laumaia* South 4° West 58.40 chains to "***Kapuko kahawai***" at ***Palauolelo***.

Thence toward the sea North $72\frac{1}{4}^{\circ}$ East 860.40 chains; North $60\frac{3}{4}^{\circ}$ East 60.10 chains to rock called Kukailimu in the Waiaama gulch; Thence down the gulch along boundary between Kawainui and Pepekeo North $78\frac{3}{4}^{\circ}$ East 156.80 chains to a place where the gulch turns to the South East; Thence along gulch South 26° East 8.09 chains; North 82° East 9.41 chains to a pile of rocks at the *mauka* corner of Kulaimano; Thence along boundary of Kulaimano North 56° East 9.39 chains to top of Hill, Puu o Kanoa; Thence across the middle of the hill North $39\frac{1}{2}^{\circ}$ East 6.76 chains; North $51\frac{1}{8}^{\circ}$ East 18.89 chains and North $59\frac{3}{4}^{\circ}$ East 10.74 chains to the "*auwai*" below the hill; North $82\frac{1}{2}^{\circ}$ East 17.60 chains; North $82\frac{3}{4}^{\circ}$ East 22.40 chains; North 71° East 16.80 chains to an *awaawa* at the Government road from Hilo to Hamakua; North $59\frac{1}{4}^{\circ}$ East 29.00 chains; North $75\frac{1}{2}^{\circ}$ East 5.74 chains; South 69° East 29.25 chains; North 56° East 7.46 chains; South $82\frac{1}{2}^{\circ}$ East 2.00 chains to the sea shore at the mouth of the Waimaauau gulch; Thence along the shore North $7\frac{3}{4}^{\circ}$ West 78.20 chains; North $1\frac{3}{4}^{\circ}$ West 18.20 chains; North 9° West 20.48 chains to the point of commencement.

Comprising an area of Seven thousand six hundred Acres, as surveyed by H.M. Lyman, A.D. 1852.

Pepekeo is an ili of Makahanaloa, and included in the survey of ***Makahanaloe***.

R.A. Lyman
Commissioner of Boundaries, 3rd J.C.

Costs in full 3 days hearing 30.-; 1 day looking at boundary 10.-; recording 44 folio testimony 11.-; Certificate 2.-; stamp 1.

Description certificate 6 folio 3.-; Traveling expenses 2.-;

54.
5.
59.-

Pd. May 27, 1874

Nanue Ahupuaa

District of Hilo, Island of Hawaii

Boundary Commission, Hawaii [Volume A, No. 1 page 454]

[Petition]

I ka Mea Hanohano R.A. Lyman, Commissioner hooponopono no na palena Aina me ka mahalo.

Ma keia palapala noi ke hoakaka aku nei au imua ou penei.

A ke ahupuaa o "Nanue" ma Hilo, Mokupuni o Hawaii ua hookoia no Kawai e ke Kuhina Kalaiaina ma ka Palapala Hooko Helu 23 malalo o ke kanawai i kapaia He kanawai e wehe ai i ka pilikia o kekahi poe Konohiki i loaa ka Mahele Aina mai ka Moi Kamehameha III mai a i aponoia i ka la 24 o Augate M.H. 1860 ; a ma ka la eha o Augate M.H. 1863 ua hoolilo mai o Kiaaina ka hoolina o Kawai i kela Aina o Nanue, a ua lilo ia'u ma ka palapala kuai i kope ia ma ka Buke kope o na palapala hoolilo o ke aupuni, ma Honolulu ma ka Buke Helu 17 ma ka aoao 455.

Eia na Aina e pili ane me "Nanue."

*Ma ka aoao Akau komohana o **Piha**, no Keelikolani ; ma ka aoao mauka mai o **Humuula**, he Aina Moi ; ma ka aoao Hikina Hema o Honohina no Kamakaeha; ma ka aoao Hikina Akau ke kai hononu a ke kailawaia no ko Nanue.*

*Owau no me ka mahalo
D.S. Alapai*

Hilo, Hawaii
Sept. 28, 1873 [Volume A No. 1 page 454]

Nanue Ahupuaa
District of Hilo, Island of Hawaii
Boundary Commission, Hawaii [Volume D No. 5 pages 14-16]

In Re: Nanue, Hilo, Hawaii.

Boundary Commission, 3d Judicial District, Hawaiian Islands, Hilo, Hawaii.
August 22d, 1883

An application to decide and certify the Boundaries of the Land of Nanue, by Keliikanakaole (*wahine*) claiming to be the present owner of said land, in Hilo, Hawaii, awarded to Kawai, No. 23, having been filed with me on the 3d day of July A.D. 1883, and Notice of a hearing of said application having been published in the *Kuokoa* newspaper of July 28th, August 4th and 11th, for a hearing this day, Court opened accordingly, in the Hilo Court House, at the Office of the Boundary Commissioner.

Present: Keliikanakaole *wahine*, H.G. Harding, J. Palau, and Kaiahua.

Evidence

Keliikanakaole (w.) Sworn –

I have lived on the land of Nanue since I was a child, with my parents. Know the boundaries *makai* of said land. On the Hamakua side the boundary is a gulch, which separates it from Kahuku, a Government land, the *makai* part of which has been sold: the stream in bottom of the gulch is the boundary; run up the gulch into the *Ohia* woods, along Kahuku, where the stream ceases, and the boundary runs up the hollow (*awawa*) to "Kaneaa," where Kahuku ends at "Kawau" then the ***Piha*** road comes into the hollow and is the boundary up along between Nanue and ***Piha*** to Kananelu, where Hitchcock's Camp was; then up along road to where road goes into the gulch of ***Waipahoehoe*** at "***Nahuina***"; then up along ***Waipahoehoe*** gulch. I do not know above this.

On the Hilo side, lies the Land of Honohina, separated by the Nanue gulch, which is the boundary from the sea to *mauka* end of the land. The stream in the gulch belongs to

Nanue, the S.E. bank of stream being the boundary. Sea bounds *makai*. [Volume D No. 5 page 14]

Kaiahuna Sworn:

I am well acquainted on the land of Nanue – know the boundaries, it is bounded by gulches on the Hilo side, the Nanue gulch is the boundary, between Nanue and Honohina – the stream of water belongs to Nanue.

On the Hamakua side the Waiehu gulch is the boundary, between Nanue and Kahuku – the stream in the gulch belongs to Kahuku, a Government land. The boundary runs up the gulch to where the water ceases, at the woods, and then up the hollow, in the woods, and on to “Kawau,” at road, which is the boundary to where it joins the ***Piha*** road, where Kahuku ends, and ***Piha*** joins Nanue, the road being the boundary, up to the [Ka] Nenelu, an old village, where Hitchcock had a camp when surveying ***Piha***; thence up to “***Nahuina***,” where the road divides, and the boundary runs up the ***Waipahoehoe*** stream to “Kaahina,” where Nanue ends, and ***Piha*** joins Honohina.

I went with the foreigner who lately surveyed Nanue to the head of Kahuku, where ***Piha*** joins Nanue – I also went with Mr. Hitchcock when he surveyed ***Piha***, to Kaahina. Ku was the *kamaaina* of ***Piha***, and showed us all these boundaries. He is now dead. I was the guide in the recent survey of Nanue.

H.G. Harding – Sworn:

I lately surveyed the land of Nanue – this is the survey I made (produces Map and Notes of survey). These two men, Palau and the other man (Kaiahua) showed me the boundaries. There was no dispute about any of the boundaries. In the Honohina side it is a natural boundary, a gulch and on the Kahuku side the boundary from the sea up into the *ohia* woods, about one mile, is a gulch; a direct course about seventeen chains to the junction of the Nanue and ***Piha*** roads; thence up the road. We did not survey any above the junction, but took the boundary from the survey of ***Piha***. The sea is the boundary *makai*. The Honohina boundary is on the South East bank of the stream. [Volume D No. 5 page 15]

We measured up by the Kahuku gulch, and took offsets to the Honohina side.

Case Costs

Testimony Closed.

The Boundaries are decided to be as given in the notes of survey.

F.S. Lyman

Boundary Commissioner

(Petition)

Hilo, Hawaii, Iulai 3d 1883

Honorable F.S. Lyman, *Comisina Palena Aina*

Aloha oe.

*Ke noi aku nei au ia oe e hoomaopopo ia na palena o kuu Aina, oia no ke Ahupuaa o Nanue, e waiho nei ma Hilo, Hawaii, o na Aina e pili pu ana, oia o Honohina ma ka aoao Hikina Hema, no Kamakaeha, alii, a ma ka aoao ma Hamakua, o Kahuku, no ke Aupuni, a me ***Piha***, no R. Keelikolani; a o ke kai ma ka aoao makai.*

Na'u na

Keliikanakaole, (X kona kaha)

Costs:
to 1 day hearing \$10.-;
to 8 folio record 2.00;
to copy of award 2.50;
to Certificate \$ 2.00;
to 6 folio description 3.00;
to oaths; .50;
Paid \$20.00

Interior Department
To certificate \$ 2.-;
to 8 folio 2.-;
Paid \$ 4.-. [Volume D No. 5 page 16]

***Nanue Ahupuaa
District of Hilo, Island of Hawaii
Boundary Commission, Hawaii [Volume C No. 4 pages 35-37]***

No. 153
Certificate of Boundaries of the Land of Nanue, District of Hilo, Island of Hawaii

L. C. Award No. 23

Commission of Boundaries, Third Judicial Circuit,
F.S. Lyman, Esquire, Commissioner

In the Matter of the Boundaries of the Land of Nanue, district of Hilo, Island of Hawaii –
H.I.'s.

Judgment

An application to decide and certify the Boundaries of the Land of Nanue, District of Hilo, Island of Hawaii, having been filed with me on the third day of July A.D. 1883, by Keliikanakaole w. as present owner of said land, in accordance with the provisions of an Act to facilitate the settlement of Boundaries, &c, approved on the 22d day of June A.D. 1868; now therefore, having duly received and heard all the testimony offered in reference to the said boundaries, and having endeavored otherwise to obtain all information possible to enable me to arrive at a just decision, which will more fully appear by reference to the records of this matter by me kept in Book No. 5 D, pages 14, 15 & 16 and it appearing to my satisfaction that the true, lawful and equitable boundaries are as follows, viz.

Commence at the mouth of the Waiehu Gulch at the sea, and running as follows:

1. South 31° West (magnetic) 23.- chains along East bank of the stream, adjoining Kahuku;
2. South 8° 30' West 16.- chains along East bank of stream; [Volume C No. 4 page 35]
3. South 29° 30' West 23.- chains along East bank of stream;
4. South 39° 30' West 38.- chains along East bank of stream;
5. West 12° South 9.- “ “ “ “ “
6. West 32° 30' South 17.- “ “ “ “
7. South 29° 30' West 17.- “ “ “ “
8. West 33° South 9.- “ “ “ “ “

9. South 34° West 24.- “ “ “ “ “
10. West 13° South 26.- “ “ “ “ “
11. West 36° South 14.- “ “ “ “ “
12. West 3° South 16.- “ “ “ “ “
13. West 37° South 7.- “ “ “ “ “
14. South 31° 30' West 14.- “ “ “ “
15. South 14° 30' West 10.- chains to head of Gulch;
16. Thence South 50° West 17 chains to where Kahuku ends and the Nanue road joins in;
17. South 31° 30' West 28.- chains along **Piha**;
18. South 70° West 16.- chains along **Piha** to the Nuelu [Nenelu];
19. Still along the road between Nanue and **Piha** to within 6 chains of the **Waipahoehoe** stream bearing South 55° 30' West 44 chains;
20. Thence following the Nanue road (The **Piha** road here branches off) and going to a place called Kaahina at the junction of the Kaahina and Painiu streams which form the Nanue stream, South 28° 30' West 51 chains;
Thence following down the Nanue gulch along the stream which is the boundary between this land and Honohina, to the sea, by the following general courses and distances;
21. North 40° East 49 chains
22. North 53° 30' East 85 chains;
23. North 47° 30' East 38 chains;
24. East 35° North 53 chains;
25. North 54° East 68 chains;
26. North 34° 30' East 46 chains;
27. North 40° East 55 chains;
Thence along the sea shore;
28. North 45° West 18 chains;
29. North 32° West 9 “ to point of commencement.

Containing 480 acres, more or less.

As surveyed by H.G. Harding [Volume C No. 4 page 36]

It is therefore adjudged, and I do hereby decide and Certify that the Boundaries of the said land are, and hereafter shall be as hereinbefore set forth.

Given under my hand at Hilo, Island of Hawaii, the Twenty-seventh day of November A.D. one thousand eight hundred and eighty-three.

F.S. Lyman, Commissioner of Boundaries

Interior

Certificate \$2.-;

folio 2;

\$4.-. [Volume C No. 4 page 37]

Piihonua Ahupuaa
Volume A No. 1:238-240
District of Hilo, Island of Hawaii
Boundary Commission, Hawaii

Honolulu, July 7, 1873
R.A. Lyman, Esquire, Hilo

Dear Sir:

Mr. F.H. Harris is authorized by the commissioners of Crown lands to make application to you as commissioner of Boundaries to have the boundaries of all Crown lands on the Island of Hawaii defined. He has a list of the lands with him.

I have also authorized Mr. F.H. Harris to make application to you for the settlement of boundaries of all lands belonging to Estate of His late Majesty and Her Excellency, R. Keelikolani.

I expect to be in Kona by the trip of the "Kilauea" which leaves here on the 28th instant...

I remain, Yours respectfully,
Jno. O. Dominis

Honorable R.A. Lyman, Boundary Commissioner for Island of Hawaii, Hawaiian Islands.
The undersigned would herewith make application for the settlement of the boundaries of the following named *Ahupuaa* or lands belonging to the Crown, viz.:

Waiakea in the District of Hilo bounded by Keaau, Olaa, Kapapala, ***Humuula***, ***Piihonua***.
Piihonua in the District of Hilo, bounded by Punahoa, ***Waiakea***, ***Humuula*** and Pueo, Paukaa & Alae and other lands names not known.
Ponahawai in the District of Hilo bounded by Punahoa, Kukuau & other small lands.
Hakalauike in the District of Hilo, adjoining lands unknown [page 239].
Humuula in the District of Hilo bounded by Kapapala, various lands in Kona and Kohala and Hamakua, and ***Hakalau***, ***Makahalanaloa***, ***Papaikou***, Paukaa, ***Piihonua*** and Waiaka in the District of Hilo.

Your Honor will therefore please appoint a day for the hearing the evidence in the foregoing named lands and having decided upon the same to grant a certificate to that effect to the undersigned.

(Signed) Jno. O. Dominis, Crown Land Agent,
by F.H. Harris, attorney at law,
Hilo Hawaii, August 16th A.D. 1873 [Volume A No. 1 page 238-240; see full letter in records for Humu'ula].

Piihonua Ahupuaa
District of Hilo, Island of Hawaii
Boundary Commission Volume B:20-27

The *Ahupuaa* of ***Piihonua*** 1st, District of Hilo, Island of Hawaii, 3d Judicial Circuit

On this the 8th day of October A.D. 1873, the Commission of Boundaries for the Island of Hawaii, 3d Judicial Circuit met at the Court House, Hilo, for the hearing of the application of J.O. Dominis, Agent of Crown Lands, for the settlement of the boundaries of ***Piihonua*** Situated in the District of Hilo, Island of Hawaii. Notice personally served on owners or Agents of adjoining lands, as far as known.

Present: E.G. Hitchcock for applicant. Notice served by publication in the Hawaiian Gazette of _____ and *Kuokoa* of _____.

For Petition see Folio 238, Book A.

Testimony

Kamalo ^K. **Sworn.** *(same witness as on Ponahawai)*

Ponahawai joins **Piihonua** at a place called **Nahuina**. Punahoa ends at **Puuiki**, and from there to **Nahuina**, Ponahawai bounds **Piihonua** (Punahoa 2nd is owned and Patented by Mess. T. Cone, D.B. Lyman and C.H. Hitchcock).

Kaaumana joins **Piihonua** at **Kawauwai** where bird catchers used to live, said place was destroyed by the lava flow of 1855. Thence the boundary between these two lands runs *mauka* to Kalapalapanui; thence to Kalapalapaiki, on the lava flow; thence to Naumuapaakea, a small island in the lava flow covered by trees; thence to **Kilohana** an *ahu* in the center of the lava flow from which you can see to the shore; thence to **Piliwaleokahalu**, an *ahua* in the flow which is in sight of **Kilohana**; thence to Kapilinui, an island in the flow covered with trees, this is the *mauka* end of Kaaumana and where **Piihonua** and **Waiakea** join. (You come to Kapiliiki before you come to Kapilinui) Thence the boundary between **Piihonua** and **Waiakea** runs *mauka* to **Halehaleakalani**, an *ahua* on the lava flow where bird catchers [Volume B page 20] used to meet the ones who carried up the food; thence to **Mawae**, a small island in the lava flow covered with trees, this is where **Humuula** cuts off **Piihonua** and **Waiakea**. There is an old pile of stones there and when Wiltse surveyed for a road, Keakaokawai and myself built another pile close to it. The first pile was built previous to 1859. Thence the boundary runs along the land of **Humuula** turning towards the right to **Kaelekalua**, an old *kauhale*, where trees are growing. The boundary runs *makai* of the old *kauhale*, and the tall trees belong to **Piihonua**. Thence to **Kalaikahiliku** a grove of *koa* and *ohia* trees, the boundary runs along the edge of the woods. The tall trees being on **Piihonua** and the short ones on **Humuula**. Thence to **Nakalokiolaola** the boundary running on the *mauka* edge of the woods on the *makai* side of this place. Thence to **Kaelewa** a large pond of water and *kauhale* on **Humuula**. Thence along the edge of the woods to **Puuoo** a hill larger than Halai. The boundary runs about as far from said hill as from the Court House in Hilo to the sea shore; on the edge of the bush. Thence along the edge of the bush to **Waikaeiki**, and thence to **Waikenui**, to small *kahawai* branches of the **Wailuku**; thence to **Aama** a cave where people used to sleep. This is in the **Wailuku** stream and belongs to **Humuula**. The boundary is in the edge of the woods *makai* of this place. Thence to **Laumaiaiki**, the boundary running to a *kahawai* *makai* of it; thence to **Laumaianui** a *kahawai*; all these *kahawai* are branches of the **Wailuku**. Thence along the edge of the woods to **Waipahoehoe**, a cave in the *kahawai*; thence to **Lai** a point of the woods, covered with *koa* and *ohia*, *makai* of **Ahuwela**, a hill at the foot of the mountain, which you can see from **Waiakea**. At this point the large trees have been marked and a stone buried by Hitchcock bearing September 1873. **Kalapapainiu** is directly below **Lai**; thence to **Kapuakala**, *kahawai* at the junction of **Piihonua** and **Paukaa** on the boundary of **Humuula**; this place is at the *mauka* end of Honolii gulch, and is the true boundary between these two lands, [Volume B page 21] as told me by my *kupuna* Eleele, Manoawahua, Paliupu, Pumine and Makole. I went with them catching birds from the time I was small till I grew up. Their *kupuna* told them in olden times, these men are all dead.

It is a short distance from **Kapuakala** to **Lai**. From **Kapuakala** the boundary of **Piihonua** runs up to Kalapapainiu, following the gulch; the water in the gulch belongs to Paukaa. Thence to **Ka Puulehu**, a hill on the edge of the gulch; thence to **Puuhaohailele**, *kauhale*

kaawili manu; thence to **Kamokuloulou**, a *kauhale*, among the palm trees; thence to Kawala, the *mauka* corner of Alae; thence along the gulch across the head of Alae to the corner of Puueo. I know this gulch is on the boundary between **Piihonua**, Alae and Puueo. I do not know how wide Alae is at the *mauka* end nor do I know the points on the boundary till you come to Waihiloa, a waterfall on Awehe, but I know the gulch is the boundary between Puueo and **Piihonua**. Thence the boundary between these lands runs along the center of the gulch to the junction of the Waiele, with the **Wailuku**; thence along the **Wailuku** gulch to the shore. The *sea water belonged to Wailuku but the tide water at the mouth of the gulch belonged to Piihonua*; also the shallow water at the foot of the land, deep sea belongs to **Waiakea**.

CX'd.

Kahue in a conversation with me told me that the boundary of **Piihonua** and **Humuula** was at **Nahuina**, on the **Wailuku** river. This conversation took place just before our giving testimony on the boundaries of **Makahalanaloa**.

He made offer to me (which I understood as endeavors to bribe me) to give evidence the same as his, whereby he and I could make money.

CX'd.

I used to go bird catching on Piihonua with Malo and others. Humuula people catching birds outside of the woods, and Piihonua people catching them, to the mauka edge of the woods. That was the boundary and my kupuna told me fights used to occur when the Humuula men went below the [Volume B page 22] edge of the woods, or if the Piihonua people went above them. From the time I was young to the present day, I have caught birds without hindrance from the Humuula people, within the boundaries I have defined.

Manuia^K. Sworn:

I was born at **Piihonua** during the time of Kamehameha I and have always lived there until a short time since. Know a part of the boundaries, was shown them by Kaumu (my Father), Puukia Mano and Awakua my *kahu hanai*, these men are all dead. They were bird catchers, and I used to go into the woods with them. I have been a bird catcher from my youth to the present time. Know junction of Ponahawai and **Piihonua**. The junction of Ponahawai and **Piihonua** is in the woods at a place called **Puuiki**, at the *mauka* corner of Punahoa 1st and Punahoa 2nd, thence the boundary runs to **Nahuina**, junction of the old roads. Know the place called Nahaleoeleele, it is a hill *mauka* of **Nahuina**, on the boundary between Kaaumana and **Piihonua**. Ponohawai [Ponahawai] leaves **Piihonua** at **Nahuina** and Kaaumana joins it. From Nahaleoeleele the boundary runs *mauka* to **Kawauwai**, on the lava flow of 1855, know where it is now. Thence to **Kapiliiki** and thence to **Kapilinui**, these places are Islands in the flow covered so thickly with trees and *uluhi* [*uluhe*] that it is impossible to go through them (thence their names). Thence to **Kalapalapaiki** and from thence to **Kalapalapanui**. My parents told me the land of Kaaumana runs very narrow about two chains wide to **Mawae**.

Kilohana is on **Piihonua** and the boundary is on the Puna side of it. **Naunuapaakea** is on **Piihonua** it is partly covered by the lava flow. Mawae is where **Waiakea** and **Piihonua** cut off Kaaumana, and the Mawae was covered up by the lava flow of 1855. I saw a pile of rocks there before the flow of 1852, said to have been put up by a foreigner who was engaged in surveying lands. This pile of stones was on the boundary between **Piihonua** and **Waiakea**. The boundary used to run up old road in a straight line from Kalapalapanui to Mawae; thence the boundary between **Waiakea** [Volume B page 23] and **Piihonua** runs to **Kaelekalua**, small *ohia* trees where we used to catch birds; thence to **Luaonanapapa** a cave where people used to sleep on the Hilo side of the lava flow; here **Humuula** cuts these other lands off. This is as my *makua* told me.

*I have always been told that **Humuula** took the mamani and pili outside of the forest and makai to other lands.*

This is as far as I learned the boundaries from my parents. I learned the mountain boundaries from Kamalo and Naa, when I was working for Mr. Castle (James Castle's father).

Thence along **Humuula** to **Aama**, thence to **Laumaia**, thence to **Waipahoe**, below **Aahuwela**; thence to **Kapuakala**, the mauka end of Honoli. The mauka boundary of **Piihonua** runs along the edge of the forest, the pili and mamani outside are on **Humuula**. Thence follow down **Kapuakala** gulch. I have never been along there in woods. The boundary between Puueo and **Piihonua** follows up the **Wailuku** gulch from the sea shore to a branch gulch called Awehe; thence it runs up this gulch to the junction of Kawala with Awehe gulch, mauka of Waihiloa; thence along that gulch to Namahana; thence across land to **Nahuina**, the mauka corner of Alae and where the Puueo and Alae roads join close to Honolii gulch. Thence to Honolii gulch the boundary running towards Hamakua from Namahana and Honolii, and the land of Paukaa is on the Hamakua side of the gulch. I have been as far as this after birds but no further, have always heard that the boundary between **Piihonua** and Paukaa follows up Honolii gulch to **Kapuakala**. I think Kalapalapanui belongs to **Piihonua**. I never heard of a place called **Lai**.

I have always heard that all the water in the **Wailuku** belongs to **Piihonua** and that the water in Awehe belongs to both lands of **Piihonua** and Puueo, and the water in the Kawala gulch belongs to both lands, also.

Have heard that the water of **Kapuakala** belonged to **Piihonua** and Paukaa. **Piihonua** had fishing rights at the seashore from Puuau to Piilani.

CX'd.

I know a place called **Halehaleakalani**, it is near **Kapilinui** near the boundary [Volume B page 24] Kaaumana and **Piihonua** run through it. **Kapiliwaleokahalu** is on the boundary between **Kaaumana** and **Piihonua** mauka of **Kilohana**. **Kilohana** is not on the boundary. **Waiakea** and **Piihonua** are not cut-off by the land of **Humuula** at Mawae. I am certain that I was told by my parents that these lands extended to Kaelekalua, and from thence to Luaoanapapapa at which place they were cut-off by **Humuula**. Know a place called **Kalaekahiliku**, makai of **Kauluhaku** on the lava flow of 1855, a rock point. It is on **Waiakea** and is mauka of a rocky point called Nakalakiolaola. **Kaelewa** is the name of a pond of water in the woods on **Piihonua**.

Kamalo^K knows the boundaries outside of the woods where he used to kill bullocks; and I know the boundaries where we used to catch birds. Kaaumana runs from **Nahuina** to Mawae, but the land is very narrow. Kukuau ends at **Nahuina**.

Kamoku^K **Sworn.**

I was born and have always lived on Puueo. I am a bird catcher, and have been bullock catching and know some of the boundaries of **Piihonua**. I do not know the boundaries on the **Waiakea** side, only on the Hamakua side. The boundary at shore between Puueo and **Piihonua** is in the **Wailuku** river; thence the boundary runs mauka to the junction of Awehe gulch with **Wailuku** gulch; thence up said gulch to mauka of Waihiloa, and to the junction of Kawala and Awehe gulches; this is as far as I know the boundaries on this side. *I have always heard that **Piihonua** extends through the woods, to the pili grass. And that the mamani and pili are on **Humuula**.* This is all I know about the boundaries.

CX'd.

Piimoku^K Sworn.

I was born at **Piihonua** before the **moku aa** came into Hilo and have always lived on said land and Punahoa, know the boundaries of **Piihonua** as far *mauka* as where Puueo cuts Alae off. [Volume B page 25] Punahoa ends *mauka* of **Puuiki**. Know **Waiakea** and **Piihonua** join at Mawae, I do not know any points on the boundary below Mawae, on that side. *Have always heard that the tall woods are on Piihonua, and the mamani and pili are on Humuula.*

The boundary between Puueo and **Piihonua** is in the **Wailuku** river; thence up the gulch to the junction of Awehe gulch with the **Wailuku**; thence up said gulch to *mauka* of Waihiloa, to the junction of *Kahawai o kahakai o Kawala*; thence along this gulch to the Alae road; where Puueo cuts Alae off. I have heard that Paukaa and **Piihonua** join in the woods.

CX'd.

Hoikaikaeleele^K Sworn.

I was born on Punahoa at the time of Ainoa, at the time Kaahumanu came to Hilo [ca. 1824], olelo o ke Akua; know the boundaries of **Piihonua** on the South East side and on the mountain. When I was young I went with Kamalo, bird catching and killing bullock. Punahoa 2nd bounds **Piihonua** from the shore to a place in the woods called **Puuiki**; thence Ponohawai [Ponahawai] bounds it to **Kilohana**. This information I got from Kamalo. I went on the mountain with Eleele, and he said **Piihonua** runs to **Kaelekalua**, from **Mawae** along **Waiakea**; thence to **Anapapapa**, at the edge of the *pili* where **Humuula** cuts **Piihonua** off and **Waiakea** off. Thence the line runs to **Kaelewa**, thence to **Puuoo**, said place being on **Piihonua** and the *mamani mauka* on **Humuula**; thence to **Aama** on **Wailuku** gulch; thence to **Laumaia** gulch (the place of that name is on **Humuula**). Thence along the *mauka* edge of the woods, to **Waipahoehoe**, thence to **Lai**, thence to **Kapuakala**. **Paukaa** is on the Hamakua of this place at the *mauka* end of Honolii gulch. Eleele said that Paukaa was the other side of the gulch, that **Lai** is on **Piihonua** and **Aahuwela**, is *mauka* of it. **Kapuakala** is *mauka* end of Honolii gulch. [Volume B page 26]

Case continued till further notice to all interested parties.

R.A. Lyman
Commissioner of Boundaries

Case opened according to adjournment on this fifth day of September, A.D. 1874 at the office of E.G. Hitchcock. Hilo Island of Hawaii.

Present D. Kamai for Hawaiian Government; E.G. Hitchcock for Crown.

Kanaloa^K Sworn.

I was born at Alae after the time of Peleleu [ca. 1795], and have always lived there. My parents lived there. Know the boundaries between Alae and **Piihonua**. Alae joins **Piihonua** at Waihiloa on the Awehe gulch. Thence up this gulch to Waiakaulupaha gulch, that comes in from the North side. Thence up that gulch across the head of Alae to the corner of Kaiwiki and from thence straight to Honolii gulch, **Piihonua** cutting off Kaiwiki and Alae.

A place on Honolii gulch called **Waikē** is the *mauka* corner of Kaiwiki.

CX'd.

[Note: **Piihonua** divided into three parcels; No. 1 containing 15.50 acres, Kaipalaoa section, *makai*; No. 3 containing ½ acre, *makai*; and No. 2, the *Ahupua'a*, below.]

Piihonua Ahupuaa
Volume B:286-287
District of Hilo, Island of Hawaii
Boundary Commission

The *Ahupuaa* of **Piihonua**, District of Hilo, Island of Hawaii, 3d Judicial Circuit

Decision

Continued from Folio 27, September 5, 1874...

...No. 2

Commencing at a rock marked P & + on the edge of Waikapu gulch; thence according to notes of survey to D.H. Hitchcock's lot. Thence along said lot and the Catholic lot and Royal Patent No. [left blank] to D.B. Lyman's, to the *makai* corner of T. Coan's lot No. _____. Thence along said Patent to *mauka* end; Thence across the head of Punahoa 1st to Kaaumana as given in evidence to a little below **Kilohana**. Thence along **Waiakea** to lower **Mawae**. Thence passing **Elekalua** to **Kahiliku** to a pile of stones on small hill or *ahua*. Thence *mauka* to a pile of stones on a small hill at the edge of the woods. Thence along the land of **Humuula** following the *mauka* edge of the woods to a large *koa* tree, marked + on the *makai* slope of **Puuoo**. Thence along the *mauka* edge of the woods to point known as **Lai** crossing the branches of **Wailuku**. From **Lai** along *mauka* edge of woods to the **Kapuakala** gulch; the first gulch on the Hamakua side of **Lai**, to the South corner of **Paukaa**.

Thence *makai* along Honoli gulch to *mauka* end of Kaiwiki (at **Waikae** a gulch running in from Puna side); Thence towards Puna to Waiakaulupala gulch 20.00 chains from its junction with Awehe gulch. Thence across the head of Alae and down the Awehe gulch to Waihilioa falls, on Awehe.

Thence *makai* along Awehe gulch the center of which is the boundary between this land and to junction of this gulch with **Wailuku** gulch at Waiele. Thence *makai* along **Wailuku** gulch to the *mauka* end of W.H. Reed's purchase on the Island, Thence along Puna side of said Island to place of commencement on Waikapu gulch.

See Certificate of Boundaries No. 53 for Notes of Survey, Folio 87, Liber I, or No. 3 [Volume B page 286]

Volume C No. 3:87-91
Piihonua Ahupuaa Portions
District of Hilo, Island of Hawaii
Boundary Commission, Hawaii
(For Testimony see Folio 20 Book B)

No. 53

Certificate of the Boundaries of portions of **Piihonua**, District of Hilo, Island of Hawaii, 3d Judicial Circuit

Upon the application of J.O. Dominis, Agent of Crown Lands and by virtue of the authority vested in me by law as sole Commissioner of land Boundaries for the Island of Hawaii, 3d Judicial Circuit, I hereby decide and certify the boundaries of portions of the *Ahupuaa* of **Piihonua**, situated in the District of Hilo, Island of Hawaii, to be as hereinafter set forth.

Given under my hand at Hilo, Hawaii, this Eighth day of September A.D. 1874

R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit.. [Volume C No. 3 page 87]

...Second Piece [*Ahupuaa*]

Commencing at a rock marked P & + on the edge of the Waikapu gulch at the North end of Reed's stone wall near the lower end of this land and running along Waikapu gulch; North 33° 00' East 420 feet; Thence in accordance with survey of lease to W.H. Reed; South 40° 00' East 99 feet; North 48° 00' East 119 feet; South 3° 00' West 122 feet; South 44° 00' East 79 feet; South 36° 00' East 41 feet; North 72° 00' East 35 feet; South 27° 00' East 92 feet; South 62° 00' West 175 feet; South 54° 00' East 90 feet; South 86° 00' West 99 feet; South 55° 00' West 172 feet; South 40° 00' West 230 feet to a lilac tree on the edge of the street at the North West corner of Hitchcock's lot; Thence South 47° 41' West 600 feet along lot owned by Catholic Mission; Thence along Hilo Boarding School lot; South 47° 00' West 603 feet; South 34° 00' West 726 feet [Volume C No. 3 page 88]; South 37° 00' East 142 feet; Thence along D.B. Lyman's land; South 46° 45' west 1550 feet; South 67° 3' West 444 feet; South 59° 45' west 1906 feet; South 66° 30' West 1003 feet to *kukui* marked B; Thence South 86° 15' West 424 feet along T. Coan's land in accordance with Royal Patent No. 1949; North 87° 30' West 797 feet; South 87° 30' West 1372 feet to stone on Puna side of small stream; Thence South 73° 08' West 1278 feet to pile of stones just above *Kukui* grove; Thence South 82° 22' West 2059 feet to flat rock marked P ++; South 63° 00' West 3844 feet to pile of stones on elevation; Thence running up into the woods; South 70° 30' West 43556 feet to the North West corner of Said Royal Patent; Thence along the top of the Royal Patent; South 26° 42' East 7000 feet to Kaumana; Thence along **Kaumana** South 83° 27' West 5230 feet to a pile of stones on the lava flow of 1855; Thence along the land of **Waiakea**; South 78° 15' West 29740 feet to a pile of stones at lower **Mawae** near a small Island in the lava flow; Thence North 82° 82' West 14420 feet to a pile of stones on a small hill or *ahua* at place named **Kahiliku**, thence North 56° 00' West 3215 feet to a pile of stones on a little hill; Thence along the land of **Humuula** following the edge of the woods, which is the boundary; North 4° 38' West 13720 feet to a large *koa* tree standing on the hill known as **Puu Oo**; *This tree is marked + and is 1650 feet from a pile of stones on the summit of the hill.* Thence North 38° 20' East 24220 feet along edge of the woods to a pile of stones at **Lae** [Volume C No. 3 page 89] Thence North 35° 00' East 1650 feet to a pile of stones in a little hollow, a branch of the Honoli at the North West corner of this land, and 2300 feet South of the main **Nukupahu** or **Puakala** gulch. Thence down this gulch into the Honoli and along the land of Paukaa; to which the water in the gulch belongs; North 80° 50' East 53020 feet to a place in the Honolii gulch called Waike, at the head of the Government Land of Kaiwii; Thence South 15° 00' East 2200 feet to the head of Alae in Wailepua gulch; Thence South 31° 30' East 1320 feet along Alae to the Awehi gulch; Thence along this gulch, the center of which is the boundary; South 75° 00' East 2244 feet; South 85° 00' East 2574 feet to Waihiloa falls; Thence along the land of Puueo; South 78° 30' East 12750 feet to Papakolea, the Amaulu Plantation water head; Thence South 45° 30' East 8550 feet to Kalelekawai Falls at the lower edge of the woods; Thence still following the Awehi gulch; North 65° 31' East 1765 feet; South 76° 05' East 2305 feet; South 72° 57' East 673 feet to gingers; South 58° 10' East 688 feet to gingers at the junction of the Awehi and **Wailuku**; Thence South 89° 00' East 2360 feet to pile of stones at the Chinaman's gardens; Thence North 73° 50' East 1692 feet to pile of stones and gingers on the top of Lonokaehu bluff near rainbow falls; Thence North 73° 15' East 2346 feet to P and + cut in a rock; North 67° 05' East 1189 feet along Waikapu gulch to pile of stones; Thence along said gulch North 12° 48' East 420 feet [Volume C No. 3 page 90] to pile of stones; North 57° 44' East 1522 feet to the point of commencement. Containing an Area of 57,280 Acres. As surveyed by J.M. Lydgate...

...Costs paid May 28, 1874 1 day hearing 10.-; 25 folio testimony 6.25; 16.25;
Costs paid October 6, 1874; 1 day hearing 10.-; 5 folio testimony 1.25; 11.25;
Costs paid June 28, 1876; Recorded Certificate 4.25, Certificate 2.-; stamp; 1; Description
Certificate 16 folio; 8.-; 15.25

Paid by applicant: 42.75

Witnesses paid by applicant & owners of adjoining lands. [Volume C No. 3 page 91]

Waiakea Ahupuaa

District of Hilo, Island of Hawaii

Boundary Commission Volume A No. 1 pages 238-240

Honolulu, July 7, 1873

R.A. Lyman, Esq.
Hilo

Dear Sir:

Mr. F.H. Harris is authorized by the
Commissioners of Crown lands to make appli-
cation to you as Commissioner of Boundaries
to have the boundaries of all Crown lands on
the Island of Hawaii defined. He has a list of
the lands with him.

I have also authorized Mr. F.H. Harris
to make application to you for the settlement
of boundaries of all lands belonging to Est. of
His late Majesty and Her Excellency, R.
Keelikolani.

I expect to be in Kona by the trip
of the "*Kilauea*" which leaves here on the 28th
inst. Can't you make it convenient to come
round as the steamer goes to Hilo on that trip.
I wish also to apply for the settle-
ment of the boundaries of Honohina.

I remain,
Yours Respy.
Jno. O. Dominis

Honorable R.A. Lyman
Boundary Commissioner
for Island of Hawaii, Haw. Is.

The undersigned would herewith make appli-
cation for the settlement of the boundaries of
the following named Ahupuaas or Lands
belonging to the Crown, viz.:

Waiakea in the District of Hilo bounded
by *Keaau*, *Olaa*, *Kapapala*, *Humuula*, *Piihonua*... [page 238]

Humuula in the District of Hilo bounded by Kapapala, various lands in Kona and Kohala and Hamakua, and **Hakalau**, **Makahalanaloa**, **Papaikou**, Paukaa, **Piihonua** and **Waiakea** in the District of Hilo... [page 239]

...Olaa in the District of Puna, bounded by Keaau, Wm. C. Lunalilo, H. M. **Waiakea** & Kapapala...

Your Honor will therefore please appoint a day for hearing the evidence in the foregoing named lands and having decided upon the same to grant a certificate to that effect to the undersigned.

Hilo Hawaii, August 16th A.D. 1873

(Signed) Jno. O. Dominis
Crown Land Agent.
by F.H. Harris
atty. at law. [page 240]

The metes and bounds of Waiākea were decided by testimonies and surveys of adjoining lands—‘Ōla’a and Kea’au, Puna; Keauhou and Kapāpala, Ka’ū; and Humu’ula on the mountain lands of Hilo; thus, no further commission proceedings were conducted for the *ahupua’a* (Crown Land) of Waiākea.

Waipunalei Ahupuaa

**District of Hilo, Island of Hawaii,
Boundary Commission, Hawaii, Volume A, No. 1 [pages 251-252]**

Waipunalei, District of Hilo
Hilo, August 22d, 1873

To The Honorable R.A. Lyman, Commissioner of Boundaries for The Third Judicial Circuit, to wit: the Island of Hawaii, Hawaiian Islands

The petition of Thomas Spencer of Hilo, Island of Hawaii, Hawaiian Islands, respectfully represents as follows, that the undersigned petitioner is possessed of a tract of Land called the *Ahupuaa* of Waipunalei, that the aforesaid Land or *Ahupuaa* of Waipunalei was deeded to C.N. Spencer of Waiohinu, Kau, Hawaii, by one I.R. Kaahu of Honolulu, Island of Oahu, by name only and not by survey, and that the Boundaries of the same are as yet undefined; that the following is the list of lands adjoining the said land of Waipunalei, and the owners of the same, as far as the same are known by our petitioner, to wit [Volume A No. 1 page 251].

Haukoa, Government Land
Nakapaa, Government Land
Humuula, Crown Land

That all and singular the premises are within the jurisdiction of this Honorable Commissioner of Boundaries.

Wherefore your petitioner respectfully prays that the boundaries of the said land, called the *Ahupuaa* of Waipunalei, may be decided and certified to, by your Honor, the Commissioner, and that a Certificate defining the said boundaries may be issued to your petitioner, and that to this end a day, hour and place may be appointed for the hearing of this petition, and the proofs there and then adduced, and that due notice according to law may be made to all persons interested in the said matter, to appear and show cause, if any they have, why the said petition should not be granted.

And Your petitioner will ever pray, &c, &c, &c,
(signed) Thomas Spencer

For Testimony see Folio 365, Book B. [Volume A No. 1 page 252]

***Waipunalei Ahupuaa
District of Hilo, Island of Hawaii,
Boundary Commission, Hawaii, Volume B [pages 365-370]***

The *Ahupuaa* of Waipunalei, District of Hilo, Island of Hawaii, 3rd Judicial Circuit

On this, the 24th day of February A.D. 1875, the Commission of Boundaries for the Island of Hawaii, 3^d Judicial Circuit met at the Law Office of E.G. Hitchcock in ***Piihonua***, Hilo, Hawaii on the application of Thomas Spencer, for the settlement of the boundaries of Waipunalei, situated in the District of Hilo, Island of Hawaii. Due notice of hearing personally served on E.G. Hitchcock, Attorney for Commissioners of Crown lands.

The applicant requested that D.H. Hitchcock's [testimony] be taken, as he is to leave for Kona, and will be absent about 2 months. Wishes to have evidence in reference to survey taken, and evidence of other witnesses taken when notice of hearing has been served on all interested parties, as he wishes to have as little delay as possible in settling boundaries.

For Petition see Folio 251, Book A.

Testimony

D.H. Hitchcock, sworn:

I surveyed the land of Waipunalei last January. An old man named Paka was my *kamaaina*. He went with me and pointed out the boundaries. The notes of survey filed are made out from my field notes, made when I was surveying the land. I also questioned Naaikauna *oopa* in reference to the boundaries of the land, and he gave the same boundaries as Paka told me, from the shore, until we reached the point in the woods, that he claimed was the place where ***Humuula*** cut Waipunalei off. I do not remember the name of the place, but think it is opposite the place called Kaukahoku. Naaikauna said that Paka was a good *kamaaina* of the land, but disputed the *mauka* boundary given by Paka. I surveyed to the point given by Paka, as he seemed to be a *kamaaina* that knew the boundaries.

Cross-examined.

Case continued until further notice.

R.A. Lyman, Commissioner of Boundaries 3d Judicial Circuit

Hilo, March 6th 1875

The Boundary Commission met at Law Office of E.G. Hitchcock, ***Piihonua***, Hilo, after due notice to interested parties.

Present: T. Spencer, the applicant, and E.G. Hitchcock for Commissioners of Crown Lands.

For testimony see next page [Volume B page 365].

Waipunalei, Hilo, Continued:

Paka^K Sworn (quite an old looking man, looks to be 70 years):

Says, I was born at Waipunalei, Hilo, Hawaii, at time of Kiholo *mua* in 1804. I now live at **Laupahoehoe**, Hilo. Know land of Waipunalei, and am a *kamaaina*, and know its boundaries.

I lived there 40 years, have lived in **Laupahoehoe** for 16 years, and have lived several years in different [places]. My brother, Keaniho, who used to live at Ponohawai, Hilo, and was drowned in the **Wailuku** River, showed me the boundaries of the land, when we were in the woods together catching birds.

Waipunalei is bounded on the Hamakua side at the sea shore by the land of Kuaia, and on the Hilo side by the land of Hakoa. The boundary at the shore between this land and Hakoa, is at a resting place on top of the *pali* called Puupoohina. Thence the boundary between these two lands runs *mauka* along an old trail to an *oioina* called Kalupeakaiwaiwa; this point is a short distance *mauka* of the Government road. Thence up old trail to *oioina* called Mamala. Thence up to Pooholuaakahi; Thence up to Pooholuaelua, old *kauhale*, where I stopped with Hitchcock when he was surveying the lands. Thence into the woods along old trail to Kalaikukui; thence to **Waipahoehoe** gulch, the *mauka* corner of the land Hakoa. Thence the boundary runs *mauka* along gulch Waipunalei being on the Hamakua side of the gulch and land **Laupahoehoe** laying on the Hilo side of the gulch, to the upper edge of the woods. The gulch is very small near the upper edge of the woods. *A place called Kulanihakoi, a water hole is the mauka corner of Waipunalei. It is at the upper edge of the ohia forest. The koa and mamani trees above this place are on the land of Humuula. Thence the boundary runs along Humuula towards Hamakua to place called Napalua, an old resting place where there are two koa trees; Thence boundary runs towards the sea along Humuula to a large koa tree called Umiolai Kaahumanu; thence boundary runs down old trail to Puuhaalulu; Thence makai to Pihahalei, old kauhale that is about as far makai of camp Pohaku as it is from where we now are to Halai hill. Thence makai to Hilo side of Kehau gulch; Thence to Kamaki, old kauhale; thence along side of gulch to Kalelepali, a pali of the gulch, the mauka corner of land of Paana; Thence leaving gulch to junction at mauka corner of Awawaike land; Thence boundary runs makai in awaawa along small lands, Kuaia boundary being an awaawa to shore. Bounded makai by sea.*

I went with D.H. Hitchcock when he surveyed the land, and pointed out the boundaries to him. He surveyed the lands to the places I pointed out. I was the only *kamaaina* along. Hoakimoa was along with us. [Volume B page 366]

Waipunalei, Hilo, continued

CX'd.

Keawekuaia, an old *kamaaina* of the land also pointed out the boundaries to me. Keaniho was my own cousin and was *Konohiki* of the land, when he pointed out the boundaries. I went three times to Kulanihakoi, the road ran up the middle of the land. **Waipahoehoe** gulch runs up to **Kulanihakoi**. I pointed out the gulch to Hitchcock. No *ohia* trees (or forest) above this place. The *ohia* woods are a short distance *makai* of it. You can tell where Napalua is; there are *koa* trees there, also a *kualapa* that runs some distance

makai to a very large *koa* tree called Umio Kaahumanu; There the *kualapa* ends, and boundary of this land runs *makai* along *kahawai* and *awaawa* that has no name, the land of **Humuula** being on the Hamakua side of *awaawa*; *Makai*, the *awaawa* is called **Kawalii**. **Waipahoehoe** is a branch of **Kawalii**.

The junction of the gulches is called Olohekahawai. The land of Waipunalei does not reach to the junction of these two gulches. The **Kawalii** gulch ends at place where ten small gulches unite, and the place is called Lapapa. Kalupeakawaiwa is on the Hilo side of land. The boundary of Waipunalei ceased to join land of **Humuula** at Kalelepali, a high water fall in the gulch. It is the *mauka* corner of Paana; Thence the boundary runs *makai* to Mahana *awaawa*, the *mauka* corner of Awawaike.

This *awaawa* comes from on Waipunalei, and runs onto Awawaike; Thence the boundary runs down to a ridge, and along ridge to Waianipoa, a hole where water stands, when it rains; Thence boundary runs along land of Kuaia and along *awawa* to shore. None of the **Humuula kamaaina** were present when the survey was made. We marked a good many trees on the boundary as we surveyed the land.

J.J. Porter, sworn, says:

I lived at **Laupahoehoe**, Hilo from 1857 to 1860; went back there in 1861 and remained there till the year 1866. I know the land of Waipunalei, and have had the boundaries of it pointed out at the Government road, from the bullock pen on one side to the hau bushes on the other side. I do not know the other boundaries below the woods or in the woods. I have heard from Frank Davis and Jack Anderson who formerly lived at place called **Lahohinu** above the woods that the land Waipunalei ended just *makai* of that place, and that the bark house they lived in stood on the *mauka* end of Waipunalei. They used to come to my place about every week. Those two men are both dead. When Blodgett was surveying **Humuula**, he stayed at my house at **Laupahoehoe** for two days, and I understood him to say that Waipunalei extended to **Lahohinu**. I have not heard where the other boundaries of the land are.

CX'd.

Have never heard Waikii, Naaikauna or Kahue say anything [Volume B page 367] about the boundaries of this land. They lived at the shore on **Humuula** some way from **Laupahoehoe**. I do not know who owned Waipunalei at that time. We used to get *pulu* from the land, but do not know what part of the land it was picked on. Captain Elderts was the *Luna* of our *Pulu* gang at that time, and lived in the woods.

Hoakimoa^K. Sworn, says:

I was born at **Koholalele** in Hamakua, Hawaii, and am now 34 years old. I know the land of Waipunalei, and have had the *mauka* boundaries and part of the *makai* boundaries pointed out to me. Waiki 1st of **Humuula** pointed out the boundaries to me at the time Abel Harris was picking *pulu*, and having bullock shot on Waipunalei. I was shooting wild bullock for Harris and Waiki Nui went to **Lahohinu** and pointed out the boundaries to me. He pointed out a place called **Kulanaihakoi** as the *mauka* boundary of **Waipunalei** and **Laupahoehoe**. This place is *makai* of the Douglas pit (where Douglas lost his life); **Humuula** cuts these lands off there. The *mauka* corner of **Waipunalei** on the Hamakua side is at a *kualapa* on the Hilo side of **Lahohino**. The *koa* trees and *ohia* are growing at this place, and the *mamani* a short distance *mauka* at place called Kailaua. A short distance *makai* of this *kualapa*, the boundary between this land and **Humuula** runs into a gulch, that runs *makai* into the **Kawalii** gulch. **Waipahoehoe** gulch is in the middle of **Waipunalei**. Waiki told me that the Palipali gulch was the boundary between **Waipunalei** and **Laupahoehoe**.

CX'd.

The boundaries were pointed out to me over 15 or 17 years ago. It was during Liholiho's reign (Kamehameha IV). It was some time before **Humuula** was surveyed.

I do not know where I was at the time **Humuula** was surveyed. Porter was living in **Laupahoehoe** at the time Abel Harris sent Waiki to point out the boundaries, and Frank Harris was staying there with him. I was shooting wild bullock there for Harris about three years. When I was living at **Kulanaihakoi**, I was arrested and taken to Honolulu for shooting bullock on **Humuula**; was tried at the Circuit court at Waimea and cleared by Waiki's evidence, that "I was on **Waipunalei**, and not on **Humuula**. I think that it is over a mile from **Kulanaihakoi** to Douglass' pit.

J.J. Porter for applicant, asks that evidence given by J.A. Simmons, and J. Parker November 3d 1873, as to boundary of **Humuula** cutting off other lands at the *mauka* edge of woods be copied as evidence as to the land of Waipunalei reaching to *mauka* edge of woods.

Granted.

E.G. Hitchcock asks that evidence given by Waiki Nui, and Naaikaunu, November 4 and November 6th 1873 be made a part of record of evidence for boundaries [Volume B page 368] of **Humuula**, as he has no other witnesses to introduce on part of Crown Commission.

Copy of J.A. Simmon's evidence given on boundaries of **Humuula**, November 3d 1873 copied from Folios 28, 29 & 30 of this book.

J.A. Simmons, Sworn:

"I have lived on Hawaii for forty two years and in Hilo District about half of that time. I shot wild cattle on **Humuula** for eight years. This was soon after I came into the country, but I have been there since. I used to live with Ned Gurney at **Lahohino**, a place above the woods on **Humuula**. He had lived there a great many years, and was *kamaaina* of the place. He and others pointed out the boundaries to me. Do not know boundaries in woods—."

(From Folio 29) "The boundary as pointed out to me above the woods runs towards Hilo. The *mamani* &c being on **Humuula** until you come to **Humuula**. I do not know what lands bound it until you come to the land of **Maulua**. The boundary between **Humuula** and **Maulua**, as pointed out to me, is at the edge of the woods *makai* of the *mamani*—".

(From Folio 30)

CX'd. The boundary (as pointed out to me) after it runs through the woods, did not run *makai* into the woods again, but took the *mamani* above the woods. The lands *makai* run through the woods to *mamani*, there may be a tree or two of *mamani* in woods. A great deal of the forest has been killed out by the cattle barking the trees and destroying the underbrush. Therefore the woods do not extend so far *mauka* as they did twenty years ago.—"

J. Parker, Sworn: (From Folio 32 of this Book)

I have lived on Hawaii nearly fifty years, used to live on the mountain, and shoot bullock for Kamehameha III, at the time that the natives were gathering sandalwood. I have often been on **Humuula** after bullock and have heard the natives talking about the boundaries; They said that wherever the *mamani* grew above the woods was **Humuula**, and the land

below the *mamani* belonged to the *makai* lands. I had this from men who were old and gray headed then. In those days the *mamani* did not reach near to the *koa* (woods) there used to be plains between and I always understood that the tall forest belonged to the *makai* lands and the *pili* and *mamani* to **Humuula**. Hemahema's father (now dead) and Paakai who was killed in a pit on the mountain were two of the ones that told me the above. I have always heard that **Humuula** commences at shore and runs up *mauka*, through the woods, but I never heard that it runs back into the woods again. Have been up **Maulua** road and always understood that **Maulua** did not run quite through the woods, but I do not know whether **Piha** or **Humuula** cut it off.

(Copied from Folio 50 of this Book)

Naaikauna, K., sworn:

I was born at **Humuula** and have always lived there; at Olohekahawai, Waipunalei joins **Humuula**, at the waterfall; Thence up across the land to the Hamakua side of **Waipahoehoe**, a gulch with water in it; thence up the road to **Pihahalei**, a *kauhale* near the *mauka* edge of the woods; and the *mauka* corner of Waipunalei, where it is cut off by **Humuula** and **Laupahoehoe**. [Volume B page 369]

E.G. Hitchcock asks that decision of the boundaries of Waipunalei be reserved until he has had time to consult the Agent of Crown Lands in reference to his wishes as to appeals in case of a decision in favor of boundaries claimed by Owner of Waipunalei.

Case continued until further notice.

R.A. Lyman, Commissioner of Boundaries 3d Judicial Circuit

Decision

The Boundaries of the *Ahupuaa* of Waipunalei, decided to be as given by Paka, and in notes of survey filed.

Certificate issued according to the notes of survey. Notice of decision given.

Hilo, Hawaii, July 21st 1875

R.A. Lyman, Commissioner of Boundaries 3d Judicial Circuit

Notice of Appeal given by Attorney for Agent Crown Lands *mauka* Boundary.

R.A. Lyman

No. 76, For certificate of Boundaries see Folios 159 & 160, Liber I.

Appeal not perfected to date

Hilo, Hawaii, August 21, 1875

R.A. Lyman, Commissioner of Boundaries 3d Judicial Circuit

Costs paid in full, see Folio 160, Liber I. [Volume B page 370]

Waipunalei Ahupuaa

District of Hilo, Island of Hawaii,

Boundary Commission, Hawaii, Volume 1, No. 3 [pages 159-160]

For Testimony of Waipunalei, Hilo See Folio 365, Book B

Land Boundary Commission, Hawaii, 3d Judicial Circuit. No. 76.

Certificate of the Boundaries of Waipunalei, District of Hilo, Island of Hawaii, 3d Judicial Circuit.

Upon the application of Thomas Spencer, and by virtue of the authority vested in me by law as sole Commissioner of Land Boundaries for the Island of Hawaii, 3d Judicial Circuit, I hereby decide and certify the boundaries of the *Ahupuaa* of Waipunalei, situated in the District of Hilo, Island of Hawaii, to be as hereinafter set forth.

Given under my hand at Hilo, Hawaii, this Twenty-first day of July A.D. 1875.

R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit

Boundaries of Waipunalei.

Commencing at a point on the sea coast immediately over two large rocks on the beach, one almost out of the water, and about square [diagram in original]; the second one stands in the water shaped thus [diagram in original]. A large rock off **Laupahoehoe** and separate from the other rocks bears North 67° East. The East point of Kaupo Gap on Maui bears North 59° West from this point. The land of Hakoa lays on the south side of this land. Thence South 13° West 24.00 chains along boundary of [Volume 1 No. 3 page 159]

Hakoa to *hau* Grove, Thence:

South 30° West 40.00 chains;

Thence South 48° West 70.00 chains to woods;

Thence South 40 ½° West 37.00 chains;

Thence South 23 ½° West 35.00 chains to place called Pooholua;

Thence South 44° West 20.00 chains;

Thence South 20° West 38.00 chains to 2 *ohia* trees marked XX;

Thence South 29° West 26.00 chains;

Thence South 22° West 27.00 chains to *koa* tree marked V;

Thence South 20° West 42.00 chains to place called **Waipahoehoe**;

Thence South 34° West 27.00 chains to *mauka* corner of Hakoa;

Thence South 27° West 48.00 chains along boundary of land of **Laupahoehoe** to a *koa* tree marked X;

Thence South 26 ½° West 26.00 chains along **Laupahoehoe** to place called **Kulanihakoi**;

Thence North 23° West 60.00 chains along land of **Humuula** to place where 3 *koa* tree stand marked W., H. and X;

Thence North 29° East 77.00 chains along **Humuula**;

Thence North 32 ½° East 153.00 chains along **Humuula**;

Thence North 16° East 42.00 chains along **Humuula**;

Thence North 30° East 115.00 chains along **Humuula**;

Thence North 26° East 65.00 chains along land of Paana;

Thence North 40° East 91.00 chains along land of Awawaiki;

Thence North 44 ½° East 44.00 chains along land of Kuaia to a *kukui* tree marked X;

Thence North 34° East 70.00 chains along land of Kuaia, and **Waipunalei** *Awawa* to sea coast and Containing an area of 2520 acres.

R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit

Surveyed by D.H. Hitchcock

Ahupua‘a in the District of Hāmākua

Kalopa Ahupuaa

District of Hamakua, Island of Hawaii

Boundary Commission, Hawaii [Volume A No. 1 pages 238-240]

Honolulu, July 7, 1873
R.A. Lyman, Esquire, Hilo

Dear Sir

Mr. F.H. Harris is authorized by the commissioners of Crown lands to make application to you as commissioner of Boundaries to have the boundaries of all Crown lands on the Island of Hawaii defined. He has a list of the lands with him.

I have also authorized Mr. F.H. Harris to make application to you for the settlement of boundaries of all lands belonging to Estate of His late Majesty and Her Excellency, R. Keelikolani.

I expect to be in Kona by the trip of the "Kilauea" which leaves here on the 28th instant.... I remain, Yours respectfully

Jno. O. Dominis

Honorable R.A. Lyman,
Boundary Commissioner for Island of Hawaii, Hawaiian Islands

The undersigned would herewith make application for the settlement of the boundaries of the following named *Ahupuaa* or lands belonging to the Crown, viz.;

...***Kalopa*** in the District of Hamakua, adjoining lands unknown...

Your Honor will therefore please appoint a day for hearing the evidence in the foregoing named lands and having decided upon the same to grant a certificate to that effect to the undersigned.

(Signed) Jno. O. Dominis, Crown Land Agent,
by F.H. Harris, attorney at law,

Hilo Hawaii, August 16th A.D. 1873 [Volume A No.1 page 238-240; see full letter in records for Humu‘ula]

Kalopa Ahupuaa

[Volume A No. 1 pages 110-114]

No. 24

The *Ahupuaa* of ***Kalopa***, District of Hamakua, Island of Hawaii, 3d Judicial Circuit

On this, the 18th day of April A.D. 1873, the Commissioner of Boundaries met at ***Kalopa***, after notice personally served on agents of owners of adjoining lands.

Present: S.C. Wiltse on part of applicant and Hawaiian Government.

Petition read as follows:
(Copy)

Mana, April 18th 1873.

Honorable R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit.

Sir:

I am instructed by His Excellency J.O. Dominis, agent of Crown Lands, to make application to you to have the boundaries of the Crown Land, **Kalopa**, situated in the District of Hamakua, on the Island of Hawaii settled and defined by you.

And that the Certificate of Boundaries may be issued according to law.

The lands adjoining **Kalopa** are the Government lands Papalele, **Kaohe** and Kahua, and Paauhau, owned by J. P. Parker.

Respectfully yours
(Signed) S.C. Wiltse

Testimony

Ohakee [Ohaku]^K. Sworn

I was born on **Kalopa**, Hamakua, Hawaii at the time of the building of Kiholo, live on Weha, have always lived on **Kalopa** and adjoining lands and know the boundaries of said land. My father, Haole, showed me the boundaries when we used to go after *mamake*, birds and canoes. I am a canoe maker. *We could not live on one land and take things off another, without having our property taken away by people of the other lands, so he pointed out the boundaries to keep us from trespassing on other lands.* **Kalopa** is bounded by Kehua 1st from shore into woods, all the way. Keahua 2d then joins onto **Kalopa** thence **Kalopa** cuts off Mahakuolo (belonging to Mele now Mr. Parker's); thence it cuts off Government land Weha. Next is bounded by Paauhau, *mauka* by land of **Kaohe**, and east side by Papalele, *makai* by sea. In ancient times this land had fishing rights taking in the *Uhu* fisheries. A gulch named Luakao is the [Volume A No. 1 page 110] boundary between **Kalopa** and Papalele on sea shore; thence the boundary follows up the centre of the gulch, Papalele on the east side, and **Kalopa** on the north side, to where the gulch forks, the name of the gulch is here called Waipahoehoe; thence the boundary follows up the east branch of said gulch to **Hanaipoe**; thence up the gulch to a ridge of *aa* named Kaapakuia; at this place the land of **Kaohe** cuts off Papalele and **Kalopa**; thence the boundary runs along **Kaohe** to Ahau a hill; then to a place called Puupapapa, on boundary of Paauhau; this place being the junction of the lands Paauhau, **Kalopa** and **Kaohe**; a hill called Puliolio is *mauka* corner of Keahua 1st, Keahua 2d, Mahakuolo and Weha; thence the boundary between **Kalopa** and Weha runs to a place called **Nahuina**. At Kapiliolapa Keahua 1st ends and Keahua 2nd bounds **Kalopa** to a large water hole called Waiomao, thence Makuolo [sic] joins to **Nahuina** and Weha. Puuliolio is where Weha ends and Paauhau joins.

I went with Wiltse on Papalele side when he surveyed it to **Hanaipoe**.

CX'd..

Kaaukai Kaiawahanui^K. Sworn

Was born on **Kalopa** in Hamakua, Hawaii, after the arrival of the second missionaries and books were around. Have lived on Oahu a few years but most of the time on **Kalopa**. Am a *kamaaina* of said place. *My father, Keiki, now dead, showed me the boundaries when we went after mamake; he showed them to me so that I should not trespass on other lands.* Papalele bounds **Kalopa** on the east side. **Kaohe** *mauka*; Paauhau down to near edge of the woods; Keahua 1st from shore to Kapiliolapa in edge of woods; there Keahua

2d is cut off by Mahakuolo, and Mahakuolo joins **Kalopa** at Kapiliolapa, *mauka* corner of Keahua 1st; thence this land joins **Kalopa** to place called **Nahuina**; there it is cut off by Weha and Paauhau runs out of gulch joining **Kalopa** letting the other two lands corner at the junction of two roads. Puliolio is a hill outside of the woods; **Kalopa** is bounded *makai* by the sea. Ancient fishing rights included the *Uhu* grounds. The place in gulch on shore, called Luakao is boundary between **Kalopa** and Palele [Papalele]; thence boundary follows up center of the gulch to a place called Waipahoehoe, where the gulch branches; thence it follows up the eastern branch to **Hanaipoeiki**; thence to a hill called Nau on the side of the gulch, where a pile of stones stands, which I have been told was built by John Low several years ago; thence to the corner of **Kalopa** and Papalele on boundary of **Kaohe**; thence along **Kaohe** to [illegible] above Ahau to the *kahawai* of Kawaiilili [Volume A No. 1 page 111] to place called Puupapapa, said place being a hill. Ohakee Kaoliili, now living hear the boundary of Hilo and myself, went with Wiltse, last month and he surveyed the boundary of Papalele up to **Hanaipoe**. We all showed the boundaries to him. Keahua 1st is all patented. Weha has a remnant left. Mahakuolo is a *Konohiki* land and belongs to Mele Peleioholani. Kananakona and brother and Timoteo were born on Paauhau and I have always heard that they were *kamaaina* of Paauhau and **Kalopa**.

CX'd.

Luai^K Sworn

Was born on **Kalopa**, at the time of the death of Kaneihala at Kapulena, Hamakua, Hawaii. Have always lived on **Kalopa** and am a *kamaaina* of said land and know the boundaries; was shown them by my father, Hamohamo, when we went after *mamake*. **Kalopa** is bounded *makai* by the sea, ancient fishing rights extending out to sea.

Papalele bounds **Kalopa** from shore to mountain. The testimony the two previous witnesses have given is correct. I have heard it. The gulch on the east side of **Kalopa** is the boundary. Nau is the name of a hill on *kahawai* of **Hanaipoeiki**, where Papalele and **Kalopa** join **Kaohe**. I do not know for certain about how lands join **Kalopa** between land sold on Keahua to boundary of **Kalopa** and Paauhau.

CX'd.

Decision

Boundaries decided to be as given in evidence and Royal Patents and Land Commission awards of adjoining lands and notes of survey to be filed previous to issuing Certificate.

R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit.

Notes of survey filed at Hilo December 17th 1873. [Volume A No. 1 page 112]

No. 24

Land Boundary Commission, Hawaii, 3d Judicial Circuit

Certificate of the Boundaries of **Kalopa**, District of Hamakua, Island of Hawaii, 3d Judicial Circuit.

Upon the application of S.C. Wiltse, acting for the Commissioner of Crown Lands and by virtue of the authority vested in me by law, as sole commissioner of Land Boundaries, for the Island of Hawaii, 3d Judicial Circuit, I hereby decide and certify the boundaries of the *Ahupuaa* of **Kalopa**, situated in the District of Hamakua, Island of Hawaii, to be as hereinafter set forth.

Given under my hand at Hilo, Hawaii this seventeenth day of December A.D. 1873.
R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit.

Boundaries of Kalopa

Commencing at mouth of gulch at large flat rock marked X, corner of Keahua 1st and **Kalopa**; then along sea shore; S. 67° E. 9.00 ch. along brow of *pali*; S. 56½° E. 32.50 to angle; S. 8° E. 12.00 to centre of Papalele gulch large rock marked X; Then following course of gulch S. 16½° W. 70.00 ch; S. 23° E. 17 ch; S. 2° W. 8.50; S. 51° W. 7.50; S. 23° W. 35.00 (35.00) crossing Government road at 20 ch.; S. 16° W. 20.00 to angle on brow of gulch and E. side of Puu Kalaniaie [illegible] side of Isaac Maui's house; S. 38° W. 17.00; S. 6° W. 22.50; S. 40° W. 18.00; S. 23½° W. 6.00; S. 5° E. 6.50; S. 43° W. 4.00; S. 35° E. 3.00; S. 20° W. 8.00; S. 13½° W. 6.00; S. 26° W. 6.00; S. 43° W. 8.00; S. 40° W. 7.50; S. 41° W. 8.50; S. 32° W. 6.00; S. 10° W. 7.00; S. 15° W. 8.50; S. 8° W. 7.00; S. 8° W. 6.00; S. 13° W. 13.00; S. 12° E. 5.50 to top of [Puuwili – illegible]; S. 4° W. 11.00; S. 2° E. 8.00; S. 34° W. 12.00; S. 30° W. 5.50; S. 19° W. 8.00; S. 6.00; S. 30° W. 7.00; S. 42° W. 6.00; S. 17° W. 7.00; S. 15° W. 7.00 ch. S. 7° W. 13.50 to Koanui; S. 8° W. 13.50; S. 31° W. 14.00; S. 3° W. 13.00 to Nakiakaio; S. 1° E. 8.00; S. 11° E. 7.50; South 11.00; S. 13° W. 5.00; S. 16° W. 11.00; S. 12° W. 6.00; South 7.00; S. 4° W. 20.00; S. 11° W. 10.00; S. 6° W. 9.00; S. 36° W. 20.00; S. 13° E. 27.00; S. 81° W. 5.00; S. 11° W. 3.50 ; S. 55° W. 10.00; S. 15° W. 11.00; South 12.00; S. 36° W. 9.50; S. 2° E. 6.50; S. 35° E. 6.50 to large *koa* in gulch marked X; S. 20° E. 10.00; S. 14° E. 10.50; S. 6° E. 11.00; South 7.50 chains; S. 40° E. 8.00; S. 30° E. 12.00 to a rock marked X *mauka* side of road in center of gulch NE corner of J. Low's survey of *mauka* part of **Kalopa**; S. 13° E. 35 chains [Volume A No. 1 page 113]

S. 10° E. 32.50; S. 30° E. 52.00; S. 27½° E. 40.00; S. 36° E. 53.25 to side of Puu Kapakuia, SE corner of land on the Northern boundary of **Kaohe**; thence along **Kaohe**; N. 88° W. 64.70 to top of Puu Moano; N. 88° W. 92.00 to large pile of rocks marked P.; N. 72° W. 38.50 to corner of Paauhau and **Kalopa**; thence along the gulch between Paauhau and **Kalopa**, a general course and distance N. 10° E. 3.20 chains to rock marked K.P. corner of Paauhau Kai, Paauhau Uka and **Kalopa**; Thence along Paauhau Kai N. 4° ¾ E. 50 chains to a pile of stones; N. 9° 30' E. 74.00 to a rock in the bottom of the ravine; N. 2° ½ E. 71.25 to pile of stones on ravine marked X; N. 3° ½ E. to a rock on west side of the trail marked P.X. 68.50 chains; N. 23° E. 28.75 chains to top of small conical hill; N. 5° E. 50 to Nohoana a Kiniakua; N. 15° ½ W. 22.50 to junction of Paauhau, Weha and **Kalopa**; then along Keahua 2d; N. 30° E. 10.00; N. 40° E. 12.00 to an *ohia* tree marked X at a place called Waiohao; thence along Keahua 1st; N. 31° E. 20.00; N. 38° E. 38.00 to an *ohia* tree marked X at a place called Kapualei; thence following general course of gulch N. 22½° E. 232 chains to point of beginning.

Papalele bounds **Kalopa** on Hilo side from shore to **Kaohe**.

R.A. Lyman, Commissioner of Boundaries, 3d Judicial Circuit

Costs paid in full \$26 by applicant May 28, 1874. Witness paid by ditto.
Surveyed by S.C. Wiltse & J.F. Brown [Volume A No. 1 page 114]

Kaohe Ahupuaa

As a Government Land, Ka'ohē was not brought before the Commission (see descriptions of adjoining boundaries for Humu'ula, Kalopā, Koholālele, Kūka'iau, Pā'auhau, and Waikōloa).

Koholalele Ahupuaa

District of Hamakua, Island of Hawaii

Boundary Commission, Hawaii, [Volume A No. 1 pages 19-21]

No. 5

Ahupuaa of **Koholalele**, Hamakua, Hawaii.

On the fifth of November, 1866, Governor P. Nahaolelua filed with the Commissioner of Boundaries, an application for the settlement of the boundaries of the Ahupuaa of "**Koholalele**," in the District of Hamakua, Island of Hawaii.

Notice was given to the Minister of the Interior for the Government, to whom belong two adjoining Lands, viz.: "**Kaohe**" and "Kainehe," and to George W. Macy, the proprietor of the other adjoining land, called "**Kukaiau**."

On the fifteenth of January, the Minister of the Interior filed his assent, in writing to the boundaries as claimed, and on the second of February the Commissioner received the like assent in writing from George W. Macy.

On the fifth day of February A.D. 1867, the Commissioner decided and duly certified the boundaries of said land, as follows, viz.:

Boundaries of "Koholalele" (as surveyed by S.C. Wiltze)

Beginning at a rock marked X in the mouth of the Lepehau gulch at the sea; Thence up along the centre of said gulch boundary between this land and the Government land of "**Kaohe**," South $15\frac{1}{2}^{\circ}$ W. 30 chains; South $13\frac{1}{2}^{\circ}$ E. 18.60 chains; South 10° W. 34.50 chains; South 30° W. 4.70 chains; South $65\frac{1}{2}^{\circ}$ East 11.06 chains; South 6° W. 7.16 chains; South $41\frac{1}{2}^{\circ}$ W. 24.10 chains; South 26° E. 6 chains; South 31° W. 15.50 chains; South 7° W. 30.50 chains; to an *ohia* marked X on west bank of this gulch, southeast corner of J.H. Simmons' land in "**Kaohe**." From this point the gulch is called "Kanakahiu." Lower edge of the forest.

Thence up said gulch, South $20\frac{1}{2}^{\circ}$ E. 23.50 chains; South $8^{\circ} 45'$ W. 32.75 chains; South $32\frac{1}{2}^{\circ}$ W. 29 chains; South 8° W. 18.50 chains; South 21° (at 6 chains the gulch forks; the right hand gulch is called "Leleha" and is the boundary) 41.50 chains to angle; South 11° W. 20 chains; South 2° E. 21.80 chains; South $17\frac{1}{2}^{\circ}$ W. 17.50 chains to a small hill called "Umukoa." Thence (crossing over to the main gulch Kapili) South $35^{\circ} 7'$ chains; Thence up said gulch South $18\frac{1}{2}^{\circ}$ E. 11.50 chains. Leave the forest; South 12° E. 23 chains (A small [Volume A No. 1 page 19] Hill on West side of this Gulch called "Hanane"); South $15\frac{1}{2}^{\circ}$ W. 13 chains; South 7° W. 30 chains; South 16° W. 26 chains (A small Hill on the East side of this Gulch called "Papa") which is likewise the name of the gulch above this point. Thence South 5° W. 58 chains (at this point two small Gulches come in from the left. This place is called "Kahuwai"). Thence South 49° W. 33 chains; South 28° W. 16 chains to the **Laumaia** Road, a large *Koa* marked X on the lower side of the road. From this point up, this gulch is called "**Nakuia**." Thence South 42° W. 54 chains; South $12\frac{1}{2}^{\circ}$ W. 26.30 chains. At this point the boundary leaves the gulch to the right. Thence South 19° E. 23 chains to a pile of rocks on the top of a small hill called "**Maiuhelele**."

Thence $8^{\circ} 40'$ E. 147 chains to a pile of rocks on the northwest point "**Pukea**," the southwest corner of this land. Thence along the South side of this land, South $83^{\circ} 15'$ E. 82 chains to a pile of rocks on the *mauka* side of a small pond. This point is known as the corner to the lands "**Koholalele**" and "**Kukaiau**," on the boundary of the Government land "**Kaohe**." Thence *makai* along the boundary between this land and "**Kukaiau**," North $6\frac{1}{2}^{\circ}$

E. 14.25 chains to the top of "**Puu Okiha**" [Puu o Kihe] 134.25 chains to angle. Thence North 8° E. 77 chains to the **Laumaia** Road; thence North 15° E. 37 chains to a pile of rocks on the top of a small hill called "Kahupohako." Thence North 20° E. 84 chains; North 22° E. 50 chains to the Kalapahapuu Gulch. (The centre of this gulch is the boundary between these lands from this point). Thence North 40° 50 chains; North 20° W. 31 chains, enter forest; North 2° East 31.80 chains; North 11° E. 47.20 chains; North 28° E. 40 chains to a rock marked X at the head of the Government Land "Kainehe;" at this point the gulch forks. The left hand branch called "**Koholalele**" is the boundary between this land and the Government land "Kainehe." Thence down the centre of said gulch North 28¼° W. 21.20 chains; North 2¼° W. 20 chains; North 12½° E. 32.40 chains; North 25½° E. 35 chains to the corner of Davis' land on "Kainehe." (The gulch below here is called "**Umiwai**"). Thence down this gulch along the western boundary of Davis' land; North 15° E. 18.18 chains; North 9.00 chains; North 30° E. 9.85 chains; North 22½° E. 3.98 chains; North 42° W. 4.12 chains; North 10° W. 5.23 chains; North 47½° E. 4.70 chains; [Volume A No. 1 page 20] North 6° 30' W. 12.43 chains; North 85½° W. 2.90 chains; North 1¼° W. 5.37 chains; North 33° 30' W. 11.21 chains to corner of Kauwahi's *kuleana*. Thence North 9½° E. 8.80 chains to the lower corner of said *kuleana*. Thence North 9° E. 9.50 chains; North 31° E. 24 chains; North 53½° E. 16 chains to a rock marked X, at the lower end of the Government land "Kainehe" at the intersection of this gulch with Kalapahapuu. Thence down said gulch, which is the boundary between this land and "**Kukaiau**," North 19° E. 24 chains to the sea. Thence along the sea, North 53° W. 11 chains; North 29½° W. 12 chains; North 38½° W. 5 chains; South 52° W. 6 chains; South 83° W. 19.50 chains to the place of beginning (Said to contain an area of 6330 acres).

Kukaiau Ahupuaa

District of Hamakua, Island of Hawaii

Boundary Commission, Hawaii, Volume A, No. 1 [page 455]

To the Honorable R.A. Lyman, Boundary Commissioner for the Island of Hawaii.
May it please your honor to set a day for the hearing and settling of my land of **Kukaiau**, situated in the District of Hamakua, Island of Hawaii.

Yours Respectfully,

S. Kipi
per E.G. Hitchcock, his Attorney

Hilo, January 29th 1874

Kukaiau Ahupuaa

District of Hamakua, Island of Hawaii,

Boundary Commission, Hawaii, Volume B [pages 440-449]

Land of **Kukaiau** in the District of Hamakua, Island of Hawaii

Petition filed December 1880

Paauiilo Hamakua, Hawaii, December 8th 1880

The Honorable F.S. Lyman, Commissioner of Boundaries, Hilo

Sir,

Herewith enclosed I beg to hand you copy of notes of survey of the land of **Kukaiau** of which I have become the owner by recent purchase. I will thank you to appoint a time for hearing evidence in connection with the settlement of the boundaries of this land.

The adjoining lands are as follows:

Land of Kaao (part owned by native named Moeuhane and part by the Government)

Land of Kekualele 1st, Government;

Kekualele 2d, Government;

Kaawikiwiki, Government;

Humuula, Government;

Kaohe, Government;

Koholalele, Honorable H.A. Widemann;

Kainehe, native named I, residing on the land.

With the exception of the land of **Kaohe**, the lands enumerated above are separated from **Kukaiau** by the boundary Gulch. The map of the land I will either forward to you or produce [Volume B page 440] at time of hearing the case, as you may instruct.

Yours Respectfully

Charles Notley,
per FSL.

Land Boundary Commission, Third Judicial District, Hawaii Islands, Island of Hawaii

Land of **Kukaiau**, District of Hamakua

Met in the Governor's Office at Hilo, March 3d 1881 2 p.m. according to Notice in Hawaiian Gazette of February 16, 23, 30 for hearing this day.

Present C. Notley, the Petitioner; J. Nawahi, acting for D.H. Hitchcock as Attorney for the Hawaiian Government, D.B. Wahine, Keaomakani, and many others, also Kauahipaula, son-in-law to I, owner of Kainehe.

Petition and Notice read in Court.

Evidence

Kahookaamoku ^{K.} sworn:

I know the boundaries of the land **Kukaiau**, I was born and brought up on the land with my parents. I now live on Kaao, the adjoining land.

Keaweakau is the name of place where the boundary begins at the sea shore, on South *pali* of Stream between **Kukaiau** and Kaao, follow up stream to Paeohi and on to Auhuhu, and on to Mauihelelele at *Aupuni* road, and on to Okolepohopoho, and on to Haapuukaai, a bank of stream along Kaao to Kuhina and to Pelapela, and on to branch stream from **Kukaiau**, at Mokuopepe, and on to Kaleiiki at another branch stream, and on to Kahaleuli, and to Palanihoua, and to Kanamanu, here Kaao ends; thence up to Puki, along Kekualele, *Aupuni* land, to Keanapopolo, and on into *pili* to Kailiulaula, end of one Akualele and up to Puuokamakoa, and up to Hanumakaaha, a bullock pit; here ends a Keakualele; here Kaawikiwiki joins **Kukaiau**, and on to Kalepoulaula, and on to Cart road; end of Kaawikiwiki, at end of Kaula as surveyed. The balance of the land remains for **Humuula** perhaps. Then on to **Ahoapuapua** [Ahupoopuaa], where Hitchcock surveyed; then up to "**Kanukulua**," sharp turns in the stream, thence on up to **lolehaehae**, under which is "**Kaluamakani**" and *mauka of lelehaehae are graves; then across the mauka boundary runs to grave mauka of Puuokiha; then down to Papakea, makai of Puuokiha, and down on the land to Kamokuiwi; then to hill of Ahopuapuaa; then to Hapuukahi, and on to the Laumaia ridge; then to Laumaia, and on to Kapoano, and on to*

Lalakeaiki, and on to Kupuku, and on to Pohulimukele and on to Pauokainehe [Puuokainehe], and Kalapahapuu, and on to Kakikiki [Volume B page 441] and on to Ipou, and to Alii, and to Kalehuahale, and to Kaaleale, and to Kahonu at Government Road, and down to Helepo, and Piliaama, and on to Koolau, and to Makea, and to Kilohana, at *Pali* of seashore, on the North side of the stream.

In going up the Kaao boundary, the stream is the boundary to Kanamanu, where it ends and the boundary runs along a ridge a short distance and strikes another stream which is the boundary up to Iliohaehae [should be **lolehaehae**, as used throughout text].

Kaala, as surveyed, ends at the *mauka* road, and my mother formerly told me that Kaawikiwiki formerly extended up to Iliohaehae between **Kukaiau** and Kaala, and **Humuula** joins it, a corner at Iliohaehae. **Kaohe** joins the *mauka* boundary; and on the West side, Kaholalele [should be **Koholalele**, as used throughout text] joins **Kukaiau** down to Kainehe owned by I and formerly Keelikolani's land. The West boundary comes down the **Laumaia** ridge to the stream at **Laumaia**, then the stream is the boundary to the sea; thence along the seashore to commencement.

I went with the surveyor to point out these boundaries last year, all around the land, and pointed them out as I have stated. My father, Napaelua, shewed me the boundaries *makai*, and my "*makuahine hana*" told me the *mauka* boundaries; and that the two graves are the two *mauka* corners.

Cross Ex'd. – This was the first time I went to these places as my parents told me; i.e. the first time I went with a surveyor. I have often been to all these boundaries before.

The boundary joining Kaao &c is a stream. It is an *awaawa* (hollow) near Iliohaehae, the Kapohulimukele stream. Curtis Lyons cut of Kaala at the *mauka* road; the land did belong to Kaala as far up as to Iliohaehae.

Humuula follows the large stream of Kaula, a long distance from Iliohaehae, and **Humuula** does not really join **Kukaiau** as some have tried to make it. The old kamaainas are all dead. Hapuukahi is a pile of stones *makai* of the *mauka* road. Kaholalele joins **Kukaiau** again near the seashore.

Kalaaualoha^K sworn:

When young I lived in Hamakua at **Kukaiau** and Kainehe. I once had charge of **Kukaiau** and when it was surveyed by Samuel Wiltse, Kauwahi and Paelua were the kamaainas, and I went with them; one boundary was a long distance *mauka* and the hill **Iliohaehae** ends one boundary. Do not know the lands joining on this side, but on the other side Kaholalele and Kainehe join **Kukaiau** below the woods, a stream is the boundary, on each side. I do not know the boundaries in the woods. [Volume B page 442]

Kauahipaula, S.:

I was born and brought up on Kainehe, Hamakua. I know the boundary. It is a stream (*kahawai*) boundary between **Kukaiau** and **Koholalele** from sea to Kainehe at Umiwai; then Kainehe comes between **Koholalele** and **Kukaiau**, boundary follows up stream to **Ohulemaunakea** near outer edge of forest at mountain here. Kainehe ends and **Koholalele** joins again; stream is the boundary and up stream to Lalakeaiki at mountain, and on to **Laumaia**, here stream ends and boundary follows up as marked, piles of stones and ridges up to **Puuokihe**; boundary runs over the top, and on to a pile of stones on sand and aa, a burying place of Hamakua people in olden times. **Kaohe** joins *mauka* and it is also the end of **Koholalele**. I saw that the land **Koholalele** was surveyed to that point,

above **Puuokihe**. **Kaohe** joins *mauka* to **lolehaehae**; and Kaala joins. I went with Samuela [Wiltse] to survey **Kukaiau**, and saw where the kamaainas pointed out the boundaries; from **lolehaehae** a small stream is the boundary; and at Pohulimukele the stream becomes deep; thence along the stream which is the boundary, to land of Kaawikiwiki, and along that stream boundary, and along 2 Keakualele to Kalepoulaula, and on along Kekualele, in woods to Kaa, at Kanamanu, here boundary leaves the stream, and goes along about (a mile perhaps) as far as from here to the Mill at Waiakea, and joining another stream which is the boundary to sea. Sea bounds on North.

Cross Ex'd. – Kainehe goes nearly through the woods. Pohulimukele is *mauka* of woods, the kamaainas say Laala joins **Kukaiau** up to **lolehaehae**. **Humuula** does not. I am not certain where Hapuukahi is. Pauelua and Kauwahi were the kamaainas in 1865 when we surveyed the land. That is the way I saw the boundaries. Do not know where Palapala or Kuaialii are.

Charles Notley, Jr., S:

Know the land **Kukaiau**, – the last 5 years. I went with the surveyor James Gay, in June 1880, Kahookaamoku and Kauloha were the kamaainas who showed us the boundaries. I went with them all around the land. J. Gay surveyed the bounds as pointed out by these kamaainas. This is the plan of that survey. We began to survey at Kaawa to Kaieha to Pukomakawa, and from Kaawa aku North and to Kikiki, and Ipou, and Alii, and Kalehuahale, and Kaalaale, and Kahonu, at government road, *makai*, then to Helepo, and Piliaama, and Koolau, and Kamakea, and Kilohana, at shore, along shore to Keaweakano, to Kapiihale, and Moano, and Paeohi, and to road at Mauihelelei [Mauihelelei], and to Okolepohopoho, and to Hapuukaai, and Kanahena, and Mokuopepe, and Kaleiki, and Kahaleulu, and Kapalanihauna, and stream ends, and run up ridge to Kanamanu, here Kaa ends; and join stream of Pohulimukele, and up to Ukii, and to Keanapopolo, and to Halelolo, outside and above the woods; and on to **Laumaia** road, and on to **lolehaehae**, and on to **Puuokukaiau** [Volume B page 443] where people were formerly buried; thence to **Keahuonaiwi**, on back side of **Puuokihe**; thence North over **Puuokihe** to **Laumaia** ridge, below the ridge meet stream, and on to **Keanapoaono**, and to **Alalakeiki**, and on to **Kuapuku**, and **Ohulemaunakea**, and **Puukomakawaa** (the above names read from note book). I was one of the chain men and wrote down the names in my book at the time. Mr. Gay was employed to survey the land for my father.

Petitioner rests case (see dep. of Kauahi also).

Contestant, Hawaiian Government

Kahue, Sworn: – I live now at Kaohaoha, Hilo; know well the bounds of **Kukaiau**. I lived there with my parents.

At shore, on east side, Kaa joins **Kukaiau**, a stream is the boundary; Pupukawaa stream, and Mano stream is the boundary into woods and through woods. Kekualele and then Kaawikiwiki join, and then Kaala, which ends at **Ahoipopuaa** [Ahupoopuaa].

Kaohe owns the land above that. Namanoikowaa joins above Kaawikiwiki. **Kukaiau** goes up to Ahoipopuaa, where **Kaohe** joins **Humuula**, above the *mauka* road, where I have lived a long time. **lolehaehae** formerly belonged to **Humuula**, and now to Kaala. *I know Puuokihe. It belonged to Kaohe, and above that is where people were buried in old times, when people used to make fish hooks from the bones.*

From **Ahuipopuaa** [Ahupoopuaa], **Kukaiau** boundary goes across to **Laumaia** which used to be the *mauka* corner of **Koholalele**, but now it is taken *mauka*. **Kaumuhapuu** is

on the boundary, *makai* of the road, **Koholalele** joining on the West, and Kainehe joins it *makai*, and **Koholalele** joins again near the sea, and on to seashore. My father, Pelealii, formerly had charge of **Kukaiau**. He was killed at “*Kaua o kuamoo*” [December 1819]. My first child was born 1825. I was born at “*Kaua o lao*” [1793]. Kalaaualoha and Kahookaamoku were children when I was a man; my son Moa went with Lyons to survey Kaala and other lands. Kaala did not extend *mauka* then, and would not now if he was living. I knew Kauwahi; knew Paelua of **Laupahoehoe**. In time of Kuakini we went into the mountain to kill cattle, and lived there until my children were grown. Ulu is the only man I know in Hilo as old as me. Kahookaamoku’s mother was my sister.

Cross Ex’d. – I do not know why the land was called “**Kukaiau**.” Formerly the boundary went from **Ahoipopuaa** to **Laumaia**; formerly there was no water along the side of the mountain until the cattle tramped hollows and then water stood after rains. **Kaohe** owns **Puukea**. *Formerly when any one died, on all those lands, Kaao, Kaawikiwiki &c would not wail — at night wrap up [bodies] and take into the mountain and bury secretly, lest the bones be used to make fish hooks.* [Volume B page 444]

Formerly no lands went out of the woods but **Kaohe** to Keauhou of Kona, and **Humuula** to Kau at Pohakuhanalei. Now that foreigners own lands, they take them up through the woods. I have been to all these places on the mountains with surveyors. At **Ahoipopuaa** all other lands end, but **Humuula** and **Kaohe**. I do not know all the bounds between the small lands. Know some of them, but I do know the bounds of **Kaohe** and **Humuula**. **Ahoipopuaa** is about a mile *mauka* of the cart road. **Laumaia** is just below the road. **Kukaiau** never went above those points formerly. I heard that Hitchcock put the corner a little below **Ahoipopuaa**, which latter is the real boundary. I did not go with the surveyor of **Kaohe**. I went with Wiltse to survey **Humuula** along Hilo lands and shewed bounds correctly, far below the road. *Formerly Kaohe and Humuula had all the Uau. Kukaiau and Koholalele had none. Uau are found at Iolehaehae and other places.*

The written statement of C.J. Lyons of the Government Survey Department, received with tracings of **Kukaiau** as surveyed by S.C. Wiltse A.D. 1863 and D.H. Hitchcock 1875 and other sectional tracings in the case, read in Court, viz.:

“C.J. Lyons

Statement with reference to Boundaries of **Kukaiau** 1st, that when I surveyed the land of Kaala in 1853 for John Li, then guardian for W. Pitt Leleiohoku, &c. I was inclined to extend the land Kaala to **Iolehaehae**, as some of the kamaainas claimed. But John Li himself forbade it, telling me personally that it was Government land above the mountain road.

A tracing of the *Mauka* portion of Kaala, viz. Of my own map made at that time in which the part now claimed as **Kukaiau** was then marked as “**Kaohe**,” is herewith enclosed.

The award by Survey of Kaala was made according to above orders.

On Wiltse map of **Humuula** “Kamoku” is marked on the tract now in question. Testimony in the Commissioner’s record will probably agree with it.

Nainoa in 1876 went with me over the ground and distinctly told me that either **Kaohe** or a “Moku” for the whole district covered the tract in question, not **Kukaiau**.”

(Signed) C.J. Lyons, Government Surveyor
and Agent for settling Boundaries. [Volume B page 445]

On Motion of J. Nawahi, the further hearing of the case is postponed until May 4th for the evidence of Nainoa, who has been summoned, but is too sick to attend at present, and also the evidence of D.H. Hitchcock, who is also unable to be present, on the part of the Hawaiian Government.

C. Notley, is also allowed the privilege of Rebuttal testimony at that time.

Hilo, May 4th, 1881

S.F. Chillingsworth, for C. Notley, D.H. Hitchcock for the Hawaiian Government.

Present also C. Notley Jr., and many others.

Kahookaamoku – recalled: I was born at **Kukaiau** – know its boundaries well. The *mauka* corner of **Kukaiau** is at a grave at the *mauka* base of **lolehaehae**, *mauka* of that is **Kaohe**, and **Kukaiau** is *makai*; thence straight to a grave *mauka* of **Puuokiha** [Puu o Kihe]; **Kaohe** being *mauka* and **Kukaiau** *makai*; thence runs down across the hill **Puuokiha**, the most of it being on **Kukaiau**, and the least on **Koholalele**; **Kaohe** is on other side of **Koholalele**; that is the boundary I pointed out in surveying. Keakapu (*wahine*) was formerly the *Konohiki* of this land. I knew her, but no relative. My father is Paelua. We lived on **Kukaiau**, then on Kaala. He was my *makua hanai*.

Cross Ex'd. – I saw when D.H. Hitchcock surveyed the land. The *mauka* corner of Kaala is by **lolehaehae**, at same place as the corner of **Kukaiau**; I do not know *mauka* bounds of Kaala well, but think it is the same as **Kukaiau**. Pohulimukele stream is the boundary between those two lands up to near **lolehaehae**. The *konohikis* used to ascertain the bounds of these lands. We used to go to the mountain to kill cattle. My mother said that Nainoa and Paelua did not know the boundaries when they went with the surveyor, as they did not know that the true *mauka* bounds are at **lolehaehae** and **Puuokiha**.

Paelua and Kauahi went with Samuela to survey the land.

Moeuhane S.:

I was born at **Kukaiau**. I went with the surveyor Samuela (Wiltse) and heard about the boundaries. We went *mauka* of **lolehaehae**, as the boundary, thence *mauka* of **Puuokiha**, they said the land of **Kaohe** bounded it *mauka*. Paelua and Kauahi were the *kamaainas* and pointed out the bounds. [Volume B page 446]

Petitioner rests case filing also the deposition of Kauahi (^K) taken before Honorable C.F. Hart, Circuit Judge, April 26th 1881, said Kauahi being too feeble to come to Hilo.

Deposition of Kauahi (K.) taken at Kainihi [Kainehe], Hamakua, Hawaii on the 26th day of April A.D. 1881.

Kauahi ^K. Sworn says –

"I was born on **Kukaiau** in Hamakua. I know the boundaries of the land. I had them from my father. I was born when tobacco was first brought into the country. **lolehaehae** is the *mauka* boundary of **Kukaiau** on the Hilo side. **Puuokiha** is the *mauka* boundary of **Kukaiau** on the side of **Koholalele**. The boundary of **Kukaiau** runs in a direct line from **lolehaehae** and **Puuokiha**. The people of **Kukaiau** were interred there.

(Signed) Charles Frederick Hart, Circuit Judge, Third Judicial District.

Nainoa – sworn:

Live at Kaala, Hamakua. Know the lands there well. Was born on **Kaohe**. Am very old. I

used to go often to the mountain for *Mamake*. The people of each land could only get it on their own lands. My father went with me, and pointed out bounds of all the lands there from **Kaohe** to Kaula gulch. He was *Konohiki* of **Kaohe** then. **Puuokiha** is well into (“*waena konu*”) **Kaohe**. All the lands there run up together, and end alike, cut off by one land. I went up with C.J. Lyons to survey Kaala with Kamoā, the *kamaaina* of that land, and he sent a pile of stones at the corner.

The true boundary of **Kukaiau** is at a large pile of stones at the road. It does not go up to **Puuokihe**. **Poopuaa** below in Pohulimukele stream is the boundary of Kaala, **Kukaiau** and **Kaohe**. The boundary is not just where D.H. Hitchcock set pile of stones, but a little *makai* of it by a pile on other side of stream. *There are graves on Puuokiha, and also at Iolehaehae, and many other places. In old times, if any one died, could not wail, lest people come and steal their bones for fish hooks; so used to carry body secretly and bury in mountain.*

Cross Ex'd. – **Kukaiau** and **Koholalele** run up together to **Kaumuhapuu** and Papa, do not go to **Puuokiha** as surveyed, but are *makai*. **Koholalele**, **Kukaiau** and Kaala are all cut straight off alike by **Kaohe**.

Lahohinu is a (“kulanakauhale”) village adjoining Kaula gulch, is boundary of Kaala and Kaohe, above Puuloa; thence along Kaala and Kaohe to Pohulimukele gulch, to place [Volume B page 447] below Pohupuaa [Ahupoopuaa]; thence along Kaohe and Kukaiau to Kaumuhapuu, at boundary of Koholalele; thence along Kaohe and Koholalele to Papa; thence Kaohe and Koholalele run makai together.

D.H. Hitchcock – Sworn:

Think it was early in 1875, Mr. Kipi asked me to survey the land of **Kukaiau** for him, and he directed me to Nainoa and Paelua as being the two *kamaainas* of the land. We began to survey, with them as *kamaainas*, above the woods, on the Hamakua side; went to a hill by Government road, an old *ahu*, and on through a thick grove of *koa*. Paelua said he had been with Wiltse in surveying it, to sand hole above **Puuokihe**. Nainoa said it was not the boundary up there, but down *makai* where we were, and they disputed a long time about it. Finally, Paelua said Nainoa was right.

That formerly none of those lands went up to the sand of the mountain; that Wiltse took it up there; there was no dispute about the side boundaries, only how far up to take it. If Paelua had still persisted, I should have taken it clear up; but it seemed to be satisfactory that what Nainoa said about it was correct. The boundary, as we put it, at the Kaala corner was a little above what Nainoa said, some 200 or 300 feet.

D.H. Hitchcock files tracing of a portion of **Kaohe** from the Government Survey Office, as surveyed in 1853 by C.J. Lyons also tracing of Wiltse's survey of lower part of **Humuula**, also tracing of Wiltse's survey of **Kukaiau**, also tracing of Wiltse's survey of **Koholalele**; Also tracing of D.H. Hitchcock's survey of **Kukaiau**, also tracing from Government Survey department showing the relative position of lands in South part of Hamakua, from **Kaohe** to **Laupahoehoe** in Hilo.

Case rests, testimony closed.

July 19, 1881. It is decided that the boundaries of the Land **Kukaiau** are as given in the Survey by James Gay, from the sea shore up to **Ahupoopuaa** in the Pohulimukele gulch, thence along **Kaohe** in a straight line to point on the boundary of **Koholalele**, *mauka* of the **Laumaia** road, as in the survey by D.H. Hitchcock; thence along **Koholalele** &c. to

the seashore, and along the sea to commencement. Corrected notes of survey to be filed previous to issuing Certificate of Boundaries.

F.S. Lyman, Commissioner of Boundaries

Costs accrued \$60.00.

C. Notley takes appeal to the Circuit Court.

Paid costs and costs of appeal \$8.50.

August 6th 1881.

F.S. Lyman [Volume B page 448]

Costs

3 summoned witnesses \$1.50;

Service 1.00;

Mileage 1.25;

2 witnesses fee 12.00;

8 oaths, .75,

Commissioner 3 days on case 30.00;

36 folio record @ 25c 9.00;

Copy of Decision .50;

Appeal, transcript of evidence to Circuit Court 34 folio 8.50.

\$68.50 Paid

F.S. Lyman, Commissioner of Boundaries

Kukaiau Ahupuaa

District of Hamakua, Island of Hawaii,

Boundary Commission, Hawaii, Volume B [pages 461-462]

In the Circuit Court of the Third Judicial Circuit,

November Term 1881.

McCully, Justice Supreme Court;

Hart, Circuit Justice

In the matter of the boundaries of ***Kukaiau***.

This is an appeal from the decision of the boundary Commissioner for the Third Judicial Circuit, concerning the boundary of the Ahupuaa ***Kukaiau*** in the District of Hamakua. ***Kukaiau*** lies between ***Koholalele*** on the West and Kaala on the East. These lands may be described in general terms as running from the sea inland, in strips, narrow compared with their length, and cut off at the top by the land of ***Kaohe***.

The petitioner for the settlement of the boundary of ***Kukaiau*** claims that it reaches *mauka* to a line extending from the hill ***Puu o Kiha [Puu o Kihe]*** to ***lolehaehae***. The Hawaiian Government contesting, claims that the upper boundary is where the boundary Commissioner has placed it near the Government road to ***Laumaia***.

The principal support of the lower line is in the testimony of Kahue and Nainoa, aged men, and kamaainas. Kahue appears to us to contradict his own testimony by saying that Kaala extends to ***lolehaehae*** in fact, although it has been brought to the line near the Government road by survey and determination of the boundary Commissioner, for he testifies, and all the testimony is to the same effect, that these three lands are all cut off by the continuous line of ***Kaohe***. Nainoa pointed out the line in company with Paelua, also a *kamaaina*. The testimony is that they did not agree in fixing the line near the road.

Paelua contended that it was from **Puuokiha** to **Iolehaehae**, but after much resistance yielded to Nainoa's view. But Edwin Thomas, who was produced as a witness on the appeal testifies that twenty years ago Paelua and Kauahi showed him the boundary along the upper line claimed.

Mr. Hitchcock, who was surveying with Nainoa and Paelua as kamaainas was under the impression that the upper line was more likely to be the true boundary, and says he would have surveyed it accordingly if Paelua had adhered to his view. We therefore think the testimony of Nainoa is neutralized.

On the other hand, the testimony of Kahookaamoku, Kalaaualoa, Kauahipaula and Kauahi is strong [Volume B page 461] and consistent for the upper line. *Kahookaamoku, born and brought up on the land was shown the bounds by his father and mother and clearly makes the mauka line by the graves at Iolehaehae and Puuokiha.*

Kalaaualoa, who lived on Kukaiau and once had charge of it, knows that Iolehaehae is one of the mauka boundaries. Kauahipaula testifies unequivocally and clearly as to Iolehaehae and Puuokiha being the two points terminating the mauka line and speaks of the burying place of Hamakua people being in the sand and aa, at the latter named place. We are particularly impressed by the evidence of Kauahi, taken before Judge Hart. It is direct and strong. He was an impartial witness and entirely removed from influences which might color his testimony. He satisfactorily shows the South Eastern and Western corners of the land to be respectively at Iolehaehae and Puuokiha, the boundary between Kukaiau and Kaohe running in a direct line between the two points named. We therefore sustain the appeal and decide that the South Eastern boundary of Kukaiau is continued up and from Ahupoopuaa to the point known as Iolehaehae; thence across in a direct line to Puuokiha where it abuts on Koholalele. Thence following down the determined line of Koholalele.

The survey herewith appended by James Gay, which carries the boundary up from Ahupoopuaa, along the gulch to Iolehaehae; thence across to Puuokiha, and thence down along the line of Koholalele, defines the boundary of Kukaiau as we hereby amend the findings of the Boundary Commissioner.

(Signed) L. McCully, Justice Supreme Court, Presiding at the November Term.

(Signed) Charles Fredk. Hart, Circuit Judge, Third Judicial District.

Costs

Record 7 folio @ .25c \$1.75;

Certificate 2.00;

14 folio description in ditto @ .50c 7.00;

Paid \$10.75

Interior Department

16 folio copy of certificate & .25c \$4.-;

Certificate 2.00; \$6.00

Kukaiau Ahupuaa

No. 141

Certificate of Boundaries of the Land of **Kukaiau**, District of Hamakua, Island of Hawaii.

Land Commission Award No. _____

District of Hamakua, Island of Hawaii,

Boundary Commission, Hawaii, Volume C, No. 4 [page 3-6]

Commission of Boundaries, Third Judicial Circuit,
F.S. Lyman, Esquire, Commissioner

In the Matter of the Boundaries of the Land of **Kukaiau**, District of Hamakua, Island of Hawaii.

Judgment

An application to decide and certify the Boundaries of the Land of **Kukaiau**, District of Hamakua, Island of Hawaii, having been filed with me on the 11th day of December 1880 by Charles Notley, the present owner of said land, in accordance with the provision of an Act to facilitate the settlement of Boundaries, &c., approved on the 22nd day of June A.D. 1868; now, therefore, having duly received and heard all the testimony offered in reference to the said boundaries, and having endeavored otherwise to obtain all information possible to enable me to arrive at a just decision, which will more fully appear by reference to the records of this matter by me kept in Book No. 2 B, page 448, and it having been decided in the Circuit Court, Third Judicial District, Hawaiian islands, on appeal, at the November term A.D. 1881, that the true, lawful and equitable boundaries, are as follows, viz.: (in Book No. 4, C, page 3) "The Northeast corner of this land at the sea beach is the centre of the gulch dividing this land and the land known as Kaao. The boundary runs thence up the centre of said gulch, which is called **Kukaiau** Gulch. The notes of survey are as follows and are run on the east side of the Gulch –

South 15° 22' East (true) 1600 links to the top of terrace (from whence the Government trig. stations bear: Piele [diagram in original]; 31' West; Puunalu [diagram in original] South 47° 12' East; **Puuokihe** [Volume C No. 4 page 3]
South 23° 4' West [diagram in original], **Iolehaehae** South 18.13 West; thence:
South 31° 2' West (true) 1816 links crossing gulch to place called Moano
South 12° 44' West (true) 506 links up ridge;
South 30° 35' West (true) 662 links;
South 31° 7' West (true) 640 links;
South 14° 35' West (true) 600 links to the top of Auhuhu hill;
South 10° 14' East (true) 1376 links;
South 52° 10' West (true) 1193 links to *makai* side of Government Road, place called Manuhelelei down in the centre of Gulch on *mauka* side of road crossing marked [diagram in original];
South 23° 43' West (true) 2075 links to place called Okolepohopoho;
South 76° 59' West (true) 660 links;
South 16° 0' West (true) 6775 links up ridge to opposite forks in Gulch;
South 60° 32' West (true) 671 links crossing small Gulch;
South 12° 40' West (true) 2175 links at 500 on this line enters forest, crosses small gulch;
South 36° 50' East (true) 1500 links to place called Kaleike, 500 East of boundary Gulch;
South (true) 1375 links up side of Gulch;
South 27° 15' West (true) 1855 links cross a gulch and on to point of spur called Kahaleuli, an old *mamake* settlement;
South 7° 40' West (true) 1770 links, at 800 crosses small Gulch in Junction marked [up arrow] place called Kapalanihauna;
South 66° 8' East (true) 404 links up side of Gulch;
South 3° 0' East (true) 1950 links; this is as far as the Gulch is taken as the boundary, as it metes out from here, the boundary is as follows:
South 29° 40' West (true) 3015 links up narrow ridge to open space called Kanamanu, at the head of the Government land of Kaao, stones set thus [diagram in original] and marked [diagram in original] on the West bank of Pohulimukele Gulch, a rock in said Gulch on *makai* of road crossing, marked [diagram in original]; this

gulch from here is the boundary between this land and Kekualele, a government land, the survey as follows:
 South 19° 20' West (true) 5600 links crossing on to East bank of Gulch on the West of this line at 700 links [Volume C No. 4 page 4] a mark in Gulch [diagram in original]
 South 14° 20' West (true) 5430 links at 4430 on this line get through woods to Halelolo.
 South 24° 44' West (true) 1360 links crossing to hill on West of Gulch (from whence ***lolehaehae*** bears South 18° 14' West ***Puuokihe*** South 27.55 East; ***Papalekoki*** South 52.45 West);
 South 14° 30' West (true) 8800 links up West of boundary gulch to small hill;
 South 13° 36' East (true) 7569 links crossing gulch to hill 7 chains East of boundary Gulch;
 South 20° 46' West (true) 2700 links to rock marked JGAY [arrow up] KAALA from whence ***lolehaehae*** bears South 26° 15' West; Papalekoki South 63° 16' West;
 South 84° 6' West (true) 2775 links crossing a small Gulch on to spur;
 South 36° 47' West (true) 4800 links at 760 links with [arrow up] in Gulch at ***Laumaia*** Road crossing;
 South 14° 30' West (true) 14900 links up General run of Gulch (taking the line as the boundary, as the Gulch breaks off into small branches);
 South 37° 30' West (true) 5000 links up to Government trig station on ***lolehaehae***;
 South 16° 30' West (true) 1425 links, thence the Southern boundary of this land runs along the Land of ***Kaohe***;
 North 41° 02' West (true) 7946 links to the southeast corner of ***Koholalele***, which is the southwest corner of this land;
 North 6 ½° East (true) 14.25 chains to the top of "***Puuokiha***;"
 (North 6 ½° East true) 134.25 chains to angle;
 Thence North 8° East (true) 77.—chains to ***the Laumaia Road***;
 Thence North 15° East (true) 37 chains to a pile of rocks on the top of a small hill called "Kahupohaku";
 Thence North 20° East (true) 84 chains;
 North 22° East (true) 50 chains to the Kalapahapuu Gulch (The centre of this Gulch is the boundary between these lands from this point);
 Thence North 40° (true) 50 chains North 20° West (true) 31 chains, enter Forest;
 North 2° East (true) 31.80 chains;
 North 11° East (true) 47.20 chains;
 North 28° East (true) 40.- chains to a rock marked X at the head of the Government Land "Kainehe," at this point the Gulch forks. Thence [Volume C No. 4 page 5] down the East fork, along the boundary of Kainehe, middle of Gulch;
 North 13° 50' East (true) 7480 links to lower edge of Forest, called Kaawa;
 North 27° 40' East (true) 746 links to place called Kikiki;
 North 4° 45' East (true) 3500 links close to place called Ipou;
 North 41° 15' East (true) 2620 links;
 North 5° 30' West (true) 1540 links down East side of boundary Gulch to place above Puuhau spring;
 North 12° 25' East (true) 2250 links to place called Kaeleele;
 North 1° 26' West (true) 2000 links to Kahonu mark [arrow up] ***makai*** of Government Road;
 North 17° 55' East (true) 2640 links;
 North 35° East (true) 1770 links;
 North 15° 34' East (true) 502 links, from this station Government station on Piele bears South 36.2 West;
 North 11° 9' West (true) 326 links along West side of Gulch;

North 8° 37' East (true) 952 links crossing the Gulch to East terrace to a point just below the junction of the forks of Gulch, the lower end of Kainehe being at the junction.

Thence, from the lower end of Kainehe, down the Gulch which is the boundary between this Land and **Koholalele**.

North 19° East (true) 24 chains to the sea (in the centre of the Gulch 55 links from the *pali* overhanging the sea a mark thus [up arrow] is on a large Rock). Thence from the East side of the Gulch, which is called Kalapahapuu;

South 59° 30' East (true) 6000 links along the sea shore to the point of commencement.

Area contained 6,188 acres, more or less.

It is therefore adjudged and I do hereby decide and certify that the boundaries of the said land are, and hereafter shall be as hereinbefore set forth.

Given under my hand at Hilo, Island of Hawaii, the eighth day of April A.D. one thousand eight hundred and eighty two.

F.S. Lyman,
Commissioner of Boundaries [Volume C No. 4 page 6]

Paauhau Ahupuaa

***District of Hamakua, Island of Hawaii,
Boundary Commission, Hawaii, Volume A, No. 1 [pages 1-5]***

Papa Komisina no na Palena Aina, Mokupuni o Hawaii

Palapala Hooiaio, Helu 1

*O Makou, nona na inoa malalo, na Komisina nona Palena Aina, ma ka Mokupuni o Hawaii Ke Hooiaio Aku Nei makou ma keia, no ka waihoia ana ma keia Keena Kona, i ka la 12 o Julai 1864, o ka Hoopii o J.P. Parker, ka mea nona kekahi hapa o ka Ahupuaa i kapaia kona inoa o Paauhau, ma ka Apana o Hamakua, ma keia Mokupuni no; a no ke kauohaia mai o na mea nona na aina e pili ana e hele me ka mea i kakauia ma ua Palapala Hoopii la, oia hoi Kamehameha IV. Nona o **Kalopa**; a no ke Aupuni na aina e ae e pili ana.*

A ua Hooholoia na Palena o ua aina la o Paauhau no J.P. Parker, e like me na Palena i hoakakaia malalo nei.

*Hanaia ma Kau, i keia la 12 o Augate, M.H. 1864.
F.S. Lyman*

Commencing at a *mamane* post on the top of Puunohu hill.

Thence due East 237.50 chains along the dividing line of J.P. Parker's Paauhau uka to a rock in the bottom of Kawaililii gulch marked K.P.; Thence down an ancient foot path which is the boundary between **Kalopa** and Paauhau along the West bank of the gulch. North 4 ¾ ° East 50.- chains to a pile of stones;

Thence North 9½° East crossing the gulch to a rock in the bottom of a ravine marked X 74 chains; Thence North 2½ ° East to a pile of stones on the west bank of a branch ravine 71.25 chains; Thence North 3½ ° East to a rock on west side of the trail marked P.X. and a pile of stones 68.50 chains;

Thence North 23° East 28.75 chains to the top of a small conical hill; thence North 5° East 50. Chains to Nohoana o Kiniakua, now a *pulu* station; Thence North 15 ¾° West 22.50 chains to a point which forms the junction of **Kalopa**, Weha, and Paauhau; Thence North 8 ¾° West 75. Chains to Pupuawa at which place the path crosses the gulch and is no longer the boundary; said point is marked by a pile of stones;

Thence the boundary is the top of the *pali* forming the east bank of the Kawailiili gulch (which gulch belongs to Paauhau) to the sea. (A line from this point to the sea shore to the point of rocks known as Kahupoku which forms the Breakwater of the landing place known as Mahiki.

Note. The fish between Mahiki point and Kawihinui point belong to the *Ahupuaa* of Paauhau.

Thence up along the *pali* upon the west bank of Kahaupu gulch which is the boundary of Kaao, to a natural bridge crossing the mouth of a small ravine which runs into Kahaupu gulch. [Volume A No. 1 page 1]

(This point is three miles in a line from Mahiki)

Thence following the bank of the gulch South 6° West 41.50 chains to the gulch of Kaopili; Thence the boundary line is an old trail leading to Makahilina; South 32° West 58 chains South 57° West 27 chains to Nahuina, a point which is the junction of Kaao and Nienie with Paauhau; Thence South 38° West 10.25 chains to Kahilina road a pile of stones; Thence 5½ ° East 25.30 chains across the gulch of Kohakohakupaa (a water hole) to Kamakahilina, a point where the road crosses Kahaupu gulch which now becomes the boundary between Nienie and Paauhau;

Thence following the gulch up along the middle to a pile of stones on the west bank at the Moku of Nienie; Thence (leaving the gulch) along the Moku South 63° West to the top of Puunohu 95 chains to point of commencement.

Containing an area of 8165 acres

J.S. Low, Surveyor
Hamakua, Hawaii, December 1862

Honolulu 8th March 1864

This is to certify that I have agreed [sic] to & accepted the survey of the boundary between the lands of **Kalopa** and Paauhau in the district of Hamakua, Hawaii, made by J.S. Low in the month of December 1862, as examined, and certified & sworn to by S.C. Wiltse before G.F. Henway, District Judge on the 16th day of December 1863.

Mr. Webster, Administrator of the Estate of His Late Majesty

This is the Survey sworn to in December 1863 by Kamaainas Kanakamai and Ohakee, and (myself) and approved by Mr. Webster, Land Agent to His Late majesty, March 8th 1863.

S.C. Wiltse, Surveyor. [Volume A No. 1 page 2]

[see Diagram, Volume A No. 1 page 3]

[see Diagram, Volume A No. 1 page 4]

Volume A No. 1 (No. 3)
Ahupuaa of "Paauhau."

On the 4th day of October, 1866, John P. Parker sent & filed with the Commissioner, an application for the settlement of certain boundaries of the *Ahupuaa* of Paauhau, in the District of Hamakua, Hawaii, which he alleged to be still undefined.

Notice was given to all parties interested, and the Commissioner was occupied at Waimea, Hawaii, on the 8th, 9th, 10th, 11th, 12th, 13th, 16th, 17th, 18th, 19th, 20th and 22nd of October, in hearing evidence on behalf of the applicant and also on behalf of George Davis Hueu, and the Waimea Grazing Company (Contestants). The evidence was closed at Honolulu, on the 23rd day of November, and was argued by counsel on the 26th November.

Decision of the Commissioner.

After a very careful examination of all the evidence presented in this case, I am clearly of the opinion that the application of Mr. Parker must be dismissed, for the following reasons, viz.:

Firstly – By Section 4th, of the Act of 22nd August, A.D. 1862, establishing the Land Boundary Commission, it is provided that the Commission "shall in no case alter any boundary described by survey in Royal Patent, in Deed from the King or in Land Commission Award."

It is objected on behalf of the contestants in this case, that the Commissioner cannot grant the application of Mr. Parker, without conflicting with the before cited provision of the Statute. In my opinion this objection is entitled to great weight, for it will be found on reference to the Royal Patent granted to Mr. Parker, in 1861. Royal Patent No. 2769, that several of the boundaries of "Paauhau" are clearly and expressly defined and described in that Patent. In order to show this, I quote a part of the description given in the Patent, as follows: "Thence South 30 West, 56 chains to a pile of stones marked XIII; thence South 69° West, 40 chains to top of a conical hill known as **Puulaau**, on a large flat rock on the summit marked XIV, said hill is known to be the South East Corner of Paauhau; thence down the gulch know as the [Vol. A No. 1 page 14] **Auwaiakeakua**, which is also a boundary line between the District of Hamakua and South Kohala; North 78° West, 138 chains to a *koa* tree 3 feet in diameter marked "P" on North side, and North 70°, West 138 chains to a point where this gulch ends, known as **Kaimumoa**, said point is marked by a hill of stones marked "P" and is the most South Western point of Paauhau; thence along the Western boundary of this land (also a boundary line between the District of Hamakua and South Kohala); North 21°, East 627 chains to **Puukaliali Hill**."

What may be called the South Western and Western boundaries of the *Ahupuaa* of "Paauhau," are distinctly defined by the above language of the Patent, and as the lands which Mr. Parker now claims to have included within the boundaries of Paauhau, cannot be so included without entirely altering and shifting the South Western and Western boundaries, as defined by the Royal Patent, and so established, it follows as a matter of course that his application could not be granted without infringing the law governing the Commission.

Secondly - In my opinion, the weight of evidence is altogether against the proposition that the boundaries of Paauhau ever extended so as to include the kind of land now sought to be included in that *Ahupuaa*. The weight of oral testimony seems to me already against it, and this is strongly corroborated by what may be regarded as the solemn declarations of the applicant himself, made in 1860, when he furnished to the Interior Department the description which is embodied in his Royal Patent, and the accompanying map, by both of

which he explicitly states where the South Western and Western boundaries of Paauhau are, and that the land adjoining Paauhau round those boundaries, is in the District of Kohala, and must therefore belong to Waimea. The testimony of a large majority of the witnesses, coupled with those declaration of the applicant, are in my opinion conclusive against granting the applications.

For the foregoing reasons the application is dismissed.

G.M. Robertson
Commissioner of Land Boundaries
Honolulu; 26th November, 1866. [Vol. A No. 1 page 15]

Ahupua‘a in the District of Kohala

Waikoloa, Ili of Waimea

***District of South Kohala, Island of Hawaii,
Boundary Commission, Hawaii, Volume A, No. 1 [pages 6-12]***

(No. 2)

Rex vs. George Davis

Boundary Dispute

Waikoloa nui, Ili of Waimea – Hawaii.

Testimony taken August 8th and 9th 1865 at Waimea-Hawaii:

Davis' Witnesses:

1. Mi 1st
2. Ehu
3. Kuehu
4. Kalua
5. Moolau
6. Kuahine
7. Wahahee

Rex Witnesses:

1. Kaolulu [Kaolulo]
2. Kuupele [Kupele]
3. Kanakaole
4. Moluhi
5. Kanehailua
6. Kahakauwila
7. Kualehelehe

George Davis claims that Waikoloa, as he had heard, begins at Puaapilau, thence down the road from Hamakua to Waimea, to Puu Okikona, thence to Paakai nui, thence to Ouli, the land of Keoniana, and along the boundary of Ouli to the sea shore at Kaihumoku, thence along the shore to Lalamilo; thence to Keaha [Keahaaha], thence to Keakolono [Keahuolono], on the boundary of Kona; then along the boundary of Kona to ***Kaohe***, then along the boundary of ***Kaohe*** to Kemoli [***Kemole***], thence to Kupaha.

Ehu – sworn:

I am *kamaaina* of Puukapu. I was born in Waimea. I know the boundary from my own and my father's knowledge.

Commence at Puaapilau, thence to Napamakani, thence to ***Paakainui***, thence to Kapuulepo, thence to Kapalihalapape, thence to Puuainako, thence to Kalalakoa.

I knew Kahanapilo w. wife of George Davis, she was not *Konohiki* of the ilis on Waikoloa – nor of Waimea – I was in Kona when she died.

I am *kamaaina* of Puukapu only – Kainea was the *Konohiki* when I lived there. There was no *pili* grass on that land – my father was not a bird catcher, he used to *mahiai* [farm]. Waikoloa was the land that had the birds – the boundary as stated is the boundary from the time of Kamehameha first.

Cross – Kainea was *Konohiki* in the time of Kalaimoku – Kainea is dead. Waikoloa is an *ahupuaa* of Waimea, which is a *Kalana*, with eight divisions. I only know about Waikoloa. – I have been on to Pukalani – Nohoaina and Paulama – they join Waikoloa, but do not run far out. – Pukalani joins Puukapu. Nohoaina joins Pukalani, and Paulama joins Waikoloa. Puukapu is a division of Waimea. – Pukalani belonged to Kamehameha and he gave it to his man Kekoikumoku. Nohoaina belonged to the chiefs of Waimea, Kupapaulu. Paulama belonged to Kupapaulu. – Puukapu belonged to Kalaimoku. (I do not know the present owners). I do not know who was the *Konohiki* before Kainea.

Wahahee – sworn.

I am *kamaaina* of the King's land Puukapu – I was born there. Commence at Puaapilau, thence to Pooholua, thence to Leohu, thence to ***Paakainui***, thence to Kapuulepo, that is all I know.

Puulepo is close to Pukalani, which land joins Puukapu. – My parents showed me the boundary. – My mother belonged at Puukapu, my father was from Napuu [Volume A No. 1 page 6].

Nohoaina joins Pukalani, Paulama joins Nohoaina, and Waikoloa joins Paulama. Pukalani belonged to Kamehameha fourth. – Nohoaina and Paulama to the same; also Puukapu; and I suppose they descended to Kamehameha V.

Cross. – I do not know the boundary of Paulama and Waikoloa. – I heard that Waikoloa was divided. – there are two Waikoloa's, they lie side by side. I do not know the adjoining lands to Waikoloa, except Paulama on the *mauka* side. – I heard that Waikoloa joins Napuu. – I have not heard that Paulama joins Napuu. – All the *pili* belonged to Waikoloa.

Mi 1st – sworn:

I live on Waikoloa – I am a *kamaaina* of the lands in dispute. The name of the large land is Waimea – I am a witness for George Davis, and also for the Rex. – *Waimea is a Kalana. – which is the same as an island divided in to districts. – there are eight Okana in Waimea. In those Okana are those lands said to extend out (hele mawaho). These lands came in to the possession of Kamehameha I who said to Kupapaulu, go and look out to of the large lands running to the sea, for John Young and Isaac Davis. Kupapaulu went to Keawekulua, the haku Aina, who said if we give Waikoloa to the foreigners they will get Kalahuipua [Kalahuipuaa] and Anaiomalu [Anaehoomalu] (two lands at the beach) then your master will have no fish. So they kept the sea lands and gave Waikoloa to Isaac Davis. John Young asked my parents if it was a large land they said, the black aa was Napuu, and the good land Waimea.*

They kept all the valuable part of the lands, and gave the poor land outside to Isaac Davis. They kept Puukapu, Pukalani, Nohoaina, Kukuiula (above the church), and Paulama; and gave Waikoloa to Isaac Davis. The other Waikoloa [*iki*], this side of the stream dividing them, was the King's. It comes down along the stream by Mr. Lyon's, then along the ditch, then along the wall of ***Puuloo***, to Ahuli on the King's land, to the round hill, Uleiokapihe, and is cut off here by Davis' Waikoloa. – The wall was the boundary below, between Waikoloa of Isaac Davis and the land of the King, Kamehameha I. The latter built it by Kauliakamoa; to keep the cattle off from the King's land. The boundary runs to Liuliu, and the *pili* was all South, on Davis' land; then I know along an old road, Puupa, Waikoloa being South and Waimea North of the road, then to Kaniku. That is all I know.

Cross. – My parents heard the command of Kamehameha I to Kupapaulu, and they told me, and also about John Young's asking about the land.

I never heard that Puukapu, Nohoaina, Pukalani, and Paulama extended out to the *pili*. A road divided the land of the King and that of I. Davis.

Waikoloa. – The wall was built to keep off the cattle, and to mark the land. The church is on the King's land. When Kalama measured Waikoloa he took in the church, I heard. I went with Kalama some of the time. Kalama said leave the old boundary and make a straight boundary, so I left them, lest Davis' land would go to the King. The boundary as I know it is from the English school house along a hollow, to the ditch near to Hoomaloo; thence to *puu* Makeokeo; thence to hills outside of Ahuli. The church is on Paulama which joins Waikoloa.

I know the boundary of Paulama it does not reach Napuu.

I know the *mauka* boundary of Waikoloa and Puukapu. Puukapu extends to Puulepo, then goes in (*maloko*). [Volume A No. 1 page 7]

Kuahine – sworn:

I am *kamaaina* at Lihue. I know the boundaries of Waikoloa; viz. from Koananai to Puuokaa, to Kekio, to Pahoa, which are cut off from Waikoloa, and are cut off by it; they are all divisions of the Okana Lihue.

Liuliu is an old road, forms the boundary between Waikoloa and the *ahupuaa* to Puuwaawaa, where the road divides, one goes to the sea shore, and the other goes along the boundary, along the *pili* to Kepani; thence to Keahu a Lono, Waikoloa being *mauka* of the road. – My father, who was *luna* [overseer] of the land Lihue, told me the boundary.

Cross. Kahanapilo w. was *Konohiki* of Waikoloa – it descended from her parents, and from her husband, Hueu, this is from my knowledge.

I know about the wall built, my father was luna at the time. I was large at the time, and could carry stones. Kupapaulu and Keawekuloa were the *Konohikis* of the land. I never saw Kamehameha I. But I was born before his death. I was a babe when Kiholo was built [built ca. 1810].

I know Waikoloa first, it goes to the mound near Ahuli.

Moolau sworn.

I am *kamaaina* of Waikoloa. I was born there.

Puaapilau to Keahu, to Kipukapamakani, to Puakamimi, to Kapuulepo, between Puukapu and Waikoloa, to Pukalani. Palahahapapa, to Puuainako, to Keanakoloa, between Pukalani and Waikoloa, to Nohoaina, which joins Paulama; the road is the boundary all the way. At Ahuli the King's Waikoloa is cut off, while Davis' Waikoloa runs towards the sea. Then Puuokaa joins; also Kekio, Pahoa, Puupili, Kaleiokumakeau, and Puuhuluhulu; the wall built as before spoken of is then the boundary of the King's land inside, and Waikoloa outside, to Liuliu, as perhaps said by the other witnesses; then the road Puupa is the boundary, along the *pili*; all the plain was given to Waikoloa, and Keanakaloa secured the fish lands at the shore. All the *pili* from Ouli to the *aa* of Kona belonged to Waikoloa.

I went around the land with my father.

Hueu was *Konohiki* of Waikoloa, and it descended to George Davis.

Kahanapilo was only *Konohiki* of **Waiau**, her father's land. When I was small, the wall was built, and I helped carry the stones. I was born at Kiholo.

Kuehu sworn.

Rejected from Kaukuna's testimony, the truth of which Kuehu admits.

Kaukuna sworn.

I formerly went for Kuehu to show the boundary of Napuu, Waikoloa, etc. and he refused, saying that he did not know the boundary, that Kuupele and Kanehailua knew the boundary.

Kalua sworn. (For the boundary of Napuu)

I am *kamaaina* of this boundary. Commence at Hiiakaakaiki, thence to Keahuolono, thence to Puupoe, thence to Keanawiliwili, the corner of the land joining Waikoloa, Davis' land. Waikoloa nui. Waimea Joins Napii below this point, to the sea; the *Ahupuaa* of Waimea.

I was born at Waikoloa iki, the King's land; it extends to Ahuli; from Keanawiliwili to Kapualei; thence to Hanaialii; thence to Wawaekae; thence to Kaoheakauholo; thence to Kalawamauna. That is all I know. Keauhou here cuts it off. I have heard Waikoloa of George Davis joins Napuu to Kalawamauna. [Volume A No. 1 page 8]

Moolau – recalled.

I know some of the boundaries of Napuu, and have heard some. From Ohiiakakaalei [Hiiakaikaalei] to Keahuolono; thence to Puupoe; thence to Kapalihai; thence to Makahonu; thence to Hanamauloa; thence to Kauakahialaa; thence to between Keanawiliwili of Waikoloa and Kahoohewahewa of Kona; thence to Kapukaiki; thence to Puuulaula; thence to Hanaialii; then this side of Wawaekae, and *awawa* of Keahuolono; to Keamuku of Kona; thence to Puukapele; this is the boundary between Kona and Waikoloa to Hamakua. Only at the sea shore is the Kings.

The *mauka* boundary of Waikoloa is from **Puukapele** to **Puukeekkee**; thence to **Kilohana**; thence to Waikii; thence to **Kapoowaiakeakua** [Auwaiakeakua]; thence to Kamakoa; thence to Kalapamaile; thence to **Kemole**; thence to Kupahaa, between **Kaohe** and Waikoloa. Thence turn down Kapaakea; thence to Puupueo, thence to Kapuaapilau.

Kuahine – recalled.

I know the boundary of Napuu. The *aa* is Napuu, and the *Pili* is Waikoloa. *Mauka of the road from Puukapele, Kaohe lies mauka of the road, and Waikoloa makai to Waikii.*

Kaolulu sworn. (For the King)

I am *kamaaina* of the lands in dispute from one end to the other. I was born on Ouli, and have lived on different parts of the lands.

Commence at Kokiaina, the head of Waikoloa, thence to Waikalehua, thence to Kapele, thence to Alaanui, thence to Alaohia, thence to Keakualapalapa, thence to Kulanapahu, thence to Kaopapa, thence to Keanakii, thence to Kahoalapiko, the *makai* boundary is from Puupanui to Puuakowai, thence to Kilohana, thence to Puuokaa, thence to Waikoloa, thence to Puuohu, this is the boundary of Waikoloa nui of George Davis.

Cross. Puupanui is the corner *makai*. This description begins at Paulama. Puuhuluhulu is the land *makai* of Waikoloa; and also Kaleikumikiau; Puupili; Pahoa; Kekio; & Puuokaa; and Waikoloa are King's lands adjoining. I know about the wall; I could carry stones then; in the time of Kamehameha I. I know the boundary of Waimea. – Commence at Puukapu,

the head of the land. *Waikoloa is an ili of the Ahupuaa Waimea, as I have heard.*

Waikoloa first reaches Napuu at Puupanui. – The two Waikoloas joined *mauka*. The King's Waikoloa reaches Puuokaa, which is cut off by Davis' Waikoloa. Davis' Waikoloa does not reach Puukeekee, nor Waikii.

The land from here down to the sea is Waimea, which has divisions. Paulama is adjoining Napuu; so is Nohoaina. Paulama and Waikoloa meet Napii at Kahooalapiko. Kahanapilo w. was never *Konohiki* of any land but Waiaua.

Kuupele sworn.

I am not *kamaaina* of Waikoloa, but of Waimea *Ahupuaa*. The boundary of Paulama and Waikoloa commence at Nohoaina; thence to Waiakalehua; thence to Kapele; thence to Alaanui; thence to Alaohia; thence to Kalualapalapa; thence to Kulanapahu; thence to Kaopapa; thence to Kanakii; thence to Kahoopapale; thence to Kahooalapiko; thence to Puuanahulu.

The *makai* boundary is from Puupaha to Puuakowai; thence to Kilohana; thence to Puukaa; thence to Kamakeokeo; thence to Puuohu.

Waikoloa first adjoins the Puukii, Kalapapa, Kanakanaka, Lauhulualii, Manienieula, that is all I know. Paulama adjoins *mauka*, then comes Kukuila and Nohoaina. [Volume A No. 1 page 9]

I know the wall, it was built to keep off the cattle from the cultivated land. I could carry stones, it was after Kiholo in the time of Kamehameha I.

Davis' Waikoloa reached Napuu. The King's Waikoloa only reaches Puuokaa. Kahooalapiko is the point where Paulama and Waikoloa join Napuu.

Puuiwaiwa is the *mauka* corner of Paulama on the boundary of Napuu.

Cross. Puuohu is in Davis' Waikoloa. – explanation; Puuohu is in Waikoloa of the King, it was formerly in the other Waikoloa when it was surveyed by Kalama.

Kaleiokumikiau is the land *makai* of Waikoloa on the boundary of Napuu; then comes Puuhuluhulu, and Kokiapuueo. Paulama is *makai* of Puukeekee, and the land adjoins that.

Kanakaole sworn.

I am *kamaaina* of Pukalani, land of the King commences at Kulanapahu. (Paulama joins Waikoloa of Davis, and Nohoaina joins Paulama, then comes Pukalani.) Thence to Kapaakea, thence to Keanaauloa, thence to Puukapu, *mauka*, and along Puukapu to Haloa, where there is a *loi* [irrigated pond field].

Pukalani belongs to the King, and is leased to the Grazing Company.

Moluhi sworn.

I am *kamaaina* of Puukapu. I was born there. I know the boundary of Waipio and Puukapu. At Puaapilau Paauhau joins Puukapu; thence to Puukalii; thence to Puupapapa; thence to Keanaauloa, where ends Puukapu and commences Pukalani; then to Puulepo, between Puukapu and Pukalani; then to Naialolo; thence to Haloa, the end of Pukalani; then Puukapu extends to Kawaihae. Pukalani, Nohoaina, and Paulama lie between Puukapu and Waikoloa, so I do not know the boundaries of Waikoloa. Puukapu

is a *kupono* of Waimea *Ahupuaa*, my father had charge of it; the present King owns it.

Kanehailua sworn.

I am *kamaaina* of Waimea. I know the boundary of Waikoloa and the King's land. Paulama joins Waikoloa. Commence at the woods, at Kokiaina, thence to Puakalehua, thence to Kapele, thence to Alaanui, thence to Alaohia, thence to Kekualapalapa, thence to Kulanapahu, thence to Keanakii, thence to Kahoopapale, thence to Kahooalapiko. Puuanahulu cuts off Paulama here. Nohoaina joins Paulama from the woods to Napuu. That is what I know of the boundary *mauka* of Waikoloa. The *makai* boundary is from Puupaha to Puuakowai, thence to Kilohana, also adjoining Puuokaa and Kamakeokeo, to the settlement of Mr. Lyons *ma* [folks].

Waikoloa of the King joins *makai*; then comes Pahoa first and second. Puupili, Kalaeokumikiau, Puuhuluhulu, Kaleohai, Kokiapuueo, Paaina, Opuokopukini, Kaluaana, Papuaa, Wailoa, and Mahoe, which is the *kahawai* [stream gulch] of Puuiki. All of these are the King's lands. *Waikoloa is an ili of Waimea Ahupuaa; as are also these other lands.* Waimea is an *Okana*. Nohoaina is between Paulama and Puukeekee; these lands reach Napuu. Waimea is the land adjoining Kona.

Cross: Puuhinai is the *makai* corner of Waikoloa of George Davis on the boundary of Kona. Puupaha is the corner of the King's Waikoloa. Puupili joins Napuu, so does also Kalaeokumikiau. Kapaakea is the name of the place where Puupili joins Napuu. The Hooneene gulch is where the land joins Napuu. Puuhuluhulu joins Napuu at Halolo gulch. Kaleohai joins Napuu. Kokiapuueo joins Napuu. These are all the lands that join Kona. [Volume A No. 1 page 10]

Kahakauwila sworn.

I am *kamaaina* of Waimea. I know the boundary of Waikoloa. Commence at Kokiaina; thence to Waiakalehua; thence to Kapele; thence to Alaanui; thence to Alaohia; thence to Kekualapa; thence to Kulanapahu; thence to Kupapa; thence to Kekuanakii; thence to Koopapale; thence to Koalapiko; thence to Napuu. The *makai* boundary is from Puupaha to Puako; thence to Kilohana; thence to Puuokaa; thence to Makeokeo; thence to Puuohu, which is the corner. There are two boundaries of Waikoloa of George Davis. It is bounded by Waikoloa nui of the King *makai*, and Paulama, *mauka*. Waikoloa iki is Davis', and Waikoloa nui is the King's.

The boundary of Waikoloa nui commencing at Puuokaa runs *mauka*, Pahoa, the *mauka* corner. Puuiki to Kanakanaka, Halapepe, Lauhualii, Manienie, Olelokoa, to Keanuimanu, the corner of Hauhanalamea, Puaahopu, Napooekolu, Waiemi, Haleapala, Koleakanea, ***Puukole***, Kahuhu, Paaina, Kokiapuueo. Waikoloa boundary, Kekio Puupili, Kumaikau, Puuhuluhulu.

Cross. Napuu is the boundary of all these lands.

Kualehelehe sworn.

I am *kamaaina* of Puukapu. I was born there. The boundary of Hamakua and Puukapu, commencing at Waipio, at Pupukualana; thence to Kahakolea; thence to Kaimuhonu; thence to Puumoe; thence to Kalapapohaku, along Kanaina's land to the corner. Then to Manukea; thence to Papalaokiekie; thence to Kahaleula; thence to Makahaluhalu; thence to Kapuaapilau; thence to Puukaliali; then along Paauhau to Puupapapa; thence to Keanaauloa, the corner of Paauhau; thence to Kapuulepo; thence to Waialolo; thence to Kaloa, along Pukalani to the corner. Then along Nohoaina to Paulama and on to Puuohu, the corner of Waikoloa of Hueu; and thence on to Wawaihae. Pukalani, Nohoaina and Paulama lie between Puukapu and Waikoloa of Davis. I had charge of Puukapu when the late King was king. I am *kamaaina* of this land only. Pukalani belongs to the King.

Moolau again recalled by permission of the King – and sworn.

The remaining boundary of Waikoloa: commence at Kapele, thence to Kaluamanu; thence to Kokiaina; thence to Kaholopalaa; thence to Puuiki; then turn and run along the foot of Puuohu at Wainehe (Puuohu is the King's), to Mr. Lyon's, Waikoloa; thence to Kamakeokeo, and along the middle of the ridge to Puuokaa.

Review the whole boundary of Waikoloa: commence at Puaapilau; to Keohu; Kipukapamakani; ***Paakainui***; Kapuulepo; Palehalapepe; Puuainako; Kamakalae; Nawawaekanakaikike; Kekualapalapa; Kapele; Kaluamanu; Kokiaina; Kaholopalaoa; Puuiki; turn down at foot of Puuohu; Wainehe; Waikoloa; Makeokeo; Akuanui; along Puuokaa; Pookahuhu; Puuhuluhulu; Liuliu; along road Puuanuanu; Palinui; Kalapunakekua; Kapaakea; Kapohakau; Pooholua; Kapae; Kaala; Puuweuweu; Kiiiki; Kapeaa; Pohakuloo; Keahualono; Puupoe; Kapalihai; Makahuna; Hanamauloo; Kauakahialaa; through Keanawiliwili; Kapukaiki; Uwekaula; Keanaohia; Hanaialii; between it and Wawaekua; Kaohekauhola; Keamuku; Kaawa; ***Puukapele; Puukeekie; Kilohana; Waikii; Kapoowaiokakua; Kamakoa; Kalapamaile; Kemole; Kupahaa***; turn down to Kapaakea; Puupueo; Puaapilau. [Volume A No. 1 page 11].

The Boundaries of Waikoloa nui as decided by the Commissioners of Boundaries at Waimea – Hawaii, August tenth 1865.

Commencing at Kokiaina run to Waiakalehua, to Kapele, Alaanui, Alaohia, Keakualapalapa, Kulanapahu, Kaopapa, Keanakii, Kahoopapale, Kahoolapiko, then along Napuu to Puupaha; then along the King's land to Puakowai, Kilohana, Puuokaa, Makeokeo, Waikoloa, to Puuohu, and to commencement, as given by Kaolulu, Kuupele, Kanehailua, and Kahakauwila.

P. Cummings

F.S. Lyman. [Volume A No. 1 page 12]

Note: The following letters are selected communications that were made a part of the Boundary Commission proceedings for the Waimea-Waikōloa region, but not copied on microfilms of the proceedings. They are given here in chronological order, with those records found in the microfilm collection at appropriate dates. It will be noted that the full testimonies given by witnesses before the Commission were apparently not recorded in the Volumes copied in the microfilms. Thus, greater detail is found in the testimonies of witnesses cited below as dated communications (records were viewed in the collection of the Hawai'i State Archives).

Mana – February 19, 1866

S.C. Wiltse, Government Land agent – Surveyor;

to Jno. O. Dominis, Land Agent for the Crown:

...The present would be a favourable time to make the survey of "Waimea" & "Waikoloa," as there is now plenty of water on the Kona side of these lands, which is not the case in the dryer part of the season, grass is also abundant.

I cannot believe that an appeal from the decision of the Comm's in this case has been taken. It could not have been done without your having been legally notified of the fact. I shall be glad to hear from your Ex. upon this matter as soon as convenient... [HSA – Interior Department Lands]

October 4, 1866

To the Hon. George M. Robertson, First Associate Judge of the Supreme Court & Sole Commissioner of Boundaries:

The undersigned Commissioners of Crown Lands most respectfully beg leave to Represent that they desire Your Honor to take into consideration the settlement of the

Boundaries of Waimea in the District of South Kohala on the Island of Hawaii, and for that purpose submit that the names of the adjoining Lands to Waimea in the District aforesaid are as follows to wit: Lalakea, Waikoekoe, Kamoku, Paauhau, Puuanahulu, Kalahuipuaa, Kawaihae kai, Kawaihae uka, Honokane 1st and 2nd, Waimanu and Waipio.

That the names of the owners of said Lands are as follows: Lalakea, Keau; Waikoekoe, H.H. Lunailo, now leased to Waimea Grazing & Agricultural Company; Kamoku part of it belongs to the Waimea Grazing Company and part owned by the Government; Paauhau, John P. Parker, Senior; Puuanahulu, Government Land; Kalahuipuaa, H.M. Queen Kalama, in charge of Kanaina; Kawaihae kai, H.M. Queen Emma; Kawaihae uka, Crown Land; Honokane 1st and 2nd, Estate of the late R.H. Princess Victoria, in charge of Kuke; Waimanu, Crown Land; Waipio, H.M. Queen Kalama, Leased to Halemanu.

That a formal description of the Boundaries of Waimea, aforesaid, is as follows, to wit:

Commencing at a point called Kilohana on the south bank of Waipio *pali*, the corner of the land of Lalakea to a large *Ohia* tree marked "W" on the *makai* side of the Road leaving from Waimea to Waipio. Thence along the line of Waikoekoe to a large *mamane* post marked "Puukapu," at which point Waikoekoe and the land called Kamoku meet. Thence along the line of Kamoku to a *Naio* tree marked H. Thence along the line of Kamoku to a pile of rocks at the S.E. corner of H. Purdy's land. Thence along Kamoku to a large rock marked "P 19" at Puaapilau, where Kamoku and Paauhau meet. Thence to Puupapapa. Thence to Keanaoloa. Thence to Puuahaka or Paakea. Thence to Puumahoelua. Thence to a large rock marked "H." Thence to Kuikahekili; then to Namahana on the line of Kona. Thence along the gulch called Poopoo, bordering the land called Puuanahulu to an *Ohia* tree marked "H." Thence to Puuiwaiwa. Thence to a point of rocks marked "H." Thence along the line of Puuanahulu to Kahooalapiko, then to Puuhinei; thence to Puupaha, then to the gulch called Pakoa, then along the gulch to Kapaakea. Thence along the gulch called Pakoa and the road called Keekee or Kiikii to a pile of rocks on a low rocky ridge. Thence to the most Northerly of three small hills called Lolo. Thence to a large pile of rocks at the South East corner of Kalahuipuaa, on the *mauka* side of the Beach Kona Road. Thence along the *mauka* side of said land to a large pile of Rocks on the *aa*, thence *makai* to the sea over a large pile of rocks on the *mauka* side of the Beach Road leading to Kona. Thence along the sea to the mouth of a gulch called Waiulaula. Thence up and along the centre of said gulch to a Rock marked "H," on the North side of said Gulch at a point called Malohuihui, where said Boundary line leaves the gulch, thence along Kawaihae uka to Puuainako. Thence to Luawahine Gulch to the head of said gulch at a place called Kalualepo, which intersects the land called Pukapu. Thence along the *mauka* line of Kawaihae uka to the head of Honokane *Pali*. Thence along the head of the Lands called Honokane 1st and 2nd, Waimanu and Waipio to the place of Beginning. Which together with an accompanying chart of the survey of the *Ahupuaa* of Waimea District aforesaid, are herewith submitted...

C.C. Harris

F.W. Hutchinson

John O. Dominis

Commissioners of Crown Lands. [HSA – Interior Department Lands]

Waimea Hawaii
October 5th 1866

Land Boundary Commission.

The Commissioners of Crown Lands filed an application for the settlement of the exterior boundaries of the Ahupuaa of Waimea...

Mooluhi sworn. (on behalf of the Crown)

Was born at Puukapu, has lived there nearly all his life. Puukapu is in the *ahupuaa* of Waimea. Know the boundaries of Waimea on the Hamakua and Kohala sides. Beginning at the *pali* of Waipio and running to Kaakolea, along the boundary of Lalakea; thence at Waihonakalua along Waikoekoe; thence to Papahookiiki along Waikoekoe; thence on to Puaapilau along the line of Kamoku; thence to Pukaliali, on the boundary of Paauhau; thence along Paauhau to Pupapapa; thence still along Paauhau to Keanaoloa. I don't know the boundary beyond that. I know some of the boundary on the side next to Kawaihae uka, as informed by my ancestors. A hill on the head of Honokane gulch is the boundary between Puukapu and Honokane. The watercourse which starts from the high hill or peak I have mentioned and runs to Waipio divide. Puukapu from the lands called Honokane and Waimanu in North Kohala.

The line of Puukapu runs on to the *pali* of Waipio. *Kaakolea was a place of sacrifice* [see Register Map No. 1080]. At Papalahookiiki is a hill where the people used to get *mamaki*. Puaapilau is an ancient place of worship. Kamoku, Paauhau and Puukapu meet there. Pukaliali and Puupapapa are hills. There is a water course and cave at Keanaoloa.

The boundaries as stated today are the same as I have always known. I got my information from my parents and uncles who lived on Puukapu before me. I was *Konohiki* of Puukapu from the time of my father's death at the arrival of the missionaries [1820], till recently.

At Keanaoloa the lands called Paauhau, Puukapu and Pukalani meet. Pukalani is an *Ili* in Waimea...

Kaolulo sworn.

Was born at Kaupo in Waimea. Knows the boundaries of Waimea on the sides of North Kohala and Hamakua. Kalualepo is on the boundary of Waimea and Kawaihae uka. There is a hill at that place; from Kalualepo on to Kalahomane on the boundary of Honokane, the place called Waimalu is the boundary of Waimea. Kulanapahu is on the boundary of Waimea and Honokane 2nd. Thence on to the gulch at Oulu. The stream called Oulu runs clear on to Waipio and marks the boundary between Puukapu and the North Kohala lands. A place called Kilohana at the *pali* of Kahonohono and runs to the place called Kilohana by the last witness, and then to Kaakolea. Thence to Waihonakalua. Thence to Papalahookiiki on Waikoekoe. Thence to Puaapilau. Thence to Pukaaliali. Thence on Puupapapa on the boundary of Paauhau. Thence to Keanaoloa where Paauhau, Puukapu and Pukalani meet. Pukalani is an *ili* of Waimea. *Thence on to Puumahoelua on the boundary of Paauhau. Thence on to Kuikahekili, where is a hill. Thence to Namahana on the boundary of Kona, where there is a gulch called Poopoo. Thence on to a hill called Puuaiweoweo. Thence on to Kahoolapiko. Thence to Puupaha. Thence on to Kapaakea where is a gulch, and on to Kepulumao. This is the boundary along Puuanahulu as far as I know it.*

I learned the boundaries from my ancestors. Waimea was a rebellious land.

[answer to question from Mr. Jones for G.H. Davis] I know Keahuolono, it is on the boundary of Waimea. Puupoe is on the lava country outside of Waimea. It is a hill. I don't

know of a cave there. *I know Palihae, it is in Paauhau not on the boundary of Kona. Kahanamauloa is in Hamakua. Kapukaiki is in Kona out beyond the line of Waimea; and so is Hanaialii, a long way from the boundary of Waimea; and so is Wawaekia. Keamuku is also in Kona, a long distance from the line, a point covered with lava. Heewai is also in Kona. Kaawa is in Kona. Puukeekie is on the boundary of **Kahe**. Puukapele is in Kona, on beyond the boundary of Waimea. I had to travel over the land to get sandalwood, and I used to go out to hunt for the birds called uwau; my father used to point out the different places to me when we had occasion to travel over the land. I have travelled all along the Kona boundary as far as I have stated it. Waimea bounds on the Kona line, but that line as now given by some people is new to me. Naohulelua is on the boundary of Kona and Hamakua. I have never heard that Kohala goes out so far as that place...*

Charles Hall sworn.

Says he is a resident of Kona. Has resided there 27 years. Has crossed between Kona and Waimea as often as twenty times. Part of the boundary of Kona and Waimea has been pointed out to me by natives, one is called *Kuahine who used to live at Keamuku, or near it. I know Puupaha which I was told is on the Kona and Waimea line, below where three gulches join. One of the gulches is called Waikii. Puukeekie I think is in Hamakua away beyond the Waimea boundary.* The hill called Puuaweoweo is in Kona as I understand, not far from the corner of **Kahe** and Keauhou. There are some large hills covered with grass there. I don't know whether Naohulelua is in Kona. I think those two hills are near the boundary between Kona and Hamakua. Kuahine showed me points on the Kona line three or four years ago. He is an old man. *He said the place where the three gulches meet was at the corner of Waimea and the Kona line. I was shooting bullock and was not allowed to go beyond the Waimea line, hence I employed Kuahine to guide me.*

[answer to question from Mr. Jones for G.H. Davis] *I am not sure about Puuaweoweo. I understand that Spencer's sheep station is in Kona, about a mile and a half perhaps from Puupaha. I have been shown Puukapele in Kona, four miles perhaps from the boundary, and five or six from Waikii Gulch. Keamuku is in Kona, not on the Line. Pukaiki is in Kona. There may be several places of that name. Keahuolono near the sea is in Kona. Shown to me as the division between Kohala and Kona.*

Kanehailua sworn.

Was born in Waimea. Know some of the boundaries of Waimea. Commencing at Puaapilau, where Puukapu and Hamakua meet. Paauhau touched that point; from thence *the boundary runs to Pukaaliali between Puukapu and Paauhau; thence on to Puupapapa; thence on to Keanaoloa; thence to Puunahaha between Waimea and Paauhau; thence on to Kenakuku; thence to Puumahoelua; thence to Kuikahekili; thence on to Namahana at the junction of Waimea, Paauhau, and Puuanahulu, in Kona.* Thence on to Puuiwaiwa; thence to Kahoolapiko; thence to Puupaha; thence to Kapaakea; thence to Kalolo and on to Kiiiki road, which is on the boundary line of Waimea, on to Puali, above Kalahuipuaa. Keahuolono is at the corner of Waimea where it touches Kona. Anaehoomalu is the land on the shore and belongs to Waimea. Kapalaoa is the land on the Kona side. Then turning and running along the sea beach to Waiulua; thence Iliilinahihi; thence to Kamakaiwa; thence to Kapukalua, a cave; thence to Paniau; thence to Milokukahi; thence to Waima; thence to Lalamilo, including Puako hamlet; thence to Wailea; thence to Kaihumoku.

Then leave the sea and run *mauka* to Puainako on the boundary between Kawaihae and Waimea; thence to a gulch called Kaluahine which is between Kawaihae and Puukawaiwai; thence to Waiokamalii gulch. Then into the woods and towards the mountains; thence to Kalualepo where Kawaihae, Waimea, and Puukapu join. from Kalualepo to Waipahu; thence to Kaleapi; thence to Ulu gulch or stream; the head waters

of the streams which run to Waipio, Waimanu, Pololu, Honokane and Keanuiomano. The stream of Honokane is on the boundary of Honokane and Waimea. On from Ulu the boundary runs to Kilohana at the termination of two roads, at the boundary between Puukapu and Waipio. The boundary of Puukapu runs along the mountain range, by the head of the ravines which run into North Kohala, till it reached Waipio. The boundary runs on from Kilohana to Pupualenalena; thence to Kaakolea; thence to Waihonakalua; thence to Papalahookiiki; thence to Puaapilau.

At Namahana on the boundary of Hamakua, Kohala and Kona, there is a gulch called Poopoo. Waikii is a spring in Hamakua, the farther of the different streams of Poopoo etc. Kalolo is the same water course that is called Poopoo farther up. It is called Waiulaula where it meets the sea.

[answer to question from Mr. Jones for G.H. Davis] Naohulelua is in Kona a long distance from the boundary. It is at the line of Keauhou and **Kaohe**... Puukeekee is between Namahana and Puukapele on the boundary between Kona and Hamakua...

October 6th 1866

Kahakauila sworn.

Was born at Paulama, Waimea... At Namahana is a gulch called Waikii where are several ponds or wells supplied with water from the mountain, where men and animals drink. I don't know the names of the smaller gulches, but I know the one called Poopoo which has two branches, proceeding from Waikii...

Kupele sworn.

Was born in Kona on Puuanahulu. I have some knowledge of the boundaries of Waimea. Commencing at Puaapilau, it runs to Puukaaliali; thence on to Puupapapa; thence to Keanaoloa at the termination of the Puukapu boundary. Thence to Keanakuku; thence to Puumahoelua; thence to Kuikahekili; thence to Namahana at the junction of Kohala and Hamakua, and Kona. From Namahana the boundary runs along Kona to Puuiwaiwa... I learned these boundaries from my father. I have been over them with him when he went to catch uwau.

At Namahana there are two gulches. Waikii is the name of the gulch as it comes from the mountain. The names of Namahana and Poopoo are given below Waikii.

Cross. Naohulelua is in Kona District. It was never the boundary of Kohala, I have always heard that Namahana was the boundary of Kohala. Never heard from kamaainas that Naohulelua was the boundary. Puupoe is in Kona, not on the boundary. Hanamauloa is above Keahuolono and in Kona. Perhaps five miles from the line. Kapukaiki is also in Kona, say five miles from the line. Hanaialii is also in Kona, about the same distance from the boundary. Wawaekia is about the same. Keamuku is also about 5 miles from the line of Waimea. Heewai is also in Kona, say a mile or two onto the side of Namahana. Kaaawa is just below the last lava stream, say seven miles from Namahana. From Heewai to Kaaawa may be 10 or 12 miles. Puukapele is perhaps 5 miles from Namahana. (The witness seemed to have an imperfect idea of distances.)...

October 13th 1866

Kiai Sworn (on behalf of G. Davis Hueu):

Born in Waimea at the time of the Dysentery [ca. 1804]... Beginning at Keahuolono and running to Hanamauloa; thence on to Puuhinai; thence to Hanaialii; thence to the Keamuku; thence to Puukapele; thence to *Naopili* [situated on **Mauna Kea** side of Pu'u Ke'ek'e - see Register Map No. 528; S.C. Wiltse, 1869]. Puukapele is at the junction of Kohala, Kona, and Hamakua, where Waikoloa, Napuu [Puu Anahulu] and **Kaohe** meet.

Keahuolono is a rocky point. Hanamauloa is *pili* land. So is Puuhinai. At Hanaialii is a cave and lava. Keamuku is a point in lava field. Has known the boundary since the time of Kamehameha first. Got my information from my father. I have visited the places mentioned by me...

[answer to question from W. Stanley for Government] *Puuhinai is a slight rise in the pili lands, a low hill...Keamuku is a lava field quite near Puukapele. Hanaialii is two miles perhaps from Keamuku.. There is no road nor any gulches on the boundary. I know no gulch between Hanaialii and Puukapele. There is a gulch of Waikii and one of Palihai, but they are not near the line. These gulches join at Naamana or Namahana... I am well acquainted with that part of the boundary, and the rest of it also. I have travelled the whole line personally. Used to hunt for uwau and neenee [nēnē], and to cut sandal wood in that part of the country...*

Haupu sworn.

Lives on Haleaha, Waimea. Born near the Kawaihae line, at the time of the building of Kamehameha firsts' first *heiau* at Kawaihae [ca. 1790]. Know the boundary of Kohala and Kona, beginning at Keahuolono and running to Hanamauloa; thence to Kapukaiki near Puuhinai; thence on to Hanaialii; thence to Keamuku; thence on to Puukapele at the junction of the Districts of Kona, Kohala, and Hamakua, where **Kaohe**, Napuu, and Waikoloa meet. There is a cave at Kapukaiki. *I got my knowledge from my ancestors, with whom I went over the country for sandal wood.* Travelled the line in person and have seen the places I named. Saw it when I was a boy in the time of Kamehameha first, and that boundary was always regarded as settled; undisputed until recently.

Cross. From Keahuolono to Hanamauloa is a long distance. From Hanamauloa to Puuhinai is perhaps a mile and a half from Puuhinai to Hanaialii I cannot say. I cannot state distances confidently. Puuhinai is a pretty high hill where people used to cultivate on Waikoloa side. There is a gulch which approaches Puuhinai within half a mile or so. There is no gulch on the Kona boundary, nor very near it. Knows the Kiikii road. Knows Puuwawaea on the boundary of Waikoloa and Waimea... Kahoolapiko is close to Puuhinai in Waikoloa, not near the boundary...has heard of Puuiwaiwa from youth, but has not seen it. The Poopoo gulch is below the Keamuku, it is in Waimea, not very far from the Kona line. The gulches of Waikii and Palihai unite at Namahana, in Waikoloa, a long distance from the Kona line, say nearly 2 miles.

Pupuka sworn.

Lives half a mile below this house. Born on Ouli, in the time of Kamehameha, when he died, I was grown up. I know the boundary between Keahuolono to Hanamauloa; thence to Kapukaiki; thence to Hanaialii; thence to Keamuku; thence to Kapuukapele, there is a hill there. It forms a junction at this place of Kohala, **Kaohe** and Napuu of Kona. **Kaohe** is in Hamakua. Waikoloa is on the Kohala line. I obtained my information from my ancestors. *I first knew the boundaries when I used to hunt birds upon Waikoloa from the time of Kamehameha 1st.* I have examined the boundaries personally, that has always been the boundary between Kona and Kohala, from the time of Kamehameha first...

My father died at about the time of the abolition of the *Kapu* [1819]. I have gone over the boundaries with my father and he showed me the boundaries of Kona and Hamakua. Keahuolono is a rocky point of rocks. Kahanamauloa is *pili* land. Kapukaiki is close to Puuhinai. From Puuhinai to Hanaialii is as far as from Court House to Lyons place. From Hanaialii to Keamuku is as far as from the board house to the French Mission. From Keamuku to Puukapele, as far as from the Court House to Mr. Purdy's. The places I have given are the most prominent. I am unable to give you any other places upon the line. There is a Road that runs out of Waimea into Kona. There is a road between Keahuolono

and Puuhinai that comes up to Keamuku. I don't know the Kiikii gulch or road. There is a gulch this side of the boundary upon Waikoloa. I cannot give the name of the gulch, it is as far from here as to Mr. Lyon's place.

I know the Poopoo gulch, it finds it's source at Naopili. There is another branch at Waikii. They form a junction at Naamana, which is the same place as Namahana. I don't recognize the gulch Palihai. Namahana is as far as the Hill Holoholoku to the Kona boundary, from the Court House. I did not hear anything about the dispute between His Majesty and Geo. Davis...

Pololi sworn.

Lives in Kona, was born in Waimea before the time of Kiholo, about that year. Knows the boundary between Kohala and Kona, beginning at Hiiakaikaalei on the sea shore and running to Keahuolono; thence on to Kapukaiki; thence to Hanaialii; thence to Keamuku; thence on to Puukapele, where Napuu, ***Kaohe***, and Waikoloa join. This is the junction of Kona, Kohala, and Hamakua. Learned the boundary from his father, when *they went to hunt for birds; also going for sandalwood*. Has also traveled there frequently...

There is a cave with a small mouth at Kapukaiki... Kapukaiki is as far from the sea as say six miles. I know Puuhinai, it is in Waikoloa, not on the boundary, opposite Kapukaiki. Cannot state how far apart. My father showed me the boundary from the sea to Puukapele. The last time I traversed the boundary was when I went to ***Kaohe*** after cattle. I did not go with my father along all the line, but he pointed out all the points on that line to me from Keahuolono. I could see Puukapele from that place, and Puuhinai also...

Cross. There is no gulch on the boundary, nothing but stones and old lava, and stony *pili* land in places. There is no gulch on the line. *The aa is in Kona and the pili land in Waimea*. There is a gulch in Waikoloa, not far from the boundary. The name of the gulch is Heewai, $\frac{3}{4}$ of a mile or so from the line. The Waikii and Palihai gulch is on Waikoloa. Some mile and a half from the aa on the boundary, and more than three miles from Puukapele... I don't know any other name than Heewai for the first gulch. The name Poopoo is applied to Waikii and Palihai gulches...

I live at Kainaliu between Kailua and Kealakekua. I never resided on Napuu. I lived in Waimea when I went for birds. I went to live in Kona when Liholiho went to England [1823]. I have traveled from Kona to Waimea by the road which crosses the boundary near Puukapele. I have only been on the *mauka* part of the boundary since that time, not on the part *makai* of Hanaialii. *I have been after sandalwood in Kuakini's time on Napuu, in the aa, on the line of ***Kaohe***, boundary of Hamakua. Also across the mountain after cattle.*

October 15th 1866

Kuehu sworn. (on behalf of G. Davis Hueu)

Resides on Puuanahulu. Was born there. Helped to carry stones to build Kiholo [in ca. 1810]. Saw Kamehameha the first. Knows the boundary of Kohala and Kona. It begins at Keahuolono and runs up to Puupoe; thence on to Palihai; thence on to Hanamauloa; thence on to a hill called Kauakahiala; thence to Paliokaakaa where is a road and a resting place; thence to Kapukaiki on a road; thence to a resting place called Kikiha; thence to Hanaialii, where people sleep; thence to Wawaekaa a resting cave; thence on to Keamuku; thence to Heewai Gulch where is a resting place in the aa; thence to Kaaawa; thence to Puukapele, at the junction of the three Districts. ***Kaohe***, Puuanahulu and Waikoloa meet at that place.

Puupoe is clumps of rocks and old lava. I learned the boundary from my father who got his information from his ancestors. We were familiar with that boundary. He showed me the whole line. I was grown up at the time. It was before the death of Kamehameha. *I was a bird catcher as well as my father.* Many others know that to be the boundary and can testify.

Cross. I know Keawekoloua he has knowledge of the boundaries. He has not told me about them. I have not been on the line with him. Kupele is a *kamaaina* also. Never went on to the boundary with him. There is no road which runs along the boundary. There is no gulch on the boundary. There are several gulches in Waikoloa. Puuhinai is in Waikoloa. *Keamuku is a general name for the great field of old lava. It runs to near Puukapele.* I never saw Puukapele from Keahuolono. From Keahuolono the boundary runs to Hiiakaikaaleiki on the sea shore. Anaehoomalu is the name of the Kohala land which joins the boundary at the sea side, and lies all together on the *makai* side of the Gov't. Road. Waikoloa in Waimea is on the *mauka* side of the road.

Kuahine sworn.

I live at Napuu in Kona. I was born about the time of Kiholo. I was born at Lihue, I know the boundary between Kona and Kohala. From Keakalahi [Hiiakaikaalei] at the sea shore, at the land of Anaehoomalu; thence up to Keahuolono; thence to Puupoi; thence to Palihi; thence on to Hanamauloa; thence to Kahuakaiala; thence to Palaokaka; thence to Kapukaiki; thence to Kikiaha; thence on to Hanaialii; thence to Wawaekea; thence on Keamuku; thence to Heewai; thence to Kaaawa; thence on to Puukapele. That is the end of the line. There the three lands join, Kohala, Hamakua, and *Napuu ma Kona*. ***Kaohe*** is in the Hamakua district. I derived my knowledge from my father and my elder brother. I have been a *luna* upon Waikoloa in the time of Kamehameha III. *I have been on the boundary hunting Uau, Wild Geese and in search of Sandal wood...*

Malai sworn.

I live on Waikoloa. I was born at Pukalani in Waimea. I was born about the time of Kiholo, while they were building it [ca. 1810]... I used to hunt with my father, I was a boy when Kamehameha 1st died... My father went with me to Kiholo to help build Kiholo, my mother remained at Pukalani. I have been to Puuhinai to obtain the Potato leafs, it is a place of cultivation. It is not on the boundary. You can see Puukapele standing at Keahuolono, that is the top of Puukapele. I have been over the whole boundary line, hunting, sleeping at the caves, in and out of the line, sometimes upon one side and sometimes upon the other. Makahuna [Makahonu] is a cave in Kona not far from Palihi and from the boundary. I did not state it was upon the boundary before the Boundary Commissioners. Huikaula is in Kikiaha, an old sacrificing ground of the ancestors; it is not on the boundaries. I stated it was upon the boundary of Waikoloa and Napuu, before the Commissioners. Keamuku is a streak of old lava to this point.

I know some roads crossing the boundaries from Waimea into Kona. There is a road, Keahuolono to Puupoi to Makahuna; thence on to Hanamauloa, the road crosses the boundary and recrosses it at various places. The road comes from the sea shore to Puuhinai, at Makahuna, a part of Kona crosses the road and comes this side of Puupoi. The next point is also upon the Kona side. At Palihi it is upon the boundary. Hanamauloa is also upon the boundary. Kanakaola is a burying place. At that point the road is on the Kohala side, about 50 paces from the burying place. At Paliokaka the road is upon the boundary. The name of the road from Keahuolono is "Puukowai..."

There is a road from Kapukaiki on to Kikiaha. At Hanaialii the road is not on the boundary. At Wawaekea the road is in Kohala. It is close to the boundary, the road passes on to Keamuku and goes into the Kona side. After you pass Keamuku, you cannot call it a land, there is a gulch, it is called Heewai.

November 10th 1866

(in Honolulu, for the Commissioners of Crown Lands)

Keawekoloua sworn.

I was born at Puuanahulu in Kona Hawaii, adjoining S. Kohala. I was born after the building of Kiholo. I know the boundaries of Kohala and Kona. It commences at sea shore at Hiiakaikaalaihi; thence to Keahuolono; thence to Pohakuloa; thence to Kepani; thence to Kapuuale; thence to Kiikii; thence to Kahawaiokalolo; thence to Kapaakea; thence to Puupoha; thence three lands join – viz the *Ahupuaa* of Waimea, Napuu & Waikoloa. Thence to Kahoolapiko. Waikoloa ceases there. Thence to Puuiwaiwa; thence to Namahana, the junction of Paauhau, Napuu & Waimea. Paauhau is in the district of Hamakua.

Namahana is a gulch. There is a road from Namahana to Kona. There is a road on the line which I have described, dividing Kona & Kohala.

*I know Puukapele it adjoins & belongs to Napuu. it is on the edge of Napuu, on side adjoining **Kaohe**. I know **Naopili** [situated on Mauna Kea side of Pu'u Ke'eke'e], it is a cave. It's where Paauhau ends, joins **Kaohe**. I have learned these things from my grandfather and father. Accompanied my father in excursions hunting the uau and nene. Went after uau till they were destroyed by wild cats. Afterwards went after sandal wood. I have very frequently visited these places. Have been a guide to foreigners from Kaawaloa to the volcano. My father belonged to Napuu. I lived at Napuu and Waimea... Naohulelua is the junction of Napuu, Keauhou & Hamakua. Puukapele & **Puukeekee** stand near each other, are in Napuu, mauka of them is **Kaohe**. I have been to **Naopili**. It is beyond **Puukeekee** towards Mauna Kea. I have been to Namahana with my father who pointed out the country. Have been there since his death.*

Have been there with Joaquim after cattle. *It was a place of meeting where we drove cattle & lassoed them. Heard the name Namahana from my father. Never knew Puukapele was the ancient boundary of Kona.*

...I know Waikoloa in Waimea. Part of it is cultivated, at Kapanaolona, in potatoes. Pumpkins, melons and gourds grow if planted there. There is a hill called Puuhinai on the Kona side... It was not considered a part of Waimea till very recently at least...

The boundary runs to Kahoolapiko. Kahoolapiko is at junction of Waikoloa, Waimea & Napuu. I was there last about two years ago. I pass that way to Napuu when I visit my sisters at Napuu. *This place has been pointed out by my father on bird catching. It was necessary to know the boundaries so as not to trespass. I took birds on Napuu, **Kaohe** & Keauhou...* [HSA – Interior Department Lands; 1866]

1866

Before the Honorable G.M. Robertson,

Sole Commissioner of Boundaries, Hawaiian Islands.

In the matter of the application of the Commissioners of Crown Lands, for the boundaries of the *Ahupuaa* of Waimea.

And now at this day comes George Davis and respectfully represents to your Honor, that he owns and possesses the *ahupuaa* of Waikoloa by Award of the Land Commission of the Hawaiian Islands dated the 24th day of February A.D. 1854, and numbered 8521, in which his said land is designated as the *ahupuaa* of Waikoloa: that the petition of the said Crown Commissioner, in setting forth their external boundaries, include the whole of said *ahupuaa* of Waikoloa, except perhaps a small part near the Kona line; that the said George Davis claimed as the external boundaries of his said *ahupuaa* of Waikoloa, the following, to wit:

Commencing at Keahuolono, the corner of the *ahupuaa* of Waikoloa on the Kona line, thence turning eastward on the Kona line to Puupoe where there is a cave; thence to the *Pali* of Palihi; thence to a place of *pili* land in the midst of the lava called Kahanamauloa; thence to the hillock and being place of Kuikaiheole; thence to the *pali* of Paliokaka; thence to the cave of Kapukaiki; thence to the cave of Hanaialii; thence to the cave of Wawaekia; thence to the lava bed of Keamoku; thence to the resting place and hillock of Heewai; thence to a wood or forest called Kaawa; thence to the hill of Puukeke; thence to the hill of Puukapele, a short distance northwest of Naohuleelua; said Puukapele being the land in the Kona side; thence along the land of **Kaohe** in Hamakua, to the water course and resting place of **Kilohana**, thence to the large water course of Waikii that runs to Puuku, thence to **Auwaikakua**; thence to the *koa* forest of Kamakoa; thence to the mound of Keahuamaiele; thence to the cave and water course of **Kemole**; thence to the cave of Kupaha; thence to the cave and water course of Kapakea; and thence to Puaapilau, the corner of the *ahupuaa* of Waikoloa on the external line as indicated in said petition: all of which is respectfully submitted with the prayer that said external line be made to conform to the boundaries herein indicated.

George Davis by
W. Claude Jones his Attorney
[HSA – Interior Department Lands; 1866]

Boundaries of Waikoloa in Waimea, Hawaii
Volume A No. 1 [pages 22-24]
No. 6 [Certified March 4, 1867]

Beginning at a place known as Kapuulepo on the boundary of Puukapu where there is a pile of rocks being at the East, Northeastern corner of Waikoloa. Thence North 89° W. 86 50/100 chains to Halapepe; Thence North 88 ½° W. 51 50/100 chains to Kalaeiki; Thence North 83° W. 4 14/100 chains to a pile of rocks; Thence North 84° W. 33 60/100 chains to Puainako; Thence South 85° W. 19 83/100 chains to Komikolae; Thence North 80° W. 44 60/100 chains to Kulanapahu; Thence North 73° W. 48 80/100 chains to Kanakaikiiki; Thence North 35 ½° W. 14 83/100 chains to a pile of rocks; Thence North 32½° W. 17 35/100 chains to Holuakamakoa; Thence North 21° E. 2 72/100 chains to Puuhoolelelupe; Thence North 23° W. 6 35/100 to Hoomoe; Thence North 65° E. 4 61/100 chains to a pile of stones; Thence North 53° E. 3 00/100 chains; Thence North 25° E. 4 66/100 chains; Thence North 2° W. 11 37/100 chains to a pile of stones; Thence North 41° E. 2 42/100 chains; Thence North 58° E. 6 10/100 chains to **Makanaka**. Thence North 3 15/100 chains to Walaohia; Thence North 6° W. 6 85/100 chains to a pile of stones; Thence North 18° E. 7 86/100 chains to Kailiohia; Thence North 17° E. 5 84/100 chains; Thence North 39° E. 5 10/100 chains; Thence North 25° W. 5 92/100 chains to Makahikilua; Thence North 2° W. 4 42/100 chains crossing the enclosure; Thence North 58° W. 1 70/100 chains; Thence North 21° West 4 72/100 chains to a pile of stones; Thence North 4° E 5 70/100 chains to a pile of stones; Thence North 57 ½° E. 2 10/100 chains to Awawa o ka Pele; Thence North 21° W. 3 50/100 chains to a pile of stones; Thence North 84° E. 13/100 chains; Thence North 3° E. 2 40/100 chains. Thence North 70 ½° E. 2 00/100 chains; Thence North 39° E. 4 80/100 chains; Thence North 1½° W. 3 86/100 chains; Thence North 23° E. 1 84/100 chains; Thence North 34° W. 3 76/100 chains; Thence North 8° W. 2 82/100 chains; Thence North 14° E. 28 00/100 chains to *Manu* at which point there is a *Kihapai*; Thence North 3° E. 6 70/100 chains to Waikalehua. Thence North 20° E. 7 50/100 to Kaholopalae where there is *Ohia*; Thence North 5° W. 23 00/100 chains; Thence North 25° W. 11 00/100 chains; Thence North 35° W. 38 00/100 chains to Puuiki Hill; Thence South 21° W. 82 00/100 chains along to the Waimehe watercourse; Thence South 61° E. 20 00/100 chains along the Waikoloa watercourse; Thence South 34° E. 20 00/100 chains along the Waikoloa watercourse. Thence South 20° E. 20 00/100 chains. Thence South 2° W. 2 50/100 chains; Thence South 23 ½° W. 3 34/100 chains;

Thence South 63½° W. 3 00/100 chains; Thence South 62° W. 8 88/100 to Puuloa; Thence South 66° E. 5 62/100 chains; Thence South 26½° W. 11 46/100 chains; Thence South 29° W. 42 00/100 [Volume A No. 1 page 22] chains to Kamakeokeo. Thence South 37½° W. 14 85/100 chains to Aieanui; Thence South 88° W. 6 21/100 chains; Thence South 69½° W. 4 66/100 chains to Puuokaa; Thence South 21° E. 4 42/100 chains; Thence South 25° W. 2 62/100 chains; Thence South 47 ½° W. 2 88/100 chains; Thence South 27° W. 1 72/100 chains; Thence South 31° E. 1 24/100 chains; Thence South 18° W. 1 44/100 chains; Thence South 27° E. 2 40/100 chains; Thence South 54° W. 10 82/100 chains to Akuanui; Thence South 41½° W. 1 50/100 chains to a pile of rocks; Thence South 25° W. 3 10/100 chains to a pile of rocks; Thence South 43° W. 7 70/100 chains to Pahoa; Thence South 27° W. 5 20/100 chains to Kauhuhu; Thence South 56° W. 32 90/100 chains to Puupili; Thence South 47° W. 46 80/100 chains to Kuniiaikeau [Kumikiau]; Thence South 66° W. 59 20/100 chains to Puuhuluhulu; Thence South 73° W. 14 10/100 chains; Thence South 55° W. 8 50/100 chains along to wall of Kauliokamoa; Thence South 67½° W. 1 90/100 chains; Thence North 67° W. 2 00/100 chains; Thence North 84½° W. 10 00/100 chains; Thence North 71° W. 4 00/100 chains; Thence North 62° W. 8 90/100 chains; Thence North 68 ½° W. 10 80/100 chains to Kalaeohai; Thence North 76½° W. 12 50/100 chains; Thence North 52° W. 7 80/100 chains to Liuliu; Thence South 71½° W. 20 90/100 chains to a pile of rocks on the boundary of Ouli; Thence South 61° W. 31 50/100 chains; Thence South 71½° W. 21 60/100 chains; Thence South 53° W. 11 00/100 chains; Thence South 49° W. 22 90/100 chains to Puuanunu; Thence South 64° W. 73 30/100 chains to Palinui; Thence South 65° W. 40 50/100 chains to a pile of rocks; Thence South 53° W. 40 50/100 chains to a pile of rocks; Thence South 59° W. 13 00/100 chains to Kapaakea; Thence South 64° W. 85 50/100 chains to Pohakau; Thence South 63½° W. 24 00/100 chains to a pile of rocks; Thence South 67° W. 25 50/100 chains to Pooholua; Thence South 74° W. 49 30/100 chains to Kapae; Thence South 70° W. 70 00/100 chains to Kaala; Thence South 67° W. 17 00/100 chains; Thence South 76° W. 20 00/100 chains to Puuwaewae where there is a big stone; Thence South 43° W. 83 50/100 chains to Kiikii, at Puako; Thence South 49½° W. 122 00/100 chains to a pile of rocks at Waima; Thence South 32° W. 85 00/100 chains to Kahopea at Kalahuipuaa; Thence South 12° W. 19 00/100 chains along Government road; Thence South 17° W. 86 50/100 chains to Pohakuloa at Anaehoomalu; Thence South 29° W. 80 00/100 chains to Keahualono on the Kona line; Thence North 89° E. along the boundary of Kona 522 00/100 chains; passing by Puupoe, Palihai, Hanamauluoa, Kauakahialaa, Kapalihookaakaa to Kapukaiki; Thence South 47° E. 84 00/100 chains to a pile of rocks; Thence South 30° East 65 00/100 chains to Kikiha; Thence South 53° E. 136 00/100 chains to the cave of Hanaialii; Thence South 42° E. 87 00/100 chains to Wawaekaa; Thence South 53° E. 73 00/100 chains to a pile of rocks; Thence South 65° E. 72 00/100 chains to Keamuku; Thence South 58° East 162 00/100 chains to Heioia [Heewai]; Thence South 85° E. 72 00/100 chains to a pile of rocks; Thence South 62½° E. 160 00/100 chains to Kaaawa; Thence South 58° E. 194 00/100 chains to a point on the Southeast side of Puukapele at the junction of the districts of Kohala and Hamakua on the Kona line. Thence North 12° West along the boundary of the [Volume A No. 1 page 23] *Ahupuaa* of **Kaohe** 131 00/100 chains to a pile of rocks; Thence North 6° W. 24 00/100 chains to a pile of rocks; Thence North 4° E. 31 00/100 chains to pile of rocks; Thence North 13° W. 80 00/100 chains to **Kilohana**; Thence North 14° W. 70 chains to Keoneheehee near at Waikii Gulch; Thence North 23° E. 111 00/100 chains to **Aiakala** by the **Auwaiakeakua** Gulch; Thence to a large flat rock marked XIV on the top of a conical hill known as **Puulaau** at the southeast corner of S.P. Parker's land of Paauhau; Thence down the gulch known as the **Auwaiakeakua**; North 78° W. 138 00/100 chains to a *koa* tree three feet in diameter marked P on the North side, and North 70° W. 138 00/100 chains to a point where this gulch ends known as Kaimumoa, said point was marked by a hill of stones marked P and is the most southwestern point of Paauhau; Thence along the western boundary of S.P. Parker's land. North 21° E. 454 00/100 chains to a point

opposite to Keanaoloa; Thence West 56 00/100 chains to Keanaoloa; Thence North 13⁹ W. 283 00/100 chains along the boundary of Puukapu to Kapuulepo on the road leading from Waimea to Hamakua to the place of beginning.

I hereby certify the foregoing is a true and faithful copy of the “Boundaries of Waikoloa in Waimea Hawaii” as rendered by the Justices of the Circuit Court of the third Judicial Circuit, February 15th 1867, and at present deposited in this office.

L. McCully, Clerk, Supreme Court
Honolulu, March 2d 1867

I hereby certify that the above is a true and faithful copy of the copy of the “Boundaries of Waikoloa in Waimea, Hawaii,” as certified by L. McCully, Clerk, Supreme Court and copied by him in a certified copy dated Honolulu, March 2, 1867 and deposited with me in February 1869.

R.A. Lyman, Boundary Commissioner, 3d Judicial Circuit
Hilo, March 18th 1871 [Volume A No. 1 page 24]

III. Land Use and Leasehold Interests on the ‘Āina Mauna Following the Māhele ‘Āina (1850-1963)

After the *Māhele ‘Āina*, large tracts of land (from Government and *Ali‘i* Land inventories) were more readily available to lessees who sought to develop a wide range of business interests—these interests were also the force behind the defining of boundaries of land as described in the preceding section of the study. On the *‘āina mauna*—lands extending from the vicinity of the forest line to the mountain peaks—ranching was determined to be the best economic use. The history of leasehold interests and transitions in ranching activities, including the competition between ranchers for the right to develop the ranches, is an important one in the history of the *‘āina mauna*. These activities shaped the landscape as it was known up to the time of development of observatories on Mauna Kea in the 1960s. It was also those individuals associated with the ranches, who controlled most access, and maintained the closest ties to Mauna Kea and the *‘āina mauna*.

This section of the study provides readers with a detailed account of activities on Mauna Kea and neighboring mountain lands, documenting transitions in native practices, and the evolution of ranching on the mountain landscape. Records cited below were found in the collections of the Hawaii State Archives (HSA), Bureau of Conveyances (BoC), the Paniolo Preservation Society and Parker Ranch.

January 16, 1857

Francis Spencer; to John Young, Minister of Interior

(Regarding lease of Kalaieha and Kaohe for development of sheep ranching interests):

...The undersigned carrying on Sheep Farming &c. at Lihue, Waimea, Island of Hawaii, and being anxious to increase his Flock to an extent that would enable him to raise sufficient wool to make it a profitable business to export the same. And having ordered some pure blood Marino Sheep from Germany and New South Wales.

Beg Respectfully to offer to lease for a term of Twenty or more Years — Kalaieha part of the Government Land called Kaohe, district of Hamakua between Maunakea and Maunaloa. A small portion of which was let at five cents per Acre in mistake for his Majesty King Kamehameha IV. Land your petitioner is now informed the land belongs to the Government and Respectfully offers to lease say Ten Thousand Acres at Three Hundred Dollars per Annum allowing your petitioner at any time to annul the same. By

forfeiting one years rent and all improvements. *Your petitioner would further say there are no inhabitants within Thirty or Forty miles of the place and through the scarcity of water is not likely to be that, together with wild Dogs induces your petitioner to ask the privilege of annulling the lease with the above proviso.* Trusting that your Excellency will be graciously pleased to grant my petition...

*Resolved that the Minister of the Interior be authorized to lease 10,000 acres of land in **Kaohe**, Hamakua, Hawaii to F. Spencer at the rate of 6 cents per acre a year for such time as the Minister may see fit, provided however that the thousand acres applied for and now occupied by Mr. J. Low shall not be included in the 10,000 acres. [HSA-Interior Department Lands]*

Honolulu, Oahu

April 21, 1857

E.P. Adams; to Minister of the Interior:

...Proposal for the purchase of Wild Cattle belonging to His Majesty Kamehameha IV and the Hawaiian Government which are now running on or near **Mauna Kea** & Mauna Loa in Hawaii and being the same which are now advertised for sale in the "Polynesian."

The undersigned offers for all the Cattle specified above, the sum of One dollar and seventy five cents per head, calves running with their mothers not to be counted – to be paid for monthly as received; and will make an advance of One thousand dollars within ten days after signing of contract. It being understood that sufficient time shall be allowed for the fulfillment of the contract. [HSA ID Misc. Box 147]

April 28, 1857

E.P. Adams; to Keoni Ana:

...This Instrument made this twenty-eighth day of April, A.C. one thousand eight hundred and fifty seven, between His Excellency John Young, His Hawaiian Majesty's Minister of the Interior on behalf of His Majesty Kamehameha IV and of the Hawaiian Government, of the first part, and Edward P. Adams of Honolulu, Oahu, Hawaiian Islands of the second part, Witnesseth, that the said party of the first part, for and in consideration of the agreements & covenants, hereinafter contained, to be by the said party of the second part, his representatives & assigns kept & performed, hath sold, and by these presents doth sell & convey to the said party of the second part his representatives and assigns, all and singular, the wild cattle, to wit; bulls, oxen, cows and calves, unmarked and unbranded now running on the Island of Hawaii, in the Districts of Hilo, Hamakua and South Kohala, and on or near the Mountains of **Mauna Kea** and Mauna Loa; excepting and reserving so many of the said animals as have heretofore been sold to third parties by the King or Government and yet of the said animals as have heretofore been sold to third parties by the King or Government and yet remain undelivered.

To have and to hold, all and singular, the said wild cattle, subject to the above reservation, with the proceeds and profits thereof, and all the right, title and interest of His Majesty the King, and of the Hawaiian Government therein or thereto, unto the said party of the second part, his representatives & assigns forever, subject to the provisions of this contract, together with the privilege of pursuing, taking, driving, and slaughtering the same wherever they may be found upon lands belonging either to the King or the Government without charge for pasturage and with free right of entry upon the said lands, the King's land of Puukapu excepted for and during the term of three years, from and after the first of July next.

And this Instrument further witnesseth that the said party of the second part, for and in consideration of the premises, doth for himself, his representatives and assigns covenant

and agree to and with the said party of the first part and his successors in office that he will well and truly pay unto the said party of the first part, or his successors in office, monthly, the sum of one dollar and seventy five cents, for each and every of the above named animals, calves running with their mothers excepted, taken and reduced to possession by him; and that he will furthermore, within ten days after the execution of this instrument pay in advance to the said party of the first part or his successors in office the sum of one thousand dollars; it being understood that such payment is not in the nature of a bonus but is an advance for and in lieu of the said monthly dues until the amount of the same shall be equal thereto.

And the said party of the second part for himself, his representatives and assigns, doth further covenant and agree, to and with the said party of the first part and his successors in office, that at the expiration of each and every month of the three years aforesaid, he will render to the office of the party of the first part in Honolulu, a certified return of the number of the said animals, calves, excepted as aforesaid, taken and reduced to possession by him, his representatives or assigns during such months—unless the said party of the first part shall appoint an agent or agents to take account of the same, in which case the said party of the second part, his representatives or assigns will give notice to such agent or agents of the time and place, when & where they are about to drive in or slaughter the said animals; provided, however, that such agent or agents be with them in the District of Waimea, Hawaii.

And the said party of the second part for himself, his representatives and assigns, doth further covenant and agree, to and with the said party of the first part and his successors in office, that at the expiration of each and every month of the three years he will, and his representations and assigns shall, quit and surrender up, to the party of the first part his successors and his or their assigns all and singular of the above names in cattle up to that date not taken or reduced to possession by him, his representations and assigns—and that the same shall then and there revert and become the property of the said party of the first part, his successors or assigns, without farther or other conveyance and all right and title of the party of the second part, or of any one holding under him, therein or thereto, utterly cease and determine.

And the said parties of the first & second parts, for themselves, their representatives, and assigns, do further mutually covenant and agree to and with each other that, anything herein contained to the contrary notwithstanding this contract shall be avoided and shall cease and determine if default shall be made by the said party of the second part, his representatives or assigns in any of the monthly payments aforesaid for more than thirty days after the monthly return corresponding thereto shall have been made to the office of the party of the first part, in Honolulu; and that it shall also be avoided and cease and determine, if the said party of the second part or his representatives or assigns, shall fail to drive in, kill or receive five hundred head of cattle hereby conveyed in any consecutive six months during the three years aforesaid.

And the said parties of the first and second part for themselves, their representatives, and assigns, do further mutually covenant and agree to and with each other that any disputes or differences arising under this Instrument shall be settled by reference to arbitration, each party to choose one arbitrator, & the two so chosen, in case of difference between them, to choose or third—and their decisions, or that of a majority of them to be final and binding on all parties.

And the said party of the first part, for himself and his successors in office, doth covenant and agree to and with the said party of the second part, his representatives and assigns that he is duly and fully authorized and has good right to sell & convey the above named

cattle, and all the right, title and interest either of his Majesty the King, or of the Hawaiian Government therein or thereto as aforesaid: and he doth further affirm, covenant and guarantee that there now are in the Districts above named, Two thousand head of cattle aforesaid.

In testimony whereof the said parties of the first and second parts have hereto set their hands and seals the day and year first herein above written. [HSA ID Misc. Box 147]

Waimea, Hawaii

July 25, 1857

Isaac Y. Davis; to Prince Kamehameha;

...Your letter of the 14th of July inst., was received by the hands of Mr. E.P. Adams, directing me to let Mr. Adams know the number of cattle which had been lassoed by those who have cattle in the mountain, and the number of cattle remaining.

I have done so, and gave Mr. Adams the report showing the number of cattle sold, and the cattle which had been lassoed, the remainder running there in the mountain.

And I am sending the report of the same to you, and there you will find out.

The number of fever cases are on the increase in Kawaihae kai, and is commencing up here, – fever, cough and dysentery.

My health at the present time is not very good. [HSA ID Misc. Box 147]

Waimea, Hawaii

July 25, 1857

Isaac Y. Davis; Report

Sold, Wild Cattle In The Mountain:

To G.S. Kenway		500	
To G.S. Kenway, lassoed	268		
Sold to Spencer & Louzada,	50		
Sold to Mr. E. Brith,	100		
Sold to Mr. C. Carr,	40	458	42
Sold to Mr. D. Vida,		500	
Sold to Mr. D. Vida, Lassoed,	98	98	402
Sold to Von Houghten,	588	588	1032
Waimea, Hawaii, 25 July, 1857. Spencer & Louzada lassoed and slaughtered 21 wild cattle:			1032
Grand total of all cattle sold,	1588		
Grand total of all cattle lassoed and sold to others:	556		1032

[HSA ID Misc. Box 147]

Hamakua, Hawaii

April 11, 1859

J.P. Parker; to L. Kamehameha

(Regarding disposition of wild cattle in the forest and mountain lands of the Government):

...I beg leave to address Your Royal Highness on the subject of the unbranded cattle running in the *ohia* forest and among the fern on the Hamakua side of this Island on lands adjoining the lease hold lands held by myself and other private individuals all chiefly interested in the grazing business.

The cattle running in the district I speak of are, and have always been considered as totally distinct from the so called Mountain Cattle, inasmuch as they are all the breeding of private heads, and generally speaking a totally different breed. No cattle of any kind were ever seen or heard of in this Hamakua forest until the late Mr. French commenced purchasing and creating a herd and station on this very ground, in which business he was shortly followed by myself and afterwards by Harry Purdy, and on a smaller scale by a few other private individuals, and in the course of time this part of the island became the extensive and valuable private cattle land, the chief and by far the largest proportion of the herds being owned by the late Mr. French, myself and H. Purdy, whilst the Government owned no cattle whatever in this district. From the natives of the country to the Windward of our private lands (a dense forest and almost impenetrable undergrowth covering nearly the whole of it) as the herds increased, it became a impossibility to prevent cattle from time to time getting beyond the reach of our control, and gradually they have filled this land with their offspring, which, tho frequently driven partly out, and collected as occasions and the opportunity served, on their play grounds in the forest, have not been generally branded, tho their private origin and ownership is notorious and cannot be disputed, but at the present moment, a difficulty of an unpleasant nature seems likely to occur, resulting directly from the contract lately made between the Government and Mr. Adams and since, transferred to another party, for the unbranded cattle running in certain districts specified as belonging to the Government.

A diversity of opinion exists as to the present ownership of the unbranded cattle in this bush and altho I, as perhaps the most interested party in the matter, have never for a moment opposed the Government, would consider it has any claim, yet I would desire now that a question has arisen on the subject, to have the matter settled beyond dispute and with that view, I would respectfully request that your Royal Highness will consider the question and apprise the parties interested of your decision. I may be allowed to report in conclusion that if these unbranded cattles shall be placed at the disposal of any party who may scour the forest with guns, spears and dogs, such a course will apparently result in the injury, and with a high destruction of the tame herds which are now one of the mainstays of this Island... [HSA – ID, Lands]

November 11, 1859

Kamehameha IV to Harris & Swain

(Five year lease of Humuula to upper forest region, withholding right to take wild cattle; lowlands used in development of plantation interests):

This Indenture made this 11th day of November AD 1859, between His Majesty Kamehameha IV, King of the Hawaiian Islands of the one part and Abel Harris & F.B. Swain of Honolulu and **Laupahoehoe** of the other part. Witnesseth that for and in consideration of the Rent & Covenants on the lessees part herein after recorded & contained, he the said Kamehameha IV hath demised and leased & by these presents doth demise & lease unto the said Abel Harris and F.B. Swain, their heirs, executors, assigns, *all that part of the land of Humuula in the District of Hilo, Island of Hawaii – Lying between the Sea & the mauka edge of the dense forest — excepting only from the Lease*

Kuleanas awarded by the Land Commissioners & reserving the right of catching & converting the wild Mountain Cattle that may be running in the forests, with all the rights, members, easements, appurtenances thereunto belonging for & during the term Five Years to commence from the 11th day of November, AD, one thousand eight hundred & fifty nine yielding & paying therefore unto the said Kamehameha IV his heirs, co assigns the yearly rent of Two Hundred Dollars to be paid in half yearly installments, one hundred dollars each at the end of each half year of the said term, over & above all taxes, charges & assessments to be levied as imposed thereon...

...& that the said Abel Harris & F.B. Swain shall not commit or knowingly permit or suffer any waste to be done up the said demised premises, or cut down or permit to be cut down any forest trees on said land... [BoC Liber 12:351-352]

No Date (ca. 1860)

Manuia, et al. to L. Kamehameha

(Regarding the right to collect ‘ō‘ō, mamō, and other native birds from Pi‘ihonua):

*...Be generous; We, your obedient people, residing on the land of **Pi‘ihonua**, Hilo, Island of Hawaii, humbly pray:*

We have seen the notice of prohibition of the oo, the mamō, and other birds on said land, therefore, we pray unto you the King of the Hawaiian Islands, to release the restriction of the birds.

This is our desire of you, the King, that a division be made of the birds, some to you and some to us, if it is agreeable to you, Gracious King of the Hawaiian Islands, of our prayer, let us know immediately, do not delay.

THEREFORE, we are the ones whose names are below:

Manuia.

Mahoe.

Mahoahoa.

Hooikaika.

Haa.

[HSA, ID Lands, Doc. No. 89]

June 13, 1860

F.B. Swain to Abel Harris

Trust Deed

(Property and goods, land of Humuula):

Disposing of property of c-partnership which expired by limitation on May 1st 1860; and paying off debts. [BoC Liber 13:162]

August 30, 1860

Abel Harris to A. Bates

*In consideration of \$1,200.00, interest in lands, including lease of **Humuula** as recorded in Liber 12:351. [BoC Liber 13:171]*

August 30, 1860

Ashur Bates to Abel Harris

Deed

*In consideration of \$1,300.00, Interest in lands, including lease of **Humuula** as recorded in Liber 12:351. [BoC Liber 13:171]*

As noted in the original lease to Abel Harris and Francis Swain, the area in Humu'ula included only that extending to the *mauka* edge of the dense forest. It appears that it was not until August 1st, 1861, that the mountain lands of Humu'ula and Ka'ohe, including the summit region of Mauna Kea, were leased out. The following lease documents the lands, terms, and right to take "wild unbranded cattle."

August 1, 1861

Indenture of Francis Spencer & Robert C. Janion;

to Waimea Grazing Company

(Regarding formation of the Waimea Grazing & Agricultural Company

and transfer of interest in lands on the slopes of Mauna Kea; the lands of Ka'ohe and Humu'ula; and other properties and rights):

This Indenture made the first day of August A.D., One Thousand Eight Hundred & Sixty one, between Francis Spencer & Robert C. Janion, lately copartners in the Grazing business at ***Puuloa***, Waimea, on the Island of Hawaii, under the name & Style of F. Spencer & Company, of the first part, & the Waimea Grazing & Agricultural Company of the other part. Whereas by articles of agreement & co partnership made & entered into & concluded by & between the said F. Spencer & R.C. Janion of the one part and Francis Spencer, James Louzada and Henry Cornell copartners in another Grazing Establishment at Lihue in the District of Kohala in the said Island of Hawaii, of the other part, reciting that the said several parties & firms respectively had agreed & did thereby agree to consolidate & unite their several partnership propositions that the same should be therefore held, managed & conducted as a Joint Stock Establishment in the name style & title of "The Waimea Grazing & Agricultural Company..."

Now this Indenture witnesseth that in perusal of the premises & the said recited agreement...conveying and making over to the said Waimea Grazing & Agricultural Company all the said several properties owned by them as copartners in the said Lihue establishment & in further consideration of Ten Dollars in hand paid by the said Waimea Grazing & Agricultural Company... They...have granted...all the right, title, & interest in & to all that tract of land in Hamakua on the Island of Hawaii aforesaid granted to George S. Kenway by Royal Patent No. 632, & by said G.S. Kenway afterwards duly conveyed to R.C. Janion & John Montgomery.

And Also in & to all that tract of land situate at ***Puuloa***, Waimea...to the late William French by Royal Patent No. 68, and afterwards conveyed by G.S. Kenway & Nancy Anne his wife to D.R. de Janion by deed 17th day of July 1856... And Also all that lot of land enclosed by a fence & forming part of the dwelling house lot previously occupied by George S. Kenway...as granted to William Beadle by Land Commission Certificate on Claim No. 4038... And Also all that piece of land situate at Pohonui, Kawaihae, Hawaii, granted to the late William French by Royal Patent No. 69... And Also one undivided interest of all that tract of land known as the *Ahupuaa* of Puukapu...as demised to the said R.C. Janion, James Louzada & F. Spencer by His Majesty Kamehameha IV by Indenture of Lease bearing date of the first day of September AD 1857 & recorded in the Register Office in Liber 10 on pages 405, 406 & 407.

And Also all that piece of Land & Houses there all in Waimea... And Also all that tract of Land called & known as Waikoekoe in the District of Hamakua...the personal property of W.C. Lunalilo by Indenture of Lease bearing the date of the 25th day of January 1860... And Also all that piece of Land situated in Waimea, Hawaii & Known by the name of Kailiohia, being a *Kuleana* from His Late Majesty Kamehameha III, as demised to the said Francis Spencer by Anthony D. Allen by lease bearing date of the 5th day of January AD 1861...

And Also all that piece of Land containing 1641 acres in Kapulena, Hamakua...Lease bearing date of the 20th day of January 1859... And also in & to all the piece of Land situate at Puukapu... by Deed bearing date the 19th day of April AD 1861... And Also all that piece of land situate at **Hanaipoi** in the District of Hamakua...conveyed to George K. Lindsey by His Majesty Kamehameha IV by deed bearing date of the 2nd day of September AD 1859... And Also all that piece of land situate at Puukapu...granted to Kaluahinenui by the Board of Land title Commissioners by Award in claim No. 4138... And Also all that piece of land situate at Puukapu aforesaid awarded to Mokuhea by the Board of Commissioners of Land Title on claim No. 4210... And Also all that piece of land situate at Puukapu aforesaid awarded to Mahoe by the Board of Commissioners of Land Title on claim No. 3685... And Also all that piece of land situate at Puukapu aforesaid awarded by the Board of Commissioners of Land Title to Kulunui on claim No. 4227...

And Also all the joint interest of the said Francis Spencer & Robert Janion parties here to in a certain Indenture of Lease bearing date of the 16th day of November AD 1859 made between His Royal Highness, Prince L. Kamehameha, His Majesty's Minister of the Interior on behalf of His Majesty King Kamehameha IV & the Hawaiian Government of the first part & the said Robert C. Janion party hereto of the second part where by the said party of the first part demised to the said Robert C. Janion his executors, administrators & assigns, *all that part of those lands belonging to His Majesty & the Government on the Mountain of **Mauna Kea**, [Ka'ohe and Humu'ula] lying above the forest on the Hilo side of the Mountain & on the Waimea side of the Mountain above the lands of Paauhau & Waikoloa (except certain lands therein specified) with the privilege of catching & killing the wild unbranded cattle on any of the lands belong to His Majesty or the Hawaiian Government on the Districts of Hilo, Hamakua & South Kohala (excepting His Majesty's land at Puukapu), for and during the term of five years from & after the first day of August 1859...* [Bureau of Conveyances Liber 15:24-28]

Piopio, Hilo, Hawaii

August 7, 1865

Isaac Y. Davies. To John O. Dominis

(Regarding Prohibition on 'Ō'ō and Mamo birds):

...In accordance with your instructions, I have made and wrote out the notice of the King's lands being prohibited, that is concerning the Oo birds. But, I have also included the Mamo birds.

I am forwarding a copy of the notice aforesaid, and you send it and have it printed in the newspapers.

The health of the Honorable R. Keelikolani and A. Keohokalole is good.

I am still feeling a little better. Hilo weather is calm, the same as when we were here together. [HSA, ID Lands]

Hamakua, Hawaii

September 5, 1865

S.C. Wiltse. to F.W. Hutchison:

...In compliance with your request of the 23rd inst., I have made out, and now forward to you, the names & description of the un-sold Government Lands in the Districts of "Hamakua," Kohala," & Kona." As far as I am acquainted with them. Likewise those sold but not Patented. There may be some small lands or fractions, that I have not mentioned.

Your Excel. will no doubt be some-what surprised to learn that there are so few land in these Districts remaining to Govt. but such is the fact, nearly all of the best lands have been sold, or rather given away, on a wage at about 50 cts. pr. Acre.

The forest lands as a general thing have been well preserved—and should be as a regulator of the climate.

A law was passed by the Legislature of 1862 requiring that the Boundaries to all the Private Lands not Patented, should be established by Survey or otherwise—worth in five years from that time. Three years have passed, and hardly a commencement has been made on this Island. It is highly important that this law should be enforced, as the old kamaainas are fast dying off, and in a very short time the establishing of Boundaries will be a near matter of Jury work.

When the Boundaries of the Private lands are established, then will be known what belongs to Government—and not until then.

I would very well to know what disposition are to be made of the lands sold by Sheldon, whether the Parties who have paid him money and got no receipts, are to lease it, and whether any of said lands sold by him, are to be Patented at his valuation. [HSA, ID Lands]

**(Attachment) Hamakua
Government lands in this District not Sold.**

“...Kaohe”

Sold below the forest. This is the largest land in this District, and includes nearly the whole of “Maunakea.” About 2000 Ac. of an open forest and 2000 Ac. of 2nd rate grazing land above the forest is all of this land that is available... [HSA, ID Lands]

Hamakua, February 10, 1866

S.C. Wiltse, to Jno O. Dominis, Acting Commissioner for the Crown Lands.

I have added the survey of the *makai* part of the Crown land “*Humuula*” to the plan of the *mauka* part as you requested and will forward the same to you by the first opportunity. The field notes are also appended to the notes of the *mauka* part.

That part now added contains 7215 acres, 924 acres of which is good grazing land below the forest. *The forest part is a rich alluvial soil and covered with the largest growth of ohias and koa that is to be found on this Island.*

The reason for this survey was not reported to the late Mr. Webster at the time it was made because I had lost confidence in the men that pointed out the boundaries. They pretended to be Kamaainas of the old land and a survey was made accordingly. I afterwards ascertained that they knew little or nothing about the boundaries of the *mauka* part and so I had all of that work to do over again. But since then I have found out by inquiries and examinations that those men were Kamaainas of the lower part of this land, in fact the only men living that did know said boundaries through the forest. I am therefore able now to report that survey as correct according to the best of my knowledge... [HSA – Crown Lands Commission]

Hilo, Hawaii

April 21, 1866

R.A. Lyman. to J.O. Dominis

**(Regarding the right to collect native birds, and the collection
of Kōlea bark for tanning leather):**

...Meheula desires me to write you in reference to *Piihonua uka*, *Puueo uka*, and *Humuula*, whether they are leased or not. *He has directed the bird catchers to divide the feathers with His Majesty, but Kui still claims the woods of Piihonua. Can I sell timber from the Crown lands? The natives wish to get Kōlea bark for tanning leather.*

It is a tree that is not worth anything for timber. *They have been selling the Koa trees getting bark.* Please send me a list of Crown lands in Hilo & Puna, and of their leases &c...
...Please give me full instructions what you wish me to do with these lands... [HSA, ID Lands]

September 5, 1868

The Waimea Company to F. Spencer

Deed:

This Indenture...between The Waimea Grazing and Agricultural Company of the one part, and Francis Spencer of Waimea in the Island of Hawaii of the other part. Whereas by Instrument dated 1 November 1859 and supplemental agreement dated 19 March 1860 His Royal Highness Prince L. Kamehameha Minister of the Interior on behalf of His Majesty Kamehameha IV and of *His Majesty's Government did lease for a term of five years from the **first day of August 1859** certain tract of land in Hilo and Hamakua Hawaii unto R. C. Janion his heirs and assigns with the privilege of catching the Wild Cattle thereon, and whereas the said Prince L. Kamehameha on the **7th day of July AD 1862** again on behalf of His Majesty and the Government did extend the term of the said lease on the same like conditions for a further term of five years from the first day of August AD 1864 unto the said Waimea Grazing and Agricultural Company who had become entitled to the said lease, and whereas the individual interest of His Majesty in the said lands so as aforesaid demised or comprised in that part of the land of **Humuula** as described in the said Instrument of 11 November 1859 now in recital by survey thereof with the exception of so much of the same as may lay within the dense forest of Hilo which was not included in the lease from the said Prince L. Kamehameha, and it was by said instrument of the 11th day of November 1859 witnessed that His said Majesty Kamehameha IV for the consideration therein mentioned did agree on the part of himself and heirs and assigns, and did thereby grant unto the said Company...the privilege to renew the said lease of that said land of **Humuula** above and therein described with the Cattle catching rights therein, and without the exception therein and herein before mentioned for a further term of Ten Years from **the first day of August AD 1869** at the yearly rent of Eight Hundred Dollars payable half yearly. And whereas the said Company has agreed to demise and lease to the said Francis Spencer all their estate and interest in a portion of the said land of **Humuula** herein after more particularly described excepting as is herein expressed for the consideration herein after more particularly mentioned...*

*...The said Company do hereby demise and lease to the said Francis Spencer his heirs & assigns all their estate right title and interest under and by virtue of the several documents herein before recited in and to **all that part or portion of the said land of Humuula from Nauhi Gulch to the Northern boundary and from Puuoo Hill and on a line there from to the Kolie to the Southern boundary all above the Woods.** To have and to hold the same unto the said Francis Spencer...for all the term and time thereof granted to the said Company...subject to the yearly rent of Two Hundred Dollars to be paid to the said Company...annually. And also subject to the reservations as to pasturing their Horses and Cattle over the said portion of land hereby demised...*

The Waimea Grazing and Agricultural Company by
W.L. Green, President
Theo H. Davies, Secretary
Francis Spencer... [Bureau of Conveyances Liber 26:220-223]

Additional information regarding the above lands covered by Mortgage Deed in the amount of \$16,000.00 paid by the Waimea Grazing and Agricultural Company on the part of Francis Spencer, and dated September 5, 1868, is recorded in Liber 26:221-225.

On April 14, 1870, W.L. Green, on behalf of the Waimea Grazing and Agricultural Company (WGAC), wrote to F.W. Hutchinson, Minister of the Interior, regarding the lease on Ka'ohe and Humu'ula, and the right to take wild cattle from the mountain lands around Mauna Kea. The application also itemized the number of head of cattle that might be taken from the neighboring lands per annum. Apparently, at this time, the application for a renewal of the lease on Ka'ohe was not granted; instead, John P. Parker II secured the lease on June 5th, 1871, thus enlarging the range adjoining his Pā'auhau lands. Regarding the application of the WGAC, Green wrote:

Honolulu

April 14, 1870

W.L. Green; to Hutchison, Minister of Interior:

...I have the honor to address your Excellency in regard to our conversation of the 12th inst. respecting *the proposed lease to the Waimea Grazing Company of the Mountain Lands of **Mauna Kea** belonging to His Majesty's Government and of their interest in the wild mountain cattle.*

As I endeavored to explain to your Excellency the Grazing Company could not expect to make anything if they paid the same sum for the Government lands and cattle as they do for **Humuula** & the Crown interest in the cattle on **Humuula** viz \$800. per annum — which would make \$1600 per annum in all. *I presume it will not be questioned that the land of **Humuula** is of considerably more value than the Government mountain lands in question;* and I may state that my idea of the value of what the Government now proposes to lease is about \$500 per an. — say \$1300 per annum in all.

I understand that the Crown Commissioners would feel inclined to lower the rent of **Humuula** & the cattle of the Grazing Company would accept of a shorted term, and as possibly your Excellency may hold the same views with regard to *the Government mountain lands & cattle on **Mauna Kea***, I beg to make the following alternative offers for/in the name of the Grazing Co., for the consideration of your Excellency and the Crown Commissioners; *say for the Lease of **Humuula** & the Crown interest in the mountain cattle, and the lease of the Government mountain lands on **Mauna Kea** and their interest in the mountain cattle.*

Seven years Lease (instead of ten)	\$1300 per annum.
Five years “	\$1200.
One year's Lease with yearly privilege up to five years	\$1300.
Year by year with one year's notice from either party	\$1000.

*In these cases however, the Grazing Co. would wish to stipulate for a sheep grazing privilege on a certain portion of **Humuula** for Mr. Francis Spencer & assigns for whatever term may remain, short of ten years from August 1st 1869.*

In all the above offers I have considered that half the rent, say for **Humuula** counts from August 1st 1869, and the other half (for the Government interests) is to be reckoned from April 1st 1870. The lease to expire however, on the same day.

I beg to enclose a copy of the memorandum I showed your Excellency with some further remarks for your information...

Literal copy from W.L. Green's private Mem. Book of hides that might be reasonably counted on per an. made at Waimea:

Gr. Co's. Land	Lalakea Bush	400 hides per an.
Parker & Gr. Co. Land	Parker's Bush	400 “

Gr. Co. Land	Kohala Bush	100	“
Gr. Co. Land	Apipii Waikoloa	500	“
Government Land	Waikii	300	“
Gr. Co. Land	Amoku [Ke-amoku]	100	“
Government Land	Charley Hall	100	“
Humuula Kalaieha –	Louzada	500	“
Humuula Hopuwai to Hanaipoe		300	“
Humuula Hilo Bush Kalaieha to Nauhi		300	“

Deducting 900 Bush cattle of own leaves 2100 mountain hides – which is about the average number which have actually been obtained when the business has been prosecuted with energy.

It should be observed by the above list that a small population of mountain cattle may be expected from Government lands and how large a population of mountain cattle are obtained from the Grazing Company's seven lands for which they pay high rents.

Estimate of Mountain Hides:

2000 hides at 9½ \$ per Hd.	\$5700	
Cost of catching, killing & flaying	\$2250	
Salt & cartage to Waimea	\$750	
Drying – cartage to Beach frt. to Honolulu	\$1000	
Commission on sales cartage etc.	\$285	4285
Leaving for rent, profit, etc.	\$1415.	

N.B. 9½ \$ is an extreme price.
[HSA – Interior Department Lands]

January 2, 1871

**R.C. Janion and W.L. Green (Waimea Grazing Company);
to R.M. Kibbin, M.D.**

**(Dissolution of the Waimea Grazing and Agricultural Company,
and transfer of Humu'ula, other lands, livestock and resources):**

Memorandum of Agreement made and entered into this second day of January A.D. 1871 between Robert Janion of Liverpool and W.L. Green of Honolulu, sole owners of the Stock and Property of the Waimea Grazing and Agricultural Company incorporated of the one part, and Robert M. Kibbin M.D. of Honolulu of the other part. Witnesseth that for and in consideration of the sum of Nineteen Thousand Dollars paid by the said Robert M. Kibbin to the said patties of the first part, the receipt of which is hereby acknowledged, they the said parties of the first part do hereby agree for themselves as such sole proprietors in said Company to and convey by proper and sufficient Deeds to the said Robert M. Kibbin his heirs or assigns at their cost and expense, all the Lands, tenement and premises, cattle, horses and other live stock, and all personal property there on and elsewhere in the Island of Hawaii, and which lands are more particularly described in the Schedule hereto annexed; as well as those held under fee simple as those held under terminable Leases, and which are this day sold subject to the Rents and reservations on the tenants part therein respectively contained and which are hereafter to be paid and performed by the party of the second part, his heirs, representatives and assigns.

This Conveyance and Agreement of the foregoing properties to be carried into effect by proper Deeds as soon as the said Charter shall have been annulled and the Company dissolved in accordance with the Statutes for the said purposed provided and which the parties of the first part undertake to do without delay...

Schedule of Lands Reference to in the written Deed.

Land of **Nahuina**, Royal Patent 632; 2 Lots at Kawaihae; Stone House Premises at Lihue; Sundry Kuleanas on Puu Kapu; Tract on Ouli; Billy Bells lot; Paddock at **Puuloa**, 6 acres; Lease of Puu Kapu from the Crown; Lease of Waikoekoe from Guardians of Lunailo; Lease of Lalakea from Keau Hao; *Lease of Humuula from the Crown*; Leases of Cattle running and pasturing from Spencer on Waikoloa; Beadle Hill; Pitman Lease; Holuokawai; **Kalopa** and Puuanahulu; *Agreements with Simmons and Kipi and with laukea about Pasturing Cattle.*

Recorded & Compared this 6th day of February A.D. 1871... [BoC Liber 31:374-375]

On January 6th, 1871, the Commissioners of Crown Lands authorized an extension of ten years on the lease of Humu'ula to the "Waimea Grazing Company," also known as the Waimea Grazing and Agricultural Company; in which Francis Spencer was still a lead player at the time. The lease included the notes of survey, referencing key points along the boundary of Humu'ula and Ka'ohē, from the upper forest to the summit of Mauna Loa at Pōhaku o Hanalei, and along the Hilo lands cut off by Humu'ula. It is of importance to note that the forest was to be protected, and all improvements such as walls, trails-roads, and structures were considered property of the Crown Lands Commission upon termination of the lease.

January 6, 1871

***Indenture Between the Commissioners of Crown Lands,
and the Association known as the Waimea Grazing Company:***

All that tract or parcel of land situated on the Island of Hawaii known and described as follows to wit:

Humuula— "Commencing at a pile of rocks erected on **Papaalepo Hill**, the bottom rock marked KIV on the Boundary of Komoko [Kamoku; see Register Map 668; Wiltse, 1862]. The boundary runs...to a pile of rocks, bottom rock marked KIV, on the top of a small hill called **Ahuamoa**; thence...to the top of a low flat hill called **Ahuapoopuaa** at the *mauka* corner of the land of Komoko; thence in a South Westerly direction bounded by the lands of **Kaohe** and **Kalala** to a rock on the slope of Mauna loa called **Pohakuohanalei**; thence in a North Easterly direction bounded by the land of **Kapapala**; thence in a North Westerly direction bounded by **Waiakea**; thence in a Northerly direction bounded by **Mauna Kea**, **Piihonua**, **Makahalanaloa**, **Hakalau**, **Piha**, **Maulua**, **Kapehu** and **Laupahoe** to a pile of rocks on a rocky ridge running East & West; thence in a Northerly direction bounded by the other part of **Humuula** to Commencement..."

...During the term of Ten Years to commence the First day of January A.D. 1870... Paying therefore unto the said Land Commissioners or their successors in office, the yearly rent of Eight Hundred Dollars...and *that they will not commit or knowingly permit or suffer any waste to be done on the said demised premises, or cut down or permit to be cut down any trees on said land, of Humuula.*

And will at the end or expiration of the term hereby granted yield up unto the said Commissioners...the premises hereby demised, with all erections and buildings now on or hereafter to be put upon the same in as good order and condition in all respects (reasonable wear and tear and damage by fire and other inevitable casualties excepted) as the same are at present or may hereafter be put by the said Party of the Second Part or those entitled to the Lessee's interest...

Jno. O. Dominis, Commissioner and Land Agent
The Waimea Grazing & Agricultural Co.
W.L. Green, President
Theo. H. Davies, Secretary

And it is further intended by the parties of the First Part to convey to the said parties of the Second Part the right to Kill all Wild and Unbranded Cattle within the District herein above referred to.

(Signed) Jno. O. Dominis. [HSA Lease Book, Series 369 Vol. 5]

January 6, 1871

John O. Dominis to Waimea Grazing Company

(Lease of the Crown Land of Humuula, and right to take wild cattle):

This Indenture, made this Sixth day of January A.D. 1871 between the Commission of Crown Lands, of the First Part, and the Association known as the Waimea Grazing Company, doing business on the Island of Hawaii of the Second Part. Witnesseth; That for and in consideration of the Rent and Covenants by the Party of the Second Part to be paid, kept, and informed, they the said Land Commissioners, by virtue of the authority in them vested by the Act entitled "An Act to relieve the Royal Domain from encumbrances, and to render the same inalienable," approved January 3rd, 1865 have demised and leased, and by these presents do demise and lease unto the said Party of the Second Part, and to Their Heirs Executors, Administrators and Assigns *all that tract or parcel of land, situated in the Island of Hawaii known and described as follows, to wit: Humuula* – "Commencing at a pile of rocks erected on Papaalepo Hill, the bottom rock marked K. IV. on the Boundary of Komoko – The Boundary runs S. 37 W. (Variation 9° 43' East) 141 20/100 Chains to a pile of rocks, bottom rock marked K.IV. on the top of a small hill called Ahuamoa – thence S. 42° 20' W. 172 Chains to the top of a low flat hill called Ahuapoopuuaa at the *Mauka* Corner of the land of Komoko – thence in a South Westerly direction bounded by the land of **Kaohe** and Kalala to a rock on the slope of Mauna Loa called **Poho Kuo hanalei** [Pohakuohanalei], thence in a North Easterly direction bounded by the Land of Kapapala, thence in a North Westerly direction bounded by Waiakea, thence in a Northerly direction bounded by **Waiakea, Piihonua, Makahanaloa, Hakalau, Piha, Maulua, Kapehu and Laupahoehoe**, to a pile of rocks on a rocky ridge running East and West, a rock in the bottom of the pile marked K. IV. from thence in a Northerly direction bounded by the other part of **Humuula** to commencement." *With all the rights, easements and appurtenances thereunto belonging:* To have and to hold, unto the said Party of the Second Part. Their Heirs and Assigns for and during the term of Ten years to commence from the First day of January A.D. 1870. The said Party of the Second Part, yielding and paying therefore unto the said Land Commissioners or their successors in Office the yearly rent of Eight Hundred Dollars payable semi annually over and above all taxes, charges and assessments to be levied as imposed thereon by Legislative authority...

...And that they will not commit or knowingly permit or suffer any waste to be done upon the said demised premises or cut down or permit to be cut down any trees on said land of Humuula and will at the end or expiration of the term hereby granted yield up into the said Commissioners or their successors all and singular the premises hereby demised, with all erections and buildings now on, or hereafter to be put upon the same in as good order and condition in all respects (reasonable wear and tear, and damage by fire and other inevitable casualties excepted) as the same are at present, or may hereafter be put by the said Party of the Second Part or those entitled to the Lessee's interest in the premises... [BoC Liber 32:27-29]

Waimea
May 22nd, 1871

Chas. T. Gulick; to F. Spencer:

...I am directed by His Excellency the Minister of the Interior to acknowledge the receipt of yours of the 17th inst. in reference to the land of **Kaohe**, and he desires me to say that he has not had time to consult with Gov. Dominis, who has just returned from Hawaii, on the subject, but will investigate the matter and inform you further by next mail. His Excellency desires me to ask you if you will be kind enough to send him four (2 pairs) mountain geese (brandt) by the first opportunity – they are to exchange with the Acclimatization society of New Zealand which has already very kindly sent quite a number of their birds – The Minister is willing to pay a reasonable or even a handsome price for them, and is desirous of sending them, by the next trip of the Nevada which sails on the 4th or 5th of June. ...

P.S. If you can induce the natives to catch any of the Native Hawaiian birds – *not honey birds* – His Excellency is desirous of obtaining them for the same purpose, and will pay what you may consider a reasonable price for them. [HSA ID Letter Book 10:464]

June 5, 1871

F. Hutchinson, Minister of the Interior; to J.P. Parker

Government Lease no. 156

(Demising a five year lease on the land of Kaohe, and right to take unbranded wild cattle from the land.):

This Indenture of Lease made this fifth day of June A.D. one Thousand Eight hundred and Seventy one by and between His Excellency Ferd. Hutchinson, His Hawaiian Majesty's Minister of the Interior on behalf of the Hawaiian Government party of the first part and John Parker of Waimea, Hawaii, party of the second part, Witnesseth that the said party of the first part for and in consideration of the covenants and agreements hereinafter set forth has leased and doth hereby lease unto the said party of the second part all that tract of lands known as **Kaohe** situated in the district of Hamakua, Island of Hawaii. Which land the said party of the second part, his Executors, administrators and assigns, are to possess together with all its present improvements and advantages, also the right to kill the wild unbranded cattle thereon, for the term of five years from the date of this indenture, without unlawful molestation, provided that he or his said representatives will yearly pay or cause to be paid unto the said party of the first part the sum of Four Hundred Dollars in four quarterly payments at the Interior Office in Honolulu, that is to say One Hundred Dollars on the fifth day of June, September, December and March of each and every year during the term of this Lease, and in addition thereto pay any taxes now or to be hereafter imposed by law on landed property which are applicable to leasehold estates...

...And the said party of the second part doth further covenant and agree to and with the said Minister of the Interior and his Successors in Office, that he will not under let the same premises nor any part thereof, and that he will not suffer, strip nor waste thereof, and that in case he shall under let the same or any part thereof or suffer, strip or waste thereof the said Minister of Interior at his option, if in his judgment the interests of the Government shall so require, may at any time thereafter determine this lease, and enter upon the premises and expel the lessee... [HSA – DLNR 2 Vol. 15]

Hilo
March 5th, 1873

R.A. Lyman; to J.O. Dominis:

...The following are the unleased Crown lands...

...**Piihonua** runs from just above Mr. Hitchcock's in the upper edge of the forest. Have received about \$60. a year for it. The natives living on the land offer \$100. a year to lease it for 5 years. I will lease it to them for \$150. a year with the privilege of taking the unbranded hides.

If you will include the birds in the lease, I will pay more for it. I do not wish the birds killed, but the privilege of catching them... [HSA, ID Lands]

April 14th 1873

J.O. Dominis, Board of Commissioners of Crown Lands; to Maa & Paahao

(Lease of the Ahupuaa of Piihonua, and Right to take Wild Cattle):

This indenture made this 14th day of April A.D. 1873 between the Commissioners of Crown Lands of the first part and Maa & Paahao of Hilo, Hawaii, of the second part. Witnesseth: That for and in consideration of the rent and covenants by the party of the second part to be paid, kept and performed, they the said Land Commissioners by virtue of the authority in them vested by the Act entitled "An Act to relieve the Royal Domain from encumbrances, and to render the same inalienable," approved January 3rd, 1865; have demised and leased and by these presents do demise and lease unto the said party of the second part and to their heirs, executors, administrators and assigns all that tract or parcel of land situated in **Piihonua**, Hilo, Island of Hawaii. Known and described as follows, to wit: All the Ahupuaa known as **Piihonua** outside of the town of Hilo, commencing at the mauka boundary of the lot of land formerly leased to Mr. Hitchcock and running mauka to the extreme mauka boundary of the land of **Piihonua**, joining **Humuula**; With all the rights, easements and appurtenances thereunto belonging; To have and to hold unto the said party of the second part, their heirs and assigns for and during the term of five years, to commence from the 15th day of April A.D. 1873, together with the right of Killing wild cattle with the privilege of subletting this right. The said party of the second part yielding and paying therefore unto the said Land Commissioners or their successors in office the yearly rent of Two hundred (\$200) dollars per annum...

...And that they will not commit or knowingly permit or suffer any waste to be done upon the said demised premises or cut down, or permit to be cut down any trees on said land, excepting for use on the lands, and will at the end or expiration of the term hereby granted yield up unto the said Commissioners or their successors, all and singular the premises hereby demised, with all erections and buildings now on, or hereafter to be put upon the same in as good order and condition in all respects (reasonable wear and tear and damage by fire, and other inevitable casualties excepted)... [BoC Liber 38:32-33]

Hilo, June 9, 1873

R.A. Lyman, to J.O. Dominis, Agent of Crown Lands

(Regarding Boundaries of Humu'ula and Neighboring Lands, and Disposition of Pi'ihonua):

...Enclosed, please find a list of lands as near as I can make it out at present. I have written to Mr. Wiltse and Hoapili asking them to send you correct lists of lands in their districts and to forward me copies as soon as possible. Please to send me surveys of as many of the lands as you can. If the surveys made by my brothers have been lost, I think that any brother could make out new copies of most of them. The survey of **Humuula** made by Wiltse cuts way into Waiakea as surveyed by Webster and cuts off several miles of Kapapala and Keauhou.

Kahue, Wiltse's Kamaaina swears that they did not go to a single point on the boundary of **Humuula** along in the woods and did not put any flags there but that he pointed out some above the woods where he guessed the points were and they signed to them.

The **Piihonua** people are very much put out about the survey of **Humuula** as they supposed they had leased **Piihonua** by the ancient boundaries and the survey of **Humuula** cuts off a strip several miles wide clear across the head of the land and leaves no wild cattle to speak of for **Piihonua**. They say they cannot afford to pay \$100 a year for the woods of **Piihonua** now. [HSA, Crown Lands File]

April 30, 1875

A.S. Spencer; to F. Spencer

Mortgage Deed

(Documenting the operation of the Sheep Station at Kalaieha):

This Indenture made this 30th day of April 1875 between Ashford Sydney Spencer of Waimea, District of South Kohala, Island of Hawaii, Hawaiian Islands, of the one part, and Francis Spencer of the same place of the other part, Witnesseth: That the said Ashford Sydney Spencer, for and in consideration of the sum of Two Thousand Five Hundred Dollars, to him paid by the said Francis Spencer... hath granted, bargained & sold... the undivided half interest which the said Ashford Sydney Spencer holds jointly with the said Francis Spencer in and to *a flock of about five thousand sheep running at the **sheep station of Kalaieha** on the district of Hilo, Island of Hawaii aforesaid and marked with an ear mark thus _____ [blank]; together with the increase of all the lambs from said flock of sheep and the produce of the wool and hides of said flock of sheep, together with all their increase; also all the horses, mares and colts of the said Ashford Sydney Spencer, branded thus _____ [brand depicted] consisting of about one hundred head and being and running upon the Island of Hawaii aforesaid...* [BoC Liber 44:131-133]

As recorded above, Parker's securing the lease on the Ka'ohē mountain lands by conveyance in 1871, facilitated changes in the Waimea Grazing and Agricultural Company's range of operation on the *āina mauna*—removing the entire *ahupua'a* of Ka'ohē (most of Mauna Kea) from the interests of the WGAC. A further reduction of the WGAC's role on the *āina mauna* transpired on March 6, 1876, when the Commissioners of Crown Lands entered into a new lease for the land of Humu'ula, between itself and James W. Gay. The conveyance of March 6th, 1876, granted all the land of Humu'ula by terms of 25 years, including the right to kill wild and unbranded cattle from the land; though reserved the trees on the land. Also of importance, all improvements ranging from buildings, walls, trails and roads were to become the property of the Crown upon termination of the lease (Crown Lands Lease No. 75). The instrument reads:

March 6, 1876 (Lease No. 75)

Crown Lands Estate, to James W. Gay

(Disposition and terms of the 25 year Lease of Humu'ula):

...This Indenture made this Sixth day of March A.D. 1876 between the Commissioners of Crown Lands of the first part, and James W. Gay of Honolulu, in the Island of Oahu of the second part.

Witnesseth: That for and in consideration of the rents, covenants and agreements hereinafter reserved and contained on the part and behalf of the said party of the second part, his executors administrators and assigns, to be paid kept and performed, they the said parties of the first part, by virtue of the authority in them vested by the act entitled "An Act to relieve the Royal Domain from encumbrances and to render the same inalienable" approved January 3rd, 1865 lease demised and leased, and by these presents do demise and lease unto the said party of the second part, his executors, administrators and assigns, *all that tract and parcel of land situated in Island of Hawaii one of the Hawaiian Islands known as the land of **Humuula** the boundaries whereof are or will be more particularly described in the Certificate of the Commissioner of Boundaries for the said Island of Hawaii. Together with full and free liberty to kill all wild and unbranded cattle which may be found upon the said land. Except the timber trees, and all young trees fit*

and proper to be raised and preserved for timber trees, now growing or being, or which shall hereinafter grow, or be in and upon the above demised premises, or any part thereof together with free liberty of ingress, egress and regress, to and for the said parties of the first part and their successors in office. To Have and to Hold, all and singular, the said premises above mentioned described with the appurtenances (except as before) excepted unto the said party of the second part, his executors, administrators and assigns, for and during the term of twenty five years to commence from the first day of April A.D. 1876 the said party of the second part, his executors administrators and assigns, yielding and paying therefore, from and immediately after the commencement of the said term, and during the term thereof unto the said parties of the first part and their successors in office the yearly sum of Eight-hundred Dollars by semi-annual payments, dues and above all taxes, charges and advancements to be levied or composed thereon by Legislative authority the first payment of the said rent to be made on the first day of October next ensuing the date last aforesaid...

...And also that he the said party of the second part, his executors administrators and assigns shall not nor will at any time during the term hereby granted, do or commit, or permit or suffer to be done, any willful or voluntary wastes, spoil or destruction, in and upon the above demised premises or any part thereof, or cut-down, or permit to be cut-down any trees now growing or being, or which shall hereinafter grow or be in and upon the above demised premises, or any part thereof, except for use on the said land: and will at the end or other sooner determination of the said term hereby granted, peaceably and quietly leave and up unto the Said parties of the first part, or their successors in office, all and singular the premises hereby demised, with all erections, buildings and improvements of whatever name or nature, now on or which may be hereafter put, set up, erected and placed upon the same, in as good order and condition in all respects (reasonable use wear and tear excepted) as the same are at present or may hereafter be put by the said party of the second part, his executors administrators and assigns. And also that he the said party of the second part, his executors or administrators, or any of them, shall, not nor will at any time during the continuance of the said term, let, set or assign over the said premises, or any part thereof, to any person or persons whomsoever, for any term or time whatsoever, without the license and consent of the said parties of the first part, or their successors in office, in writing, under their hands first had and obtained for such purpose... [BoC Liber 45:258-261]

In 1882, James W. Gay mortgaged the livestock and resources he held on Humu'ula, to Paul Isenberg, of Hackfeld Company. The description of the conveyance describes the land use activities from sugar plantation on the lowlands, to some 10,000 sheep on the sheep station lands.

August 5, 1882

J.W. Gay to P. Isenberg

Indenture of Livestock and Resources of the Humuula Sheep Station:

...This Indenture made the 5th day of Aug. A.D. 1882 between Jas. W. Gay of Waimea on the Island of Hawaii, Sheep farmer of the first part and Paul Isenberg of Honolulu on the Island of Oahu, Merchant of the second part. Whereas the said James W. Gay is the owner of certain *flock of sheep numbering in the whole Ten thousand or thereabouts* and branded _____ [diagram] now depasturing upon the land called and known as **Humuula** in the District of Hilo on the said Island of Hawaii and is also entitled under a certain Agreement dated the 17th day of June, 1881, made between him the said James W. Gay on behalf of himself and his then partner Llewellyn Smith of the first part, and the Ookala Sugar Plantation Company of the second part to one tenth part or share or one sixteenth part or share respectively of the sugar grown, produced or manufactured by the said Company from and planted upon certain parts of the said land of **Humuula**. And whereas the said Paul Isenberg hath agreed to lend and advance to the said James W. Gay the

sum of Fifteen thousand Dollars upon the security of the said sheep and share in the said Sugar Now this Indenture Witnesseth that in pursuance of the said Agreement and in consideration of the sum of Fifteen thousand Dollars lent by the said Paul Isenberg to the said James W. Gay, the receipt whereof is hereby acknowledged. He the said James W. Gay doth hereby grant, bargain, sell, assign, transfer and make over unto the said Paul Isenberg, his executors, administrators and assigns All those flocks of sheep numbering together Ten thousand or thereabouts and branded and now depasturing, running or being upon the said land of **Humuula** part or parts thereof. Together with *all the natural increase of the said flocks and also all the wool now upon the said sheep or which during the continuance of this security may be produced and shown from the said sheep and their said increase*. And also all that the past share or proportion of him the said James W. Gay of in and to the said Sugar to be grown, produced or manufactured from cane grown upon the said land pursuant to the said Agreement... [BoC Liber 76:322-324]

July 6th, 1883

C.H. Judd, for the Crown Commissioners; to Jas. W. Gay

(Seven year extension of the Lease of Humuula, to April 1, 1908):

Memorandum of Agreement entered into this sixth day of July 1883 Between the Commissioners of Crown Lands and the within named James W. Gay whereby it is agreed that the within Lease shall be and is extended for the term of Seven Years from the first day of April last... ..rental of \$1000.00 per annum... [BoC Liber 45:259]

History of the Humu'ula Sheep Station and Land Use on the 'Āina Mauna

In his personal notes, A.W. Carter documented facets of the history of land use and conveyances associated with the Humu'ula Sheep Station. His notes (viewed in the Parker Ranch & Paniolo Preservation Society Collections) provide us with a fairly detailed summary of that history, and are partially based on his personal experiences and research. Readers will also find additional information—clarifying, and in some instances correcting certain points made by Carter—pertaining to land use and the individuals involved on the mountain lands, in other records cited throughout this section of the study. As a part of the present research, a careful review of many of the conveyances was made in order to identify those who were a part of the history of the mountain lands, and to identify historical resources which were referenced in the archival documentation.

December 12, 1946

Humuula Recollections of A. W. Carter

James W. Gay started the **Humuula** Station as a sheep station and established his headquarters at **Keanakolu** and built the sheep shearing shed there. This was apparently in 1876. He found that this section was so wet, it was impossible to handle the wool and his shed and equipment were pulled down and taken by bullock cart into Waimea and from there, to **Kaleieha** via Waikii. Kaleieha has been the headquarters ever since. **Keanakolu** was between twenty and thirty miles from Kaleieha but the bullock cart could not haul over the shorter distance. That is the reason it was taken in a roundabout way.

Shortly after the beginning of Mr. Gay's occupancy, the place was, I think, operated as a sheep station. The first few years, I imagine he put in his time shooting wild cattle and selling the hides which was quite a business on both sides of **Mauna Kea**.

Mr. Gay obtained a lease of **Humuula** on March 6, 1876. The original lease was signed by John O. Dominis, Commissioner and Land Agent for the Board of Commissioners of Crown lands. The term of the lease was 25 years from April 1, 1876 and the annual rental was \$800. The lease covered:

“All that tract and parcel of the land situated in the Island of Hawaii, one of the Hawaiian Islands, known as the land of Humuula and the boundaries whereof are or will be more particularly described in the Certificate of the Commissioner of Boundaries for the said Island of Hawaii, together with full and free liberty to kill all wild and unbranded cattle which may be found upon the said land.”

Subsequently, on October 30, 1883, a Charter of Incorporation of the **Humuula** Sheep Station Co. was given to James W. Gay by Chas. T. Gulick, Minister of the Interior. Capital was \$100,000.00. 1000 shares at \$100, the stock being owned by James W. Gay (400 shares) Conrad Henke (400 shares), and Paul Isenberg (200 shares). On October 31, 1883, the lease was assigned to the **Humuula** Sheep Station Co. by James W. Gay, consent to this assignment having been given on July 30, 1883 by Charles H. Judd, Crown Commissioner and Land Agent. At that time also (July 30, 1883) the Commissioner of Crown Lands extended the term of the lease for a period of 7 years and the rent was increased to \$1,000. per annum and the additional reservation given to Mr. Gay, as follows:

“Adding to the reservations that all indigenous wild birds for the time being on the said lands, with the full right to take, kill or capture the same.”

At the time James W. Gay assigned the lease (October 31, 1883) he reserved to himself “the lower or *makai* portion bounded on the East by the sea, on the south by Kaawalii Gulch in Waipunalei, on the north by the land of Ookala and on the west by a line through the woods to include in the above *makai* reserved portion, an area of 1200 acres more or less.” By this same document, he sold all herds and flocks of sheep and cattle running in and upon the land of **Humuula**, 150 head of horses, and all agricultural implements and other chattels used in connection with the sheep station.

Sometime about 1887, A. Haneberg apparently went to **Humuula** as manager as he testified at the hearing for boundaries in 1891 that “he had been there about 4 years.”

On September 26, 1895, J.F. Brown, Commissioner, consented to the assignment of the **Humuula** lease for the balance of the term, together with the extension by James Gay to Messrs. H. Hackfeld & Co. Hackfeld sent up a couple of young German officers who operated the place. I remember seeing their swords and helmets on the wall of the room at Kaleieha. One of them was murdered and it was never known whether the survivor murdered him or not.

Subsequently a Mr. Glade, as a young man, was sent up by Hackfeld & Co. and managed the place for some time.

Later, the stock of the corporation was sold to Mr. Gramberg. He remained there a number of years. He sold out to Sam Parker Sr. in 1906, who gave it to his sons, principally to Sam Parker Jr. but he prevailed upon them to permit him to mortgage it, for a large sum of money. Sam Parker Jr. decided to sell **Humuula**, or the stock of the company. He promised Davies & Co. to give them the first chance to purchase it but Davies & Co. considered his price too high. He promised Shingle the second chance but Shingle ridiculed Sam for the amount he was asking. He then came to my man and the Parker Ranch purchased all of the corporation stock for the price he asked. The Parker Ranch has held the lease continuously since that time.

At the time I purchased the lease of **Humuula** [conveyance of 1915], the piece of land at Waipunalei, which was owned by Sam Parker, was conveyed to me. This has been a valuable addition to **Humuula** on account of the water in the gulch.

Mr. W. H. Shipman once told me that in the early days, he took cattle (steers, I think) to Pohakuloa for fattening. Whether he dealt through the government or the **Humuula** Sheep Station Co., I do not know.

I do not remember when the little house which formerly stood near the large eucalyptus tree and close to the end of the pipeline, was built. I do remember that Joe Mehrrens lived in that little house and attended to the water. He lived there alone. I think his reason for staying there was that he had eczema very badly and so long as he lived there in that cool climate, it did not bother him... [Journal of A.W. Carter, December 12, 1946]

Leasehold Interests and Ranching in Humu'ula and Pi'ihonua (1883-1900)

Following James W. Gays' securing an extension on his original lease of Humu'ula, he then moved to organize a Joint Stock Company on July 30th, 1883. The agreement was witnessed by H.F. Glade (Hackfeld & Company), and Edward Preston (BoC Liber 93:152-153). On October 30, 1883, a Charter of Incorporation of the Humuula Sheep Station Company was given to James W. Gay by Chas. T. Gulick, Minister of the Interior. Company capital was \$100,000.00, in one thousand shares sold at \$100.00 each. The stock was owned by James W. Gay (400 shares) Conrad Henke (400 shares), and Paul Isenberg of Hackfeld & Company (200 shares). On October 31, 1883, Gay then assigned his lease of Humu'ula to the Humu'ula Sheep Station, Company, represented by H. Hackfeld and Company (BoC Liber 86:79-80).

On June 1st, 1885, the Humuula Sheep Station Company and H. Hackfeld and Company, entered into a mortgage agreement in the amount of \$30,000.00 covering all livestock, property, buildings, tools, wagons and other resources of the company (BoC Liber 97:151-153). The mortgage was paid in full on July 1st, 1886, and all interest in the operation returned to the Humuula Sheep Station Company (ibid.), with Hackfeld still representing the sheep station.

As the Humuula Sheep Station Company was developing, and its management program settling in, the *ahupua'a* of Pi'ihonua was also being considered for ranching interests. In 1887, John Timoteo Baker, husband of Chiefess Ululani, Governess of Hawai'i Island (later also the Governor of Hawai'i), secured a lease from the Commissioners of Crown Lands for the *ahupua'a* of Pi'ihonua, including the forest lands and Pu'u 'Ō'ō. While Baker had interests in ranching, he apparently did not actively pursue the activity on the Pi'ihonua mountain lands until the 1890s. Baker secured Lease No. 103, from the Commissioners of Crown Lands on March 21st, 1887.

March 21st, 1887

Curtis P. Iaukea, Paul P. Kanoa,

Commissioners of Crown Lands; to John T. Baker

(Twenty year Lease of the Ahupuaa of Pi'ihonua):

Lease Number 103

This indenture made this 21st day of March A.D. 1887. Between the Commissioners of Crown Lands of the first part, and John T. Baker of the Second part. Witnesseth, that for and in consideration of the rents, covenants and agreements hereinafter reserved and contained, on the part and behalf of the said party of the second part his executors, administrators and assigns, to be paid, kept and performed, they, the said parties of the first part, by virtue of the authority in them vested, by the Act entitled "An Act to Relieve the Royal Domain from Encumbrances, and to render the same Inalienable," approved January 3d, 1865, have demised and leased, and by theses presents do demise and lease, unto the said party of the second part, his executors, administrators and assigns,

ALL that tract and parcel of lands, situated in Hilo, Island of Hawaii one of the Hawaiian Islands, known and described as follows, to wit:

The Ahupuaa of Pi'ihonua, as by Survey described in Crown Land Book of Surveys, page 10 Area 57,220 Acres, more or less. Excepting such portions of said *ahupuaa* that are now under lease and excepting also all mineral or metallic mines and the timber trees, and all young trees fit and proper to be raised and preserved for timber trees, now growing or being, or which shall hereafter grow, or be in and upon the above demised premises, or any part thereof; together with free liberty of ingress, egress and regress, to and for the said parties of the first part, and their successors in office. To have and to hold, all and singular, the said premises above mentioned and described, with the appurtenances, (except as before excepted) unto the said party of the second part, his executors, administrators and assigns, for and during the term of Twenty Years, to commence from the Twenty-first day of March A.D. 1887 the said party of the second part his executors, administrators and assigns, yielding and paying therefore, from and immediately after the commencement of the said term, and during the continuance thereof, unto the said parties of the first part, and their successors in office, the annual rent of One Hundred and Fifty \$150. Dollars, over and above all taxes, charges and assessments to be levied or imposed thereon...

And also, that he the said party of the second part, his executors, administrators and assigns shall and will bear, pay and discharge, at his or their own expense, all costs and charges for fencing the whole or any part or parcel of the above demised premises, if such fencing should be so required by any law now in force, or that may be hereafter enacted by Legislative authority...

And also, that he the said party of the second part, his executors, administrators and assigns shall not, nor will at any time during the term hereby granted, do or commit, or permit or suffer to be done, any willful or voluntary waste, spoil or destruction, in and upon the above demised premises or any part thereof, or cut down, or permit to be cut down any trees now growing or being, or which shall hereafter grow or be in and upon the above demised premises, or any part thereof; and will, at the end or other sooner determination of the said term hereby granted, peaceably and quietly leave and yield up unto the said parties of the first part, or their successors in office, all and singular the premises hereby demised, with all erections, building and improvements of whatever name or nature, now on or which may be hereafter put, set up, erected and placed upon the same, in as good order and condition in all respects (reasonable use, wear and tear excepted) as the same are at present or may hereafter be put by the said party of the second part... [Lease No. 103 – State Land Division; and BoC Liber 106:126-129]

Records of the Humu'ula Sheep Station Company, provide us with detailed notes describing its development and management of facilities at Pu'u 'Ō'ō, as an out-station of the company's interests. Apparently the Haneberg/Hackfeld partners believed that the Humu'ula boundary took in the Pu'u 'Ō'ō facility, thus Baker was denied use of the upper reaches of Pi'ihonua. By May 1891, Haneberg and company and John T. Baker entered into a law suit, with Baker claiming his right to the interests in the Pu'u 'Ō'ō section of Pi'ihonua. Proceedings of the Boundary Commission followed and cleared up the matter by its decision of October 3, 1891 (see Boundary Commission records in this study); and the case was settled in court in 1896 (see documents below).

The Humuula Sheep Station Journal of August Haneberg

In 1887, James Gay removed himself from the business enterprise at Humu'ula, and August and Armin Haneberg assumed management responsibilities of the Humuula Sheep Station Company³⁴. On November 5, 1889, an annual meeting of the Humuula Sheep Station Company took place, and officers were elected, they were: August Haneberg, President; Armin Haneberg, Vice President; J.F. Hackfeld, Secretary and Treasurer (A.W. Carter, Humuula File; Parker Ranch Collection). With this action, the Haneberg brothers took over operation of the station, with its primary headquarters having been established in past years at Kalai'eha.

From the surviving Journal of August Haneberg (1890-1892), we learn much about the history and development of the sheep station, and use of lands in, and adjoining the *ahupua'a* of Humu'ula. The following notes provide readers with an overview of the documentation recorded in the journal of August Haneberg, President and manager of the Humu'ula Sheep Station Company (ca. 1887-1898). The citations include references to activities at the Humu'ula Sheep Station, Kalai'eha headquarters and out-stations at Pu'u 'Ö'ö, Hopuwai, Laumaia, Keanakolu, and Waiki'i (generally written Waiki).

Additionally, various paddocks are named, including the — Horse Paddock I, II, III; Wether Paddock, Paddock I, II, III; Sheep Paddock I (around the 'Öma'okoli Hills); Sheep Paddock II (Around Pu'u 'Ö'ö); Sheep Paddock III (around Laumaia); Sheering Paddock (adjoining the Kalai'eha Woolshed); Ram Paddock; Laumaia Paddock; Bullock Pen (Laumaia Section); and the *Aina Hou* (usually written *Aina Ho*) horse range. Several references are also made to Pua'ākala (then, Hitchcock's place) and Hānaipoi (then under the charge of Samuel Parker).

Among the citations in the journal, are those documenting:

- Hunting wild cattle on the Pōhakuloa flats, Pu'u Kumu, Kalepeamo, Laumaia, **Hopuwai**, as well as hunting wild dogs and pigs.
- Construction and maintenance of buildings and support facilities at Humu'ula, Pu'u 'Ö'ö, Hopuwai, Laumaia, Keanakolu, and Waiki'i-Auwaiakeakua. All of these facilities were worked as a part of the Humu'ula Sheep Company's operation.
- Work on stone walls and fences at various locations along the boundary of Humu'ula, and in interior paddocks.
- Maintenance and development of trails and roadways from Humu'ula to Keanakolu and down to 'Ö'okala; and from Humu'ula to Waiki'i and on to Waimea. The journal also records that access across Humu'ula was at times denied to neighboring business interests.
- Survey disputes and proceedings of the Boundary Commission.
- Development of "Japanese Camps" in the field for laborers, when work was being done on various wall, fencing, road and telephone line projects.
- Development of the telephone pole and line system—the first phone call between **Hopuwai** and Kalai'eha was made on June 9, 1892.
- In September 1890, efforts were underway to kill the introduced thistle; by January 1891, Haneberg documented that efforts were underway to control the "Australian weed" (gorse); and by October 1891 crews were also periodically pulling out *Joi* weed. (See also the 1892 article by W.D. Alexander, regarding these efforts.)
- Transportation of sheep to Kawaihae.
- Collection and curing of cow hides.
- Regular work on garden plantings at the Humu'ula station.
- Planting of cypress and pine trees at Humu'ula and Pu'u 'Ö'ö.
- Planting of potatoes at Keanakolu and Hopuwai.
- Hunting "geese" on the 'Āina Hou range.

³⁴ The date is based upon August Haneberg's testimony before the Commissioner on Boundaries in 1891 (see testimony in this study).

- Daily notes on the weather conditions (though rainfall amounts and temperatures were not given).

Names of Individuals Associated with the Humu'ula Sheep Station Operation

Readers will note that Haneberg's spellings were at times inconsistent, and it appears that German language influenced his approach to phonetically spelling names of the Japanese, Chinese and Hawaiian employees. His spellings of Hawaiian place names were also inconsistent. Another problem in deciphering the journals is that Haneberg's penmanship was at times difficult to read. He was not wordy, and often abbreviated words as well; most notably in the original texts, Japanese was often written "Japanese"³⁵.

Japanese Employees. Primary tasks included – construction of stone walls, fences, and carpentry; sheering and herding sheep; baling wool; trail and road work; garden work; setting of phone poles and lines; weeding thistle and gorse; and general facility maintenance:

Moto, Kawamoto, Yamakiki, Taniguchi, Kosina (Kosima), Nakajiro, Kuramoto, Hadano, Sato, Moriwaki, Shirimoto, Tamaru, Matsu, Iwahei, Kumahei, Hatsubare, Punikio, Masaki, Sakamoto, Takahana, Haruka, Kumezu, Tokuhara, Matsutaki, Yamauchi, Matsushigi, Hazu (Hatsu), Nakatani, and Matsudaki.

Chinese Employees. Primary tasks were as above, but also included weekly runs between Humu'ula, the out-stations, and Waimea with mail; the Kawaihae run with sheep, and for supplies; cooking; and hunting wild cattle:

Ah Fu, Ah Sing (Ah Tsing), Ah Nui, Ah Sir, Ah Fu, Ah Kong, Ah Ano, Pakenia, Ah Waa, Ah Sur, Ah Hoi, Ah Si.

Other Employees and Personnel from Neighboring Ranches. Primary tasks included construction and maintenance of station facilities; tool work; supervision of labor crews; breaking horses; hunting wild cattle and pigs; herding sheep to Kawaihae; managing out-stations; overseeing the killing of thistles and gorse; and hunting and poisoning wild dogs:

Waltjen, Ellerbrock, Kramer (Cramer), J. Spohler, A. Brechthaupt, Portuguese Anton Fernandez, Burges, Plumer, D. McLane, Oelshluger, J.M. & Joe Horner; Maikai, Johnny Lindsey, Ernest Campbell, Bohrmann (Bormann), J. Muir, Frank Wilson, Kaiser, Jim Stevens, Deverill, Fitzsimmons, John Crowly, Palmer, John Donahoe, Johann Wulber, Wilhelm Munzel, Eben Low, Sam Parker, Kauwe, Schlemmer.

Selected Entries from Haneberg's Journal— Describing Land Use, Development of Station Features, and Daily Operations

Tuesday, July 1st 1890.

Spohler returned from Waimea, mule "John Bull" had bladders on all four legs; *Ellerbrock puts out poison and shoots pigs*; Moto weeds garden paths; *8 Japanese work on fence Sheep Padd III.*

³⁵ The term "Japanese" has been used throughout the following citations.

Heard dogs bark up *mauka* of Sheep Padd III. Caterpillars are doing immensely damage to pastures.

Weather dry and warm all day; Trade wind. [page 1]

Friday, July 11th 1890.

Returned to **Kalaieha** [from **Hopuwai**]. Rain kept up at **Hopuwai** all night and morning; *all gulches along towards Kalaieha full of water roaring down; Japanese on fence Sheep Padd III stopped work all day; Water passed through openings in walls through gulches without injuring the same.*

Trade wind; cold and shivering, fog, rain stopped towards evening. [page 3]

Monday, July 21st 1890.

Spohler and Burges pack wire to *Japanese Camp fence* **Laumaia** Sheep Padd III; 7 Japanese work on fence there; Kuramoto and 7 Japanese shear sheep; Moto bundles fleeces; Crāmer cuts top pieces for Wool bags; Waltjen and Ellerbrock with sheep at **Waimea**.

Weather: Frost previous night, clear and warm from early morning till 5 o'clock; fog and mist; Trade wind. [page 6]

Wednesday, July 23rd 1890.

Spohler packs provisions for *Japanese House* **Laumaia**; Burges fixes Harnesses; Crāmer takes fleeces up, and bundles them; 5 Japanese shear, 1 sick; discharged Cook Ah Nui, hire Ah Sir for \$20.00 a month; Ellerbrock and Waltjen returned from **Waimea**, having delivered 93 sheep to steamer at **Kawaihae**; Plumer with them; 7 *Japanese fence* **Laumaia**.

Weather: clear from early morning, afternoon some fog and mist; Trade. [page 6-7]

Tuesday, July 29th 1890.

Spohler and Burges leave with Backboard for Waimea; Ellerbrock to shoot cattle in *Sheep Padd III, found fence broken in two places; cattle apparently chased in from above; succeeded in getting all cattle out;* Waltjen paints wagon and fixes up tent; Crāmer presses wool; Moto takes fleeces up; 6 Japanese shear; 7 *fence Sheep P. III.*

Weather: fog and mist almost all day; Trade. [page 8]

Sunday, August 10th 1890.

Ellerbrock returned with beef from **Laumaia**, heard shooting on **Ahuwela**; Kuramoto and Nakajiro out to fix fence Sheep Padd III.

Weather dry and hot all day, some fog towards evening; Trade wind. [page 11]

Wednesday, August 13th 1890.

Burges and Ellerbrock with 9 mules pack wire and staples to *Fence* **Laumaia** Sheep Padd III; Plumer from **Keanakolu** in, left with one mule and 3 horses for **Laumaia** to take charge of the place, \$15.00 wages, 10 cts. Pig, \$2.00 dog; Waltjen woolshed; Kramer wool press; Kuramoto, Ah Fu, Nakajiro and 4 Japanese shear sheep; Moto takes fleeces up.

Weather: clear and bright all day, very warm; Trade wind. [page 12]

Friday, September 5th 1890.

Reverend Baker left for **Waiki** [had arrived August 30th]; Waltjen fence sheep Padd I, afternoon sows grass seed; Kramer garden work and *grass seed*; Kuramoto, Taniguchi and Kosina and Shirimoto refix wall horse Padd III; Masaki and Yamakiki sick.

Weather: fog, rain and mist all day, clear at nightfall; Trade wind.

Ellerbrock for pigs, none killed. [page 19]

Saturday, September 6th 1890.

Ellerbrock left with mail for **Waimea**; Kramer garden work; Waltjen to kill pigs, did not see any; Kuramoto sick; other Japanese sent out to work, did not find place and returned; Bohrmann and Ah Nui arrived; A. Brechthaught and Portug. Anton left their camp and **Ahuwela**; caught Japanese Kosina and Yamakiki stealing chickens, discharged [subsequently reinstated]. *Inspected fence Sheep Padd III from Bush to stone wall, found wire slack and broken; in one gulch the wall partly down and a dead Bull not being skinned outside the fence. Teams returned all right.*

Weather clear and fine in the forenoon but fog and mist afternoon; Trade wind. [page 19-20]

Monday, September 8th 1890.

Spohler and McLane left with team for **Kawaihae**; Hadano left; Ellerbrock and Kramer drive sheep; Waltjen sows *grass seed*; 4 Japanese stone wall horse Padd III.

Weather bright and fine all day; Trade. [page 20]

Thursday, September 11th 1890.

Masaki helps to lay out horse Pen in **Aina Ho**; afterwards with Kuramoto, Taniguchi, Kosina and Shirimoto Wall Horse Padd III; Waltjen garden work; Teams Spohler and McLane returned all right; Yamakiki left for Maui.

Weather, fog morning early, clear afterwards and almost all day; fog night but dry; Trade. [page 21]

Friday, September 12th 1890.

Waltjen fixed fence **Puu Oo**; Spohler and McLane leave with wool for Kawaihae; Horses "Banjo" and "Billy" sick, stiff in legs; 5 Japanese wall Horse Padd III.

Weather clear till 3 o'clock afternoon, fog and mist; very cold previous night; Trade wind. [page 21]

Monday, September 15th 1890.

Kramer, Waltjen and Ellerbrock down to "**Halealoha**" to look after sheep, returned through *Ohia* bush and **Kipukahina**, did not find any sheep; brought in a flock on flat **Puu Oo house**; 2/3rd run away, found 36 wethers outside the fence near **Huikau**, did not get them in; 11 wethers in corner above Sheep Padd I & II, got them in, both flocks more than those that run away on the 9th and 10th inst.; Moto washes; 5 Japanese stone wall Horse Padd III.

Weather fine and bright early morning till 3 o'clock, then fog and rain; Trade wind. [page 22]

Thursday, September 18th 1890.

Sent Ellerbrock below "**Halealoha**" to look after sheep, did not see any but a few goats; Waltjen returned with mail from Waimea; Kramer takes fleeces up and bundles them; Kuramoto, Taniguchi and Masaki shear sheep; Kosina garden work; Moto washes.

Weather fine all day and night; Trade. [page 23]

Monday, September 22nd 1890.

Kramer and Ellerbrock drive sheep, some sheep (12) on **Kalaieha Puu** run away; *some sheep on slope at shepherd's hut put in horse Padd there*; about 100 sheep down on flat **Puu Oo** scattered; Waltjen woolshed; 4 Japanese shear; Kosina garden work; Moto washes pack saddle blankets.

Weather fine all day, very warm; Trade wind. Rain on **Mauna Kea** above **Pohakuloa**; Trade, calm. [page 24]

Thursday, September 25th 1890.

Waltjen and Kramer kill thistles in Horse Padd II and Ram Padd; Ellerbrock fence Sheep Padd I; Japanese wall horse Padd III.

Weather bright and hot all day, frost previous night; Trade wind. [page 25]

Tuesday, September 30th 1890.

Left with Kramer and Ellerbrock to bring 105 sheep to **Waiki**, no trouble arrived there at ½ past 1; very much dust and heat; Waltjen finishes garden; *5 Japanese finish stone wall Horse Padd III.*

Weather slight rain all night till noon, then dry, very cool. Trade wind. [page 26]

Wednesday, October 1st 1890.

Left with Waltjen for **Keanakolu** to take charge of the place; stopped over at **Hopuwai** and brought the balance of horses from Padd II into Padd I. *Japanese start on Horse Pen in Aina Ho.*

Weather fair all day. [page 26]

Friday, October 3rd 1890.

Left for **Ookala** with Muir and returned the same day, *conversed with Walker about Humuula road on Ookala land, Kaala, Kaiwicki [Kaiwiki]* and other items, no definite arrangements could be made. *Road through bush extremely bad as it had rained all night and all day.* J.M. Horner called at **Keanakolu**. Bormann returned to **Hopuwai**.

Weather incessantly rain all day. [page 27]

Monday, October 6th 1890.

Japanese Shirimoto left for Olowalu, Maui; Ellerbrock shoots a heifer at **Laumaia**; *4 Japanese, stone pens Aina Ho*; Kramer sorts out 107 sheep for Honolulu and changes wethers to upper part of Padd I.

Weather, fog and mist early morning, then dry, some rain afternoon, very calm by South wind evening, warm and soft. [page 28]

Saturday, October 18th 1890.

*Masaki, Kosina and Taniguchi pens in **Aina Ho**; Kuramoto sick.*

Weather slight fog and mist almost all day; Trade. [page 31]

Monday October 27th 1890.

*Spohler fence Sheep Padd II, saw 5 dogs outside the fence at **Puu Kumu**; Kramer paints and bales wool; Japanese shear weathers for Honolulu; Moto washes;*

Went to **Waiakeakua** [Auwaiakeakua], saw Ah Ano; Ernest Campbell not there.

Weather, Wind changed over night to southerly direction, kept dry all day; very calm evening, warm. [page 33]

Tuesday, October 28th 1890.

*Spohler leaves out poison where saw dogs the previous day; Kramer paint Tank; 4 Japanese pens **Aina Ho**.*

Weather, wind changing from South to Trade, and back frequently, a few drops of rain, very mild. [page 33]

Wednesday October 29th 1890.

*Kramer finishes tank and then kills thistles; Spohler leaves with mail for Waimea; 4 Japanese, pens **Aina Ho**.*

Left for **Keanakolu**, arrived there at 3 o'clock.

Weather fine and warm all day. [page 33]

Friday, October 31st 1890.

*Kramer weeds thistles; Spohler looks for dead sheep in Padd I; 3 Japanese Pens **Aina Ho**; Masaki sick.*

Weather fair by southerly wind, Thunder and lightening evening and afternoon. [page 34]

Tuesday, November 4th 1890.

*All Japanese **Aina Ho** horse Pen, set gate posts.*

Weather fine all day, no dew or fog previous night; Trade wind. [page 35]

Thursday, November 6th 1890.

*Waltjen returned to **Keanakolu** then to take charge of **Laumaia** Spohler helps to do some blacksmith work,; Kramer garden work; 4 Japanese Horse Pen **Aina Ho**.*

Weather fog almost all day; Trade wind, cool. [page 35]

Tuesday, November 11th 1890.

*Spohler fence Sheep Padd II; Kramer garden work; 4 Japanese Horse Pen **Aina Ho**.*

Weather; sharp frost previous night, clear during day till 3 o'clock; fog and mist; clear at 6 o'clock again; cold; Trade wind. [page 36]

Friday, November 21st 1890.

Spohler and Kramer left with 105 sheep, lost several (3 or 4) in bushes beyond **Pohakuloa**; 4 Japanese still Horse pens **Aina Ho**.

Weather; frost previous night, very hot during all day, south wind. [page 38]

Saturday, November 29th 1890.

Spohler leaves for Waimea with mail; Kramer sick; 4 Japanese start on Road to **Aina Ho**; fire on Mauna Loa.

Weather by changing wind bright and warm; very dry. [page 40]

Monday, December 1st 1890.

Spohler shoots a bull in upper part of Sheep Padd I, still one more there; Kramer takes old post up on fence Ram Padd I; Japanese half day on road into **Aina Ho**, then home to get ready for Waimea Road; Moto sundries.

Weather clear and bright all day, very warm; trade. [page 40]

Tuesday, December 2nd 1890.

Kramer packs provisions over to **Keanakolu**; Spohler brings on team; Japanese to halfway **Waiki** to cut bush down, where they camp and started work.

Weather clear and bright by Trade wind, very warm all day, dry. [page 41]

Thursday, December 4th 1890.

Kramer fixes fence upper part Sheep Padd I which was greatly damaged by wild cattle; 4 Japanese Road to **Waimea**, cutting down bushes.

Weather fog early morning and during night, clear and bright all day afterwards; Trade wind. [page 41]

Saturday, December 6th 1890.

Returned Japanese from their camp halfway **Waiki**, having finished fixing Road to Waimea; Kramer fixes fences around the house Paddocks.

Weather very cold early morning, bright and clear all day; very dry; strong Trade wind. [page 42]

Tuesday, December 9th 1890.

Japanese finished sheep then go to **Aina Ho** to work on road there; Kramer fixes fences and takes posts down.

Went **Waiki** to arrange with Ernest Campbell to bring sheep down.

Weather fog early, afternoon Thunderstorm with heavy rain for a short time, fog and mist evening again; Trade wind. [page 42]

Wednesday, December 10th 1890.

Kramer leaves with mail for **Waimea**; 4 Japanese start to make wall Sheep Padd III higher; met Waltjen there.

Weather fog and mist and slight rain almost all day, clearing up towards nightfall, calm and warm; Trade wind. [page 43]

Thursday, December 11th, 1890.

Kramer returns with mail from **Waimea**; Japanese moved over to **Puu Oo** house and work on stone wall Sheep Padd III.

Weather very hard frost previous night, then rain and fog all day; Trade wind. [page 43]

Monday, December 15th 1890.

Japanese make wall in Sheep Padd III higher; Moto ½ day weeds garden paths.

Weather fine all day, wind South during part of afternoon; Trade towards evening, fog. [page 44]

Wednesday, December 17th, 1890.

Went with Buckboard to **Waiki**, met Kramer and Ernest Campbell there returning from **Kawaihae**; delivered all sheep (107) to steamer; returned to **Kalaieha** ½ past 6 with Corrug. iron from old Grass house at **Waiki**; Japanese wall sheep Padd III.

Weather fog and mist all day, cold; Trade. [page 44]

Friday, December 19th 1890.

Returned from **Keanakolu**; met Kramer and Waltjen on **Ahuwela** with Mules to shoot cattle; Waltjen was bucked off the Mule "Kawaihae," left wrist swollen also eye and cheek; Japanese all stopped home, bad weather; Kuramoto sick and left **Puu Oo** house for **Kalaieha**.

Weather rain all day and previous night by constantly changing wind. [page 45]

Saturday, December 27th 1890.

Kramer fixes fence on **Puu Huluhulu**, then takes old posts out on Ram Paddock; 4 Japanese work on wall sheep Padd III; several outside, one sheep standing on top of wall trying to eat Mamani leaves; put several hundred sheep through small gate at Shepard's horse Padd from Padd III into Padd II; Horses Lakaloa, Billy and Freten went out of Horse Padd III into Sheep Padd I lower part; fence not damaged.

Weather cold, fog early morning, dry afterwards, evening fog again; Trade wind. [page 47]

Monday, December 30th 1890.

Sent Kramer with two Mules to **Laumaia** for beef, did not return; 4 Japanese finished wall Sheep Padd III and returned to Station.

Weather warm and bright all day; Trade wind. [page 47]

Wednesday, December 31st 1890.

Left for Waimea; Kramer with salt to **Laumaia** to pack hides back; Kosina and Taniguchi & Masaki finished sheep then make wall **Sheep Padd I at Omao Koili Hills** higher; Kuramoto sick. [page 48]

Monday, January 5th, 1891.

Taniguchi and Kosina enlarge wall at Omao Koili hills Sheep Padd I; Kramer to **Puu Oo** to kill out **Australian weed**.

Left with 2 mules to bring poison to **Keanakolu** and a mule for Muir to ride over to **Kalaieha**. Arrived at **Keanakolu** at ½ past 2. Tasbure is getting very poor, Puakea mare

of **Aina Ho**, Blossom, foal of white wild mare probably dead; ordered all horses to be put in Bullock pen; notified Muir to be over at **Kalaieha** to take teams down on Wednesday next week; Wilbur and Muir received bill of J. Sandh [?].

Met Mr. McKinley at **Hopuwai**, who proceeded to **Laumaia**. Left Mule Tow Tow at **Keanakolu** to pack over coal oil.

Met Waltjen on trail close to stone pen.

Weather dry, some fog about noon, soon disappeared, then dry again. [page 49]

Thursday, January 15th 1891.

Muir left with team for **Kawaihae** late; Kramer returned with beef and hides from **Laumaia**; **Kosina and Taniguchi Wall Sheep Padd I Omao Koili hills**; Horses "Springer" and "Coldwater" not to be found.

*On a hill way into the Paahoehoe below **Omao Koili hills**, have been plenty of sheep as an abundance of manure and a dead sheep prove, also a lot of dog manure all along the Paahoehoe.*

Weather bright but dry and clear till 5 o'clock, a few heavy showers and slight thunderstorm; Trade. [page 52]

Saturday, January 17th 1891.

Kosina and Taniguchi fix gulches between Ram and Horse Padd II; Kramer helps to bring Sheep from Padd III into Padd II, about 2-3000; Saw 7 wild Dogs above **Huikau** in the Clinkers.

Weather slight fog at about 9 o'clock, but beautiful all day afterwards; very calm and pleasant evening. Trade wind. [page 52-53]

Friday, January 23^d 1891.

Kramer and Waltjen helped to drive sheep from **Laumaia Paddock into Puu Oo Paddock**; about 2000 in; Bormann arrived from **Keanakolu**. Horse "Lakaloa" died. Japanese Tamura and *wahine* left.

Weather frost previous night, very warm during all day; calm; Trade wind. [page 54]

Monday, January 26th 1891.

*Kosina and Taniguchi wall on **Sheep Padd I Omao Koili hills**.*

Weather hot all day, some rain during afternoon and sunset; Trade. [page 55]

Friday, February 6th 1891.

Bormann helps to drive in Wethers and then picks out together with 105 for Honolulu, afterwards lays out poison; Kramer garden work; *2 Japanese stretch wire at fence Sheep Padd III **Laumaia**.*

Weather fog and mist early morning, soon clear and kept dry all day; cool; Trade wind.

Vredenburg arrived from Waimea late. [page 57-58]

Sunday, February 8th 1891.

Hired Frank Wilson for \$15.00 and board as Shepard on **Puu Oo**. Vredenburg left for **Waimea**; made contract for 1 year with Bormann.

Weather clear during morning night and forenoon, some rain afternoon, dry towards nightfall and calm and warm. Trade. [page 58]

Friday, February 13th 1891.

Kramer and 2 Japanese garden work; Bormann packed provisions to *hut at Puu Oo*; Wilson takes charge of **Sheep Padd II (Puu Oo)**; afternoon Bormann fixes pack saddle and lays out poison.

Weather strong Kona, cool, clear and bright all day, calm towards evening. [page 59-60]

Friday, February 20th 1891.

Kramer returned from **Keanakolu**; Bormann to **Laumaia** for beef, did not return; 2 Japanese $\frac{3}{4}$ day garden work, afternoon *unrooted Australian weeds in Sheep Padd II and Horse Padd II*.

Weather dry all day but cool; strong Kona.

Inspected Aina Ho, feed plenty lower part, abundance of water; saw but few horses, perhaps 50 in all. [page 61]

Saturday, February 21st 1891.

Kramer left with mail for **Waimea**; Kosina and Taniguchi started to fix gulches *Sheep Padd II*; discharge Frank Wilson on **Puu Oo**; stops overnight at Station to leave early in morning; Bormann returned with beef from **Laumaia** and 5 hides.

Dogs killed several sheep during previous night on fence not far off Huikau, many lambs of about 2 weeks age died of cold.

Weather still Kona, frost previous night, at nightfall wind subsiding; cool, fine weather. [page 62]

Monday, April 6th 1891.

Bormann helps on Stone house, then brings in horses; Taniguchi and Kosina Cook house; Ah Ano shepherd; Muir arrived from **Keanakolu** on Mule Bischoff.

Weather forenoon dry and bright, afternoon rain; Trade wind.

Thursday, April 16th 1891.

Bormann paints *Laborer's House II*; Ah Ano returned with mail from Waimea; 3 Japanese sow grass seed in Shearing pen; Baldwin and Kelsoni from **Puakala** in, left again; Deverill arrived from Waimea; Vredenburg killed 4 heads of cattle.

Weather fog early morning, soon clearing up and then clear all day; Trade wind. [page 73]

Saturday, April 18th 1891.

Bormann finished *Laborer house II* and then started on *Veranda Roof Old Dwelling house*; 3 Japanese sew grass seeds; 2 Japanese sick.

Weather, frost by South wind during previous night, but clear and bright during day by Trade wind. [page 73-74]

Monday, April 20th 1891.

Left with Buckboard for **Waimea**; Bormann carts; 3 Japanese started to work for raising and locking tanks; 2 Japanese sick; Matsu washes. [page 74]

Friday, May 1st 1891.

Ah Ano shepherd; Bormann helps to restock goods, then paints and afterwards sundry jobs to get in horses and mules and water the mares; Japanese garden work; Matsu cleans Kitchen.

Weather fine and bright all day. Trade.

From Baldwin at **Puakala**, the half-caste "Kelsoni" in to get provisions. [page 77]

Sunday, May 3rd 1891.

D.H. Hitchcock and Chinaman arrived from **Halealoha** (Hilo), arranged with him about suit against J.T. Baker or Maa in Hilo.

Weather frost previous night, but very warm and fine during all day; _____ Trade sometimes south wind. [page 77]

Sunday, May 10th 1891.

Government Surveyors Baldwin and Thrum in from **Puakala**; Meyer returns with team all right from Kawaihae.

Weather frost previous night; bright till 3 o'clock, then fog, no mist; Trade. [page 79]

Monday, May 18th 1891.

Bormann paints old Dwelling house; Pakenia, Ernest and Ah Ano sort horses; afternoon brake in horse "Eran;" Ah Ano afternoon, shepherd, saw 3 wild dogs at **Kipuka ahina**; all Japanese garden work; Matsu wool bags.

Weather very warm and hot all day; some fog towards evening; Trade wind, very dry. [page 81-82]

Wednesday, May 20th 1891.

Sent Pakenia and Ah Ano in the bush below **Keanakolu** to look for Filly of Blossom, did not find it; went to **Umikoa**, met Albert Horner there, returned at 12 o'clock; Bormann sundry jobs. Returned to **Hopuwai** and stopped there over night; Waltjen at **Keanakolu** to take his dog back, but without success.

Weather, rain from 3 o'clock, clearing up during night by rising moon, very cold then. [page 82]

Friday, May 22nd 1891.

Ah Ano moves over to **Puu Oo hut**; Ernest and Pakenia ride colts; Bormann forenoon helps Blacksmith work, afternoon paints Kitchen and waters horses; Japanese garden work; Matsu Wool bags.

Weather previous night sharp frost, very hot and dry during day; fog and mist evening; trade. [page 82-83]

Tuesday, June 2nd 1891.

Ernest Campbell and Pakenia returned from **Kawaihae**, delivered 99 sheep to steamer; Japanese finished garden works and kill out thistles in Wether Padd; Matsu wool bags; Bormann paints wagons.

Weather: calm early morning; soon Kona again, very much dust; evening calm, hot and dry. [page 85]

Wednesday, June 3rd 1891.

Pakenia and Ernest to **Hopuwai**, to pack provisions and drive horses; Bormann to **Laumaia** to pack hides; 5 Japanese on Waimea Cart Road; Matsu wool bags; met surveyors Baldwin and Thrum near **Laumaia** Horse Pen with two natives; 2 Messrs. Castle and 2 natives at **Puakala**.

Weather fog and rain at **Hopuwai**; now at **Kalaieha**, very hot and dry there. [page 85-86]

Thursday, June 4th 1891.

Muir returned with Team from **Kawaihae**; Pakenia and Ernest Campbell shoot a cow for beef; Matsu wool bags; all Japanese start on Telephone line.

Weather fine and bright all day; towards evening fog and slight rain; wind changed to Trade. [page 86]

Friday, June 5th 1891.

Muir left for **Keanakolu**; Bormann, Ernest, Pakenia, Ah Ano and Waltjen drive sheep from Padd III into Padd II; Japanese continue on Telephone line; Matsu wool bags.

Weather: clear and warm forenoon, afternoon and during night rain; Trade wind.

Surveyors Baldwin and Thrum put up flags on several Hills around **Kalaieha**. [page 86]

Sunday, June 7th 1891.

Pakenia returned with mail from Waimea.

Thrum in returning from **Kalepe a Moa**.

Weather very dry all day; Waltjen in reporting 500 sheep left in **Laumaia** Padd. [page 87]

Monday, June 8th 1891.

McLane makes his wagon ready and bundles hides; Bormann paints Buckboard and helps McLane; Pakenia and Ernest Campbell bring all horses (breed stock) from Wether Padd into Sheep Padd II; 5 Japanese finished garden work and then start on Telephone line again; Matsu ½ day house work ½ day Wool bags; then kill cow caught the previous day; Two Messrs Castle from Honolulu passed with a native for Waimea; Baldwin and staff moved from **Puu Oo** to beyond **Omao Koili hill**.

Weather hot and bright forenoon, afternoon fine shower of rain; fog evening; Trade wind. [page 87]

Tuesday, June 9th 1891.

McLane left with Team for Kawaihae; Bormann finishes Buckboard, then files gate hooks for **Aina Ho** pens; then started on other wagon to paint; Pakenia and Ernest ride colts; Matsu house work; 5 Japanese sew grass seeds in Shearing pen. The half white Kelsoni in from Surveyor Camp **Omao Koili** to get water and provisions.

Weather fine, during afternoon very threatening for rain, but only a little mist; Trade. [pages 87-88]

Thursday, June 11th 1891.

*Pakenia and Ernest pack gates into **Aina Ho**, afternoon ride colts; and mules; Bormann paints wagon box; Japanese sow grass seeds; Matsu house work; Kamaka passed for **Puakala**.*

Weather bright and warm all day; very dry; Trade wind. [page 88]

Monday, June 15th 1891.

Bormann fixes fences around the house shear pen, Team padd and Ram Padd; McLane and John Donahoe cart firewood; Ernest and Pakenia shoot a heifer and then drive sheep; Matsu sews clothes; *5 Japanese kill out thistles in different places. Baldwin and Thrum surveyed house lots etc.* Ah Ano reported that one black mare (probably Mabel No. 58) fell into a Gulch below **Huikau** and died.

Weather very hot and dry all day; water in the tanks is getting low. [page 89]

Tuesday, June 16th 1891.

Waltjen in from **Laumaia**, returned, reported 2 bulls in Padd III, plenty cattle close outside the fence, no more cartridges; *Baldwin and men moved from **Omao Koili** to **Hale Aloha***; commenced shearing sheep; Pakenia, Taniguchi, Hatsubare, Kosina and Iwahei shear sheep, Kumahei takes up fleece and bundles them; Bormann presses wool; Ernest Campbell fixes fences, shears a dead sheep Wether padd upper part; waters horses; McLane and John Donahue cart for wood then load wagons with wool for **Kawaihae**. Matsu house work.

Weather hot and dry all day, towards nightfall dark and slight mist; Trade. [page 89-90]

Friday, June 19th 1891.

Taniguchi, Hatsubare, Kosina, Iwahe and Pakenia shear sheep; Matsu mends tents; Bormann presses wool and fixes harnesses; Kumahei takes fleeces up and bundles them; *Ernest rides colts; sent him into **Aina Ho**; met surveyors there setting flags.*

Weather little rain previous night; same during day by hard Trade wind; evening clearing all off. [page 91]

Saturday, July 4th 1891.

McLane returned with team alright; Masaki sick, all other hands shear sheep; Matsu garden work; Bormann presses wool and looks at fences; *Ernest fixes mauka fence Sheep Padd I and then wall into **Aina Ho**.*

Weather fog early morning and with interruptions all day; evening fog and mist; Trade wind. [page 96]

Sunday, July 19th 1891.

*Arranged with Muir and McKinley to catch cattle on **Humuula** for \$3.00 a head; they to retain hides and all, the use of the butcher shop.*

Muir permitted to build a fence above **Keanakolu** close to stone house; to turn in his stock all revocable at any time; met Surveyor Baldwin at **Kaelewai** where he pointed out boundary points of **Humuula** to **Piihonua** and **Waiakea**; Ernest returned with mail; sold Muir two Donkeys in horse padd for \$7½ a piece and 8 more when in; McKinley leaves for Waimea; Muir stops over night.

Weather bright all day, no rain or fog; Trade. [page 100-101]

Wednesday, August 12th 1891.

Left with Bormann, Ernest and Pakenia for **Keanakolu**; met below **Hukapea** [?] R. Hitchcock with 3 Natives chasing for lost Mules; gave Hitchcock notice that he was not allowed to go on **Humuula** land anymore, offered him to take his lease of part of **Papaikou** and house and release him from building fence on boundary line; arrived at **Hopuwai** and met J.M. Horner with Native Maikai from **Umikoa**, left Pakenia at **Hopuwai** and proceeded with Horner and other men to **Keanakolu**; settled with Horner about new piece of land between Spncr's. lot and **Humuula** above **Kaala**, per written Memorandum. Gave the run of the slaughter house to Muir.

Japanese all work on the Telephone line; Matsu house work.

Weather bright and fine all day and night. [page 108]

Sunday, August 16th 1891.

Native from **Puakala** in with letters from Laukea in Hilo to fetch provisions to **Hale Aloha** for the surveyor Thrum.

Weather clear and bright early morning, but very foggy afternoon, mist; Trade wind. [page 109]

Monday, August 17th 1891.

Sent Ernest Campbell to **Puakala** with Mule for Hitchcock and letter; Pakenia rides colts; Bormann fixes fences sheep Padd I; Kumahei sick; Matsu did not work; *other Japanese finished telephone line except setting 3 posts to **Puu Oo**, then started on making wall in Sheep Padd III higher.*

Weather fog forenoon and afternoon late; Trade. [page 110]

Thursday, August 21st 1891.

Met Rev. Baker at breakfast; met Colonel Laukea and after arrival of Steamer "Kinau" Surveyors Baldwin and Brown; an appointment was made to 1 o'clock in afternoon. Met at the Survey office where the boundary commissioner Lyman was present, went over to Courthouse where evidence was taken by Lyman from Hoakiamoa, Amina and Armin Haneberg; closed at 4 o'clock; settled with Tax assessor Austin. [page 110-111 (see Boundary Commission Testimonies in this study).]

Wednesday, August 26th 1891.

Bormann, Pakenia, & Ernest bring in all wethers and Rams; Japanese sort wethers and rams, weed garden paths, then *get ready to move over to camp below **Kole***; Vredenburg in again.

Weather frost previous night but very fine all day; Trade. [page 112]

Monday, August 31st 1891.

Ernest and Pakenia tried to get in two strange horses that jumped into Padd I upper part; succeeded to get in one, with Parker brand, the other, a dark brown jumped out over the fence; afternoon boys ride colt; Bormann fixes fences and kills pigs; *Japanese all on stone wall sheep Padd II*; Matsu house and garden work.

Weather sometimes southerly wind, very threatening for rain during forenoon, rain afternoon, very warm. [page 113]

Friday, September 4th 1891.

Pakenia, Ernest and Bormann take one half of the sheep in Padd III and put them into Padd II; afternoon ride colts; Bormann fixes fence, and tent; *Japanese fix stone wall sheep Padd III which was damaged by last nights rain on 3 places.*

Weather fine early morning, then fog and mist, evening southerly wind and very fine. [page 114]

Saturday, September 12th 1891.

Pakenia and Ernest ride colts; *Bormann digs small pen under Tree for planting Cypressess; Matsu washed; Japanese Stone wall; Waltjen in and stopped over night; Ah Ano brings a hide.*

Weather fog and mist all day; Trade, cool. [page 116]

Wednesday, September 16th 1891.

Pakenia and Ernest leave early and catch a heifer on **Puu Kumu**; afterwards ride colts; Matsu garden work; *all Japanese on wall sheep Padd III; fell in on two places after the rain.*

Weather fog and mist almost all day, slight thunder storms; Wind Trade. [page 117]

Thursday, September 17th 1891.

Ernest and Pakenia help to put in gates in Aina Hou Horse Pens; afternoon Pakenia works on Lasso; Ernest stops home; Bormann fixes harnesses; Matsu house work, stopped home afternoon; Japanese Wall sheep Padd III.

Weather mist early morning, noon rain keeping up all day, thunder storm; Trade wind.

Saw Horse "Fred" in **Aina Ho**. [page 118]

Wednesday, September 23rd 1891.

Bormann mends meat bags, cuts flag poles, same works in garden; Ernest and Pakenia catch a cow on **Kaohe** for meat, then ride colts; *all Japanese on wall sheep Padd III; Matsu sick.*

Weather mist all day, ____; Trade. [page 119]

Saturday, September 26th 1891.

Bormann weeds garden and helps Waltjen to plant trees; Waltjen in from **Laumaia** to plant Cypress trees; Ernest and Pakenia ride colts; Matsu sick; *6 Japanese on wall sheep Padd III.*

Weather slight fog and mist all day; Trade. [page 120]

Sunday, September 27th 1891.

Kramer in from **Hopuwai**, stopped over night; Waltjen left for **Laumaia**; *Kumahei reported wall above shepherd's hut on Oo fell down.*

Weather dry all day; clouds; rain towards evening; Trade wind. [page 120]

Friday, October 2nd 1891.

Pakenia breaks in horses; Bormann revises fences and fixes halter; Ernest returns with mail from Waimea; teamster Andrew Carlson arrived with him; hired the latter for

teamster, wages to be settled after satisfactory work; *6 Japanese finished wall sheep Padd III; then started on gulches and crossings; Matsu cleans garden of weeds.*

Weather rain and wind all day though fine a few hours early morning; Trade. [page 121-122]

Monday, October 5th 1891.

Pakenia and Ernest pack provisions to Japanese and change their camp close to Puu Huluhulu; Bormann revises fences; 6 Japanese work on crossings and wall close to Puu Huluhulu; Matsu garden and house work. Andrew Carlson leaves with Team.

Weather very fine all day; Trade. [page 122]

Wednesday, October 7th 1891.

Bormann paints new Dwelling house; Ernest and Pakenia break in horses; Matsu cleans garden paths; 6 Japanese on fence sheep Padd III fixing crossings and walls.

Weather fine till 2 o'clock, when fog and slightly mist; frost previous night; Trade. [page 123]

Saturday, October 10th 1891.

*Bormann paints new Dwelling house, but had to stop about 2 o'clock when rain; killed out Joi then; Pakenia rides colt, afternoon breaks his own horse; Matsu house and garden work; 6 Japanese on crossings and gulches sheep Padd III; Ah Ano leaves with mail for **Waimea**; Spohler arrived from **Auwaiakeakua**.*

Weather fine till 2 o'clock, then thunder storm and rain, soon clear and dry again; Trade. [page 124]

Monday, October 12th 1891.

*Ah Ano back to **Puu Oo**; Bormann paints and cleans the yards; Spohler fixes fences; Pakenia breaks horses in; Matsu washes; 6 Japanese crossings Sheep Padd III; one wall damaged in the gulch by yesterday's rain.*

Weather fine till 11 o'clock then mist and clouds, cool; Trade wind. [page 124]

Thursday, October 15th 1891.

*Proceeded with Pakenia to **Laupahoehoe** where at ½ past 11 arrived; met laukea there and arranged with him to make appeal from Decision of boundary Commissioner at Hilo concerning boundary between **Kaohe** and **Humuula** on its northern end; each party (Crown and H.S.S. Co.) to bear one half of the expenses, to be paid by the Company and to be deducted from the next rent; stopped over with McKinley.*

Weather raining heavy all day without almost any interruption. [page 125]

Friday, October 16th 1891.

*Returned from **Laupahoehoe** with Pakenia to **Hopuwai**, inspected horses, all there (49) and in good order. When arriving at 11 o'clock at **Keanakolu** met Harry Johnson with Pack animals and Native inquiring to go to **Maulua**. Refused them to pass over **Humuula** land but allowed them to proceed after they having acknowledged to have any right to pass over **Humuula** land.*

Weather fine till 2 o'clock when rain and fog again. [page 125-126]

Monday, October 26th 1891.

Bormann paints new Dwelling house and cuts posts to tie horses to; Pakenia breaks in colts; Matsu house work; 6 Japanese fence sheep Padd III; again part of wall above **Puu Oo** house fell in.

Weather fine till 3 o'clock when a light thunder and heavy rain lasting till 5 o'clock; warm; Trade wind. [page 128]

Wednesday, October 28th 1891.

Spohler leaves with team for **Kawaihae**; Bormann and Pakenia went to **Pohakuloa** to catch cattle for beef, but failed, then went above **Puu Kumu** and caught a heifer there; Matsu house and garden work; 6 Japanese crossings, Sheep Padd III.

Weather fine till 11 o'clock, then slight mist and fog; Trade wind; warm. [page 129]

Monday, November 2nd 1891.

Bormann and Pakenia with 9 Mules change Japanese to camp on Road to **Hopuwai** above **Puakala** and as there was much delay, returned at 7 o'clock, two mules left outside; 6 Japanese started to make road towards **Laumaia**; Matsu some house and garden work; Spohler leaves with team for Kawaihae with hides and to bring up merchandise.

Weather Sharp frost previous night, southerly wind, very warm all day, fog in the evening, soon clear again by Trade. [page 130]

Friday, November 13th 1891.

Bormann paints house; Pakenia rides colts; went with lauhea to the boundary line between **Piihonua** and **Humuula**, also to the **Waiakea** points to settle about a new line to be established. Afternoon Bormann with lauhea to shoot pigs; 6 Japanese on trail to **Hopuwai**; Matsu garden work.

Weather fine all day, South wind. [page 133]

Monday, November 16th 1891.

Bormann piles corrug. iron and paints on New Dwelling house; Spohler leaves with team for Kawaihae; Pakenia not returned yet; 6 Japanese finished trail to **Laumaia** gate and started on **Nukupahu** gulch towards **Hopuwai**; Matsu house and garden work.

Weather bright all day; sharp frost previous night; Trade wind. [page 134]

Monday, November 30th 1891.

Spohler oils and cleans harnesses; Bormann finishes tanks on wool shed and then helps to oil harnesses; Ah Ano shepherd; Sakamoto sick; 5 Japanese started to set posts for Telephone line between **Laumaia** and **Hopuwai**.

Weather very warm and windy till 2 o'clock, then mist and light rain and very cold; Trade wind. [page 137]

Tuesday, December 8th 1891.

Munzel makes Bain Wagon; Matsu washes; Ah Ano shepherd; 5 Japanese on Telephone line finished **Nukupahu** gulch to **Laumaia**; did not work.

Weather heavy rain previous night. [page 139]

Wednesday, December 9th 1891.

Munzel makes a rake for grind stone and fixes the mule cart; Matsu ironing; 6 Japanese finished Telephone line as far as **Laumaia**, started then on camp (**Nukupahu gulch**) in the direction towards **Hopuwai**; Ah Ano shepherd.

Weather rain almost all day, Trade; not very cold. [page 140]

Thursday, December 17th 1891.

Ah Ano shepherd; Munzel helps to fix Bain wagon; Matsu house and garden work; 6 Japanese on Telephone line to **Hopuwai**; finished as far as **Waiaheu Gulch**.

Weather sharp frost previous night, very fine and warm during day; Trade wind. [page 142]

Friday, December 18th 1891.

Ah Ano shepherd; Munzel digs garden; Matsu house and garden work; 6 Japanese start on road from **Nukupahu gulch** to **Laumaia** gate again, which was not fixed well enough before.

Weather commenced to rain heavily at noon and kept up with fog and mist all afternoon; cold and disagreeable towards evening; Trade.

Met Kramer at **Waiaheu Gulch**, reported that he found Lubras Filly "Moto" dead. [page 142]

Friday, December 25th 1891.

Ah Ano leaves for **Laumaia**; Bormann arrives from there at **Kalaieha**; Munzel thrashes peas; Matsu finishes wash and works on Mule blankets again; 3 Japanese work ½ day on holes in Wall sheep Padd III yet; afterwards all 5 on trail to **Hopuwai**; ordered Sakamoto home to herd sheep afterwards.

Weather fine till sunset when fog again; Trade. [page 144]

Monday, December 28th 1891.

Waltjen takes charge of **Laumaia** again; Ah Ano returns to station; Sakamoto herds Wethers, got them in pen without trouble; Munzel thrashes peas; Matsu finishes wash; 5 Japanese finish trail to **Laumaia** gate and commenced on **Nukupahu gulch** to overhaul a short piece there.

Weather fog early morning, but most of the day dry and bright; fog evening again; Trade wind. [page 145]

Thursday, January 21st 1892.

Spohler returned with team alright; asked Paul Jarrett, Manager of Sam Parker, if he had any objection against rebuilding a shanty at **Hanaipo** and fencing a lot like **Waikii**, to which he consented; Sakamoto herds wethers; Ah Ano shepherd Padd II; Bormann fixes fences Padd I; Munzel and Matsu garden work; 5 Japanese on trail to **Hopuwai**; Iwahei sick, left at noon; previous day Kosina sick, other men worked half a day on account of bad weather; met Kramer; met Waltjen.

Weather beautiful all day, grass apparently grown considerably within a few days; Trade; calm and warm evening. [page 152]

Saturday, January 23rd 1892.

Ah Ano leaves with mail for Waimea; Bormann sick; Munzel finished garden, then filed bolts for Wool shed addition; 5 Japanese work on trail to **Hopuwai**; Matsu house and garden work; Deputy Policeman Kauwe and Native Kawae arrived from Waimea to look after 7 prisoners who escaped from the Volcano Road.

Weather warm and bright all day; Trade wind. [page 153]

Thursday, January 28th 1892.

John Crowley covers in Veranda of Wool shed; Fitzsimmons makes some Implements; Matsu works in garden; 5 Japanese on trail to **Hopuwai**.

Weather fine all day, sometimes fog but no mist; Trade. [page 154]

Monday, February 1st 1892.

Fitzsimmons fixes bedstead and shovels then on Woolshed; Crowley woolshed; Iwahei and Taniguchi make posts to addition of Wool shed; Hatsubare, Kumahei and Kosina clean weeds and Joi out; Kosina afternoon stops home; Sakamoto herds wethers; Ah Ano fixes fences in the small pens around the house; Spohler leaves with team for **Kawaihae**; Bormann sick; Matsu washes half a day.

Weather heavy rain almost all day without interruption; Trade. [page 155]

Wednesday, February 3, 1892.

Ah Ano leaves with mail for Waimea; Bormann presses wool and fixes harnesses; Fitzsimmons makes book shelve; Jack, chairs and table; Kumahei helps to press wool, afternoon takes fleeces up and bundles them; Taniguchi and Iwahei make posts to addition of wool shed and gate posts; afternoon shear sheep; Hatsubare cleans out weeds then shears sheep; Sakamoto forenoon stops home afternoon shears sheep; Kosina sick; Matsu house work.

Weather without change, heavy rain day and night almost without interruption; Trade wind. [page 156]

Friday, February 5th 1892.

Sakamoto herds wethers; Ah Ano packs provisions over to **Hopuwai**; Hatsubare sick; Kosina and Kumahei make holes for posts to Woolshed addition; Taniguchi and Iwahei cut posts for enlarging fence on Woolshed; Bormann Saddle bag; Spohler leaves with team for Kawaihae; Matsu house work and makes pillows; Fitzsimmons fire box; Jack, tables.

Weather fine till 10 o'clock when rain again, thunder storm and heavy rains afterwards; Trade wind. [page 157]

Tuesday, February 9th 1892.

Fitzsimmons finishes wash trough, then started on Wool shed addition; Crowley finished long table, then helped on Wash trough and started on Wool shed addition too; Sakamoto herds wethers; Taniguchi and Iwahei make three gate posts then together with the other Japanese carried firewood; Spohler returns with team and new Japanese Kumezu with him; Palmer arrived from **Waiki**; Kumahei sick; Matsu washes.

Weather fog early morning, soon clear and fair all day; Trade wind.

Bormann helps to make shoes for lamp poles and drills holes for Telephone connection. [page 158]

Friday, February 12th 1892.

Bormann helps to cut pipes for water tank to New house; then finishes tank painted previous day; Fitzsimmons and John Crowley addition to wool shed; Sakamoto herds wethers; Iwahei sick; other Japanese set posts to wool shed addition; Ah Ano shepherd.

Weather fine all day; Trade wind. [page 159]

Saturday, February 13th 1892.

Bormann paints box for fire wood; wash trough, finishes Tank and helps to put water pipes on new dwelling house; then cuts pipes to over flow on Tank; Spohler returned with Team, animals are looking down; Fitzsimmons and Crowley erect frame work for Wool shed addition; Japanese finish setting posts; Taniguchi, Hatsubare and Kumezu make paving around the woolshed; Kumahei fills up holes on the big water tanks; Kosina and Iwahei start on enlarging pen behind the wool shed; Sakamoto herds wethers; Ah Ano leaves with mail for Waimea; Matsu garden work.

Weather heavy frost during night, but prevailing South wind very warm and pleasant all day. [page 159-160]

Monday, February 15th 1892.

Spohler oils harnesses; Bormann cuts pipes to overflows, paints brackets for wash trough; Hatsubare and Taniguchi pave around the wool shed addition; Kumahei finishes hallow on big tanks, then helps Iwahei, Kosina and Kumezu to set posts for new Pen around wool shed; Sakamoto herds wethers; Matsu cleans garden lawns; Fitzsimmons and John Crowley finish putting up frame work of woolshed addition; Ah Ano shepherd.

Weather Southerly wind very dry but not cold. At 7 o'clock Eben P. Low arrived with Robert Stevens from Mana. [page 160-161]

Tuesday, February 16th 1892.

*Eben Low and Native boy left for Waimea; arranged with Low about catching cattle, he expected to be over on Land between **Hopuwai** and **Laumaia** after having given notice to catch wild cattle; furnish everything himself; put the cattle into the **Laumaia** paddock herding them there for about a week and then take them over to his place; to pay \$3.00 a head except old bulls, he will kill and deliver hides; Spohler oils pack saddles; then makes wagon ready; Bormann fixes harnesses and helps Spohler; Ah Ano shepherd; Sakamoto, Taniguchi and Hatsubare finished paving around the wool shed; other Japanese set post to additional paddock; Matsu work in garden; Fitzsimmons and John Crowley on wool shed addition; Muir and McKinley arrived late.*

Weather by changing wind, calm but very agreeable. [page 161]

Monday, February 22nd 1892.

*All Japanese over to **Puu Oo** house, set posts to tank there, fix gate into horse Padd; and fix part of trail; Bormann paints New Dwelling house; Spohler revises fences; Matsu house and garden work; Fitzsimmons and Crowley hang doors in Woolshed Addition. Waltjen met at **Puu Oo**, part of wall caved in, had 6 wild dogs in Paddock, which killed quite a number of sheep.*

Weather fine and warm all day; wind shifting frequently from Trade to South. [page 163-164]

Tuesday, February 23 1892.

Bormann paints New Dwelling house; Matsu garden work; Spohler helps to make door locks and to shoe horse "Dick;" then makes wagon ready for lumber; Fitzsimmons and John Crowley put battens on Woolshed; all Japanese bring manure on the garden land.

Weather fine all day; very warm, no fog, slight Trade.

Ah Ano brings paper to **Laumaia** and lays out poison. [page 164]

Thursday, February 25th 1892.

*Ah Ano returned with mail from Waimea; China man Ah Hoi arrived; all Japanese work in garden; Fitzsimmons and John Crowley put up gutters on Wool shed addition; Waltjen and Bormann left for **Laumaia**, the latter to stay there for several days to help Waltjen on account of the wild dogs.*

Weather very dry and warm all day. Trade wind. [page 165]

Friday, February 26th 1892.

Ah Ano shepherd; Fitzsimmons and John Crowley finished Wool shed Addition; Fitz then repairs _____, John sets gate in Alley way; all Japanese prepare garden for planting Pine trees; Matsu stops home; hired Ah Hoi to make Lassoos, one Lasso for one hide.

Weather fog and mist all day, towards evening clear for ½ an hour, then fog again; Trade wind. [page 165]

Tuesday, March 1st 1892.

*Sakamoto leaves on foot; all other Japanese and Wahine work in garden yet; Bormann returned from **Laumaia** reporting that no more trouble of wild dogs; Wulbers Johann arrived to inquire whether to shoot trespassers of **Humuula**; Fitzsimmons and John Crowley make cover for pipe on New Dwelling house and then start to make bedsteads; Ah Ano shepherd.*

Weather fog and mist by heavy trade all day. [page 166]

Wednesday, March 2nd 1892.

*Wulbers returned, hired him to take charge of **Keanakolu** for \$10.00 a month and board and the privilege of planting potatoes in the garden; Bormann paints on floor in New house; Fitzsimmons and John Crowley make bedsteads; Iwahei sore wrist, stops home; Matsu home bad weather; Ah Ano shepherd; All Japanese plant trees in garden.*

Weather rain previous night and almost all day; evening calm and clear; Trade. [page 166-167]

Saturday, March 5th 1892.

*Bormann finished Office floor; Ah Ano leaves with mail for Waimea; all Japanese fix trail to **Puu Oo**; Matsu washes; Fitzsimmons and John Crowley make bedsteads; Palmer and companion arrived with 3 horses from Waimea.*

Weather bright and warm all day; Trade wind. [page 167-168]

Monday, March 28th 1892.

*Fitzsimmons and John Crowley and Bormann over to **Puu Oo** house putting up tank there and fixing house; finished; Spohler leaves with team to fetch up lumber; Ah Ano looks after horses; 5 Japanese on trail to **Hopuwai**; Matsu washes.*

Weather dry during previous night and all day though dull but very mild and calm; Trade. [page 174]

Tuesday, March 29th 1892.

*Fitzsimmons and John Crowley make short ends to spout for **Laumaia**, New Spout on laborer House I, fix roof on Laborer house II and work on buckles and body; Bormann paints Sitting Room New Dwelling house; 5 Japanese come over from **Hopuwai** to **Laumaia** and set posts there for Tank, then go over to **Kalaieha**. Ah Ano shepherd; Matsu sick.*

Weather dry till 3 o'clock when fog and mist; Trade wind. [page 174-175]

Thursday, March 31st 1892.

Ah Ano shepherd; Bormann helps on forge to make clamps for buckboard; then bundles hides, packs lumber gets in mules and helps to make wagon ready; Spohler returned with lumber from Kawaihae, horse "Willy" in Waiki sick; 4 Japanese finished setting posts for Cook house; then leave for **Laumaia** to fix the old stone pen there; Fitzsimmons and Jack put up brackets for lumber in Wool shed addition then make frame for a light to cook house and smoke box for chimney.

Weather fog, rain and mist all day; Trade wind. [page 175-176]

Saturday, April 2nd 1892.

Ah Ano herds wethers; Bormann returns from **Keanakolu**; Fitzsimmons and John Crowley Cook house; 4 Japanese on stone pen and new gate at **Laumaia**. Matsu and Kumahei house.

Weather fine all day; Trade wind. [page 176]

Monday, April 4th 1892.

Ah Ano herds wethers; Bormann packs lumber for Tank to **Laumaia**; Fitz and Jack finish cook house and put up two platforms in Woolshed; 4 Japanese on Road to **Hopuwai**.

Weather bright and warm all day; Trade wind. [page 176]

Tuesday, April 5th 1892.

Ah Ano herds wethers; Bormann paints and whitewashes Cook house; Spohler returned with team alright; Fitzsimmons and John Crowley leave for **Laumaia** to put up Tank and spouts and overhaul house; 4 Japanese from **Hopuwai** to **Laumaia** to put up gate.

Weather fine and warm all day; Trade wind. [page 176]

Thursday, April 7th 1892.

Ah Ano returns with mail from Waimea, mule looked bad; Bormann herds wethers; Spohler fixes fences; Fitzsimmons and John Crowley finished at **Laumaia** and left for **Hopuwai** to fix roof of house and sundry small other jobs; 4 Japanese work on Road to **Hopuwai**.

Weather extremely fine all day; Trade. [page 177]

Monday, April 11th 1892.

Fitzsimmons and John Crowley make a back house for Waimea; Spohler fixes fences and looks after horses, saw those wethers that ran away on Saturday above the **Puu Oo**

fence at **Huikau**; Kumahei cleans garden paths; 4 Japanese on road to **Hopuwai**; 2 Policemen left for **Keanakolu**, met 1 Policeman not far off **Hopuwai** towards **Laumaia**, returned to **Keanakolu**.

Weather fog and rain over at **Laumaia**; none at **Kalaieha** where South wind. [page 178]

Tuesday, April 12th 1892.

*Eben P. Low and his men arrived at **Pohakuloa** to catch cattle; Joe brought over several horses for water and pasturage; Spohler looks after sheep and brings in colt "Drummond" which used to run before with flock at **Laumaia** and is probably kicked off; Kumahei cleans garden and helps on sundry jobs; Fitz and Jack finish back house and commence to make several wagon pieces; 4 Japanese finish road to **Hopuwai** and start on Telephone line through the Paddocks I and II.*

Weather bright and hot all day; fog evening and very slight mist; Trade.

Late in the evening several of Low's men with 30 horses and Tame cattle arrived from Pohakuloa. [page 178-179]

Wednesday, April 13th 1892.

Bormann and Ah Ano return from **Kawaihae**, delivered 141 sheep to steamer, 13 lost; 2 of them put into the Paddocks again at **Kalaieha**; Spohler helps to bring sheep from upper Paddock into the lower one; then fixes fences; Kumahei cleans garden paths; 4 Japanese on Telephone line; Fitzsimmons and Jack made several wagon pieces ready.

*Eben P. Low and John Low arrived from **Pohakuloa** with team and wild cattle caught there, all stopped over at **Kalaieha**, in the evening go mauka to catch cattle at **Puu Kumu**; delivered to Low 3 horses bought sometime ago.*

Weather is extremely hot and dry by South wind; evening calm and very pleasant.

Low and men went in the evening late again but had no success. [page 179-180]

Thursday, April 14th 1892.

*Low and men left in the early morning for **Laumaia**, went mauka above **Kalepe o Moa** but saw only a few heads of cattle, lost one on the road at **Huikau**; arranged with Low that of all cattle he will lose during his stay at **Laumaia** he is to deliver the hide at the vat there, but shall not pay for the cattle as stated the stipulated price of \$3.00; Fitzsimmons and John Crowley sundry small jobs and finished their work; Ah Ano shepherd; Spohler over to **Waiki** to burn off the dry grass in that paddock there; Bormann paints back house for Waimea and windows in new cook house; 4 Japanese on Telephone line, finished 8 posts; Kumahei cleans garden paths.*

Weather extremely warm all day; thunder afternoon but no rain; Trade in the evening. Brought in 5 horses from **Puu Oo** and "Box" with Lightfoot. [page 180]

Sunday, April 17th 1892.

During night Kramer arrived from **Hopuwai** reporting that Muller in **Keanakolu** was arrested and taken to **Laupahoehoe**; that *Eben P. Low got his left hand hurt by a lasso and was taken down to the **Hopuwai** house*; Ah Ano returned with mail from Waimea; Waltjen in from **Laumaia**; Kramer left; Bormann left with horse "**Kaluamakani**" for **Keanakolu**; proceeded to **Keanakolu**; met at **Hopuwai** Low and Japanese Physician; arrived at **Keanakolu** at ½ past 6. [page 181]

Tuesday, April 19th 1892.

Returned from **Laupahoehoe** to **Kalaieha**; Wulbers put in at **Keanakolu** again; Bormann returned to **Kalaieha**; 4 Japanese on Telephone line at **Hopuwai**; saw thick smoke at **Puu Oo**, met Spohler who told me that he made fire there, sent him out to extinguish it, reported to have done; arranged with Ah Ano to get in Johnny Morgan flock, but as a foal just born had to leave him behind; Ah Ano herds wethers afternoon; Kumahei in garden yet.

Weather extremely dry, day and night, no fog, mist or drip; Trade wind. [page 182]

Friday, April 22nd 1892.

Ah Ano herds wethers; Kumahei garden yet; left with Bormann and 5 mules for **Hopuwai** to bring Japanese from there to camp between **Laumaia** and **Puu Oo**; Japanese finished Telephone posts through Paddock I and II.

Weather very dry all day; Trade. [page 183]

Thursday, May 5th 1892.

Proceeded to **Ookala**, settled with wages ____ of having the road changed through **Ookala** land, and proceeded to **Keanakolu** and **Hopuwai**; **John T. Baker with Rickard and 5 Natives had passed through to Piihonua**; John Low arrived the previous night and stopped over; went on to **Laumaia** the next day; arrived at **Kalaieha** at 5 o'clock.

Heavy south wind and extremely dry. [page 186]

Wednesday, May 25th 1892.

Bormann and Ah Ano returned from **Waimea**; delivered 152 sheep to steamer; 2 sheep played out at Waimea and were sold to Akona for \$6.00; worked on pit for back house, fence and waterhole; Matsu makes wool bags; Kumahei carries Telephone Instruments over to **Puu Oo** house; garden work; 4 Japanese on Telephone line.

Weather slight fog previous night; very dry and cool during day, heavy wind, evening some fog and mist; calm then; Trade wind. [page 191]

Monday, May 30th 1892.

Matsu washes; Kumahei carries Telephone instruments to **Laumaia**; 4 Japanese finished overhauling first part of line and commenced to stretch wire; Ah Ano shepherd sent to **Kipuka ahina** to look after two Natives said to have arrived from **Ookala**; not there, camp probably lower down near **Hale Aloha**. Bormann left for **Hopuwai**.

Weather very dry all day; no fog in day. Trade. [page 192]

Monday, June 6th 1892.

Ah Ano packs Telephone wire and blankets over to **Hopuwai** and provisions to **Keanakolu** where he stops over night; Bormann in **Hopuwai**; Kramer returned from his vacation; Kumezu carries Telephone Instruments over to **Hopuwai**, other Japanese proceed stretching wire and go over to **Hopuwai** where they stop over night; Matsu makes wool bags.

Weather dry during day, but slight rain during night; Trade. [page 194]

Thursday, June 9th 1892.

Returned to **Kalaieha**; Ah Ano returned with mail from Waimea, then helps with Bormann to pick out 150 wethers for Honolulu; *all Japanese kill thistles out*; Matsu makes wool bags.

*The first conversation on Telephone from **Hopuwai** to Kalaieha at 12 o'clock.*

Weather afternoon at 5 o'clock rain, light; Trade wind. [page 195]

Monday, June 20th 1892.

Ah Ano shoots a cow for beef; Charles [Hall] helps to put 2 young team horses on a rope; Bormann herds wethers; *5 Japanese on road to Waimea; 3 Japanese work with Schlemmer kills out thistles*; Matsu house and garden work; Japanese garden work.

Weather extremely dry all day; Trade. [page 198]

Monday, June 27th 1892.

Schlemmer with 9 men weeded out thistles; Bormann and Kumezu pack over tent and poles from **Laumaia camp**; *Iwahei, Kumahei and Hatsubare help to lay out boundary between **Humuula** and **Piihonua***; Charles breaks in horses; Matsu prepares grass for mattresses; Ah Ano fixes fences and shepherds; Ah Si left for Waimea.

Weather fog and mist all day; Trade. [page 200]

Wednesday, June 29th 1892.

Schlemmer with 10 Japanese weeds thistles; Yamauchi and Matsushigi home; *Iwahei and Taniguchi help to lay out line between **Kaohe** and **Humuula***; Ah Ano leaves with mail for Waimea and horse sold to Pakenia for Koki; Charles leaves with team for Kawaihae; Bormann takes mule January with hides back from **Laumaia**; Matsu grass for mattresses.

Weather fog, rain and mist almost all day, for only a few hours, clear; Trade wind. [page 201]

Thursday, June 30th 1892.

*Schlemmer with 8 Japanese weeds thistles yet; Taniguchi and Iwahei help to lay out boundary between **Piihonua** and **Humuula***; Punikio, Nagami, Nakatani and Matsushigi stop home; Ah Ano returns with mail from Waimea; Bormann fixes fence and stone wall; Matsu mattresses.

Weather rain during previous night, fog and mist almost all day; Trade wind. [page 201]

Monday, July 4th 1892.

Ah Ano herds wethers; Charles breaks horses for team; Bormann packs hides from **Laumaia** and **Hopuwai**; Matsu and Hazu wash and weed garden; *Taniguchi, Iwahei, Hatsubare, Kumahei, Toraguchi, Eizuchi and Tasaka start on stone wall between **Piihonua** and **Humuula***; Masaki, Kosina, Komezu, Punikio, Nagami, Nakatani, Kanikubo, Matsutaki and Matsushigi start on fence between **Humuula** and **Piihonua** at **Kaelewai**; Schlemmer Luna.

Weather very fine all day; Trade wind. [page 202-203]

Wednesday, July 6th 1892.

Bormann with 7 mules over to bring tent and provisions to 2 Japanese camps and **Kaelewai** and half way up to **Puu Oo**, afterwards bundles hides; Charles breaks horses

for team; Ah Ano herds wethers; Nakatani and Yamauchi sick; Matsu and Hazu house and garden work; *15 Japanese on fence Piihonua*; Schlemmer, Luna.

Weather fine all day; Trade wind. [page 203]

Thursday, July 7th 1892.

Bormann herds wethers; Ah Ano shoots a cow for beef, saw 6 wild dogs above Puu Horse pen outside the wall in the clinkers; Matsu and Hatsu wash and mend clothes; Nakatani, Yamauchi and Matsushigi stop home, *all other Japanese work on Piihonua fence and wall*; Charles leaves with team for Waimea; 2 Japanese arrive on foot from Waimea.

Weather hot and dry all day; fog and slight mist in the evening; Trade wind. [page 204]

Saturday, July 9th 1892.

Ah Ano leaves with mail for Waimea; Bormann herds wethers; Matsu home; Schlemmer Luna; *7 Japanese (station men) work on Horse wall all day*; other gang stops work at noon being too wet.

Hopuwai and Laumaia report that 4 Japanese, 4 Natives, 2 Natives and 2 Japanese women past for Halealoha, stop over night in cave below Laumaia horse pen.

Weather fog, rain and mist all day; Trade. [page 204]

Sunday, July 10th 1892.

Bormann herds wethers; Ah Ano returns with mail from Waimea; *Charles returns with load for professor Alexander*; Johann Wulbers over from *Keanakolu* to take provisions back, sent Schlemmer to *Puu Oo* lower gate to watch men coming from *Laumaia* going to *Halealoha*, did not see them; hired Japanese Tokohara for \$15.00 to work on fence.

Weather slight fog and mist all day; Trade. [page 205]

Monday, July 11th 1892.

Ah Ano herds wethers; Bormann packs water to Japanese Camp; Charles leaves with team for Waimea; Nakatani sundry jobs and helps to sort wethers for Honolulu; *7 Japanese work on stone wall at Kaelewai*; *9 on Piihonua fence proper*. Matsu and Hatsu house and garden work; Schlemmer, Luna.

Weather fog, mist and rain all day; Trade wind. [page 205]

Tuesday, July 12th 1892.

Bormann, Ah Ano and Nakatani left with 154 sheep for Honolulu, no trouble as far as *Waiki*; *7 Japanese working on stone wall, stop home having sore hands*; *9 men work on Piihonua fence*; Matsu and Hazu house and garden work; Schlemmer Luna; *met Preston and Wall at Waiki coming from Waimea and proceeding to Kalaieha.*

Weather fair all day. [page 205]

Wednesday, July 13th 1892.

Masaki and Yamauchi stop home; all other hands, 7 on fence & on wall, work; Charles returns with team from Waimea alright; *Professor Alexander with Chamberlain and cook came up*; Matsu and Hatsu some house and garden work.

Weather fair all day, fog and mist at dark; Trade wind. [page 206]

Friday, July 15th 1892.

5 Japanese on fence **Piihonua** boundary stop home; 5 work on same; 7 men on stone wall; Matsu and Hatsu plant peas, corn and beans; then weed the garden; Muir in from **Keanakolu**; Charles breaks colts; late surveyor Baldwin with 1 Native boy and pack train arrived from Hilo.

Weather fine all day; Trade wind; clear all night. [page 206]

Saturday, July 16th 1892.

Discharged Charles Hall who left; Bormann, Ah Ano and Nakatani returned from Kawaihae, delivered 150 sheep to steamer; *Charles Wells and Kauwe with pack mules for Surveyor Alexander arrived from Laumaia*; Matsu stops home, Hazu house and garden work; 6 Japanese work on Stone wall others on road along fence through bush at **Piihonua**; all stop work at noon on account of bad weather.

Weather fog and rain till 2 o'clock, when clearing off; Trade wind. [page 207]

Sunday, July 17th 1892.

Parties into **Aina Hou** hunting geese and pigs; Kauwe found **Waihu** and put a flag up there.

Weather fair all day; Trade.

Ah Ano out for beef, but none got. [page 207]

Tuesday, July 19th 1892.

Ah Ano out for beef again, returned with 2 calves from Pohakuloa; Bormann helps to fix wagon, then makes harness ready, feeds the team horses and sundry other jobs; Hatsu and Matsu house and garden work; Matsushigi and Tokuhara stop home, all other hands work on fence and stone wall at **Piihonua** boundary; Surveyor's party started out for **Mauna Kea**, but returned as one mule ran away and could not be found in the fog, found in the afternoon.

Weather fog till 10 o'clock, then clear but fog again afternoon, clear and bright during night; Trade wind.

J. Wulbers in from **Keanakolu** with letters; returned to **Hopuwai**. [page 208]

Wednesday, July 20th 1892.

Ah Ano leaves with mail for Waimea; Charles Wells leaves with team for Kawaihae; Bormann fixes fences sheep Padd II; *Professor Alexander, Preston, Wall and Chamberlain with Baldwin and cook, guide and Pitt leave for the summit of Mauna Kea, 11 pack mules; 10540 [feet] above alright*; Matsushigi and Nakatani home, all other men set posts, make road and build stone wall; Hazu and Matsu garden work.

Weather fine all day, 5 o'clock fog; Trade.

Natives returned at 8 o'clock with mules and horses. [page 208]

Friday, July 22nd 1892.

Ah Ano shepherd; Bormann and Pitt take paint over to **Puu Oo house** and start to paint it; Matsu and Hatsu garden and house work; 8 Japanese on stone wall; 10 on fence; at about 3 o'clock Baldwin and Chamberlain returned from the top of **Mauna Kea**, being sick;

*Kauwe and Lancaster with 3 mules up to **Mauna Kea** to pack fire wood, Lancaster and 2 mules returned, Kauwe stops over, Nakamura in from **Halealoha** to buy provisions.*

Weather fair all day; Trade. [page 209]

Saturday, July 23rd 1892.

*Ah Ano shepherd; Bormann and Pitt paint house on **Puu Oo**; 8 Japanese on stone wall, 10 on fence on **Piihonua** boundary; Charles Wells returned with team alright from Kawaihae, complaining very much about the road from **Auwaiakeakua** to **Waimea**; Kauwe returned from **Mauna Kea**; Hatsu and Matsu house and garden work.*

Weather some slight rain and fog early morning, afternoon clear and bright; Trade wind. [page 209-210]

Tuesday, July 26th 1892.

*Bormann packs provisions over to **Laumaia** and takes potatoes from **Hopuwai**; Pitt paints the small house at **Puu Oo**; Matsu and Matsushigi sick; Yamauchi home; Hatsu house work; Ah Ano shepherd and packs water to Japanese Camp; 7 Japanese on fence and 8 Japanese on stone wall **Piihonua** boundary; Rickard, McKinley and natives stop over at **Puakala**; Survey party Alexander and Preston returned alright from top of **Mauna Kea**; one man Mr. Moore, who left on foot at ½ past 8 not yet in.*

Weather warm and dry all day; Trade wind.

Moore arrived on foot at 9 o'clock. [page 210-211]

Thursday, July 18th 1892.

*Returned to **Hopuwai** where stopped over night; **Kalaieha** Mr. Preston, Baldwin and Wall leave for Hilo; Moore via **Keanakolu** for Mana; Native Kauwe with horses and mules for Waimea; Ah Ano shoots cattle for beef; 9 Japanese on **Piihonua** fence and 8 Japanese on stone wall progressing very slowly as on Paahoehoe. Hatsu washes. [page 211]*

Monday, August 1st 1892.

*Ah Ano packs water to Japanese camp on **Piihonua** and **Waiakea** Boundary; afternoon shepherd; Charles Wells leaves with team for Waimea to take surveyors outfit down; Alexander, Chamberlain and Louis Koch leave for **Waimea**; Fitzsimmons leaves for **Hopuwai**; Waltjen in from **Laumaia** to settle up; Bormann and Isaac Pitt over to **Laumaia**, the latter to take charge of that place; 8 Japanese on Stone wall on **Waiakea** boundary, 8 Japanese on fence on **Piihonua** boundary; Matsu pillows, finished; Hatsu house and garden.*

Weather dry and cold all day; towards evening fog; Trade wind. [page 212-213]

The Humu'ula Sheep Station Company operations, including the Kalaieha headquarters and out-stations, continued much as described above, until around 1898.

Leasehold Interests and Ranching on the Government Lands of Ka'ohē and Pi'ihonua

On September 9, 1891, the Humuula Sheep Station Company secured a formal lease (Lease No. 451) on the tract known as Ka'ohē IV, and covering Pōhakuloa, the summit of Mauna Kea, and the Ka'ohē lands extending to the summit of Mauna Loa. The notes of survey for the new lease described the Ka'ohē tract, and also included authorization for the company to transfer the lease to Hackfeld & Company, dated September 30, 1895:

GOVERNMENT LEASE NO. 451

Dated September 9, 1891

C.N. Spencer, Minister of the Interior;

to Humuula Sheep Station Co., Aug. Haneberg, President; E. Luhr, Secretary & Treasurer.

...All that piece or parcel of land known as Tract No. 4, **Kaohe**, Hamakua, Hawaii and more particularly described as follows:

Beginning at the Trig. Station on the hill known as "**Kole-A**" on the side of **Maunakea**, above **Puu Oo** and running as follows:

N 80° 3' W true 13798 feet along **Humuula** to **Lepe a Moa Hill**.

S 40° 0' W true 19876 feet along **Humuula** to **Omaokoili Hill**.

S 15° 14' W true 78286 feet along **Humuula** to North **Pohaku Hanalei** on **Maunaloa**.

S 44° 50' W true 21075 feet along Kapapala to the point in **Mokuaweoweo Crater**, which is 20° 23' W true 5316 feet from the summit Trig. Station W Maunaloa.

N 30° 26' W true 86135 feet along Keauhou 2nd of Kona to **Naohuleelua** a point on the flow of 1859 that is S 57° 45' W true 64606 ft. from **Ahumoa** Trig. Station.

N 42° 30' E true 46800 feet along Puuanahulu to the South corner of Waikoloa at the foot of "**Puu ka Pele**."

N 68° 30' E true 60200 feet along Tract No. 3 to the old Trig. Station on the N.E. point of the summit of **Peak Maunakea**.

S 62° 10' E true 24200 feet along Tract No. 5 to the hill **Kaupakuhale**.

S 13° 10' W true 17200 feet along **Humuula** to the initial point, and containing an—
Area of 137,200 Acres.

This lease is granted upon the condition that the Government may at any time during the term of this lease enter upon, take possession, and dispose of all or any portion of the same for Homestead purposes, the Government allowing in such case, a corresponding reduction on the rents.

Term: 15 years from Sept. 9, 1891.

Rent: \$310. per annum. [State Land Division Lease File]

Honolulu September 30, 1895.

Office of the Commissioners of Public Lands.

Permission is hereby given to the **Humuula** Sheep Station Co. to assign the within lease No. 451 to Messrs. H. Hackfeld & Co. it being expressly conditioned that no other or further assignment of the same shall be made without the written consent of the Commissioners of Public Lands (or their successors in office) being first obtained for such purposes and subject to the terms and conditions of said lease.

For the Commissioners

J. F. Brown

Commissioner and Agent of Public Lands. [State Land Division Lease File]

In 1891, Samuel Parker also secured a lease on the Ka'ohē III tract (Lease No. 436), which bounded lands held in fee by the Parker Ranch. The parcel included the Hānaipoe out-station, sections of the Māna-Laumai'a trail, and also ran to the summit of Mauna Kea, adjoining the Ka'ohē IV tract (described in Lease No. 451). The notes of survey, recorded in C.S.F. No. 423, recorded the following metes and bounds:

September 24, 1891

C.S.F. 423

Description of Tract No. 3 Kaohe, Hamakua, Hawaii.

Leased to His Ex. Samuel Parker.

Beginning at the South East corner of the land **Kalopa**, and running as follows:

1. N 79° 30' W true 3800 ft. along **Kalopa** to Summit of hill **Moano**;
2. N 80° 30' W true 6500 ft. along the same;
3. S 80° 00' W true 2500 ft. to the corner of **Kalopa** and **Paauhau** to a pile of stones, above **Koailiili gulch**;
4. S 88° 10' W true 5027 ft. along Paauhau to a pile of stones on the N W side of **Kaluamakani**;
5. S 43° 34' W true 16170 ft. along Paauhau to **Kemole hill**;
6. S 54° 10' W true 27900 ft. along Paauhau to **Puu Laau**;
7. N 70° 00' W true 9700 ft. along Paauhau to a point near **Aiakala** on **Auwaiakekua**;
8. S 35° 30' W true 8500 ft., along **Waikoloa** to **Keonehehee**;
9. S 20° 30' E true 22200 ft. along Waikoloa passing **Puu Kekee**, to the South corner of Waikoloa on the Southeast side of **Puu Ka Pele**;
10. N 68° 30' E true 60200 ft. along Lot 4 **Kaohe**, to the summit Peak of **Maunakea**, to the old Trig Station on the NE point of it.
11. N 17° 30' E true 22600 ft. along Lot 5 **Kaohe**, to the peak **Kole**;
12. N 9° 00' E true 8700 ft. along the same down the mountain side to the initial point and containing an area of 38700 Acres. [Hawaii State Survey Division]

This lease is granted upon the condition that the Government may at any time during the term of this lease, enter upon, take possession, and dispose of all, or any portion of the same for homestead purposes, the Government, allowing in such case, a corresponding reduction on the rents...

Consent is hereby given to a mortgage of the foregoing Lease to Charles A. Bishop trustee and to Mr. G. Irwin and S.M. Damon Trustees...Chas T. Gulick, Minister of the Interior. [Hawaii State Survey Division Files]

Lease No. 452 for the forest lands of Ka'ohē V was also issued to J.M. Horner and J.F. Hackfeld (Kukaiau Plantation Company) on September 9, 1891. The Ka'ohē V tract, covered the lands from the "1877 Mountain Road" at Papa Gulch to Hanaipoe iki Gulch at Kalopā (the road being the *makai* boundary), to the "summit hill of Maunakea," and recorded the following metes and bounds:

GOVERNMENT LEASE No. 452

September 9, 1891

**C.N. Spencer, Minister of the Interior;
to the Kukaiau Plantation Co. Limited**

...all that piece or parcel of land known as Tract No. 5, **Kaohe**, Hamakua, Hawaii, and more particularly described as follows:

Beginning at the point where the *Mountain road of 1877 crosses the Papa Gulch*
and running as follows,

S 45° 0' W true 5500 feet along **Koholalele**, the gulch being the boundary;

Due South true 11600 feet along **Koholalele** to **Puu Kea**;
 N 74° 10' E true 15800 feet along the head of the land of **Koholalele** to a *water hole on the mauka side of Puu o Kihe*;
 S 41° 00' E true 5200 feet along the head of the land **Kukaiau** to its south corner, just *mauka* of **Iolehaehae**;
 S 73° 10' E true 5400 feet along Government tract to a place called **Waikulukulu** at the west base of the hill **Puu Kalepa**;
 S 34° 30' W true 9000 feet along **Humuula** to the double Hill **Holei Kanakaleonui**;
 S 18° 40' W true 26000 feet along **Humuula** to the hill **Kaupakuhale**;
 N 62° 10' W true 24200 feet along Govt. Tract No. 4 to the old Trig Station on the N.E. point of the *summit hill of Maunakea*;
 N 17° 30' E. true 22600 feet along Tract No. 3 to the hill **Kole** on the north face of **Maunakea**;
 N 9° 0' E true 8700 feet along Tract No. 3 to the South angle of **Kalopa**;
 N 13° 40' W true 14400 feet along **Kalopa**, the boundary being the **Hanaipoe Iki** gulch, to the *Mountain road*.
 S 89° 00' E true 13500 feet along — said mountain road being the boundary, to "**Hope A**,"
 S 60° 00' E true 7400 feet along the same road being the boundary to initial point, and containing an Area of 24250 Acres.

This lease is granted upon the condition that the Government may at any time during the term of this lease enter upon, take possession, and dispose of all or any portion of the same for Homestead purposes, the Government allowing in such case a corresponding reduction on the rents... [Hawaii State Land Division Lease File]

As the leases in Ka'ohē were being granted in 1891, J.T. Baker also applied to the Commissioners of Crown Lands for an extension of his lease on Pi'ihonua. The minutes of the Commission reported:

September 14th, 1891

Present: Saml. Parker, J. Mott Smith, C.P. Iaukea:

...A communication from J.T. Baker was read, proposing to surrender the lease of Waiakolea & Kaimu, Puna, in consideration of an extension of his present lease of **Pi'ihonua** for fourteen years at an increased rental of \$300. per annum from now. After some discussion it was agreed to defer formal action until the Minister of Interior had been consulted with regarding certain water rights and privileges upon the land of **Pi'ihonua**... [HSA – Series 367 Minutes 1888-1895:38-39]

Subsequently on September 29th, 1891, the Commissioners, granted Baker's request, adding another fourteen years to the lease, to begin on March 21st, 1907:

September 29, 1891

Memorandum of Agreement

Between J. Mott-Smith, Samuel Parker, and C.P. Iaukea; and John T. Baker

(Extension of terms of Lease No. 103):

Memorandum of Agreement entered into this 29th day of September A.D. 1891 between the Commissioners of Crown Lands and the within named John T. Baker. Whereby it is agreed that the within lease shall be and is extended for the term of Fourteen years from March 21st 1907. The said John T. Baker, his executors and assigns paying an annual rent for the residue of the within term and extension thereof at the rate of Three Hundred Dollars instead of One Hundred and Fifty, as reserved by the said lease. And it is further agreed and understood that in consideration of the extension hereby granted, the said John T. Baker for himself, and his heirs and assigns, releases and quitclaims, all his right, title, interest and claims in and to the water and springs of fresh water upon the land herein described... [Lease No. 103 – State Land Division]

On January 24th, 1894, Hackfeld and Company applied, on behalf of the Humuula Sheep Station Company, to the Commissioners of Crown lands for a 30 year extension on the lease of Humu'ula. In the application, the applicant described its' desire to build a substantial road between Kalai'eha and the coast at Hāmākua, noting that the extension on the lease would help make such an undertaking feasible. Minutes of the Commission provide details on the application and the subsequent denial of the extension:

March 21, 1894

Present: J.A. King, W.O. Smith, C.P. Iaukea

A communication from H. Hackfeld & Co. was read requesting that the present Lease of the Crown Land of **Humuula** to the **Humuula** Sheep Station Co., which has 14 years to run, be extended for the term of 30 years from now, upon same terms, so as to enable the Company to *construct a substantial road from Kalaieha, the station on Humuula, to Ookala or Paauilo, on the Hamakua Coast*. Thereby affording better facilities for the shipping of wool, sheep &c.

The communication further stated that the construction of a good and substantial road would involve considerable expense, besides being a permanent improvement to the land.

After some discussion on the general policy of the Board in dealing with questions of renewal or extensions of Leases, the following action, or motion of the Attorney General was agreed to viz:

That as the Commissioners at present viewed the matter, it would be contrary to the policy hereto for adopted to grant an extension while there is so long a term unexpired, but the Commissioners are willing to meet the Representative of the **Humuula** S.S. Co., to hear any further statements they have to make... [HSA – Series 367 Minutes 1888-1895:76-77]

April 4th, 1894

**Present: Mr. J.A. King, Mr. W.O. Smith, C.P. Iaukea, Land Agent;
and Mr. H. F. Glade was also present by invitation.**

The Agent stated that in accordance with the action taken by the Commissioners at their last meeting in the matter of the application of the **Humuula** S.S. Co. for an extension of its lease of **Humuula**, he had communicated to Mrrs. H. Hackfeld & Co., agents, the decision of the Commissioners. Mr. Glade representing the Company, was now present to make further statements on behalf of Mr. Haneberg the Co's. Manager.

Mr. Glade states that it had been found necessary in carrying on the Company's affairs to *build a road from the Station at Kalaieha to the Hamakua coast which would mean a large outlay*. This the Co. could not do unless an extension of the present lease was obtained. The proposed road it is claimed would open up a large section of country for agricultural purposes and would greatly enhance the value of the surrounding lands, of which a large portion belonged to the Gov't.

If the renewal asked for was not granted the Company would not be able to carry out the proposed improvements. He therefore urged that the Commissioners take the matter into consideration and hoped that a favorable decision be reached.

After some few general remarks as to the advantages which would result by the opening of the proposed road, Mr. Glade retired.

It was then resolved that final action be deferred until the Commission was in possession of more definite information as to the general character of the surrounding lands and whether the opening of such a proposed road would benefit the public generally. The

Agent was instructed to communicate with the Survey Department for the required information...

...It was also further agreed, in the matter of the **Humuula** S.S. Co's. application for extension of the lease of **Humuula**, that from all the information received relative to the subject, the Commissioners see no good reason to change their opinion as expressed at a meeting of the Board held Jany. 24th last which in effect was unfavorable to the application... [HSA – Series 367 Minutes 1888-1895:78-80]

The thirty year extension on the lease of Humu'ula to Hackfeld and Company was not granted.

Being faced by difficulties in operation and logistics, the Humu'ula partners were granted permission to transfer their lease of the Ka'ohē IV parcel, including the Pōhakuloa tract, to H. Hackfeld & Company on September 30th, 1895 (Lease No. 451). On November 11th, 1895, The Humu'ula Sheep Station Company, formally mortgaged its' business interests, including the Humu'ula and Ka'ohē leases, and operational resources to H. Hackfeld and Company. The conveyance described the resources of the operation, and various lands associated with it:

November 11, 1895

Chattel Mortgage

**Humuula Sheep Station Co. (Aug. Haneberg and J.F. Hackfeld);
to H. Hackfeld & Co.**

(Indenture of lands, livestock and resources to H. Hackfeld & Co.):

This Indenture made this 11th day of November A.D. 1895 by and between the **Humuula** Sheep Station Company, a corporation organized and existing under the laws of the Hawaiian Islands of the first part and Paul Isenberg and J.F. Hackfeld of Honolulu, partners in business at said Honolulu on the Island of Oahu, under the name of H. Hackfeld & Co., of the second part. Witnesseth: Whereas the corporation is indebted to the parties of the second part in the sum of Nineteen Thousand Eight Hundred forty four 67/100 Dollars or there abouts which indebtedness bears interest at seven percent (75) per annum, payable annually, and whereas the party of the first part have requested the parties of the second part to defer demanding payment of said amount and to make further advances to carry on said Company's sheep Ranch which advances including the present debt may amount to twenty Thousand Dollars (\$20,000.) the making of any further advances and the extent of the same to remain however solely in the discretion of the parties of the second part. Now therefore this Indenture Witnesseth: That the party in consideration aforesaid and of One Dollar to it paid by said parties of the second part, the receipt whereof is acknowledged, does hereby assign, transfer and set over unto the said parties of the second part, their executors, administrators and assigns the following indentures of lease, viz:

- 1) *Lease of the Commissioners of Crown Lands to James W. Gay dated March 6, 1876 of record in Liber 45 on pages 258 to 261 and the extension thereof granted July 30, 1883 of record in Liber 45 on page 259, said lease being assigned to said party of the first part by indenture dated October 31, 1883 of records in Liber 86 pages 79 & 80.*
- 2) *Lease of the Hawaiian Government No. 451, dated 9th September 1892 [1891] to the Humuula Sheep Station Co., of land known as Tract No. 4, **Kaohe, Hamakua, Hawaii. Area 137200 Acres.***

To have and to hold the said leases and the lands and premises thereby demised with all improvements and buildings thereon and all tenements, hereditaments and privileges thereto belonging but subject to the terms and conditions in said leases expressed for the

unexpired term of said lease or any extension thereof. And in consideration aforesaid the party of the first part does further sell, convey, bargain and set over to said parties of the second part all of its stock running on said leasehold lands, viz: *Twenty Thousand sheep more or less; Three Hundred Eighteen (318) tame Horses branded [_____ diagrams]; Two Hundred (200) semi wild Horses in Aina Hou, partly branded as above; Eighteen (18) Wagon Saddle and Pack Mules branded as above; all clips of wool; fourteen wooden tanks; Wagons; Harnesses; To have and to hold the same with the increase thereof to said parties of the second part...* [BoC Liber 157:284-286]

A note on the same conveyance records that the Haneberg brothers and partners were able to repay the loan on October 26th 1897 (BoC Liber 157:285), thus retaining their interest in the Humuula Sheep Station Company for a few more years.

As noted in the Haneberg journal and other records above, a dispute arose regarding the boundary between the lands of Humu'ula and Pi'ihonua. Indeed, the Pu'u 'Ö'ō out-station of the Humu'ula Sheep Station Company had been built on Pi'ihonua, land which had been leased to John T. Baker in 1887. The official boundary between Humu'ula and Pi'ihonua was finally settled by the Boundary Commission on October 3, 1891. On January 16th, 1896, and after several years of litigation, the Humuula Sheep Station Company and John T. Baker came to an agreement regarding the boundaries and compensation for improvements on the land of Pi'ihonua:

February 25th 1898

***Humuula Sheep Station Company (Aug. Haneberg and J.F. Hackfeld);
to John T. Baker***

***(Agreement on the Boundary and use of lands
along the Humu'ula-Pi'ihonua Boundary):***

This Indenture made this 25th day of February A.D. 1898 by and between the ***Humuula*** Sheep Station Company...party of the first part, and J.T. Baker residing in Hilo, in the Island of Hawaii said Hawaiian Islands, party of the second part, Witnesseth: Whereas the party of the first part, owns a sheep run and ranch on the slopes of Maunaloa, including leaseholds above the District of Hilo, and Whereas the party of the second part, owns a leasehold below the sheep run of the party of the first part, but adjacent thereto used as a cattle ranch, said cattle ranch including the *Ahupuaa* of ***Pi'ihonua***, extending from the town of Hilo up to the property aforesaid, of the party of the first part, and Whereas, the party of the first part, heretofore at its own expense erected a fence on a line which was supposed to be on the true boundary line between the properties aforesaid of the parties of the first and second parts, and has demanded contribution of the party of the second part towards the expenses of said boundary fence and towards the completion thereof; and Whereas, the party of the second part has declined to make such contribution assigning among other reasons for his refusal, that the fence was not upon the true boundary line, but took in portions of the leasehold owned by the party of the second part as aforesaid; and Whereas, heretofore the party of the second part brought an action of trespass in the Circuit Court of the Third Judicial Circuit, Republic of Hawaii, to recover damages of the party of the first part for trespass of its sheep and animals upon the lands aforesaid of the party of the second part which suit terminated in favor of the party of the second part, who was awarded \$3,000.00 damages in said suit; and Whereas upon the termination of said suit as aforesaid, the parties hereto agreed to adjust all their differences hereinabove set forth, and did so adjust the same, upon the 16th day of January, 1896, by executing an agreement, a copy of which is hereto attached, marked "Agreement" and made a part hereof; said agreement consisting of a proposition by the party of the first part to the party of the second part, and acceptance thereof, with certain modifications and additions by the party of the second part and a stipulation adjusting both propositions attached hereto. Now therefore, the parties of the first and second parts

hereby mutually agree to all and singular the terms, conditions and stipulations of said agreement therein mutually accepted by them and do hereby covenant and agree to observe and perform the same, it being understood that all strips of lands enclosed within the properties of either of the parties hereto by the fence already built and by the fence to be built pursuant to said agreement, which are in fact the property of the party shut out from possession thereof by said fence, shall never the less be considered as leased to the party within whose enclosure such strips shall be found, without rent for and during the balance of the terms of the lease of **Piihonua** now held by the party of the second part...

Exhibit A. The **Humuula** Sheep Station Company will build at their expense a six foot wire fence, three and a half feet high from **Waikēe Gulch** turning mauka to a straight line between **Puu Oo and Lae**, laid out by Baldwin, and on this line to Lae, and along the boundary line between **Paukaa** and **Piihonua** down into the woods for such a distance as to prevent sheep and horses running on **Paukaa** to enter **Piihonua** within nine months after date of this agreement; Baker to haul posts wherever they are off the line more than 100 yards, posts to be cut on both lands, **Humuula** and **Piihonua** wherever they can be had best without charge to the **Humuula** Sheep Station Company. The **Humuula** Sheep Station Company agrees to keep the whole fence and stone wall between **Humuula** and **Piihonua** in good repair, with the right to cut and use posts on both lands as stated before for said purpose, but fence and stone wall remain their property after expiration of Baker's lease of **Piihonua**. We close up the road through **Aina Hou** opened up by Baker, but he shall be permitted to work a new road at least 1500 feet below the lowest point of **Aina Hou** from Waiakea to **Piihonua**. Baker shall have the free use of the piece of **Humuula** excluded by our stone wall and situate between the boundary line from **Kahiliku**, as shown by Lidgates survey of **Piihonua**, to **Kaelewai** or **Kaelewa**, a hill in the lava; thence to the stone wall and along the same to the aa flow of 1855; thence along the edge of said to **Kahiliku**, the point of commencement. The line the so called boundary fence between **Piihonua** and **Humuula** is built on or will be built on shall be accepted as the boundary line between the two lands for the purposes of the parties. Baker shall be permitted to drive cattle over **Humuula** from **Piihonua** to Hamakua via Kaala by giving us timely notice thereof and taking such roads, or trails as will be pointed out to him by us in reasonable localities. During the time the boundary fence between **Humuula** and **Piihonua** not being finished, Baker shall not ask for trespass, damages or pasturage for such stock belonging to the **Humuula** Sheep Station Company as may pasture on his unfenced or uninclosed lands of **Piihonua**. The **Humuula** Sheep Station Company agrees to pay the fees of Baker's attorneys and will withdraw their pending suit against Baker for damages done to **Aina Hou**.

Exhibit B. We consent to Mr. Haneberg's proposition with these amendments and additions. The fencing is to be such as the Commissioners have prescribed. Time to finish fencing nine months. The line of fencing is agreed to except that it should turn mauka at least 25 fathoms on the Kau side of the Waikēe gulch. Mr. Baker declined to bind himself to haul posts though he intends to help in so doing as far as he reasonably can. The fencing and stone wall to go to **Humuula** so far as Baker's rights therein are concerned at end of lease or end of renewal or new lease if he obtains same, Baker claims the privilege of taking cattle and stock across to and from Hamakua and agrees to give timely notice of his intention so to do, and he further agrees to keep the cattle etc., and drivers off the made road except at the gates but submits that the further provisions about following the trails to be pointed out by the agents of **Humuula** is unnecessary and should be left out. He further claims the right for all persons coming and going between Hamakua and **Piihonua** to use said way, the above provision to be without prejudice to his assertion of the right that said way is an ancient and public way if he chooses so to do. A gate is to be built at **Lae**. This agreement and the payment of \$500. and costs of Court by **Humuula** to

operate as full payment, satisfaction and discharge of all claims, demands, and causes of actions whether pending or not by either party up to date... [BoC Liber 112:109-112]

In September 1899, John T. Baker, sold his interest in the *mauka* lands of Pi'ihonua, including the Pu'u 'Ō'ō Ranch station to W.H. Shipman, thus bringing Shipman into the history of the Pu'u 'Ō'ō Ranch operation, which was maintained until the 1970s. The conveyance included the metes and bounds of the land and listed the heads of cattle, horses and livestock, buildings, improvements, and described the brands of the ranch:

September 26th, 1899

John T. Baker; to W.H. Shipman

(Conveyance of Pi'ihonua – Puu Oo Ranch lands):

This Indenture of lease and Bill of Sale made this 26th day of September A.D. 1899 by and between John T. Baker of Hilo, Island of Hawaii, Hawaiian Islands, party of the first part, hereinafter called the "Lessor" and William H. Shipman of said Hilo, party of the second part hereinafter called the lessee. Witnesseth: That in consideration of the sum of Thirty two thousand dollars (\$32,000) to the lessor in hand paid by the lessee, the receipt whereof is hereby acknowledged, the lessor doth hereby demise and lease unto the lessee all of that certain piece or parcel of land situate in the said District of Hilo, being a part of the *Ahupuaa* of **Pi'ihonua**, described and bounded as follows:

Beginning at the extreme south angle of this land the said point of beginning being at a large mound of stones a little West of the trail crossing the flow of 1855 to **Halealoha**, the place being commonly known as **Mawae**, the boundary runs as described in Certificate 153.

1. N. 82° 32' W. mag. 15620 feet to mound of stones on **Kahiliku Hill**.
2. N. 56° 00' W. mag. 3215 feet to mound of stones on small hill.
3. N. 4° 38' W. mag. 13720 feet to large *Koa* tree on the slope of **Puu Oo** hill 1650 feet from the pile of stones on the summit.
4. N. 38° 20' E. mag. 24220 feet along edge of woods to *pile of stones at place called Lae*.
5. N. 35° 00' E. mag. 1650 feet to a little hollow, the branch of the **Honolii stream** this being the N.W. angle of the land of Pi'ihonua, thence down said hollow and into the Honolii Stream, the south bank of which is the boundary, the direct bearing and distance being;
6. N 80° 50' E. mag. 18020 feet to the N.E. angle of this leased piece.
7. South mag. 37650 feet to the S.E. angle of this piece.
8. S. 78° 15' W. mag. 15000 feet to the point of beginning.

To have and to hold the said demised premises, together with all the rights, easements, privileges and appurtenances thereunto, subject always to a certain contract entered into between John T. Baker and the **Humuula** Ranch fixing boundaries at *mauka* end of **Pi'ihonua**, reference to which is hereby made; or to any part thereof, appertaining unto the said lessee, his executors, administrators and assigns for and during the entire rest and residue of the term of that certain Crown Land Lease of said *Ahupuaa* of **Pi'ihonua** to said John T. Baker dated March 21, 1887, and recorded in the Registry of Deed in Honolulu in Book 106 on pages 126 to 129, and of the full term of the extension of said lease for Fourteen (14) years from March 21, 1907. And for the consideration aforesaid, the lessor doth hereby give, sell and deliver to the lessee 1000 head of cattle, more or less, branded [____ diagram]. And also, all unbranded cattle upon, about or belonging to the said leased

premises. And also about 200 head of horses and mules, more or less, branded [____ diagram], and also all horses mules and cattle branded with Spencer's brands, except those reserved in contract, branded [____ diagram]. And also, the said brand [____ diagram] and the right to use it. And also all buildings, fences, tools, improvements, fixtures and appurtenances upon, about or connected with the said demised premises. It being hereby understood and agreed that the payment aforesaid is the full purchase price for all of said enumerated property... [BoC Liber 205:294-297]

Shortly after the tenant of Pi'ihonua changed from Baker to Shipman, changes were also being considered for the Humu'ula and Ka'ohe Sheep Stations. In 1899, the Hawaiian Gazette, announced that the Haneberg-Hackfeld interests had entered into an agreement to sell the leases and resources of the Humu'ula Sheep Station Company to Samuel Parker, thus bringing to an end, their role in the sheep stations' operation. Though predating the recorded conveyance, the Hawaiian Gazette reported:

November 3, 1899

Meat for Hawaii

Heavy Beef and Mutton Hui for the Big Island.

A Ranch Changes Hands. Col. Sam Parker the Head of the New Company-Supply for Future.

One of the largest land deals ever chronicled in the records of the islands will be consummated on the return of the Hon. Col. Sam'l. Parker from the mainland.

For some time past Col. Parker has held an option of purchase over **the Humuula and Kaohe sheep stations** on the Island of Hawaii, comprising an acreage of 237,000 acres and immediately adjoining his present ranch of about 300,000 acres and was only prevented from completing the purchase before his departure through a difficulty in obtaining a complete inventory of the stock carried.

The lease of this great property which expires in 1908 is held by August Hanneberg, manager of Olowalu plantation, his brother Armin of Honolulu and Manager Gramberg, who together hold the whole of the 1000 shares of the **Humuula** Sheep Station which is capitalized at \$100,000.

With the real estate there is sold about *30,000 head of sheep, 7000 lambs, 600 horses* and also two shares in the Metropolitan Meat Company.

The purchase price is said to be \$70,000. It is understood that H. Waterhouse & Co. were the brokers who brought about the transfer, but upon enquiry there, beyond admitting that Col. Parker held an option they declined to give any information.

The **Humuula** Sheep Station is the ranch from which heavy drawings of mutton are made for the local market and the object of the new ranch company of which Col. Parker is the reputed head is to place a check on the present heavy draughts from that island and conserve the present stock to supply the rapidly increasing demand in Hawaii.

This action will of course benefit the local supply.

Graziers, land owners and business men generally of the big Island have for a long time been considering or expecting precisely the step that has been taken by Col. Parker. The population of Hawaii is increasing very rapidly and with the extension of established cane fields and the establishment of new plantations the pasturage area is contracting. At the same time the call from this place for live stock from Hawaii has become stronger and

stronger from month to month. The agitation on Hawaii for “protection” of the meat supply of the big Island has resulted in the formation or the proposal to form a concern that will be a factor of the caliber of the Metropolitan Meat Company of this city, upon the same lines, but probably a “closer” corporation.

No less a personage than United States Senator Clark is a member of the new company. [Hawaiian Gazette; November 3, 1899]

As final details of the conveyance from Haneberg to Parker were being worked out, the Hawaiian Gazette, again covered the transaction, reporting:

May 4, 1900

Sam Parker Gets Humuula Ranch

**Sale to be Made Today for Seventy-Five Thousand Dollars
and Meat Company Stock:**

Today the *Humuula* sheep ranch will be transferred by August and Armin Hanneberg to Col. Sam Parker. The consideration is understood to be \$75,000 and several shares of the stock of the Metropolitan Meat Company.

The ranch proper contains about 250,000 acres of choice pasture lands. It is on Hawaii and the land immediately surrounding it, some 500,000 acres, is owned by the purchaser of the *Humuula* ranch. With the ranch goes over 20,000 sheep and about 600 head of horses.

The *Humuula* ranch property is all leased land, the lease on which still has eight years to run. In case of failure to secure a renewal of the lease the cattle and other livestock will be driven onto the land now owned by Col. Parker.

R.W. Shingle, who arranged the sale was asked regarding the details. He confirmed the report that the sale was about to be consummated but until it was, he felt that he could not make public the details.

It is reported that this sale is the beginning of a new meat company which will be operated on a very large scale in catering to the increasing demand for meat. [Hawaiian Gazette, May 4, 1900]

On May 8th, 1900, Samuel Parker loaned \$20,000.00 to the Humuula Sheep Station Company, Haneberg and partners, using the station as collateral (BoC Liber 204:342-344). In 1901, August Haneberg conveyed the Humuula Sheep Station Company to Parker in the following conveyance:

May 21st, 1901

August Haneberg; to Samuel Parker

(Conveyance of the Humuula Sheep Station Company):

...In consideration of the sum of Twenty Thousand Dollars (\$20,000) to me paid by the said Samuel Parker, the receipt of which is hereby acknowledged, the same being paid on account and in part payment of the sum of Forty seven thousand seven hundred dollars (\$47,700) secured by the said mortgage, do hereby remise, release and reassign unto the said Samuel Parker — that certain mortgage and the note and debt secured thereby from James Frank Woods, of Kahua, Kohala, Island of Hawaii, in favor of the said Samuel Parker, in the sum of Thirty two thousand dollars which mortgage is dated August 23rd, 1899 and recorded in the Registry Office, Oahu in liber 196 pages 244-247, together with all rights of remainder or reversion and equity of redemption of the mortgagor in said mortgage note and debt. To have and to hold unto the said Samuel Parker, his executors, administrators and assigns, absolutely, subject only to the prior assignment of the same

by way of mortgage to Alfred W. Carter, trustee, to secure a loan of twelve thousand dollars which assignment is dated March 10th, 1900, and recorded in the Registry Office, Oahu, in liber 207 on pages 113-115, provided however that nothing herein contained shall prejudice or affect my security for the balance of the said Sum of Forty seven thousand seven hundred dollars under the assignment of May 8th, 1900, of shares of the **Humuula** Sheep Station, a corporation, made by the said Samuel Parker to me or on shares of the Metropolitan Meat Company Limited, as additional security for the payment of the said sum... [BoC Liber 220:275-276]

Samuel Parkers' Humuula Sheep Station was described in a detailed article published in the December 1902 edition of the *Paradise of the Pacific*. The author, "Blacksheep," reported on the background of the station, the layout of the paddocks, and also described the shearing process:

Sheep Raising in the Hawaiian Islands

The **Humuula** Sheep Station largest of its kind in the Hawaiian Islands and is one of the vast estates owned by the Honorable Samuel Parker and ably managed by his son, Samuel Parker, Jr. **Humuula** is situated between the mountains of **Mauna Kea** and Mauna Loa at the average elevation of 6000 feet, and is the highest point of habitation on the Island of Hawaii as well as the coldest, for, during the winter months, when the higher paddocks are covered with snow, the thermometer has been known to show twenty-eight degrees. The station was started by the late James Gay, but most of the laying out of the paddocks and fences was done by Mr. A. Haneberg, who had acquired it, and from whom the present owner bought it. The station is composed of 250,000 acres and is divided into five sub-stations with the head station at **Kaleieha**, about thirty-eight miles distant from Waimea, and are all connected with a private telephone, the one extreme station from the other being about thirty-five miles.

The stock of sheep varies in number from twenty to thirty thousand head and is chiefly composed of the Merino breed, which not only seems to thrive better than any other in this climate but produces the best wool. Although the average weight of the sheep in these Islands is much lower than that on the mainland or in other countries, sheep raising, if properly attended to, is a very profitable investment, although one must have a large tract of land to raise them on, allowing at the most three sheep to the acre. Mutton brings ten cents a pound and the sheep when shorn average five pounds of wool, for which fifteen cents a pound is paid. The **Humuula** horse and mules, of which there are a good number, are noted for their size, speed and endurance, and in any market realize the highest prices for Hawaiian-bred stock. The greatest pest and enemy of the sheep are the wild dogs, which are very numerous in the mountains of Hawaii and are eradicated only by the laying of poison by the boundary riders along the fences and by shooting them when seen, which, however is very seldom, as they generally hide or sleep during the day time and do their mischief at night.

The shearing season is always the busiest time of the year on the station and generally begins in June. Japanese from all over the island come to work during that period, either as shearers or roustabouts, and the best of the former average about one hundred head a day during the season, which compares very favorably with that in other countries. The sheep having been driven over night into the pens in the large wool-shed at **Kaleieha**, where the shearing generally takes place, the head overseer rings the bell at 6 o'clock in the morning and shearing commences. As each sheep is shorn, an overseer, one on each side of the shed, puts distinguishing marks with red ochre on the ewes, wethers and rams, at the same time looking at the teeth to see the age, and as this is done, calls it out to the tally man, who enters it in his books. A roustabout then picks up the fleece and carried it to a long table where two men are constantly at work rolling the fleeces up ready for the wool-press. Two men are at work pressing the fleeces in the press with their feet, and

when a bale is pressed and the bag sewn it is weighted, numbered and addressed, and is ready for market, and generally averages about 275 pounds.

One of the chief things the overseers must watch is to see that the shearers are not racing with each other, for this is a very common occurrence amongst them and a way they make a little more money on the side. When they do this, their work is careless and, besides not getting off as much wool as they should, they cut the sheep with their shears. The only way of stopping them, when caught, is to warn them the first time and lay them off permanently the second. After the day's work is over, each shearer is credited with the number of sheep he has shorn and the sheep are driven from the small pens around the wool-shed into the larger ones awaiting the time of dipping, which commences when the season is about half over. The dip generally used, into which each and every sheep is put for two minutes, is a mixture of sulphur and lime, which destroys all vermin, scab or disease that a sheep is subject to, and also promotes the growth of the wool. It is after the shearing and dipping is over that the sheep are classified and parted generally, the wethers for market going to the fattening paddocks and ewes, lambs and rams being put in paddocks reserved for them.

The officers of the company are Hon. Samuel Parker, President; Samuel Parker, Jr., Vice President; G.J. Waller, treasurer; and Carl A. Widemann, Secretary. Mr. Fred Wundernberg is the Honolulu agent. ["Blacksheep" in Paradise of the Pacific, 1902 Vol. 15 No. 11:28]

Needing money, in 1903 and 1906, Samuel Parker, Sr., was granted the right to make modifications in the lease agreement for Ka'ōhe III (Lease No. 436), by which he was able to transfer the lease to Annie T.K. Smart for Parker Ranch (Hawaii State Land Division Lease File). The conditions allowed:

November 6, 1903

THIS AGREEMENT, made this 6th day of November, A.D. 1903, by and between the COMMISSIONER OF PUBLIC LANDS for and on behalf of the GOVERNMENT of the TERRITORY OF HAWAII, party of the first part, and SAMUEL PARKER, of Honolulu, Island of Oahu, party of the second part,

WITNESSETH:

That whereas, on September 9, 1891, C.N. Spencer, Minister of the Interior, for and on behalf of the Hawaiian Government, by Government Lease No. 436, leased to the party of the second part, certain land at **Kaōhe**, Hamakua, Island of Hawaii, and

Whereas, it satisfactorily appears from the Memoranda in the office of the Superintendent of Public Works, relating to the leasing of said land as aforesaid, and otherwise, that the term of said lease was then agreed on by both parties to said lease to be fifteen years from said September 9, 1891, and

Whereas, the lease of said land was advertised for the term of fifteen years, and

Whereas, at the sale of said lease of said land it was knocked down for said term of fifteen years, and

Whereas, it appears from said memoranda and from newspapers published at said time and from the statements of persons conversant with said transaction that the term of said lease was to be fifteen years; and

Whereas, through inadvertence and mistake of both parties to said lease, it appears that said lease as executed provided for a term of ten years from said September 9, 1891, instead of fifteen years from said date, as had been theretofore agreed upon and was the intention of both parties;

NOW, THEREFORE, THIS AGREEMENT WITNESSETH: That in consideration of the foregoing and in order to fully effectuate and carry out the intention of both parties to said lease and in further consideration of the covenant herein contained by and on the part of the party of the second part, the party of the first part for himself and his successors in office, hereby covenants and agrees to and with the party of the second part, his heirs, executors, administrators and assigns, that said Government Lease No. 436 in all its terms, provisions, conditions and covenants, shall and is hereby extended for the term of five years so that the term thereof shall be fifteen years from said September 9, 1891.

And the party of the second part, for himself and his heirs, executors, administrators and assigns, covenants and agrees to and with the party of the first part and his successors in office, that he will remove or cause to be removed from the land described in said Lease during the first year from date at least one thousand (1000) head of cattle, and during the second year from date at least one thousand (1000) head of cattle, and during the third year from date at least Seven Hundred (700) head of cattle.

IN WITNESS WHEREOF, The parties to these presents have hereunto and to another instrument of like date and even tenor set their hands and seals the day and year first above written... [Hawaii State Land Division Lease File]

October 3, 1906

KNOW ALL MEN BY THESE PRESENTS that I, JAMES W. PRATT, Commissioner of Public Lands of the Territory of Hawaii, do hereby give permission to Samuel Parker, of Honolulu, County of Oahu, Territory of Hawaii, to transfer and assign to Annie T.K. Parker of San Francisco, State of California, all of his right, title and interest in and to general lease number 436 of the land of ***Kaohe*** 3 dated September 9, 1891, subject to the covenants and conditions thereof.

PROVIDED, HOWEVER, that no other or further assignment of the foregoing lease shall be made without the written consent of the Commissioner of Public Lands being first obtained.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal this 3rd day of October, A.D. 1906.

Jas W. Pratt

Commissioner of Public Lands. [Hawaii State Land Division Lease File]

Honolulu, H.T., December 1, 1906

Alfred W. Carter; to James W. Pratt, Land Commissioner

...Upon re-leasing a portion of ***Kaohe*** III, I will undertake to construct one half of the fence, joining with the successful bidder of said land, from ***Puulaau*** to ***Kemole***, along the boundary between the land of Paauhau and ***Kemole***.

This undertaking on my part to be done upon the completion of the balance of the fencing as per conditions of lease now being advertised... [Parker Ranch-PPS, ***Humuula*** File]

Samuel Parker, Sr., and associates held the leases on the Humu'ula and Ka'ohē IV parcels for about fourteen years. In that time, the original lease to James Gay, which had been extended for an

additional seven years, ended on April 1, 1908. The Humuula Sheep Station Company, under the management of Samuel Parker and Theo. H. Davies, secured a new lease on December 30th, 1907. The lease (No. 608), covered some 53,000 acres—removing those lands which were being incorporated into the Hilo and Mauna Kea Forest Reserve lands—had terms of twenty-one years from January 1, 1909, running until December 31st, 1929. General Lease No. 608 provides readers with the metes and bounds of the revised Humu'ula parcel, and included a map of the area described (*Figure 32*):

November 27, A.D. 1907

***NOTICE OF SALE OF GENERAL LEASE OF
PASTORAL LAND OF HUMUULA, HAWAII.***

At 12 o'clock noon, Monday, December 30, 1907, at the front entrance of the Judiciary Building, Honolulu, there will be sold at public auction under Provisions of Part 5, Land Act 1895, (Sections 278 to 285 inclusive, Revised Laws of Hawaii) a General Lease of the following described land:

All that portion of ***Humuula*** lying between the upper boundary of the Hilo Forest Reserve and the southern boundary of the ***Kipuka Aina Hou***, and containing an area of 53,180 acres a little more or less.

Term of lease, twenty-one years from January 1, 1909.

Upset rental, \$3,500.00 per annum, payable semi-annually in advance.

In addition to the regular provisions of a General Lease this lease will carry Special Conditions reserving to the Government the right to resume possession at any time of such portion or portions of the premises as may be required for settlement purposes of for public use. Also reserving to the Government for public purposes all trails, roads and right-of-way crossing said lands. Also requiring that the boundaries of the lands shall be fenced with a lawful fence within one year from the date of the occupation of the land under the lease and that said fence shall be maintained in good repair during the life of the lease. The locations of said fence to be on the public land of ***Humuula*** at or reasonably near the boundary of said land...

Jas. W. Pratt
Commissioner of Public Lands

December 30, 1907

General Lease No. 608

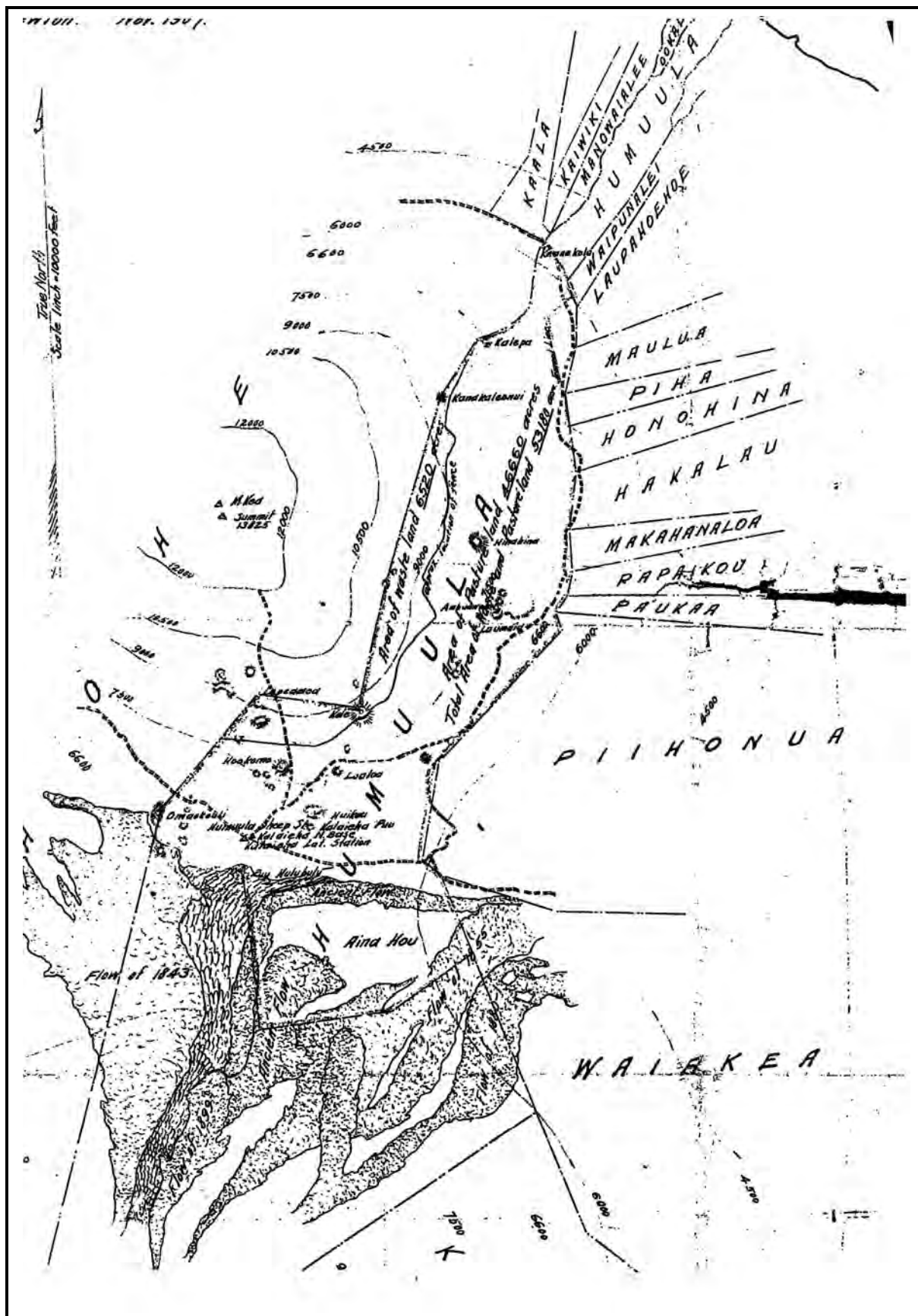
Commission of Public Lands;

to Humuula Sheep Station—

T. Clive Davies, President; E.H. Wodehouse, Treasurer:

...All of that portion of ***Humuula***, Hilo, Hawaii, and more particularly described as follows:

Beginning at Government Survey Trig. Station "***Kole*** South" (marked by ____ on set stone *ahu*) on hill of that same name on the South side of ***Mauna Kea*** and on the boundary of ***Humuula*** and ***Kaohe*** the true azimuth and distance to "***Aahuwela***" Trig. Station being 234° 44' 30" 22851.8 feet and to "***Puu Oo***" Trig. Station being 307° 04' 13" 11113.9 feet, as shown on Government Survey Registered Maps Nos. 1718 and 1809, and running by true azimuths:



- 1 – 193° 10' 17260 feet along **Kaohe** to **Kaupakuhale Hill**;
- 2 – 199° 42' 20" 26368.0 feet along Kaohe to **Holei**;
- 3 – 214° 30' 9000 feet along Kaohe to **Waikulukulu** a point in **Kaula Gulch**;
- 4 – Thence following along the center of Kaula Gulch to a [____ diagram] cut in the rock ledge near the middle of said gulch at *the old Keanakolu-Waimea trail crossing*, the said gulch at this point being on the Hilo-Hamakua Boundary, the direct azimuth and distance being 214° 34' 16000.0 feet;
- 5 – 322° 57' 45" 4374.) feet across the land of **Humuula** to the Northwest corner of **Waipunalei** at a point on the middle of three *koa* trees marked H, X and W respectively, the true azimuth and distance to "**Lahohinu Puu**" Trig. Station being 102° 00' 1241.0 feet and the coordinated referred to "**Kalepa**" trig Station being 9613.4 feet North and 10936.0 feet East;
- 6 – 343° 03' 03" 4502.0 feet along the *mauka* line of **Waipunalei** to a mound of stones by a *koa* tree marked "**Poloka**" at West brink or edge of a pool of water called **Kulanahakoi** [Kulanihakoi];
- 7 – 49° 55' 4638.0 feet along the North line of **Laupahoehoe** to Northwest corner of same at the crossing of *the Hopuwai-Keanakolu trail over the "Keahua-ai" or "Douglass Pits" Gully*;
- 8 – 352° 02' 12" 4125.0 feet along the *mauka* line of **Laupahoehoe** to the Northwest corner of **Maulua Nui** at *koa* tree surrounded by a mound of stones a little East of the **Hopuwai-Keanakolu trail** and at the bend of the same into **Kaiaiki Gully**;
- 9 – 349° 23' 6208.0 feet along the *mauka* line of Maulua Nui to the Northwest corner of **Piha** at a point on the **Hopuwai-Keanakolu Trail** where it leaves the brush and enters on open flat covered with black sand, in the middle of which has been erected a large mound of stones called "**Kahuwai**", the coordinates of said point referred to "**Kalepa**" Trig. Station being 7867.3 feet South and 10415.5 feet East;
- 10 – 353° 28' 4069 feet along **Piha** to the **Nauhi Gulch** (same as **Umauma Gulch**);
- 11 – 354° 20' 6250.0 feet along **Honohina**, passing *mauka* of **Hopuwai**, to a rock marked H.H. [____ diagram] and *ahu* on a commanding elevation above the lower trail, half a mile South of **Hopuwai**, the coordinated referred to "**Kaloaloe**" Trig. Station being 6900.0 feet North and 600.0 feet East;
- 12 – 8° 15' 8080.0 feet along Hakalau Nui to a plat rock marked M [____ diagram] about 70 feet South from gulch and South of "**Kaloaloe**" trig. Station as per Boundary Certificate No. 130;
- 13 – 359° 10' 5450.0 feet along Mahanaloa [**Makahanaloe**] to the summit of a small conical hill the most Southern of a range overlooking the country below, the coordinates of said point referred to "**Aahuwela**" Trig. Station being 4550.0 feet North and 10250.0 feet East;
- 14 – 15° 00' 3700.0 feet along **Papaikou** to a fall on **Nukupahu Gulch**, near an old site called Simmons' hut;
- 15 – 40° 12' 2617.0 feet along **Paukaa**;
- 16 – 343° 00' 2600.0 feet along **Piihonua** to place called "**Lae**" marked by [____ diagram] on stone and *ahu* with four ridges of stone radiating from center at right angles (being Lydgates old *ahu*), the true azimuth and distance to "**Aahuwela**" Trig. Station being 112° 45' 33" 9069.8 feet;

- 17 – 44° 26' 23765.0 feet along **Piihonua** to the side of Lydgate' [____ diagram] on Koa tree, the coordinates referred to "**Puu Oo**" Trig. Station being 584.6 feet South and 1517.3 feet East;
- 18 – 11° 11' 13553.0 feet along **Piihonua** to a place called "**Kaelewai**" marked by a [____ diagram] on rock in Lydgate's old *ahu*, the true azimuth and distance to "**Puu Oo**" Trig. Station being 184° 34' 20" 13923.3 feet and to "**Kalaieha**" *Puu* Trig. Station being 108° 53' 55" 15000.4 feet;
- 19 – 313° 01' 3174.5 feet along **Piihonua** to **Kahiliku Hill**;
- 20 – 339° 25' 11200.0 feet along **Waiakea** to a point on the *Pahoehoe* flow of 1855;
- 21 – 55° 30' 12980.0 feet along **Humuula** remainder to a point on the Aa flow of 1855;
- 22 – 83° 05' 17970.0 feet along **Humuula** Remainder to a point on the Aa flow;
- 23 – 175° 55' 20950.0 feet along **Humuula** Remainder to top of **Puu Huluhulu**;
- 24 – Thence along the edge of the Aa Flow to a point at edge of same on the **Humuula-Kaohe Boundary**, the true azimuth and distance being 118° 15' 12675.0 feet;
- 25 – 195° 12' 18" 3110.0 feet along **Kaohe** to "**Omaokoili**" Trig. Station (marked by [____ diagram] on solid imbedded bomb);
- 26 – 219° 58' 42" 19875.8 feet along **Kaohe** to "**Lepeamoa**" Trig. Station (marked by a [____ diagram] on set stone) and *ahu*;
- 27 – 279° 56' 58" 13798.5 feet along Kaohe to the point of beginning.

Pasture Land 46660 Acres
 Waste Land 6520 Acres
 TOTAL AREA 53180 ACRES, more or less.

Special Conditions...

- (2) *The lessor also reserves for public use all rights of way for present roads or trails across said land.*
- (3) The Lessees to construct at their own cost and expense, within one year from the date of acquiring possession of the land under this lease, a lawful fence as defined by section 407, Revised Laws of Hawaii, along its entire boundaries, the location of said fence to be on the public land of **Humuula** at or reasonably near the boundary of said land, and to keep and maintain said fence in good repair during the term of the lease... [Lease No. 608 – State Land Division]

***Ranching the Mountain Lands in the early 1900s,
 and Transfer of Humu'ula to the Management of Parker Ranch***

A.W. Carter, trustee and manager of the Parker Ranch, and Samuel Parker, Sr., had shared disagreements over management of the ranch and trust. Indeed, Samuel Parker, had bid against A.W. Carter for leasehold interests in the Humu'ula and Ka'ohe holdings. By 1902, Samuel Parker, his cousin Eben Low, and backers set in motion plans to take over the ranch and remove A.W. Carter from the role as trustee. Their first action was to contest Carter's trusteeship of Annie Thelma K. Parker. Parker and party also bid, unsuccessfully, on the Waikōloa lands, including the Ke'āmoku Sheep Station from heirs of the Davis Estate, and attempted to demonstrate that expenditure of Parker Ranch funds by Carter on the development of water lines to the dry Waikōloa lands and northern slopes of Mauna Kea was a waste.

Things got so heated between Samuel Parker and A.W. Carter, that a takeover was attempted, and on June 7th, 1904, Eben Low, J.A. Magoon, and J. Lightfoot stormed Carter's office, with Low apparently brandishing his pistols (A.W. Carter, Parker Ranch Files, 1904). Things were heated, but no shots were fired. Subsequently, John "Keoni Poko" Lindsey (father of interviewee Elizabeth Lindsey-Kimura) slept in Carter's office, armed, in case of an attack. Also in 1904, litigation over the right of trusteeship was entered into between Parker and Carter. The case was decided on November 3, 1905 in favor of A.W. Carter as trustee; and the case regarding partition of assets was decided in September 1906, thus bringing an end to more than five years of disagreements and litigation (Parker Ranch-PPS Files, 1904-1906).

In 1904, as a part of the litigation, A.W. Carter took testimonies from cowboys regarding the range of activities undertaken on the ranch, including the rounding up of cattle on the Mauna Kea and the mountain lands. Among his notes were found the following references to the taking of mountain cattle from Mauna Kea:

Mountain Cattle: As Described by Cowboys of 1904

The cattle go up into the wild places and the more you chase them the further in they go, and never come out. Tame cattle join the wild and they become wild too.

The ***Mauna Kea summit*** is quite a distance from the forest lands. The wild cattle go up there beyond the forest into the sand and rocks. They stay there until dark, then come down to feed and go up again in the morning.

It is precipitous and it is almost impossible for the men to head the cattle down after they get started up. One man cannot head one bullock down. He will have to rope him if he gets him at all. It requires the very best of horses. There is an accident almost every time the men go up there.

When there is snow on the mountain the cattle come down to lower land and then it is easier to drive them.

An experienced man knows the right times to get the wild mountain cattle. If he goes at the wrong time he will get only a few – fifteen or twenty.

Sound: noise – on the mountain reaches a long way, sometimes down as far as ***Kemole Hills***. This way, by yelling, wild cattle are driven into certain locations – concentrated in one place. Then if the proper men are there to make the road, they can handle those cattle while they are in bunches and force them into the traps. It can be done in an hour sometimes, if the fog is not so thick it obstructs the view. With twenty or thirty of the right men you can pack your pen full. But it depends on the conditions.

When the men are lassoing wild cattle on the mountains they will always take a bull in preference to a cow. More wild steers are brought down than cows.

The cattle that hang around ***Kekuahanai pen*** we call tame, even though some of them are wild. The really wild cattle are up on the mountain – ***Makahilinu***. The Hawaiians call only the really high places the mountain.

When we got wild cattle down from the mountain, one or two hundred of them, the proper thing to do would be to put these cattle into a pen and have them kept there nights. Then during the day have them put out somewhere where they could be watched. Some good places about a quarter of a mile from the pen.

It would require ten men or more to drive these cattle to the chosen place. Then three men would be able to watch, and ten again to drive them in at night.

In this way they would be tamed and used to being driven. Taming would take two or three weeks... [Parker Ranch-PPS, Cattle File]

January 18th, 1904

The **Puuloa** Sheep and Stock Ranch [purchased by G.W. McFarlane from the Spencers in 1896] was purchased by Parker Ranch on January 18, 1904. Frank Johnson, manager of the Ke'āmoku section of the **Puuloa** Sheep and Stock Ranch, reported on February 18th 1904, that a total of 6,175 sheep were held at the Ke'āmoku Station [Parker Ranch-PPS, **Humuula** File].

Following settlement of the lawsuit between Parker and Carter in 1906, the two once again entered into a cautious working relationship. By 1914, Parkers' efforts in business at Humu'ula were floundering, and in that year A.W. Carter, on behalf of the Parker Ranch, sought out a means of purchasing the Humuula Sheep Station Company for Parker Ranch. In the months leading up to the sale in 1915, A.W. Carter researched and documented the conditions, and extent of the Humu'ula holdings. From his records, come the following descriptions of the Humuula Sheep Station operation:

April 2nd, 1914

**A.W. Carter; to Elizabeth "Tootsie" Dowsett Parker-Knight
(Regarding Acquisition of Humuula Sheep Station Lands and Livestock):**

...I am in receipt of your letters of March 10th, 20th and 24th.

I have been on Hawaii for three weeks, returned last Saturday. My trip was confined mostly to **Humuula**. Sam Parker, Jr. went up with me and we drove the place and I took possession. Sam did not know who he was selling to when he closed with Williamson. Under my instructions Williamson did not divulge who he was purchasing for. I did this for two reasons: First, that I knew that Davies & Co., were anxious to obtain the place, so was Shingle, for I think, the Baldwins', and had they known that I was in a position to buy and was a candidate, it would have made a difference I think in what they themselves would offer. Money was so terribly tight that I think that Davies & Co., banked on the assurance that they could get it at their own figure. Secondly: I did not know what Sam's attitude would be and thought it was just as well to eliminate any consideration of personalities. He did not come to me, therefore I did not go to him.

I am more than ever pleased with the deal since making a drive of the place. Sam guaranteed 400 head of horses; we counted out 518. He guaranteed 400 head of cattle, and we counted out 475, but in addition to this there are about 50 head of wild cattle in a small paddock. He guaranteed 23,000 head of sheep. We drove all of the sheep but we did not count them. There were quite a large number of young lambs and it would have been bad to have handled them to the extent of counting particularly as they would have to be handled now within a month for shearing. There is very little question that this number will be made good. The sheep are superior, the cattle are very good and while there are a good many scrub horses, there are a good many which are saleable this year and the next to the Army. The sheep are ready to be shorn at the present time, and they will average a dollar a head about for wool to be taken off them inside of the next thirty days. Even assuming the balance of the value was only \$2.00 per head, this would bring the value of the sheep on the place to over \$60,000.00 The 500 and odd head of horses put it at only \$50.00 per head would make \$25,000.00; 500 head of cattle put in at \$40.00 per head would add \$20,000.00. There you have \$105,000. in livestock at very conservative figures. *In addition to this, the place is well equipped with wagons, harnesses, wool sheds, shearing machines, houses, water tanks, and about \$20,000.00 worth of fencing, so you can see why I consider the purchase a good one.*

There is a good deal about the purchase of **Humuula** of which I have not told you, a great deal which Sam told me which led me to believe that he did probably the only thing, although as I told him that if he had come to me I should have advised against parting with the place, but with more full information I imagine that he did the right thing so far as his own interest is concerned, of course, provided that he can hold on to his money. Ernie Wodehouse was the first one that spoke to me about **Humuula** being for sale and started to tell me that they would probably purchase it. I interrupted him and told him that if Sam Parker came to me about it, I should advise him that he was a fool to sell, but if I were convinced that he was going to sell anyway, that I should endeavor to obtain the property for the Parker Ranch. He then suggested that a *hui* consisting of myself and himself, Henry Holmes and Robert Hind, be made up to purchase the property. He said that we would only have to put up \$5,000.00 apiece. I told him that I could not do this feeling as I did that the Parker Ranch should own the property. He said that he did not see the reason why, but I told him there was no use discussing it as I was convinced by very good reasons. This proposition I resented more and more as I thought of it. Now while Wodehouse was informed of my desire to acquire the place, I do not believe that he dreamt for a moment that I would be able to raise the funds, taking into consideration the condition of the money market, but I think I wrote you I had the time of my life in finally getting it.

Please treat the foregoing as confidential. Sam Parker offered it first to Davies & Co. for \$110,000.00 Wodehouse told him nothing doing, that the place was not worth over \$85,000.00 and to go out and see others and come back and perhaps they could do business. He then offered it to Shingle for \$110,000.00. Shingle wanted to give him a guarantee that sometime in the future he would give him \$110,000.00, but Sam told him that his guarantee was no good, but to go and get the Bank of Hawaii's guarantee and he would do business. Shingle then thought that Sam was bluffing about another man being in the field and Sam was told in Shingle's office that he was the biggest bluffer in town. He walked right over to Williamson's office, Williamson asked him if he was ready to do business and he said yes. Williamson then asked him what his price was, he said \$110,000.00 and Williamson handed him a check for \$75,000. and he signed an agreement of sale and the whole thing was closed up inside of five minutes.

Sam has been very decent with me and he has played square and above board, and I appreciate it." [Parker Ranch-PPS, Humuula File]

May 21st, 1915

A.W. Carter; to O. Sorenson:

I have given instructions to have the sheep pen built at Nohonaohae. I would like to have this completed before our next shipment of sheep, therefore it had better be pushed to completion. Let Sam Parker supervise this job and give him as many men as he can use. It will be all right to take men from Manuel Vierra's gang or put all Manuel Vierra's gang onto the job. Let it take precedence over the tree planting of Pookanaka and the pipe laying on the mountain. I should like to have all of these jobs completed by the first of July or as soon thereafter as possible.

*I want the floor of the small pen on the intake side of the dipping vat at **Humuula** cemented. If you wish to you can also cement the floor of the draining pen, but it will have to be arranged differently from the present arrangement. It should be as it is at Keamoku. The water drain into a cement container and from there drain into the vat so that the sediment will be collected in the bottom of the small cement container. If you decide to do this it is not necessary to make this pen as large as the present one at **Humuula**. Sam Parker can superintend this job but you had better go out with him to Keamoku to look at the arrangement out there. Have him tackle this job as soon as he finishes the sheep pen at Nohonaohae. [Parker Ranch-PPS, Humuula File]*

July 23rd, 1915

A.W. Carter; to J.D. Tucker, Commissioner of Public Lands.

*I hereby make application for a fifteen year lease of the land of **Kaohe 4** and offer as an upset rental the sum of Five Hundred Dollars per annum.*

This land has been used by the **Humuula** Sheep Station to run horses and mules on. Water is piped down to it and stored in a tank at a place called **Pohakuloa**. Since I have come in possession of the sheep station I have not run over One Hundred head of stock on this property but on inquiry of the former owner he informs me that they have run as many as Two Hundred and Fifty head at times. Much of this property is worthless being covered with lava flows and a portion of it being inaccessible. The land used for pasturage is on either side of the road running to Kaleieha and consists of sandy soil and is very dry. [Parker Ranch-PPS, Humuula File]

July 29th, 1915

J.D. Tucker; to A.W. Carter:

...I have for acknowledgment your application of July 23rd, for a fifteen year lease of the land of **Kaohe 4**, at an upset rental of \$500.00 annum.

I will recommend the same to the Land Board at its next meeting... [Parker Ranch-PPS, Humuula File]

The formal conveyance of the Humu'ula Sheep Station Company and associated properties and resources was recorded in November 1915. The sale was recorded in the following conveyance:

November 9th, 1915

O.L. Sorenson, Trustee of Humuula Sheep Station Company;

to A.W. Carter, Trustee of the Estate of Annie T. K. Parker

(Conveying all property and resources of the Humuula Sheep Station Company):

This Indenture, made this 9th day of November, A.D. 1915, by and between **Humuula** Sheep Station Company, an Hawaiian corporation, by O. L. Sorenson, Trustee for its stockholders and creditors, party of the first part, and Alfred W. Carter, Trustee under that certain deed of trust made by Annie T.K. Parker, dated April 25, 1912 and recorded in the Hawaiian Registry of Conveyances in Volume 365, page 273, party of the second part;

Witnesseth: Whereas, on May 8, 1915, the **Humuula** Sheep Station Company, an Hawaiian corporation, duly filed in the office of the Treasurer of the Territory of Hawaii, its petition to dissolve and disincorporated according to law; and

Whereas, notice of said petition was duly advertised according to law; and

Whereas, on August 4, 1915, said **Humuula** Sheep Station Company was legally declared to be dissolved by C.J. McCarthy, Treasurer of the Territory of Hawaii...and O.L. Sorenson was duly appointed Trustee for the Creditors and stockholders of said **Humuula** Sheep Station Company, with full power to settle the affairs of said corporation...
...Whereas the party of the second part was on May 8, 1915 and now is the sole and only stockholder of said **Humuula** Sheep Station Company...;

Now Therefore this indenture Witnesseth: That the party of the first part, in consideration of the premises and of One Dollar (\$1.00) to it paid by the party of the second part, the receipt whereof is hereby acknowledged, does hereby give, grant, bargain, sell, convey, assign, transfer and deliver unto the party of the second part, his heirs, successors in trust and assigns, all of the property, real personal or mixed, cattle bulls, horses, stallions, mules, sheep, wool, carriages and wagons, buildings and tanks, leases, lands, brands of

any and all kinds, and all other property whatsoever formerly belonging to or held by said **Humuula** Sheep Station Company... [BoC Liber 435:249-250]

The year 1929 was an important one in the terms of leases on Humu'ula and Ka'ohe. It was also of importance at Pi'ihonua, as it was the year in which W.H. Shipman, Limited, purchased the 40 acre parcel that made up the Puu Oo Ranch headquarters. On February 3, 1929, Governor Farrington, issued Land Patent Grant No. 8970 to Shipman. The grant included the following conditions:

Land Patent Grant No. 8970

...Containing an area of 40 00/100 Acres.

Together with right-of-way to the Patentee, its successors and assigns, over the Government lands of Humuula and Pi'ihonua, Island of Hawaii, *subject always to the existing rights of others, for reasonable and ready access to present Government Roads for animal and vehicular traffic.*

The land herein described is granted subject to the condition that the Patentee will maintain the spring situated on said premises in good condition, with the purpose in view of the conservation of the water flowing there from, and will maintain in good condition tank or tanks on said premises for the storage of eight thousand (8,000) gallons of water, so long as said spring is a live spring, and

Subject also to the condition that prior to the expiration of the present Government General Lease No. 99s, dated April 6th, 1918, from the Commissioner of Public Lands of the Territory of Hawaii, to W.H. Shipman, and assigned to W.H. Shipman, Limited, the Patentee will erect a good and substantial fence around the said premises herein granted, and thereafter will maintain the same, and that no building or other improvements shall be placed on said granted premises for the purpose of the operation of the leasehold premises covered by said General Lease No. 992, it being the intent of the parties to this exchange as set forth in the deed above referred to that improvements and equipment for the operation of said leasehold premises covered by said General Lease No. 99 shall be placed on said leasehold premises, and

Subject also to the further condition that the Patentee shall be entitled to a prior right to, with first charge upon, all waters flowing from the above mentioned spring, for agricultural, garden, household and domestic purposes, also for the use of livestock as may be upon the granted premises, and the patentee covenants that it will not sell or lease to others the water which is granted to it by these presents. The surplus over the above stated requirements for the said Patentee its successors and assigns, shall be retained for the use of the Territory of Hawaii, its lessees and assigns, shall have a right-of-way for a pipe-line to said storage tanks situate on the granted premises, with right of entry for maintenance of said pipe-line. [BoC Patent Grant No. 8970; Vol. 53:317-320]

Leases on the Humu'ula and Ka'ohe lands were renewed in 1929. Parker Ranch secured Humu'ula and portions of Ka'ohe, A.W. Carter being out-bid for the Pōhakuloa section of Ka'ohe.

March 14, 1929

Pasture Lease

Kaohe III Section B, Hamakua, Hawaii

(C.S.F. 5301):

Being a portion of the Government land of ***Kaohe*** adjoining ***Mauna Kea*** Forest Reserve, and the lands of Paauhau and Waikoloa.

Beginning at a + on the Northeast slope of Puu Laau on set stone at the Northeast corner of this tract, on the Southwest boundary of the ***Mauna Kea*** Forest Reserve, the

coordinates of said point of beginning referred to Government Survey Trig. Station “Puu Laau” being 37.0 feet north and 188.0 feet East from the Government Survey Trig. Station “**Ahumoa**” being 9030.0 feet North and 5872.0 feet East, as shown on Government Survey Registered Map No. 2786, and running... [13 courses] ...AREA 12,131 ACRES.

Excepting and Reserving there from all existing roads and trails within this tract and such other roads, trails and other rights-of-way that may be required for public purposes.

Compiled from Gov’t. Survey Records and Parker Ranch Map by Geo. F. Wright.

E.W. Hockley
Assistant Government Surveyor. [State Survey Division]

On April 7th, 1929, A.W. Carter bid for and secured General Lease No. 1971, replacing the earlier General Lease No. 608 for the land of Humu’ula. Terms of the lease were for twenty-one years, from January 1st, 1930 to December 31st, 1950; with a one year extension granted from January 1st, 1951. The lease was sold at an annual rental of \$25,100.00, and 49,100 acres, with 9,000 acres of the total being described as “waste land” (Land Division, General Lease No. 1971).

In his notes of April 29th, 1929, describing the new leases of Humu’ula and Ka’ohe, A.W. Carter observed that he:

...was run up tremendously on all of the leases. **Humuula** went from \$8,150.00 to \$25,100.00. It was an outrageous price to pay for this but I am glad that we got it. I would have even gone some higher to obtain it. We can make money on this rental. I doubt, however, if anybody else would have. We have the stock and we need the land.

*The road to **Humuula*** [the Pōhakuloa flats of Ka’ohe], consisting of about 16,000 acres, was bought by a Portuguese at an annual rental of \$8,000.00. This is largely a desert section and runs well up into the rocks on the **Mauna Kea** side. The lease provided for a fence to be built by the successful bidder of sixteen (16) miles, which will cost him, I think, not less than \$1,000. a mile. No one, I think, can make anything out of the place on the price paid for the lease and the conditions of the lease.

*The other section of **Kaohe** between the Waikii gate and the last gate* [the **Ahumoa** section] consisting of about 11,000 or 12,000 acres, I was run up to \$4,000.00, which is an excessive rental but considering the fact that it butts right into our Waikii paddock, it was essential that we get it.

There is considerable good land in this lease and I feel that we can make it pay its way. The other two leases, one back of the homesteads in Waimea Village and the other one on the mountain back of the old dairy, I obtained. We got all our leases with the exception of **Kaohe** section above mentioned, and the rent to the purchaser of this lease is prohibitive.

NOTE: The Land Commissioner went up from Honolulu early in February “to inspect **Humuula** and decide upon the question of a new lease.” [Parker Ranch-PPS, **Humuula** File]

In 1919, Parker Ranch had closed its sheep station at Ke’āmoku—this was in-part the result of an introduced bur infesting the lowlands, making the wool almost impossible to clean. The Ke’āmoku and Waiki’i stations were dedicated to the cattle operation, with Waiki’i also focusing on feed production.

Humu’ula served as the heart of the Parker Ranch sheep operation throughout the period of General Lease No. 1971.

Ranches on the Mountain Lands Described in 1929

In 1929, L.A. Henke, published a "Survey of Livestock in Hawaii," University of Hawaii Research Publication No. 5. The publication included historical descriptions of ranches throughout the Hawaiian Islands. The following narratives describe the primary ranches and their operations on the mountain lands around Mauna Kea up to 1929:

KUKAIAU RANCH

Kukaiau Ranch is located above ***Kukaiau*** Plantation and the headquarters of the ranch are reached by an automobile road leading seven miles *mauka* from the government road.

Kukaiau Plantation was started about 1886 by John M. Homer and ***Kukaiau*** Ranch was started about 1887 by Chas. Notley above the sugar belt. The ranch lands begin *mauka* of the sugar plantation at the 2,300 foot elevation and extend up to 7,600 feet. The ranch headquarters are located at the 3,513 feet elevation.

The area at present consists of about 35,000 acres, about 2,000 of which are lava flows and 1,000 acres are so heavily wooded with blue gum trees that no grass is found between them. In May, 1928, the ranch carried 5,063 cattle, about 500 of which are Holsteins and the balance well bred Herefords. The ranch also had 294 horses, 100 mules and 3 jacks at that time. Forty nine of the horses are heavy brood mares of the Percheron breed, which are largely bred to jacks to produce mules. No sheep and practically no swine are kept at the present time.

The aim is to carry about one animal to seven acres. On this basis the ranch is slightly overstocked at the present time. The forage consists of native and imported grasses. *Paspalum dilatatum* does very well and buffalo grass (*Stenotaphrum americanum*) cocks foot (*Dactylis glomerata*) and mesquite (*Holcus lanatus*) are among the other leading forage grasses found on the ranch. Hilo grass (*Paspalum conjugatum*) is also found to some extent on parts of the ranch. Cultivated crops have been grown to some extent in days gone by but none are being produced at present.

The ranch is divided into about 30 large pastures with a total of about 150 miles of wire fencing, and a few stone fences.

Beef cattle are marketed at about 3 to 3 ½ years of age, at which time they weigh about 1,200 pounds and dress out slightly in excess of 50%. Calves are branded with the number of the year when born. About 1,000 to 1,100 are marketed annually, about 50% being sent to Honolulu, being [page 33] driven to ***Kukaiau*** Station, thence by train to Hilo and steamer to Honolulu. About 30% of those marketed annually are slaughtered locally and 20% are slaughtered in Hilo.

The Holstein male calves are sold as steers and at a given weight are as large as the Herefords but do not dress out quite as well. A few cross-breeds occur and at a given age these in the first generation are larger than either the Herefords or Holsteins. Holstein females are sold as dairy cows, locally and in Honolulu. No dairy products are produced except for local consumption.

The ranch has 52 Hereford bulls, 8 of which are imported and practically all are purebred. They have five purebred Holstein sires, one of which, Matador Segis Walker, originally purchased from a mainland Holstein breeder was later sold back to the same breeder for \$5,000, a price many times greater than the purchase price.

Mules are raised and sold to local sugar plantations. Perhaps the biggest problem is to get enough drinking water for the cattle. The rainfall averaged about 79.5 inches annually

during thirty years at **Umikoa**, the station at the ranch headquarters. However, the rainfall varies greatly from year to year, being as low as 19.3 inches in 1897 and as high as 180.59 inches in 1902. A severe drought was experienced in 1920 and about 1,000 head were lost due to drought at that time.

Roofs are built in the various paddocks for catching the only water that can be secured, and the smallest of these roofs has an area of 10,000 square feet, and supplies about 600 cattle. Tanks are used to store this water, the total tank capacity at present being 2,140,000 gallons. This includes a 640,000-gallon reinforced concrete cistern. Additional water storage facilities are contemplated. Something in excess of 3,000,000 gallons storage capacity is desired.

The climate is cool, 34° F. being the record low temperature on the ranch. About 18 men are required to take care of the livestock on the ranch with additional men needed from time to time for special work. The ranch consists of about 2,000 acres held in fee simple by the owners, 20,000 acres are leased from the government and the balance is leased from other private owners.

Kukaiau Ranch interests were sold by Mr. Notley to J.M. Horner soon after he started same and Robert Horner was the manager for many years till 1912. The herd books of those early days (about 1890 to 1910) show that many Hereford bulls were purchased from Gudgeon and Simpson, noted Hereford breeders of Independence, Mo., and these bulls were rich in the blood of Don Carlos, Beau Brummel, Lamplighter and Anxiety 4th, all outstanding animals in Hereford breed history. Excellent light horses, both standard breeds and thoroughbreds rich in the blood of Hambletonian X were imported and raised in the nineties and thereabouts when horse racing was more popular in Hawaii than it is at the present time. A small Short-horn herd was also maintained in the early days of the ranch. Good butter was made in the nineties but difficulty in marketing same caused this work to be abandoned. Good cattle giving 20-25 quarts of milk were, sold at that time for about \$75 each.

Mr. D.S. Macalister has been manager of the ranch since 1912. T.H. Davies & Co., Ltd., are the Honolulu agents. [page 34]

PARKER RANCH **Historical**

The Parker Ranch is by far the largest of the Hawaiian ranches. The Parker Ranch proper (excluding the Kahuku Ranch owned by the Parker Ranch) has a total area of about 230,000 acres, about 155,000 of which are held in fee simple and the balance is leased, mostly from the government. The beginnings of the Parker Ranch go back one century. Wild cattle were abundant in the Waimea plains (then largely forested) about 1820, these cattle being descendants of those brought in by Vancouver.

The present Parker Ranch is the combination by purchase or lease at various times of smaller ranches which existed in this region, the **Humuula** sheep station consisting of 50,000 acres being acquired as late as 1914. The ranch derives its name from John P. Parker of Newton, Massachusetts, who was the original owner of the ranch (then much smaller than now) about 1830. He had two sons, John and Eben and one daughter, Mary, who married a Mr. Fuller. John P. Parker, Jr., succeeded his father as manager. Samuel Parker, a son of Eben Parker, was manager for a time. Following this Paul Jarrett was manager from about 1887 to 1899, when Alfred W. Carter became manager and has continued to the present time, his son Hartwell now acting as assistant manager... [page 37]

...The lands of the Parker Ranch extend from the sea to the slopes of **Mauna Kea** about 7500 feet elevation. Soil, rainfall, wind and temperature conditions vary widely in the different sections of the ranch. Some areas are not capable of carrying more than one steer to fifty acres while other more favored sections of the ranch may carry one head on about three acres... [page 38]

The Humuula Sheep Station

The sheep ranch headquarters are high up on the slopes of **Mauna Kea**, 32 miles from Kamuela. These lands, having an area of about 50,000 acres, became a part of the Parker Ranch in 1914 and have an elevation ranging between 6600 and 9500 feet. Twelve thousand Merinos are kept, all the rams being purebred.

The wethers average about a seven pound fleece and the ewes five pounds, the total wool production being about 70,000. [page 39]

Dressed two year old wethers weigh about 48 pounds. Present day demand is largely for lamb, but marketing lambs interferes with the wool production program.

This is a region of heavy dews and much fog and the sheep get all their water from the vegetation... [page 40]

PUU OO RANCH

Puu Oo Ranch, largely on the slopes of **Mauna Kea** on a line between Hilo and the top of the mountain, has an area of 23,000 acres, 40 of which are held in fee simple, 13,000 are leased from the government and the balance from private parties. The ranch is located at an elevation ranging between 5,000 and 6,500 feet, and can be reached by an auto trail through Waikii and by horse trail from Hilo. The soil is good except for about 3,000 acres of rocky land between **Mauna Kea** and Mauna Loa. It is mostly an open forest country with *Ohia lehua*, *koa* (*Acacia koa*) and *mamani* (*Sophora chrysophylla*) trees.

This region has an annual rainfall of 92.48 inches based on eighteen years' records and the temperature has been observed to drop as low as 19° F. Water is secured from springs which lead to tanks and this ordinarily is an ample supply for the cattle. It is estimated that an average bullock drinks about 15 gallons per day. **Puu Oo** Ranch has about 75 miles of fence. This ranch carries about 4,000 high grade Herefords, 100 of the Hereford cows being registered animals. Forty-five bulls, all registered, are in service. All of the herd bulls except three from the Parker Ranch are **Puu Oo** raised. A total of about 1200 head are marketed annually from Keaau and **Puu Oo** Ranches, cattle from Keaau, the lower ranch, often being brought to **Puu Oo** for a year or more before marketing them.

Kentucky Blue Grass (*Poa pratensis*) with white clover (*Trifolium repens*) mixed in predominates as a forage grass in this section, and mesquite (*Holcus lanatus*) is considered very good. A wide variety of forage grasses are found, including cocks foot (*Dactylis glomerata*), *Paspalum dilatatum*, carpet grass (*Paspalum compressum*), redtop or Herd's grass (*Agrostis alba*), perennial rye (*Lolium perenne*), sweet vernal grass (*An-* [page 42] *thoxanthum odoratum*), *Phalarus bulbosa*, Beffiluda grass (*Cynodon dactylon*), tall meadow oat grass (*Arrhenatherum elatins*), brome grass (*Bromus unioloides*), *Panicum pruriens*, native sedges, creeping bent grass (*Agrostis alba* var. *maritima*), bird's foot trefoil clover (*Lotus corniculatus*), sheep sorrel (*Rumex acetosella*) and Hop vine clover (*Trifolium agrarium*), etc.

The lease on **Puu Oo** Ranch was purchased in 1899 by W. H. Shipman from John Baker, who started the ranch about 1896. He had built some fences, and about 600 head of mixed cattle, including some Longhorns, were found on the ranch at that time. Hereford bulls have been used on this ranch since 1900 and the cattle are well bred.

The ranch is still owned by W. H. Shipman, Ltd., and managed by W.H. Shipman and his son, H.C. Shipman. [Henke, 1929:43]

By the end of the term of General Lease No. 1971, in 1952, the Territory subdivided the Humu'ula lease into several smaller divisions, and placed them out for bid. These included the Keanakolu Paddocks (General Lease No. 3438); the Hopuwai Paddock (General Lease No. 3439); and the Kole and Laumaia Paddocks (General Lease No. 3440). All of the leases were sold by terms of twenty-one years from December 29, 1952.

Transitions in Leasehold Interests and Land Use on the 'Āina Mauna (1950s-1960s)

By the middle 1950s a number of changes in ranch operations and management were occurring. In 1956, the Ka'ōhe IV (Pōhakuloa) began to be withdrawn from the leases of the Parker Ranch, for military purposes (Governor's Executive Order No. 1719; and Presidential Executive Order No. 1167). The Ke'āmoku and Waiki'i stations were closed, and many of the station buildings moved or demolished. By 1963, the ranch announced that it would be shutting down its sheep operation at Humu'ula, with all grazing activities focusing on cattle. Rally Greenwell, then manager of Parker Ranch, and Richard Smart, heir of the Parker Ranch Estate, announced the closure of the sheep operation at Humu'ula in the ranch newsletter, *Paka Paniolo*, observing:

February 1963

Sheep Raising Business

Over half a century of sheep raising on Parker Ranch will end next year in a program to enlarge the Ranch's cattle operations. Manager Radcliffe Greenwell has announced.

The ***Humuula*** Sheep Station will see a "peeling off" of its sheep population by June, 1964.

Greenwell said there would be no changes in ***Humuula*** personnel. Foreman Peter L'Orange will continue as head of ***Humuula*** operations.

"There are four reasons why Parker Ranch is stepping out of the sheep business," Greenwell said.

By disposing of the sheep and utilizing the 33,185 acres at Humuula solely for cattle raising, Parker Ranch will receive a far greater return on its investment. Our machinery is old. If we continue this operation we must invest thousands of dollars in new machinery. It is becoming more difficult to get men to shear.

Wild dogs and wild pigs kill a great many of our sheep. Predatory dogs will attack anything—ewes or lambs. The wild pigs go after only new born lambs. Of the 4,500 head of sheep at Humuula today, we suffer at least a five per cent loss from wild animals.

Greenwell said "the Ranch has stopped the breeding program. First lambs of the season will drop the end of February, these lambs to be marketed as soon as they are fat."

Shearing has started with about 40 to 50 a month going under the scissors.

Mutton is being sold at the Kamuela Meat Market, some shipped by the Market to Honolulu. Between 50 to 60 sheep are being marketed, this number to be increased to 200 a week as feed improves and the animals gain weight.

"We should get the sheep off ***Humuula*** by June of 1964, thereby increasing our cattle operations. About 85 per cent of the ***Humuula*** crew's time is spent on cattle work as it is," Greenwell said.

He said calves born and raised on the main Ranch will be weaned and sent to **Humuula** where they will stay until old enough either to be bred or fattened for market.

He said no physical changes are anticipated at the sheep station. Present employees will continue to live at **Humuula**.

Humuula is closely woven into the history of Parker Ranch.

The area is leased until June 1974, from the Hawaiian Homes Commission with the exception of a little finger of land known as Waipunalei near **Keanakolu**, which runs to a point above **Laupahoehoe**.

It is the highest elevation of any Parker Ranch land, a nippy country in the winter. Three times this past month the temperature has slid to 32 degrees and lower.

The Humuula Story

German immigrants first ranged sheep at **Humuula** and on the **Mauna Kea** slopes. **Humuula** was acquired by Sam Parker Jr. It was bought March 3, 1914 by the late Alfred W. Carter as trustee and manager of Parker Ranch. Waipunalei was bought from Colonel Samuel Parker at the same time, "being valuable on account of the water in the gulch."

Humuula then included some 400 head of horses, 500 head of cattle, and 23,000 head of sheep. As high as 30,000 sheep have been run on the station.

In his early years as Parker Ranch manager, Mr. Carter authorized "small importations of sheep, recommending full blooded Shropshire or Southdown ewes, these to be already in lamb, to mix the blood."

When the shipments reached Honolulu they were "admired by everyone—a prize lot."

Experimentation proved these two breeds did not do so well at **Humuula** as Merinos.

In 1904, Mr. Carter bought the **Puuloa** Sheep Ranch for Parker Ranch from the MacFarlane Estate. The inventory showed 6,175 head of sheep. The sheep industry, from this point on, became an important factor in Ranch affairs.

Ten thousand pounds of wool were sent to Boston in 1904; 30,000 in 1908. A wool press was ordered from Sydney in 1912, also a shipment of rams.

Continued ram importations gradually raised the wool clip per animal. The wool was of a high quality desired by the trade. Shipments were made to Boston, headquarters of the United States wool market. Last year's entire clip was sold to the Blue Mountain Wool Co., Portland, Ore.

Humuula has long been one of our greatest and finest sections and will continue to be...

"There will be no changes at **Humuula**. I regret we are moving out of the sheep business but I feel it is a step toward strengthening our cattle production," Richard Smart said. [*Paka Paniolo*, February 1963. No. 15.]

In December 1963, Richard Smart penned an article in *Paka Paniolo*, from interviews with Willie Kaniho, Sr., who had been manager of the Humu'ula and Ke'āmoku Stations. The elder Kaniho shared his recollections of the sheep operation and lands of the Humu'ula region:

December 1963

Willie Kaniho, Sr., Recalls Humu'ula and Ranch Life:

There are some people for whom you can find the proper adjectives. But a new set should be invented for William Kaniho Sr., who winds up 50 years with Parker Ranch and is still strong as the ropes he used to tie the wild cattle.

He is "Willie" to everyone, the Big Boss on down.

Born at **Kalopa** on March 18, 1894, Willie's life has been woven into the ranching history of Hawaii. His father was William Kaniho who worked "for the Germans at **Humuula**." His mother was Kanaiholo Papa.

His father died shortly after Willie was born and he was taken by his grandparents, the John Papas, who also worked at **Humuula**. There was an older brother, Robert, now a Kona tour guide.

This is Willie's story. We regret the typewriter does not carry the proper inflection and the humor in Willie's face as he tells it.

I went to school at Kalopa but I left at 14 and went to work at Humuula but the Germans had gone and Sam Parker Jr. was owner then. He was a big fellow, tall, husky—the house where he lived in Waimea is down now. It is where the CCC camp is now.

I was all-around cowboy for Sam Jr. I worked for Sam little more than two years then he sold to Parker Ranch. Mr. Carter bought it. I remember the day Mr. Carter came to Humuula and said Parker Ranch had bought the land.

When I started at Humuula, Ikua Purdy was the foreman—you know the famous roper. He stayed on as foreman when Parker Ranch bought the land. Then three of us went to Kauai—for better pay—Ikua Purdy and Kainapau Kailikini and me. We went for more money. We got \$12 a month at Humuula. Princeville Ranch paid us \$75 and a bonus. Ikua was Princeville foreman.

I worked at Princeville two years. Then Frank Wood at Kahua offered us better pay—\$85 a month, top wage and bonus. Ikua was to be foreman, I was still a hand.

We had a disagreement over the wage bonus and I got in my Model T, packed my gear, and drove to Waimea. Mr. Carter heard I had left the job and he had a cowboy named Manoa (he was our lunch boy and carried lunches out to the job on horseback in those days) waylay me at Uyeda's Barber Shop (across from Lanakila Park).

He said, "Mr. Carter wants to see you." I said, "I'll see him in the morning." He said, "He wants to see you now." I said, "I'll see him in the morning." So I went to my mother's house at Hamakua and came back the next morning.

Mr. Carter's office is where the Bank of Hawaii is now. He asked "You left Kahua Ranch?" and I said "yes," and he said "Why?" so I told him. Then he asked me to come back and work for Parker Ranch. I say "Okay but how much you going to pay me." So he told me he'd pay me "\$35." "Excuse me for that," I told Mr. Carter. "But I get more pay at Kahua Ranch and they feed me and I get free wood."

He say he cannot pay that much. I say "That's Okay, you can't pay that much, I don't ask for the job, you want me." He told me he'd "give me a foreman's job then can pay more high pay."

So I took that job at \$100 and he sent me to Keamoku and I stayed there one week and he brought me back to stay with him at a cottage in the back. I get free food with him. Then he send me to work with the cowboys as a hand but I got my \$100. I stayed six months with Mr. Carter.

He sent me back in charge of Keamoku. I stayed there two years. Then he sent me in charge of Humuula replacing Herbert Ishizu's brother Junichi Ishizu who was killed in the flash flood on his horse.

Willie then tells of his six years at ***Humuula***, returning to the cowboy gang, replacing Johnny Lindsey Sr. when he retired, and his eight years as cowboy foreman in the days when cattle were lashed to longboats and lifted aboard the ***Humuula***.

He talked of Hogan Kauwe, Awili Lanakila, Harry Kawai, Joe Pacheco, Kaliko Mainaupo, Tom and Albert Lindsey, Frank Vierra, Alex Akau Sr., William Campbell, John Lekelesa and others who were members of the legendary cowboy gang.

Willie stayed on at ***Humuula*** until 1959 when he was brought to Waimea as general foreman under Manager Richard Penhallow... [*Paka Paniolo*, December 1963. No. 25.]

Oral history interviews with John Ah San, Teddy Bell, Rally Greenwell, Toshi Imoto, Sonny and Daniel Kaniho, Hisao Kimura, Pete L'Orange, and others, cited in Volume II, provide readers with first hand accounts of the history of the *'āina mauna*, dating from the 1930s to 1980s.

Identification and Development of the Mauna Kea Springs for Water Supply

Throughout the history of ranching on the *'āina mauna*, development of water sources—first to ensure a drinking supply for people in the region, and later for the increasing herds of livestock—has been a consideration. Historical records document that the wild, and early herds of cattle and sheep were sustained by the dew and rainfall on the mountain lands. The wild herds were also reported as frequenting Lake Waiau and the snow line for water. Over the years, as the herds were increased, and pastures formalized, there arose a need for standing water sources. By the late 1800s, the Humuula Sheep Station and other outlying ranch facilities, developed systems of catchments and reservoirs that fed troughs and supplied ranch facilities with water. Among the early efforts of the ranches to develop water from Mauna Kea sources, were the tapping of springs at Waikahālulu Gulch and Houpokāne³⁶-Waihū, on the Pōhakuloa Gulch. The Waikahālulu spring was tapped and pipes laid out towards the Humu'ula Station, while the Houpokāne-Waihū springs were tapped and fed the Pōhakuloa sub station, near the present-day Mauna Kea State Park.

Interestingly, early in Carter's investigations into water sources, and a means of getting water to the Ka'ōhe lands around Pu'u Ke'ēke'e, and the lower Waiki'i and Ke'āmoku region, he caused an inspection of the high elevation Mauna Kea springs to be conducted. C.H. Kluegel and former ranch manager, Paul Jarrett traveled to the Mauna Kea springs in July 1900, and Kluegel provided the following report to Carter:

July 14, 1900

C.H. Kluegel; to A.W. Carter:

(Report of an Inspection of the Springs on Mauna Kea):

...it is disappointing to find so little water in the three springs on the south slope of ***Mauna Kea***. With an abundant supply at that elevation a large dry area could be supplied with water.

³⁶ Houpokāne is mistakenly written Hopukani on most maps dated after 1900.

The matter of water rights I have not examined.

One and one half, and two inch pipe is proved to be a pressure of 500 pounds per square inch. This is more than the pressure on the proposed line from Waikoloa Creek, but pipe of good quality is required. It should be galvanized pipe.

Regarding asphalt lining for reservoirs, Messrs. Vincent and Belser, Sewer contractors in Honolulu may be able to give you cost, etc...

...In accordance with your request, I have examined, with the assistance of Mr. Paul Jarrett, the water supply for the Parker Ranch at Waimea and vicinity.

On the Southerly slope of **Mauna Kea** there are three springs. **Waihu** is the lowest. Its elevation is 8900 feet. A $\frac{3}{4}$ inch pipe 2 miles long now conveys the water to **Pohakuloa**, a station on the road to **Kaleieha**.

The flow of this spring is 1730 gallons in 24 hours.

The second spring is at an elevation of 9800 feet. The flow is 2900 gallons in 24 hours.

The third spring, called **Kahoupokani** [**Ka Houpo Kane**], is at an elevation of 10,500 feet. The flow is 4300 gallons in 24 hours.

The total flow of the three springs is 8930 gallons in 24 hours.

A portion of this amount is now required in the near vicinity, and more may be required hereafter. Much trouble has been caused in the present pipe by freezing and bursting. This has been remedied to some extent by covering the pipe with earth. This would be difficult to do between the lower and the upper springs as there is only rock and no earth at hand while the protection is more needed. Even at this time we found ice at the second spring.

The distance from the springs to the lower paddock at Waikii is about 16 miles... [Parker Ranch/PPS Water File]

Apparently the proposal of developing water lines from the Mauna Kea springs to the Waikii vicinity was not acted upon, as more reliable sources from the Kohala Mountains were developed in the next couple of years.

March 28th, 1910.

Mr. Sam Parker, Jr.,

Waimea, Hawaii.

...Regarding the springs on your side of **Mauna Kea**, the following report was made to me some ten years ago: -

On the southerly slope of **Mauna Kea** there are three springs.

Waihu is the lowest. Its elevation is 8900 feet. A $\frac{3}{4}$ inch pipe two miles long now conveys the water to Pohakuloa, a station on the road to **Kalaieha**.

The flow of this spring is 1730 gallons in 24 hours.

The Second Spring is at an elevation of 9800 feet. The flow is 2900 gallons in 24 hours.

The Third Spring called Kahoupokani is at an elevation of 10,500 feet. The flow is 4300 gallons in 24 hours.

The total flow of the three springs is 8930 gallons in 24 hours... [Parker Ranch/PPS Collection]

October 21, 1946

L.W. Bryan, Associate Forester; to A.W. Carter

...I thank you for your letter of October 16, and it is a long time since we have seen each other. I was pleased to learn that your health has improved and trust that I shall have the pleasure of seeing you when you again visit Hawaii.

I am interested in the history of the **Humuula Sheep Station Company**, particularly, as it affects the **Pohakuloa** section and I wonder if, from your wealth of knowledge, you can perhaps help me out by supplying answers to the following questions: When was the **Humuula** Sheep Station Company first founded and where was the original headquarters? In this connection it seems that I have heard that the original headquarters was located at **Keanakolu** and later on moved to **Kalaeheha** [**Kalaieha**]. Was **Pohakuloa** (which is in the land of **Kaohe**) originally part of the **Humuula** Station? About what year was the little house that formerly stood near the large Eucalyptus tree built? Do you know when the pipeline to the **Waihu Spring** was first constructed above Pohakuloa? Any other information that you might be able to give me will be appreciated... [Parker Ranch/PPS Collection]

December 12, 1946

A.W. Carter; to L. W. Bryan, Associate Forester

...Referring to your letter of October 21st; asking several questions relative to the **Humuula Sheep Station, Pohakuloa and the Waihu Spring**, attached hereto is a statement which I have made for you. Some of the things in this statement are from my personal recollections, from statements made to me by old timers in Waimea, and from records in my office.

Pohakuloa was never included in the lease of **Humuula** but was in a separate lease of land known as Tract No. 4, **Kaohe**, Hamakua, Hawaii³⁷. This lease, No. 451, was dated September 9, 1891 and was signed by C.N. Spencer, Minister of the Interior to the **Humuula** Sheep Station Co., at the time Mr. Haneberg was President of that Company. Particulars of the **Humuula** lease are included in the attached statement. I had the certificate of boundaries checked at the Land Office and find there was a decision as to the boundary between **Humuula** and **Kaohe** (**Pohakuloa** being a part of **Kaohe**). This was made in 1891 and I attach some of the testimony and the decision itself [see Boundary Commission Testimonies cited in this study].

*I could not tell you the date that the pipeline was constructed from the **Waihu Spring** to the **Pohakuloa** flat but I do know that it was before 1900.*

There may be other matters which will come to mind, of interest to you, and if so, I will write you further... [Parker Ranch/PPS Collection]

³⁷ Note that by 1857 & 1859, the Government leases to F. Spencer & the Waimea Grazing and Agricultural Company, included all the mountain lands of Humu'ula and Ka'ohe in one lease. It was not until 1871, that J.P. Parker II secured the lease of the Ka'ohe mountain lands covering the Pōhakuloa and Mauna Loa region. The Lease No. 451, issued in 1891 to the Humu'ula Sheep Station, represented the first time that the Government divided portions of the Ka'ohe mountain lands into sections, and bid them out as separate parcels (see records cited in this study).

Oral history interviews with Rally Greenwell and Jess Hannah provide us with interesting historical accounts about development of the water resources at both Waikahālulu and the Houpokāne-Waihū springs (see Volume II).

IV. Nā Ala Hele o ka ‘Āina Mauna – Native Trails to Government Roads

The story of travel and access on the ‘āina mauna is an interesting one. We know from native traditions and historical accounts (written as early as the 1820s), that people traveled across the mountain plateau lands and up to Mauna Kea with great frequency. One early account dates back to the 1500s, at the time that ‘Umi-a-Liloa fell into a disagreement with the chief of Hilo over a whale tooth (ivory) pendant. Traveling from Waipi‘o, across Mauna Kea, ‘Umi and his warriors camped in the uplands of Kaūmana. Native historian Samuel Kamakau (1870 & 1961) wrote that ‘Umi-a-Liloa:

...conferred with his chiefs and his father’s old war leaders. It was decided to make war on the chiefs of Hilo and to go without delay by way of **Mauna Kea**. From back of Ka‘umana they were to descend to Hilo. *It was shorter to go by way of the mountain to the trail of Polī‘ahu and Polī‘ahu’s spring at the top of Mauna Kea, and then down toward Hilo. It was an ancient trail used by those of Hamakua, Kohala, and Waimea to go to Hilo. They made ready to go with their fighting parties to Mauna Kea, descended back of Hilo, and encamped just above the stream of Wai- [page 16] anuenue without the knowledge of Hilo’s people that war was coming from the upland.* Hilo’s chiefs were unprepared.

A certain fisherman of Pu‘ueo was at sea, catching *nehu* fish, and he noticed that the water in the ocean was dirty. He was surprised and guessed that there was war in the mountain, and it was that which caused the water to be so dirty. Some [of his companions] denied this and declared that it was a cloudburst instead of war, and that was the cause of the dirt and the reddening of the water flowing into the sea. He would not believe them and insisted that this dirt was stirred up by the feet of men. He hauled up his draw nets at once and went ashore. He did not stop to dry his nets, but cooked taro and some *nehu* fish, picked up his war spear, draped his cape of *ti* leaves over his back, and departed for the upland. The name of this man was Nau.

When Nau arrived away up in the upland of Ka‘umana, he remained at a narrow pass, and the other side of it was the camp [of ‘Umi]. He sat on a flat stone beside the stream and after opening his bundle of *nehu* fish, ate some with the cooked taro (*kuala*). ‘Umi-a-Liloa’s warriors noticed Nau, the noted fisherman of Pu‘ueo, eating taro and *nehu* fish. It was difficult for ‘Umi-a-Liloa’s men to pass through to the trail. They came in single file to go through the pass, and at the narrowest part a leg had to reach out first. The spot in which he sat was comfortable and was in a depression. When someone on the other side reached out to go through, he was stabbed with a spear and fell over the cliff, dead. (*Kē Au Okoa*, Nov. 24, 1870). This was continued until many were destroyed by this lone man who guarded the narrow pass of Ka‘uamoa. Forty were killed. Pi‘i-mai-wa‘a climbed over the cliff and saw but one man against its side. He said to himself, “I shall kill you,” and leaped over. [A cry went up] “Pi‘i-mai-wa‘a is dead! He has fallen over the cliff.” It was Nau who died, and so there was no one to warn the chief of Hilo. When night came, the war party reached Hilo. They were supplied with torches and saw the chief’s residences and the house of Kulukulu‘a’s daughter. ‘Umi-a-Liloa’s warriors surrounded them, and the chiefs of Hilo were destroyed. Kulukulu‘a’s daughter was spared, and Nani-koki, the famous *palaoa*, was restored. Regret for the loss of the *palaoa* was the cause of the war. After the battle, the districts of Hilo and Hamakua were united under the rule of ‘Umi-a-Liloa... [Kamakau 1961:16-17]

In this account, 'Umi went on to secure all of the island of Hawai'i under his rule, and it was at that time that the *heiau*, Ahu-a-'Umi, Pu'u Ke'eke'e, Mauna Halepōhaku, and Pōhaku o Hanalei, and many trails and other sites were made in the mountain lands (see the account of Kanuha, recorded by Jules Remy in 1865, earlier in this study).

In ancient time, travel across the mountain lands, via the *ala hele* (trails and byways), afforded people access to various localities, and also facilitated the collection of various resources including, but not limited to: stone for adze; burial sites; 'ua'u, *nēnē*, 'ō'ō, *mamo* and other birds; and various plant materials. In 1793-1794, A. Menzies visited Hawai'i with Captain Vancouver, during which time Menzies and crew members walked inland with native guides to botanize and take readings of the topography. While ascending Mauna Loa, Menzies observed that the Hawaiian kept "*Mora*" (*heiau* – ceremonial sites) along the trails at which they regularly stopped in prayer and with offerings (Menzies 1908:110). The following excerpts from Menzies describe this practice:

"So bigoted are these people to their religion that here and there, on the sides of the path, they have little *Morais*, or spots consecrated to their Deity, which none of them ever pass without leaving something—let it be ever so trifling—to obtain his good will, and they were highly delighted, indeed, when we followed their example in throwing a nail or a few beads, or a piece of *tapa*, before their Deity, which the women were not allowed to pass without uncovering their breasts and shoulders." [Menzies 1908:110]

While the above narrative was recorded on a trip to Mauna Loa, such protocol was uniformly practiced throughout the islands, and is deeply rooted in the spiritual beliefs of the people. There remain to this day examples of small shrines, upright stones (Pōhaku o Kāne) and other features along trails across the mountain plateau, leading across the *'āina mauna*, and to the summit of Mauna Kea.

By the 1840s, social and economic pressures led to the formalization of a road division in the Hawaiian Kingdom. Native *ala hele*, which had been used for centuries and often provided the "path of least resistance," to travel around and across the island, proved inadequate for the new methods of travel with horses, wagons and team animals. By 1847, Kamehameha III had instructed island governors to undertake the survey of routes and construction of new roads, which became known as the *Alanui Aupuni* (Government Roads). Construction was to be paid for through taxation and "labor days" of the residents of the lands through which the roads would pass. Governor Kapeau, on the island of Hawai'i, expressed his *mana'o* on this matter to Premier and Minister of the Interior, Keoni Ana, in a letter of August 13, 1847:

Aloha oe e ka mea Hanohano –

I have a few questions which I wish to ask you. Will the police officers be required to pay, when they do not attend the Tuesday (*Poalua*) labor days? How about parents who have several children? What about school teachers and school agents? Are they not required to work like all other people when there is Government work on the roads and highways?

I believe that school agents, school teachers and parents who have several children, should only go and work on the weeks of the public, and not on the *Konohiki* days....

...The roads from Kailua and down the *pali* of Kealakekua, and from Kailua to Honokohau, Kaloko, Ooma, and places spoken of to our King, and from thence to Kaelehuluhulu [at Kaulana in Kekaha], are now being surveyed. When I find a suitable day, I will go to Napoopoo immediately, to confer with the old timers of that place, in order to decide upon the proper place to build the highway from Napoopoo to Honaunau, and Kauhako, and thence continue on to meet the road from Kau. The road is close to the shore of Kapalilua...

*The width of the highways around Hawaii, is only one fathom, but, where it is suitable to widen where there is plenty of dirt, two fathoms and over would be all right... If the roads are put into proper condition, there are a lot of places for the strangers to visit when they come here. The Kilauea volcano, and the mountains of **Maunaloa, Maunakea, and Hualalai**.*

There is only one trouble to prevent the building of a highway all around, the steep gulches at Waipio and Pololu, but this place can be left to the very last... [HSA – Interior Department, Roads; translation modified by Maly]

The great land resources of Ka’ohe, Humu’ula, Waimea, Waikōloa, and the plateau lands between the mountains, were early determined to be important to the development of ranching interests on Hawai’i. Thus, while in most locations roads were improved through populated areas, on the mountain lands old trails were modified or realigned to improve access to large tracts of Crown and Government Land.

In between May-December 1873, and August 1891, testimonies given by native informants regarding the land of Humu’ula also documented the locations of old trails around the mountain. Among the references to trails—most associated with bird catching, canoe making, and later bullock hunting—are the following:

Kahulanui — “The *mamani* grows on **Humuula**, the water is called **Kapuuakala**. I have been up the road on **Makahanaloa** with John Pilot and saw a place called **Kapuuakala**; this was before the land was surveyed” (Volume A No. 1:183).

Ili — “...came to *kahawai* of Kolekole and was told Hakalau was on Hamakua side of this gulch. Before we came to this gulch we came to **Nahuina**, where **Hakalau** road comes in” (Volume A No. 1:184).

Manuia — “**Mawae** is where **Waiakea** and **Piihonua** cut off Kaaumana, and the Mawae was covered up by the lava flow of 1855. I saw a pile of rocks there before the flow of 1852... This pile of stones was on the boundary between **Piihonua** and Waiakea. The boundary used to run up old road in a straight line from **Kalapalapanui** to Mawae...” (Volume B:23)

Nainoa — “The old trail from **Humuula** towards **Piihonua** used to run along the *mauka* edge of the woods, near the boundary, not in the woods” (Volume B:31). Waiki observed that “*The road in olden times, ran from Lahohinu to Laumaia, above the woods. No road from Humuula to Lai, along through the woods*” (Volume B:43).

Hanioa — “The road from **Humuula** to **Piihonua** runs along on the *pili*, and not in the woods. *The roads in the woods were only bird catchers roads* (Volume B:45).

Kamohaiulu — “...along the land of **Kahoahuna** 1st to **Lainakaunohi**, a spot in the old canoe road of **Humuula** at **Mauiana**” (Volume B:48).

Naaikauna — “In olden times the road from **Humuula** to **Laumaia** went along on the *pili* and not through the woods. I used to go into the woods a short distance catching birds, and then go back outside again” (Volume B:52).

Kainoa — “The ancient road runs along outside of the woods” (Volume B:56).

R. Lyman (notes from field visit with *kama’āina*) — “The boundary between **Humuula** and **Makahanaloa** as pointed out by Kahue is a hollow commencing on the ridge between these two lands, this ridge is the one on which the road from the beach, through **Makahanaloa** lies” (Volume B:176).

Amina — “The boundary from *lolehaehae* to *Poopuaa*, a hill below, then to *Puukalepa*, at Kaula gulch. I know *Lahohinu* on *Humuula*, near the road, a small road, the Government road is above that” (Volume D:56).

In this historical collection, we look at several primary routes, most, if not all of which were based upon traditional *ala hele*. Subsequent to the 1840s, the same trails were modified into the system of *Alanui Aupuni*, thus being constructed in conformance with the then accepted practices of road development. The primary *ala hele* and *Alanui Aupuni* include: the Hilo-Kalai’eha-Waimea route; the Hilo-Kula’imano-Makahalanaloa-Mānā-Waimea route; and the *mauka* Waimea-Kona route, passing from Keauhou, by Ahu a ‘Umi, Nā’ōhule’elua, Nāpu’ukulua, to Pu’u Koko on the Pōhakuloa-Ka’ohe flats, and connecting with the Hilo-Waimea road.

It will be noted below, that formal surveys of the Hilo-Kalai’eha-Waimea government road via Waiki’i (the early Saddle Road) were begun in 1862. The Kalai’eha-Waiki’i alignment remained basically the same until after the outbreak of World War II, and the paving of the “Saddle Road” in the 1940s. In the area from Kilohana (on the north side of the present-day Girl Scout Camp) to Waiki’i proper, the route is almost as it was finally laid out in 1869 (overlaying one of the ancient trails through the area), except for widening. Near the Pu’u Māhaelua-Keanahuehue vicinity, the old route cuts across the Pā Kila-Pā ‘A’ali’i Paddocks and out past Pu’u Heihei and Holoholokū; while the present-day road cuts down to Pu’u Nohonaohae. The latter route was established around 1902, coinciding with the construction of the Waimea-Kona road.

The Kalai’eha-Hilo section of the route remained basically as constructed in 1869, but because of the dense forest vegetation—extending up to about the present-day 18 mile marker—and the difficulty encountered in traveling through the region, the route received little maintenance and use by travelers other than those on foot or horseback, generally on their way to one of the ranch stations or the summit of Mauna Kea. Portions of the 1869 alignment are still visible on the 1855 lava flow between the 19 to 21 mile markers.

The Waimea-Mānā-Kula’imano-Hilo route along the upper forest line of Hāmākua and Hilo, was developed in 1854, with subsequent modifications in 1877, and again in the 1890s, as a part of the Humu’ula Sheep Station operation. Further modifications to the Kalai’eha Keanakolu-Mānā route were made as a part of the tenure of Parker Ranch-Humu’ula Sheep Station, the Civilian Conservation Corps (CCC), and Territorial Forestry tenure of the land.

The great land resources of Humu’ula, Ka’ohe and the neighboring mountain lands were early determined to be important to the development of ranching interests on Hawai’i. Thus, while in most locations roads were improved through populated areas, on the mountain lands old trails were modified or realigned to improve access to large tracts of Crown and Government lands. Construction on the *Alanui Aupuni* from coastal Kona to the saddle lands was actually begun in 1834, and stopped. Then in 1849, it was begun again, with ten miles of the road, completed by 1850. The route was cut off by the lava flow of 1859, and all but abandoned by public use; though it remained in use by ranchers and those traveling between Kona, the saddle region, and Waimea until the early 1900s.

The earliest map found, depicting trails across the mountain lands between Waimea, Humu’ula, and the coastal lands of Hilo was published in the *Pacific Commercial Advertiser* in 1859 (Figure 33). The map depicts two routes around Mauna Kea—the first, indicated as a solid line (a more significant route), extends from Kawaihae to Waimea, into Hāmākua, along the forest to Kula’imano, and then along the coast to Hilo Bay; a branch also continues along the forest to the Laumai’a vicinity. The second route, indicated by a dotted line, extends from Waimea, along the base of Mauna Kea to the Humu’ula-Kalai’eha vicinity. A third route is also depicted as a dotted line, out of Kailua, through the saddle between Hualālai and Mauna Loa, to the 1859 lava flow, and then across the saddle between Mauna Loa and Mauna Kea, down to Hilo.

April 1850

Report of the Minister of Interior for the Years of 1848 & 1849

(Reports on Status of Kona to Hilo Mountain Road – Judd Road):

...A Mountain Road is being constructed on the Island of Hawaii, from the District of Kona to that of Hilo. This is a great and important work, and the Prisoners on that Island have been employed upon it. It is said that about 10 miles of the road are completed. Should this Road be finished, it will be of immense advantage to the People of the Island, and greatly facilitate the business of the Government. But work of such magnitude must require time... [HSA – Interior Department, Misc. Box 141]

Kailua, Hawaii

May 15, 1851

Isaac Y. Davis; to Keoni Ana:

...On the 12th day of May past, however, I went up to inspect *the Mountain Road* which S. Haanio is building with the prisoners, began the ascent from where it starts to where they are now working, the road has nearly reached **Ahuaumi**, there is about 2 miles more before it reaches there. It has been built properly, S. Haanio has been fast building the road and it is good too, Kinimaka was very slow. You will praise the road too, and everything you will see... [HSA ID Misc. Box 144]

Kaupakuea, Hilo, Hawaii

December 14, 1854

Contract to Construct Waimea-Kulaimano Road

(via the Hamakua Mountain lands)

**between T. Metcalf, Superintendent of Public Works,
and Jno. Van Houghten**

...It is hereby agreed between John Van Houghten of the Island of Hawaii, and T. Metcalf, Superintendent of Public Work on the part of the Hawaiian Government. That said, John Van Houghten shall superintend the *construction of a road from Waimea to the present Aupuni Road in or near Kulaimano kai, Hilo. Said road to take the shortest and most eligible course through the mountain i.e. by the way of Hanaipoi, Puu Kalepa crossing the clinkers as high up as practicable, then through Nauhi to Palauolelo or thereabouts, selecting the most practicable starting point at the upper edge of woods. Then cutting to clearing out a road sixty feet wide down through woods to said Kulaimano kai. Said road to be prosecuted to completion with the utmost diligence and to be left in a condition practicable for carts or carriages to pass over its entire length.* Said Van Houghten is to make and perfect all contracts for labor, provisions &c. necessary, and pay for the same at the most reasonable rates in wild bullocks now running in the region of **Maunakea**, and he shall render a strict account of the same to the Superintendent of Public Works. The above work is to be executed to the entire satisfaction of the Superintendent of Public Works and for the faithful performance of which the said Superintendent of Public Works for as on the part of the Hawaiian Government hereby agrees to pay to said John Van Houghten or his representative five hundred wild bullocks above mentioned. The same to be caught and delivered at the expense of said Van Houghten.

In witness whereof we have hereunto set our hands this 14th day of December A.D. 1854, at Kaupakuea, Hilo, Hawaii... [HSA, Misc. Public Works, DAGS 7 Box 35; Fldr. 6]

December 22, 1856

**R.A.S. Wood, Superintendent Bureau of Public Works;
to R.C. Wyllie, Minister at War and Public Works
(Regarding payment for work on Mountain Road between Waimea
and Kulaimano, Hilo):**

I beg to state for your information and guidance in settling the claim of Mr. John Van Houghten for *the Mountain Road*, Hawaii, that 500 Wild Bullock was sold on the 3rd day Dec. to Mr. Bryan, for the sum of \$500. which price was considered fair. Mr. Metcalf accounted to me for that amount, after deducting \$360. 25/100 paid to Mr. Van Houghten, the balance was paid by Mr. M. in *ohea* [*ohia*] Lumber to this department – April 4th, 1856. [HSA – Public Works; DAGS 7, Box 35, Folder 6]

Honolulu, Oahu

December 22, 1856

John Van Houghten; to Superintendent of Public Works:

...I beg leave to lay before you a statement of my claim for the information of His Excellency R.C. Wyllie for my services in forming the Mountain Road at Hawaii.

*On the 14th day of December 1854 I entered into a contract with Mr. T. Metcalf, late Superintendent of Public Works, for the Superintendent for the construction of a road from Waimea to the present Aupuni road in or near **Kulaimano Kai**, Hilo and to make and perfect all contracts for labor, provisions, necessary, and pay for the same at the most reasonable rates in wild bullock now running in the region of **Maunakea**, and he shall render a strict account of the same to the Superintendent of Public Works for the time being—and for the due performance of the said work to the satisfaction of the Superintendent of Public Works. I was to receive Five Hundred Wild Bullock to be caught and delivered at my own expense. I proceeded with the making of the said road for six months until stopped by you in a letter dated 2nd August, 1855. I now claim from the Hawaiian Government for money expended on the said road the sum of \$468.75 as per furnished and herewith enclosed from which sum I have deducted the sum of \$360.25 in cash and goods received from the hands of Mr. T. Metcalf and which leaves a balance in my favor from the Government the sum of \$108.50, besides 300 Bullock which is the number I claim in proportion for the work I have completed out of the 500 as per Agreement if the road had been entirely completed. I beg further to state that there is due to the natives for their labor the number of 188 Bullocks which they hold me responsible. I therefore urge upon you to lay this before His Excellency at your earliest convenience as I am now being delayed in Honolulu until this matter is arranged.*

Comments by T. Metcalf:

I believe the amount claimed above by J. Van Houghten on his contract for superintending the Kawaihae to Hilo road to be fair & just... [HSA, Public Works DAGS 7 Box 35 Fldr 6]

December 24, 1856

**R.A.S. Wood, Superintendent Bureau of Public Works;
to R.C. Wyllie, Minister at War and Public Works
(Regarding payment in bullocks, for work on Mountain Road between Waimea
and Kulaimano, Hilo):**

...Please pay to John Van Houghten on his order, Five Hundred & eighty eight wild bullock now running in the region of Maunakea, to be caught at his own expense, being the amount awarded on account of his contract for making new mountain road as follows, viz.:

300	according to voucher No. 1. on Contract.
100	according to voucher No. 2. on account.
188	according to voucher No. 3. due to Natives.
Total	588.

And charge the same to the appropriations of 1854, viz., \$2000 payable in Wild Bullock for making Mountain Road from Waimea to Hilo... [HSA – Public Works; DAGS 7, Box 35, Folder 6]

April 17, 1862

Samuel Wiltse, Government Surveyor;

to Lot Kamehameha, Minister of the Interior

(Regarding development of the Kawaihae–Waimea–Hilo Mountain Road, via Waikoloa and Waikii):

*...In accordance with your Highness' request, I proceeded to examine the proposed route for a Govt. Road, commencing at Kawaihae and passing through Waimea, thence in a South East direction **crossing the plains of Puukapu and Waikoloa, to the S. West base of Maunakea**. Thence along the S.W. and South base of this mountain to the plains of **Kaihea [Kalaieha]**, and to **Hilo**.*

Mr. Reed, Road Supervisor of Hilo has passed over the entire route, or rather somewhere along the general course of the route, and you are doubtless in receipt of his report. I met Mr. R. at **Kalihae [Kalaieha]**, where we compared notes. I was then satisfied that a shorter and better route could be found than the one which he had explored. Examinations which I have since made confirmed that opinion. And I have no doubt but when the road shall be located by actual Survey, that many improvements will still be made. The distances which I shall give will be found very nearly correct, as I have taken observations between prominent points along the route from Kawaihae to Waimea, distance 10 miles; there is already a passable wagon road. This is by far the most important section of the proposed road. It is traveled present and probably always will be, by more heavy teams than any other road on this Island. I would recommend that one thousand dollars in addition to the District labour should be expended on this section of the road.

*From **Waimea to Kalaihae [Kalaieha]**, distance of 30 miles. There is a good surface and easy grades nearly all of the way. If prison labour is employed \$500.00 expended will build a good wagon road to this point.*

*From **Kalaihae [Kalaieha] to Hilo**, I take for granted that a good horse road is all that is contemplate at present. This is the most difficult part of the route, as the road will require to be built over an uneven surface of lava for the distance of about 18 miles. I estimate that one man will be able to build 10 ft. of this part of the road per day, bad weather and necessary loss of time included.*

Distance in feet 9540; days labour 9504; 11083 days rations, which will cost 15 cents per day per man which amounts to \$1662.45.

The next three miles take us through the forest, nearly all of this section will require to be ditched, and the road built of logs & covered with fern roots. Timber of a suitable size can be had in abundance.

I estimate that one man will average 10 feet of this part of the road per day; requiring 1584 days labour. Cost for board, \$237.60.

From the lower edge of the forest to Hilo, distance 4 miles will cost, say \$400.00 all told.

Distance from Kawaihae to Hilo by this route, about 65 miles, saving in distance over the old road 15 miles.

Cost to build this Road.

From Kawaihae to Waimea,	\$1000.00
From Waimea to Kalaiha [Kalaieha].	500.00
From Kalaiha to Hilo.	2300.00
Tools and Shelter for the entire rout	1000.00
Overseers.	500.00
Surveying and locating.	300.00
Incidental Say	300.00
Total Cost	5900.00

I believe that the road can be built for this amount and when once built will require but little repairing for the future... [HSA, Interior Department Roads, Box 37, Fldr. 2]

Hamakua, Hawaii

July 5, 1865

S.C. Wiltse. to H.A. Wideman:

...Mr. Charles Wall who leases and occupies the *mauka* part of the Govt. land "Honuaula" in Kona, begs that your Department would grant him leave to work out his Road Tax, on what is known as *the Doct. Jud [Judd] Road*. Mr. W. has a Sheep Station above the forest 8 mls. from any settlement, and about that distance from any Road that is now worked. The Doct. Jud Road is the one that he travels to and from the Settlement, it is also traveled by most people going to and from Waimea as it is by many mls. the shortest route, no work has been done on said road since it was first built. Mr. Wall has two natives in his employ and would be glad if they could be allowed to work out their tax on said road likewise. Mr. Wall will be much obliged if you will write to him upon this subject. Direct to Kailua Kona.

I wrote some time since to Mr. Spencer in reference to the leasing the *mauka* part of the govt. lands Makaloa 1st & 2nd in Kohala, but as yet have received no answer.

I should have seen Mr. L. myself but for some time I have been confined by lameness. He should be required to pay the rent on said lands from the date of the survey at least, as he had the run of them some time previous to its being surveyed, and up to the present time. I will however ascertain as soon as I can whether they have leased them or intend doing so...[HSA ID Roads Fldr 3]

1866

D.H. Hitchcock; to Hutchinson

(Regarding proposed route of Mountain Road from Hilo to Kalaieha, and Waimea; see Figure 34):

...Since writing you last on the subject of *the Mountain Road* I have seen Governor Dominis, on the matter. From what I learn from him, I am led to think that Mr. Wiltze, has not said anything to your Ex. about there being *a shorter route through the woods to the lava flow* than the one he surveyed. The flow in its nearest point to Hilo. I don't think is over 5 ½ miles, maybe 6. That is directly above ***Kaumana*** some two miles to the South of Mr. W's survey. That is the route always traveled by parties going up to visit the flow. I myself have been over it several times. I don't think it is over 1 ¾ miles perhaps two, through the woods. Not a single stream to cross in the woods & on the whole, I think

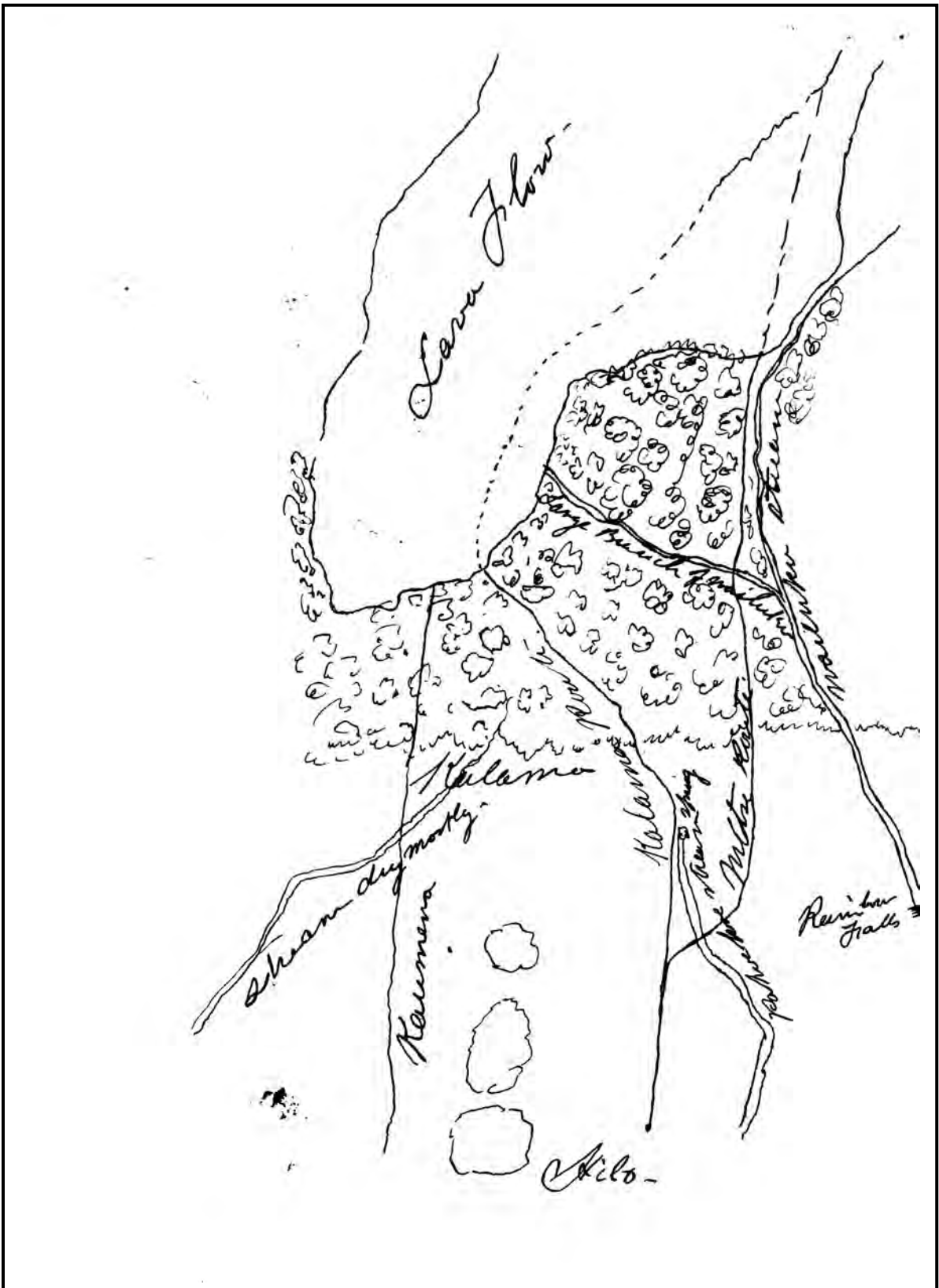


Figure 34. Sketch of proposed Route of Mountain Road from Hilo Town, Towards Kalai'eha (D.H. Hitchcock, 1866)

easier to make than Mr. W's. From Hilo to the woods can't be much if any further & the route from town to the roads in the whole distance over the *Pahoehoe* & not over mud as the other route.

It has been several years since I went on the road through the woods, but from my recollection of it there is more rock & easier to be got at, wherewith to make a road bed.

I don't think it could lengthen the road over half a mile on the flow. But every half mile of road saved in the woods is great gain, as it will be harder work to maintain a passable road through the woods than anywhere on the whole road.

I have spoken with Mr. Coan and others in reference to the matter & they all say, "take the Kalama route." Mr. Coan calls the flow by that route only 5 miles from town but I think he is mistaken. Horses have frequently been up that way to the flow. The road now is entirely grown over.

I do not write this in any ones particular interest, but because I think you ought to know that there is another route than the one Mr. W. surveyed & one fully as feasible & one which I think can be built, on the whole, at less expense. Mr. W's route is, I know the nearest in a straight line, but that is not always the nearest in reality. I think the one matter of Bridges alone sufficient to make a change.

It may be possible that a small 12 foot bridge may be necessary on the Kalama route to pass a hollow where when there are heavy rains there is a small stream but no 60 foot bridge, always rotting out & hard to keep in repair. The Flow covered over the stream that's in Mr. W's survey, requires to be bridged.

As for the work I'd rather take the Wiltze's route, as of course more money can be made on making 3 miles of Wood Road than two, but, as for the cheapness of getting the road done, I do not hesitate to say the Kalama route is the best.

I do not think of any thing more to write at present on the matter. Only to say that if Mr. W. could come again & survey this route, all doubts as to the length would be set at rest... If Mr. W. did not wish to come back to do that work, I can do it for you. [HSA – ID Roads, Hawaii, Folder 5]

June 16, 1869

S.C. Wiltse; to F.W. Hutchinson, Minister of the Interior

(Regarding Survey of new road from Waimea to Hilo, via Holokawai

– Hamakua Route):

...Your letter dated June the 7th did not reach me in time to return an answer by the last mail, by some mistake my letter was forwarded to Mr. Holmes in Kohala & his letter sent to me.

You wish me to estimate the cost of surveying a route for a Road, from a point known as "Holokawai" on the mauka Hamakua Road to Hilo, by the Mountain road.

I beg to say that so little is known about the last 20 mls. of this rout, that it would be impossible for me, or any one, to estimate the cost for exploring and selecting the best rout for a Road for that part of the one proposed.

In common with everybody here, I am very anxious to see a Road opened from Waimea to Hilo by the mountain rout & will do the exploring & locating as cheap as it can possibly be done.

I am presently willing to leave it to your Excellency to say what it is worth after the work is done.

*I would respectfully say, that there is already a good, natural road from **Waimea** to a point known as "**Kalaeha**" [Kalaieha] on the S.E. side of **Mauna Kea**. Distance about 35 mls. This rout is along the southern base of the mountain. Kalaeha is about 22 mls. from Hilo Bay on a direct line. When the road for this 22 mls. is built the whole rout will be opened from Kawaihae to Hilo.*

This rout is so much shorter & better everyway than the one by Holokawai around the northern base of the mountain, that there are hardly to be compared and Mr. Spencer should have told you so.

Should your Exel. decide to have me undertake this work I will be much obliged if you would advance me \$50. to pay expenses with, as I have not funds enough on hand of my own to do it... [HSA, ID Roads, Fldr. 5]

Waimea, Hawaii

June 19th, 1869

S.C. Wiltse, Surveyor;

to F.W. Hutchison, Minister of the Interior

(Regarding the route of the Waimea-Hilo Road, via Kalaieha):

...Your note dated Hilo, June 11th, is at hand.

The people of Hilo informed your Excel. correctly with regard to the merits of this new route for the proposed Road from here to Hilo. *The one around the south & S.E. base of the mountains is the best every way.*

*I propose to commence my explanations from a point known as "**Kalaeha**" [Kalaieha] on the S.E. side of the Mountain and follow the lava flow of 1854, as, far as it extends in the direction of Hilo. (This I now think is the best rout for the road.) I will next see if a rout that is practicable can be got through the forest. If either of these should prove practicable for a Road, I could then proceed to make a partial survey of the two routs is from the mauka side of the Hilo forest to Waimea & a careful report on the same so that your Excellency can decide on their merits... [HSA ID Roads Fldr 5]*

Waimea, Hawaii

August 2, 1869

S.C. Wiltse. to Minister of Interior [Figure 35a & 35b]

(Regarding Proposed Route of the Hilo-Waimea Mountain Road):

With this, please to receive my report survey re – of a Rout for a Road from Hilo to Waimea in South Kohala. I drew the Plan on cap paper with the intention of copying it, but I found that I had not time to do so, and forward it by this mail. Should your Excellency wish it drawn on better paper, I will do it some other time.

The expenses amount to more than I expected, but they were unavoidable. I used every economy possible.

I received no assistance whatever from the People of Hilo or Waimea.

For my own Service, I will be perfectly satisfied with whatever amount your Excellency may be pleased to allow me, I will be greatly obliged if your Excellency can make it convenient, to let me have some money, by the return mail, as I have been compelled to borrow money to help me through...

Expenses of Surveying a Rout for a Road from Hilo Bay, to Waimea in South Kohala. As made in July 1869 by S.C. Wiltse.

To B. Macy Chainman 13 days	13.00
To G. Kembal Chainman 13 days	13.00
To Kekekawai Kaamina 13 days	13.00
To Kamalo Kaamina 9 days	9.00
To Kailihakuma Paeku 8 days	8.00
To Kahooikaika Paeku 8 days	8.00
To Kahooikaika for 2 Pack Mules 2 days	3.00
To Kauloa for taking our horses from Hilo back to Waimea	5.00
To board of 5 men in Hilo 2 days	5.00
To Kauailana, self horse & mule 6 days	10.00
Outfit & Provisions for the Sup	16.00
Total Expense	\$103.00
Cash received on a/c of	\$ 50.00
Bal Due	\$ 53.00

[HSA, ID Roads, Fldr. 5]

Honolulu, Oahu

September 14th, 1869

Robert Stirling; to S.C. Wiltse Esqr.:

(Regarding Proposed Route of the Hilo-Waimea Mountain Road):

...I am instructed by His Excellency the Minister of the Interior to acknowledge receipt of your favor of July 31st accompanied by the Plan & survey of the proposed new road from Waimea to Hilo, and to explain that he would have answered your letter sooner had it not been that *His Majesty who takes a lively interest in the formation of this road wished to have your report &c submitted to him, and to have time to study it before coming to any determination on the subject.* I may also say that it would have been answered 10 days ago but that the "Marilda" (our only means of Communication with Kawaihae) has been under repair for some time.

His Excellency is highly satisfied with your work in this matter & desires me to inform you that you may draw upon him for the sum of two hundred (\$200) dollars as compensation for your labour. You may perhaps not be able to find any one who wants this sum in Honolulu, in which case I beg you will advise me, and I shall have it sent to Mr. Chillingworth in Kawaihae, where you can call for it without much trouble.

His Excellency also requests me to inform you that although at present he cannot find funds to carry the road through, he is still desirous to make a beginning, in the hope of being able to complete it after the next meeting of the Legislature, and with this expectation he requests that you will endeavour to find out some one who is willing to undertake to make that section of the road, say from Hilo to the upper edge of the bush, (a distance of 7 miles), on the terms of your estimate. You are of course in a position to know better than any one what sort of road, or rather what construction would be best for this road, all H.F. desires at present is a solid and dry path, upon which two horsemen can pass each other conveniently, say 7 or 8 ft. wide, and from our experience on other portions of your Island I should think there would be no difficulty in getting such a road made, within the figures of your estimate. Please therefore to make inquiries on this subject and advise His Excellency at your earliest convenience. Of course you must specify to a nicety the class of road that is to be built.

His Majesty the King and H.E. the Minister of the Interior both take a deep interest in the carrying out of this project, and I trust you will be able to further their desires on

reasonable terms, as there can be no doubt that if this road were made it would be of immense services...[HSA ID Letter Book 9]

Hilo, Hawaii

October 11, 1869

D.H. Hitchcock; to S.C. Wiltse:

(Regarding Hilo Forest Section of Hilo-Waimea Mountain Road):

...Mr. Wiltse on last Saturday requested me to go up through the woods on the route proposed by him for **the New Mountain Road**, & examine the route & the practicability of the road. I went up with my Brother H. Rexford, & we both carefully examined the proposed route. *It lays for the most part near the old Saw Mill road & through an Ohia & Koa forest.* The undergrowth is very heavy in most places. The soil is apparently not very deep, as stones crop out presently on the route. One or two swamps lay in the route, but which I think might be gone around. Only two hills or steep pitches are found inside the woods. It is for the most part a gentle rise. One long bridge from 40 to 60 feet will be necessary over a branch of the Wailuku. A ford will not be passable only a low water. No material, as I came to find in the woods, presents itself to make a good road with. The best to be had is the Fern stump—Sand & gravel can be had from the Wailuku river bed, but it will cost a good deal to get it out & on to the road. A large deposit of sand & gravel are to be found just in the upper edge of the woods along side the lava flow, and I think that there is little doubt, but that more is to be found lower down on the river & not very far from the road. So as to the practicability of the route I would say that a really good road can be made through the woods by this Route.

As to the road from Town to the woods it will need a good deal of marking especially on the upper half. I will enclose a draft of the Route surveyed by Mr. W. I also add to it some changes in the Route, as suggested by myself from previous knowledge of the route.

I can not estimate the cost of a road through the woods such as you may wish but would say, that it is the opinion of myself & Brothers that a Road through the Hilo bush, ought to be as follows. The road to run through a cleared space of 100 feet in width. The road 20 feet wide to be ditched each side & rounded up. The Road way to be 8 feet wide & either ferned with heavy long Ferns or sanded heavily. The cost of a Road built thus we estimate, (if ferned & not sanded) will be not less than \$2,500 per mile— The clearing of the 100 feet swath through there woods is in itself a heavy job. We however would be unwilling to call this a final estimate until further examination of the wooded route. From our own knowledge of what it takes to clear land we feel assured that 50 men will not be able to cut & clear off a swath through the woods 100 feet wide & a mile in length, cutting down & remaining the large trees under 18 or 20 days & that would not be one half the labor but nearly so our estimate.

I think that the road through the woods will cost not less than 8,000 together with a good substantial Bridge & the road way ferned at that. The Road this side to town can be done well for \$ 1200 per mile, i.e. a horse road.

I think that the road through to Waimea & Kona practicable & one that is much needed by the whole island. I have personally examined the route & over the lava Flow a good road can be constructed.

The want of Labor is the great obstacle. Could the prisoners be put on work to the number of 40 or 50 under the management of one able man. That I think would be the cheapest method to get the road through.

In order to get native labor one will have to pay \$12 to 18 per month & board, in order to induce them to work on the road.

As I think of nothing more now I will close saying that anything I can do to assist in this matter I will willingly do, and hope that your Excellency will feel perfectly at liberty to call on me for information or assistance in this matter... [HSA – ID, Roads, Hawaii Fldr. 5]

Hilo, Hawaii

October 12, 1869

S.C. Wiltse. to F.W. Hutchison

(Regarding Proposed Route of the Hilo-Waimea Mountain Road; and plans for Section of road in Hilo Forest Lands):

...Under date of the 14th ult: I had the pleasure of receiving from Mr. Sterling a communication with reference to the projected road, through the woods, from this post to Waimea. As suggested by that gentleman, that I should do, I have made inquiries—with the view of getting parties to render estimates of the cost completing that portion of the road from here to the upper edge of the woods — and, to enable me to do so the more effectually. I have come over here myself, for that purpose, as well as to make a new and more thorough investigation of the said route, which I have now done, within the first few days in company with the Messrs. D.H. and H.R. Hitchcocks, as well as with Mr. Chesebro, who came over with me from Hamakua, which gentlemen will, at an early date—if they have not already done so—render you their own ideas and estimates.

Annexed here with, I also beg to hand you my own ideas of a Road which it might be expedient to construct.

After referring you to my estimates which I had the honor of submitting to your Excellency some few weeks ago, I would now beg to state that after a very careful review of the whole matter, I have no reasons for changing my then expressed views. Still it may be possible that I have somewhat under estimated the probable cost, though I hardly think materially so.

The Messrs. Hitchcocks, however, seem to think that my calculations are altogether too low in figures, and such opinion also appears to be entertained by some other parties here, at the same time opinions widely differ, as other parties more nearly coincide with my views.

Mr. H.R. Hitchcock, since his return from Honolulu a few days ago, informed me that he had heard a report in that City to the effect that I had already began to feel a little “Shaky” with regard to the practicability of the route as well as my estimates &c. All this however, entirely foreign news to me; as I have not had occasion nor have I ever to any one expressed any such opinion.

I could wish, for your Excellency’s satisfaction, that it mite be convenient for Mr. Sterling to come up and take a survey of the road &c. Should it not however, be possible for him to do so, I will—should you desire, it—do myself the honor of paying you a visit in person; when I could explain matters in detail, and much more explicitly than it is possible for me to do in writing.

To parties and settlers here, who really seem to have the welfare of this Island in view, I would beg to say that the projected road is looked upon in no other light than one that cannot otherwise than contribute to most materially, and to the prosperity of the whole country.

Messrs. Hitchcocks, Chesebro & S. Kelii, will give you their ideas of the kind of road that should be built over the first (7) miles, extending from this place to the upper edge of the forest, and tender proposes for making the same. They are all thorough practical men, and have had more or less experience in road building, but I believe that either Chesebro, or Kipi, would make as good a road as Mr. Hitchcocks', and for a good deal less money, rather of them can command all the labour necessary would superintend the work in person & am willing to work for much less pay.

I am satisfied that neither of these gentlemen would have contracted to have built this section of the road, for considerable less than this tender, had they not been frightened by extravagant estimates of what it would cost, made by some prominent men in this place who are opposed to this road.

Mr. D.H. Hitchcock says that if he undertakes to make this section of the road that it must be on their times that every days work per man must count him one dollar, or in other words, he must make one half of the amount of his contract clear. It is not to be wondered at that he is anxious to see the road made, if he can get the contract to build it on such terms.

The kind of road that I propose to build. From Hilo to the woods, distance (4 mls.) there is a uniform gradual ascent, over an old formation of *Pahoehoe*. The first half of this distance (or nearly so) is covered with soil from 1 to 2 feet in depth, here I propose to make a road 8 ft. wide, well ditched & drained, the tract to be in an oval shape, the center to be 2 ft. higher than the bottom of the ditches. Two small bridges of 10 or 12 ft. span, will be required on this part continuing the road the same width over the *Pahoehoe* to be leveled with earth and rocks covered with fern.

It appears to me that 20 men can build this piece of road (4 mls.) in five months time very easily. I should think that prison labour, under a good overseer could be employed here to advantage.

Through the woods three miles in distance, I propose to open a space 100 feet in width, all the tree tops and brush to be cleared from this opening. Road to be 12 feet wide with 4 ft ditches on either side, with covered drains sufficiently often, so as to keep the tract in good traveling condition at all times.

Where the ground is swampy, or inclined to be soft I propose to build the road with *Ohia* logs, to be fitted close together well imbedded in the soil and covered with *iii* (a species of *hupu*) not less than 1 ft. in diameter, the whole land to be covered with earth not less than one foot in depth. This kind of a road, I am satisfied would last good for many years, and when repairs were required, an abundance of the same material is at hand to do it with.

A bridge of 60 feet span will be required across the "*Hopau*" creek, this can be built of *Ohia* timber & planks, cut upon the ground, and should not cost to exceed \$600.

I do not know what stile of a road may be proposed by parties who have examined the rout, and reported to your Excellency, but I trust that the best will be adopted without respect to persons; of one thing I am positive that is, that I have selected the best rout for the road that can be found.

I shall be in Waimea on the 15th inst. Where I propose to remain, until I hear further from your Excellency upon this subject.

I feel a deep interest in this success on this project, and am ready and willing to do all in my power to forward it... [HSA – Public Works, DAGS 7 Box 36 Fldr. 2]

Hilo, Hawaii

October 12, 1869

Joseph L. Chesebro; to Minister of Interior

(Regarding Hilo Forest Section of Hilo-Waimea Mountain Road):

...I have been With Mr. Wiltse to Hilo after that section of the proposed route for a road from Hilo to Waimea stretching from Hilo to the upper edge of the bush and now feel prepared to make the following proposal to build the Said road from Hilo to the bush, 4 miles including three bridges, the road to be 8 ft. Wide, to be ditched on both sides, where practicable to be built With the best material at hand, \$2000 to build the Said road though the 3 miles as follows: to clear a shape 100 ft wide to build the track 12 ft Wide With the best Material at hand, *ohia* timber ferns *Hapu & ii* to be covered with earth say from 10 to 12 inches. With a ditch on both sides say 4 ft Wide. With all necessary drainage including a bridge over the **Hopou gulch** about 60 ft span the bridge to be built with timber but on the ground.

If his Excellency should be fit to give me the Contract I Will do the Work in a Workman like manner for 5000. or including the full Seven miles for Seven thousand dollars finding my own tools, & Commence directly after signing Articles. I Should Come to Honolulu to get my tools then I Could Explain more fully on the Subject... [HSA – Misc. Public Works, DAGS 7 Box 36 Fldr. 2]

Hilo, Hawaii

October 28, 1869

R.A. Lyman. to F.W. Hutchinson

(Regarding Hilo Forest Section of Hilo-Waimea Mountain Road):

...I have been looking at Mr. Hitchcocks plan of the three roads to the lava flow. I have been over the Wiltse route & the Kalama route a great many times, during the lava flow of 1855 and once over the Kaumana route. And I think that the best road can be made by the Kalama route. Parties used to ride up the lava flow every week, for several months, as there was less deep mud that way than on the other roads and the lava of old flows comes nearer the surface than on the Wiltse route. The lava flow comes nearer town on that side than on the other side of the flow. And you can go from town here to the woods at Kalama, without having to crop half a dozen streams, and do not crop the large branch of the Wailuku in the woods.

I think that there is only one place on the road, that would ever need a bridge and that would not have to be a large one.

The natives that guided Mr. Wiltse through the woods came to me several times, to try and get me to promise not to tell Mr. W. about the Kalama road, as they said that they wished to have the road go direct to the old saw mill on the Wailuku and not by way of Kalama, & up the lava flow. I told Mr. W. all about the different roads, and he said that he should go up the Kalama road. But after he left here the guides persuaded him to go the other way. It will be very difficult to get lumber in the woods for the 60 feet bridge across the branch of Wailuku, & very expensive. I have been through the woods from the Kaaumana side of the flow to the Wailuku side.

I write now as Gov. Dominis said that Your Excellency wished to know what I thought about the road. I am very anxious to see the road opened & to have it opened in the best place. And that can only be determined by having some competent person explore the different routes thoroughly, and go all over the lava flow, & pick out the best way up the stream. As in some places on the flow, the lava can be worked easier than in others. It is the general opinion here, that Judge H. would be the best person on Hawaii to explore, as he understands native, and is well acquainted with work in the woods. As he has made

several flumes in the woods & brought out the water from the gulches for the Plantations here.

I hope that you will pardon me for writing you about it, as I want to see the road made...
[HSA – ID, Roads, Hawaii Fldr. 5]

Hilo, Hawaii

December 22, 1869

D.H. Hitchcock. to F.W. Hutchinson:

...The undersigned would respectfully make the following offer, as regards building the Mountain road from Hilo through the woods, the Kalama Route, as per Survey of D.H. Hitchcock reaching to the Lava Flow of 1856; a distance of about 6 $\frac{3}{4}$ miles.

The road to commence at the head of Waianuenue St., and following the general line of the Survey, to build a good and substantial road 8 ft wide over the route to the woods, leveling down the irregularities of the rock & filling in the low & swampy places with Rock (not pounded up fine, but paved) & making one Bridge 12 ft long over the stream nearest Station No. 3 & for the sum of two thousand six hundred dollars (\$2,600). The Road through the woods to be built as follows.

1st To Cut down & trim up all the trees, Bushes & ferns (not carrying the same off the ground) for the space of 40 feet each side of the road way.

2nd To *Clear* a road way 20 feet wide of all trees, bushes & ferns between said 40 feet side clearings.

3rd To build a road of Fern or paved with Rock, or cleaned down to the bed rock & evened up, as may be found practicable the said road to be eight feet wide, and if ferned to be ferned in a good & trusty manner. The said road not to be drained, unless in swampy places & then only when practicable without going through rock. The price for the same to be (\$3,400) three thousand four hundred dollars.

The undersigned therefore are prepared to contract for the sum of \$6,000 to build the road as above specified, for the sum of six thousand dollars (\$6,000). The work to be done before the 1st day of January A.D. 1871. The terms of Layman subject to arrangement...[HSA – Misc. Public Works, DAGS 7 Box 36 Fldr. 2]

Hilo

January 5, 1870

L. Kipi; to F.W. Hutchison

(Construction of the Mountain Road from the lava flow and forest into Hilo Town):

I hereby inform you of my desire pertaining to the Mountain Road, from Kalama to the lava flow.

I have heard from S.H. Coney, that the distance from the Town of Hilo to the lava flow is five and three quarters (5 $\frac{3}{4}$) miles, perhaps so, or maybe not. But, if that is the distance, I can build it well for those 5 $\frac{3}{4}$ miles of the road, just as described by R. Stirling at the time that he was in Hilo, for eight thousand six hundred dollars.

It will be:

First taking for the beginning, \$2,600.00.

Finishing the Road in the forest, till it is good, then taking again \$2,4000.00, to complete the miles below the forest to the Town of Hilo; and when it is approved, I shall receive the balance of \$3,6000.00... [HAS, ID Roads, Hawaii, Fldr. 6]

Honolulu

January 10, 1870

J. Wilson & Benj. Macy; to Minister of the Interior

(Proposal to Construct Portion Hilo-Waimea Route; Hilo Forest Section – Via Kalaieha):

Tender

For six and three quarter mile of the proposed Road from Hilo to Waimea via Kalaihea [Kalaieha].

First Section

From Hilo to the Busch four miles Road to be eight feet wide all grass and fern to be cleaned all low swampy places to be filled to an ordinary level and all high ridges to be thrown off, so as to make convenient traveling; and two bridges twelve feet span if required.

Second Section

One and three quarter miles through the bush, all timber and scrub to be cut a space of One Hundred feet wide, Twenty feet in the centre of that to be cleaned eight feet in the centre of that to be cross laid with fern or so filled as to make it at all times passable in such places as the cross layering and filling in may be required, and to give a good Drainage the whole distance that in no place shall the water be allowed to stand on the road.

Third Section

One and a quarter miles Lava flow to be a road eight feet wide to be filled in all low places to an ordinary level all high sharp ridges which cannot be avoided to be removed so as to admit of easy pass and all cracks and crevices to be properly filled for the full accomplishment, and performance of the Foregoing Described Work the undersigned will do the same for the sum of Thirty five Dollars with sufficient surety for completion of the contract... [HSA – Misc. Public Works, DAGS 7, Box 36, Fldr. 3]

No date (post-dates preceding communications)

Report on Mountain Road, Hilo To Waimea

(Summary of proposals for construction of the Hilo-Waimea Mountain Road):

...In July, 1869 Mr. Wiltse surveyed the whole route from Hilo to Waimea, making a distance of 53 ½ miles, as against 80 miles by way of Hamakua. He also formed an estimate of the cost of making a road by the route surveyed in the sum of \$12,300. He afterwards in October of that year went over the Hilo end of the proposed road accompanied by Messrs. D.H. and H.R. Hitchcock, Mr. Kipi, & Mr. Chesebro, as intending officers for its construction, when he again wrote to your Excellency confirming his previous letter in every respect.—

In December, the above mentioned parties sent in Tenders for the Construction of the road to the lava flow of 1854, but all much in excess of the estimate:

Amt. of Mr. Chesebro's Tender \$7000.

Amt. of Mr. Kipi Tender 6850.

Amt. of Hitchcock Bros. Tender 6000.

Amt. of Wilson & Macy Tender 3700.

In October Mr. D.H. Hitchcock wrote to recommend a different route from Hilo to the lava flow to that proposed by Wiltze, and your Excellency sent me up to go over both routes to see which would be most easily made & kept in repair. I went over both routes with Mr. Hitchcock & decided in favour of the route proposed by him. He then, at my request made

a survey and sketch of the route and the contract to build the road was given to Wilson & Macy for the sum of \$3700.—

*On the completion of the work I went up again to inspect it, and on this occasion I went over the whole route from Waimea to Hilo, and was so impressed with the difficulties in the way of constructing a practicable **road from Kalaieha to the forest above Hilo**, that had I seen it before, I would not have recommended attempting to make a road there. I reached the portion of the road already constructed, in a deluge of rain, & found almost the whole road to Hilo under water, with strong currents sweeping across the road every few yards carrying away the material with which it was constructed, fern trunks & stone indiscriminately, and I felt satisfied that under such conditions no road that was not paved with blocks of stone could stand. Mr. Hitchcock has reported that on this road, one small 12 ft. bridge might be necessary and I found at least 20 streams of as many feet wide each, and one of 50 to 60 ft. wide with a depth of water up to the middle of the saddle.*

It was said to be an unusually wet time in Hilo and that may have been the case, but still the road would have to be built to withstand such a time and only a road built of stone could do so.

New Bridges in the District of Hilo

March 1867.	New Bridge on Wailuku Stream	\$3800.00
March 1869.	New Bridge on Waiakea Stream	2050.00
March 1870.	New Bridge on Kolekole & Nanue Stream	1534.34
March 1871.	New Bridge on Kawainui Stream	935.38
Sept. 1871.	New Bridge on Kaiwilahilahi Stream	734.42
		\$9054.14

In addition to the above there was a bridge put up near Onomea, costing somewhere about 6 to \$700, but of which I have no record and cannot speak positively...[HSA ID Sub. File, Roads Hawaii Fldr 4]

Honolulu

January 21st, 1870

Robert Stirling; to D.H. Hitchcock:

...Your favor of 3d inst. only came to hand on the 19th per "Pauahi," which will account to you for not receiving an answer to it by the "Kate Lee" as you requested.

Your Bill for surveying, in the sum of \$80. has been paid to Messrs. H. Hackfeld & Co to your credit; as you desired. I shall be glad in future to put any surveying the department may require in your neighbourhood in your way, as it is satisfactory to be able to get a reliable survey when needed.

As regards the building of the new Mountain road His Excellency the Minister of the Interior desires me to inform you that John Wilson of Hamakua having offered to build that portion from Hilo to the Lava flow of 1855 for the sum of \$3500. and within 6 months from February 1st he has accepted his tender. The work will therefore be begun early in February, and I trust that a really serviceable road may be the result. — I expect to go to Waimea during next week to inspect the road now being built through "Mud Lane" by Mr. Wilson, when the final arrangements in connection with your road will be made. [HSA - ID Ltr. Bk. 9]

Honolulu

February 7th, 1870

Robert Stirling; to John Wilson

(Regarding Construction of Mountain Road from Hilo to Waimea):

...By this opportunity, Mr. Gulick Chief Clerk of the Interior Department, sends to care of Mr. Spencer \$2400. for you, \$1200. for Balance of your Contract for the Aiku road, and an equal sum on a/c of advance on your Contract for the Mountain Road from Hilo to Waimea. I trust that by this time you have completed the Aiku road in the manner we talked of, and that you may soon be able to commence operations at Hilo.

In the Carrying out of this new contract, should there be any thing requiring explanation further than I have already given you, I beg that you will let me know at once, and I shall do all in my power to facilitate matters for you as well as to explain what may be required.-

Please to send by return the receipts Mr. Gulick asks for, and do not forget to have filled in to the contract &c the date on which it was executed.-

The plan of that section of the road which you contract to build is sent today to care of Mr. Spencer. If you are in any doubt as to the precise location of the road, you must get Mr. Hitchcock to point it out.

Honolulu

July 27th, 1870

Robert Stirling; to John Wilson:

...I have your favor of 18th inst. and note contents. Since Mr. Reed approves the change in the location of the road near Hilo, if there is no one who objects to it on account of crossing his land or otherwise I can have no objections to it. I will however write to Mr. Reed on the subject, and he will advise you what to do when he has made enquiries about it. In a letter I had from him two days ago, he says that your idea is that the specification for the making of the road is only a matter of form, and that we had a private understanding on the subject. Now I never have private understandings in matters of Public Works, but in regard to this one, I told you that it was impossible for me in the then state of the Forest to specify *absolutely* what kind of road would be best in every point, and that I must leave a good deal to your own judgment in this respect when you saw the ground cleared, and certainly my only motive for waving the specifications was in the hope of getting a better road, & not a worse one, so that unless you can shew a better construction of road, we must fall back on the specification. When the *pahoehoe* is smooth and level, and not covered with mud it would be folly at the present time to round it up in the centre with earth or anything else, as I have no doubt that in its present state it is a better road than any that could be made, and it will be many years before it is so much worn as to make it unfit for travel. Wherever, in the forest, or out of it, the roadway has to be built up, it must be done with such materials as can not be washed away, and of course using earth is inadmissible.

I must say that I do not see why there should be any difficulty in this matter, and I trust that you will go on and make a good job of it. I cannot go up just now to see your work, but shall do my best to be able to go when it is finished. Meantime, do not get into bad blood with any one on the subject.

Per "Kate Lee" I send you today to care of Mr. Reed the \$800. – you ask for on the faith of your work being half finished, and I have to beg that you will give Mr. Reed a receipt for it as on former occasions. –

I hope you continue to have favourable weather and that you may soon have your work finished... [HSA – ID Letter Book 9]

Honolulu
July 27th, 1870

Robert Stirling; to W.H. Reed:

...Yours of 19th inst. came duly to hand and I thank you for the information it contained in regard to the Mountain road, although I am sorry to hear that you think so poorly of the way in which the work is being done. The specification is no mere matter of form, and I had no understanding with Mr. Wilson farther than this, that as it was not easy to specify what road would be best for all parts of an uncleared forest. I left a good deal to his judgment to depart from the specification if he saw any way of making a better road than that specified, but on no account will a worse road be received. I wish I could go up to see it, but I cannot at present and must hope to be able to do so when it is finished.- I will be obliged if you will enquire whether there is any objection on the part of the owners of the property on the route on the south side of the hills in entering Hilo, and if not, let be made there.

I send p. "Kate Lee" \$800. to your care to be paid to Wilson, and for which I beg you will take his receipt and send it to me.

The \$59.64 due you has been paid to Messrs Hackfeld & Co. to your credit as you desired, & I am much obliged to you for your trouble in the matter... [HSA – ID Letter Book 9]

Hilo
August 6th, 1870

H.R. Hitchcock; to H.W. Hutchison

(Regarding status of Hilo-Waimea road construction):

...Agreeably to your request, I have been over the new road, now being built by Wilson and Macy. The following are the facts which I gathered on the exploration.

Upon the first section, as per specifications, nothing has yet been done. In regard to the second section, that thru the woods, the trees have been cut down to the width of a hundred feet, except the last half mile, where the width cut will not average more than 75 or 80 feet. A clearing thru the middle of this swath has been made, of an average, available width of 12 feet.

There is no ditch on either side to distinguish the road way proper of eight feet, nor is there any pretence of rounding up in the center. The bog holes have been filled in, apparently with fern stumps. In some portions of the clearing the trunks of ferns of the proper length have been laid across the road, but these trunks have been split, in most instances into quarters thereby rendering them very springy. There is not the slightest solidarity about the portions ferned. The decided tendency is to sag in the middle. I witnessed the men at work laying the ferns. These were simply thrown down and placed in position, without any previous preparation of the ground.

I crossed two streams, within the length of this section, which, in rainy times, would swell to torrents, and sweep away large portion of the road, as at present constructed.

I went up on the *a-a* flow portion. I left my horse behind as he was not shod and as the road across the flow was rougher than the flow itself. The filling in material is the hard *pahoehoe* instead of the crumbling *aa*. The stone has been pounded up till the fragments averaged about the size of breadfruits, and with these fragments the road has been filled in for the average width of six feet.

These are the facts which I have to communicate to Your Excellency.

In my opinion there is no reason why the road should be so shiftlessly done; as the material for a good road, and for a literal carrying out of the specifications are abundant and close at hand. [HSA - ID Roads Hawaii, Fldr. 6]

Honolulu

August 10th, 1870

Robert Stirling; to John Wilson

(Regarding status of Hilo-Waimea road construction):

...I have duly received yours of 3d inst. and note what you say in regard to the difference of opinion between yourself and Mr. Reed as to the proper understanding of the specification for your work on the New Road. In reply, I can only refer you at present to mine of 27th ult. Advising you to adhere to the specification, unless you can shew that a deviation from it would be advantageous.

I wish to call your attention to a report on the state of the road made to the Minister of the Interior by Mr. H.R. Hitchcock, at his request. He says, "upon the first section, nothing has yet been done." In regard to the second section, that through the woods, the trees have been cut down to the width of a hundred feet, except the last half mile, where the width cut will not average more than 75. or 80 ft.

A clearing through the middle of this swathe has been made of an average available width of 12 ft. There is no ditch on either side to distinguish the road way proper of eight feet, nor is there any pretence of rounding up in the centre. The bog holes have been filled in, apparently with fern stumps.

In some portions of the clearing the trunks of ferns of the proper length have been laid across the road, but these trunks have been split, in most instances into quarters, thereby rendering them very springy. There is not the slightest solidity about the portions ferned. The decided tendency is to sag in the middle. I witnessed the men at work laying the ferns; these were simply thrown down and placed in position without any previous preparation of the ground. I crossed two streams within the length of this section, which in rainy times would swell to torrents and sweep away a large portion of the road, as at present constructed. Farther on he says, "the road across the flow was even rougher than the flow itself. The filling in material is the hard *pahoehoe*, instead of the crumbling *Aa*. The stone has been pounded up till the fragments average about the size of breadfruits, and with these fragments the road has been fitted in for the average width of six feet." Again he says, "there is no reason why the road should be badly done, as the materials for a good road, and for a literal carrying out of the specification are abundant, and close at hand."

I give you these quotations from Mr. Hitchcocks letter, simply to let you know how the work is looked at by an outsider, not that you should be made angry, and I have again to beg of you that you will not get into any row with anyone on the subject, but go ahead, do your best; and let me know when you expect to finish it. Let me know a fortnight beforehand.

Again recommending you to keep the specification always in view, and hoping you will soon be able to announce the completion of your contract... [HSA – ID Letter Book 9]

Honolulu

September 24th, 1870

Robert Stirling; to John Wilson

(Regarding status of Hilo-Waimea road construction):

...I am sorry to say that through the "Kate Lee" having been laid up for repairs for the past fortnight, I have not had an opportunity of answering yours of 3d inst. nor of sending you the \$400. you asked for. She goes this afternoon however, & I send by her to care of Mr. Reed the money you require, for which you will please sign the order I enclose to him.-

I note that you propose being finished with your work in about 3 weeks from the date of your letter, and although I do not expect that you will be so to a day or two, still I hope you may not be long after that time.

The "Kilauea" is expected to be ready for sea in about a fortnight, and if you are ready by that time, & advise me so, it is probable that H.E. the Minister of the Interior will go up to inspect your work, and in any case I shall go by her. Her first trip will be made to Hilo.

Try then to be ready by that time, and to have the road in as good shape as possible so that there may be no difficulty... [HSA – ID Letter Book 9]

Honolulu

November 14, 1870

Robert Stirling; to John Wilson

(Regarding status of Hilo-Waimea road construction):

...By last steamer I sent you a message by Mr. Spencer to the effect that in the short time I had been at home, I had not had an opportunity of consulting His Excellency the Minister of the Interior on the subject of the Mountain Road from Hilo to Waimea, on the construction of the first section of which you had been engaged & had just completed previous to the severe storm which broke over that district and which I experienced.

Since that time I have talked with His Excellency on the subject, and represented the matter to him as fairly as I could in the interest of both parties to the contract, and I have now to inform you that he has come to the conclusion to pay you \$800. being the Balance of the contract price still due to you, and to release you and your Bondsman from all farther liability in respect of this road.

I am truly sorry that the issue of this undertaking should have been so unfortunate for you, in that you have suffered loss through it; and, had the road remained tolerably decent and serviceable after the storm, I would have done all in my power to obtain for you something in excess of the contract price, but, under the circumstances; I could not conscientiously advocate such an arrangement, and I trust that you will see it in this light yourself.-

Please let me know at your earliest convenience whether you will have this money sent to you to Hilo, or Kawaihae, and I shall cause it to be forwarded by return... [HSA – ID Letter Book 9]

Waimea

November 16th, 1870

John Wilson to Robert Stirling

(Regarding completion of the Hilo-Kalaieha section of the Mountain Road):

...Yours of the 14th inst. has duly come to hand and in answer would say that I am glad to hear from you and that there was nothing worse befell you than your sore feet after such a time as we had in Hilo on the *paahoehoe* in the storm.

I hope for my part never to have to travel it again in such a time altho for my part am all right, and I am also glad to hear that you have got me out of Hilo and that His Excellency the Minister of the Interior Accepts the road as it stands, for if His Excellency had not have done so I do not know what I would have done to pay off the men. But now I can do so without any default on my part.

There is only one thing I am sorry that it is a failure what is done, altho I must say that you've seen the road under very unfavorable circumstance it may be a long time before Hilo will be deluged again should you ever come again to see the place please let me know and I will go with you and forward your project all I can.

When you send me the balance of the money please to send it to Kawaihae as all the men are now in Hamakua. I have just heard from Macy, he says that it is still raining in Hilo. I shall go there next week to bid in good... [HSA – Misc. Public Works, DAGS 7 Box 36, Fldr. 3]

Waimea, Hawaii

June 13th, 1871

John A. Simmons; to F.W. Hutchinson

(Regarding funding for repair of Hamakua Mountain Road):

...The Mountain Road from Waimea requires about two hundred dollars, to place it on good order from that place to the Hamakua-Hilo Road, upon **Kaohe**, which amount I would respectfully ask be sent me. I have placed Guide Boards so that the stranger may no longer need a guide from Waimea to Hamakua. The two hundred dollars will make a Cart Road to where I mention... [HSA - ID Roads, Box 37, Fldr. 8]

Puuloa, Hawaii

October 7th, 1871

John A. Simmons; to F.W. Hutchinson

(Regarding completion of repairs on the Waimea-Hilo Mountain Road to Koholalele):

I have finished the Mountain Road from Waimea to Hamakua, a loaded wagon can now be driven from Kawaihae to the Landing at **Koholalele** in that District. The whole cost of which amounts to two hundred and twenty dollars.

I have had three new bridges made upon the Hilo Road from Waipio in the same district which cost One hundred and five dollars, in all expended \$325... [HSA - ID Roads, Box 37, Fldr. 8]

Honolulu

March 5, 1884

H. Hackfeld, Agent for the Humuula Sheep Station; to Chas. T. Gulick:

...The undersigned agents of the **Humuula Sheep Station Company of Waimea, Hawaii**, hereby most respectfully beg to petition your Excellency to grant a subsidy and encourage the Company to cut and build a road through the woods from **Humuula** to Ookala, the total cost of which is calculated to be about \$1200.

Said road would not alone open a very large area of land towards the Hamakua District, but also place all the neighboring Plantations in a position to obtain their Beef and Mutton from **Humuula**, whereas now they have to consent with great inconveniences in attempting to procure their supplies from distant places.

Trusting the foregoing will receive kind consideration, we remain... [HSA - ID Roads, Box 38 – fldr. 10]

Waimea March 30th, 1897

**Wilmot Vredenburg; to J.A. King, Minister of the Interior
(Regarding disposition of the Waimea-Humuula Road and
Waimea-Hamakua Road):**

...Your favour to hand & contents noted. For the information wanted I enclose for you a rough sketch of the district showing the two roads in question. [Figure 36]

The **Humuula** road is though in fact a Government road, yet in a strict practical sense, private one. It is used by no one except the **Humuula** Sheep Stn., and the **Puuloa** Sheep Ranch.

The road leading from Waimea to Hamakua is the only available road from the district of Hamakua to the landing of Kawaihae. In former years, people did not travel so much to Kawaihae to catch steamers, hence the neglect of this road, but of late the carriage and wagons passing over this road have cut it up to such an extent that in places, the ridge is almost touching the axles.

I drew Mr. J.F. Brown's attention to this matter and he promised to draw your attention to the road in question.

I do not deny that I will be particularly affected by the repairing of this road. It is for this reason that I have made an excessively low bid for its repair. Mr. Lidgate estimates the building of such roads at \$150. per mile, and this road is far nearer 5 miles than 4 ½ miles.

As I live midway on this road, I am in a better position to put the work through with dispatch. Besides this, I have several teams and plows that could be utilized to push this work through.

Our district is in a deplorable state as far as roads are concerned. The Kawaihae road is perfect as all our available funds are spent on this road only. The road from Waimea to Kohala does not exist any longer, though two appropriations have been made for it. It is now nearly a cattle trail.

The road to **Humuula**, as I have before stated, is not a public thoroughfare, and if you do not think fit to spend much on this road, I can have the stones thrown out and a little filling done, which will enable teams to get through a little better than they do at present. If you will look on the map of Hawaii you will see what extent of this road is in Hamakua, Hilo, and S. Kohala. I could not repair this road to the boundary for less than \$500. There is no water, and every drop has to be carted 10 miles.

Planters in Hamakua are getting a petition up in the matter of the road leading to Hamakua. You may probably receive it by this mail.

For the last 15 years south Kohala has not been extravagant in its demands for road funds. If I am not mistaken, this is the first instance of extraordinary repairs being asked for. I have done all in my power to further the cause of good roads but am not in a position to continually repair roads as I have done, after freshets, to enable my own teams to travel.

My offer to repair the Hamakua side of our roads for \$500. still stands good, and will keep it open until arrival of next Kinau's mails... [HSA – ID Roads, Hawaii, Box 42]

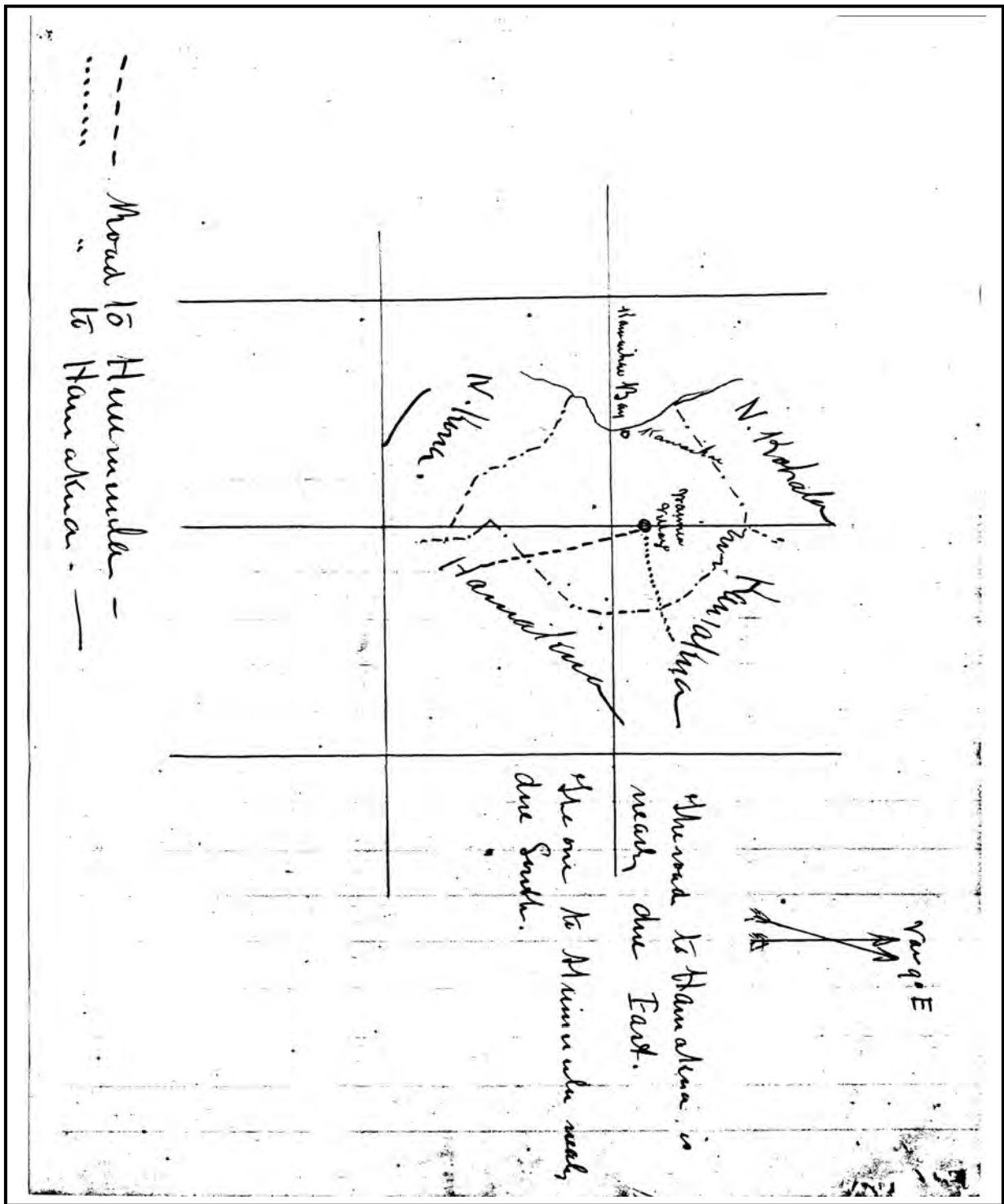


Figure 36. Sketch of the Waimea-Humuula, and Waimea Hamakua Mountain Roads (W. Vredenburg, 1897)

Following the above letter of 1897, almost no further communications regarding work on the mountain trails and roads between Hilo and Waimea—routes via Kalai'eha or above the forest on the Hāmākua side—were located. *Figure 37*, is a portion of a map from 1896-1897 (S.M. Kananui, Surveyor), from the collection of the Library of Congress. The map depicts the primary Government Roads around the island of Hawai'i, including the routes that crossed the plateau lands and mid-slopes of Mauna Kea, between Hilo and Waimea.

We find that from the 1890s through the 1930s, nearly all communications describing travel and the trails-roads of the Kalai'eha section, via the Pōhakuloa-Waiki'i route, or by the Laumai'a-Keanakolu-Mānā route, were documented as a part of the operations reported by the Humuula Sheep Station Company and Parker Ranch, or in historical accounts by visitors to Mauna Kea and the mountain lands. In the 1930s, the Civilian Conservation Corps (CCC), under the direction of L. Bill Bryan, undertook improvements on the mountain roads, particularly the section between Kalai'eha and Keanakolu, and in 1942, following the outbreak of World War II, the USED (United States Engineering Division) and United States Army began realignment and improvements of the route that became known as the Saddle Road. Territorial ownership of the road was assumed on June 30, 1947 (HSA – GOV 9-21, Saddle Road).

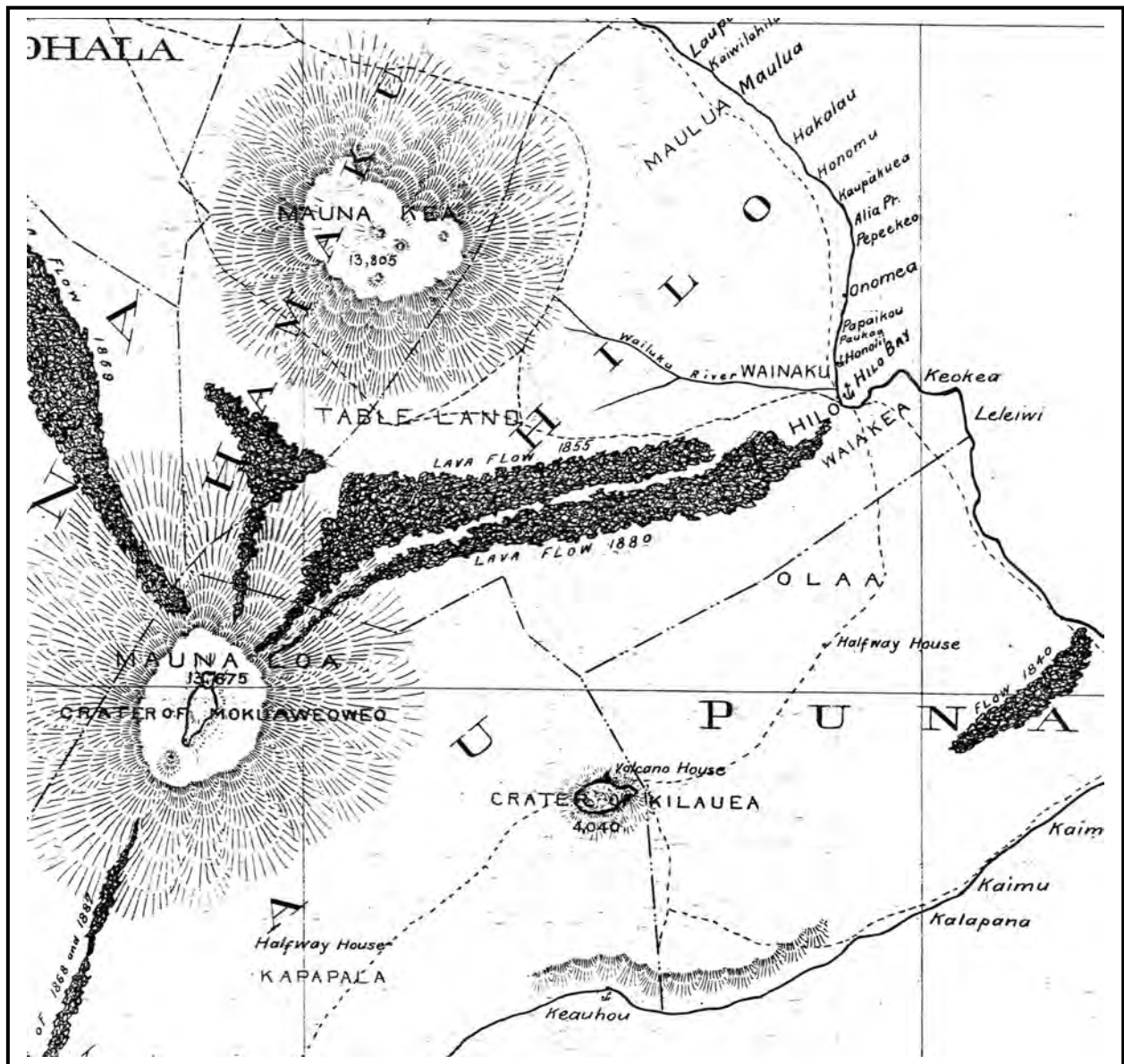


Figure 37. Portion of an 1896-1897 Map of the Island of Hawaii, Depicting the Mountain Lands, and Government Roads Between Hilo and Waimea (S.M. Kanakanui, Surveyor) (In collection of Library of Congress)

V. Historical Surveys of the Lands of Humu‘ula, Ka‘ohe, and the ‘Āina Mauna

By the 1830s, early surveys of the inland sections of Hawai‘i began to be made. This work was formalized as a part of the *Māhele ‘Āina* between 1848-1855, and furthered by the work of the Kingdom Survey Division and Boundary Commission proceedings between 1860s to 1900. In the 1860s, W.D. Alexander was appointed Surveyor General, a position he held through the 1890s, and under his direction, detailed surveys of the islands were undertaken. The survey work focused not only on parcels of land sold, but also on land divisions and entire islands. In this period, several island-born surveyors excelled—among them were: Curtis Lyons of Waimea, Hawai‘i; J.S. Emerson of Waialua, O‘ahu; D.H. Hitchcock of Hilo; and the Lyman brothers of Hāmākua and Hilo.

In the region of the *‘āina mauna*, S.C. Wiltse did some of the earliest work through the 1860s, though as a result of subsequent surveys, the boundaries set by Wiltse were modified. Wiltse’s 1862 map of Humu‘ula (Register Map No. 668; *Figure 31*), depicts the boundary of Humu‘ula and Ka‘ohe extending to the summit of Mauna Kea, and also names several key locations on the boundaries and within the land. Subsequent surveys and proceedings of the Boundary Commission (1873-1891), revised the *mauka* boundary of Humu‘ula, to its present location, and was depicted on Register Map No. 1641, prepared by C.J. Lyons and others in 1891 (*Figure 38*). E.D. Baldwin’s Register Map No. 1718, of Central Hawai‘i (1891), includes details of the topography from the summit of Mauna Kea, to Ahumoa, across Pōhakuloa, to the Waiākea-Pi‘ihonua Boundaries of Humu‘ula, and along the boundary of Humu‘ula to Hakalau (*Figure 39*).

Between 1879 to 1892, C.J. Lyons, J.S. Emerson, E.D. Baldwin, and W.D. Alexander, conducted detailed field surveys on the *‘āina mauna*. The surveyors were accompanied in the field by *kama‘āina* guides, and sought out elder native informants to confirm locations. Thus, they often recorded not only specific points on which triangulation stations were set, but also interesting historical notes pertaining to the *‘āina mauna* and neighboring lands. The surveyors also recorded traditions of place names, residences, trails, and various features of the cultural and natural landscape, including the extent of the forest and areas impacted by grazing. Another unique facet of the field books is that they often include sketches that bring the landscape of the period to life.

As an example, in 1882, J.S. Emerson wrote to W.D. Alexander, describing his methods of surveying and recording historical documentation. He reported that they noted:

...every visible hill, cape, bay, or point of interest in the district, recording its local name, and the name of the *Ahupuaa* in which it is situated. Every item of local historical, mythological or geological interest has been carefully sought & noted. Perryman has embellished the pages of the field book with twenty four neatly executed views & sketches from the various trig stations we have occupied... [Emerson to Alexander, May 21, 1882; HSA – DAGS 6, Box 1]

W.D. Alexander (with J.M. Muir), and his nephew, E.D. Baldwin also prepared sketches as a part of their field books, thus through their work, we are given views of the landscape as it appeared in the 1880s-1890s.

The following communications, written as letters or entries in survey field books provide us with a historic look at the landscape of Mauna Kea, including the mountain slopes and the Pōhakuloa flat lands, and the neighboring *‘āina mauna*. They also include important documentation on—place names; the presence of trails to Mauna Kea, and between Waimea, Hilo, Kona, and the coastal lands; historical features associated with the Humuula Sheep Station Company and other ranching operations of the mountain lands; and the location of vegetation lines and geological formations. Selected sketches from the field books are included with the narratives below.

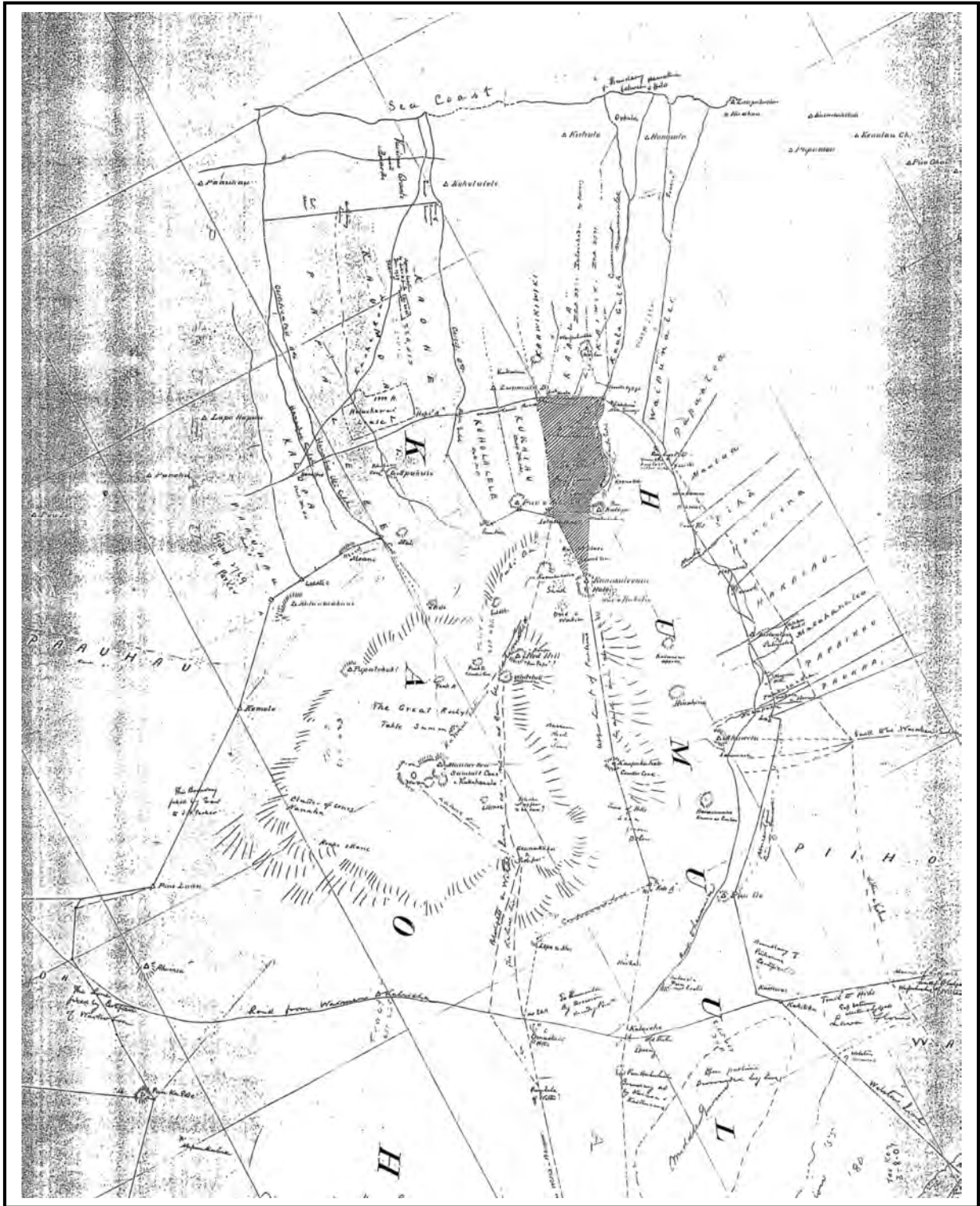


Figure 38. Reduction of Register Map No. 1641 (C.J. Lyons, 1891), Depicting Humuula, Kahohe and Adjoining Lands

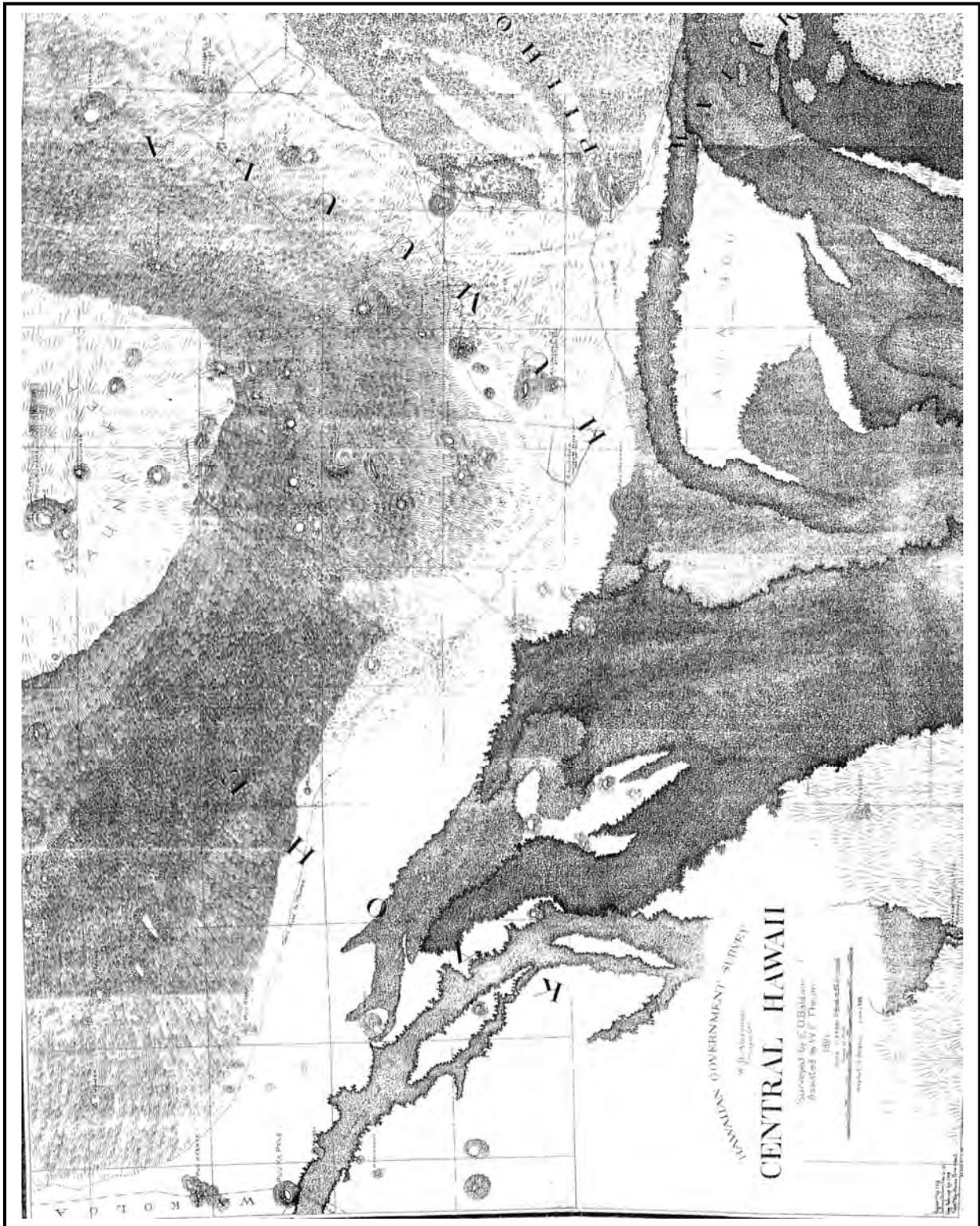


Figure 39. Reduction of Register Map No. 1718 (E.D. Baldwin, Surveyor), Map of Central Hawaii, Depicting The Summit of Mauna Kea and Humuula-Kaohe Flat Lands

The *kama'āina* testimonies and surveys recorded as a part of the proceedings of the Boundary Commission on the Island of Hawai'i (1865-1891), are presented in their own section of this study. The communications cited below, were viewed in collections of the State Survey Division, Hawaii State Archives, and the National Archives, and are presented in chronological order. Readers should also refer back to the articles published by E.D. Baldwin (1892) and W.D. Alexander (1892), documenting their survey expeditions in 1889 and 1891 respectively. Emphasis is added to selected portions of the texts below, to draw reader's attention to particular references.

February 10, 1866

S.C. Wiltse; to Jno. O. Dominis, Crown Lands Commission

(Reports on Completion of Survey of Humuula):

*...I have added the survey of the makai part of the Crown land "**Humuula**" to the plan of the mauka part as you requested and will forward the same to you by the first opportunity. The field notes are also appended to the notes of the mauka part.*

That part now added contains 7215 acres, 924 acres of which is good grazing land below the forest. *The forest part is a rich alluvial soil and covered with the largest growth of ohias and koa that is to be found on this Island.*

The reason for this survey was not reported to the late Mr. Webster at the time it was made because I had lost confidence in the men that pointed out the boundaries. They pretended to be kamaaianas of the old land and a survey was made accordingly. I afterwards ascertained that they knew little or nothing about the boundaries of the *mauka* part and so I had all of that work to do over again. But since then I have found out by inquiries and examinations that those men were kamaaainas of the lower part of this land, in fact, the only men living that did know said boundaries through the forest. I am therefore able to now report that survey as correct according to the best of my knowledge... [HSA - Crown Lands Commission]

Honolulu

January 2, 1873

W.D. Alexander; to F.W. Hutchison

(Reports on establishment of Triangulation Station on Summit of Mauna Kea):

...I have the honor to report the progress of the Govt. Survey during the past month as follows.

The surveying party arrived about the end of November, and have been at work ever since without losing a single day from rainy weather. During the first week in December we selected the base line, marked the ends with granite posts, set the aligning stakes, and made the preliminary measurements with chain and wire. We commenced the final measurement with the apparatus of the U.S. Coast Survey on the 9th, and completed it satisfactorily on the 19th. It is 13406 feet in length and very well placed for triangulation.

*On the 21st we went to **Laieha**, and from thence ascended **Mauna Kea** on the 24th. We carried up and erected on the summit a signal pole and tripod 25 feet high, and built a large cairn around it. I had a barometer carried up and took 11 observations during three hours on the summit. From the barometer observations & our triangulation since the height of this mountain above the sea is proved to be 13800 feet very nearly. Douglas in 1834 made it 13851 feet.*

Since our return on the 25th we have been setting up signals, and measuring angles with the large theodolite. I have completed sets of observations at two stations, and also determined the latitude within 5 seconds.

I think we can finish measuring the set of triangles on which we are engaged, in two or three weeks, if we continue to be favored with fine weather. My plan is then to take up the measurement of the Maui system of triangles, where we left off last year, and complete it.

The expenditures of the last month for the Survey have been unusually heavy.

My accounts show that I have drawn on the Interior Dept to the amount of \$608.60, a fourth of which however properly belongs to the preceding month.

The following is a list of the orders drawn on the Interior Dept. for the Govt. Survey since Dec. 1st.

Dec. 5 th in favor of S. F. Chillingworth	\$ 25.00
Dec. 7 th in favor of S.C. Wiltse	\$ 50.00
Dec. 28 th in favor of D. Waiau, Esq.	\$ 20.70
Dec. 28 th in favor of S.C. Wiltse	\$ 50.00
Dec. 26 th in favor of C. Notley	\$ 26.40
Dec. 26 th in favor of Rev. D. Baldwin (for W.D.A.)	\$100.00
Dec. 30 th in favor of C. Notley	\$ 80.00
Dec. 30 th in favor of C. Notley	\$ 45.34
Dec. 10 th in favor of C.J. Lyons	\$100.00
Dec. 10 th in favor of C.J. Lyons	\$ 36.16
Jan. 2, 1873 in favor of J. Lidgate	\$ 75.00
	\$608.60

The expenditures may be classified as follows.

For Native Labor	101.00
Transportation including M. Kea trip	82.13
Provisions	52.13
Signals	18.79
Repairs of instrument	1.25
W.D. Alexander	129.58
C.J. Lyons	144.16
J. Lidgate	107.25
J. Brown	10.00
Total	\$646.29

Hoping that the above report will be satisfactory I remain...
[HSA - ID Survey, 1873]

It should be noted here, that historical accounts also tell us of the presence of an *ahu* or cairn at the summit of Mauna Kea (Pu'u o Kūkahau'ūla), as also found in oral history interviews collected by Maly. Whether the *'ahu* at the summit predates western visitation, or if the *'ahu* described in oral history interviews was a remnant from the Alexander period surveys, is not known.

Waimea

February 3, 1873

W.D. Alexander; to E.O. Hall:

...I have the honor to submit the following brief summary of the progress of the Govt. Survey during the past month.

My last report was rendered Jan. 2. During the month of December we had measured the Hawaii Base line, *selected a series of stations & set up signals, including a signal on the summit of **Mauna Kea**, & measured sets of angles at the extremities of the Base line.*

On the 3 I left for Honolulu on business which detained me a week longer than I had expected, so that I did not get back here till the 21st.

My assistants were employed during my absence in setting up signals at points which I had selected, in running lines of level, &c., till the 15th when they took passage to Kona on the Kilauea. They landed at Kaawaloa, and on the 18th accomplished the object of their trip by setting a signal on the summit of Hualalai. I have since measured angles on it from two stations in this neighborhood. Most unfortunately they missed the steamer on her next trip, and remained another week in Kona with nothing to do. They finally arrived here on the 31st.

As for myself I have been shorthanded, but have been favored with good weather. On the 24th and 25th I selected one new station and set up two signals. During the past week I have occupied three stations about 5 miles apart with the 12 inch theodolite, and have determined 15 horizontal angles by 578 measures, and 12 angles of elevation by 34 measures.

If we continue to be favored with clear weather we shall finish the set of triangles on which we are engaged in two weeks more. I am happy to say that my assistant, C.J. Lyons, is rapidly recovering his health.

My accounts show that I have drawn on the Interior Department for \$450.00, as follows:

Jan. 2	Order in favor of S.F. Chillingworth	\$ 30.00
Jan. 2	Order in favor of H.N. Greenwell	20.00
Jan. 13	Order in favor of W.D. Alexander, Salary	150.00
Jan. 20	Order in favor of W.D. Alexander, for survey expenses	50.00
Jan. 31	Order in favor of Rev. D. Baldwin	200.00
		\$450.00

The expenditures have been as follows:

Transportation, including the Kona expedition	\$ 35.00
Provisions for Kona party mostly,	27.00
Maps from English Ordnance Survey,	6.75
Native Labor	8.25
J. Lidgate Cash	1.00
W.D. Alexander Jan. 13 th Balance due for December	150.00
W.D. Alexander Feb 1 st Draft in favor of D. Baldwin	200.00
	\$428.00

I shall do my best to secure greater economy as far as it can be done without crippling the efficiency of the Survey... [HSA - ID – Survey, 1873]

Office of Survey, Honolulu

September 21, 1877

C.J. Lyons; to W.D. Alexander

(Reports on establishment of Triangulation Stations on Mauna Kea):

...I received your letter with much pleasure the other day—containing items of interest with respect to the triangulation of Koolau and Hana. I begin to think that there are no “impossible” districts for triangulation on the Is. While I have not finished the triangulation of Hilo, I have nevertheless picked out a series of points with which to reach Waiakea without all conditioned triangles, even if I do not succeed in seeing the M. Loa signal. In the same manner in which the triangles go around **Papalekoki**, a series will resolve on

Kaupo as a centre, viz the one marked "**Red Hill**," on the plan I sent you some months since.

It is the N.E. shoulder of **Mauna Kea** continually visible from the middle of Hamakua all the way to Puna. My signal on it shewed beautifully at Hilo Bay the other day – viz. cloth cov'd. *ahu pohaku*.

The angles are measured as far as **Puu Ohai**, South of **Maulua** – well enough to locate said **Puu Ohai**. I think four stations will carry me from there to Hilo Bay, making 13 in all from Waipio to Waiakea.

For azimuths the following and intervisible Haleakala, **Puu Loa**, **Puu o Kihe**, **Makahanaloa**.

I have secured H.R. Hitchcock's home in Hilo for an office & head quarters for baggage &c. Expect to take my family up to Hilo on the 1st of October steamer and live in Edward Hitchcock's house.

Mr. Cabot is down also. We left Hilo on Friday P.M. and were till Tues. night 9 P.M. in reaching Honolulu. The landing of lumber in Kau was the uncertain unknown factor in the problem of getting here. A comfortable passenger boat the Likelike.

Emerson I find here.—Unfortunately he has leave of absence for Waialua a couple of weeks to engineer for Samuel he says. With which delay I suspect you will not be pleased. I have an idea you will have to take him under your tuition for a longer or shorter period. The Technological Institute does not seem to me the right training place for him to work. We must train our own men – and under strict orders too. I fear Mr. E. will know both too little and too much. Mr. Cabot is certainly quite particular to carry out orders which is much in his favor.

I have not yet had an interview with the Minister of Interior.

When I was down in June I took a quantity of H.R. Hitchcocks paper. Do you sanction the purchase of the whole roll and I shall write to H.R.H. about it. It is our office now.

I think Mr. Cabot is inclined to stay at work at least till the end of December.

My address will be Hilo. Hoping to hear from you... [HSA – Survey, DAGS 6 Box 1]

Hilo

October 18, 1877

C.J. Lyons; to Prof. Alexander

(Reports on establishment of Triangulation Stations on Mauna Kea):

...I was glad to get your letter the other day. We have had like experience in the weather line but it seems better now. I have started a party in charge of Mr. Cabot to clear off the famous hill of **Kauku** in **Makahanaloa** woods – and put up a signal there. I am expecting it to take not less than a week.

I was disappointed in not getting a co-visible station on the extreme point of **Makahanaloa**, but the hill would have to be occupied anyway – so it is just as well probably.

There will then be the following points to occupy [Figure 40].

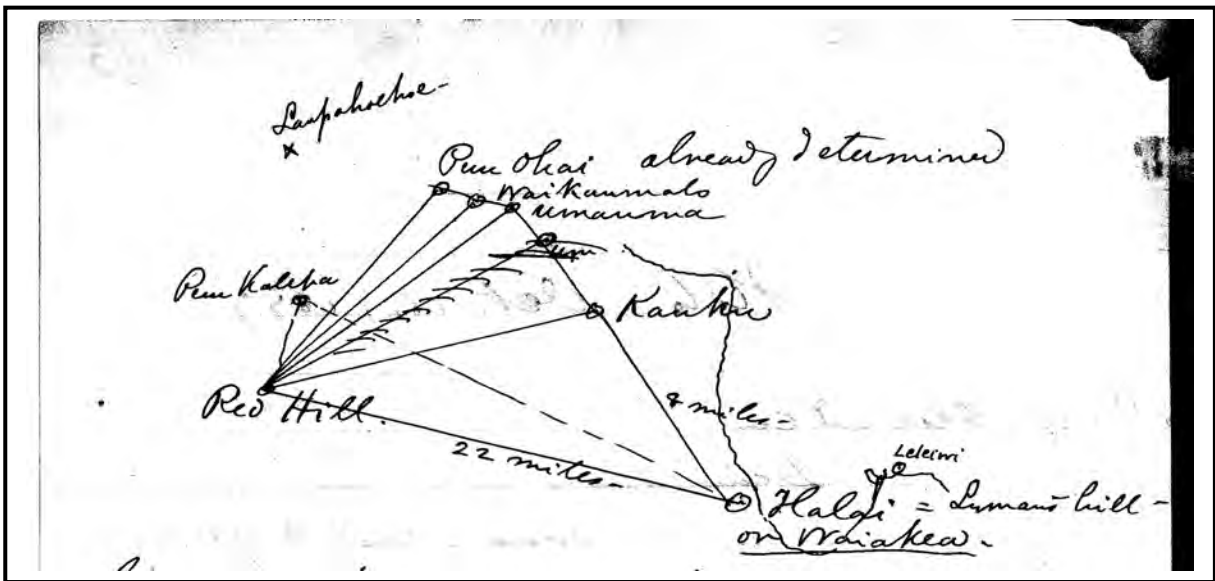


Figure 40. Sketch of Mauna Kea Stations—Kaupo (Red Hill) and Stations from Halai (C.J. Lyons, 1877)

You see there are only three primary stations between where I left off & that one. I was up at Halai this morning with the instrument; the signal on **Red Hill** shines like a white star.

There is a check triangle from **Puu Kalepa** of about 10° apex. The **Kauku** triangle makes a trifle over 30° here.

I cannot make out anything of my Mauna Loa signal, and have no time this season to look after it.

This (Halai) is a very important station, as it commands a line of points extending from the East Cape, Kumukahi, to Mauna Loa. I think as soon as we have time it should be made an azimuth station and latitude too perhaps.

The **Mauna Kea** Station is visible here & I regret much the necessity there has been for not having a good signal there although it would have been of no use for the series thru Hamakua & Hilo. It will be invaluable for going to the southward.

I shall not dare give a thought to anything not necessary for the main object, viz. a map of Hilo & Hamakua. Shall try to get a signal out toward Lelewi, in order to get in coast between here & **Makahaloa** by resection, and then occupy **Kauku**, Umauma & Waikaumalo.

Eight triangles revolve on **Red Hill** as a centre, & eight on **Papalekoki**.

I hope to get the distances correct to 1 in 5000. Mr. Cabot measured a test line of 2000 ft in Hamakua with the chain & the agreement was absolute to an inch. As it was a very uneven line – the coincidence seemed almost an obscure piece of luck – tho he took great pains.

I have sent Mrs. Adams some secondary Hamakua triangles to work up – My plan is now to have all the triangles in one book... Mr. Eiles made some more unwarrantable changes in the lettering of the map of Hawaii, which made the pains I took in marking out the larger ahrs. of Hilo &c. of no account, other names are omitted entirely.

The location of Waiakea seems to be practically correct – on our Cert. map... [HSA – Survey DAGS 6, Box 1, Fldr. 4]

Subsequently in 1879, C.J. Lyons was working on the Hilo Mountain Lands, trying to determine the Humu'ula Boundary with lands below it. In Field Book No. 315 (page 18), Lyons included a sketch of the Makahanaloa-Honohina boundary with Humu'ula, and also depicted the mountain road, named localities, "Norton's hut" and survey points in the vicinity (*Figure 41*). Also, while conducting the survey in the Keanakolu vicinity on November 13, 1879, Lyons reported on the location of the old sheep station, while referencing survey stations. He reported:

Recon Obs. at Keanakolu. On the way from Waimea to Puakala.

Mem. at Keanakolu

Red Hill. * 47° 53 mag.

Kalepa. 50° 46'

Kanakaleonui. 37° 49'

Iolehaehae 74° 40'...

This is the old sheep station, but just mauka of the stone house, now in ruins...

[Field Book 315:45-46; in Collection of State Survey Division]

Field Surveys on the 'Āina Mauna by J.S. Emerson (1882)

The following letters written from the field to W.D. Alexander and excerpts from records of the survey field books provide us with a historic look at the landscape of Mauna Kea and the 'āina mauna of the Ka'ohe region of Hawai'i. Unfortunately, the "Puukapele Section Map," Emerson's Register Map No. 1279 (1885) cannot be copied as it is too fragile to open. Other maps cited in this study include some of the locational references made by Emerson. In Emerson's letters, we also find the names of two of his native guides in the region, they were Iakopa Kaha'ikupuna and Ka'iliihiwa (cf. HSA – HGS DAGS 6, Box 1; May 5, and August 30, 1882).

Selected sketches from the field books are included with the narratives below, and several of the site numbers referenced by Emerson coincide with those recorded on the sketches.

March 30, 1882

J.S. Emerson to W.D. Alexander:

On the road to Ahumoa; Auwaiakeakua, Kohala, Hawaii:

...Yesterday was the first clear day we have had for a week, and we made good our retreat from Nohonaohae as a wind storm was threatening the safety of our tent. The threat however was but a threat, and we had a good opportunity to reach this place in peace. *We left camp at 4:30 P.M. reaching this abode of a thousand different gods at 7 P.M.* and now at 8 A.M. we resume our march with a clear sky and beautiful weather. Our stay at Nohonaohae was a success as far as measuring angle was concerned... [HSA – HGS DAGS 6 Box 1]

April 5, 1882

J.S. Emerson to W.D. Alexander

(Describing conditions of survey from Ahumoa and the mountain lands):

...We are having a terrible time with the weather. The cloud views are magnificent, at times we look down upon a Chaos of surging fog and vapor and anon we are engulfed in it. It is very fine for anything but triangulating. Occasionally however the parting fog allows a sight. I am afraid that this is a poor season for our work... I must compliment my comrade, Perryman, for his very artistic sketches in the field book of the grand mountain scenery about us... [HSA – HGS DAGS 6 Box 1]

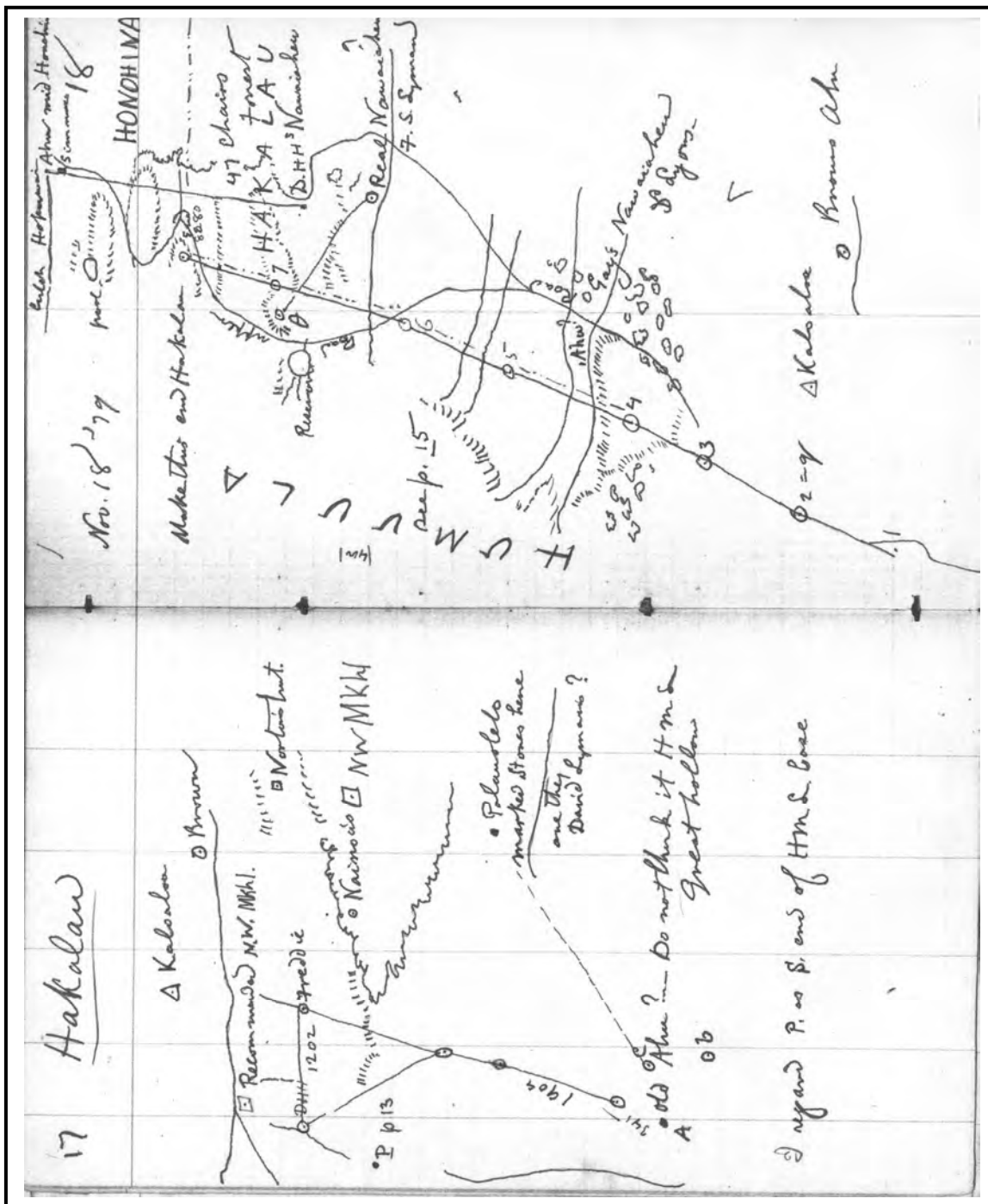


Figure 41. C.J. Lyons' Field Book 315 (pages 17- 18), Depicting the Boundary between Humu'ula and Makahanaloa-Honohina (November 18, 1879).

Field Book No. 251:121

April 8, 1882

Ahumoa Station [Figure 42]

Puukapele

1. Palihae ³⁸	highest Point in Waikoloa, Kohala	(see page 109)
2. Poopoo	highest Point in Waikoloa, Kohala	“
3. Puu Papapa	highest Point in Waikoloa, Kohala	“
4. Puu Mahoelua	highest Point in Waikoloa, Kohala	“

Warren's Keamuku “

Gay's Sheep Sta.

Auwaiakewa

Spencer's sheep house

1. Puu o Maneo	highest Point in Kaohe, Hamakua	(see page 105)
2. Puu o Kauha	highest Point in Kaohe, Hamakua	“
3. Puu o Kau	highest Point in Kaohe, Hamakua	“
Ahumoa		
4. Puu Ulaula	highest point	“
5. Aiakala	highest point old cattle pen there	“

Field Book No. 251:127

April 11, 1882

Ahumoa Station

Puu ka Pele

1. Kuainiho	
2. Puu Huluhulu	(not Kalaieha)
3. End of Keamuku flow.	

Field Book No. 251:137

April 12, 1882

Puu ka Pele Station

Napuukulua

2. Lepe a Moa	single peak – denote peak to right
3. Puu Hookomo	sight on trees on top
4. Koaohi	
5. Omaokoili	
6. Kokopuu	highest hill of four having same name.
7. S. of Omaokoili	
8. Puu	
9. Pohakulua	sight on clump of trees...
Puu Keekee	sight on “ <i>ahu</i> ” near highest point – put up by Kailihiwa [Figure 43]

Field Book No. 251:145

April 13, 1882

Napuukulua Station

Puu ka Pele

Puu Keekee

- | |
|--------------------|
| 1. Puu Laau |
|--------------------|

³⁸ J.S. Emerson's Register Map No. 1279 (1885, in collection of State Survey Division), gives the location of Palihae, noting that it is also called Nalopakanui. The latter name is still found on some maps, though Palihae is no longer given.

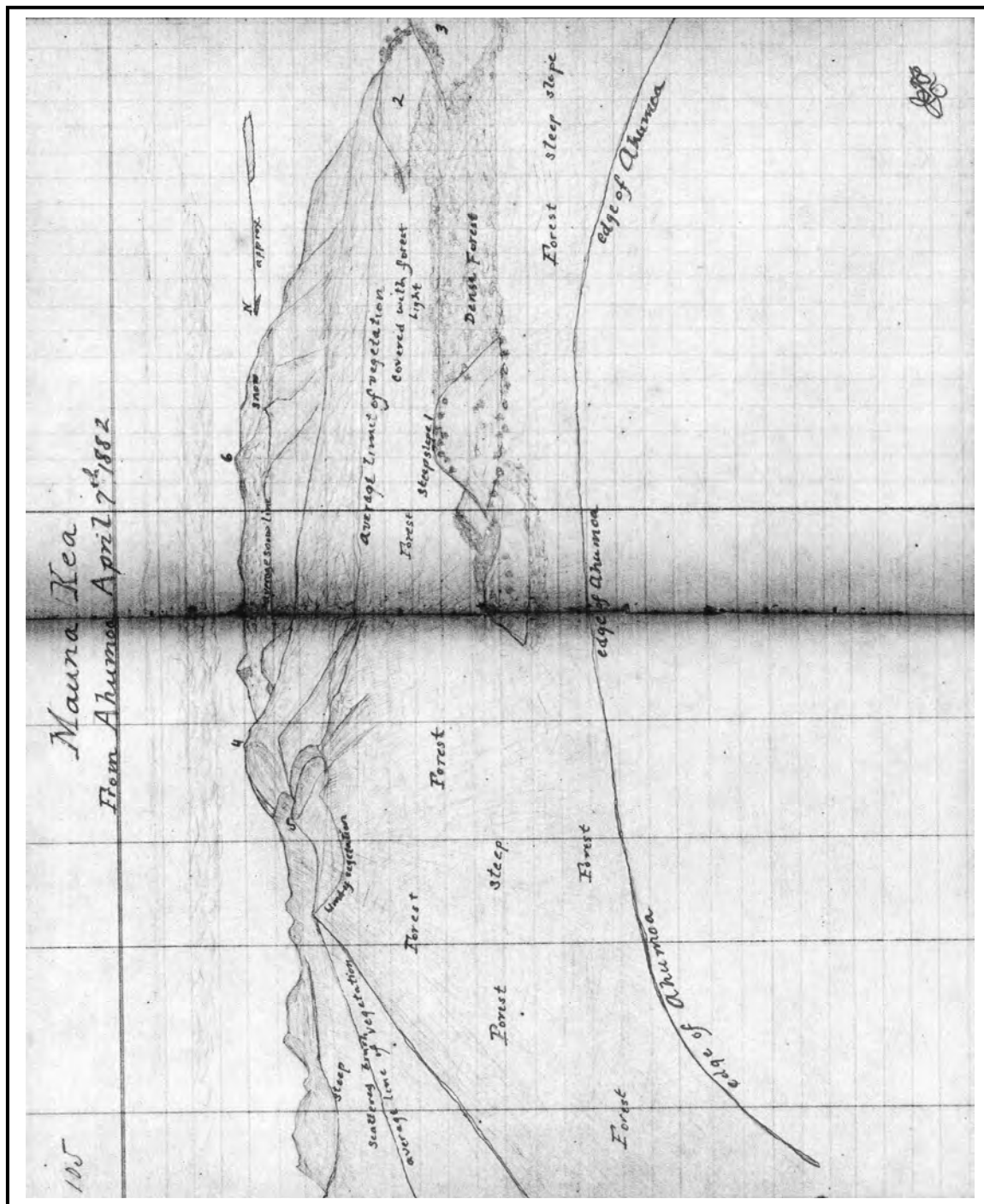


Figure 42. J.S. Emerson Field Book 251:105; View of Mauna Kea from Ahumoa (April 7, 1882).

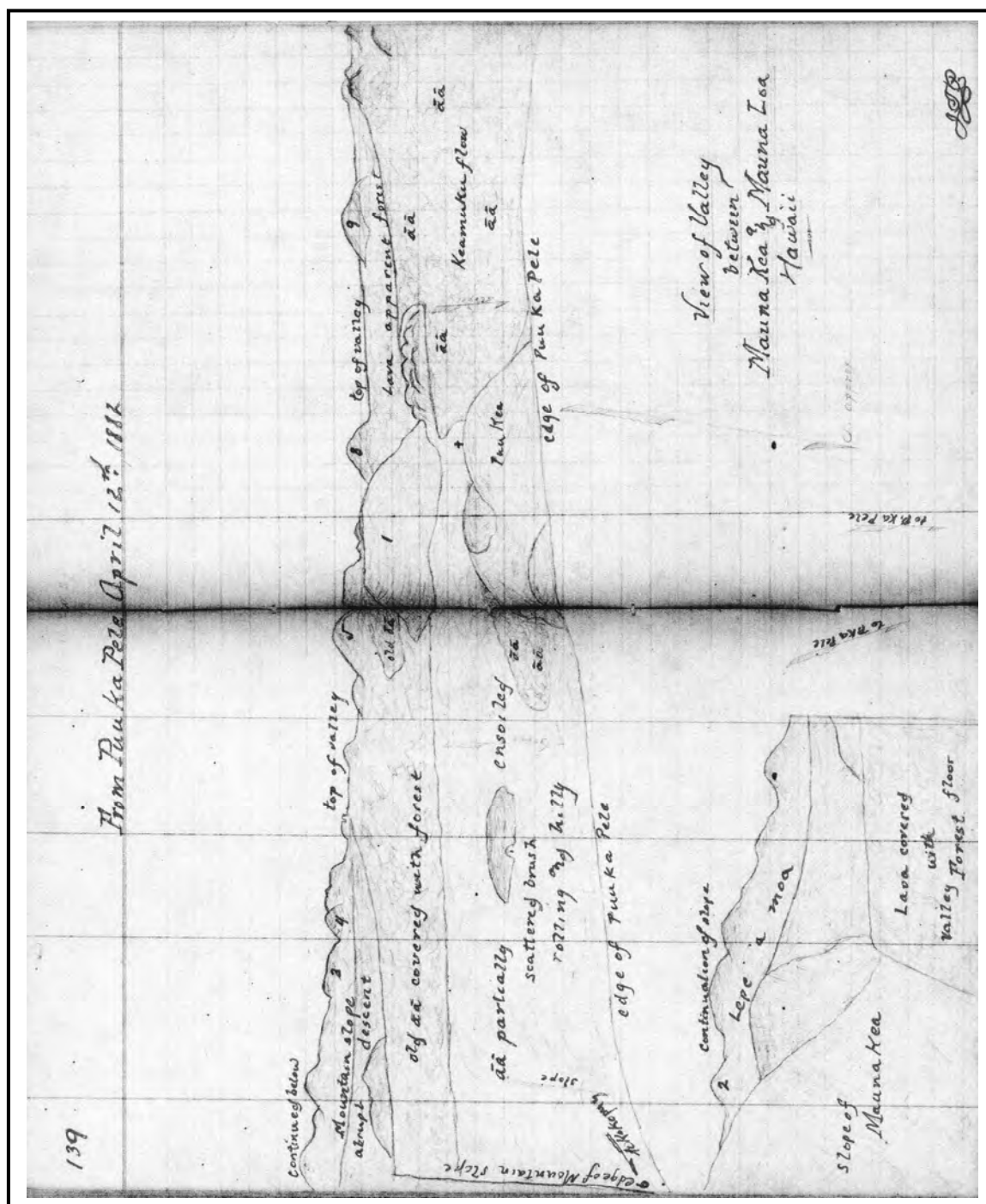


Figure 43. J.S. Emerson Field Book 251:139; View of "Valley Between Mauna Kea & Mauna Loa" (April 12, 1882).

Field Book No. 251:145
April 13, 1882
Napuukulua Station (continued)

2. **Napuukulua**
Puu o Kau

4. **Puu o Kauha**
Puu Mauu
Lepe a moa
Puu Hookomo
Koaohi
Omaokoili

[Figure 44 (& Figure 43)]

Field Book No. 251:151
April 13, 1882
Boundary flag

Puu Kea Flag An “*ahu*” shown us by “Kailihiwa” and said by him to have been located by Hitchcock – also said to be by the corner of the districts of Kohala, Hamakua and Kona and the only “*ahu*” that he knows of around the **Hill of Pele** [**Puu ka Pele**].

Field Book No. 252:19
April 20, 1882
Keamuku Station

Spencer’s grass house	sight on center
Puu Ewaewa [Iwaiwa]	an <i>ahu</i> on top
Warren’s house	on East gable
1. Puu Poopoo	sight on right hand “ <i>ahu</i> ”
2. Puu Poopoo	
3. Puu Poopoo	
4. Puu Palihae	sight on highest point
Puu Keekee	sight on hill on extreme left
1. Muku flow	
2. Muku flow	
3. Muku flow	
4. Spencer’s grass hut	[native house on sketch]
5. Mauna Loa	

Field Book No. 252:27-29
April 22, 1882
Keamuku Station

Puu Mahoelua
Kuu Noulupo
Auwaiakekua
Kuikahekili
Kamakoa
1. **Kaluamakani**
2. **Puu Nanahu**
3. **Mauna Kea**
4. **Puu o Kauha**
5. **Puu o Kau**

[Figure 45]

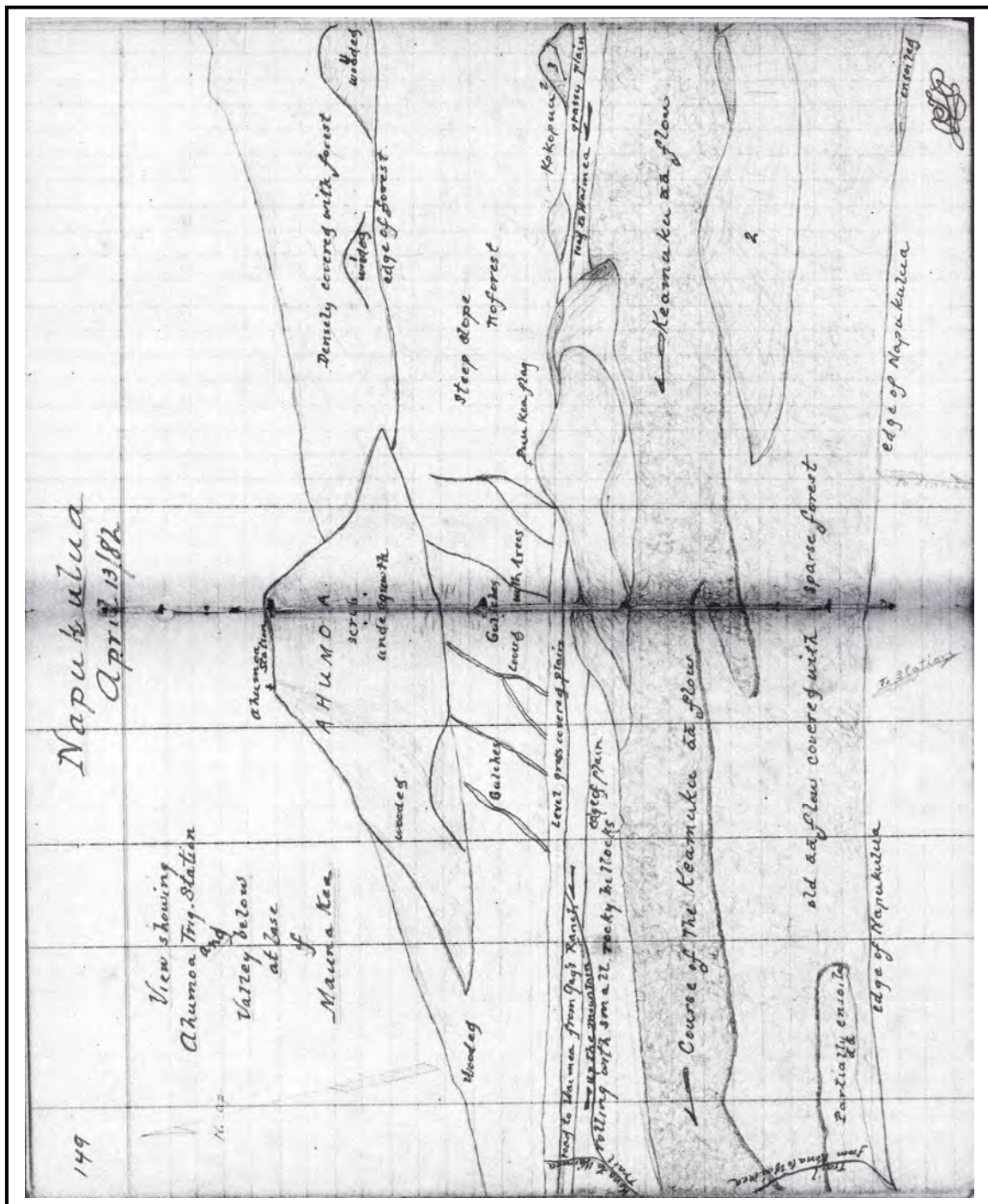


Figure 44. J.S. Emerson Field Book 251:149; View of Ahumoa and portion of Mauna Kea from Napuukulua (April 13, 1882).

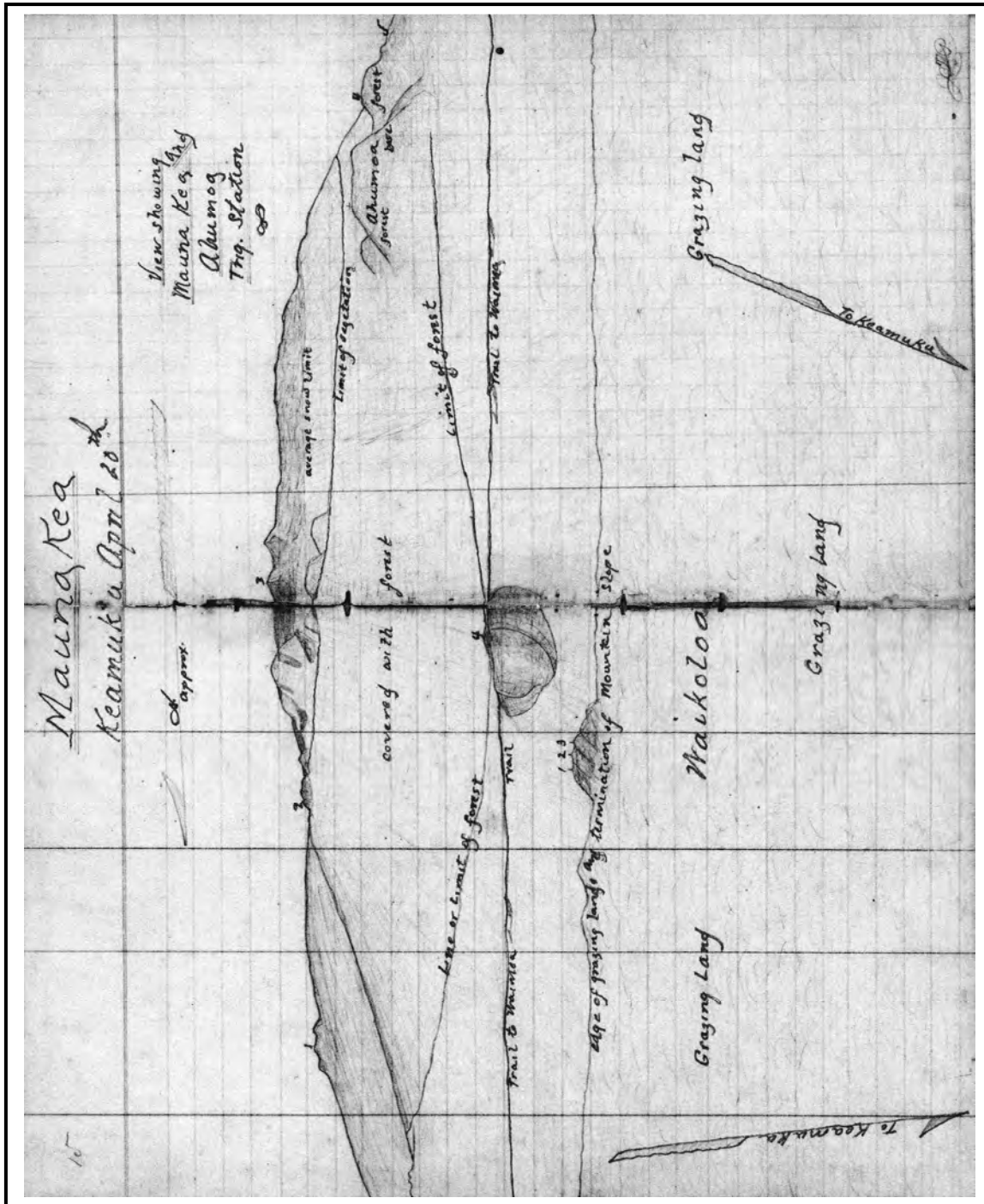


Figure 45. J.S. Emerson Field Book 252:15; View of Mauna Kea from Keamuku (April 20, 1882).

May 5, 1882

J.S. Emerson to W.D. Alexander

(Describing survey from Puu Anahulu to Ahumoa and the plateau lands):

...In spite of a “Mumuku,” with clouds of dust and occasional whirlwinds howling past, we have finished up this station in first class shape... *Iakoba has just returned from setting a signal at Naohuleelua, visible from Nohonaohae, Ahumoa, Puu ka Pele, Napuukulua, Puu Waawaa & Kaupulehu. It will have my careful attention and a thorough locating. We start at once for Puu Waawaa & then in a few days for Naohuleelua, via Keamuku & Puu ka Pele, a long and ugly road. But the journey must & will be made.*

Perryman is just laying himself out in the matter of topography. His sketches deserve highest praise... We are all well and ready for anything, though our eyes are red and inflamed by the fierce *mumuku*... [HSA – HGS DAGS 6 Box 1]

On May 20th, 1882 Emerson penned a description of Pu'u Moanuaiahea, and alluded to a *moa* (chicken or rooster) of some traditional fame that came from the Auwaiakeakua vicinity:

Moanuaiahea, from the rooster “*ahea*” that was probably the one that came from **Auwaiakeakua** on the slope of **Mauna Kea**. A rock resembling a rooster is to be found there. [J.S. Emerson Field Book No. 252, May 20, 1882:137]

May 21, 1882

J.S. Emerson to W.D. Alexander

(describing survey from Puu Waawaa to Ahumoa):

...To get a fair sight of **Ahumoa** taxed our patience severally. During the entire ten days we had a clear view for 15 minutes during one morning and 45 minutes one afternoon. The one essential condition for seeing the signal was an illuminated background of fog, in addition to the usual necessity for clear air between the signal & observer. *The ahu on the alaloe at Naohuleelua is in a forest and in a hollow, for which reason the signal was set on a clear hillock about 1000 ft. (one thousand) from the ahu.* This signal was clearly seen from our station at Puu Waawaa and carefully sighted upon. After a council of war, held for the purpose, on May 17, we concluded that as there was a rain & thunder storm in progress in the direction of Naohuleelua, it was inexpedient for this party to attempt a journey to that place at present, & that the logic of events demanded that we get out of that nest of sow bugs and abode of the fog as fast as possible...

...Perryman has embellished the pages of the field book with twenty four neatly executed views and sketches from the various trig. stations we have occupied... [HSA – HGS DAGS 6 Box 1]

Field Book No. 254

August 1882

(Descriptions of Stations and Station Marks):

...Ahumoa

Is a station on the western slope of **Mauna Kea** and is a large pyramid like hill. The station is situated on the Northern side of the crater and on the end of the hill nearest to [254:117] the slope of **Mauna Kea**. The underground point marks consist of a large irregular rock, apparently “in situ,” marked by a triangle, a drill hole, a pair of spectacle rims are in the hole... *A large “ahu” also surrounds the signal. There remain few trees on the summit as we cut them down.*

Puu Ka Pele

The most prominent hill in the valley below **Ahumoa**, it's top being very visible from the station in the direction of the S.W. base of Mauna Loa. The marks are as follows, viz: they are all above ground. The signal being set into a hole drilled in rock "in situ," said hole being in the centre of a raised triangle... A very small "*ahu*" erected.

Napuukulua

A small hill in the same valley, as **Puu Ka Pele** and about one mile and a half to the S.E. of it. The point marks are above ground and resemble those at **Puu Ka Pele**. [254:119]

Keamuku

Is on a small eminence to the N.W. of the Keamuku *āā* flow and said to be on the boundary line between the districts of Kona and Kohala. The underground point marks consist of a section of copper bolt driven into a large rock "in situ," and projecting about an inch. It is surrounded by numerous tin cans and a few bottles. [254:121]

September 23, 1885

J.S. Emerson, to W.D. Alexander

(Regarding Surveys of the Lands Around Mauna Loa and Mauna Kea; location of "Naohuleelua" and the old Trail to Mauna Kea and Neighboring lands from Kona):

...Monday I spent in hunting up a couple of suitable men to go with me into the mountains, in which I finally succeeded... We expect to go thence to Mr. Greenwell's ranch at Kanahā, from which place as a base of supplies etc. to set signals to command the following points, viz.

Jack's Goat pen at head of Lehuula
Ana o Kiha at head of Lehuula
Kikiaeae at head of Hokukano
Aahuwela cave at head of Hokukano
Ahu on Umi Road, head of Kealakekua
Kanekii water hole, head of Kealakekua
Wahapele crater, head of Kahauloa 2.

To do this will occupy some little time, as the great difficulty is to find some of the points. They all say that the only *kamaaina*, who really was posted, was Keakaikawai (Jack i ka wai) and he is dead!

I spent last Thursday night with your bro. James at Kealapuali (Charles Wall's old place). Though he has, like myself been somewhat ill he is pushing the work at the head of Kaumalumu and was to ascend Hualalai last Monday...with a humbug of a guide, we started Aug 26 up the **Judd road** & camped successfully at **Kealapuali, Ahu o Umi & Halelaau**, where we established a base of supplies. Sat Aug 29 our old guide led us a day's journey over the *pahoehoe* rock in search of **Naohuleelua**, which I am satisfied he knows very little about... Aug 31 we started for the summit of M. Loa and after many trials with a foolish guide, who got lost in the woods...we reached a point near the summit Thursday evening, Sept 3.

Friday Sept 4...with one brave native, your bro. & I pushed boldly into the fog...to the very summit... We set a huge signal a great distance down the mountain to command the southern part of Keauhou... Another equally fine signal we set on the summit ridge of the crater commanding (1) a large portion of the interior & base of the crater, (2) the opposite side of the crater, (3) **M. Kea**, (4) **Ahu Moa**, (5) **Puu ka Pele**, (6) Puu Waawaa, (7) W. Hualalai, (8) Puu Laalaau, (9) Keahuolu. Thus the problem of locating the crater will be solved...

On Wed. Sept. 9 with a boy I started for Puu Anahulu to find another guide to show us **Naohuleelua**. We slept in a cave on the way, and on reaching Iakopa's the next day found that he was the man to go with us, but Mr. Spencer could not spare him until Tuesday Sept. 15. While waiting for him, I set signals at Ana o Maui & Puu Huluhulu & reset that at Puu Waawaa...

*Sept. 15 we started with our guide & spent the night in a cave. The next day Iakopa showed us a large tomb like ahu on the old road from **Waimea** to the **Ahu o Umi** which he says is the real **Naohuleelua Ahu**. It is at least a mile north of the flow of 1859 and still further from the point which our first guide showed us. In conclusion I do not think the man can be found to show me a point to answer Hitchcock's description of **Naohuleelua**...*

*I am told by Iakopa that **Kaohe** was surveyed by the "haole lolo," Wiltze. When at Puu Waawaa with Perryman I sighted Iakopa's flag for Naohuleelua. Mr. Lyons thought it was too near Puu Ka Pele. But if that is not the point, where is it?*

...There is much to be said about the wonderful crater, Mokuaweoweo, and the grand scenery from M. Loa, but I must close... [HSA – HGS DAGS 6 Box 2]

December 8, 1885

J.S. Emerson, to W.D. Alexander

(regarding survey of Naohuleelua, Keamuku and Ahumoa vicinity):

*...I have to report that my effort to settle the location of the much talked of **Naohuleelua Ahu**, of Keakaikawai & D.H. Hitchcock has been, as I believe, successfully accomplished. I have located an ahu 18 feet long, 7 feet wide & 4 feet high on the East side of the well known **Alanui Kui** leading across the ancient aa from the flow of 1859 to **Puu Ka Pele & Waimea**. The direction of the road, as far as visible is N. 20 E. magnetic. About 40 feet South of the ahu is the edge of the aa bank. At about 90 feet is another similar descent of say 7 or 8 feet.*

From that point the road going South crosses a "kipuka" or open land (ancient *pahoehoe*), covered with shrubbery & weeds for say 250 feet before reaching the barren, black *pahoehoe* flow of 1859. The ancient aa about this ahu is covered as far as visible with small trees, *ohia*, *aalii*, etc. Magnetic bearing to **Puu Ka Pele** 229° 15'. At Waimea I saw the aged Kahakauwila, brother-in-law of John Parker, who assures me that the two bald headed men, for whom the ahu is named, met on this road, one coming from Waimea & one from Kona. There is no other road above this one on which they would have crossed the aa. This is the road and the only road and all agree that the point was somewhere on this road. The point selected by Hitchcock was on the aa bank on the North side of the flow of 1859. These considerations lead to the adoption of the above ahu as the one which Mr. Hitchcock fixed upon & attempted to locate.

I think that the difference of bearing in our observations of **Puu Ka Pele** need not cause any anxiety.

Some local or personal attraction may have deflected his needle the trifling amount of 24°. I went to the point on the N. Bank of the flow of 1859 whence **Puu Ka Pele** bore in the direction indicated in his notes. I spent one day most carefully searching for an ahu somewhere near the edge of the flow, going a good distance above and a greater distance below the point indicated. I stimulated my men by the offer of a reward for finding it & am satisfied that no such ahu exists. After all the testimony which I have gathered on this subject, it seems that there is little chance of any other point being found to claim the title of **Naohuleelua**. I occupied **Puu Ka Pele** and **Ahu Moa** two days each and left large cloth covered ahus and puloulous at each place. The air was full of dust and I failed to see Puu Ouo in spite of its huge signal, but did good work in other respects.

*The terminus of the Judd Road among the other points is carefully located. No expedition which I have ever conducted has caused me such anxiety and has been attended with such loss as this. It was a frightful trip, the remembrance of which haunts me. The water holes were dry and the country parched with drought. At Waimea we encountered a cold storm of wind and rain. At **Keamuku** the animals drank too freely of bad water. Used up with hunger, thirst, cold and improper drink, they fell by the way. Though I did my best to save them, I lost my poor old horse at Waimea and left the old Waawaaikinaauao to die on the flow of 1859 along with a mule belonging to my man... The rumor which reached you that the tank at Keamuku was locked up and that I went to Waimea for the key was a mistake...* [HSA – HGS DAGS 6 Box 2]

Surveys of Mauna Kea and the Hilo Region Mountain Lands by E.D. Baldwin (1889-1891)

In 1889, E.D. Baldwin conducted a detailed survey of the Hilo Mountain Lands. His trip and results of the survey were documented in an article he published in 1890 (cited earlier in this study), and in letters as the one cited below:

Hilo, Hawaii

August 18, 1889

E.D. Baldwin; to W.D. Alexander

(Reporting on Mauna Kea and vicinity survey trip):

...I am just back from our **Mauna Kea** trip. We left Hilo Aug. 6th at 8 A.M.; with three pack animals. Mr. Burt, Levi and Ernest Lyman went along with us. *We took the Hitchcock road, up through the woods and then over the 1855 flow to their camp **Halealoha**, about 20 miles from Hilo, which camp we reached at 8 P.M. – the moon assisting us to find the trail the latter part of the way. The bark house at **Halealoha** is partly rotted away, but gave us good shelter for the night. Next morning we made a start for **Puakala** or Hitchcocks house near **Ahuwela**.*

Mr. Burt and I went on ahead with our rifles and shot two young bullocks, from which we got enough meat to last us several days. Arrived at **Puakala** about 5 P.M. *Here the Hitchcocks have a fine large house, made of koa, - which was sawed out by hand.* They had kindly given us the keys of the house, so that we made it our headquarters. The rest of the week was spent getting out poles for **Ahuwela** sta. We had to go a mile below Puakala house to find straight – enough poles, which we hewed out and then dragged up to the hill. (Mr. Lowenstein and I saw the poles clearly this morning, from Hilo.) Both Morris Chamberlain and my native boy were taken down sick Monday. We intended to make a start for the top of the mountain any way, and got up at 4 A.M. for that purpose, but found some of the horses gone, which were not found until near noon, so we gave up the trip for that day. Next morning, Tuesday, we started at 7 A.M. The party consisting of Mr. Burt, Levi & Ernest Lyman and myself. Morris and the native boy (David) being left behind, as they were not well enough. *Mr. Burt was the only one, in the party who had been to the top of **Mauna Kea**. There is no regular trail going up, we followed the main cattle trails until those disappeared, and then clambered over the clinkers, picking our way as best we could.* One of our pack mules began to act rather stubborn about going up the mountain so I packed my horse, and rode the mule, and by means of considerable spurring got him about a mile further, or about three miles from the top when he refused to go at all, so we tied him, with a feed of oats near by and left him. I walked part of the way, when Mr. Burt kindly urged me to ride his horse, which I did for a ways, (as I had quite a headache) *reaching on the top plateau we pushed on some two miles further, trying to find the lake.* I tramped the last two miles on foot, and was taken down very sick, with mountain sickness. We concluded to camp while *Mr. Burt went in search for the lake, which he found quite aways above us among the central cones.* The animals were very

uneasy during the night; clawing up the dust, and breaking and chewing up their ropes. One mule persisted in breaking away and hanging around the tent; barking all of our wood, tearing an animal cloth and one of our blankets all to pieces. Levi Lyman and I were the only sick ones. Mr. Burt and Ernest standing the trip first rate. Next morning we packed up; *visited the lake on the way down, which is about 200 feet by 150 feet; and set our pole on the summit cone.* We struck the right cone the first time. I rode up on my horse, carrying the pole and 4 inch instrument up with me. The climb was a hard one, but by zigzagging and taking it slowly the horse managed to get up, a mile north of us I could see Lyon's pole lying on the ground. Our cone over topped considerably all the others. The day was fairly clear, but I was feeling rather under the weather to appreciate the grand scenery from the top, so we made for lower regions. Found our plaid out mule had also concluded he would seek a lower altitude; as he had broken loose and gone. It fogged in, about half way down, so thickly that we could see only a few hundred feet before us. We kept on steadily going down, crossing the trail to the house, without knowing it just at dusk, and fetched up against the *makai* end of a fence which we recognized, and followed up about a mile until we struck *the main trail near the corner of the fence. Here we started one of the mules ahead on the trail and trusted that he would keep the trail and carry us to the house (as it was intensely dark – with the thick fog); which the mule did nicely, getting us there about 8 P.M.*

Mr. Burt, Levi and Ernest Lyman started for Hilo Thursday noon, and I concluded to start for Hilo Friday morning, (reaching Hilo at 8 P.M.) and sent another pack animal up to Morris. On the way down here I found the mule, which had given out going up the mountain... [HSA – ID Survey, 1889]

In 1891, Baldwin again returned to Humu'ula and vicinity, furthering the survey work initiated in earlier years, and to finalize the surveys of the Boundary Commission. Baldwin's letters and sketches from his field books, provide us with descriptions and views of the mountain landscape at the time. On April 27th, 1891, Baldwin reported back to W.D. Alexander:

...I arrived in Hilo last Saturday night from **Puakala**. We have had fairly good success at **Aahuwela**, having measured the angle between **Alala** and Kulani also nearly finished the angle between Halai and Kulani also Alala and Halai. The 8 inch is a very slow instrument to work with, there being a great deal of lost motion in setting. But by a great deal of care in setting, I believe we have managed to do very fair work with it. The measurements of the Alala-Halai angle so far close the triangle within 4".

We had a very rough trip up the mountain; it raining steady all of the three days on our way to **Puakala**. Thrum started the day before I did and reached **Hale-Loulou** just at dusk; and was unable to start a fire, everything was so wet. He had a great deal of trouble with the pack animals in the woods. Two of our animals were completely used up by the trip, and I am afraid will be unfit for use any more.

I will start back early tomorrow morning. I send down any April accounts; the laborers pay roll, I will send down next month... [HSA – ID Survey, 1891]

In May, Baldwin reported:

Hilo, Hawaii

May 30, 1891

E.D. Baldwin; to W.D. Alexander:

(Reporting on survey trip along Humu'ula slopes of Mauna Kea):

...We are having a very tedious time of it upon the mountain; the weather has been very fair below, but the fog and clouds hang just over **Aahuwela**, so that for the last three weeks we have done almost nothing.

I have given up the idea of trying to see Kapoho or the other Puna stations from Aahuwela as they are always covered with a cloud, and I am afraid we will have to wait until doomsday to see them. I am going to send a heliotrope to Kaloli point – a short ways beyond Keaau, and devote myself to the large quadrilateral **Aahuwela**, Alala, Kulani and Kaloli, and work on through Puna from the base, Kulani to Kaloli which will form good triangles with my other Puna stations.

We hope to finish with Aahuwela soon if the weather permits, at any rate I am going to finish the topographical work around the base of the mountain to **Kalaieha** and a little beyond, and leave Thrum to watch at **Aahuwela**. We have been on Aahuwela for the last four weeks, every morning at day light, and then gone up before noon, and remained until there was no hopes of its clearing, without accomplishing any thing on the Hilo station with the exception of Kulani and Puu Ulaula which are always clear in the morning.

Kulani is just below the almost perpetual cloud line, so that I think it will not take us long there.

I have no suitable map tin to send the Hilo map down in; and think rather than run any risk of damaging the map, I will bring it down with me, as I intend to go to Honolulu on June 22nd and attend the Punahou Jubilee.

I send part of my accounts for the month of May, that is all but the labor items. Can you please turn over to H. Chamberlain \$72.00 on my account.

We need all the animals we can get, but they must be strong and in fairly good condition to stand our hard trips. If the Molokai horses are in good condition, I think we had better have them up here... [HSA – ID Survey, 1891]

Entries in Baldwins' Field Book No. 323 (viewed in the collection of the State Survey Division), from June 1891 include sketches depicting various localities on Humu'ula, Ka'ohe, and neighboring lands. Among the features identified are Pu'u 'Ō'ō survey points and the location of the original ranch house; fence and paddock lines; trails to Mauna Kea, Kīpuka'āhina, and the mountain road; named *pu'u* from the forest line to the mountain slope, and on the Pōhakuloa flat lands—several of the names are no longer found on maps; the location of "Waihu" spring; the extent and range of the forests; and the Haneberg facility at Kalai'eha (*Figures 46a, 46b, 47, 48, 49, and 50*).

Figure 51, taken from Baldwins' entry in the field book for June 16th, 1891, depicts the scene from Pu'u Huluhulu across the table lands to the Kalai'eha Station, and up to the summit of Mauna Kea—"Puu o Kukahauula." Baldwin includes the main station paddock fences, a depiction of the station buildings, and names several prominent features on the Mauna Kea landscape.

On Wednesday, June 17th, 1891, Baldwin recorded the occurrence of piles of stones on the summit cones of Mauna Kea, and on the cones of Kaupakuhale and Omahulua. A note in the field book entry for the summit cone (Pu'u o Kūkahau'ula) recorded:

Pile of rocks on Highest peak. 151° 16' 30" Pile of stones on highest point of Mauna Kea as sighted from Puu Huluhulu & Lepeamoā, where E.D.B. set flag. [Field Book 315:58; in collection of State Survey Division]

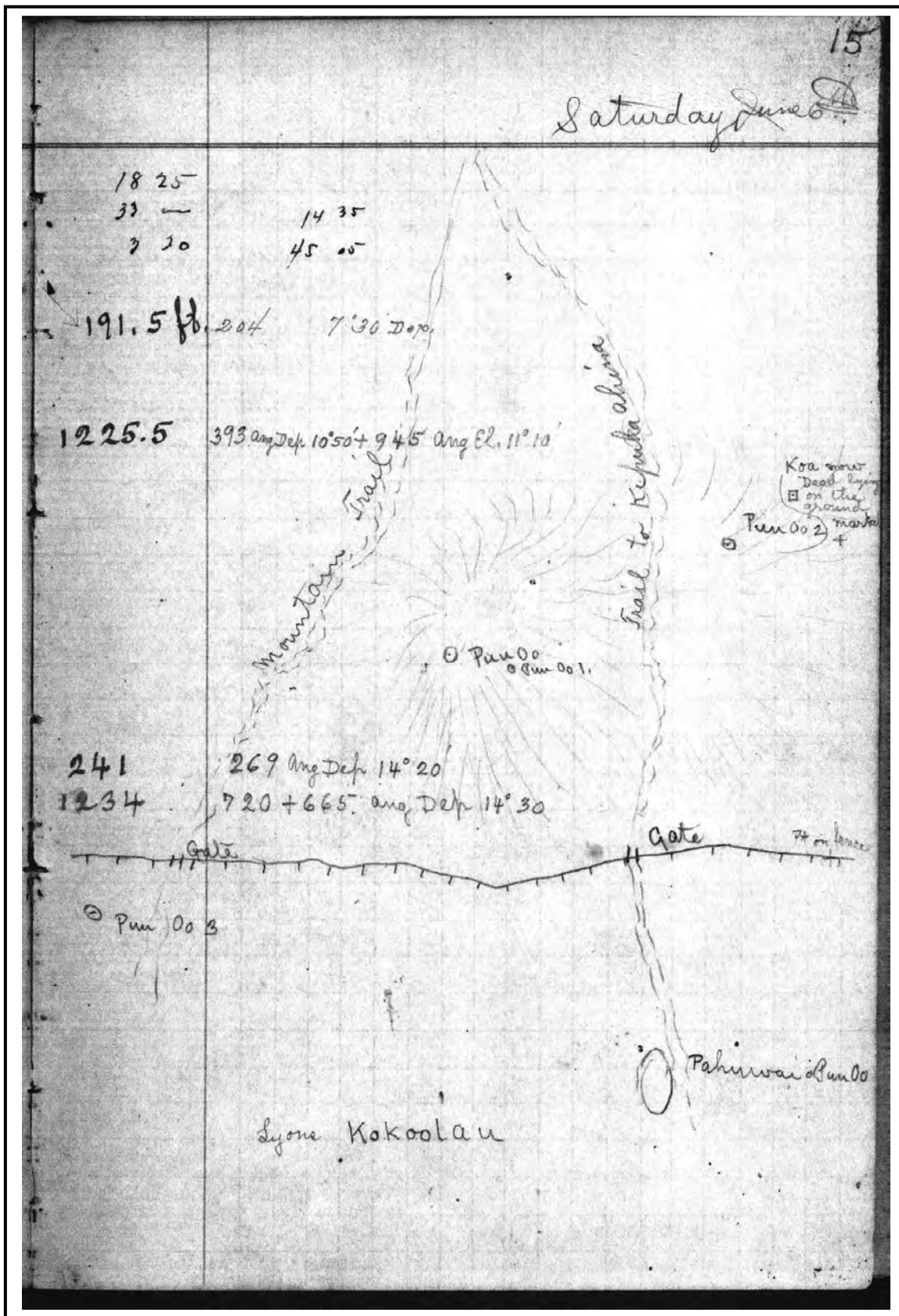


Figure 46a. Pu'u 'Ō'ō Vicinity Trails and Fence Line
(E.D. Baldwin, Field Book No. 323:15; June 6th, 1891)

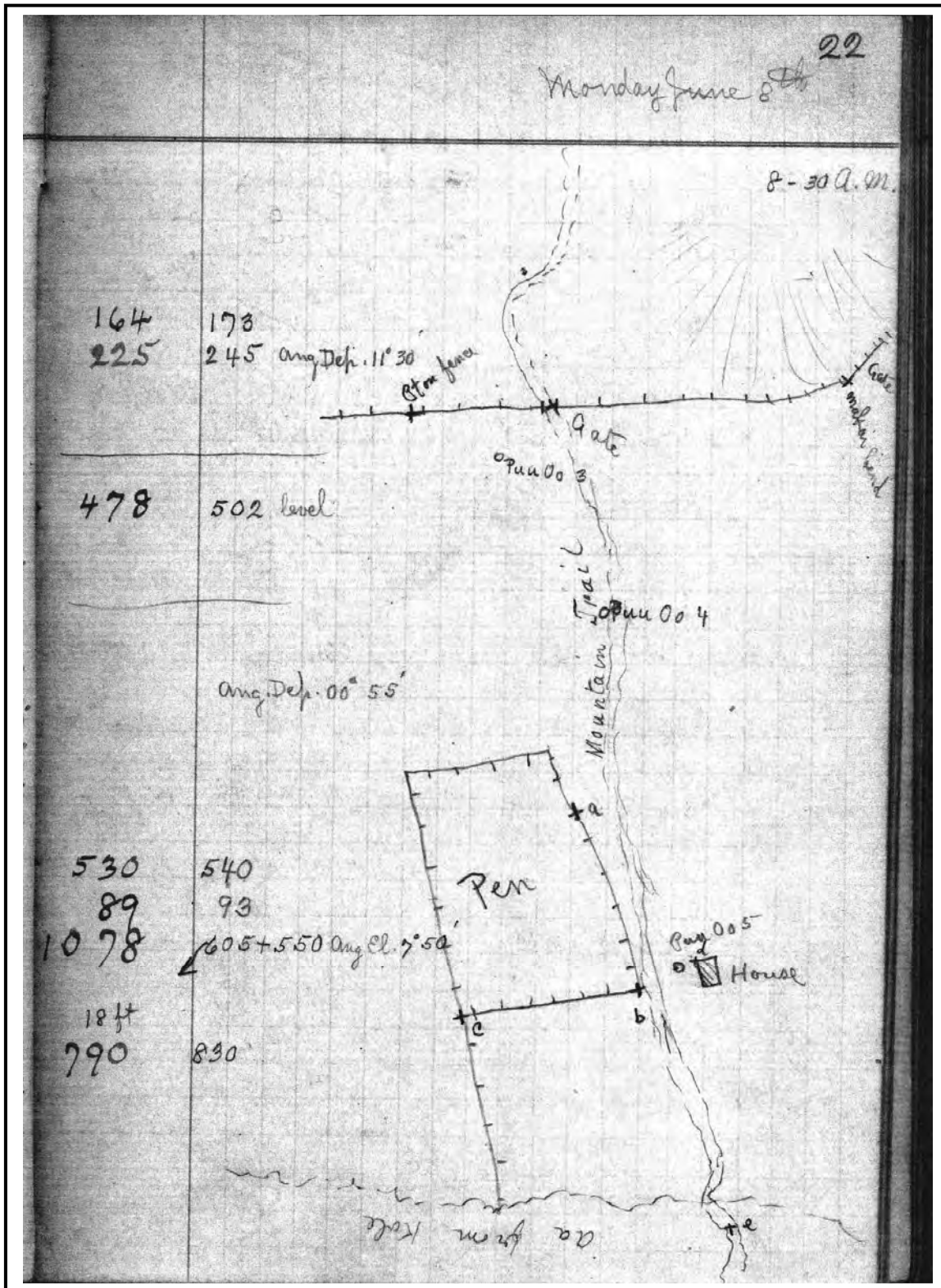


Figure 46b. Lower Pu'u 'Ō'ō Vicinity Trails, Paddocks and House
(E.D. Baldwin, Field Book No. 323:22; June 8th, 1891)

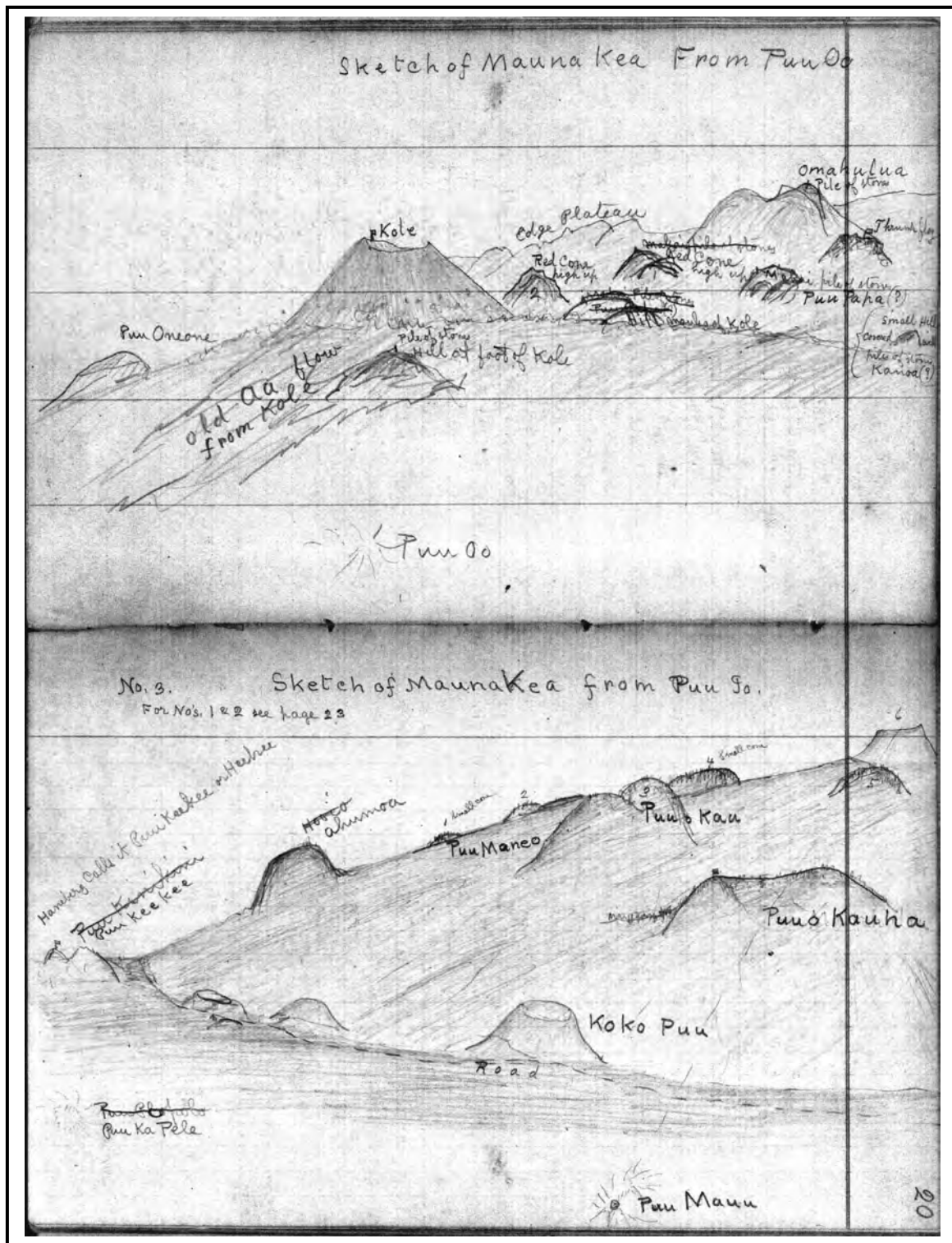


Figure 47. Sketch of Mauna Kea from Puu Oo, Depicting named Puu; & Sketch of Mauna Kea from Puu Io, Depicting Puu Koko (with Road), Puu Keekee, Puu o Kauha, and Named Pu'u of Kaohe (E.D. Baldwin, Field Book No. 323:19-20; June 7th, 1891)

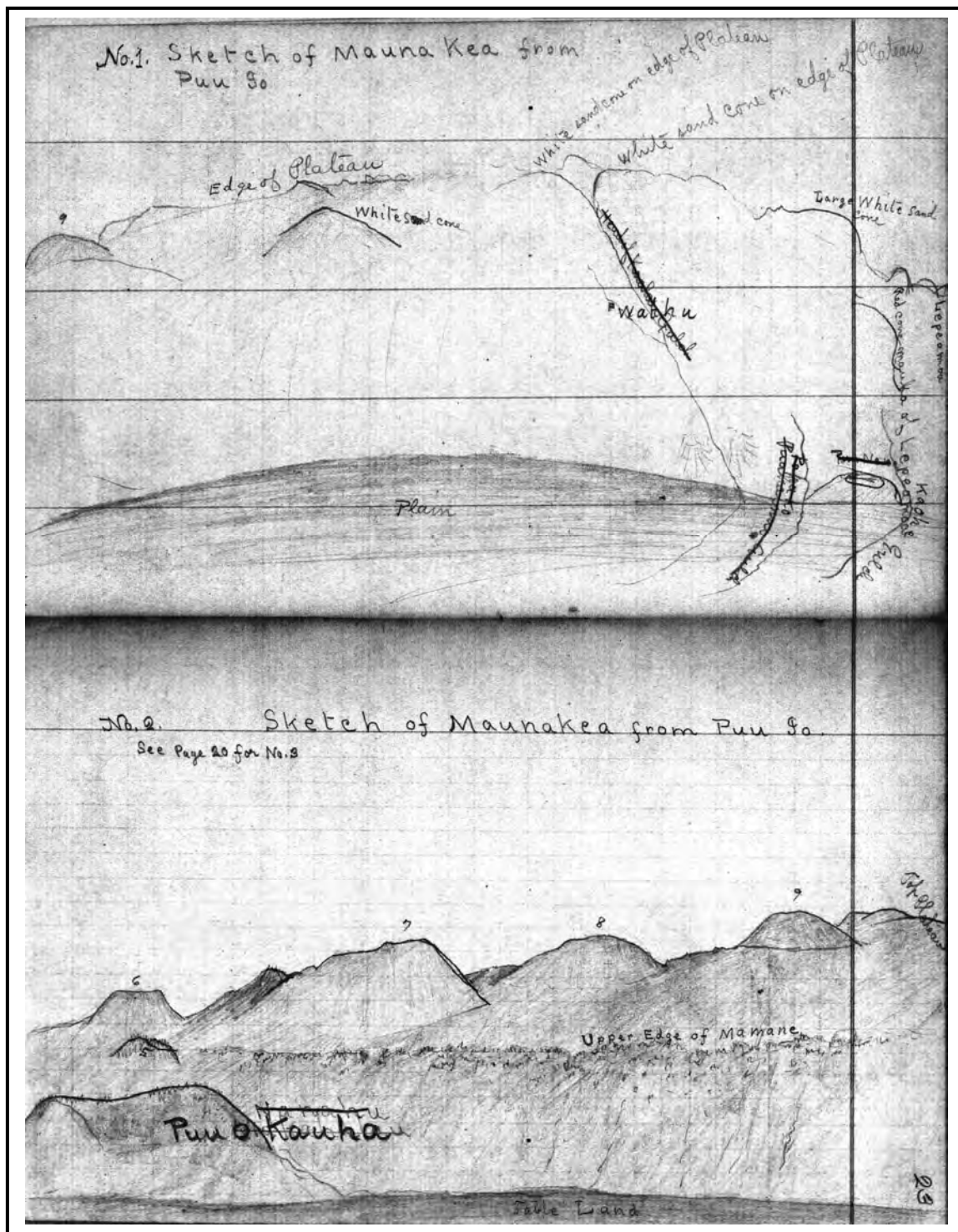


Figure 48. No. 1. Sketch of Mauna Kea from Puu Io (locating Waihu); and No. 2. Sketch of Mauna Kea from Puu Io (locating Upper Edge of Mamane and Puu) (E.D. Baldwin, Field Book No. 323:22-23; June 9th, 1891)

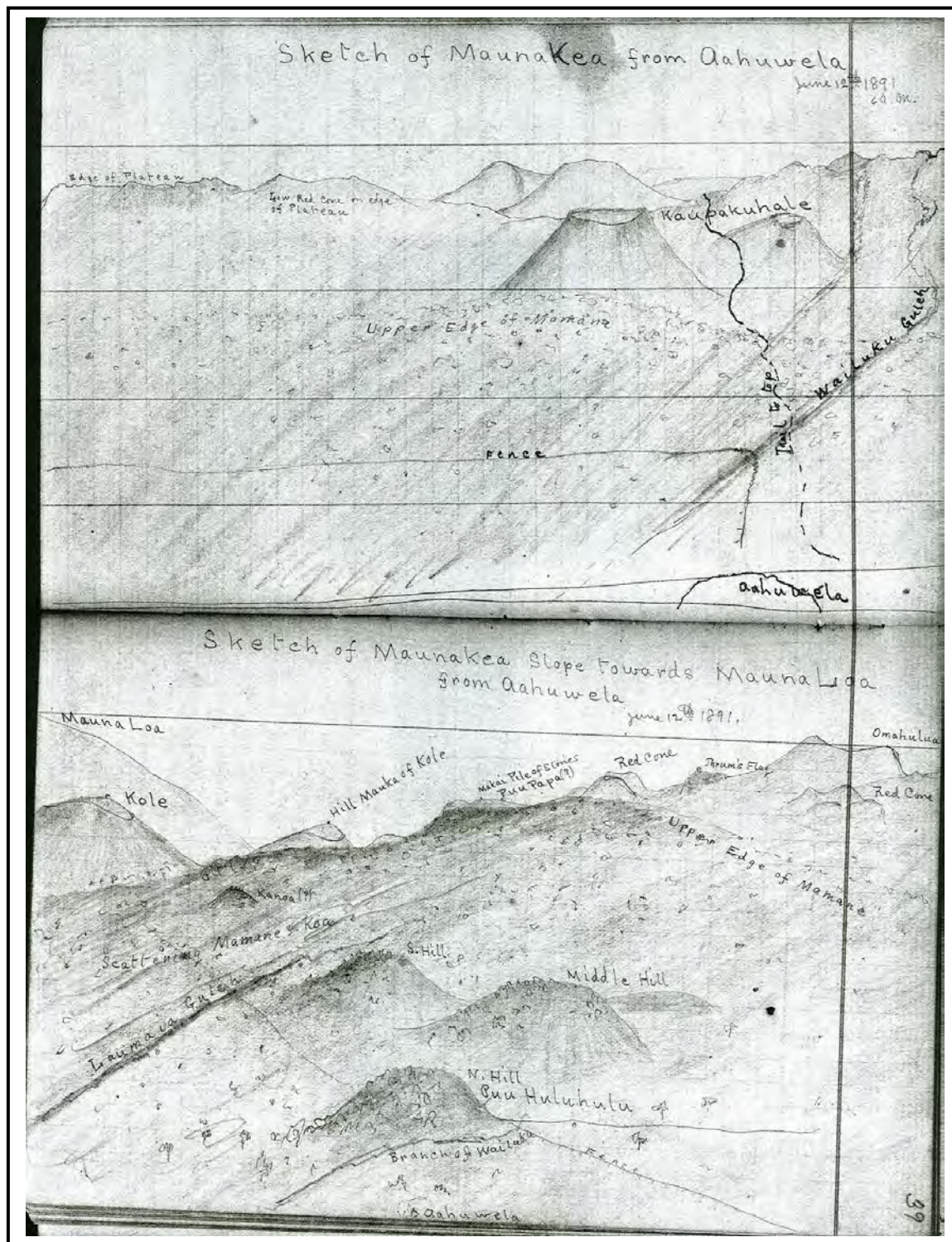


Figure 49. Humu'ula and Mauna Kea from 'A'ahuwela; Depicting Named Pu'u and Gulches, Fence Lines, and Forest Lands (E.D. Baldwin, Field Book No. 323:38-39; June 12th, 1891)

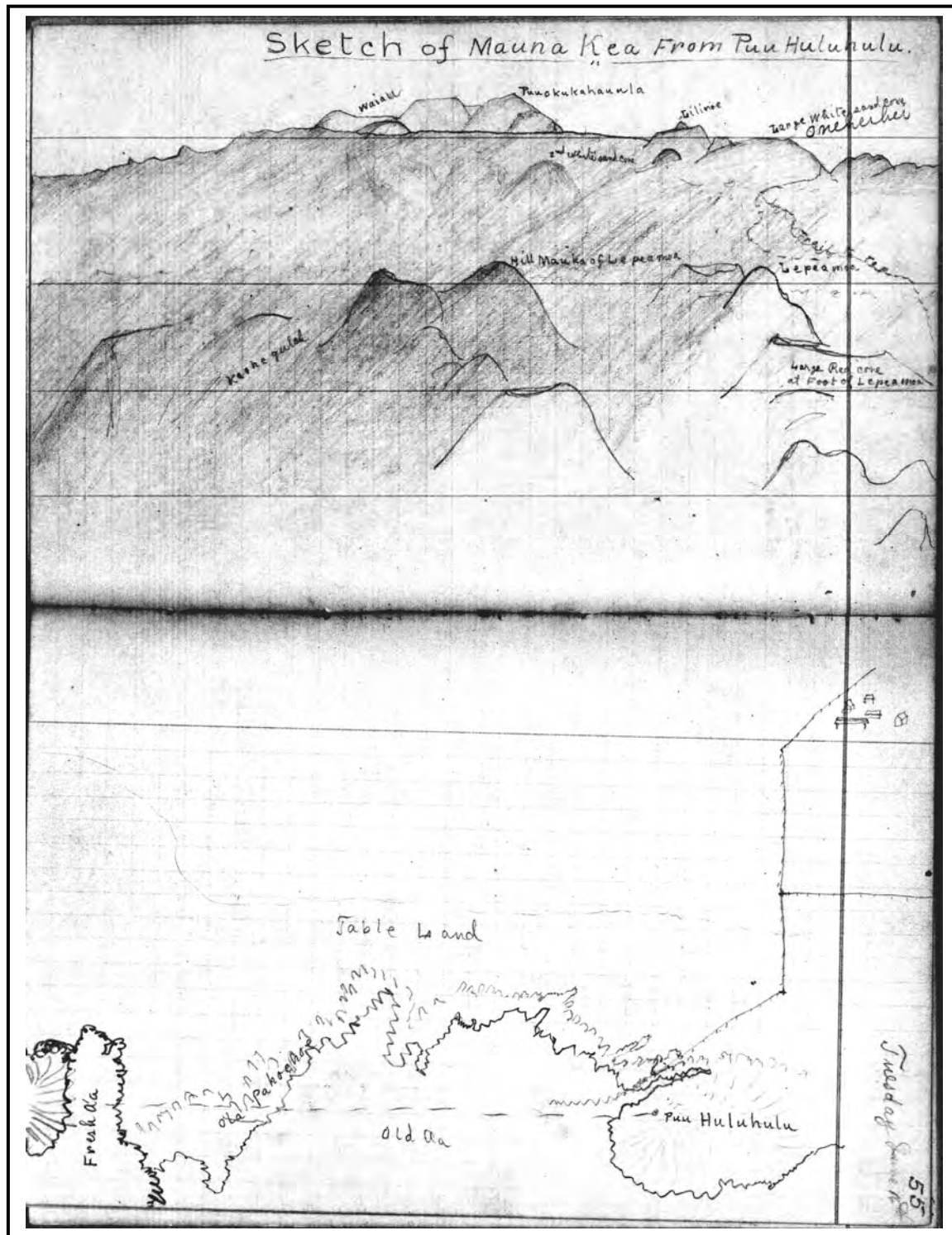


Figure 51. The Kalai'eha Station and Mauna Kea (Locating - Puu o Kukahauula, Waiau, Lilinoe and Trail to summit), viewed from Pu'u Huluhulu (E.D. Baldwin, Field Book No. 323:54-55; June 16th, 1891)

Mauna Kea Survey Notes (1891-1894)

Honolulu, Oahu

August 27, 1891

C.J. Lyons; to W.D. Alexander

(Requests survey of Kaohe, in preparation of issuance of lease):

...The Interior Office will very soon want the notes of survey of **Kaohe** for lease, and I expect to be called upon for them.

It was with reference to this that I wished the positions of **Kole A; Lepe a Moa, Omaokoili, and Pohaku Hanalei**, as fixed by triangulation by Mr. Baldwin, and requested them of him through yourself about a month since. I should like to respect fully inquire why they have not been finished, as it is now a long time since the measurements were made... [HSA – ID Survey, 1891]

Hilo, Hawaii

September 2, 1891

E.D. Baldwin; to Professor W.D. Alexander:

...Thrum and Chamberlain arrived this evening from the mountain. I wrote to Thrum to give up locating any points below Lydgates **Mawai** [Mawae] on the 1855 flow, so that we might push on to Kulani. We will make a start for Kulani next Monday. In regard to the location of those five points – I understood that you wished the notes of survey from **Kaupakuhale on to Pohaku o Hanalei**, and as I supposed that Lyon's had located **Kaupakuhale** I did not relocate it again; and after receiving your letter a month ago; wrote by return steamer for Lyon's location of **Kaupakuhale**, so that I could get the distance and bearing from **Kaupakuhale to Kole** from my map. Lyon's has not as yet sent me the location of **Kaupakuhale**; but wrote by last steamer that he would like the coordinates of four of the points referred to **Aahuwela**, which I have sent him by this steamer.

We have been making up a lot of oil-skin clothes and bags, also we made a fly and tarpoling for our small tent, which accounts for the large amount of canvas duck we have been buying.

Our large tent and fly are nearly all to pieces. Can you please send us up another large tent and fly. Also I would like a lot of blank vouchers and a large calculation book.

Can you please pass H. Chamberlains pay over to W. Frear \$79.85. And deposit \$300.00 in the Postal savings Bank for me, and please send the balance to me... [HSA – ID Survey, 1891]

Hilo, Sept. 11th, 1891

E.D. Baldwin; to W.D. Alexander

(Regarding survey and map (No. 1718) of Central Hawaii):

...We are having beautiful weather up here now; **Mauna Kea** has been clear twice nearly all day, and it seems a pity to give up the field work just now.

Horace [Chamberlain] is the best boy I ever had to work with me. He is a rusher, and not a bit afraid of work. He shod all the animals on the way down from **Mauna Kea**, and I was about to get him a saddlers out-fit so that he could do all our saddle mending, which amounts to quite an item, in a wet climate like this – where every thing rots so quickly. I am afraid he will be very much disappointed, unless he can get some-thing to do...

Please send me some definite instructions in regard to Thrum and Chamberlain, so that I can dispose of them as soon as we return from Kulani; also I have over \$600.00 worth of animals and saddles of my own on my hands, and 3 Gov't. Survey horses. My own

animals are pretty well plaid out by **Mauna Kea** trip and packing into Kulani, and if sold now will fetch less than half of their value, and if put out to pasture, will soon eat up their value...

I will finish as soon as possible the Central Hawaii map. Also will take up the Hilo Town 50 ft. to the inch maps... [HSA – ID Survey, Hawaii, 1891]

July 23, 1892

Field Book No. 429, W.D. Alexander

Mauna Kea Survey Trip Notes

Records of former parties who visited Peak A & left them in a tin box

[See Figure 12 – for Peak A (Poliahu)]

- I. Sep. 9th, 1885. Dr. E. Arning, F.W. Glade, R. Sneyd Rynnersley, H. Purvis & Deverill.
- II. Aug. 8th, 1875. S. Berggren, Naaekauna, Ahueau, Onohi.
- III. Sec. 9th, 1875. Commander Lon R.N., Leiut Noel R.N. H.B.M.S. “Fantome.”
- IV. July 26th, 1875. E. Wetmore, D.H. Hitchcock, Hattie A. Castle, Danny Wetmore, Ella Hitchcock, Carrie Castle, Katie Wetmore, Clare Shipman, Cora Hitchcock & Lucy Wetmore.
- V. Sep. 24, 1870. Howard Hitchcock, Haalelea & Kahale Kai. Plenty of snow around.

Capt. Long remarks that it is not the highest pt., which bears N.W. from it. [Field Book 429:25; in Collection of State Survey Division]

Hilo, Hawaii

September 20th, 1894

E.D. Baldwin; to W.D. Alexander

...You will find the elevation of **Omaokoili** in my calculation book, which I turned over to Lyons. I do not remember calculating the elevation of **Huikau**, but believe I have some angles of elevations on **Huikau**, which you can find in my **Mauna Kea** field book, which has also been turned over to Lyons.

I learn that Pres. Dole and Mr. Iaukea are coming up here next steamer, and can you kindly loan me the little pamphlet on New Zealand lands, as I would like to discuss the matter with Mr. Iaukea... [HSA – ID Survey, 1894]

Mauna Kea Survey Records in

Collection of U.S. Coast and Geodetic Survey (1876-1892)

As a result of work conducted by E.D. Preston on Mauna Kea, in partnership with the Survey Division of the Kingdom of Hawai‘i, a record and description of primary triangulation stations on Mauna Kea were furnished to the Coast and Geodetic Survey. These records, now a part of the National Archives and Records Administration (NARA) collection series RG-23, record survey coordinates compiled by W.D. Alexander and C.J. Lyons from 1876 to 1892. They include the following records for Mauna Kea and vicinity:

Description of Primary Triangulation Stations, Hawaii

Papalekoki

Station mark a tremendous *ahu* on North brow of hill with a flag pole in its centre. Perhaps a brass [triangle] or tube.

Altitude 11,429 feet.

Reference Objects:

Puu Io
Nohonaochae
Kihe
Punohu
Koholalele
Paauihau
Anuenue
Apakuie
Kaluamakani
Kuilei. [pages 34-35]

Mauna Kea [Figure 52]

Station mark an iron pin & an ahu of light stones & the bones of a defunct cow on the peak 1689 feet Northerly from the summit. This peak is visible from Hamakua.

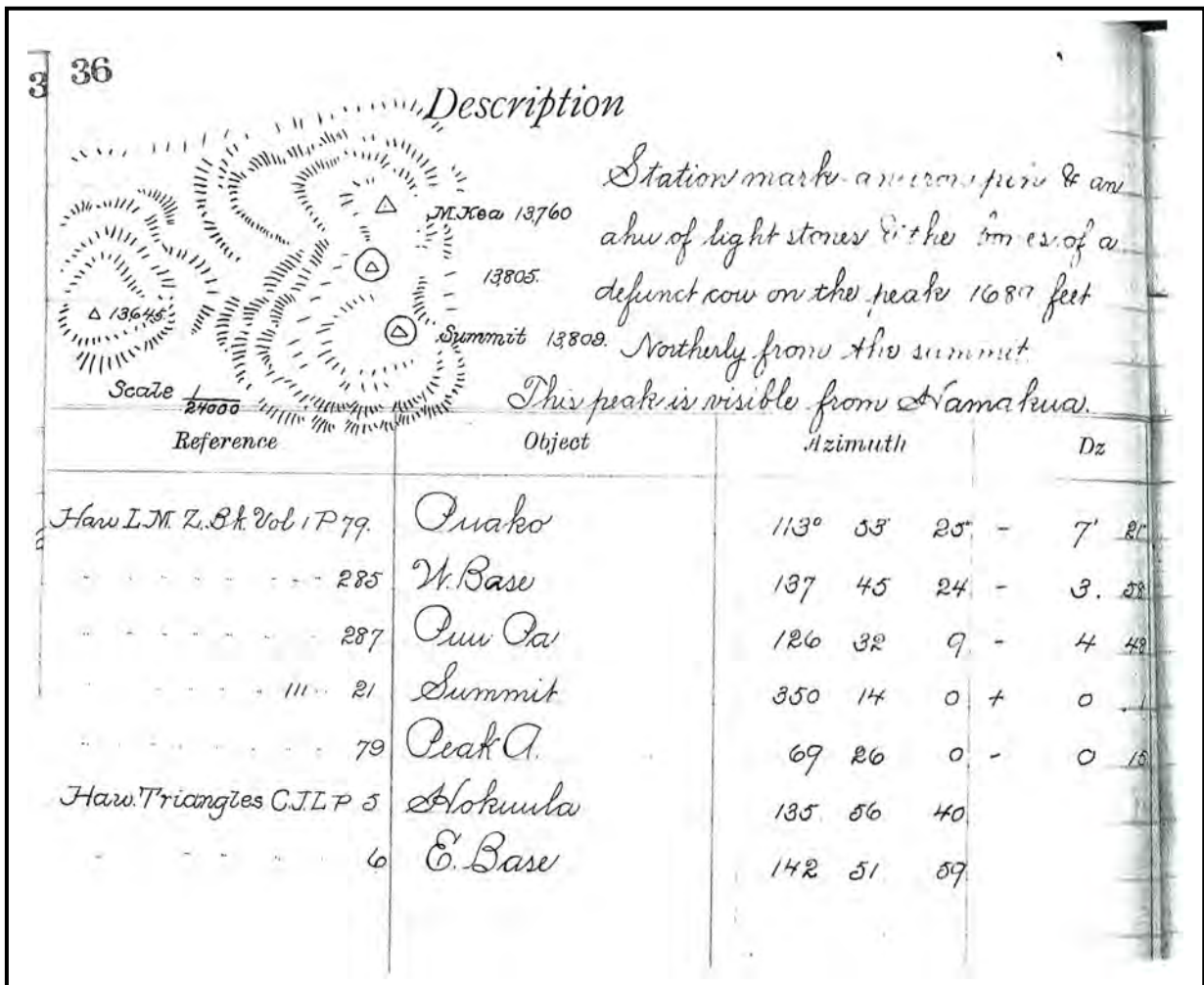


Figure 52. Mauna Kea Triangulation Signal; NARA Collection, Series RG-23 (page 36)

Altitude 13760.0 feet

Reference Objects:

Puako

W. Base

Puu Pa

Summit

Peak A.

Hokuula

E. Base. [pages 36-37]

Summit = **Kukahaula** [Kukahauula]

Station mark a wooden flag pole & a stone *ahu*, no other mark.

Altitude 13810.0 Feet

Reference Objects:

M. Kea

Lilinoe

Peak A

Peak B [pages 38-39]

Peak A (Poliahu)

Station mark, a flag pole & a tall stone *ahu* with a tin box containing records of 6 parties from '85 down; no other mark – on the most striking but not the highest peak of the mountain.

Altitude 13646.5 feet

Reference Objects:

Lilinoe

Mauna Kea

Waiau Aston. Sta.

Summit

Peak B

Waiau Crater Sta.

Lilinoe [pages 40-41]

Waiau Aston. Sta.

Station mark, a pier about 3x2 ½ ft. & 3 ft. high, built up of stone & cement with a + cut in stone on top situated on a slight rise, about 35 or 40 feet from the S.E. edge of **Waiau** pond.

Reference Objects:

Peak A

Peak B [pages 44-45]

Red Hill

Station mark a large stone *ahu* visible from Volcano house and a small N.W. pole on the most prominent part of **Kaupo** peak as seen from Hamakua & Hilo. Probably a copper [triangle] under the pole.

Altitude 11873.2

Reference Objects:

Kihe

Humuula

Kawailahilahi

Papaaloa

Puu Ohai

Haiku

Honohina

Kauku

Halai

Kalepa

A. Kaala

Kaloaloa [pages 46-47]

Apakuie [Figure 53]

Station mark — A tin can buried at the intersection of 3 rows of stones, sunk in the ground as in diagram, with a screen of stones to the windward, to keep wind off; on W. summit of a hill [triangle] on rock on **Holuokawai** cave bears $115^{\circ} 20'$ Mag. Distant 910 feet. Altitude 5848 feet.

Reference Objects:

Kihe

Papalekoki

Laumaia B.

Kaluamakani

Punohu [pages 48-49]

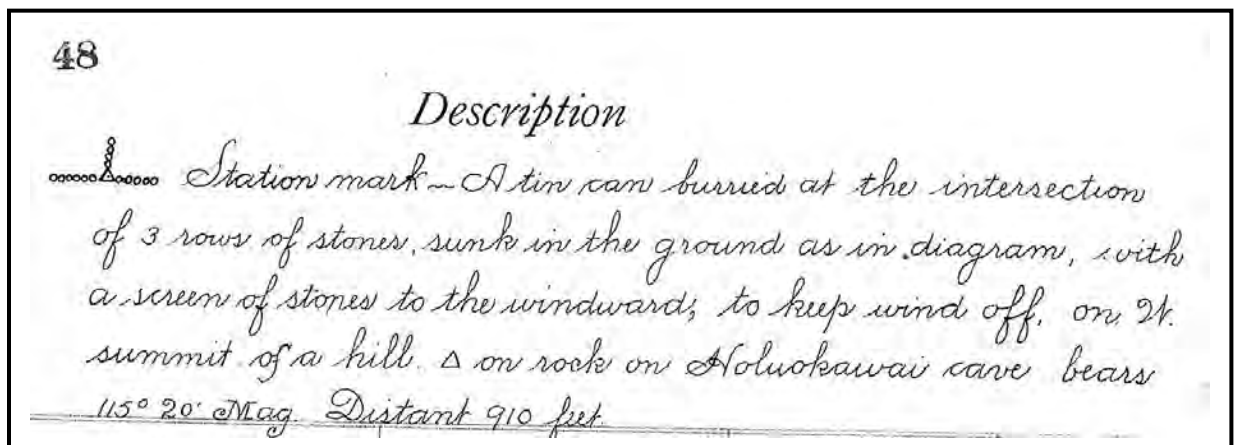


Figure 53. Apakuie Triangulation Signal; NARA Collection, Series RG-23 (page 48)

Kihe

Station mark a *mamane* post in the centre of a platform of stones about five feet high & 8 feet on a side. With an az. of 38° Mag. and Dist. 96 feet from the Sta. is a X on a stone in situ on the W.N.W. side of crater. Altitude 7822 feet.

Reference Objects:

Papalekoki

Punohu

Koholalele

Kaholo
Humuula
Red Hill
Apakuie
Laumaia B
Poopuaa
Kaluamakani
Kalepa
A. Kaala [pages 50-51]

Kaloaloe [Figure 54]

Station mark a buried copper [triangle] & a *mamane* post set up over it in 1879. As. $76^{\circ} 45'$, 545 feet to highest point of a magnetic rock marked [triangle]. An Az. $70^{\circ} 35'$ 87 feet to a small marked rock. Az. Red Hill $113^{\circ} 0' 33''$ Az. M. Kea Sta. $95^{\circ} 11''$ Station situated in map. Altitude 66637 feet.

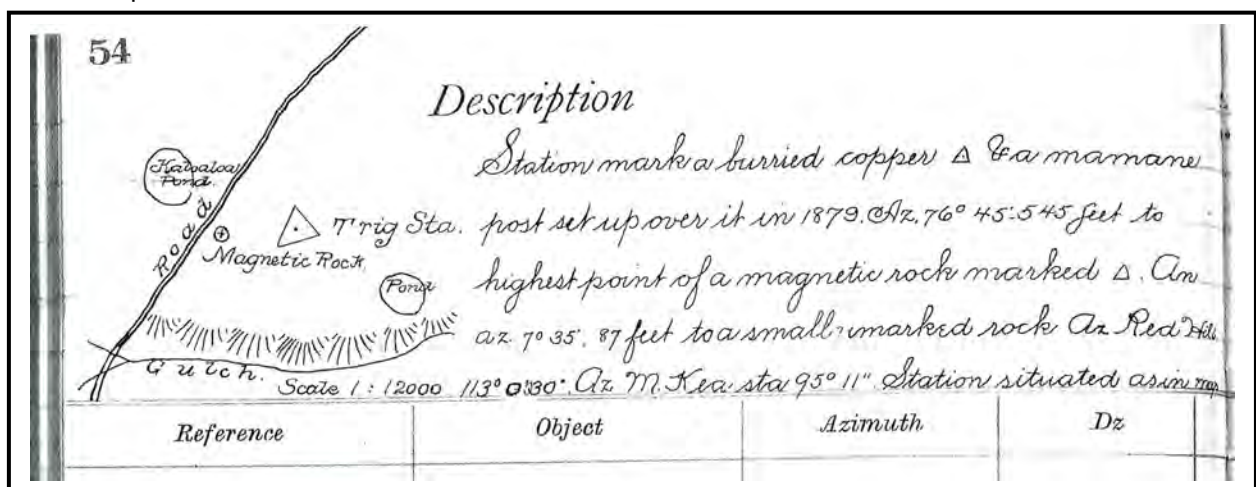


Figure 54. Kaloaloe Triangulation Signal; NARA Collection, Series RG-23 (page 54)

Reference Objects:
Red Hill
Kalepa [pages 54-55]

Omaokoili

Station mark [triangle] on solid imbedded bomb, with 3 ridges of imbedded stones radiating from the centre thus [Figure 55].

Altitude 7090 feet.

Reference Objects:
Lilinoe
Waiau Crater
Kalaieha N. Base
Lepeamo
Kalaieha Puu
Huikau [pages 62-63]

Description

Station mark - Δ on solid imbedded bomb, with
3 ridges of imbedded stones radiating from the centre
thus

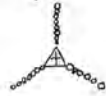


Figure 55. Omaokoili Triangulation Signal; NARA Collection, Series RG-23 (page 62)

Ahumoa [Figure 56]

Station mark underground a triangle cut in a large irregular rock in situ, with a drill hole $4\frac{1}{2}$ inches deep in which are a pair of spectacle rims. 3 + s as shown in diagram. Stone ahu 8 ft. in diam. & 6 ft. high on N. side Ahumoa hill.

Altitude 7033.6 feet.

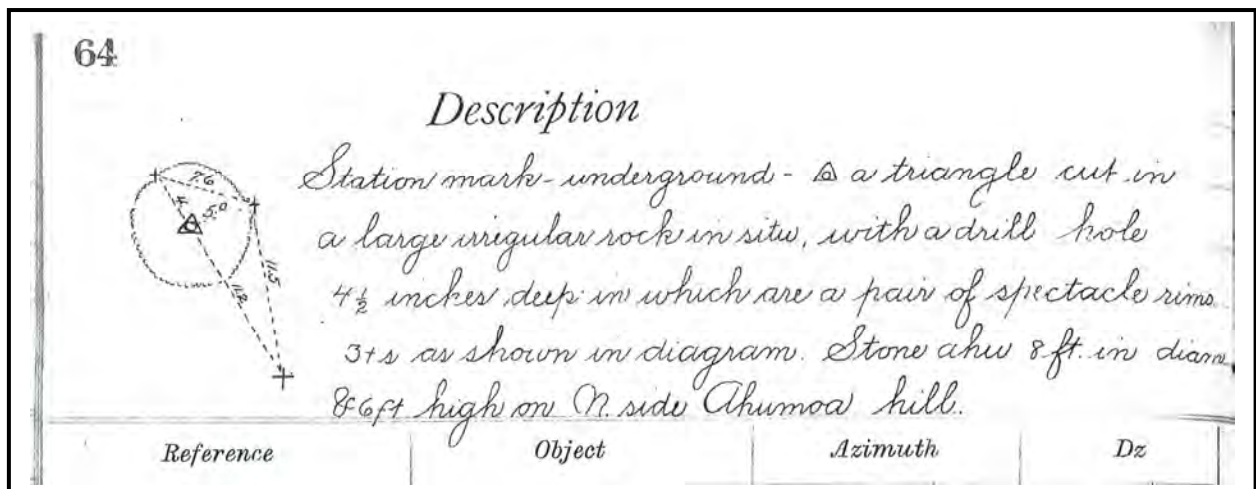


Figure 56. Ahumoa Triangulation Signal; NARA Collection, Series RG-23 (page 64)

Reference Objects:

Nohonaohae

Keamuku

Puako

Anahulu

W. Hualalai

Waawaa

Puu ka Pele

Napukulua

S. Hualalai

M. Loa

Puu Ouo

Kaunuoku

Poikahi

Jacob's No.2

Anaehoomalu

E. Hualalai

Puu Lehua
N. Bank [pages 64-65]

Keamuku

Station mark underground copper bolt driven into a large rock in situ, projecting 1 inch, also 4 + s on stones as in diagram [Figure 57] on a small eminence to the N.W. of the Keamuku aa flow.

Altitude 3078.5 feet

Reference Objects:

Puako

Nohonaohae

Ahumoa

Puu ka Pele

Waawaa [pages 66-67]

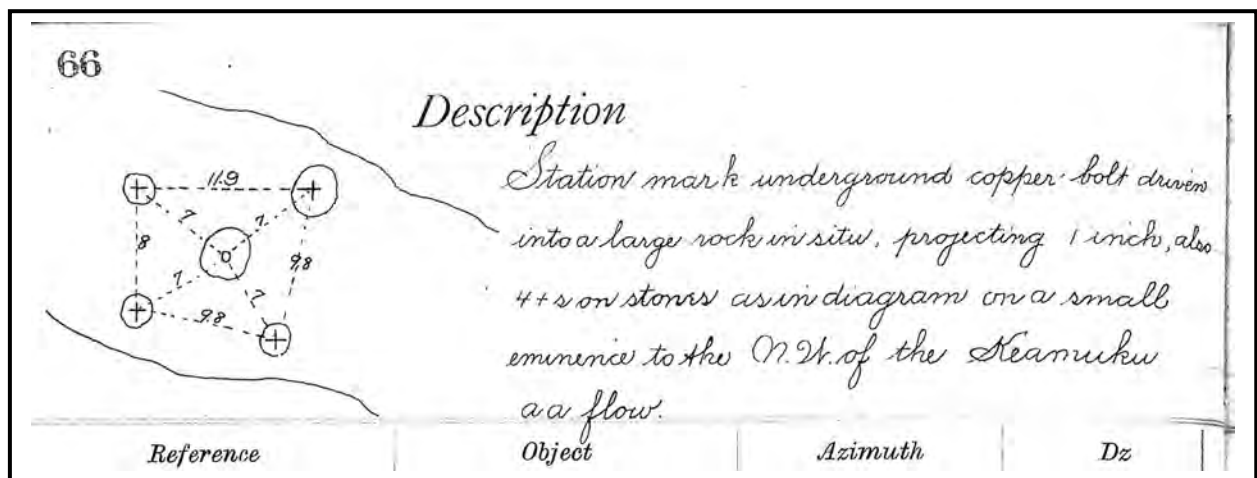


Figure 57. Keamuku Triangulation Signal; NARA Collection, Series RG-23 (page 66)

Additional records of surveys of Mauna Kea and the neighboring mountain lands were recorded between 1905 to 1937, as a part of the development of the Territorial Forest Reserve program, and follow in the next section of this study.

THE HILO AND MAUNA KEA FOREST RESERVES: RANGE LANDS WITHDRAWN FROM GRAZING USES

As noted in preceding sections of the study, by the early 1800s, concerns regarding the retreat of forest lands before the increasing populations of livestock were being voiced. On Hawai'i, lands around Mauna Kea and the Kohala Mountains were of particular concern. Though leases on Crown and Government lands included provisions for fencing and protection of forests, the destruction continued. So significant was the threat of wild animals to the Hawaiian landscape, that on September 19, 1876, King David Kalākaua signed into law an "Act for the Protection and Preservation of Woods and Forests." By that Act, the Minister of the Interior was authorized to set apart and protect from "damage by trespass of animals or otherwise, such woods and forest lands, the property of government...best suited for the protection of water resources..." (Hawaii Laws Chapter XXX:39). The Minister of the Interior was authorized to appoint a superintendent of woods and forests:

...who shall, under the direction of said Minister, enforce such rules and regulations as may be established to protect and preserve such reserved woods and forest lands from trespass. Said superintendent shall have charge of the construction of fences and barriers required to protect the said woods and forest lands, and shall be responsible for their being kept in good condition... (ibid.).

The above Act was further defined by an Act of the Legislature of the Hawaiian Kingdom, approved by Queen Lili'uokalani on January 4, 1893, which established the Bureau of Agriculture and Forestry. Among the Bureau's goals was the "preservation of forests" (Hawaii State Archives – Com 2, Box 11). In 1893, J. Marsden, Commissioner of Forestry, wrote to J.A. King, President of the Bureau of Forestry and Agriculture, regarding the deforestation of Ka'ohe and the larger Hāmākua-Waimea lands:

...Within the past (20) twenty years, the land of the Hamakua District extending from Ookala to Waipio gulch, along the sea coast, and inland as far back as Waimea were covered with a dense forest impassible except by trails out through the brush and undergrowth. While in this condition the district had an abundant rainfall, some of the roads being known for their perpetual muddy condition. Within the same period of twenty years, the lands adjoining the sea coast have been gradually cleared for cane, and Agricultural purposes without seriously affecting the rainfall. *Also during this same period of time the Ranching industry in the neighborhood of Waimea has been largely increased. The cattle in grazing around Waimea, and in the adjoining mountains have gradually caused the destruction of the underbrush and finally the large trees throughout that section of the District.*

The areas of land affected was at first small, but year by year it has steadily increased until now there are probably 100,000 acres entirely cleared, except for an occasional dead stump still standing. As the above area has increased so the rainfall has diminished, so that now there are two causes, lack of moisture, and the damaging effects of the cattle, for the rapid denudation of all the Forest land in this District... The ranching industry extensively carried on between the Hamakua and Kohala Districts, is also seriously threatened from the reduced feed and water supplies... [HSA – Interior Department Box 2 Agriculture & Forestry; May 29, 1893]

On June 14, 1900, the members and functions of the Bureau were absorbed by the Board of Commissioners of Agriculture and Forestry (Hawaii State Archives – Com 2, Box 11). The Board set about the task of establishing forest reserves on all the islands. In 1904, the Board of Agriculture and Forestry proposed development of the Hilo Forest Reserve, which was needed to "protect the

headwaters of the streams, which play so important a part in the success of the various plantations” (Wm. Hall 1904:277; in Hawaiian Forester and Agriculturalist, 1909). On August 9, 1904, the Commissioners approved the recommendation that “all government and other lands in the district of Hilo, Island of Hawaii, lying above a line approximately 1750 feet above the sea, be set apart as a forestry reservation” (Hall, *ibid*:282). The lands extended from Laupāhoehoe to Pi‘ihonua.

Leasehold interests in the Government land of Ka‘ohe, which in 1891 had been divided into several parcels, and included the entire summit region of Mauna Kea, were modified during this time. The lands generally above the 7,500 to 9,500 foot elevation were removed from the leases. Parker Ranch, Kukaiau Ranch and the Humu‘ula Sheep Station Company had also been required to fence their boundaries between pasture lands and mountain lands. This was done in part, to keep ranch herds separate from the remaining wild herds on the mountain. Among the interesting features associated with fencing and boundaries on the mountain lands are the stone walls north of ‘Ōma‘okoili and ‘Ōma‘okanihae Hills and the Humu‘ula Sheep Station Company, and those walls and fences along the on the Waiākea-Pi‘ihonua-Humu‘ula boundaries. As documented in Haneberg’s journals, the walls were constructed primarily by Japanese labor in 1891 to 1892. The Pu‘u Huluhulu section walls were under construction by October 5, 1891, and the boundary between Ka‘ohe and Humu‘ula was being laid out on June 29, 1892 (Haneberg Journals, 1891:122 – 1892:201).

By 1909, the summit of Mauna Kea had been removed from the leases, and Territorial Governor, W.F. Frear, approved the boundaries for the proposed Mauna Kea Forest Reserve. The following communications describe the thoughts behind the Hilo and Mauna Kea Forest Reserves, and some of the early actions on lands adjoining them (Register Map No. 2682, depicts the Hilo Forest Reserve Lands; HTS Plat No. 613, depicts the Mauna Kea Forest Reserve Boundaries and Fence Line).

In 1904, the Board of Commissioners of Agriculture and Forestry, met on several occasions to discuss proposals to establish the Hilo Forest Reserve. The proposed reserve would extend from Kaūmana-Pi‘ihonua (the 1881 lava flow) to Humu‘ula, taking in the important forests and watershed lands. In 1904, the Hawaiian Forester and Agriculturalist (HFA) reported that the Board of Commissioners had formalized its’ proposal, and identified considerations for establishment of the reserve; the reports also deliberated on the lower boundary line of the reserve:

Proposal and Description of Lands in the Hilo Forest Reserve

At the meeting of the Board of Agriculture and Forestry held on August 17, 1904, the following reports and recommendations were made public:

REPORT OF THE COMMITTEE ON FORESTRY.

Honolulu, August 16, 1904.

To The Board of Agriculture and Forestry.

Gentlemen: Your Committee on Forestry have had under consideration the subject of a permanent forestry reserve line in [page 275] the Hilo district, and also the petition of certain persons for homesteading certain Government land in Honomu, Hilo, Hawaii, now in forest.

The members of the committee are personally familiar with the general conditions existing in the Hilo district and the Superintendent of Forestry has visited and examined the localities in question, in detail, and presented to the committee full reports and recommendations.

These reports accompany this report, and we recommend their adoption.

In brief, the report of the Superintendent of Forestry is in favor of establishing a forest reserve line at approximately the 1750 foot level above the sea, varying to meet local conditions, as set forth in detail in his report. All above this line to be made a forestry reserve under the law of 1903. The upper boundary to be fixed later.

As to the **Honomu** homestead proposition, your committee is in doubt as to whether the establishment of homesteads in this locality is economically practicable or not. The land is over three miles from the government road. *The only road to it is a dirt one constructed by the Honomu plantation.* In the normal rainy weather of Hilo teaming is impracticable over such roads, and packing on animals is difficult and expensive. A macadamized road only is of use. This is costly to construct, and by reason of the steep grades, costly to keep in repair.

The available road funds have heretofore been scarcely sufficient to keep the one main road through the district in repair. It is questionable whether under existing financial conditions a macadamized road can be built or kept in repair, if built. A further consideration is, that the Hilo district is cut at such frequent intervals by ravines of such extreme depth that is impracticable to build an upper road above the plantations and parallel to the coast, as has been done in Kona.

A separate road must be built *mauka* on every ridge, or approximately every half mile or so. By reason of this fact the area opened by each road would be comparatively small—so small as not to warrant the cost of the road.

There are questions which, to some extent, lap over into the consideration which this Board must give every proposition to take forest land for homestead purposes. The main points upon which the committee bases its approval of the homesteading of [page 276] this land are: First, that the land itself is fair arable land, and, second, that deforestation under the restrictions recommended by the Superintendent, will not radically injure the purposes for which the forest reserve is sought to be established. The Board is not the responsible authority to decide upon the economical availability of the land for homesteads, or concerning roads to get to them. That rests with the Land Department and the Legislature. The sole scope of this report is therefore, that so far as this Board is concerned, it does not object to utilization of the land in question for homestead purposes.

Respectfully submitted,

L.A. THURSTON,
A.W. CARTER,
W.M. GIFFARD.

REPORT OF THE SUPERINTENDENT OF FORESTRY.

Honolulu, T.H., August 9, 1904.

The Committee on Forestry, Board of Agriculture and Forestry.

Gentlemen:

I have the honor to submit herewith a report with recommendations on the proposed forest reserve, in the Hilo district, on the Island of Hawaii.

This report deals with the lower line of the proposed reserve and is the result of a visit to the district, covering the period from July 6th to July 23rd, 1904. During this time I, personally, went over the ground, following as closely as possible the lower edge of the

existing forest, from the **Laupahoehoe** gulch to the 1881 lava flow, back of **Hilo town**. The examination was made in company with the managers of the several sugar plantations along the way; each manager accompanying me over his own land. Other gentlemen, also, were interviewed and much information in regard to local conditions, throughout the district, was obtained.

OBJECT OF HILO RESERVE

The reserve in the Hilo district is needed primarily to protect the headwaters of the streams, which play so important a part in the success of the various plantations. From **Laupahoehoe** to Hilo are many running streams, which thanks to the heavy and nearly continuous rainfall in the forests above, may be regarded as permanent, although of course subject to fluctuation. On these streams the plantations depend for water with which to flume their cane to the mill. Their importance is consequently [page 277] very great and the necessity of safeguarding them is apparent.

From its location and topography, the Hilo district is fortunately situated to receive an ample supply of water. The trade winds bring the moisture-laden clouds and pile them up against the slope of **Mauna Kea**, in a great bank, from which the precipitation is heavy and very nearly continuous. *This cloud stratum covers a belt, extending from an elevation of approximately 2000 feet to one of about 6000 feet;* these limits, of course, varying on different days and with the slight changes in the direction of the trade winds. The lower edge probably fluctuates more than the upper, as the cloud mass frequently creeps down the slope, causing heavy precipitation as far as the sea. But the greater part of the moisture from the clouds is dropped higher up—somewhere between the elevations of 2500 and 4000 feet.

The precipitation is heaviest at the eastern end of the district and gradually diminishes to the westward, until in the Hamakua district, permanently running streams are no longer found. The Hilo-Hamakua boundary is in this way a natural as well as an artificial line. The reason for this change of conditions is that beyond the northern end of the Hilo district, the bulk of **Mauna Kea** no longer stands in the path of the trade winds, which accordingly go over the shoulder of the mountain carrying their clouds to the lands beyond.

From quite another cause the 1881 lava flow marks the limit of flowing streams to the eastward, for beyond this point toward Puna, the porous character of the rock and soil allows all the water to sink immediately into the ground, to appear again only near the coast.

At the western end of the Hilo district, the land rises much more abruptly from the sea than at the eastern—the same elevation being reached about four miles back of **Laupahoehoe**, which, back of Hilo, lies ten miles from the shore.

Whatever may be the influence of the forest on precipitation elsewhere in the islands, the question in the Hilo district is solely one of the conservation and utilization of the water, which reaches the ground. There is naturally great fluctuation in the size of the streams, and during times of drought, the beds of many of them are almost, if not entirely, dry. The presence of the forest tends to regulate and maintain the flow, and to make available for later use, the water which would quickly run away from denuded slopes. [page 278]

While the heaviest precipitation, as has been said, occurs somewhere above the 2000 foot contour line, the beneficial effect of the forest extends much lower down the slope. But after a time, other factors come into the case, making it necessary to establish a limit above which the land should remain in forest and below which it may be cleared for the various industries, without detriment to the general welfare of all concerned.

In deciding upon the location of the lines of a permanent forest reserve it is necessary to consider future as well as present needs. A number of considerations have thus to be taken into account, among which are the benefits to be derived and the uses to which the land would be put if cleared. The former have already been discussed. Of the latter, in the Hilo district there are practically only two; the further extension of the cane fields and the opening of tracts for settlement.

At present, with the exception of what is raised on the homestead clearings, cane is the only crop grown systematically at the higher elevations. The upper line of the cane fields varies with each plantation. At the western end of the district, owing to the steeper grade, the cane runs up to about 1800 feet. On the plantations in the center of the district the highest cane ranges from 1300 to 1600 feet. While back of Hilo on the more gently sloping lands of ***Kaumana and Piihonua*** it runs up to 1800 and 2000 feet. The following table compiled from aneroid measurements, checked in part by known elevations, gives approximately the highest points on each plantation in the district. These points are, as well, the lower edge of the existing forest.

EVALUATIONS OF THE HIGHEST CANE FIELDS, HILO DISTRICT, HAWAII.

<i>Plantation Name</i>	<i>Approximate Elevation Feet</i>
Laupahoehoe	1800
Hakalau	1500
Honomu	1400
Pepeekeo	1600
Onomea	1500
Hilo Sugar Co—	
Fee lands	1500
Homestead lands	1800

Hawaiian Mill Company 2000 [page 279]

The elevation at which the highest cane now stands practically marks in each case the limit of profitable cultivation under present prices and conditions. Some of the managers expressed the opinion that with a higher price for sugar it would pay to go farther up, while others felt that the full limit had, for them, already been reached. Most of the managers, however, wanted a strip left above their present fields, on their fee lands, so that if later it were found advisable to extend the cane further *mauka*, there would be room to do so. Seventeen hundred and fifty feet was considered by all of them as being sufficiently high, and this elevation was agreed to by practically all as the best line for the permanent forest boundary.

The other main factor in the case is the demand for land for settlement and homestead purposes which will inevitably follow the development of the Island of Hawaii, through the building of the projected Kohala-Hilo Railroad and the improvement of Hilo harbor—both of which must eventually come. Indeed, because of its location and natural advantages, there are already applicants for all the land now available in the Hilo district.

As a basis on which to work in determining the location of the line, the report to Ex-Governor Dole, made by Mr. George Ross, consulting forester for the North Hilo district, was used. In this report, which embodied the consensus [sic] of opinion of the managers of the various plantations in the district, it is recommended that the lower boundary of the reserve be drawn approximately on the seventeen hundred and fifty foot contour line. In

this recommendation I am ready, on the whole, to concur, because I believe that a line so drawn would sufficiently protect the forest and safeguard the water supply of the district, while at the same time making available all the land which can reasonably be expected will be utilized within a considerable period of years.

RESERVE LINE RECOMMENDED.

In the absence of a good topographic map, it is difficult to discuss the location of this line except in a general way. For this reason the seventeen hundred and fifty foot contour has been adopted, although the line as actually laid out will vary more or less from it. At either end of the district, owing to the fact that the land has already been cleared, or partitioned off into homestead tracts, it will be necessary to go somewhat higher. When the time comes for running the line out on the ground it [page 280] should be drawn between prominent points—such as hills, junctions of ridges or ravines, pronounced angles in streams, etc.—and such points should be permanently marked.

Based upon the topographic data now in hand, I therefore recommend as the lower boundary of the proposed forest reserve in the Hilo district, the following line. *Starting at the **Laupahoehoe** homestead tract, and following the upper boundary of the same to its eastern mauka corner, thence across to, and along the upper boundary of the **Maulua** homestead tract, thence to the top of the **Kamaee** tract, thence across the lands of **Hakalau** and **Kaiwiki** to the upper line of the proposed **Honomu** homestead tracts, as recommended in my report upon that land; thence through the mauka corners of the lands of **Kawainui** and **Puumoi** to the upper corner of the land of **Kikala**, on the boundary of the Kaiwiki homesteads; thence from the eastern boundary of this tract, at about the same elevation, the line should cross to the **Awehi** stream, above the cane fields of the Hilo Sugar Company; and thence across the land of **Piihonua**, around the top of the existing cane, to the 1881 lava flow.*

Such a line would, I believe, meet the requirements of future growth and be above practically all the land best suited for agriculture.

Above seventeen hundred feet the land rises more steeply than at lower elevations and the soil is thinner. This fact combined with the greater rainfall and the consequently greater erosion makes these upper lands less desirable for agriculture. Furthermore, as many of the gulches split up at this elevation into ravines and gullies, the fields in themselves are smaller and less easily managed.

It is an axiom on Hawaii that success in the matter of homesteads is very largely a question of transportation. In a wet district like Hilo it is next to impossible to get the crop grown on the land to market without roads—unless like cane, it can be flumed. This is not the place to discuss the road question, nor whether homestead roads should be built by the government or by the settlers themselves. It is enough to say that even under the most favorable conditions, it will be a long time before there will be money enough to build roads to the higher elevations in the Hilo district, or before such roads can be considered as a paying investment. [page 281]

The foregoing observations apply, of course, only to the Government lands, but on the privately owned lands the line chosen has the advantage of allowing the plantations the leeway which many of them desire for possible future growth.

It is not the intention of this report to convey the idea that the land up to the proposed line should at once be cleared. On the contrary, the forest because of its beneficial influence, should be allowed to remain intact as long as possible, but if the time does come when the land is more needed for other purposes than for forest, it is believed that the forest

below the line may then be cleared without detriment to the best interests of all concerned.

If these recommendations be approved by the Board I recommend that the Governor be requested to set aside, as soon as practicable, all the government lands lying above the proposed line and extending up to an upper line, the location of which is to be determined in the near future.

I further recommend that the owners of private lands within this reserve be encouraged to turn them over to the Government under the terms of Act 44...

Ralph S. Hosmer,
Superintendent of Forestry.

HILO FOREST RESERVE.

The following resolution was adopted by the Commissioners of the Board of Agriculture and Forestry:

Resolved, That the Board of Agriculture and Forestry approves and recommends that all government and other lands in the district of Hilo, Island of Hawaii, lying above a line approximately 1750 feet above the sea, be set apart as a forestry reservation, subject to such change in detail of said location as is recommended by the Superintendent of Forestry in his report upon this subject, dated August 9, 1904, and on file in the records of the Board;

Resolved, That the Superintendent of Forestry be and he hereby is instructed and directed to secure as speedily as practicable a detailed description and map of the said boundary line of said forest reservation; in order that the same may be referred to the Governor for his approval in accordance with the terms of section 6 or Act 44 of the Session Laws of 1903... [HFA, 1904:282]

In October 1904, R. Hosmer, Superintendent of Forestry reported back to the Commissioners on the recommendations for the upper boundary of the Hilo Forest Reserve. As a part of the research, field visits through Humu'ula, Pi'ihonua and other affected lands, and interviews with individuals knowledgeable about the landscape were conducted. Hosmers' report described the main plants of the forest, and lay of the land:

October 14th, 1904.

Committee on Forestry

...I have the honor to submit herewith a report, with recommendations, on the upper boundary of the proposed forest reserve in the Hilo District, Island of Hawaii.

During the last week of August I made a careful examination of the upper edge of the forest from the 1881 lava flow to the Hamakua boundary, going over the ground in person and supplementing the information so gained by interviews with various persons familiar with the locality, and the conditions existing therein.

In this connection I would acknowledge my obligation to the managers of the several plantations in the Hilo District, to Mr. A.B. Lobenstein of Hilo, and especially to Mr. W.H. Shipman, for information in regard to this question and for other assistance given me.

The general reasons which underlie the establishment of the Hilo Forest Reserve have already been discussed in my report on the lower boundary. In brief they are, that this reserve is needed to protect the water sheds of the streams throughout the district, on which the plantations, and to some extent the other industries, present and prospective,

along the coast, depend for their most satisfactory development. This protection can be best afforded by the setting apart of the belt of forest along the slope of **Mauna Kea**, which receives the heavy rainfall, and in which the streams head. The object of the reserve is to prevent [page 313] excessive run-off, equalize the flow in the streams and protect the slopes against erosion.

It was pointed out in my former report that the trade winds bring in a bank of moisture-laden clouds, which pile up against the side of **Mauna Kea** between the elevations of approximately 2000 and 6000 feet. From the evidence available it appears that the precipitation is heaviest between the elevations of 3000 and 4500 feet, and that from the latter point up to an elevation of about 6500 feet there are only light rains and scattering showers. Higher than this on the slope and in the saddle between Mauna Loa and **Mauna Kea**, the trade winds die out, much as they do in Kau, just beyond the Volcano House. The point is somewhere between **Puu Oo and Kalaieha**—the latter place seldom having rain from trade wind clouds, while conversely, during the times of Kona winds, the rains that fall at **Kalaieha** do not reach **Puu Oo**.

On the main slope of **Mauna Kea**, above approximately the 6500 foot level, the rains are said to come principally with northerly winds. The storms are usually short ones, but precipitation is very heavy while it lasts, rapidly filling the ordinarily dry stream beds so that the fords become impassable. When the rain is over, however, the streams fall just as quickly, the water rushing down the mountain and swelling the volume of the permanent streams below. When more rainfall and stream-flow records come to be kept it will be interesting to see how much and for how long the lower parts of the streams are influenced by these sudden down pours far up on the mountain.

Under existing conditions little can be done to regulate the flow of the torrents resulting from the storms just described. The open *Mamane* (*Sophora chrysophylla*) forest now growing on the steep, upper slopes, has no appreciable effect on the run-off, while the establishment of a cover of vegetation sufficiently dense to make any material difference in the discharge of the streams is practically out of the question. The chief interest in water conservation thus centers in the lower forest.

The upper line of permanent running water in the streams seems to be near the upper edge of the belt of heavy precipitation, although the dense forest above must exercise a considerable influence in absorbing the light rains and helping to feed the springs from which the upper brooks come.

The dense forest now extends up to an elevation of a little [page 314] over 6000 feet. *Koa* (*Acacia koa*) and *Ohia Lehua* (*Metrosideros polymorpha*) are the predominating trees. With them are associated *Koolea* (*Myrsine lessertiana*), *Pilo* (*Coprosma cymosa*), *Olapa* (*Cheirodendron gaudichaudii*), *Naio* (*Myoporum sandwicense*), and some other trees of minor importance, and the dense mass of ferns, bracken, and other undergrowth characteristic of the Hawaiian forest.

Between the upper edge of the dense forest and the boundary of the land of Humuula there is, on the lands from Piihonua to Honohina, a strip of land on which the forest has been wholly or in part destroyed, through fire, grazing, and insect injuries. While most of this damage has occurred in recent years, it is probable that the dense forest never extended much above the boundary of Humuula. At this point the Koa and Ohia are replaced by Mamane, which, forming an open stand, extends practically to the upper boundary of Humuula, and all along the slope of Mauna Kea.

Beyond Honohina the dense forest of Ohia and Koa comes up to the **Humuula** line. From here on to the Hamakua boundary, the proportion of Koa is larger and the forest is of greater potential commercial value.

The lands within the limits of the proposed Hilo Forest Reserve, which extend through the forest, are from south to north as follows: **Piihonua, Paukaa, Papaikou, Makahanaloa, Hakalau, Honohina, Piha, Maulua, Laupahoehoe, Waipunalei, and a part of Humuula**. Of these lands **Piihonua, Piha, Humuula** and **Laupahoehoe** are owned by the Government and are, with the exception of the last named, under lease for various terms.

A portion of **Laupahoehoe** is under lease also, but a large part of the land bearing this name on the official maps is included in the tract known as Papaaloa Forest, which is still in the hands of the Government. The remaining lands in the list are owned in fee by plantations or individuals.

The upper part of **Piihonua** is sublet to Mr. W.H. Shipman, the boundary being a line run across the land from the center of Reed's Island, in the 1855 lava flow. Mr. Shipman has just completed a fence across **Piihonua** somewhat over a mile mauka* [page 315] of his lower boundary. Hereafter all of his cattle will be kept above this line. The fence starts on the rough aa of the 1855 flow above **Halealoha**, runs north to the trail, then eastward to the opening in the woods about north of **Halealoha**, and thence in a fairly straight line across **Piihonua** to a point on the **Paukaa** boundary, two miles from the **Humuula** line. There are one or two jogs in the fence line which may later be eliminated, but this straightening would not materially alter the direction of the line.

Through an arrangement with Brewer & Co., Mr. Shipman has continued the fence across the lands of **Paukaa, Papaikou and Makahanaloa**, at a slightly higher elevation than that across **Piihonua**. The fence corners on these lands are one and one-half, instead of two miles makai of the **Humuula** boundary. The average elevation of the fence across these lands is little over 6000 feet. Its location is practically at the upper edge of the dense forest.

Below the line of the fence is a considerable band of wild cattle, which has been estimated to consist of over 500 head. Formerly these cattle ranged all the way from **Laupahoehoe** to the 1855 flow, but constant hunting at the northern end of the district has now driven the greater part towards **Piihonua**. By the terms of his agreement with Brewer & Co., Mr. Shipman leases the land, builds and keeps in repair the fence, and agrees to exterminate the wild cattle in the forest below. This work is now going on with systematic driving and shooting, which will be continued as long as there are any wild cattle left.

If a similar arrangement could be made with Irwin and Company, Mr. Shipman would be glad to continue the fence across the lands of Hakalau and Honohina.

There exist division fences between **Humuula** and the lower lying lands as far north as Hakalau. Beyond this the lands are unfenced and are open to cattle or sheep from above. As a matter of fact the sheep are not allowed to get far into the forest, because of the difficulty in herding them in the underbrush. Wild pigs abound in the forest. No estimate can be made of their number.

* The convenient Hawaiian terms *mauka*, signifying "inland," hence "toward the mountain," and *makai*, "toward the sea," represent the two leading directions throughout the Territory, and are in general use among all classes.

The fence erected by Mr. Shipman meets so many of the requirements of the upper boundary of the proposed Hilo Forest Reserve, that it seems to me wise to adopt it, from the 1855 flow to the land of Hakalau, and the line desired. From there on I recommend that the boundary follow the edge of the forest across Hakalau and Honohina. (This coincides with the location de- [page 316] sired by Mr. Shipman for the extension of his fence.) From the corner of Honohina, Piha and **Humuula**, the reserve line should follow the lower boundary of **Humuula**, as far as the north *mauka* corner of Waipunalei, thence across **Humuula** to a point on the Hilo-Hamakua boundary, to be determined later in connection with the Hamakua reserve.

My reasons for recommending this line are as follows: A belt of at least two miles of forest above the upper limit of the heavy rain belt and the head of the permanently running streams is thus reserved.

The line is far enough *mauka* to include practically all of the area subject to the showers and light rains occurring above the belt of heavy precipitation.

The reservation as recommended will, I believe, insure the objects for which it is made. While the forest could undoubtedly be extended further *mauka*, I think the land above the proposed line can be used for other purposes than forest, without detriment to the best interests of the reserve.

By adopting the line recommended, the question of fencing a considerable portion of the boundary is obviated. As the objects of the plantations in their agreement with Mr. Shipman are identical with those of the reserve, in so far as they relate to fencing and to the extermination of wild cattle, they can well be taken advantage of, by co-operating with the parties to the agreement.

There remains one more point to be considered; the southern boundary of the reserve. This seems to be naturally fixed by the lava flows of 1855 and 1881, beyond which to the south and east, the whole character of the country changes. But it is urged by some that there is agricultural land on **Piihonua** between the 1855 flow and the Wailuku river, which under certain conditions, could be opened to settlement without detriment to the reserve. This is a question for future study. At present the section is unexplored. *No trails penetrate the forest and its outer edge only is accessible.*

*Should the projected road from Hilo, known as the "One County Road," be built, the area in question would be brought into touch with markets. If it were then found that land suitable for agriculture existed, and that it could be opened for settlement without endangering the sources of the **Wailuku**, I should be in favor of so doing. But until there is a more definite prospect [page 317] of the road being built, I believe the land is better in a forest reserve. I therefore recommend that the southern boundary of the Hilo Forest Reserve be the lava flow of 1855.*

If the recommendations in this report are approved by the Board, I suggest that the Governor be requested to set aside, as soon as practicable, all the Government land not now under lease within the limits of the Hilo Forest Reserve. I further suggest that the Board make known its willingness to consider propositions looking to the turning over to the Government, under the terms of Act 44 of the Session of 1903, of privately owned lands within this reserve... [HFA, 1904:313-318]

The Board of Commissioners subsequently met, to further discuss the boundaries and elevational range of the forest lands, being considered as a part of the Hilo Forest Reserve. A.B. Loebenstein was authorized to survey the boundaries of the reserve. The Board focused on the upper boundary of the

reserve, with discussion as to whether or not Humu'ula—lands leased as a part of the Sheep Station Company—should be included in the reserve. Excerpts from the minutes of the meeting on November 23rd, 1904, provide the following documentation:

November 23, 1904

Discussion on the Upper Boundary of the Hilo Forest Reserve:

...Mr. Brown moved that Mr. Loebenstein place the lower line of the proposed Hilo Forest Reserve on the map, and furnish as close a description of such line as can, at the present time, be given. Motion seconded by Mr. Carter and carried...

...Mr. Hosmer said that there was one more point to be considered in regard to the Hilo Forest Reserve; that of getting a description made of the upper line. He said that Mr. Loebenstein had been requested to make a map and prepare a description of this line, and that he now has the matter under consideration. This map would be much smaller than that of the lower boundary.

Mr. Loebenstein suggested that the **Kalaieha** section be included in the map. He said that this could be put in from data now on file in his office and that it would be as well to include it.

*Mr. Thurston asked if **Kalaieha** was included in the reserve, to which the Superintendent of Forestry replied that the reserve does not touch Kalaieha. The upper line (pointing to the map) and Kalaieha are several miles apart.*

Mr. Thurston asked if **Piihonua** runs over as far as **Kalaieha**, to which Mr. Brown replied that it does, adjoining the land of **Waiakea**.

Mr. Loebenstein stated that Waiakea was on the Mauna Loa side.

Mr. Loebenstein said that he would like to give the Board a map which would be complete in every detail.

Mr. Thurston asked the name of the forest that is below and near **Kalaieha**, to which Mr. Hosmer replied that it is the upper extension of the **Waiakea** forest.

Mr. Loebenstein stated that he did not know just how far up the forest extended, but would like to have the map show some of the **Mauna Kea** slope. *He suggested an elevation of about 8000 feet, as the vegetation extends up to about that point.*

*Mr. Hosmer said that this line would take in practically all of the existing in forest, as the Mamani does not go much above the upper **Humuula** boundary. The upper **Humuula** boundary above **Papaikou** and **Hakalau** (Pointing to the Government map) is about 9500 feet. The contour lines are approximately correct.*

*Mr. Hosmer said that there is a section above the present Mamani forest which he thought might profitably be planted with spruces and pines, between the elevations of 8000 and 10,000 feet. This area is practically all on the land of **Kaohe**. Most of the land hereabout is good grazing land.*

Mr. Hosmer said that he thought that the only government land which is not now under lease within the limits of the proposed reserve, is the upper section of **Laupahoehoe**. The names are somewhat uncertain but on the list of leases which Mr. Pratt has made up this section is known as **Papaaloa** Forest. This is the only land which the Board can ask the Governor to set aside. Asked if he was referring to the lower line, replied to both lines. Mr.

Thurston said that the Governor could set aside other than government lands by the consent of the owners.

Mr. Hosmer said that the upper line was concerned in the Papaaloa Forest.

Mr. Loebenstein was asked when he could furnish a map and description of the upper line, to which he replied that he could not have it ready before the beginning of January.

Mr. Hosmer asked Mr. Loebenstein if he could furnish a general description of the upper line, to be followed later by an exact description, to which Mr. Loebenstein replied that a general description could be given.

Mr. Thurston stated that the two propositions could be acted upon entirely independently, one of the other.

Mr. Carter asked how reserves were going to be set apart, before the boundary lines were determined upon.

Mr. Brown also said that the reserves could not be set aside until an upper line is made. Then all the land located within the reserve can be set apart.

Mr. Loebenstein said that there are very few government lands remaining unleased.

Mr. Giffard said that private owners could not make any propositions until the boundaries are fixed he also said he did not think this matter could be placed before the Governor until both of the boundaries could be given him.

Mr. Carter said that the Board could not deal with private owners until a line had been fixed.

Mr. Hosmer said that the boundary on the north side is the Hamakua District line and on the south side the 1855 lava flow.

*Mr. Brown asked if it was the intention of the Board to make the land of **Humuula** a forest reserve, to which Mr. Hosmer replied in the negative.*

*Mr. Holloway asked what the objections were of following the lower line of **Humuula** to which Mr. Hosmer replied that there is a strip of land here which could be used for grazing without detriment to the forest below. There is a sufficient extent of forest reserve below to safe guard all the streams. The upper land is good for grazing. Further north the dense forest comes up much closer to the **Humuula** line, and there is also a great deal of Koa timber which the Government should reserve, and later utilize.*

Mr. Thurston stated that it seemed that the Board was not in a position to make recommendation to the Governor until the upper line was fixed, and shown on the map. He asked Mr. Loebenstein how long it would take to make such a map and prepare a description.

Mr. Loebenstein replied that he would prefer to return to Hilo and prepare a map and description in his own office. By so doing he could furnish information that would stand any reasonable test. He thought that he could give this to the Board about the end of the year.

The president then called for any other forestry matters which were to be presented...
[HSA, Com 2-8, Minutes]

Land and Resources of Ka'ōhe IV and Mauna Kea Described (1905)

Further deliberations by the Board of Commissioners pertaining to the mountain lands of Mauna Kea and Mauna Loa occurred. In 1905, the Hawaiian Forester and Agriculturalist published the proceedings of meetings conducted in late 1904. The deliberations set the foundation for the removal of the upper regions of Mauna Kea—the lands of Ka'ōhe and Humu'ula—from leases to ranchers:

New Points in The Forest Policy of the Territory.

The adoption by the Board of Commissioners of Agriculture and Forestry of the following four reports establishes certain points in its forest policy. As the action taken on the recommendations of the Superintendent of Forestry in these reports will probably serve as precedents in other cases where the conditions are similar and as the points involved are of general interest, the reports are given in full.

The report on the land of **Kaohe 4, Hamakua**, Hawaii, brings out the position of the Board on the question of the disposition of the so-called “waste land” above the area of good grazing country on the higher mountains in the Territory. The Board believes that land of this character should not be included with the better land as has been the custom in the past, but that it should be retained by the Government against such time as it may be utilized for some now unforeseen industry, or until it can be planted with forest trees from the temperate zone... [HFA, 1905:124]

During the meeting of December 3rd, 1904, R.S. Hosmer presented a detailed report on the Ka'ōhe IV Tract, covering Pōhakuloa and vicinity. The communication was considered as a part of the Hilo Forest Reserve proceedings, though not included, though later, in 1909, a portion of the parcel was incorporated into the Mauna Kea Forest Reserve. The communication includes several important references to the nature and uses of the land, the make up of the forest, and development of the springs (though not named) at Houpo Kāne (Hopukani) and Waihū. Hosmer wrote:

...I beg to hand you herewith a written statement of my opinion in regard to that portion of the land of **Kaohe**, Hawaii, which come under discussion at the meeting of the Board on Wednesday last.

What is said below refers only to that part of the great land of **Kaohe**, known as **Kaohe 4**, which lies on the southwest side of **Mauna Kea**, above the lava flows of 1843 and of **Keamuku**, and between the lands of **Humuula**, on the east, and **Waikalua** and **Kaohe 3** on the west. The remainder of **Kaohe** will be reported upon later.

*The section in question is now used by the **Humuula** Sheep Station as grazing land for stock other than sheep. The eastern part is fenced in and used as a horse paddock. The lease on the land runs out in about two years.*

Applications have been received for the lease of the land above described, up to a *mauka* line drawn at about the 7500 foot contour, as shown on the government map of Hawaii; or to be more exact, between the bases of puus (Unnamed on the map) near the intersections of the 7500 foot contour line, as shown, with respectively, the **Humuula** line and a straight line drawn from the base of **Puu ka Pele** to the summit of **Mauna Kea** – the latter being the boundary between **Kaohe 3 and 4**.

The land in question is essentially grazing land. It is said by those who know the section, to be much better adapted for cattle and horses than for sheep. Springs on the slope above yield a [page 125] rather limited supply of water which is piped down to troughs near the road. With the lease of the grazing land goes the right to further develop this water.

Over a considerable part of the land, especially on that mauka of the road, there is a fairly dense growth of Mamani (Sophra chrysophylla). Making a practically pure stand, which extends up the mountain to above the point when the good grasses are no longer found.

On the trip around **Mauna Kea**, made last winter in company with Governor Carter, I crossed Koa. During the summer I again had an opportunity to see something of the tract from hills on adjoining lands, so that while I have not gone over the area in detail, I have a good general idea of the conditions thereon.

In common with a belt on the eastern slope of **Mauna Kea**, Above the level of the Koa and Ohia forest, this part of **Kaohe** is primarily valuable for grazing. Although there is a considerable stand of Mamani on **Kaohe 4**, this in itself does not make it necessary that the land be set apart as a forest reserve. On the contrary, on this particular land, the value of the Mamani lies, to my mind, chiefly in the fact that it increases the worth of the land for grazing.

My reasons for this are:

(1) The main use of the Mamani forest at this elevation, on the leeward side of Mauna Kea, is from its being a source of posts and fuel and because it affords protection for stock, on a dry and exposed range. This value is sufficiently great to cause any intelligent stockman to take a lively interest in perpetuating the forest.

*(2) The porous nature of this soil on this slope of **Mauna Kea** makes running streams out of the question. There is, therefore, no call for a protection forest.*

(3) Unless land on which the Mamani grows is subjected to heavy over-stocking with cattle, the trees appear not to be affected, nor is the reproduction seriously interfered with. With sheep the damage is greater. On the land in question the limited water supply practically insures against over-stocking. If therefore, only cattle and horses are grazed there is little to fear for the Mamani. And, as has been stated above, the land is said not to be suited for sheep grazing.

The possible influence on precipitation of the Mamani [page 126] forest on this land may, I think, be neglected, especially as the existing cover is not likely to be much altered.

Higher up on the slope of **Mauna Kea**, above the existing forest and far above any good grazing land is a region which is now of no real value to any one, but which I believe could some time be profitably planted with pines, spruces, firs, or other temperate zone timber trees. Before such work is undertaken many experiments as to kinds of trees and as to methods, must be tried, so that it will be some time before any extensive planting could be done. But this high lying land both on **Mauna Kea** and on Mauna Loa should, I think, be held out from all new leases, as waste land. And if, in later years, it is found that it can be made to grow forests, it should then be so used. To exclude land of this sort will work no hardship on any one now and it may, later, be of distinct advantage to the government.

In keeping with the general forest policy of the administration and in view of the possible future use of the upper slopes for forest, I advise that a fencing clause be inserted in the lease of **Kaohe 4**, providing that a fence be built and maintained across the mauka portion of the area leased. I further suggest that it be stipulated that this fence be completed within five years from the date of the lease. As the lessee would in any event probably fence on or below his mauka boundary, such a clause could not be considered a hardship.

In view of the above, I recommend that the Committee report favorably to the Board on the question of leasing for grazing the part of **Kaohe** 4 desired, with the suggestion that a fencing clause be included... [HFA 1905:127]

Proclamation of the Hilo Forest Reserve (1905)

On July 24th, 1905, Acting Governor A.L. Atkinson issued the proclamation establishing the Hilo Forest Reserve. The description of the lands and notes of survey are given below:

THE HILO FOREST RESERVE.

It is with a feeling of no small satisfaction that we are able this month to chronicle the creation of the Hilo Forest Reserve on the Island of Hawaii.

Based upon reports and recommendations made by the Superintendent of Forestry and approved by the Committee on Forestry,* the Board of Commissioners of Agriculture and Forestry, at a meeting held on June 30, 1905, unanimously adopted the following resolution:

“RESOLVED, that the Forest Reserve in the Hilo District, lying between the 1881 Lava Flow, back of Hilo Town, and the Hamakua District line, in the Hilo District, Island of Hawaii, as recommended by the Committee on Forestry, based upon the reports of the Superintendent of Forestry, dated August 9th, 1904, October 14th, 1904, and June 28th, 1905, and on maps and a description of the boundary prepared by Mr. A.B. Loebenstein and by the Survey Office, now on file in the office of this Board, a copy of which description is hereto attached and forms a part of this resolution, be approved.

RESOLVED, that the Board recommends to the Governor that the Government lands within the boundaries of the Proposed Forest Reserve, be set apart by him after the hearing required by Law. [page 181]

RESOLVED FURTHER, that the Board recommends to the Governor, that all the land within the said described boundaries be set apart as a Forest Reserve, subject to all private rights and titles, and that all owners of private lands lying within said boundaries be requested to co-operate with the Board of Agriculture and Forestry in reserving all of said lands for forestry purposes, in accordance with the terms of Chapter 28 of the Revised Laws of Hawaii.”

On July 19, Acting Governor Atkinson and the Board of Commissioners of Agriculture and Forestry held the Public Hearing required by Law. No opposition to the Reserve developing, Acting Governor Atkinson declared the Hilo Forest Reserve to be created, and on July 24th, signed the formal proclamation, describing the boundaries and setting apart the unleased Government lands lying within them. *The total area of the Reserve is 110,000 acres, more or less; the Government lands actually set apart 12,771 acres, more or less.* The proclamation issued by Acting Governor Atkinson will appear in the August issue of the Forester.

It may perhaps be well to explain the relation of the lands set apart to the remainder of the area embraced within the limits of the Reserve. By officially recognizing the larger area the Governor and the Board of Agriculture and Forestry go on record as to the section which they believe it is to the advantage of the Territory to devote to forest purposes. The Government then shows its good faith by setting apart the unleased Government lands lying within the limits of the Reserve and requests private owners to follow its example

* These reports appeared in the October and November (1904) issues of the Forester, Vol. 1, pp. 275 to 282 and 313 to 318.

and co-operate under the Law to carry out the plan and secure the objects for which the Reserve is made.

In the case of the Hilo Forest Reserve, from one-third to one-half of the land within the boundaries is owned by private individuals or corporations. The remainder is Government land, for the most part lease. *The Government sets aside at this time the two Government lands not now under lease, viz: the mauka portion of **Honomu**, 926 acres, more or less, and the section above **Laupahoehoe**, known as the Papaaloa Forest, 11,845 acres, more or less.* As the leases on other Government lands run out the Board of Agriculture and Forestry will recommend that the portions within the Reserve be also set apart. [page 182]

Except as the owners of private land or the lessees of Government land co-operate with the Board of Agriculture and Forestry as provided by Law, the Government can exercise no authority over the other lands within the Reserve boundary.

But, as the Reserve is established primarily to maintain favorable conditions of water-shed protection on which the plantations and the other large owners so much depend, it is clearly in the interest of these corporations to co-operate with the Government by setting apart the lands belonging to them until all of the area within the boundaries of the Reserve is devoted to the purposes of forestry.

As an example of the interest of the private owners within its boundaries in the creation of the Hilo Forest Reserve, the action of the Bishop Estate is significant. At the Public Hearing Mr. F.S. Dodge, Superintendent of the Bishop Estate, stated that the Estate was heartily in favor of the Reserve and proposed to co-operate with the Government in making it effective. The Estate has for some years maintained certain of its lands in the Hilo District as Forest Reserve, both within and extending *makai* of the boundaries adopted. It is expected that other large interests will follow the lead of the Bishop Estate. [page 183]

BY AUTHORITY.

PROCLAMATION OF FOREST RESERVE, HILO DISTRICT, ISLAND OF HAWAII.

Under and by virtue of the authority vested in me by the provisions of Chapter 28 of the Revised Laws of the Territory of Hawaii, enacted April 25, 1903, and amended by Act 65 of the Session Laws of the Legislature of 1905, and of every other power me hereunto enabling, I, A.L. C. ATKINSON, Acting Governor of the Territory of Hawaii, having duly given the notice and held the hearing as in said Acts provided, *do hereby approve as a Forest Reserve the lands lying between the 1881 Lava Flow back of Hilo Town and the Hilo-Hamakua District line, and between a line drawn approximately parallel to the coast (having an elevation of about 1750 ft. at the South end and an elevation of about 2000 ft. at the North end) and a line approximately along the top of the woods, in the District of Hilo, Island of Hawaii, Territory of Hawaii, more particularly described as follows, viz:*

LOWER LINE.

“Beginning at a point on the extreme lower end of the **Laumaia** Branch of the Lava Flow of 1881, this point being on the boundary line between the lands of Punahoa 1st and 2nd. Its co-ordinates referred to the Halai Survey Reference Station, being 8669 feet South, 24,934 feet West, the boundary runs by the true meridian:

1. N. one degree 41 minutes E. 4555 ft. crossing the various subdivisions of the land of **Punahoa** and to a point on the boundary line of Punahoa and with the land of **Piihonua** (Government), the co-ordinates of the said point referred to the Halai Survey Reference Station, being 4432 ft. South, 24,809 ft. West; thence crossing the land of **Piihonua**;

2. N. 21 degrees 32 minutes E. 4247 ft. to junction of the **Hookelekele Stream** with a branch from the North, the co-ordinates referred to the Halai Survey Reference Station, being 480 ft. South, 23,250 ft. W.; thence following up the middle of said branch which forms the present South boundary of the Hawaii Mill Company's Plantation to the South-west angle of the same, the direct bearing and distance to said point being;
3. N. 62 degrees 9 minutes W. 6165 ft., the co-ordinates referred to the Halai Survey Reference Station, being 2400 ft. North, 28,700 ft. West, thence across the lands of **Piihonua and Waiau** (Government);
4. N. 27 degrees 47 minutes E. 8538 ft. to a point in the **Awehi Stream**, the co-ordinates referred to the Halai Survey Reference Station, being 9950 ft. North, 24,720 ft. West, thence down the middle of the **Awehi**, also called the **Waiau Stream**, to the junction of same with the **Alae Stream**, the direct bearing and distance being;
5. S. 59 degrees 08 minutes E. 5964 ft., the co-ordinates referred to the Halai Survey Reference Station, being 6890 ft. North, 19,600 ft. West, thence across the lands of Pueo [**Puueo**] (Hilo Sugar Co.), **Kalalau and Alae** (Estate B. Pauahi Bishop). [page 245]
6. N. 4 degrees 36 minutes E. 6545 ft. to the Southwest angle of **Kawaiki** Homestead, Lot No. 40, at the junction of the **Maili and Pahoa Streams**, the co-ordinates referred to the Halai Survey Reference Station, being 13,405 ft. North, 19,075 ft. West, thence following up the middle of the Maili Stream and gulley forming the South boundary of the Kaiwiki Homestead Tract, the direct bearing and distance being;
7. N. 81 degree 10 minutes W. 18,130 ft. to the Southwest angle of Kaiwiki Homestead, Lot No. 73, the co-ordinates referred to the Halai Survey Reference Station, being 16,189 ft. West, thence along West boundary of Kaiwiki Homestead, Lot No. 73;
8. N. 5 degrees 58 minutes W. 2168 ft. to Northwest angle of Kaiwiki Homestead, lot No. 73, at a point on the South *Pali* of the **Honolii Stream** called **Waikēe** the co-ordinates referred to the Halai Survey Reference Station, being 18,345 ft. North, 37,226 ft. West, thence along North line of Kaiwiki Homestead Tract to the Northeast angle of Kaiwiki Homestead Lot No. 51, the direct bearing and distance being;
9. S. 34 degrees 10 minutes E 15,166 ft. to said Northeast angle the co-ordinates being referred to the Halai Survey Reference Station being 16,768 ft. North, 22,125 ft. West, thence across the land of **Kikala** (Estate B.P. Bishop).
10. N. 18 degrees 58 minutes E. 986 ft. to junction of the **Honolii** and the **Pohakupaa** Streams, thence across the land of **Paukaa** (Onomea Sugar Company);
11. N. 1 degree 10 minutes 30 seconds 3145 ft. to a point on the boundary line between **Paukaa and Pahoehe** (Estate B.P. Bishop), thence across the land of **Pahoehe**;
12. N. 1 degree 10 minutes 30 seconds 3605 ft. to a point in the middle of the **Pahoehe** stream the co-ordinates referred to the Halai Survey Reference Station being 24,460 ft. North, 21,671 ft. West, thence to and across the land of **Papaikou** (Onomea Sugar Co).
13. N. 2 degrees 29 minutes E. 6615 ft. to a point in the **Alakahi Stream** marking the West angle of the land of **Puumoi** (Onomea Sugar Co), this point being distant

- 1964 ft., bearing South 86 degrees 43 minutes E (True) from an x cut in the rock at the Waiemi Falls, the co-ordinates referred to the **Kauku** Survey Reference Station being 11,271 ft. North, 1080 ft. West, thence across the lands of Alakahi, **Mokuoneki** and **Kahalii** (Onomea Sugar Co.);
14. North 4491 ft. to a point on the boundary of **Kahalii** and **Onomea** (Onomea Sugar Co.) the co-ordinates referred to the Kauku Survey Reference Station being 6780 ft. South, 1085 ft. West, thence across the land of Onomea.
 15. N. 14 degrees 23 minutes W. 3251 ft. to head of the land of **Kawainui** (Government) the co-ordinates referred to the Kauku Survey Reference Station, 3632 ft. South, 1893 ft. West, thence across the land of **Makahanaloa** (Pepeekeo Sugar Co.) to and along the upper limits of the **Honomu** Homestead Lots as shown on Government Survey Registered Map No. 2296 to the South **Pali** of **Kolekole Stream** and up said **Pali** to a point, the co-ordinates of which referred to the Kauku Trig. Station [page 246] are 5250 ft. North and 5000 ft. West, the direct bearing and distance between the initial and final points, being N. 19 degrees 17 minutes W. 9409 ft, thence across the lands of **Kaiwiki** and **Hakalauiki** (Government), **Hakalaunui** (Hakalau Sugar Co.) **Kamaee** (Government), **Umauma** (Estate B.P. Bishop), **Opea** (Government), **Honohina** (Liliuokalani) and **Nanue** (Hakalau Sugar Co.);
 16. N. 22 degrees 14 minutes W. 22,361 ft. to the South angle of the **Kahuku** Homestead Lot No. 16 the co-ordinates referred to the **Puuohai** Survey Reference Station being 13,710 ft. South, 1884 ft. West, thence across the land of **Piha** (Government);
 17. N. 58 degrees 19 minutes W. 1519 ft to a point in the **Waikaumalu Stream** the co-ordinates referred to the **Puuohai** Survey Reference Station being 12,912 ft. South, 3177 ft. West, thence up the Waikaumalu Stream which forms the East boundary of the **Maulua** Gehr Settlement Association Tract to the Southeast angle of Lot No. 67 of said Tract, the direct bearing and distance being;
 18. S. 67 degrees 58 minutes W. 10,260 ft. to aforesaid point, the co-ordinates referred to the Puuohai Survey Reference Station being 16,761 ft. South, 12,687 ft. West, thence along top of Gehr Settlement Association Lots No. 67, 68, 69 and 70;
 19. N. 34 degrees 55 minutes W. 2233 ft to Southwest angle of Lot No. 70 the co-ordinates referred to the Puuohai Survey Reference Station being 14,931 ft. South, 13,965 ft. West, thence along the boundary of **Mauluanui** (Mrs. Robertson);
 20. N. 37 degrees 37 minutes E. 5852 ft. to a natural divide or fork in the **Pohakupuka Stream** called **Kepaniwai** the co-ordinates referred to the Puuohai Survey Reference Station being 10,306 ft. South, 10,403 ft. West, thence along the boundary of Maulua and Gehr Settlement Association Lots.
 21. N. 2 degrees 20 minutes W. 3062 ft. to a point in the Makaliiloa Stream 150 ft. above the **Hauwanawana Falls**, the co-ordinates referred to the Puuohai Survey Reference Station being 6347 ft. South, 10,564 ft. West, thence across **Maulua**;
 22. N. 29 degrees 14 minutes W. 4632 ft. to a point on boundary of **Mauluanui** and **Weloka** (Government), this point being distant 700 ft. and bearing South 39 degrees 16 minutes West (True) from an **Ohia** tree marked

L

- at edge of old water ditch, the co-ordinates referred to the Puuohai Survey Reference Station being 2306 ft. South, 12,826 ft. West, thence across the lands of Weloka, ***Keaalau***, and ***Kapehu*** (Government);
23. N. 64 degrees 35 minutes W. 3371 ft. to Southeast angle of ***Laupahoehoe*** Homestead, Lot No. 39, the co-ordinates referred to the Papaloa Survey Reference Station being 10,155 ft. South, 2480 ft. West, thence along South line of ***Laupahoehoe*** Homestead Tract; [page 247]
 24. N. 61 degrees 25 minutes W. 11,631 ft. to Southwest angle of ***Laupahoehoe*** Homestead, Lot No. 7, the co-ordinates referred to the Papaloa Survey Reference Station being 4413 ft. South, 13,019 ft. West, thence across the lands of ***Puualaea, Kiilau and Laupahoehoe 1st and 2nd*** (Government);
 25. N. 58 degrees 00 minutes W. 5097 ft. to a point on the boundary of ***Waipunalei*** (S. Parker), the co-ordinates referred to the Papaloa Survey Reference Station, being 1712 ft. South, 17,335 ft. West, thence across the land of Waipunalei.
 26. N. 86 degrees 16 minutes W. 1997 ft. to the Southeast angle of Section 13 ***Kahooahuna***, the co-ordinates referred to the Papaloa Survey Reference Station being 1582 ft. South, 19,331 ft. West, thence across top of Section 13 Kahooahuna to point in middle of ***Mauiana*** gulch on boundary of Humuula;
 27. N. 46 degrees 24 minutes W. 1786 ft. to the Southwest angle of Section 13, thence down middle of the ***Mauiana gulch*** and boundary of ***Humuula*** (Government);
 28. N. 27 degrees 25 minutes E. 2986 ft. to a point in the ***Mauiana*** gulch, the co-ordinates referred to the Humuula Survey Reference Station, being 8777 ft. South, 2470 ft. West, thence across the lands of ***Humuula and Ookala***.
 29. N. 61 degrees 35 minutes W. 4661 ft. to a pool at foot of Falls in the ***Kaula gulch*** called ***Paeooppu***, said point forming the Southwest angle of the land of ***Ookala*** and on the boundary between the Hilo and the Hamakua Districts, the co-ordinates referred to the ***Humuula*** Survey Reference Station being 6559 ft. South, 6507 ft. West, *thence up along said boundary between the Hilo and Hamakua Districts to an X cut in the rock ledge near the middle of the Kaula gulch at the old Keanakolu-Waimea trail crossing, the said gulch at this point being the boundary of the Hilo and Hamakua Districts, the co-ordinates of the said point being North 13,204.9 ft., East 3,301.4 ft., referred to the "Puukalepa" Terr. Survey Station.*

UPPER LINE.

30. Beginning again at the initial point the boundary runs in a general westerly direction up and along the northern edge of the various lava flows to the point described in Bd. Cert. No. 53, ***Piihonua***, as ***Mawae***, the mark being a large monument of stones erected on the top of bank of the main Aa lava channel of the 1855 Lava Flow, situated a little above the bend of the trail over the lava, where it leaves the ***Pahoehoe*** crossing the Aa channel, and about 700 ft. South of the entrance of the trail into the ***Halealoha*** opening the co-ordinates being South 40,908 ft., East 6350.0 ft. referred to the "Aahuwela" Survey Reference Station, thence by true azimuths.
31. 195 degrees 42 minutes 40,366 across the land of ***Piihonua*** (Territory of Hawaii) to a point on the South boundary line of ***Paukaa*** (Onomea Sugar Co.), the co-ordinates being South 2040 ft., East 17,273.2 ft. referred to the "Aahuwela" Survey Reference Station. [page 248]

32. 215 degrees 55 minutes 30 seconds 3436.7 ft. across the land of **Paukaa**, to a point of the South boundary of **Papaikou** (Onomea Sugar Co.), the co-ordinates being North 742.2 ft., East 19,289.7 ft. referred to the "Aahuwela" Terr. Survey Station.
33. 178 degrees 03 minutes 43 seconds 4791.0 ft. across the land of Papaikou to a point on the South boundary of **Makahanaloa** (Onomea Sugar Co), the co-ordinates being North 5983.3 ft., East, 19,135.0 ft. referred to the "Aahuwela" Terr. Survey Station.
34. 168 degrees 01 minutes 55 seconds 4783 ft. across the land of **Makahanaloa** to a point on the South boundary of **Hakalaunui** (Hakalau Sugar Co.), the co-ordinates being 250.7 ft. South, 7278.2 ft. East referred to the "**Kaloaloe**" Terr. Survey Station;
35. 179 degrees 26 minutes 56 seconds 9294.0 ft. across the land of Hakalau to a point on the South boundary of **Honohina** (Liliuokalani), the co-ordinates being North 9032.3 ft., East 7188.8 ft. referred to the "Kaloaloe" Terr. Survey Station;
36. 114 degrees 09 minutes 02 second 8695.7 ft. across the land of Honohina to Northwest angle of same, a **Koa** tree blazed **H** (old mark) re-marked
L
standing on the north bank of the Nahui [**Nauhi**] gully, about 50 ft. East or *makai* of the **Hopuwai-Keanakolu trail** where it leaves the gully, the co-ordinates being North 12,590.4 ft., West 745.5 ft., referred to the "**Kaloaloe**" Terr. Survey Station;
37. 183 degrees 19 minutes 45 80 ft. along West or *mauka* line of **Piha** (Territory of Hawaii) bordering **Humuula** (Territory of Hawaii) to Northwest angle of Piha, at a point on the **Hopuwai-Keanakolu trail** where it leaves the brush and enters an open flat covered with black sand, in the middle of which has been erected a large mound of stones, called **Kahuwai**, the co-ordinates of the aforesaid Northwest angle of Piha being South 7867.3 ft., East 10,415.5 ft. referred to the "**Puukalepa**" Terr. Survey Station;
38. 109 degrees 23 minutes 6 20 ft. along West or *mauka* line of **Mauluanui** (Mrs. Sara Robertson) bordering the land of **Humuula** to Northwest angle of **Maulua Nui** at a **Koa** tree
L
surrounded by a mound of stones, a little East of the **Hopuwai-Keanakolu trail**, and at bend of the same into the **Kaiaki gully**, the co-ordinates [page 249] being South 1765.3 ft., East 9271.5 ft. referred to the "**Puukalepa**" Terr. Survey Station.
39. 172 degrees 02 minutes 12 seconds 4125 ft. along West or *mauka* boundary of **Laupahoehoe** (Territory of Hawaii) bordering the land of **Humuula**, to the Northwest angle of **Laupahoehoe** at the crossing of the **Hopuwai-Keanakolu trail**, over the "**Keahuaai**" or "**Douglas Pits**" gully, the co-ordinates being North 2320.0 ft., East 3700.0 ft. referred to the "**Puukalepa**" Terr. Survey Station.
40. 229 degrees 55 minutes 46 38 ft. along the North boundary of **Laupahoehoe** bordering Humuula to a mound of stones by a **Koa** tree marked "**Poloka**" at West brink or edge of a pool of water called "**Kalaukahoi**" [Kulanihako'i] this forming the Southwest angle of the land of **Waipunalei** (Samuel Parker), the co-ordinates being North 5306.4 ft., East 12,248.6 ft., referred to the "Puu Kalepa" Terr. Survey Station.

41. 163 degrees 03 minutes 03 seconds 4502.0 ft. along West or *mauka* line of **Waipunalei** bordering **Humuula** to Northwest angle of Waipunalei at a point in the middle between three *Koa* trees marked **H**, **X** and **W** respectively, re-marked.

L

distant 1241 ft., bearing 282 degrees 00 minutes from the post set as a Survey Reference Station on the top of the **Lahohinu Puu**, the co-ordinates being North 9613.4 ft., East 10,936.0 ft. referred to the "**Puu Kalepa**" Terr. Survey Station;

42. 142 degrees 57 minutes 45 seconds 4374.0 ft. across the land of **Humuula** to an **X** cut in the rock ledge near the middle of the **Kaula gulch** at the old "**Keanakolu-Waimea**" trail crossing, the said gulch at this point, being the boundary of the Hilo and Hamakua Districts, the co-ordinates of the said point being North 13,204.9 ft., East 3301.4 ft. referred to the "**Puu Kalepa**" Terr. Survey Station.

Total area 110,000 acres, more or less.

And I do hereby set apart as a Forest Reserve those portions of the Government lands known as the *Ahupuaa* of **Honomu** and **Papaaloa** Forest section (embracing the Government lands between **Maulua** and Waipunalei), lying within the said metes and bounds... [HFA, 1905:250]

Leasehold Interests Modified on the Lands of Ka'ōhe and Mauna Kea (1906-1908)

The Commissioners again visited the discussion on the lands of Ka'ōhe, in the Hāmākua District, including the summit region of Mauna Kea, thus, the lands lying along the *mauka* boundary of Humu'ula, in 1906 and 1907. The following reports describing the lands, their usage, and resources was published in the Hawaiian Forester and Agriculturalist of 1907:

GOVERNMENT WASTE LAND.

At a meeting of the Board of Agriculture and Forestry, held on December 21, 1906, there was passed a resolution, based on reports submitted by the Superintendent for Forestry and by the Committee on Forestry, that further defines the policy of the Board in regard to the disposition of waste land belonging to the Territorial Government.

Another report on the land of **Kaohe**, similar in tenor and purport to those given below, was approved by the Board in December, 1904, and appeared in this magazine in the issue of May, 1905, Vol. II, pp. 124-127.

Following are the resolution and reports first mentioned:

RESOLUTION IN REGARD TO THE LAND OF KAOHE, HAMAKUA, HAWAII.

(Adopted by the Board of Agriculture and Forestry on December 21, 1906.)

*Resolved, that the Board of Commissioners of Agriculture and Forestry approves the recommendation of the Committee on Forestry in regard to the retention by the Government from sale or lease of the mauka part of the land of **Kaohe**, District of Hamakua, Island of Hawaii, contained in a report dated Nov. 1st, 1906, based on a report of the Superintendent of Forestry dated Oct. 13th, 1906.*

Resolved, that the Board recommends to the Governor that the portion of **Kaohe** lying above a line roughly described as beginning on the boundary between **Kaohe 4 and 5** at the end of the *mauka* fence required to be built across **Kaohe 4** by a lease sold to Mr. A.M. Brown in December, 1904, and running in a general northwesterly direction, *mauka*

of **Puu Ahumoa to Puu Laau**, thence northeasterly along the *mauka* boundary of **Paauhau** to **Puu Kemole**, thence *mauka* of **Puu Kaluamakani** to a point on the division line between **Kaohe 3** and **Kaohe 5**, thence along said division line to the northwest end of the existing fence across **Kaohe 5**, built by the **Kukaiau** Plantation Company, thence in a general southeasterly direction across **Kaohe 5**, following said fence, to the **Humuula** boundary, thence following said **Humuula** boundary to the south and west around **Mauna Kea** to the southeast line of **Kaohe 4**, thence across **Kaohe 4**, following the above described fence to the point of beginning, and also the portion of the land of **Kaohe** that lies above the **Keamuku and the 1843 lava** flows on the north slope of **Mauna Loa**, be for the present reserved by the Government from sale or lease and retained by the Land Office as waste land. [HFA, 1907:429]

REPORT OF THE COMMITTEE ON FORESTRY.

Nov. 1, 1906...

...Your Committee has had under consideration the report of the Superintendent of Forestry, dated Oct. 13th, 1906, concerning the land of **Kaohe**, District of Hamakua, Island of Hawaii.

The upper portion of the said land should, in the judgment of your Committee, be classed as waste land, being unsuited for any economic use now known.

But in order that it may be available in future when it is possible that some use may be found for it, your Committee are in favor of its retention from sale or lease by the Government.

Your Committee therefore recommend that the Board approve the suggestions of the Superintendent of Forestry and that a recommendation embodying them be adopted by the Board and transmitted to the Governor and to the Commissioner of Public Lands... [HFA, 1907:430]

REPORT OF THE SUPERINTENDENT OF FORESTRY.

October 13, 1906...

...I have to submit the following report upon the land of **Kaohe**, District of Hamakua, Island and County of Hawaii, with the recommendation that certain portions of this tract be reserved from sale or lease, as waste land.

Kaohe is the largest single land in the Territory, its area being given in the last Land Office List as 218,257 acres. It includes practically all of the upper slopes of **Mauna Kea** and a good share of the northern slope of **Mauna Loa**. For purposes of classification in the Land Office, **Kaohe** is divided into six parts. **Kaohe 1** is cane land under a five-year lease, expiring in 1909. **Kaohe 6** is open grazing land not under lease. All of the remainder of **Kaohe** consists of grazing, open forest and waste land. A portion of **Kaohe 2** (1,035.6 acres) is under lease until January 10, 1909. The lease on the remainder of **Kaohe 2**, with those on **Kaohe 3, 4 and 5** expired on September 9, 1906, but a new 21-year lease [page 430] for a portion of **Kaohe 4** went into effect the next day. This lease was sold to Mr. A.M. Brown during the winter of 1904.

Kaohe 2 and the lower portion of the other three tracts are primarily of value for grazing and should in my judgment be so used, except as hereinafter noted. *Above an elevation of about 5,000 feet there is a fairly dense growth of Mamani (Sophora chrysophylla) making a practically pure stand, which extends up the mountain to an elevation of about*

8,000 feet. Within the last ten years the belt of *Mamani* has, through natural reproduction, been extended both up and down the mountain and the process is still going on. Just why the *Mamani* should have taken this sudden start is not clearly understood, the usually excepted theory being that prior to about 10 years ago some insect or other pest held the reproduction in check. Unless a paddock is heavily overstocked cattle do not interfere with the growth or reproduction of *Mamani*. In fact over a considerable part of the *Mamani* belt the trees are coming up so thickly as almost to preclude grazing. Obviously no artificial protection is required for this type of forest.

The Mamani forest extends some distance above the area of good grazing land, which is marked by the upper limit of the valuable native and introduced grasses. The section above the Mamani belt being without valuable vegetation is of little account for grazing. It is for the most part now used only by wild cattle and horses. There seems at present no economic use to which it can be put.

In the leases that have just expired this area of waste land was included with the good land below, thrown in as it were as a sort of “*manuahi*,” thereby greatly swelling the acreage under lease, but being of little value to the lessee. In my opinion this arrangement serves no good end and should in future be discontinued; the land of value for grazing being leased as such and the remainder held by the Government as waste land.

In a report upon the land of **Kaohe 4** made to the Board under the date of Dec. 3rd, 1904, I made similar recommendations in regard to the *mauka* part of that tract. These were adopted and when the lease was made to Mr. Brown only the good grazing land was included, thus establishing a precedent in regard to waste land. I now recommend that when **Kaohe 3** and **5** are re-leased the portion above the following roughly described line be excluded and retained by the Land Office as waste land:

Beginning on the boundary between **Kaohe 4 and 5** at the end of the fence required to be built across **Kaohe 4**, the line should run *mauka* of **Puu Ahuamoa to Puu Laau**, thence along the *mauka* boundary of **Paauhau to Puu Kemole**, thence *mauka* of **Puu Kaluamakani** to a point on the division line between **Kaohe 3 and Kaohe 5**, thence along said division line to [page 431] the northwest end of the existing fence across **Kaohe 5**, built by the **Kukaiau** Plantation Company, thence across **Kaohe 5** following said fence to the **Humuula** boundary, thence following said **Humuula** boundary to the south and west around **Mauna Kea** to the southeast end of the fence required to be built across **Kaohe 4** and along the same to the initial point.

Mr. A.W. Carter, representing the Parker Ranch, has proposed to lease the grazing land in **Kaohe 3**, with a proviso in the lease that a fence be built and maintained across **Kaohe 3** following the line just described. Across **Kaohe 5** a fence built sometime ago by the **Kukaiau** Plantation Company (the one mentioned in the above description) marks the division between the good grazing and the waste land.

With the building of the fences on **Kaohe 3** and **4** and the gradual capture of the wild cattle on the mountain, facilitated thereby, stock will be kept off this upper section.

The retention by the Land Office of this area of waste land is directly in line with the policy of the administration to put the government land to its best use and furthermore it leaves what is now an unavailable tract in such shape that if a use is found for it in later years it will then be available for lease or sale. With the introduction of new grasses it is quite possible that the area of good grazing land may in time be extended *mauka*, while there seems to me no good reason why much of the area on the sides of Mauna Kea, between the elevation of 8,000 and 10,000 feet could not be made to grow forest trees from the

temperate zones, such as Pines, Firs and Spruces, that in time could be looked to, to supply construction timber. The establishment of such a forest belt would, of course, entail a considerable expense, even though the method of scattered seed spots were adopted, but experiments have been begun to determine what species are best adapted for use in this locality. Funds for more extended work are not now in sight.

Kaohe 2.

On the part of **Kaohe 2**, between the mountain road and the upper line of the upper Pohakea homesteads, the forest has been destroyed by one cause and another, the chief among them being fire, until with the exception of a few groves of Koa and a section of the Mamani belt, practically the whole area is open country which could only be reforested by artificial means. Except for the Koa groves already mentioned there are not enough trees left to furnish seed, even were the other factors governing natural reproduction favorable, which is distinctly not the case.

Realizing the importance of the protection which an open [page 432] forest affords stock the **Kukaiau** Plantation has proposed to Mr. Pratt that he put up **Kaohe 2** for lease with the requirement that a certain part of the land be planted with Blue gum (*Eucalyptus globulus*) trees; the stock to be kept out until the trees grow large enough to care for themselves. I heartily approve of this plan and am now having prepared by Mr. Haughs, a planting plan under which the work could be done.

If natural reproduction of Blue gum takes place in Hamakua as it has in certain other upland districts of the Territory this section may in time come under a forest cover of this Eucalyptus...

Ralph S. Hosmer... [HFA, 1907:433]

In 1908, Commissioner, L.A. Thurston reported on the lands of Ka'oho and Humu'ula, and a proposal to set aside such lands for a new reserve, to the Board of Commissioners. This proposal would become the Mauna Kea Forest Reserve, and implement a fencing project across Humu'ula and Ka'oho, around most of Mauna Kea. The resulting reserve, established in 1909, would become one of the major projects undertaken by the Civilian Conservation Corps (CCC) program in the 1920s-1930s, and one in which several participants in oral history interviews had a hand. The report of the committee, approved January 11th, 1908 reads—

Forestry Reserve on Lands of

Kaohe And Humuula, District of Hamakua and Hilo, Hawaii.

On Wednesday, December 2nd, instant, there was referred to this committee a communication from Land Commissioner Pratt, dated Nov. 29th, in which he states in substance, that the leasing of the lands of **Kaohe** and **Humuula**, Hamakua, Hawaii, is in contemplation, and asks for the views of this Board upon the subject of forest reserves upon said lands.

Kaohe IV contains approximately 137,000 acres and includes the top of **Mauna Kea**, the southern slope of that mountain toward **Mauna Loa**, the table land between the two mountains and a large portion of the northern slope of upper Mauna Loa.

The greater portion of the Mauna Loa portion consists of barren lava flows, with a sparse growth of shrubs and grass.

The tableland between the mountains, at an elevation of about 6,000 feet is dry and sandy, with scattered mamani, naio and other trees which grow on such soil and in such a climate. There is a fair amount of grass, making good grazing for a limited amount of stock.

*The steep southern slope of **Mauna Kea** up to the 7,500 foot level has a thick growth of the same kinds of trees, and somewhat less grass. Above the 7,500 foot contour there is practically no grass, and the trees though thick are scrubby.*

Above about the 8,000 foot level there is little vegetation, while the land is rocky and sandy.

The committee is not informed as to the exact conditions on **Kaohe** at the north end of **Mauna Kea**.

Humuula is the land lying below **Kaohe** on the east slope of **Mauna Kea**, and above the forest lands which run to the sea in the Hilo District. It contains 110,000 acres and is largely appropriate for grazing land.

It will be necessary to take more time and study to formulate a definite plan concerning the whole of **Kaohe and Humuula**. Your committee is informed, however, that the only proposition immediately pending for leasing either of said lands, is an application for a lease of 18,000 acres situate on the table land between **Mauna Kea** and Mauna Loa, and extending up to the 7,500 foot level on the south slope of **Mauna Kea**.

Your Committee are of the opinion that as to this particular area, it is proper land for grazing purposes. There are no running streams. The water available is so limited in amount that but comparatively few animals can run on it at once, obviating the danger of stocking out what trees there are.

Without at present having any definite plans for development of a forest growth on the waste lands of **Mauna Kea**, as they are valueless for pasturing purposes, it is recommended that they be kept under the control of the Government instead of being included in the leases of the lower grazing lands as has heretofore usually been done.

In order to protect the forest growth already there, we suggest that a proper condition of any lease given of said land should be that the lessee should fence and keep fenced, the upper boundary of the leased land.

We recommend to the Board for adoption the following resolution:

“Resolved that the Board of Commissioners of Agriculture and Forestry are of the opinion that it is not necessary to reserve for forestry purposes that portion of the land of **Kaohe**, District of Hamakua, Island of Hawaii, lying on the southerly slope of **Mauna Kea**, below the 7,500 foot contour line; and that portion lying on the table land between **Mauna Kea** and Mauna Loa.

That if the Land Commissioner sees fit to lease or otherwise dispose of the indicated portion of **Kaohe**, this Board respectfully recommends to him that a condition of such disposition be that the lessee or purchaser fence and keep fenced the upper boundary of said land.”

Your committee requests further time in which to consider the subject of forest reserves in connection with the remainder of **Kaohe** and the land of **Humuula**.

Your committee transmit herewith the report of Forest Hosmer upon this subject... ..L. A. Thurston... ..The above resolution was adopted by the Board of Agriculture and Forestry, at the meeting held Jan. 11th, 1908.

Ralph S. Hosmer, Superintendent of Forestry...

The Pi‘ihonua Forest and Watershed (1907)

During 1907, the Commissioners also discussed the Pi‘ihonua Watershed. The reports in the Hawaiian Forester and Agriculturalist provide us with descriptions of the forest; the leasehold interests of J.T. Baker and W.H. Shipman—Pu‘u ‘Ō‘ō Ranch; and ranching and forestry issues. The reports were in part generated by an investigation into the possibility of developing a lumbering venture on Pi‘ihonua; an idea which superintendent of Forestry, R.S. Hosmer, considered inappropriate—

Honolulu, Hawaii

July 18, 1907

(The land of Pi‘ihonua):

*...I have the honor to submit the following report on the question of permitting lumbering on the land of **Pi‘ihonua**, District of Hilo, Island of Hawaii:*

This report is made in reply to a request received from the Commissioner of Public Lands on June 18, 1907. It is based: (1) on an examination of the land made at the end of June, 1907, during which I saw as much of **Pi‘ihonua** as can be seen without the cutting of a considerable number of trails through heavy undergrowth and across swamps: (2) on all the other evidence in regard to the character of the land that I could obtain, and I believe I have practically all that is available. I have given the matter most careful consideration from every point of view and I conscientiously believe that I am acting for the best interests of the Territory in making the recommendations that follow.

DESCRIPTION

Pi‘ihonua is a government land, under a crown lease to the Hon. John T. Baker of Hilo. The lease (No. 531) expires on March 21, 1921. The upper part of the tract is sublet to Mr. W.H. Shipman and constitutes the **Puu Oo** Ranch. The lower line of Mr. Shipman’s lease extends almost due north across the tract from the point on the 1855 lava flow, known as Reed’s Island, at an elevation of approximately 5,000 feet. The lower portion of the tract is covered by the fields of the Hawaii Mill Company’s sugar plantation. The cane lands reach up to an elevation of about 2,000 feet. [page 253]

The section between the cane fields and a forest fence constructed by Mr. Shipman at some distance above the line of his lease, constitutes a part of the Hilo Forest Reserve, established in July, 1905.

Between the limits named the land is heavily wooded. On the lower and middle sections the forest consists of a mixed stand of *Ohia Lehua* and *Koa* trees, mainly of large size. At an elevation of approximately 4,500 feet is a belt of pure *Ohia* forest. Above this and extending to and above the Shipman fence the forest is again composed of *Koa* and *Ohia*, in mixture. Throughout the forest is a heavy undergrowth consisting of tree-ferns, low shrubs and small trees, and high growing ferns and brakes. In places are tangles of *ie-ie* vine and *uluhi* [*uluhe*]. The soil where exposed is a reddish clay, a foot to eighteen inches or more in depth.

The belt of pure *Ohia* is evidently the point of greatest precipitation from the trade wind clouds; though throughout the forest, from the plantation clearing to the Shipman line, the rainfall is heavy. All over the area are springs, pools and swamps that feed the numerous small tributaries to the **Wailuku River** and its several branches. Practically the whole drainage basin of this stream is on **Pi‘ihonua**, for the water that comes from higher up than the section watered by the trade wind clouds is limited to the flow resulting from Kona and other local storms.

Very little is known accurately of the actual sources of the water in the streams, or from which part of the forest they are most largely fed. But the indications are that from one-third to one-half of the water comes from the area of pure Ohia forest, above described, while the remainder is the result of springs and swamps lower down. These springs are dependent for their sustained and equalized flow on the protection afforded by the forest cover.

At present the water from the Wailuku river is used for fluming cane and for turning the power wheels of the Hilo Electric Light Company. For these purposes it is diverted at points near or below the 2,000 foot level.

RECOMMENDATIONS.

Having given the problem thorough and careful study, both on the ground and in its various relations, *I cannot report favorably on the proposition to lumber this tract. My principal reasons for this decision are three in number.*

First: I believe the greatest value of the forest on **Piihonua** to be in the influence which it has on the drainage of the Wailuku River and its branches, i.e. on the affect the forest exerts on the water after it reaches the surface, by equalizing the flow and preventing excessive run off. In view of its present use and possible further development for water power, irrigation and even for domestic supply—especially in connection with the growth of [page 254] Hilo town—I regard the Wailuku as one of, if not the, most important stream protected by a forest reserve in the Territory.

It might be possible, if the work were done under careful restrictions, to remove some of the mature trees from the **Piihonua** forest without detriment to its water conserving qualities. But to make lumbering profitable the operations would have to be conducted on a large scale. This would inevitably involve the opening up of considerable areas in sections where a complete forest cover is most needed. Such a policy on this particular water shed would be fraught with danger. It is a risk which I do not believe the Territory should take. For the money to be obtained as stumpage would in no way compensate for the injury that would result were the regular flow of the Wailuku River seriously interfered with.

For this reason *I am opposed to lumbering the forest on **Piihonua**.*

Second: The forest policy of the Territory has been and is to create a chain of forest reserves that are essentially “protection forests.” On the leeward side of the island, where because of the absence of running streams watershed protection does not figure, I am in favor of utilizing the merchantable timber. But on the windward side of Hawaii I believe that the forest in the several established forest reserves should for the most part be kept intact, at any rate for the present.

If this is so in general it is particularly true of the Hilo Forest Reserve; for with the growing importance of Hilo town and the Hilo District, through the construction of the breakwater and the building of the Hilo-Kohala Railroad, the streams coming from the reserve will be needed more than at any time in the past.

Considering the large area of privately owned land in the Hawaiian forest reserves it is essential that a uniform and consistent policy of forest protection be maintained, in order that the owners of this land may be brought to cooperate with the Government in its management. *The granting of logging rights on such a land as **Piihonua** would, I fear, tend to weaken the public sentiment that supports the reserve work, if indeed it did not react unfavorably on the whole forest policy of the Territory.*

Therefore, on this count also, *I believe the logging of **Piihonua** to be inexpedient.*

Third: My third reason is from a professional standpoint. Forestry rests on a business as well as on a scientific basis. In the consideration of such a problem as the lumbering of the **Piihonua** forest, the factor of whether or not it would pay is an essential one.

Even were it desirable that lumbering should be permitted, it would in my judgment be necessary, in order to safeguard the favorable conditions of stream flow that now exist, to load the con- [page 255] tract with stringent regulations as to the area to be logged, the methods to be used and the subsequent treatment of the tract. From the situation of **Piihonua** in relation to transportation, the cost of logging would at best be high. When to this were added the necessary restrictions and stumpage at the price which I believe the Territory should demand, I cannot see how there would remain any margin of profit for the contractor undertaking the work.

Looking at the matter in this light I should not be justified from the standpoint of professional ethics, in tacitly recommending the project by approving conditions under which logging might be carried on.

On this third count, then, *I cannot recommend lumbering on **Piihonua**.*

I recommend, if the Board approves this report, that copies be sent to the Governor and to the Commissioner of Public Lands...

Ralph S. Hosmer... [HFA, 1907:256]

The Mauna Kea Forest Reserve (1909)

In 1909, the summit of Mauna Kea was removed from the leases, and Territorial Governor, W.F. Frear, approved the boundaries for the proposed Mauna Kea Forest Reserve (*Figure 58*) . The following communications describe the thinking behind the reserve, and some of the early actions on lands adjoining it (see HTS Plat No. 613, for final boundaries of the reserve and location of fence lines):

Honolulu, Hawaii, March 30, 1909.

...The subject of this report is the proposed setting apart of the upper slopes of **Mauna Kea** as a forest reserve.

Unlike most of the Hawaiian forest reserves, this project is not concerned with watershed protection. Its purpose is to facilitate the systematic management of an area that can be used to better advantage for growing forest trees than for any other economic purpose. There is now on Mauna Kea a considerable stand of Mamani [māmane] forest. At the higher elevations there is much land, now unproductive, that could well be planted with commercially valuable exotic trees. By setting apart the area as a forest reserve the existing forest can be made to be of greater service to the people of the Territory, while the afforestation of the upper slopes of the mountain will be facilitated.

Description of the Area.

Mauna Kea, the highest mountain in the Territory of Hawaii, is situated in the District of Hamakua, Island and County of Hawaii. The elevation above the sea of its highest peak is 13,825 feet. The summit and the greater part of the sides of the mountain above the 7,500 foot contour line are included in the government land of **Kaohe**, an *ahupuaa* containing an immense area of waste land, in that besides the summit and upper slopes of **Mauna Kea** it also takes in a considerable portion of the north side of Mauna Loa.

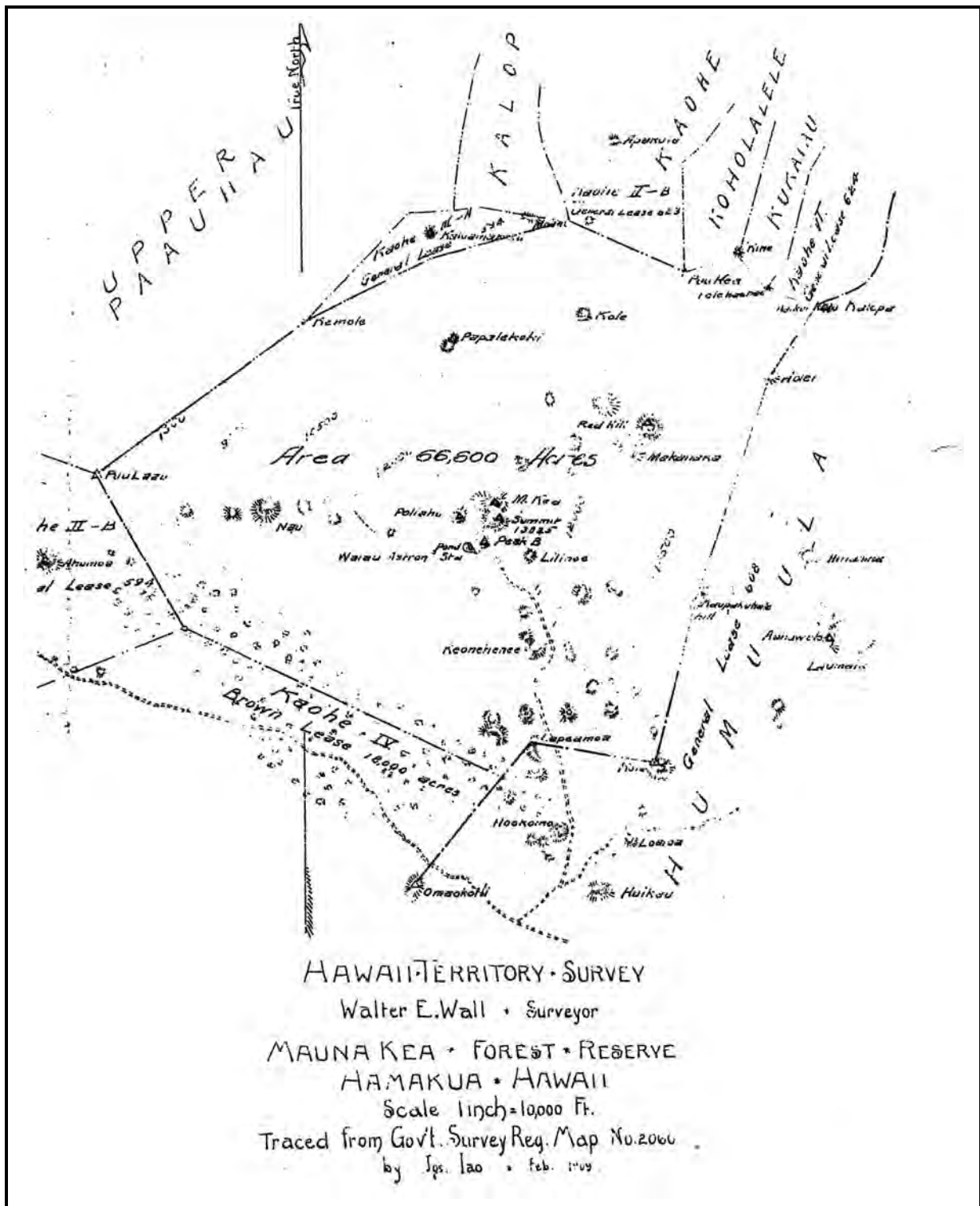


Figure 58. Boundaries of the Mauna Kea Forest Reserve (1909 – traced from Reg. Map No. 2060)

*Above a line encircling the mountain at the elevation of approximately 7,500 feet, the slopes of Mauna Kea may be classed as waste land. The herbage is too poor and uncertain to justify grazing and the land has now no other use. This fact, together with the desire to prevent their stock from straying up the mountain to join the bands of wild cattle, led the several ranches controlling the better portions of **Kaohe** and the other adjoining lands to build fences separating their upper paddocks from the area of low value above. Several such fences were built before the old leases expired. In 1907 when the leases on the govern- [page 229] ment land of **Humuula** and the better portions of **Kaohe** ran out and came to be renewed, provision was made for the extension of these mountain fences and for their up-keep during the term of the new leases. At the present time, with the exception of a stretch on the southwestern side of Mauna Kea, across the portion of **Kaohe** known as **Kaohe 4**, the mountain is wholly fenced off. It is expected that this stretch also will soon be leased, with a provision that the fence be completed. Further, negotiations are now in progress with the ranches abutting on Mauna Kea looking to a systematic campaign for the rounding up and capture and extermination of the wild cattle on the mountain.*

When the new leases of **Kaohe** were made the waste land was retained by the Government, instead of being included as formerly with the productive areas below. This usage has now become a regular part of the land policy of the Territory. It is a step toward putting all the land to the use for which each tract is best adapted. For it leaves the control of land for which there is now no use in the hands of the Government against the time when some, now unforeseen, use may be found.

In the case of **Kaohe** it is now proposed that the land be devoted to the purpose of raising trees. The object of this report is to state the reasons that make this use advisable and to show how the setting apart of the area as a forest reserve will help bring about the desired results.

The section included in the proposed reserve may roughly be described as the upper slopes of **Mauna Kea** above an elevation of approximately 7,500 feet. The area is 66,600 acres.

Use of Kaohe for Forest Purposes.

The question of using the land of **Kaohe** for wood and timber production may be considered under two heads—the existing and the prospective forest.

The Mamane Forest.

*Between the good grazing land and the elevation of about 9,000 feet, especially on the northern and western slopes of Mauna Kea, there is a fairly heavy stand of Mamane (*Sophora chrysophylla*). This forest is increasing through natural reproduction. The reason for the rapid spread of Mamane—which is a matter of the last decade—is not clear, but the fact remains to the advantage of the Territory. Mamane is a wood valuable for posts. Rightly managed there is likelihood that in time this forest can be made a source of revenue. One of the reasons for the setting apart of **Kaohe** as a forest reserve is that it will facilitate the proper handling of this forest. [page 230]*

Above the *Mamane* belt, between the elevations of from eight to eleven thousand feet, and in sections lower down where the *Mamani* forest is open and broken, there exists an excellent opportunity for the planting of commercially valuable exotic trees. The general conditions of soil, situation and climate at this elevation are sufficiently comparable to those on the mountains of Southern California to make it appear reasonable to expect that the kinds of trees that do well there can also be made to grow and thrive on **Mauna Kea**.

*The planting of pines, spruces and firs on the upper slopes of **Mauna Kea** has been recommended by each of the professional foresters who have visited the islands: Mr. E. M. Griffiths, now State Forester of Wisconsin; Mr. W. L. Hall, of the U. S. Forest Service, and by me. Favorable conditions for tree planting are also obtained on the upper slopes of Mount Haleakala on Maui, and on Mount Hualalai on Hawaii.*

The U. S. Forest Service has shown its belief in the feasibility of the plan by allotting the sum of \$2,000 for experimental planting on Mauna Kea and Haleakala, during the present fiscal period. This money is now being expended under my direction as Collaborator in the Forest Service, in the inclosure and planting up of a number of experimental plots on these two mountains, located at varying elevations and having different conditions of aspect and exposure.

It is the intention at the start to plant in each inclosure a sufficient number of seedling trees—say 100 of each—of some eight kinds of coniferous trees (pines, spruces and firs) likely to do well. Later, it is expected that additional allotments will be secured from the Forest Service to continue the work. Eventually those trees that prove to be adapted to the situation can be more extensively planted, being then set out in such a way that in the end a belt of forest will be secured. Such a result is, of course, only to be expected after a considerable time. This makes the experiment one that is only likely to be undertaken by the Government. That it appears practical and practicable to the Forest Service is evidenced by the allotment already made.

At first it was felt that it would be sufficient if only the areas actually needed for the experimental plots were turned over by the Land Department for this use. But on consultation with the Land Commissioner it appeared that from an administrative standpoint it would be more satisfactory if all of this portion of **Kaohe** were transferred to this Board. This proposal met with the approval of the Governor. The present report is the next step in the matter. [page 231]

Recommendation.

For the reasons above outlined—which may be summarized by the statement that the purpose of the reserve is to facilitate the management of the forest, present and prospective, on the upper slopes of **Mauna Kea**—I do now recommend that the Board of Agriculture and Forestry request the Governor to set apart, in accordance with law, as the “**Mauna Kea Forest Reserve**,” that portion of the non-agricultural, unleased government land of **Kaohe**, in the district of Hamakua, Island and County of Hawaii, within and above the boundary hereinafter described.

Official Description.

Following is the technical description of the boundary of the proposed **Mauna Kea** Forest Reserve, prepared by the Government Survey Department as C. S. F. NO. 2001, and accompanied by Registered Map No. 2060...

Ralph S. Hosmer, Superintendent of Forestry. [HFA, 1909:232]

By Authority

Mauna Kea Forest Reserve.

Proclamation of Forest Reserve in the District of Hamakua, Island and County of Hawaii.

Under and by virtue of the authority vested in me by the provisions of Chapter 28 of the Revised Laws of Hawaii, as amended by Act 65 of the Session Laws of 1905, and by Act 4 of the Session Laws of 1907, and of every other power me hereunto enabling, I, WALTER F. FREAR, Governor of Hawaii, having held the hearing of which notice has

been duly given as in said acts provided, do hereby SET APART as a Forest Reserve, to be called the **"MAUNA KEA FOREST RESERVE,"** that portion of government land in the District of Hamakua, Island of Hawaii, known as **Kaohe**, embracing and including the upper slopes and summit of **Mauna Kea**, above the elevation of approximately 7,500 feet, and containing an area of 66,600 acres, more or less, in the District of Hamakua, Island and County of Hawaii, Territory of Hawaii, more particularly described by and on a map made in February, 1909, by the Government Survey Department, of the Territory of Hawaii, which said map is now on file in the said Survey Department, marked "Registered Map Number 2060" and **"Mauna Kea Forest Reserve,"** and a description accompanying the same, numbered C.S.F. 2001, which said description now on file in the said Survey Department, is as follows:

MAUNA KEA FOREST RESERVE.

Including Portion of the Government Land of **Kaohe V, Kaohe**, Hamakua, Hawaii. Beginning at Government Survey Trig. Station **"Kole South"** (marked by _____ on set stone and *ahu*) on hill of that name on the South side of **Mauna Kea** and on the boundary of **Humuula** and **Kaohe**, the true azimuth and distance to **"Aahuwela"** Trig. Station being 234° 44' 30" 22851.8 feet and to **"Puu Oo"** Trig. Station being 307° 04' 13" 111,139 feet, as shown on Government Survey Registered Map No. 2060, and running by true azimuths:—

1. 99° 56' 58" 13798.5 feet along land of **Humuula** to **"Lepeamoa"** Trig. Station (marked by a $\perp$ on set stone and *ahu*);
2. 39° 58' 42" 4875.8 feet along land of Humuula to the East corner of , **Kaohe IV** (Brown Lease, 18,000 acres), from which the true azimuth and distance to **"Omaokoili"** Trig. Station (marked by on solid imbedded bomb) is 39° 58' 42" 15,000.0 feet;
3. 115° 10' 37,700.0 feet along Kaohe IV (Brown Lease) to the East corner of **Kaohe III-B** (General Lease 594 to A. W. Carter, Guardian);
4. 1610 10' 19380.0 feet along Kaohe III-B (General Lease 594 to A. W. Carter, Guardian) to **"Puu Laau"** Trig. Station on the boundary of **Paauhau**, from which the true azimuth and distance to "Nohonaohae" Trig. Station is 135° 24' 50" 43544.0 feet;
5. 234° 10' 27900.0 feet along land, of Paauhau to **"Kemole"** Hill;
6. 244° 35' 15060.0 feet along **Kaohe III-A** (General Lease 594 to A. W. Carter, Guardian) to a point directly South of **"Kaluamakan"** Trig. Station;
7. 255° 20' 15700.0 feet along Kaohe III-A (General Lease 594) to the **Hanaipoe** Gulch at the Southeast, corner of the land of **Kalopa**;
8. 293° 45' 13660.0 feet along **Kaohe II-B** (General Lease 623 to Kukaiau Plantation Company, Limited), to **"Puu Kea"** Trig. Station at the Southwest corner of the land of **Koholalele**, from which the true azimuth and distance to **"Apakuie"** Trig. Station is 154° 02' 40" 6150.0 feet; [page 246]
9. 254° 10' 5800.0 feet along the head of the land of **Koholalele** to a waterhole on the *mauka* side of **"Puu o Kihe"** Trig. Station;
10. 319° 00' 5200.0 feet along the head of the land of **Kukaiau** to its South corner just *mauka* of **Iolehaehae**;
11. 286° 50' 5400.0 feet along **Kaohe VI** (General Lease 624 to the Kukaiau Plantation Company, Limited) to a place called **Waikulukulu**, a point in **Kaula Gulch** at the West base of the hill **Puu Kalepa**;

12. 34° 30' 9000.0 feet along the land of **Humuula** to **Holei**;
 13. 19° 42' 20" 26368.0 feet along land of **Humuula to Kaupakuhale Hill**;
 14. 13° 10' 17260.0 feet along the land of **Humuula** to the point of beginning.
- Area 66,600 Acres.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Great Seal of the Territory of Hawaii to be affixed. Done at the Capitol in Honolulu, this 5th day of June, A. D. 1909... W. F. FREAR, Governor of Hawaii. [HFA, 1909:247]

Modifications in Boundaries of the Mauna Kea and Hilo Forest Reserves (1910-1937)

In 1910, Governor Frear, removed tracts of land from leasehold interests, to be included in the Hilo Forest Reserve. The proclamation named the lands and described the acreage as:

In the Hilo Forest Reserve I do hereby set apart as integral parts of that Reserve those certain portions of the tracts of government land known as **Humuula**, 3,901 acres, more or less, **Kahoahuna**, 46 acres, more or less, **Waikaumalo-Maulua**, 790 acres, more or less, Opea-Peleau, 230 acres, more or less, Kamaee-Wailua, 930 acres, more or less, Wailea-Kaiwiki, 3,834 acres, more or less, Piha, 3,780 acres, more or less, **Piihonua**, 33,941 acres, more or less, that lie within the boundaries of the Hilo Forest Reserve, in the District of Hilo, Island and County of Hawaii, Territory of Hawaii, created and approved by proclamation of Acting Governor A.L.C. Atkinson, under the date of July 24, 1905, which said proclamation gives the metes and bounds of said Hilo Forest Reserve, the same being more particularly described by and on a map now on file in the office of the Territorial Survey Department in Honolulu, marked "Registered Map No. 2060," and a description accompanying the same, numbered "C.S.F. 1629," altogether an area of 47,452 acres, more or less... [HFA, 1910:277]

In late 1913, R.S. Hosmer presented a special report to the Commissioners, among the topics discussed was an update on the fencing of the Mauna Kea Forest Reserve. He described the progress in the following letter:

November 18, 1913

Special Report: Forest Conditions – Hawaii

R.S. Hosmer; to the Board of Commissioners of Agriculture and Forestry:

...Mauna Kea Forest Reserve.

In passing mention may be made here of the **Mauna Kea Forest Reserve** that takes in all the upper slopes of that mountain above approximately the 8000 foot contour, altho' across **Humuula** it is somewhat higher – about 9,500 feet. *For the greater part of the way around the mountain the line is substantially fenced; above Humuula by a fence built about 20 years ago by Mr. Haneberg and now kept in repair, under the terms of its lease, by the Humuula Sheep Station Company; above the Kukaiau ranch by paddock fences, which with other fences on that ranch are now being, or soon will be repaired and put in good shape; above the Parker Ranch, by strong fences built and now maintained by a regular fence rider. These fences are all required to be maintained under Government Leases, respectively Nos. 608, 623, 624, 594. Under Lease 594 it was provided that the Government pay half of the cost of the fence on the boundary between the forest reserve and the fee simple land of Upper Paauhau (Parker Ranch), from Puu Laau to Puu Kemole. Lease 608 runs 'til 1930, the others to 1928.*

The section on the west slope of the Mountain, between Waikii and the boundary of Humuula, across the Government land known as Kaohe 4, is not fenced. This section is not under lease. It was lately the scene of certain litigation over a broken lease, between Mr. A.M. Brown and the Government.

There are still some wild cattle on Mauna Kea, and a few herds of wild horses, but thru' driving and shooting by men from the neighboring ranches the numbers of these animals have been very much reduced. There are also wild pigs on Mauna Kea, but not, I think, in very great numbers... [HSA – Gov 2-1 Board of Forestry & Agriculture]

In 1921, C.S. Judd, Superintendent of Forestry, conducted an inspection of the Hilo and Mauna Kea Forest Reserves. His report on the inspections, published in the Hawaiian Forester and Agriculturalist, documented the importance of the water resources generated by the Hilo forest lands (identifying primary trees found); the extent of the sugar cultivated on lands fed by the stream systems flowing from the forest; the continuing impacts on the forest by wild cattle and ranching interests; and impacts to the forest from plantation and homestead activities. Judd observed:

THE HILO FOREST RESERVE.

Every stream of any moment on the Island of Hawaii, with the exception of those in the Kohala Mountain region, has its source in the Hilo Forest Reserve. Not only does the town of Hilo depend solely upon the water coming from this forest reserve for its domestic uses, but ten sugar plantations absolutely depend upon this water for fluming their crops to the mills, for use in the manufacture of sugar, and for the domestic use of their laborers. The output of these ten sugar plantations, which comprise almost a solid belt of cane fields from 3 to 5 miles wide and 35 miles long, extending from the Olaa Plantation in Olaa to the Kaiwiki Sugar Company at Ookala, and the existence of which the water from the Hilo Forest Reserve makes possible, during the ten years from 1911 to 1920, amounted to 1,126,376 tons of sugar worth approximately \$114,469,455.14.

The Hilo Forest Reserve was the third out of the present total of 47 forest reserves to be set apart and was set aside by a proclamation signed by Acting Governor A.L.C. Atkinson on July 24, 1905. It embraces at present a total area of 110,000 acres, of which 60,223 acres or 55 per cent is unleased land belonging to the Territory, and 49,777 acres or 45 percent is land in private ownership. Owing to the peculiar system of Hawaiian land surveys the private lands and government lands in the reserve are indiscriminately interspersed and usually consist of narrow strips or wedge-shaped pieces of land running from the sea up the slopes of **Mauna Kea**.

*The largest single piece of land in the reserve is **Piihonua**, embracing 33,941 acres of government land.* This was held under lease by the late John T. Baker until March 21, 1921, when the lease expired and the land reverted to the Territory.

The lowest part of any of the reserve lies at the elevation of 1400 feet above sea level on **Awehi Stream** west of the town of Hilo, and the highest part is found at the upper end of **Piha** at an elevation of about 6,750 feet. The heaviest rainfall between these limits occurs between the elevations of 2,500 and 4,000 feet above sea level. In general, the reserve consists of a solid belt of almost impenetrable forest, in a region of heavy rainfall, 20 miles long from north to south with an average width of 10 miles lying on the gentle slopes of the huge mountain mass of **Mauna Kea**. This slope is cut up by innumerable eroded gulches and one may follow along the lower boundary of the reserve and observe more than 100 perpetual waterfalls.

The forest growth consists chiefly of *ohia lehua* with the usual undergrowth of tree ferns and *ieie* vines and a ground cover of countless other ferns, shrubs and vines, an ideal com- [page 170] bination for the conservation of water. On the well drained slopes, especially at the higher elevations, extensive groves of *koa* trees are found, and in the highest portions the *mamani* tree occupies the drier situations. In the wet forest other trees such as the *kopiko*, *kolea*, *olapa*, *pilo*, and *naio* are also found.

The Hilo Forest Reserve would have served a greater usefulness in the way of water conservation if it had been found feasible to include originally a larger area of forest land and to protect all of the forest on this area from the very start.

The work of three agencies has resulted in confining the reserve to its present size. Grazing interests on the west or upper boundary have encroached upon the forest to an undesirable extent and would still like to send their destructive stock even deeper into the forest. This, in fact, is being done on some of the private lands within the recommended forest reserve boundary, and the only way to terminate it will probably be by the purchase of the lands by the government.

On the east or lower boundary, cane cultivation has removed hundreds of acres of heavy forest. This is a proper use of the land when kept in cultivation to cane, but when such land is abandoned, allowed to grow up in Hilo grass, and then pastured without adequate fences on the boundary line, the result is further destructive of forest growth by grazing and a pushing back of the heavy forest.

In the past on some of the government lands homesteads have been surveyed out and opened to settlement on parts of this lower forest without adequate thought as to the best use of the land. Some of these in swampy and rainy country have been abandoned and some have never even been taken up.

In all such matters there is necessarily a give and take depending on the highest use to which the land should be put. Several interests, however, seem to be oblivious of the usefulness of the Hilo Forest Reserve as a whole and would “kill the goose that laid the golden egg” for some temporary gains rather than join in the general scheme of forest protection for the benefit of the leading industry and the community as a whole.

In order to ascertain exact conditions on the ground an intensive field study was begun early in May, 1921, by a party of Territorial officials who are resurveying the lower boundary and reporting on all situations as observed. This work will be completed in a short time and will result in adding about 2,500 acres of unleased government forest land to the reserve along the lower boundary and increasing its size as well as usefulness.

The investigation, which has been made under adverse weather conditions, has resulted in surveying and marking the new forest boundary at the rate of about eight miles per month, and has disclosed such situations as unbuilt or wrongly located fences required by general leases and homestead agreements issued by [page 171] the land office, unlawful grazing, illegal wood cutting, and the presence of wild cattle on the reserve.

Steps have already been taken to correct such situations and it is planned to exterminate all wild stock in the reserve, to complete the fencing of the boundary at the earliest possible date, and to place a competent ranger in charge. Because of various ownerships of land in this important reserve, it is necessary that all parties cooperate with the utmost harmony in order to bring this work to a satisfactory conclusion... [HFA, 1921:172]

...The work of delineating the *makai* boundary and surveying additional areas to be included in the Hilo Forest Reserve continued during the month and resulted in the running of 7.5 miles from ***Pohakupuka Stream to Kaula Gulch*** at the extreme north corner of the reserve. A visit was made to the survey crew and the boundary line was inspected across the lands of ***Piihonua, Waipunalei, Piha, Opea Peleau and Kaiwiki 3***. [page 223]

FENCING REQUIREMENTS.

During the course of my forest inspections the following instances of unfulfilled fencing requirements or of incorrectly located fences came to my attention and were at once reported to the Commissioner of Public Lands with the suggestion that he compel the lessee or homesteader to comply at once with the fencing requirements on the proper lines...:

4. Hilo Forest Reserve. Weloka, general lease 946 to **Laupahoehoe** Sugar Co. Supposed to be adjacent to *makai* forest reserve boundary, but upper fence of lease found to be about 700 feet *mauka* in the forest reserve.

5. Hilo Forest Reserve. **Laupahoehoe**, general lease 926 to M.P. Silva. Very frail fence found to be 1,330 feet at the NW. corner and 342 feet at the SW. corner *mauka* of the correct forest reserve boundary, and as a result about 98 acres of forest reserve land were being illegally grazed and the forest cover thereon destroyed.

6. Hilo Forest Reserve. Adjacent lot 51 of the Hakalau-iki homesteads, held under general lease 984 by Rose de Lima. Inadequate fence on *mauka* line of her lease, which allows cattle to get into the forest.

MAUNA KEA TRIP.

On August 5 and 6, visited the **Mauna Kea** Forest Reserve, in company with my assistant and six others, for the purpose of determining upon experimental planting with temperate zone trees and of making scientific observations in this high country. The *mamani* forest between 7,700 and 10,000 feet, the upper timber line, was found to be in good condition. *Two wild cattle and a band of wild sheep were seen, but no wild horses, although a band of the latter are occasionally seen on the mountain.* Six wild sheep were killed on the trip. It is possible that conifers will succeed on the lower slopes of this reserve if planted at times of favorable moisture, but there are not sufficient funds available at present for this work. At **Waiau Pond**, near the summit at 13,014 feet, where our party experienced a cold night and the temperature was as low as 18 degrees, causing a film of ice to form on the edges of the pond, *it is planned to start a small grove of lodgepole pine trees by seed spotting, so that in time fuel wood will be available for travelers who ascend the mountain. For this purpose an order of 20 pounds of seed has been placed with the Forest Service at Portland, Oregon.* The presence of numerous cinder cones superimposed on glacial drift all over the summit plateau of the mountain was found to be of great interest... [HFA, 1921:224]

Chas. J. Kraebel, Assistant Superintendent of Forestry, reported in August 1921, on the boundary survey, of lands in the Hilo Forest Reserve, and reported on a field trip to Mauna Kea. Kraebel and survey party found that the *mauka* boundaries of many of the homesteads had been pushed too far inland, thus impacting the forests meant to be protected. Kraebel also described the tree planting efforts around the mountain lands, conducted in partnership with A.W. Carter of Parker Ranch:

...I respectfully submit the following routine statement of my work during August, 1921.

BOUNDARY SURVEY.

At the end of the month the survey of the *makai* boundary of the Hilo Forest Reserve had reached the point in **Kaula Gulch** called "**Paeeoopu**," which is the extreme north corner of the reserve and therefore the end of the *makai* boundary. The distance covered by Mr. Hockley's party during August is approximately 7.5 miles, extending from Pohakupuka Stream at Waikaumalo to Kaula Gulch between the lands of Ookala and Manowaialee. At Waipunalei Mr. Hockley found it necessary to make a complete resurvey of lots 12 and 13 of the **Kahoahuna** Homesteads in order to correct an error in the original survey and to

determine the forest boundary in that vicinity. In the course of the month's work several irregularities in the location of fences were disclosed. The *mauka* fence of lot 55, Waikamalo Homesteads is several hundred feet *mauka* of its correct position, infringing thus upon the Robertson Estate land of **Mauluanui**. In **Laupahoehoe**, the *mauka* fence of the government remnant under general lease 946 is approximately 700 feet *mauka* of the true boundary; while on the government remnant under lease 926 the present fence is 342 feet *mauka* at the south end and 1,330 feet *mauka* at the north end of its true location. In Waipunalei, because of the peculiar status of that land at present, I requested the surveyor to carry the line straight across this land from the west corner of the land under lease 926 to the newly established south corner of lot 13, **Kahoahuna** Homesteads. The land of Waipunalei cannot be regarded as forest reserve at present, since the upper portion constitutes a paddock of the Parker Ranch and the lower portion is used as a pasture by homesteaders under permit from the **Laupahoehoe** Sugar Company. The effect of this use is to separate the forest in the government land of **Humuula** from the remainder of the Hilo Reserve, a condition which should be corrected as soon as possible.

At the end of the month the following portions of the boundary survey remained still to be done: From **Hanawai Stream in Papaikou to Puu Kauku**, a distance of about two miles; the final line of 1.2 miles across **Piihonua and Waiau from Hookelekele Stream to Alae Stream**; the inclusion of the area of **Piihonua** lying between Hookelekele Stream, Wailuku River, and the land of **Punahoa 2**; determination of the Punahoa2-**Piihonua** boundary from the Wailuku River to the top of the land of Punahoa 2, approximately 7 miles of straight line.

PARKER RANCH.

On August 1, in company with the Chief Plant Inspector, I drove to Waimea to consult with Mr. Carter on the forestry problems of the Parker Ranch. The ranch is well equipped to raise in its own nursery all the common species of trees for windbreak purposes, but Mr. Carter is anxious to be supplied with the less common introduced species for [page 225] experimental planting. This is an excellent opportunity for experimentation in a thorough manner and on a scale which the Division of Forestry is unable to practice independently. There is almost no limit to the range of climatic conditions which can be found on the Parker Ranch, and Mr. Carter would be at pains to help us find the most favorable site for each species. *The conifer plots established ten years ago on the slopes of Mauna Kea are examples of the excellent results which can be obtained by this sort of cooperation.*

At the time of our visit there were some 300,000 transplants in the ranch nursery, including the genera Eucalyptus, Acacia, Araucaria, Cypressus and Pinus. It is obvious that such vigorous efforts in forestry deserve our most hearty support.

MAUNA KEA EXPEDITION.

During the first week of the month I made the ascent of **Mauna Kea** with a party of government officials and scientific men, including the Chief of the U.S. Geological Survey for Hawaii, the Territorial Land Commissioner, the Director of the B.P. Bishop Museum, and the Superintendent of Forestry. The purposes of the expedition were several, centering chiefly about the problem of mapping the mountain, and about the reported evidences of ancient glaciation above the elevation of 11,000 feet, which was Professor Gregory's principal concern. Unmistakable evidences of glaciation were found and a plan for further study was developed by Professor Gregory...

PINE TREES ON MAUNA KEA.

*During the fourth week of the month I cooperated with Dr. H.E. Gregory of the Bishop Museum on a trip up the northwest slope of **Mauna Kea**. Dr. Gregory's object was to*

secure further evidence of glaciation on the mountain, while I went to inspect the conifer plots established in February, 1910, by Mr. Hosmer. Both objects were very gratifyingly realized. Abundant evidences of glaciation were found and numerous photographs of striations, moraines and ice-distributed boulders were obtained [Figure 59].

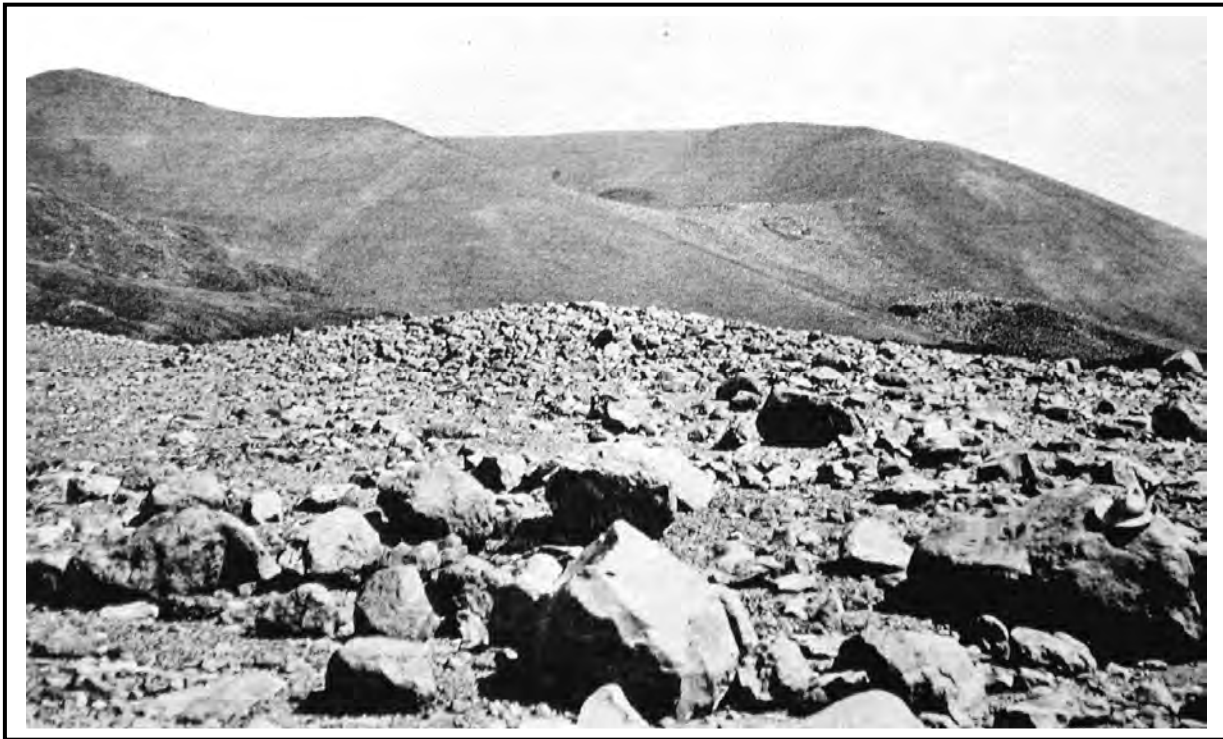


Figure 59. “Summit Cluster, View from north slope of Mauna Kea, at about 12,000 feet altitude. Glaciated terrane (foreground), cinder cones (in the distance).” Photo by C.J. Kraebel (in Gregory and Wentworth, 1937; Plate 3, Figure 2) (Copy Photo, KPA-N871)

The tree plot at the lowest elevation, 7,000 feet, contained a total of 201 thrifty trees, ranging in size from 6 feet to 20 feet, and including the following species: *Pinus coulteri*, *Cedrus deodara*, *Libocedrus decurrens* and *Pinus jeffreyi*, named of their vigor of growth. At 9,000 feet [page 226] Coulter pine again showed the best growth of all species, but the total number of living trees was only 46. At 11,000 feet, the highest plot, only a single stunted tree was found, an incense cedar. Further experimentation at this altitude is therefore inadvisable at present. The results on the whole, however, are very encouraging, since it is demonstrated that lumber-producing trees can be successfully grown at the intermediate altitudes. Numerous photographs were taken at all the plots and specimens of all species were also taken for the office herbarium. An exhibit of these, with explanatory placards in a store window in Hilo and remained there during the recent American Legion Convention in the city... [HFA, 1921:227]

In 1937, the boundaries of the Mauna Kea forest Reserve were modified, to take in additional portions of the lands of Humu’ula, Ka’ohe, and some lands lying *makai* of the two. As a result, more land was removed from the grazing operation of the Humu’ula Sheep Station. Hawaii Territorial Survey Plat Map No. 613 (by notes of survey from C.S.F. 5055, July 20, 1937) depicts the modified boundaries, and the notes of survey record the metes and bounds:

C.S.F. 5055
Maunakea Forest Reserve
(2nd Revision)

Hamakua and North Hilo Districts
Island of Hawaii

Being portions of the government land of **Kaohe** and **Humuula** and portions of the privately owned lands of **Koholalele** (R.P. 4527, **Mahele** Award 26-B to Kailakanoa) and Paauhau (Grant 2869 to J.P. Parker).

Beginning at the South corner of this tract of land at the junction of three fences in the land of **Humuula**, the true azimuth and distance to said point from Government Survey Trig. Station **OMAKOILI** being 5° 21' 40" 4036.0 feet and the coordinates of said point of beginning referred to Government Survey Trig. Station **AAHUWELA** being 30,032.8 feet South and 45,412.7 feet West as shown on Government Survey Registered Map 2789 and running on the **AAHUWELA** Meridian by azimuths measured clockwise from true South:—

1. 141° 58' 00" 18880.3 feet along fence along the remaining lands of **Humuula and Kaohe**;
2. 111° 27' 20" 12426.7 feet along fence along the remaining land of Kaohe;
3. 86° 13' 30" 14380.7 feet along same;
4. 225° 01' 40" 20217.5 feet along same to a + on set stone;
5. 147° 09' 00" 18695.1 feet along same to a + on set stone at the foot of hill called "Puu Laau" the true azimuth and distance to Government Survey Trig. Station "Puu Laau 2" being 79° 06' 30" 191.4 feet;
6. 229° 51' 10" 10788.5 feet along fence;
7. 228° 32' 00" 5384.0 feet along same to a + on set stone southeast of rocky hill called "Nanao" or "Kalepaio", the true azimuth and distance to a + on set stone on said hill being 158° 19' 86.10 feet;
8. Thence along the fence, the direct azimuth and distance between the two end points being 239° 59' 20" 11724.2 feet;
9. 152° 13' 30" 755.8 feet along fence to Government Survey Trig. Station "**Kemole 2**" marked by ___ on set stone, the true azimuth and distance to a U.S.B.M. elevation 7630 feet (marked by + on bronze tablet) being 169° 35' 18.06 feet;
10. 226° 16' 30" 8903.7 feet along fence, along the remaining portion of the lands of Paauhau (Grant 2769 to J.P. Parker);
11. 235° 40' 50" 7579.1 feet along same along the remaining portion of the land of Kaohe;
12. 256° 24' 00" 3162.6 feet along fence along the remaining portion of the land of Kaohe;
13. 304° 42' 00" 681.0 feet along same, the true azimuth and distance to a + on stone on the **Paauhau-Kaohe** boundary being 207° 15' 30" 777.8 feet;
14. 14° 18' 00" 1120.4 feet along fence West of Kawaiilili Gulch;
15. 29° 45' 30" 782.8 feet along same;
16. 20° 04' 30" 978.4 feet along same;
17. 354° 32' 30" 881.7 feet along same;

18. 277° 10' 00" 5128.2 feet along fence along the remaining portion of the land of **Kaohe**;
19. 255° 21' 00" 11150.1 feet along same to an angle in fence South of **Puu Mali** Hill;
20. 279° 33' 40" 3483.1 feet along fence along the remaining portion of the land of **Kaohe**;
21. 278° 02' 40" 8751.8 feet along same and along the remaining portion of the land of **Koholalele** (*Mahele* Award 26-B to Kailakanoa);
22. 295° 59' 50" 4034.0 feet along the remaining portion of the land of **Koholalele** to a pipe in concrete marking the end of Course 76 of Land Court Application 1090, Trustee, Estate of Charles Notley, deceased, applicant;
23. 318° 58' 20" 11083.2 feet along fence along Land Court Application 1090 and remaining portion of the lands of **Kaohe** and **Humuula** to a + on set stone, the true azimuth and distance to Government Survey Trig. Station "**Kalepa**" being 217° 54' 30" 3837.5 feet;
24. 348° 03' 20" 12093.5 feet along fence along the remaining portion of the land of **Humuula**;
25. Thence along the fence, the direct azimuth and distance between the two end points being 7° 02' 40" 13619.0 feet;
26. 57° 41' 40" 8739.6 feet along same;
27. 38° 24' 50" 13989.0 feet along same to a + on set stone;
28. 357° 23' 00" 5939.0 feet along same;
29. 105° 06' 00" 153.4 feet along same;
30. 59° 42' 00" 1164.5 feet along same;
31. 63° 13' 50" 1593.5 feet along same;
32. 88° 10' 10" 3071.4 feet along same;
33. 95° 02' 20" 2971.8 feet along same;
34. 71° 59' 30" 2061.8 feet along same;
35. 41° 43' 30" 1595.9 feet along same;
36. 68° 28' 10" 13351.0 feet along same;
37. 17° 00' 20" 5039.9 feet along same;
38. 37° 01' 10" 4210.3 feet along same to the point of beginning.

Area 88,108 Acres

Summary of Areas

<i>Lands</i>	<i>Owner</i>	<i>Area</i>
Kaohe	Territory of Hawaii	79260 Acres
Humuula	Territory of Hawaii	8453 Acres
Koholalele	Hamakua Mill Company	248 Acres
Paauhau	A.W. Carter, Trustee	147 Acres
Total Area		88108 Acres
[C.S.F. 5055, State Survey Division]		

Humu'ula and Land Interests of the Department of Hawaiian Home Lands (1920-present)

Being a part of the Crown Land inventory, Humu'ula and Pi'ihonua fell into the category of Ceded Lands as a result of the annexation of Hawai'i to the United States in 1898. Following years of work, Prince Jonah Kūhiō Kalaniana'ole and associates succeeded in passing legislation enacting the Hawaiian Homes Commission Act of 1920, enacted by the United States Congress on July 9, 1921. The Act established a land base of approximately 200,000 acres, to be set aside for homesteading purposes by Native Hawaiian beneficiaries of the Act (Hawaii Advisory Committee, 1991).

Section § 203 of the Hawaiian Homes Commission Act of 1920, identified various public lands which would be made available for homesteading purposes. The Act named the lands and available acreage, but also included exemptions to the availability of the lands:

(a) "all lands within any forest reservation, (b) all cultivated sugar-cane lands, and (c) all public lands held under a certificate of occupation, homestead lease, right of purchase lease, or special homestead agreement... On the island of Hawaii: ...*fifty-three thousand acres to be selected by the department from the lands of **Humuula Mauka***, in the district of North Hilo... [HHC, Amended, 1964:4]

While a portion of Humu'ula was designated as one of the lands set aside for Native Hawaiian homesteaders, the land was held under leases by Parker Ranch from 1914 to 2002. No pastoral homesteading lands became available until around 1990—this as a result of efforts on the part of Native Hawaiian applicants on the wait list for pastoral lease lands. The final lease of Parker Ranch on lands of Humu'ula ended in August, 2002. In the years leading up to the end of the lease, the Department of Hawaiian Home Lands, beneficiaries and applicants initiated dialog to formulate a plan for land stewardship and lessee opportunities on portions of Humu'ula and Pi'ihonua. At the time of this writing, *Ōiwi Lōkahi o ka Mokupuni o Keawe*, an organization of native Hawaiian beneficiaries and applicants for pastoral leases, in cooperation with the Department of Hawaiian Home Lands, are working on a master plan to accomplish a program of leases and stewardship on Humu'ula and Pi'ihonua.

That Hawaiians have long been in favor of, and contemplating such uses by beneficiaries of the Hawaiian Home Lands Trust, is evidenced in the voices of our *kūpuna*, and was given voice in a public forum, as early as December 1920, when efforts to ensure passage of the HHCA were still underway. On December 2nd, 1920, Stephen Desha, Sr., editor of the Hawaiian language newspaper, *Ka Hoku o Hawaii*, published an article, including an interview with an elder Hawaiian rancher, and *kama'āina* of the Humu'ula lands. The article, translated by Maly, follows, with the words of William Lindsey, who from his youth, to his old age, traveled and worked Humu'ula and other lands controlled by Parker Ranch.

While the land resource has been degraded since 1920, much of what the elder Mr. Lindsey expressed, is still held in the hearts and desires of beneficiaries of the Hawaiian Home Lands Trust:

He Mau Aina Waiwai Nui o Humuula ame Kawaihae-uka no na Hawaii (The Lands of Humuula and Kawaihae-uka are of great value for the Hawaiians)

There are many of us Hawaiians living in these days who do not know the nature of the pastoral lands of **Humuula** and Kawaihae-uka, and some of these people today, believe that these are stony and worthless lands, that the Hawaiians cannot live on.

As a result of this confusion, remaining to this day, the writer asked Mr. Wm. M. S. Lindsey of Waimea, if these lands mentioned above, were good lands or perhaps unfit lands? The straight forward answer of this native of the mountain lands, was this, "The lands of **Humuula** and Kawaihae-uka are first rate lands, with gold and money to be made."

The writer asked again: "It is said that these lands are bad, filled with stones, that people cannot live there?"

[Mr. Lindsey responded]

"These are words of deception, words spoken by Makekau at the time of casting ballots, and he is not familiar with the nature of these lands. *I am one who is familiar with every inch of the land of **Humuula**. I have gone there to round up cattle from my youth to my adulthood.* This is one of the very best lands of the Parker Ranch in these days."

Another question: "Do cultivated crops grow at this place?"

Answer:

"At **Keanakolu** and **Laumaia** are very good lands for planting. Fruit trees such as apples and others grow there, and corn will grow as well. These things will all grow there because the soil is rich. These are places with water, though on the pasture lands of **Humuula**, there is no water. But, there is much grass growing and the cattle are fat, and the horses as well.

At some places on **Humuula**, the land below the mountain of **Maunakea**, are grown the *uwala kahiki* (Irish potatoes) and corn, and feed for fattening the cattle of Parker Ranch."

Lindsey also said: "That if individuals could get 500 acres of grazing land, they would be well off.

Thus we understand: "You can raise cattle, horses, donkeys, turkeys, chickens and pigs. On these mountain lands, there are many wild pigs, and you can tame them, fatten them, and sell them. These days, the wild pigs from **Humuula** are sold for 8 cents a pound, and you can separate out the pigs that you want to sell. Thus money can be made quickly by the ones who have this land."

"The raising of turkeys and chickens is also a fast way for the stock breeder to earn money. You can raise several thousand turkeys a year, and also chickens, if you know how to care for them. Also, the cattle, horses and donkeys are not burdensome animals to care for, as they roam the pasture lands."

"Cattle raised on this land are very fat. At the time when calves are born, their weight rises quickly, and dairy cattle of this place produce a yellow cream as a result of the rich grasses of this place."

Therefore, there is no trouble for a person as he is first beginning, to get food and clothing through the goodness of these animals. With the passing of two years he will be able to sell his cattle, horses and donkeys, as he pleases. A stock breeder can purchase heads of small cattle from other places and bring them back to this land to fatten them, and in the passing of six months, will have two-fold or three-fold the money returned on them. Thus, you shall see the true value of this land for a man if he could get 500 acres of this place..."
[Desha & Lindsey in *Ka Hoku o Hawaii*, December 2, 1920; Maly, translator]

ASTRONOMY ON MAUNA KEA

Interestingly, Mauna Kea was not the first choice for the practice of such science. The development of the first astronomy facility on Mauna Kea, occurred after the development of the Weather observatory on Mauna Loa in 1951, and the solar observatory on Haleakalā, Maui, in 1956. While the practice and activities associated with astronomy on Mauna Kea represent the shortest of the period of history and land use described in this study, its forty-one years on Mauna Kea (at the time of this writing), also represent the period of most significant changes in the natural and cultural landscapes in the upper mountain region. The significance of this fact is left to the readers of this study to assess.

The records that follow below, mostly from the Hawaii State Archives (HSA), catalogued by various departments under then Governors Ingram M. Stainback and John A. Burns, represent some of the communications documenting the early development of astronomical facilities on Mauna Kea. The communications are important, as they provide readers, with the background and considerations that were explored as decisions were being made that led to the development of the first observatories on Mauna Kea.

In the preparation of this overview of the development of astronomy on Mauna Kea, we are particularly indebted to Mr. Howard Ellis, Representative Helene H. Hale (formerly Chairman of the Board of Supervisors, County of Hawaii), and Dr. Walter Steiger, individuals who participated in the early days of this history. They shared their personal recollections, and made suggestions of resources that could be researched. In addition to the records from public collections, this section of the study refers to interviews and papers prepared by the afore-named individuals.

Mauna Loa and Mauna Kea, The Birth of Modern Astronomy on the Mountain Lands of Hawai‘i

In 1947, the Territory of Hawai‘i, prepared for the development of the Kulani Honor Camp, in the upper ‘Ōla‘a and Waiākea Forest Reserves, on the slopes of Mauna Loa. Establishment of an unmanned weather station at the summit of Mauna Loa, followed two years later, and the Stainback Highway was authorized in 1950. The development of Kulani Camp and its means of access, the Stainback Highway, fell under the management of Tom Vance, Director of Institutions in the Territory. In 1951, members of the East Hawai‘i business community approached Vance with a proposal meant to draw visitors to the Island of Hawai‘i. The proposal was for the development of the “Gardens of the World Highway.” As proposed, the highway would ascend the slopes of Mauna Loa, ending at the summit, near Moku‘āweoweo. The idea was enthusiastically adopted by Vance, and supported by Governor Stainback (Hawaii State Archives, Series Gov 9-7). As the Stainback Highway and summit road was being developed, the idea of making a manned weather station on Mauna Loa also emerged, and was dedicated in 1956.

Howard Ellis, who worked at the Mauna Loa Station from 1961 to 1981, befriended Tom Vance, and from him learned details of the Mauna Loa road project. Ellis observed that Vance was particularly protective of Mauna Kea, and so inspired by its form, that he personally traveled the Mauna Loa road, laying out its route, in order to take advantage of the best opportunities to view the beauty of Mauna Kea (see Ellis, 1988, and oral history interview in Volume II). While the “highway” on Mauna Loa was never completed, its route was dozed, and access to the summit region of Mauna Loa was available. This led to the development of the manned Mauna Loa Weather Station in 1956. Around the same time, the Solar Observatory was developed at Haleakalā, on Maui, and eyes were turning towards the high mountains of Hawai‘i. According to Howard Ellis and Walter Steiger, Mauna Loa was the “logical” first choice, as the access road to the summit region had been developed. Ellis recalled learning from Vance, that he encouraged the use of Mauna Loa for observatory purposes, specifically advocating for the protection of Mauna Kea, with no development being considered (see interview with Howard Ellis in Volume II).

Indeed, the first visit to the Island of Hawai'i, by Gerard Kuiper, an internationally known astronomer, was facilitated on the ground, by Howard Ellis, who took him to the Mauna Loa Weather Station in 1963. Ellis and Steiger both recalled that initially, Kuiper pursued an observatory on Mauna Loa—as some level of access to the summit was available—but because of the active volcanism of the mountain, he met opposition in Washington D.C. On his subsequent trips to Hawai'i in 1963 and 1964, Howard Ellis, was again contacted, asked to meet Dr. Kuiper, and take him to Mauna Kea. Ellis, Kuiper, and his assistant, Alike Herring, traveled to Mauna Kea, conducted their observations on Pu'u Poli'ahu, and explored the mountain. By early 1964, Mauna Kea was promoted as the ideal, high mountain observing platform, though early proposals included development on Mauna Loa, and triangulation between facilities on the summit of Mauna Kea, Mauna Loa and Haleakalā.

Support for astronomy on Mauna Kea, was found in the membership of the Hawaii Island Chamber of Commerce, and in the person of Mitsuo Akiyama. As a result of the 1960 tsunami, economic conditions in East Hawai'i were dismal. Akiyama and Kuiper hit it off, and Akiyama, in partnership with the County of Hawai'i, took the initiative for development on Mauna Kea as a serious one (see interview with Helen Hale in Volume II). The County of Hawai'i, the State and University of Hawai'i, the National Aeronautics and Space Administration (NASA), and the national scientific communities all worked in this accord, to further Dr. Kuiper's proposal for an observatory on Mauna Kea. By May 1964, a jeep road had been dozed from the Hale Pohaku vicinity to Pu'u Poli'ahu (*Figure 60*), and a terrace leveled for a test observatory facility. In June 1964, a 12 ½ foot dome was installed on Pu'u Poli'ahu, and formal observations began to be made (see communications in this study).

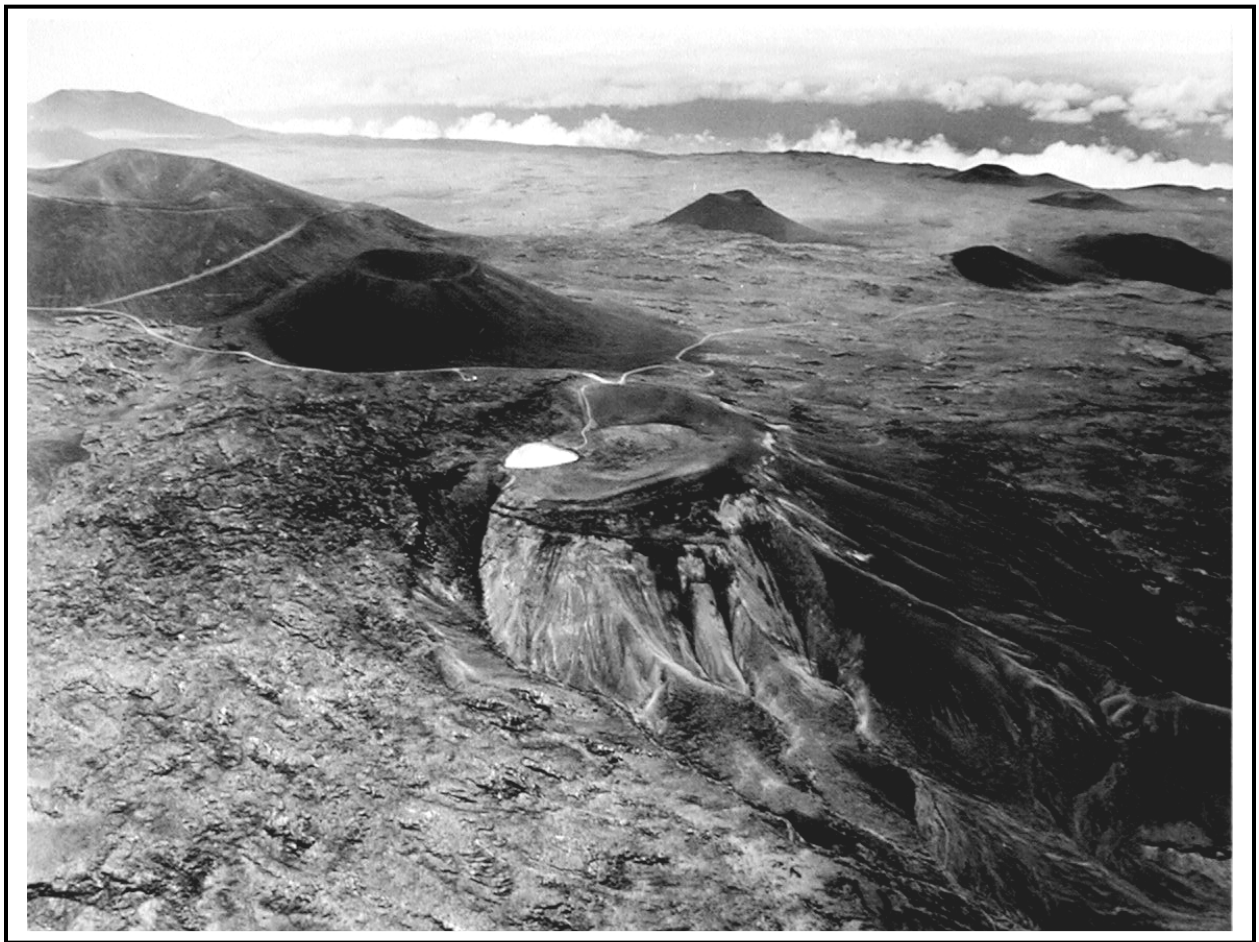


Figure 60. Mauna Kea (ca. 1965), Depicting Pu'u and Lake Waiau, Pu'u Lilinoe, Pu'u o Kūkahau'ula, and a portion of New Road to Summit (USGS Library, Denver; Copy Photo KPA-N183)

Dr. Kuiper, had been working with NASA, and on projects funded by the agency since 1959—including plans for Lunar and Mars projects. As a result, Dr. Kuiper's efforts were directed towards developing a large observatory facility on Mauna Kea, that would be operational by the time of the 1967 opposition of Mars, allowing for optimum viewing of Mars. Dr. Kuiper and associates detailed their facilities plan, including a history of his efforts in Hawaii, and on Mauna Kea, in a proposal for a 60-inch telescope to be built on Mauna Kea. The proposal of December 1964 (see proposal in this study), outlined the participation of the University and State of Hawaii, University of Arizona, NASA and other parties. Logistics and the time necessary for such a program, led to delays, and by 1965, it was determined that the 1967 date would not be obtainable. As a result of further negotiations between the University of Hawaii and NASA, it was determined that the University would build an 84" telescope on Mauna Kea. This was contingent upon a preserve being set aside on Mauna Kea, and the University of Hawaii overseeing development and management of the facility—including improvements such as the telescope pad, roads, housing, and offices. These responsibilities would fall under the direction of Dr. John Jefferies as the University established the Institute of Astronomy. By July 1966, funding from NASA was released, and plans for construction of the University of Hawaii observatory on Mauna Kea, were underway (see communications in this study).

Communications and Manuscripts Documenting Development of Astronomy Facilities on Mauna Kea

In the records of Governor John A. Burns, housed at the Hawai'i State Archives, are a number of communications between Dr. Kuiper, Mitsuo Akiyama, Governor Burns, and various parties, that provide us with details of the early development of astronomy on Mauna Kea. It is of interest to note, that among the primary factors leading to development of observatories on the high mountains of Hawai'i, was access and an available power source. It is reported that the existence of a good road, is what lead to initial development on Haleakalā in 1956. By 1964, it was determined that Mauna Kea would be the best location for further development of astronomy, but only if a good road could be made to the summit. Initially, the County and people of the Island of Hawai'i were asked to foot the bill for such development, but Governor Burns worked out arrangements for the work to be undertaken as a state project.

Selected records below, document the exploration of sites by Dr. Kuiper, and the efforts of the Hawaii Island Chamber of Commerce, Governor Burns—the State of Hawai'i, the University of Hawai'i, and NASA in development of Mauna Kea.

July 15, 1963

***Thomas H. Hamilton, President, University of Hawaii;
to Mr. Mitsuo Akiyama, Executive Secretary, Hawaii Island Chamber of Commerce
(Regarding Interest and Considerations by the University of Hawaii in High
Altitude Astronomy on Mauna Loa and Mauna Kea):***

In response to your letter to me of June 19 asking for additional information about (a) applied research on lava for commercial purposes, and (b) *the use of Mauna Loa or Mauna Kea as possible sites for space and astronomical activities*, I am pleased to send you herewith the comments of our most knowledgeable faculty members...

B. Astronomical and space projects

Dr. Walter Steiger, in charge of our High Altitude Observatory on Haleakala, assures me that it is indeed true that Mauna Kea and Mauna Loa offer unique possibilities for astronomical and space studies. It is now well known that high altitude sites (10,000 ft. and over) in Hawaii offer a large percentage of cloud-free days and nights and an atmosphere that is extremely transparent and free from contamination. As you have pointed out, these qualities are already being exploited by the Weather Bureau's Mauna Loa Observatory at 11,134 ft. and the University's Haleakala Observatory at 10,000 ft.

In 1956, when the University established the Haleakala site, the decision to do so was based on careful study of the many factors involved. As you have suggested, one of these was the relative ease of access. The excellent road up Haleakala as compared to that up Mauna Loa was an important factor. Equally important was the fact that commercial electric power was available at the summit of Haleakala whereas power at a Mauna Loa site had to be furnished by local generators—an expensive and troublesome procedure, and never quite satisfactory. A third factor that was considered, although related to the road situation, was the livability of the location for employees and their families. At Haleakala the employees can live in the Kula area where there are schools and stores, and can commute daily to the observatory without undue hardships. At Mauna Loa, at least under present conditions, this is not feasible. To have employees with a satisfactory home life is certainly an important consideration.

Studies of the scientific qualities of the Haleakala site showed them to be very good. No such thorough study was carried out at Mauna Loa, but one can judge from the meteorological records and other comparisons that Mauna Loa and presumably Mauna Kea also would be somewhat better than Haleakala, due entirely to the additional altitude that could be gained. In 1956 it was decided that this probable improvement in observing conditions at Mauna Loa was not sufficient to offset the disadvantages of that location.

In the future the situation will almost certainly change due to the expanding needs of astronomical and space research. For some programs the additional altitude that can be gained on Mauna Loa or Mauna Kea may be the determining factor. In other cases it may be that the desirable physical and meteorological conditions necessary can only be found on a Mauna Loa or Mauna Kea site.

Potential programs for the Island of Hawaii is the search by the Lunar and Planetary Laboratory of the University of Arizona for a high quality site for a new lunar and planetary observatory. This search has been extended over the United States and even to Chile. Two series of tests have been carried out at Haleakala, and the Laboratory now wishes to extend the tests to Mauna Loa and Mauna Kea. *Dr. Gerard Kuiper, Director of the Laboratory, was recently in Hawaii and through the courtesy of the Weather Bureau was flown over Mauna Kea and Mauna Loa and driven to the summit of the latter. As a result of this preliminary survey, Dr. Kuiper has decided that Mauna Kea cannot be considered at this time because of the exceedingly difficult access to either Puu Kahinahina or the summit, which seem to be the potentially most promising sites. The Weather Bureau site on Mauna Loa at 11,134 ft. is also not suitable for his program because of the local meteorological conditions. He feels that the summit of Mauna Loa may offer an excellent site, and he is anxious to carry on detailed tests at this site as he has done at Haleakala. However, in order to bring his delicate instruments to the summit, the road must be improved considerably over the last seven miles. The estimated cost of a minimal road is about \$25,000.*

We have no doubt that Mauna Loa and Mauna Kea are destined to play an important role in the future of astronomical observing sites. Clearly this role is dependent on the accessibility of such sites. We should like to encourage the people of the Island of Hawaii to do everything possible to help provide access to these sites. Perhaps the answer for the future will not be in roads but in helicopters.

We should also like to make a strong recommendation that early action be taken to set aside the summit of Mauna Loa and Puu Kahinahina as a scientific preserve for now and future generations. We would certainly be most willing to cooperate in any such plan...
[HSA Gov 13-47]

January 17, 1964

**Mitsuo Akiyama, Executive Secretary, Hawaii Island Chamber of Commerce;
to The Honorable John A. Burns, Governor, State of Hawaii**

(Regarding Investigation by Dr. Kuiper of sites on Mauna Loa and Mauna Kea):

Enclosed herewith is a photo-copy of a reply we received from President Hamilton of the University of Hawaii which should be of interest to you, especially the subject of our two tall mountains, namely Mauna Kea and Mauna Loa.

Our office has been corresponding with Dr. Gerard Kuiper for several months now in regard to his interest in exploring the sites of our two mountains, and we feel confident that his visit here for the past several days has resulted most favorably in his desire to further explore the use of our mountains, particularly the secondary peak next to the summit of Mauna Kea, if the local community can provide an access road for his project.

Therefore, the Hawaii Island Chamber of Commerce, in our sincere desire to help expand the economy of this island, would be only too willing to assist the State and County governments in everyway possible to expedite the use of our mountains for scientific work as well as to expand the recreational facilities on the two mountains. [HSA Gov 13-47]

January 22, 1964

**Gerard P. Kuiper, Director, Lunar and Planetary Laboratory,
The University of Arizona;
to President E.A. Harvill**

**(Regarding Investigation into Development of Astronomy Site and
Access Road on Mauna Kea; and Interest by NASA in the same):**

I should like to acquaint you with the results of my Hawaiian trip made last week in continuation of the search for the most favorable observatory location within the United States boundaries in the interest of the national space program. I am enclosing a copy of a letter to Mr. Oran Nicks, Director of the Office of Lunar and Planetary Sciences of NASA, and also photostats of some Hawaiian newspaper comments. Further enclosed is a copy of my letter to Governor Burns of Hawaii, written at his suggestion, summarizing the reasons for our request for road construction to Mauna Kea.

The tests on Mauna Kea will be carried out largely by our staff member, Mr. Alike Herring, who has previously conducted the three test periods on Haleakala and has made similar studies at two Chilean sites and our own Catalina Station. The Mauna Kea tests are expected to last from 6 to 12 months. There is a good probability that Mauna Kea will be the best observatory site in the world. In view of the enormous expenditures under the national space program, it is essential that in preparation all possible data be obtained from the ground.

It is perhaps too early to consider how the Hawaiian program might be conducted if it is confirmed that the site is truly excellent. My present feeling is that legal responsibility should rest with the University of Hawaii. The Lunar and Planetary Laboratory is the only institute that has so far succeeded getting NASA funds for a major telescope and it is unlikely that NASA would find it politically possible to make a second major funding to LPL without incurring a storm of protest. The Institute of Geophysics of the University of Hawaii of which my friend George Woollard is the director, will provide an excellent medium for accomplishing the national aims, with LPL and the Geological Survey through Dr. Shoemaker, having associate status.

March 4, 1964

**Board of Supervisors, County of Hawaii;
to Governor John A. Burns**

Resolution No. 361

(Regarding Development of the Mauna Kea Access Road):

WHEREAS, the National Aeronautic and Space Administration, through its Office of Lunar and Planetary Sciences has authorized a series of tests of the astronomical conditions in the Mauna Kea area of Hawaii in anticipation of locating a high-altitude observatory there at to provide scientific information and engineering data to the national space programs; and

WHEREAS, preliminary studies and surveys of the Mauna Kea area have elicited favorable observations and is deemed possessed of potentialities for further and greater utilization as a site for astronomical activities; and

WHEREAS, the present one-year test program, which will in large measure determine future investment in the Mauna Kea area as an observatory site, is not sufficiently funded to provide costs for access road construction to the area desired to allow transportation of scientific equipment and building materials; and

WHEREAS, it is considered desirable to facilitate and assist the current test program to the fullest;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF SUPERVISORS in and for the County of Hawaii that it hereby endorses said Mauna Kea observatory test program and respectfully requests the Governor of the State of Hawaii, the President of the Senate and the Speaker of the House of Representatives, State Legislature, and the Senators and Representatives to the United States Congress to use the powers of their office to facilitate the proposed road construction to and use of the Mauna Kea area as an observatory site.

BE IT FURTHER RESOLVED that the County Clerk be and she is hereby directed to forward copies of this resolution to the Honorable Hiram L. Fong, U.S. Senator; the Honorable Daniel K. Inouye, U.S. Senator; the Honorable Thomas P. Gill, Congressman; the Honorable Spark M. Matsunaga, Congressman; the Honorable John A. Burns, Governor, State of Hawaii; the Honorable Nelson K. Doi, President, State Senate; and the Honorable Elmer F. Carvalho, Speaker, State House of Representatives.

Dated at Hilo, Hawaii, this 4th day of March, 1964.

Signed:

Helen Hale, Chairman and Executive Officer, County of Hawaii

Ikuo Hisaoka

Elroy Osorio

Herbert T. Matayoshi

Sherwood R.H. Greenwell

Harold H. Higashihara

Elias P. Yadao.

March 10, 1964

Governor John A. Burns;

to Helene Hale and Members of the Board of Supervisors, County of Hawaii

(Regarding proposed development of the Mauna Kea Access Road):

This is to acknowledge the receipt of your Resolution No. 361 requesting my support for facilitating the construction of the Mauna Kea Road.

I am pleased to report that plans for construction of this road are already underway. Immediately after I received information concerning NASA's desire to use a location on Mauna Kea for a lunar observatory, I caused a review to be made as to the feasibility of the road project and an estimate to be obtained as to the cost. You will be interested to know that the cost has been estimated at about \$42,000, not \$25,000 as originally suggested.

In line with the policies of this administration the Department of Transportation has been directed to proceed with the construction of this road with the Department of Land and Natural Resources cooperating and furnishing funds. Please be assured that this administration, as a team, is working toward implementing the decision made to give expeditious attention to this project of local and national importance... [HSA Gov 13-47]

March 18, 1964

Gerard P. Kuiper, Director, Lunar and Planetary Laboratory,

The University of Arizona;

to Dr. Fujio Matsuda, Director, State Department of Transportation

(Regarding Development of the Mauna Kea Access Road; Support of NASA

for a Test Program on Mauna Kea; and Preference for Development

on "Puu Poliahu"):

It has been suggested to me by Professor Walter Steiger, writing for Dr. Woollard, Director of the Institute of Geophysics of the University of Hawaii, that I present to you the present outlook and desired schedule for the NASA-sponsored test program on Mauna Kea. Dr. Steiger and Mr. Mitsuo Akiyama of Hilo have kept me informed on the steps taken by your Office toward the construction of an access road to the summit area.

NASA's decision to support a test program on Mauna Kea for a period of approximately one year was based on my strong recommendations, following our test program on Haleakala from October 1962 to August 1963, jointly sponsored by ARPA (Department of Defense) and NASA. As you undoubtedly know, following our tests, ARPA, through contracts with the University of Michigan and the University of Hawaii, has initiated a \$4.3 million construction program on Haleakala involving the installation of three telescopes. The staff of the Lunar and Planetary Laboratory will have guest privileges at this installation upon its completion approximately two years from now.

Our tests on Haleakala made it abundantly clear, however, that a distinctly higher site, in the same general area, than Haleakala would have had very marked advantages. Haleakala is not high enough above the average top of the cloud layer surrounding the Hawaiian Islands with the result that night observations are frequently interrupted; though it is true that during a fair fraction of the nights the conditions on Haleakala are very good.

Mauna Kea was selected in favor of Mauna Loa because of the expected disturbances (seismic and volcanic) on the latter. I have overflown Mauna Kea twice (June 1963, Jan. 1964) and taken many photographs of the approaches and have also traveled the jeep roads with Mr. Lyman Nichols, State Wildlife Biologist at Hilo, to the east and south of the summit (at the 6000 to 9000 ft levels). Mr. Nichols has been good enough recently to climb to the summit area of Mauna Kea and has sent me a set of color slides taken from

the 13,440 ft cone (Peak B) between Lake Waiau and the summit. This is the cone which at first seemed the most suitable for our operations, taking into account the State interests for tourists visiting the snow-covered areas to the north. The Nichols' photographs, however, have convinced me that the nearby peak, **Puu Poliahu**, at 13,631 ft, would be distinctly preferable from the point of view of atmospheric turbulence. I am enclosing herewith black and white enlargements of some of Mr. Nichols' photographs taken from Peak B. The legend of each photo on the back. **Puu Poliahu** is better than the other nearby sites because it is a peak from which, during the night, the air cooled by radiation to space will drain off more or less symmetrically, with the observatory left in the undisturbed part of the atmosphere. The objective of the program is to find a site where a large telescope will give superior images, with resolutions better than 1/10 of a second, and I believe that the chances are very good that the optimum site on **Mauna Kea** will give telescopic images better than any site in the world now used for astronomical observation. This belief is based on the general experience in the tropics of excellent image quality, even at lower elevations, coupled with the great altitude of **Mauna Kea**, which eliminates disturbing effects of the lower and most active part of the atmosphere.

Because of the urgency to the NASA program, it would be much appreciated if the astronomical tests could begin as soon as possible after June 1, 1964. The equipment can be ready for installation, according to present estimates, late in May. It will consist of a 12 ½ ft dome, a 12 ½ inch telescope, and supporting equipment. The principal observer will be Mr. Alike Herring, who has made the three test runs on Haleakala, aided from time to time by other observers, including myself. I know that the staff at NASA Hq. attaches great importance to these tests and I believe that they will be ready to proceed with bigger plans if, as I expect will be the case, our tests during the next year turn out favorably.

Mr. Saul Price of the U.S. Weather Bureau in Honolulu has offered all possible assistance in supplying our station on Mauna Kea with adequate meteorological equipment, and I would not be surprised if they would go further than this.

The most efficient way to determine the best terminal point of the road might be for me to visit Hawaii at the time the flat area between **Puu Poliahu** and the **Mauna Kea** summit is reached, at which time the top of Puu Poliahu can be explored on foot. Provisionally I would suggest that the approach might be as indicated on the enclosed photocopy. If reaching the summit of **Puu Poliahu** would pose insurmountable problems, the tests might be made, by way of substitute, on the round peak just south of **Lake Waiau**, approximately 13,180 ft elevation, shown on plate 4, left; but I would consider the higher elevation distinctly preferable.

I hope that the above description gives you the necessary background information. [HSA Gov 13-47]

March 18, 1964

**Gerard P. Kuiper, Director, Lunar and Planetary Laboratory,
The University of Arizona;**

to The Honorable John A. Burns, Governor, State of Hawaii

(Regarding Support for use of the Summit of Mauna Kea as the "Most outstanding observatory site in the world;" Construction of the Summit Road; and use of Mauna Loa as a Lunar Training Field):

My friends at the University of Hawaii and in Hilo have kept me informed of the various administrative steps that have been taken towards the construction of a road to the summit of Mauna Kea, and I have summarized our latest thinking on this problem in a letter to Dr. Matsuda, Director of the State Department of Transportation, as per enclosed copy. I am very grateful to the response which this program has received, and I continue

to feel most optimistic about the scientific and national assets that will accrue from the construction of this road. *I do not hesitate to reaffirm my convictions that the summit area of **Mauna Kea** may prove to be the most outstanding observatory site in the world.*

I should like to take this opportunity to return to a statement I made to you during the meeting I was privileged to have with you last January. It is that the lava fields and volcanic structures on the slopes of Mauna Loa are unequalled to any similar natural phenomena on the several continents on which I have traveled and are more like typical lunar terrain than any other lava fields I know. I believe that the nature and location of these fields offer the most interesting and instructive training area for prospective astronauts scheduled to make lunar explorations in person; and as a scientist would strongly recommend that steps be taken by NASA to include suitable visits and a training program under the supervision of the geophysicists stationed on the Island. I am aware that a limited program of this nature exists in northern Arizona under the direction of Dr. Eugene Shoemaker, Head of the Astrogeology Branch of the U.S. Geological Survey, in close coordination with the NASA's Manned Space Flight Center at Houston. I believe, however, that the Mauna Loa fields, by their nature, structure, and enormous extent, offer a "lunar training ground" not approached by any areas on the Main Land. I believe that Dr. Shoemaker fully concurs with the exceptional merits of a potential Mauna Loa training program...[HSA Gov 13-47]

March 27, 1964

**Mitsuo Akiyama, Executive Secretary, Hawaii Island Chamber of Commerce;
to The Honorable John A. Burns, Governor, State of Hawaii
(Regarding Support for Big Telescope to be Built on Mauna Kea; NASA Participation;
and Eliciting Congressional Support):**

Thank you for your sincere effort and help to get the necessary road construction up Mauna Kea for Dr. Kuiper's test telescope site.

We noticed in yesterday's Hawaii Tribune Herald that both houses of the Legislature approved similar resolutions requesting your office to set aside a portion of Mauna Kea as a scientific preserve for now and future generations. If you recall, this was highly recommended by President Hamilton in his letter to our office, a copy I sent you for your files.

Perhaps this is a rather premature matter but assuming that the testing of Dr. Kuiper shows extremely favorable results, *I feel that Dr. Kuiper may face a big hurdle of convincing NASA to grant funds for another major telescope for his University, and he has suggested that the University of Hawaii be the logical institution to get the funds*, as per attached photocopy of his report to President Harvill of the University of Arizona after his return from the trip to Hawaii last January.

Furthermore, some concerted effort should be initiated by the local community to encourage NASA that steps should be taken to include suitable visits and a training program on Mauna Loa for prospective astronauts scheduled to make lunar explorations in person, as mentioned in Dr. Kuiper's letter to you, a copy of which was sent to our office and released to the Hawaii Tribune Herald as a feature article in the Sunday's paper with your permission.

We have considered this matter a so-called local problem until now, but the time has come when we may have to alert our Democratic Congressional delegates in our quest to convince NASA and other agencies that we do have the two tall mountains on our island with unique potentialities in furthering the National Space Program.

The Chamber Office has received excellent cooperation from the Congressional delegates on matters we have requested help, such as the stinkbug problem, the Naalehu Flood Control project, Emergency Cattle Feed Rations, and other Big Island problems which required Congressional help.

Therefore, at this time may we ask your advice as to whether it is advisable to inform our Democratic Congressional delegates, perhaps mail them some background information about our Mauna Kea project. We haven't sent them any information yet because, as I said, we have considered the matter a local problem, and through your efforts I know that we'll get the minimum road necessary for the test telescope of Dr. Kuiper.

If you feel that alerting our Congressional delegates at this stage may help, we'll be happy to mail them copies of whatever background material which I think may be helpful in their understanding of the potential projects envisaged for our two mountains.

On the other hand, if you want to write to them yourself requesting cooperation and support in the near future in order that the Democratic administration, both here and our delegates in Washington, can work together to accomplish this project, we'll be happy to give you the privilege and honor to initiate this request so that eventually we should be able to get a big telescope up Mauna Kea for the University of Hawaii.

Further, if you feel that this is too early and premature to mention anything, please advise [advise] and we will sit tight on this matter. [HSA Gov 13-47]

May 4, 1964

**Gerard P. Kuiper, Director, Lunar and Planetary Laboratory,
The University of Arizona;
to Dr. G.P. Woollard, Director of Institute of Geophysics,
University of Hawaii**

(Regarding Development of Telescope Terrace on Puu Poliahu; Use of Water from Lake Waiau for Facilities; and Proposed Restrictions to be set in Place):

I have just returned from a week's trip to the Hawaiian Islands, during which the road construction to the top of Mauna Kea was essentially completed and a small terrace (90 x 40 ft.) was prepared for the placement of the scientific equipment. On Friday night (May 1) I had the opportunity to make a verbal report to Dr. Steiger and some of his colleagues during a dinner party at his home. The six miles of new road are excellent for the purpose and will allow us to set up over-night accommodations at Hale Pohaku, 9200 ft., a beautifully sheltered area in a grove of oak trees. It will take 20-25 minutes to drive down these 6 or 7 miles and 4400 ft. elevation difference. The dome and telescope are scheduled to arrive in Hilo about May 15 and, if all goes well, we should be able to start our test program about June 1. The six miles of road below Hale Pohaku are still very rough, the original road cover made about 30 years ago having been nearly completely ruined. It is my understanding that the State of Hawaii will attempt to make emergency repairs on the worst 2 miles of this 6-mile section so that scientific equipment can be taken up to Mauna Kea. I have further learned that a broad program of road building and repairs in the Mauna Kea area will follow during the next budget year, \$100,000 having been appropriated for this purpose. This is a tremendous development and will open up this excellent site for a broad scientific program. Incidentally, the road to Mauna Kea will be one of the most scenic in the entire United States.

The terrace on Mauna Kea now constructed will be large enough only for the modest equipment planned by our group for the test period. If it should be decided, on the basis of favorable tests, that the installation of larger equipment is warranted (a development which I do anticipate), then the terrace will have to be enlarged, which can be done easily

by road-grading equipment since no large masses of solid rock need to be moved. There are three potential sites for scientific equipment in the immediate vicinity:

Site A which I have described;

Site B about 600 ft. due north and only about 20 ft. or so lower in elevation; and

Site C to the east, about 300 ft., away and perhaps 40 ft. farther down.

Site A is definitely the prime site of the area, and it has an unobstructed horizon in all directions except due east where the summit of Mauna Kea, 160 ft. higher and one mile away, projects less than 2 degrees above the horizon over an arc of less than 20 degrees in azimuth. Northeast of Site A there is a hollow, protected by the higher elevations of Sites A, B, and C and by the summit to the east and north, a mile away, which will be very suitable for any future supporting structures, such as laboratories, darkroom, and possibly even a small dormitory.

I have discussed with Mr. Stanley Hara, Chairman of the Finance Committee of the House of Representatives, some of the potential scientific interests on Mauna Kea. I pointed out that ordinary tourist traffic around the summit to the east will, in no way, interfere with scientific operations on the observatory peak (**Puu Poliahu**) except that we would like to avoid the installation of powerful radio and TV transmitters. Also, it will be desirable to have a gate at the foot of observatory peak with a sign explaining the equipment on it (so that the public be informed and less likely to disturb the installation) and another sign stating "No Trespassing, Government Property," or something similar. *The minimum area that should be reserved for scientific purposes, in my opinion, would be 2000 x 2000 ft., centered on Puu Poliahu, with the added requirement that no powerful transmitters be placed in the entire summit area. There is a further direct interest in Lake Waiau, 4000 ft., southwest from observatory peak, at the elevation 13,020 ft. This lake is 250 ft. square and contains potable water. Some steps should probably be taken to protect the purity of this water supply which is potentially of enormous importance to future scientific installations on Mauna Kea.*

I do not know what precise steps would be required for securing these protective measures but I am sure that the University of Hawaii Administration would have this information, and I would be most grateful if you would initiate these steps. I would also like to have your suggestions as to what formal organizational steps would be in order to develop the cooperative program between the University of Hawaii and the University of Arizona covering our use of the Mauna Kea area for the astronomical and space-oriented programs. I may be able to return to Hawaii about June 1st and perhaps we could plan on having a formal opening of the test station with representatives of the State Government and the University present... [HSA Gov 13-47]

May 7, 1964

**Gerard P. Kuiper, Director, Lunar and Planetary Laboratory,
The University of Arizona;**

**to The Honorable John A. Burns, Governor, State of Hawaii
(Regarding Completion of the Mauna Kea Access Road, and Preparation of
the Telescope Terrace):**

Last week I was able to inspect the new road constructed to the top of Mauna Kea. I supervised the preparation of a terrace on the summit for the placement of the dome and test equipment later this month. I was tremendously impressed with the site which is now essentially ready for occupation. I determined the water-vapor content of the overlying atmosphere at noon on May 1 and found it to be only 0.8 mm, which is gratifyingly low and

indicates Mauna Kea will be a site advantageous for infrared observations as well as in the optical range.

I would like to express to you personally my gratitude for your interest in this program. I believe that the opening of Mauna Kea to scientific and space-oriented research marks a major step in American science.

Enclosed herewith is a copy of a letter sent to Professor Woollard, Director of the Institute of Geophysics of the University of Hawaii, which makes reference to future possibilities of cooperation with the University.

I would like to add that all State officials with whom I have dealt in the last few months have been most gracious and helpful... [HSA Gov 13-47]

June 15, 1964

**Mitsuo Akiyama, Executive Secretary, Hawaii Island Chamber of Commerce;
to Mr. William R. Norwood, Administrative Director,
Office of the Governor, State of Hawaii**

(Regarding Initiation of Test Research on Mauna Kea by Alika Herring; Shipping of the Observatory Dome; Construction of the Cement Platform for the Observatory on Mauna Kea; and Dedication and Proposal that the Mauna Kea Access Road be Named for Governor John Burns):

We're very happy to report that the Chief Observer, Alika Herring, has started his work officially from Saturday night, June 13th, at the Mauna Kea Station of the Lunar & Planetary Laboratory of the University of Arizona, headed by Dr. Kuiper. Mr. Herring will report to Dr. Kuiper tonight via an amateur radio contact pre-arranged by Mr. Gillespie, Assistant to Dr. Kuiper, who was here the past two weeks finalizing plans for the station.

The observatory dome was completed last Thursday, and Mr. Gillespie left Saturday morning. The engineers from Ash Manufacturing Company, Plainfield, Illinois left Friday morning after working 3 full days installing the dome. S.K. Oda, Ltd., of Hilo was given the contract to make the concrete foundation and the wooden platform within the dome was completed by volunteer helpers.

During his two weeks visit here, Mr. Gillespie was in close contact with Dr. Kuiper, and according to Mr. Gillespie, Dr. Kuiper is scheduled to be in Hilo from July 16 to July 23, and Dr. Kuiper has suggested that any date during the week of July 19-25 is okay with him for the dedication program. He did suggest also that the early part of the week be preferred because of the possibility that he may have to rush back to the Mainland for some urgent work the following week.

We would suggest, therefore, that you consult the Governor and select a date convenient for him, because we are very anxious to have him personally present at this auspicious occasion. My personal suggestion would be on Monday, July 20, because it may make it convenient for some people coming from the Mainland. As previously mentioned, Mr. Gillespie said that Dr. Kuiper is very anxious to invite some top officials of NASA's headquarters in Washington, D.C., to visit the station.

Our preliminary planning calls for the dedication program to start about 2:00 p.m. and it should end in about an hour so that the guests who want to return have ample time to come back to Hilo to catch the last HAL plane leaving Hilo at 6:30 p.m. Aloha Airlines has a later flight leaving Hilo at 8:00 p.m. via Kona. The afternoon program should be convenient for everyone, although we may be faced with some logistic of coordinating transportation because it takes about 2 hours to reach the station. Our Public Relations

Committee will arrange transportation of 4-wheel drive vehicles to take all the invited guests.

Also, Mr. Gillespie suggested that we should arrange the program so that if guests are interested in staying late to observe the work of Mr. Herring, we should try to arrange necessary transportation and box lunches for them.

We could proceed on the printing of the invitation cards as soon as we get word from you regarding the convenient date of the Governor. Sunday, July 19 is acceptable if he feels that he cannot come on July 20 or July 21.

In a few days I do hope that I can inform you about the testing results of Mr. Herring. I have been to the site over a dozen times already, and from what little I know about astronomy, I am very optimistic that we may have the best observatory site in the world. As it stands now, we can already boast to the fact that we have the highest telescope observatory in the United States, and possibly the world because the dome in Peru, although higher, is not a planetary station.

We would appreciate a reply at the earliest convenience in order that we can proceed with the planning of the dedication.

P.S. Someone suggested that we dedicate the road as "Burns Highway," similar to the Stainback Highway. Please check if this proposal is acceptable to the Governor... [HSA Gov 13-47]

July 1, 1964

James L. Reid, President, Hawaii Island Chamber of Commerce

(Regarding Invitation and Notice of Dedication of The Mauna Kea Access Road):

Invitation:

You are cordially invited to the
Dedication Ceremonies
of the
Mauna Kea Summit Road
and the
Observatory Station
of the
Lunar and Planetary Laboratory
Monday, July 20, 1964
2 p.m. at the Dome Site
(Puu Poliahu)
Program coordinated by Public Relations Committee
of Hawaii Island Chamber of Commerce.

Notice:

Dear Honored Guest:

The Public Relations Committee of the Hawaii Island Chamber of Commerce is coordinating this dedication ceremonies on July 20, 1964, and we cordially welcome you to join us in this breath-taking scenic drive to the observatory site on **Puu Poliahu** (elevation 13,612 ft.) atop Mauna Kea.

Transportation of jeep station wagons will be provided from Hilo so we would appreciate an early reply. Deadline is July 17.

Departure time from Hilo is 11:30 A.M. at the area in front of the State Land Office at 1665 Kamehameha Avenue (in front of Sure Save Super Market). We suggest that you have your own early lunch because lunch will not be provided. Please bring adequate warm clothing because the temperature has varied recently from 30° to 60° F.

Box lunches (at nominal charges) will be ordered for those who want to remain after the ceremony to observe the early moon after sundown.

Every safety precaution will be taken to insure safety of your health and no hiking will be required. However, oxygen tanks will be made available at all times.

The ceremonies should be over by 3:00 P.M. to allow time for those returning to Hilo (two hour ride) to catch a late flight back to Honolulu...

You will surely enjoy the ride on one of the most scenic roads in the entire United States. Furthermore, the site is now the highest observatory in the entire United States, the second highest dome in the world, and the highest manned lunar observatory on earth... [HSA Gov 13-47]

July 20, 1964

**Participants in Dedication Ceremony
For Completion of Mauna Kea Summit Road
and Observatory Dome [Figure 61]**

**Date: Monday, July 20, 1964. Time & Place: 2:P.M.
at Puu Poliahu.**

1. Governor John A. Burns
2. Senator Dan Inouye
3. Senator Hiram Fong
4. Congressman Spark Matsunaga
5. Congressman Thomas Gill
6. Chairman Helen Hale
7. Senator Nelson Doi
8. Senator John Ushijima
9. Senator Ben Menor
10. Senator Wm. "Doc" Hill
11. Senator Kazuhisa Abe
12. Rep. Stanley Hara
13. Rep. Toshio Serizawa
14. Rep. Joseph Garcia
15. Rep. Jack Suwa
16. Rep. Yoshito Takamine
17. Rep. Takeo Kudo
18. Rep. Akoni Pule
19. Senator Bernard Kinney
20. Senator Julian Yates



Figure 61.
Governor John Burns Speaking at Hale Pohaku, prior to Ascent to Pu'u Poli'ahu (July 20, 1964); Geo. Woollard in background. Courtesy of Walter Steiger.

21. Supervisor Herbert Matayoshi
22. Supervisor Elias Yadao
23. Supervisor Elroy Osorio
24. Supervisor Ikuo Hisaoka
25. Supervisor Sherwood Greenwell
26. Supervisor Harold Higashihara
27. President Thomas Hamilton, U.H.
28. Dr. George Woollard, Director of Hawaii Geophysics Inst., U.H.
29. Dr. Walter Steiger, Chairman, Dept. of Physics, U.H.
30. Dr. Kaoru Noda, Director UHHC
31. Dr. Harold Loomis, UHHC
32. Howard Ellis, U.S. Weather Bureau, Hilo
33. Saul Price, U.S. Weather Bureau, Honolulu
34. Raymond Busniewski, U.S. Weather Bureau, Hilo Airport
35. Dr. Fujio Matsuda, Director, Dept. of Transportation, State of Hawaii
36. Jim Ferry, Director, Dept. of Land & Natural Resources
37. Charles Schuster, District Highway Engr., Div. of Highways
38. Karl Kami, Div. of Highways, Hilo
39. Hiroshi Tanaka, Land Board Member
40. Lyman Nichols, Fish & Game, Hilo
41. Michio Tanaka, Div. Head, Fish & Game, Honolulu
42. David Woodside, Chief of Branch, Fish & Game, Honolulu
43. Max Landgraf, Div. of Forestry, Hilo
44. Dr. Howard Powers, Geologist in Charge, Volcanoes Observatory
45. Fire Chief Alex Von Arnswaldt
46. Chief of Police Anthony Paul
47. T. Chocolate Nishida, Police Dept. Radio Technician
48. Fred Johnston, Superintendent, Hawaii Volcanoes Nat'l. Park
49. Seisa Kamimura, Div. of Parks, Hilo office
50. Alvin F. Ellman, S. Point Tracking Station Manager, Kau
51. Dr. Gerard Kuiper, University of Arizona
52. William Hartmann, University of Arizona
53. Carl Gillespie, University of Arizona
54. Rev. Gerald Loweth for Dedication Prayer
55. Ray Yuen, Editor Hawaii Tribune Herald
56. George Chaplin, Editor, Honolulu Advertiser
57. William K. Ewing, Editor, Honolulu Star Bulletin
58. Walt Southward, Honolulu Advertiser, Hilo
59. Jack Bryan, Honolulu Star Bulletin, Hilo

60. Lt. Col. John Coleman, Base Commander, Pohakuloa Training Area
61. President James Reid, HICC
62. President Charles Sakaguchi, Japanese Chamber of Commerce
63. President Harold Kuwahara, Hilo Junior Chamber of Commerce
64. R.W. Jaderstrom – KIPA, Hilo
65. Harold Marques – KHBS, Hilo
66. Ernest Yap, Fish & Game Warden, Hilo
67. Yasuo Kuwaye, Kuwaye Brothers
68. Glenn K. Oda, S.K. Oda, Ltd.
69. Akira Sato, Hilo Battery & Glass Shop
70. Atsuo Nishioka, State Highway, Hilo
71. Wm. McKenzie, Manager – HELCO
72. J. Stanley Hodgins, Manager – Hawaiian Telephone Co., Hilo
73. Radcliffe Greenwell, Manager – Parker Ranch
74. Wm. Seymour
75. Raymond Ikeda, County Engineer Office
76. Valentine Taka, County Engineer Office
77. Hajime Tanaka, Chief Engineer, C of H
78. Glenn Mitchell, President of Hunter's Association
79. Marlin Bordner, County ERDC
80. Harold Tanouye Sr. Chairman, ERDC
81. Myron Isherwood, Director – Civil Defense, Hilo
82. Sunao Kido, Deputy Director, Dept. of Land & Natural Resources, Honolulu
83. Robert T. Chuck, Manager-Chief Engineer, Div. of Water & Land Development, Dept. of Land & Natural Resources
84. George Inouye, Veterans Produce
85. Larry Tanimoto, Radio TV Corp.
86. William Thomspson, Manager-Engineer Board of Water Supply, C of H
87. Ralph Kiyosaki, District Superintendent, Hawaii District Schools
88. Dr. Shelley Mark., Director, Dept. of Planning & Economic Development
89. Floyd M. Cossitt, Acting State Forester
90. Dr. Clarence L. Hodge, Deputy Director, Dept. of Planning & Economic Development
91. John Lenk, Editor, Kona Torch
92. Richard Smart, Parker Ranch
93. Tom Okuyama, 1st Vice President, HICC
94. William Chillingworth, Second Vice President, HICC
95. George Mukai, Treasurer, HICC
96. George McEldowney, Director HICC
97. Herbert Gomes, Director HICC

98. Hamilton Ahlo, Director HICC
99. Don Theriault, Director HICC
100. Warren Whang, Director HICC
101. Kent Bowman, Director HICC
102. Tommy Ishimaru, Director HICC
103. Ernest Kurohara, Director HICC
104. Shigeto Setoda, Member HICC
105. Paul Tallet, Member HICC
106. Mike Cabral, Member HICC
107. William Weber, Member HICC
108. Robert Hashimoto, Member HICC
109. Robert Santos, Member HICC
110. James Runyan, Member HICC
111. Iwao Kitagawa, Member HICC
112. Robert Yamada, Yamada Transfer
113. James Osmun, Regional Director, US Weather Bureau
114. Dr. Robert M. White, Chief US Weather Bureau
115. Thomas Vance, Hilo Hospital
116. Barry Kommel, Communication Systems Inc.
117. Joe Sanders, Dept. Assistant Manager, Pacific Operations, Atomic Energy Commission, Honolulu
118. Edward Butts, Atomic Energy Commission, Honolulu
119. Alike Herring, University of Arizona
120. James Yaeger, Radio Station – KIMO, Hilo
121. Martin Sebastian, Radio Station – KEKO, Kealahakua, Kona
122. Fred Fay, President Kona Chamber of Commerce
123. Kiyoshi Okubo, Editor, Hilo Times
124. Tadayuki Tsugawa, Hawaii Times
125. E. Ochiai, The Hawaii Hochi, Hilo Branch
126. Richard Miyashiro, Cafe 100
127. Irving Robinson, Welding & Ind. Products
- 128-139. Request of Dr. Kuiper. [HSA Gov 13-47]

July 20, 1964

**Dedication Ceremony For Completion Of Mauna Kea Summit
Road And Observatory Station**

July 20, 1964 – MONDAY

2:00 P.M.

Dome Site at Puu Poliahu (13,612 ft.) Mauna Kea.

PROGRAM

1. MASTER OF CEREMONIES.
2. INVOCATION – The Reverend Gerald P. Loweth of the Church of the Holy Apostles in Hilo.
3. WELCOME ADDRESS IN BEHALF OF HAWAII ISLAND CHAMBER OF COMMERCE: James L. Reid, President.
 - a. Announcement: regrets as well as introduction of special guests present.
4. WELCOME FROM COUNTY OF HAWAII: The Honorable Helene H. Hale, Chairman & Executive Officer of County of Hawaii.

Representatives from the three following organizations to say a few words in behalf of their group:
5. State Senate – The Honorable Nelson K. Doi, President of the Senate.
6. State House of Representative – The Honorable Stanley Hara, Chairman of the House Finance Committee.
7. University of Hawaii – Dr. Thomas Hamilton, President. (A representative to speak in his behalf if he is unable.)
8. Main Speaker – The Honorable John A. Burns, Governor, State of Hawaii.
9. Response – Dr. Gerard P. Kuiper, Director of Lunar & Planetary Laboratory, University of Arizona.
10. Cutting of Leis around dome to officially dedicate completion of observatory station and the summit road... [HSA Gov 13-47]

July 20, 1964

Gerard P. Kuiper, University of Arizona, Lunar and Planetary Laboratory

Address given at Mauna Kea Station Dedication [Figure 62]:

Governor Burns, Madame County Chairman, Senators, Members of the House, Dr. Woollard and Guests from the University of Hawaii, Guests from the U.S. Weather Bureau, Guests and Friends of Hilo—Distinguished Guests!

I do not recall an occasion in my professional career that had the excitement and the promise of this moment. Here we stand on the highest mountain of the Pacific in the clearest and purest air that astronomers have found for making observations in support of the greatest of all human ventures: travel to the moon—hopefully by 1970—and later possibly to Mars.

This peak among the five summit mountains was named for the snow goddess Poliahu—built by tremendous forces of nature now dormant here—but very much alive elsewhere on this beautiful island. Hawaii is probably the best laboratory from which to study the Earth; its forces, its growth, its history, and the chemistry and history of its atmosphere. This mountain top, our tests have already shown, is probably the best site in the world—I repeat—in the world, from which to study the Moon, the Planets, the Stars.

The factors which make this so are lasting factors. We are here far away from the sources of industrial soot, smoke, and smog and other air pollution. And this will remain. On the mainland the industrial growth has caused a blanket over the land that all of you that have flown the jets have seen. This cannot happen here! The trade wind brings ever fresh air, cleansed by the rain. But other disturbances are possible: car lights, search light beams, radio and TV transmitters near the Observatory. I would strongly recommend that steps be taken by the Government of this State to prevent such local, man-made interference. This is a simple problem.

As many of you know, the Lunar and Planetary Laboratory staff was brought to these Islands at the invitation of the Department of Defense to test conditions on Haleakala. We found these conditions to be at times extraordinarily good, but it soon became evident that such excellent conditions would be more frequent on Mauna Kea, nearly four thousand feet higher. Because of the tremendous potential importance to the space program, I requested the Space Agency to assist in the discovery of what might prove to be the best observatory site on Earth.

The knotty problem of building a road on State land from federal research fund could be by-passed by the extraordinary cooperation of the citizens and Government of this State.

Governor, Sir, I want to express to you the deep appreciation for your interest and your favorable decisions—not only on behalf of myself and my associates—but, at the request of Dr. Liddel, Chief of Sciences in the Office of Lunar and Planetary Sciences, also on behalf of NASA. I want further to express appreciation to the citizens of Hilo for their tremendous help. In particular, to Mr. Akiyama, who has been our counsel and guide throughout this program. What was attempted here was unprecedented but with Mr. Akiyama's guidance and almost daily participation it was accomplished. Mr. Akiyama also prepared the very interesting pamphlet which you have received, describing the history and the legends of this beautiful Island.

Thanks are extended also to Pacific Division of the U.S. Weather Bureau in Honolulu; the director, Mr. Johnson and the Chief Scientist, Mr. Price; and especially Mr. Howard Ellis, chief of the Mauna Loa Weather Observatory. Their advice gave me some understanding of the causes and trends of the weather on these Islands. My first good views of Mauna Kea were from a chartered plane as the guest of Mr. Price. The help of the Weather Bureau has been vital. I also want to thank Mr. Lyman Nichols, State wildlife Biologist in Hilo, who taught me about this great mountain from the ground. The selection of the observatory peak was made in consultation with Mr. Nichols, Mr. Akiyama and Mr. Ellis. Mr. William Seymour has been a good friend of our observers—he gave them a second



Figure 62.
Dr. Gerard Kuiper Speaking at Hale Pohaku, prior to Ascent to Pu'u Poli'ahu (July 20, 1964). Courtesy of Walter Steiger.

home. He freely donated his time and personal resources to provide the radio links Hilo-Mauna Kea and Hilo-Tucson. These links have been invaluable for the personal safety of our staff on their remote and lonely post and for prompt transmission of data to Tucson and NASA Headquarters.

Now the Future: Mr. Governor, as a scientist who has worked in Europe, Java, the Mainland, Chile, and on Haleakala, I want to tell you that, to use the words of Mr. Alike Herring, our first observer, "This mountain is it." It is a jewel! This is the place where the most advanced and powerful observations from this Earth can be made. I believe that as citizens of the U.S., it behooves us to strengthen the scientific position of this country by developing the potentialities of this mountain top. I hope that ways can be found, in collaboration between the University of Hawaii, the U.S. Government Agencies, the Lunar and Planetary Laboratory, and other interested groups, to develop the opportunities now open.

In this development I recommend close association with the various Departments of the State. *I want to stress that recreation, conservation, and science are not rivals; on the contrary, that their interests are parallel.* Most major U.S. observatories are on game preserves, in National Forests or in Parks. The scientists will welcome visitors (naturally in small numbers) and could arrange for "open house," say, once a month.

In order to avoid conflicting efforts or rivalry, I would specifically recommend that the State Government set up a coordinating Committee charged with receiving requests for building space, examining their compatibility and providing coordination generally. This committee might concern itself also with development of roads, electric power, water. In this manner the Mauna Kea High Altitude Research and Recreational facility can be developed.

Tomorrow I shall have a meeting with Dr. Woollard, director of the Hawaii Geophysical Institute to explore common scientific interests.

My closing remark must be one of thanks to the citizens of Hilo who have organized this festive occasion... [HSA Gov 13-47]

Around the time of the dedication of the test telescope on Pu'u Poli'ahu, Alike Herring photographed Dr. Kuiper, Mitsuo Akiyama, Howard Ellis and other participants in the test program at the site on Mauna Kea. *Figure 63*, is reproduced from Mr. Herring's slide, in the collection of the Institute for Astronomy.

Figure 64, an aerial shot of the Pu'u Poli'ahu facility, shortly after development in 1964, was also taken by Alike Herring, and is reproduced here from a slide in the Institute for Astronomy.



Figure 63. Dr. Kuiper (seated, left), Mitsuo Akiyama (standing, left), Howard Ellis (standing, right), and others at the Lunar and Planetary Laboratory – Test Telescope Site on Pu'u Poli'ahu (ca. July 1964). Photo Courtesy of the Institute for Astronomy.

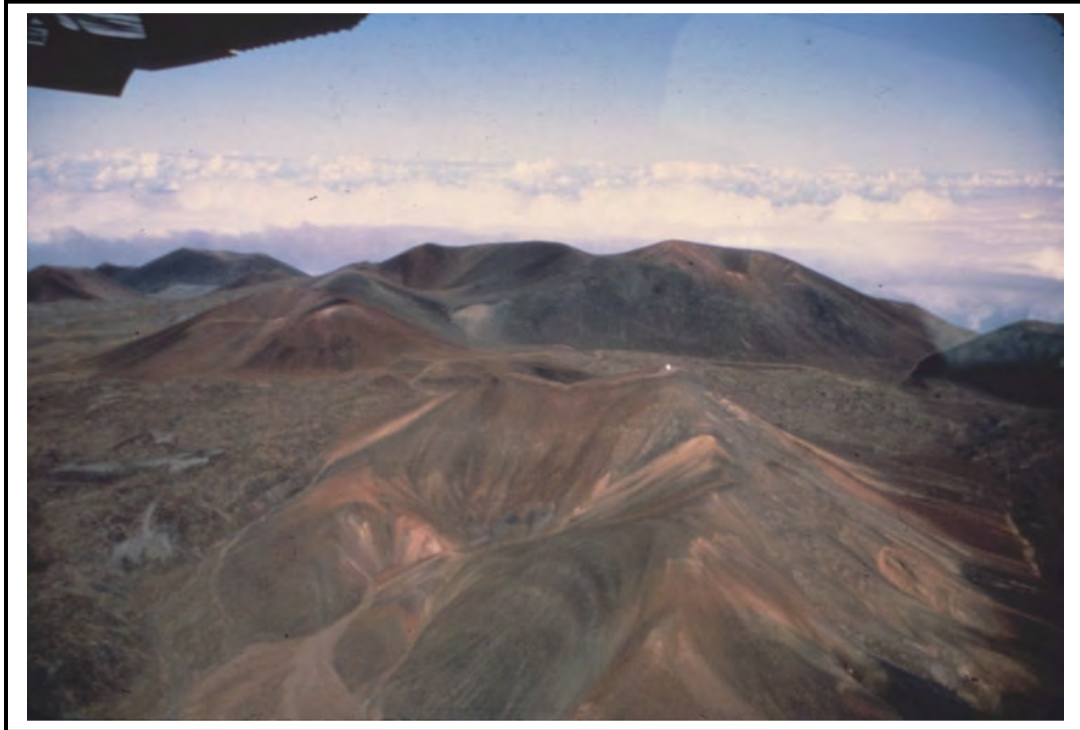


**Figure 64. Aerial Photograph of the Pu'u Poli'ahu Lunar and Planetary Laboratory–
Test Telescope Site. Alike Herring, Photographer (October 14, 1964).
Photo Courtesy of the Institute for Astronomy.**

Mauna Kea Pamphlet of the Hawaii Island Chamber of Commerce (July 1964)

As noted in the address above, given by Dr. Kuiper, Mitsuo Akiyama of the Hawaii Island Chamber of Commerce, prepared a pamphlet providing readers with an overview of Mauna Kea. The pamphlet discussed the natural and cultural environments, and considerations in development of the astronomical potential of Mauna Kea. It is notable that the cultural association of Mauna Kea, Pu'u Poli'ahu, the Hawaiian goddess Poli'ahu and her companion gods was brought to the attention of the early participants in the development of Mauna Kea. The pamphlet (July 20, 1964) is reproduced in its entirety here, as a reference point for future readers.

***MAUNA KEA
Island of Hawai'i***

Prepared By:
Hawaii Island Chamber of Commerce
95 Wai'anuenue Avenue
Hilo, Hawaii
July 20, 1964

FOREWORD

This simple pamphlet was prepared by the office of the Hawaii Island Chamber of Commerce to provide some background information about Mauna Kea ceremonies for the completion of the summit road and the observatory station atop **Puu Poliahu** on July 20, 1964.

This is an historical event because the State of Hawaii, through the vigorous leadership of Governor John A. Burns, has finally dared to push through this new summit road to open up a new vista in the development of possibly two major types of activities on this mountain:

1. Scientific and space-oriented research work.
2. Expanded recreational activities such as camping, hunting, skiing and hiking.

This pamphlet is hereby dedicated to Governor John A. Burns, and we urge the people of the Big Island to support the idea of naming the new summit road as the “John A. Burns Highway” similar to the naming of Stainback Highway and other new roads.

Also, at this time we would like to honor the scientists and explorers of the past who have made extensive exploration and research to make it possible for us to reprint and copy many of the valuable information about the mountain—its topography, climate, glacial geology and other features.

Finally, we know that the people of the Big Island wish Dr. Kuiper and the Lunar & Planetary Laboratory continued success in their quest to develop the Nation’s space program, and we all hope that Mauna Kea will develop into a Mecca of scientific research someday.

TABLE OF CONTENTS	PAGE [see page numbers in square brackets]
General Description of Island of Hawaii And Mauna Kea	1
A Tour of Mauna Kea in 1963	3
General Geology of Mauna Kea	5
Topography of Mauna Kea	7
Drainage System of Mauna Kea	8
Climate of Mauna Kea	10
General Features and Glacial Geology of Mauna Kea	12
Multiple Glaciation of Mauna Kea	16
A Legend: “Pele and the Snow-Goddess”	18
References	22...

GENERAL DESCRIPTION OF ISLAND OF HAWAII & MAUNA KEA

Island of Hawaii

The island of Hawaii consists of five volcanoes, namely, **Mauna Kea** (13,784 feet), Mauna Loa (13,679 feet), Hualalai (8,251 feet), Kohala (5,505 feet), and Kilauea (4,040 feet).

During the past century Mauna Loa has averaged one outbreak in the caldera for every 3-1/3 years, and has produced a lava flow every 6 years. Kilauea has contained a lava lake for years at a time, but since 1800 has produced only seven flows outside of its caldera. The only recorded eruption of Hualalai was in 1800-1801. **Mauna Kea** and Kohala have not erupted in historic times.

Hawaii, except for the windward slope of Kohala is little dissected. The only perennial streams are on the northeastern slopes of **Mauna Kea** and Kohala. The high permeability of the fresh lavas forming the surface of Kilauea, Mauna Loa and Hualalai inhibit the development of permanent streams. Large areas on these mountains are covered with black rock and are bare and devoid of vegetation. The southwestern side of Kilauea is a desert.

The lavas of Mauna Loa interfinger with the lavas of Kilauea, Hualalai, and **Mauna Kea**. The lavas of **Mauna Kea** interfinger with the latest lavas of Kohala Mountain. The 25-foot shore line has been found on Mauna Kea but not on Hualalai, Mauna Loa and Kilauea.

Marine conglomerates reach a height of 260 feet and stream terraces, a height of 1,100 feet on Kohala mountain. Thus, Kohala Volcano became extinct before all others on the Island. It is probable, however, that all except Kilauea have been active simultaneously since sometime in the Tertiary. The stratigraphy given in the accompanying table and the distribution of the rock units shown have been recently completed. The mountains are described in order of height.

MAUNA KEA

This mountain is the highest insular peak on the earth. Snow usually remains throughout the year in one place on the summit. The peak rises 13,796 feet above sea level, but the base of the island, and also the peak, is 18,600 feet below sea level. So the entire height of the peak from the ocean floor is more than 32,000 feet.

The lower slopes of the mountain, especially the high plains of Waimea, are blanketed with tan-colored ash deposits. Most of this material is fine-grained fire foundation debris wafted from the numerous cinder cones nearby. Streams have cut narrow gashes in the windward slope and Laupahoehoe Gulch contains an intra canyon flow. At its mouth is a flat of *pahoehoe* so recent that very little soil has formed on it. Obviously **Mauna Kea** poured out this lava after a canyon more than 400 feet deep had been cut. [page 1]

The volcanics of **Mauna Kea** are divided into two series by G. A. MacDonald. The older or the Hamakua volcanic series forms the major part of the mountain and is chiefly primitive olivine basalts with picrite-basalts carrying olivine and augite phenocrysts and a few andesites in its upper part. It usually carries a blanket of tan-colored vitric Pahala ash 4 to 15 feet thick and is separated from the over-lying Laupahoehoe volcanic series by the presence of the ash blanket and the porphyritic picrite-basalts. Interbedded with the Hamakua lavas near the summit are several beds of lithic-vitric explosion breccias reaching 90 feet in thickness. The Laupahoehoe volcanic series are predominately andesine andesites but olivine basalts are also present. The lavas of this series form a thin veneer over the upper part of the cone, reaching a maximum thickness at the summit.

They are characterized by many short flows and bulky cinder cones. The top of the mountain above 11,000 feet is a plateau that may be caused by the Laupahoehoe volcanic series filling a caldera in the Hamakua volcanic series. Six recent flows, which are all andesites, comprise the upper member of the Laupahoehoe volcanic series. They are mostly black and bare and differ from the lavas in the lower member of the Laupahoehoe series only in their youthful appearance and because those above 10,500 feet overlie glacial drift. They indicate that **Mauna Kea** became extinct in recent time.

A glacier about 250 feet thick covered the top of the mountain during the Wisconsin glacial stage as shown by moraines and glaciated areas above 10,500 feet. The glacial evidence was discovered in 1909 and details have been described more recently. Three older drifts have been described, but these have been found to be conglomerate and explosion deposits. [page 2]

A TOUR OF MAUNA KEA IN 1963.

The 55-mile Saddle Road crosses the broad pass between the slopes of Mauna Loa and **Mauna Kea** to connect Hilo with the Waimea-Kohala district, the island's northwest corner. It also gives access to hiking and skiing areas on Mauna Kea's slopes and to Hawaii's best hunting region.

You start from Hilo in land that is forested with *ohia* and ferns, then you reach open plateau country as you get into the saddle. The road cuts through successive lava flows which have occurred over thousands of years, but the most apparent (indicated by Hawaii Visitors Bureau warrior signs) are recent Mauna Loa flows. You'll traverse 9 miles of the 1855 flow, an eruption which lasted 13 months—longer than any other in historic times. Later you'll pass over lava from the 1935 eruption which threatened Hilo's water supply until the flow was successfully diverted by aerial bombing.

Puu Huluhulu cinder cone seems to rise right out of the saddle floor near the **Humuula** Sheep Ranch junction. This cone, from Mauna Kea is surrounded by *pahoehoe* lava which flowed from Mauna Loa in 1935.

From the junction you can take a gravel road northeastward along Mauna Kea's slopes. You pass the Humuula Sheep Ranch Station, then drive on through open grazing lands broken here and there by small clumps of trees. At 7,000 feet you are above the Hamakua rain forest and often surrounded by clouds. From the end of the road a jeep trail continues, passing close by a monument in a grove of Douglas firs—a memorial to David Douglas, botanist and explorer who was killed near this spot. The Douglas fir was named for him. About 20 miles farther along, near Mana, the trail becomes a good road again and takes you to the Mamalahoa Highway.

From the sheep ranch station another road leads to cabins and a picnic area at the 10,000-foot level on **Mauna Kea** and to the start of the hiking trail to the summit. To drive this road you'll need a key to the gate—pick up the key at the office of the Department of Land and Natural Resources in Hilo, then check in at the sheep station.

The road is very steep all the way, but you can make it in a passenger car if the car is in good condition. It winds through sheep grazing lands among cinder cones up to about 9,000 feet. Scattered around are native trees—*ohia*, *naio*, or false sandalwood, and *mamani*.

At **Halepohaku Camp** (elevation about 9,500 feet) are two well-insulated stone houses with barracks-type accommodations for about 30 persons in each. Both houses have fireplaces as night time temperatures are extremely cold even in summer. You can make arrangements to use the cabins by contacting the State Parks Division office in Hilo.

The road ends at **Kilohana Lookout**, a delightful picnic area about one-half mile beyond the camp. The picnic area is set among several cinder cones and its few trees seem almost out of place at this extreme elevation. [page 3]

*A 6-mile trail to Mauna Kea's summit begins at the picnic area. The round trip to the summit is a grueling all-day hike; the air is so thin you can scarcely breathe and your feet will sink into cinders—high shoes are necessary. Along the trail you pass **Keanakakoi Cave**, an old Hawaiian mine where Hawaiians chipped their spear points and other implement out of the hard lava. You can still see a pile of chipped rock and imperfect tools which they left. You can also see glacial scratches on the lava slopes in this area. At the foot of a cinder cone, at 13,020 feet, is little **Lake Waiau**, 300 feet across and 8 feet deep.*

The trail spirals around the north side of the cluster of summit cones of various hues, but coming back you can plunge right down the soft south slopes and rejoin it below the lake.

From **Humuula** junction it's about 7 miles to **Pohakuloa Camp** in the heart of some of the finest upland game bird areas in the world. The camp has picnic grounds and cabin and barracks accommodations, and pens housing some rare *nene*, or Hawaiian geese.

The 12 ½ — mile stretch from Pohakuloa to Mamalahoa Highway is through the Parker Ranch. The junction is about 5 miles from Waimea town. [page 4]

GENERAL GEOLOGY OF MAUNA KEA

Mauna Kea, on the island of Hawaii, is the highest peak in the Hawaiian Islands. A large cinder cone at the summit reaches an altitude of 13,784 feet above sea level. On the north the lavas of Mauna Kea are banked against the older and smaller Kohala Volcano and to some extent interbedded with the latest lavas of the Kohala Volcano. On the south they are over-lapped by late lavas of Mauna Loa, but deflection of late flows of Mauna Kea eastward and westward along the depression between the two mountains indicates that the northern slope of Mauna Loa must already have been built nearly to its present position at the time they were erupted. Mauna Kea and Mauna Loa must have grown to a large extent simultaneously, and their lavas must be interfingering at depth. A similar relationship probably existed between the lavas of Mauna Kea and Hualalai.

The volcanic rocks of Mauna Kea are divided into two groups, named respectively the Hamakua and Laupahoehoe volcanic series. The Hamakua volcanic series is named for its exposures along the Hamakua coast, northwest of Hilo, where it is well exposed in sea cliffs and in the walls of large gulches. Its great exposed thickness is 650 feet, but its thickness below sea level is many thousands of feet. The Laupahoehoe volcanic series is named for its exposures at Laupahoehoe peninsula, where a typical andesite flow has built a lava delta. At its type locality lava of the Laupahoehoe volcanic series is separated from the rocks of the older Hamakua volcanic series by a profound erosional unconformity. Erosional unconformities of lesser magnitude separate the two volcanic series at other localities, but in still other places there is no sharp separation. Volcanism was essentially continuous from one to the other. Around the periphery of the mountain many of the lava tongues of the Laupahoehoe volcanic series are only one or two flows in thickness. On the upper flanks of the mountain erosion has in general been too slight to expose the base of the Laupahoehoe volcanic series, but the presence of a large *kipuka* of the Hamakua volcanic series extending up the southern slope to about 10,000 feet altitude indicates that the thickness on the outer slopes of the mountain probably nowhere exceeds a few hundred feet, and in many places may be measurable in tens of feet. However, if a caldera formerly existed, as appears probable, and was filled by the Laupahoehoe volcanic materials, the series may reach a thickness of two or three thousand feet.

The rocks of the Hamakua volcanic series consist largely of olivine basalts, representing the undifferentiated magma of the Hawaiian province. A few thin ash beds are intercalated with the lavas, but for the most part pyroclastic debris forms only a small proportion of the whole. The lavas were erupted in a highly fluid condition, and spread out as thin flows far from their vents, building a broad shield volcano. In the upper part of the Hamakua volcanic series, high on the southern slope of the volcano, there are exposed, however, thick deposits of explosion debris composed of blocks of olivine basalt and picritic basalt in a matrix of vitric-crystal tuff. If such deposits are abundant in the upper part of the cone, below [page 5] the levels revealed by the shallow erosional dissection, they together with the greater abundance of eruptions at and near the central eruptive axis probably account for the steepness of the upper slopes of the cone, which have an average inclination of about 16° in contrast to 5° on the lower slopes.

Gradually, as the frequency of eruption decreased and the magma chamber feeding the volcano cooled, differentiation brought about important changes in the composition of the erupted lavas. Interbedded with the olivine basalts in the upper part of the Hamakua volcanic series there are many flows of picritic basalt and andesite. The picritic basalts are

rich in phenocrysts of olivine and augite, and are believed to have formed by the settling of intratelluric phenocrysts from upper to lower portions of the magma column. The andesites are believed to represent the upper part of the magma column, impoverished in the constituents of the sunken phenocrysts.

The Laupahoehoe volcanic series contrasts with the earlier rocks in consisting very largely of andesites, with less abundant olivine basalts. Picritic basalts are entirely absent. The andesites in general were erupted in a more viscous condition than the earlier lavas, with the production of greater quantities of pyroclastic material. Locally, small viscous domes were formed by the accumulation of lava around vents.

Except in a small wind-swept area southwest of Waimea, on the northwest side of the mountain, the surface of the lavas of the Hamakua volcanic series is buried beneath a cover of yellow to reddish-brown ash, correlative in age with at least a part of the Pahala ash on Mauna Loa. This ash is 15 feet thick near Hilo, gradually decreasing in thickness northwestward. Near Kukaiaua, 25 miles northwest of Hilo, it is only 5 to 6 feet thick and in the saddle between Mauna Kea and Kohala its greatest depth is 4 to 5 feet. Where not influenced by outside factors, its thickness increases up the mountain. At any locality, the maximum thickness is present only where the accumulation of ash has not been interrupted by lava flows. Its distribution and variation in thickness indicate clearly that most of the ash came from cones on Mauna Kea, although there must have been small additions from such other neighboring sources as the northeast rift zone of Mauna Loa. Far from being a good time marker, the Pahala ash at its places of maximum thickness represents continuous accumulation from late Hamakua time to the present. A smaller amount of ash is present also on many flows of the Laupahoehoe volcanic series, equivalent in age to the upper part of the ash on lavas of the Hamakua volcanic series.

Near the end of its eruptive history, the summit of Mauna Kea was buried beneath glacial ice. A few small lava flows are later than the glacial drift, and other flows at lower altitudes appear to be of about the same age. These late flows have been arbitrarily separated from the rest of the Laupahoehoe volcanic series. All are andesites. [page 6]

TOPOGRAPHY OF MAUNA KEA

The Mauna Kea dome, forming with the Kohala dome the north-eastern third of the island of Hawaii, is next younger than the Kohala dome in age. At least its uppermost lava flows overlap the Kohala dome along a curved boundary which extends from the northeast coast at Kukuihaele to the west coast at Kawaihae. In turn, the Mauna Kea dome is overlapped by Mauna Loa lava flows along a similar curved boundary on the south and southwest sides from Hilo to Puako. The saddle of overlap at the north lies at the elevation of about 2,900 feet; that at the south between Mauna Loa and Mauna Kea at 6,600 feet.

Thus below 6,600 feet, the southern and the western slopes of Mauna Kea are wholly concealed; at the north the Mauna Kea mass is built over and around the Kohala dome and only in the 120-degree sector from N. 20° W. to S. 80° E. are the full slopes accessible from the summit to sea level. Only the upper half of the mountain is involved in this study. Slopes of this party are in general much steeper than those of the exposed northeast lower sector, and the upper half of Mauna Kea has only about one-third the volume of the nearby Mauna Loa above the 7,000-foot contour line. The steepest slopes of the upper half of Mauna Kea on the east are between 9,000 and 10,500 feet, where the gradient is about 1,200 feet a mile. Between 9,000 feet and 6,000 feet, slopes average about 700 feet a mile; below 6,000 feet, less than 500 feet a mile.

On the north side, a maximum gradient of 1,500 feet a mile is found between 7,500 and 10,500 feet, with a gradual reduction to about 500 feet at the 5,000-foot elevation. On the west side there is a pronounced spur around which the contours pass, and down the axis of which the gradient of about 850 feet a mile obtains from 12,00 feet down to 7,000 feet, with a gradual decrease below. In the southwest sector, between 11,000 feet, and 7,000 feet, the general gradient is 1,600 feet, with a few small areas as steep as 2,000 feet, a mile. On the south side, toward Humuula, 1,500-foot slopes are found between 9,000 and 11,000 feet. Up to 7,500 feet north and northwest of Humuula is a gently sloping area with gradients of less than 500 feet a mile. The remainder of the south slope is somewhat irregular, with variable slopes among numerous cinder cones.

Above the zone of marked steepening, around the entire mountain, the slope decreases rather abruptly to form a gently domed summit plateau, whose edge may be placed at 11,000, 11,500 and 12,000 feet in elevation on the east, north, west, and south sides, respectively. Its surface rises to slightly over 13,000 feet somewhat west of the center, and on this portion stand the several large cinder cones forming the summit of the mountain. Above the 7,000-foot level, there are more than 80 pyroclastic cones. **Puu Makanaka**, the largest isolated cone, exceeds 4,000 feet in diameter at the base, 600 feet in height on two opposite sides, and has a nearly circular rim about 1,500 feet in diameter. [page 7]

DRAINAGE SYSTEM OF MAUNA KEA

Only a very rudimentary drainage system is developed on the higher parts of Mauna Kea. So porous is the material of the cinder cones and of the broad sheets of debris between them that water from falling rain and melting snows is quickly absorbed. The cones are little scarred by runways and most of the valleys on the flatter lands assume definite form only in their lower courses.

At 6,500 feet, a circuit of the mountain reveals about eighty channels of intermittent streams, of which only twenty reach as high as 10,000 feet. Only three continuous channels of intermittent streams and lead down from elevations above 12,000 feet, **Pohakuloa** and **Waikahalulu** gulches on the southwest and **Kaula Gulch** on the northeast. There are no perennial streams above 4,500 feet on any part of the Mauna Kea dome. Headwaters of the Wailuku River flow intermittently from about 11,000 feet on the east-southeast side, and several intermittent streams drain to the coast from about 12,000 feet on the northeast and north. Most of these stream channels are ill-defined trenches ranging up to 50 feet in depth. Waikahalulu gulch is 200 feet deep for a considerable distance below the 10,000 foot level, and Pohakuloa is a still more prominent gorge for about 2 miles down the steep southwestern side of Mauna Kea.

In certain respects the most remarkable drainage feature of the Mauna Kea summit area is **Lake Waiau**—a perennial body of water in the bowl of the comparatively old Waiau ash cone. As measured in August, presumably its low-water stage, it has an area of approximately 1 ½ acres, a depth of 8 to 15 feet, and lies 6 feet below the lowest sag in its rim. The freshness of its outlet channel suggests that each spring the surplus water from melting snows finds its way to Pohakuloa Gulch. Around the southern half of its shore the beach is moist with seepage water, and a spring hole dug on the southeast side was maintained full to a level of about a foot higher than the lake. The day-time temperature of the lake water in August of three different years was close to 54° F.; in the spring hole about 10 degrees less. At night the margin of the lake was covered with ice. The lake has a yellowish green color derived from organic matter in the water and in the debris which forms its end. Samples of the water and the muck were examined by Lyon with the following result:

“The water from Waiau Lake is a veritable infusion. Bacteria are extremely numerous and probably the chief factor in causing the turbidity of the water. A small ciliate is also present in enormous numbers, while a larger infusorian, *Stylonchia* sp., is present in large numbers. I also find a few diatoms and numerous dead bodies of a crustacean, *Daphnia* sp. which are being consumed by a fish mold, *Achlya* sp. The sample of muck contains several blue-green algal, desmids, diatoms, at least two species of nematodes, hosts of bacteria and many kinds of protozoa, among which are present all of those found in the sample of water.” [page 8]

A chemical analysis of the water made by the Dearborn Chemical Company (December 30, 1929) shows total dissolved solids of 6,424 grains. These include silica, 0.233; iron oxide, .070; calcium carbonate, 2.686; magnesium carbonate, 0.789; sodium sulphate, 1.954; sodium chloride, 0.680; sodium nitrate, 0.834. in composition the ratio is much like that from ephemeral Hawaiian streams fed from rain water. As compared with water from the Honolulu artesian basin it is low in silica, sodium, and chlorides and high in iron oxides, aluminum, calcium carbonates, sulphates, and nitrates.

Lake Waiau is one of the few perennial water bodies in Hawaii. Its position in an area of porous rocks at an altitude of 13,000 feet is worthy of special comment.

BASIN OF LAKE WAIIAU

Lake Waiau lies in the bowl of Puu Waiau—a cone built chiefly of fine grained and much-weathered cinders and ash. On its north side, the cone is breached and thus forms an outlet for the lake at high water stages. As the average depth of the lake when full of water is about 15 feet and the muck at its bottom as much as 8 feet, the floor of its basin lies 23 feet below the lowest part of its rim. In superficial view, Waiau has the appearance of an ordinary crater lake, but striae directed toward the basin from the northeast, morainal deposits high up on its southern slope, and scour marks on its outlet bar, show that it was occupied by glacial ice. It seems probable that ice to a depth of 100 feet or more was forced into the basin and after a temporary halt was forced out to join the larger ice tongues moving down Pohakuloa Gulch. Scouring by the ice doubtless deepened the original basin, and it may be that some ice remained after the glaciers disappeared. The possibility is suggested that downward seepage of lake water is impeded not only by fine-grained ash and organic material but also by ground ice that probably forms each year. [page 9]

CLIMATE OF MAUNA KEA

Except for the miscellaneous observations by ranchers and a few instrumental measurements made from time to time by scientists who have ascended Mauna Kea, knowledge of the climate at the summit platform is based on records made during the years 1895, 1905-1914, at Humuula Sheep Station and at Lake Waiau during the period August 8-19, 1935. As elaborated by Coulter, these records permit a generalized description of precipitation and temperature characteristic of a subpolar (“tundra”) climate.

On the windward (northeast) side of Mauna Kea the zone of maximum rainfall lies between contours 1,800 and 2,000, where annual precipitation may exceed 200 inches. At **Humuula** (6,685 feet) it is 32 inches, at **Puu Kea** (8,580 feet) 29.03 inches; at **Lake Waiau** (13,007 feet) probably less than 15 inches. The rainfall wherever recorded varies widely in amount and distribution—annual, monthly, and daily—and exposure to wind and local topographic features greatly modify the conditions resulting from altitude. On the summit area, precipitation is almost entirely snow and fog.

Above 10,000 feet, snow falls generally during the period October-May and in some years, every month. The repeated snows during the colder seasons may form a thick continuous white cap that remains for several months. The snowfall from most summer storms is light and may rapidly melt. In August, 1926, small snow banks remained in sheltered places; in August, 1935, no snow was found; during a storm in August, 1936, the summit area was covered. During a snow storm in February, 1936, generally regarded as the most severe storm in at least 25 years, the lower limit of snow which remained on the ground around the slopes of Mauna Kea followed approximately the 7,000-foot contour line. Snow to a depth of 2 ½ feet was reported between **Puu Oo** and **Hookomo** on the south slope. Sleet formed part of a brief storm in August, 1935, and several observers report sleet and ice storms during June, July, August and September.

Fogs are common about the slopes of Mauna Kea especially on the saddle which separates the mountain from Mauna Loa. Humuula during 1895 experienced 177 days of fog. At Laumaia in 1893, 233 foggy days are recorded; "the fogs came during the afternoon" and "remained during the night." On the summit of the mountain, fogs are frequent, at least during the summer season. Those noted at Lake Waiau by the Mauna Kea Expedition came from the west between 11 a.m. and 2 p.m. Other observers report heavy fogs in the late afternoon and at night.

The mean annual temperature at Humuula is 52 degrees: mean maximum, 62.1 degrees: mean minimum, 42 degrees. At Lake Waiau the highest temperature measured during 11 days in August, 1935, was 57.1 degrees, the lowest, 18.9. In January and February, so far as can be deduced from known temperature gradients and airplane observations over Oahu, the general range of mean minima and mean maxima is probably 19 degrees to 41 degrees, with extremes of 10 degrees and 45 degrees, and a mean of perhaps 30 degrees. [page 10]

Freezing temperatures are not uncommon at altitudes as low as 9,000 feet in summer and 6,000 feet in winter. Temperatures above 70 degrees are expected on unclouded days at altitudes below 7,000 feet. At Humuula, the highest temperature recorded is 84 degrees; the lowest, 25 degrees. All observers report that the water in Lake Waiau freezes at night during all seasons of the year. During the summer at least the ice melts during the day. In December 1833, Goodrich found the lake only "about half frozen over."

VEGETATION

Botanically, the alpine zone of Mauna Kea from timberline (9,500 feet) to the summit is a desert, for few species of plants and few individual plants are found. To succeed in the cinders, plants must endure many vicissitudes. Low temperature, short seasons for growth and reproduction, low rainfall, and grazing by sheep and goats combine with high soil porosity and instability of substratum to produce unfavorable conditions. Seeds that drop in the crevices in the lava rocks are the most likely to succeed, and here most of the vegetation is found.

The entire summit area, above 13,000 feet, which bears any vegetation at all is in the pioneer stage. In the alpine zone, 28 species of ferns and flowering [flowering] plants were found, also several kinds of lichens, a few mosses, algae (in Lake Waiau), and micro-organisms. No plants were abundant; of the xerophytic flora, only one living silversword has been found. The plants found above timberline have been studied by Hartt and Neal, members of the Mauna Kea Expedition. [page 11]

GENERAL FEATURES AND GLACIAL GEOLOGY OF MAUNA KEA

INTRODUCTION

The four volcanic masses whose coalescing bases form the island of Hawaii are substantially alike in petrographic composition: all of them bear cinder cones on their flanks, and lava flows from all of them have extended far into the sea, and also inland to join their neighbors. As regards their topographic expression, they form two groups, Mauna Loa and Hualalai have remarkably flat, smooth profiles and summit craters; Mauna Kea and Kohala are rugged masses sharply incised by canyons and have no topographic feature to indicate the major source of the materials of which they are constructed. The two giant domes, Mauna Loa and Mauna Kea, reveal these differences clearly.

The profile of Mauna Loa extends from the coast as an almost unbroken curve with a gradient averaging about 600 feet to the mile nearly to the rim of the active crater, Mokuaweoweo, at an altitude of 13,680 feet. Mauna Kea, only 25 miles distant, rises from a base about half as large as that of Mauna Loa and reaches an altitude 104 feet higher (13,784 feet). Its profile is a series of broken, irregularly placed steps which lead to a summit plateau with an area of about 10 square miles, a plateau made uneven by cinder cones rising above its surface and by gorges cut below it. The ascent of Mauna Loa from the hotel at Kilauea involves the traverse of a slope of lava sufficiently fresh to retain its original structure and over a trail which might readily be converted into an automobile road. All routes to the summit of Mauna Kea wind in and out among foothills, follow and cross gorges with alternating stretches of "good going" and "stiff climbs." Up to about 11,500 feet in the valleys, and to about 12,500 feet on the flat divides, the rock where exposed is much weathered and the soil in places is deep. The plateau is covered with red and brown lapilli, partly decomposed blocks and bombs of lava and with ridges and flats of angular, fresh blocks and slabs of dense basalt. Particularly in the valleys and on the flanks of rock-ridges this material is so continuous, so deeply piled, and presents such sharp edges as to make travel on horseback hazardous.

Mauna Loa is an active volcano and any traces of glacial action which may have taken place at its summit during Pleistocene time have, so far as known, been effaced by subsequent lava flows. Mauna Kea, on the contrary, has long been dormant and shows evidence of little post-Wisconsin volcanic activity. Hence it is the only place in Hawaii, and probably in the entire central Pacific, where a record of Pleistocene glaciation can be found. The mountain is therefore of peculiar interest to geologists, and to geographers and biologists as well. [page 12]

HISTORICAL SKETCH

*That the Hawaiians were familiar with the summit of Mauna Kea is amply demonstrated by adz quarries at **Keanakakoi** (cave of the adz makers), by walls, stone platforms, and burial caves. The first recorded ascent of the mountain was by Joseph Goodrich in August 1823. In describing a subsequent ascent in December 1832, he speaks of "fragments of granite embedded in lava—specimens of compact lava resembling hornstone—some specimens of granite a foot or more in diameter." He found near the summit a "lake or pond of water—75 rods in circumference, or 25 in diameter—half frozen over—very deep."*

James McRae, botanist of the 'Blond,' who spent many uncomfortable hours on top of Mauna Kea, June 15-17, 1825, noted "Lava and sand intermixed with small broken stones about the size of brickbats—large, sharp edged granite stones of several tons weight, which have beyond a doubt been thrown up by some previous convulsion."

David Douglas, who ascended Mauna Kea, January 19, 1834, describes the top of Mauna Kea as a “tableland or platform where spring the great vent holes of the subterranean fire or numerous volcanoes...large blocks of lava of every shape, size and color...in some places the round boulders of lava are so irregularly placed and the sand so washed among them as to give the appearance of a causeway.”

Charles Pickering and William D. Brackenridge with a guide, “Dawson, alias Billy-Lilly,” ascended Mauna Kea in 1841. They speak of “a plain made desolate by stones, gravel, sand, scoria...resembled the dry bed of some great river over which the water has passed for ages—no appearance of lava streams or clinkers...”

Dutton noted the salient physiographic features of Mauna Kea during a day spent on the upper slopes in 1882. He writes:

“After seven hours of travel without a halt, we reached what may be termed the summit platform, which has an altitude...averaging probably 12,500 feet...Upon this platform stand about a dozen large cinder-cones, from 700 to 1,000 feet in height, carrying the extreme apices of the mountain very nearly 14,000 feet...The aspect of the lavas beneath our feet now becomes somewhat different from those seen lower down the mountain. They are lighter colored and some of them are much more compact...Hard by the noon-day camp is a mass of very light-colored lava which seems at first to have a constitution notably different from the very black almost ultra basalts to which we have thus far been accustomed. It is exceedingly compact and fine grained and has a very light gray color. No signs of any recent volcanic activity are to be seen...How these lava sheets have thus been torn to pieces, as it were, and reduced to piles of moldering ruins I can explain only by suggesting the action of frost and ice filling the cracks and wedging the pieces apart by expansion...A few hundred yards from our noon camp is the head of a ravine which has been scored to a considerable depth by the unmistakable action of running water.” [page 13]

Hitchcock, who ascended the mountain in 1886, mentions “many canyons about the base of Mauna Kea” as “criteria of a great age” and states that “there is a sort of plateau upon the higher part of Mauna Kea about the contour of 12,500 feet with an area of from 35 to 40 square miles.” The Mauna Kea summit cones are usually “perfect” (not breached)...“cone at the summit is covered by blocks of consolidated lava including many bombs.” “A lake about 200 feet long and 150 feet wide occupies a small crater between two sand cones”.

Baldwin, while establishing a triangulation station on Mauna Kea in 1889, observed that the “sides of the mountain are made up mostly of disintegrated aa flows and sand cones...on top the texture of the scoria is somewhat different being of a light bluish gray color; rings when struck, and splits in regular smooth layers; the feldspars being present in large quantities.”

Bryan noted that the deep gulches which furrow the northeast side of Mauna Kea do not extend to the summit, and ascribed the difference to the later extinction of volcanic activity at the summit. He says:

“Its elliptical summit is rather thickly sprinkled with a number of cinder cones; about two dozen being above the 12,500 foot contour line...one of these cones is occupied by a pond 40 feet deep and several acres in extent.”

Though Dutton ascribed the fresh angular blocks of compact basalt to “the action of frost and ice”, and both Dutton and Bryan called attention to the sudden change in profile of the drainage lines, the first record of unmistakable glacial features on Mauna Kea was made by Daly, who ascended the mountain to the edge of its summit platform in 1909. Daly writes:

“Hawaii itself seems to have borne at least one small glacier, the characteristic traces of which were observed by the writer on Mauna Kea at the 12,000 foot level.”

There have doubtless been many unrecorded visits to the summit of Mauna Kea since Goodrich’s traverse in 1823. Indeed, it is probable that fifty or more years ago, when ranch operations were of relatively greater importance and the old Makahala-Keanakolu trail was in general use as a route from Kawaihae and Waimea to Hilo, the upper slopes of the mountain were more generally known to the residents of Hawaii than they are today. During the last two decades a number of scientists interested in the natural history of Hawaii have reached the summit on single-day trips. Forestry surveys by the Hawaiian Dept. of Agriculture, topographical surveys by the U.S. Geological Survey (1925-1927), and observations by T.A. Jaggar and his colleagues of the Hawaiian Volcano Research Association have supplied authentic information. In particular, photographs and notes by C. S. Judd and C. J. Kraebel and sketch maps by E. G. Wingate (1927) showing approximately the position of the “new fresh rock” and “old unaltered rock” are contributions of value. [page 14]

Systematic studies of the glaciation, petrography, and structure of Mauna Kea were made by Gregory and by Wentworth at intervals during the years 1921-1935. On these studies the present report is based. In 1921, Gregory spent seven days (August 5-7, 22-25), and in 1926, three days (July 23-25) on the summit and upper slopes. Awaiting the completion of topographical maps (issued 1932), those observations were recorded in preliminary papers.

Wentworth ascended the mountain in 1929, and as leader of the Mauna Kea Expedition of the Hawaiian Academy of Science spent two weeks of August 1935 in a survey of the summit area, with special attention to glaciation. During the course of this survey, the central summit area was studied in some detail, though only a very general examination of parts of the marginal area of glaciation was made. Even with the convenience of a fixed camp at Lake Waiau, field work at 11,000 to nearly 14,000 feet is arduous for a party coming up abruptly from life at sea level in the tropics. Many problems, particularly those of altering volcanic and glacial activity and of multiple glaciation have scarcely been touched and offer a promising field for more detailed studies. [page 15]

MULTIPLE GLACIATION OF MAUNA KEA, HAWAII

Mauna Kea, Hawaii (13,784 feet), was glaciated four times during a period presumably correlative with the ice age elsewhere. Snow mantles Mauna Kea during winter but banks rarely survive the summer. Evidence is abundant not only for the latest glacial stage in the summit area but also for three earlier glacial advances in the zone outside and below the youngest moraine. The four indicated stages have been named, beginning with the latest, the ***Makanaka, Waihu, Pohakuloa***, and pre-Pohakuloa stages.

Distinguishing features of the several drifts are:

1. Stratigraphic position. The three earlier ones lie under successive series of late lava flows.
2. Moderate weathering and surface staining (to brown) of the older drifts. Climate has probably been periglacial throughout Pleistocene and recent time.
3. Litho logic differences due to derivation from different series of surface lavas.
4. Matrices of the older drifts are partly tuffaceous indicating contemporary volcanism.
5. In places the oldest drifts are well-indurated tillite.
6. The drifts are dominantly boulder beds, much water-washed. Boulders are somewhat faceted but only faintly striated.
7. Striated pavements are known under the older drifts, but glacial erosion was generally feeble.
8. Glaciers in the pre-Pohakuloa stage descended to about 7,000 feet but only to 10,200 feet in the latest stage.
9. Interglacial processes other than extrusive volcanism are little known. Climate is now sub arctic above the timber line; and significant soils probably were never developed.

Four glacial stages on Mauna Kea are indicated by four distinct drifts separated by series of lava flows up to 100 feet in total thickness. Such criteria as progressively greater internal induration, greater surface weathering where broadly exposed, and development of soil and plant cover on the older drifts indicate that true glacial stages are represented. A tentative correlation is indicated with Nebraskan-Gunz, Kansan-Mindel, Illinoian-Riss, and Wisconsin-Wurn stages of north America and Europe. No other known island summit in the Pacific area affords evidence of this sort. It is highly significant that glaciation occurred here on a summit where no permanent snow fields exist today. If Mauna Kea were higher than its [page 16] present 13,784 feet, the snow line today would probably lie between 14,000 and 15,000 feet. During the Pleistocene, general ocean-wide climatic changes led to periodic fall of the snow line below the level of 13,000 feet, the probable approximate height of Mauna Kea early in the Pleistocene. Glacial advances in some continental areas may be correctly attributed to increases in precipitation, but in Hawaii this explanation seems less plausible than ocean-wide lowering of temperature. Most of the cinder cones on Mauna Kea probably were erupted during the Pleistocene, but their relations to moraines indicate that all but three or four were formed prior to the last glacial stage. Up building of the volcanic dome by lava outflows has been negligible since glaciation, and even since the beginning of the ice age it has not exceeded 100 feet for the whole dome.

EPOCH

Recent	less than 20,000 years ago
Pleistocene	20,000 to 1,000,000 years ago
Pliocene	1,000,000 to 11,000,000 years ago

Correlation with Glacial Stages elsewhere.

Stage no.	Hawaii.	North America.	Alps
4	Makanaka	Wisconsin	Wurn
3	Waihu	Illinoian	Riss
2	Pohakuloa	Kansan	Mindel
1	Pre-Pohakuloa	Nebraskan	Gunz [page 17]

PELE AND THE SNOW-GODDESS

“A LEGEND”

There were four maidens with white mantles in the mythology of the Hawaiians. They were all queens of beauty, full of wit and wisdom, lovers of adventure, and enemies of **Pele**. They were the goddesses of the snow covered mountains. They embodied the mythical ideas of spirits carrying on eternal warfare between heat and cold, fire and frost, burning lava and stony ice. They ruled the mountains north of Kilauea and dwelt in the cloud-capped summits. They clothed themselves against the bitter cold with snow-mantles. They all had the power of laying aside the white garment and taking in its place clothes made from the golden sunshine. Their stories are nature-myths derived from the power of snow and cold to check volcanic action and sometimes clothe the mountain tops and upper slopes with white, which melted as the maidens came down closer to the sea through lands made fertile by flowing streams and blessed sunshine.

It is easy to see how the story arose of **Pele and Poliahu**, the snow-goddess of **Mauna Kea**, but it is not easy to understand the different forms which the legend takes while the legends concerning the other three maidens of the white mantle are very obscure indeed.

Lilinoe was sometimes known as the goddess of the mountain **Haleakala**. In her hands lay the power to hold in check the eruptions which might break forth through the old cinder cones in the floor of the great crater. She was the goddess of dead fires and desolation. She sometimes clothed the long summit of the mountain with a glorious garment of snow several miles in length. Some legends give her a place as the wife of the great-flood survivor, Nana-Nuu, recorded by Fornander as having a cave-dwelling on the slope of Mauna Kea. Therefore she is also known as one of the goddesses of Mauna Kea.

Waiau was another snow-maiden of Mauna Kea, whose record in the legends has been almost entirely forgotten. There is a beautiful lake glistening in one of the crater-cones on the summit of the mountain. This was sometimes called “The Bottomless Lake,” and was supposed to go down deep into the heart of the mountain. It is really forty feet in its greatest depth—deep enough for the bath of the goddess. The name Wai-au means water of sufficient depth to bathe. Somewhere, buried in the memory of some old Hawaiian, is a legend worth exhuming, probably connecting Waiau, the Maiden, with Waiau, the lake.

Kahoupokane was possibly the goddess of the mountain Hualalai, controlling the snows which after long intervals fall on its desolate summits. At present but little more than the name is known about this maiden of the snow-garment.

Poliahu, the best-known among the maidens of the mountains, loved the eastern cliffs of the great island Hawaii,—the precipices which rise from [page 18] the raging surf which beats against the coast known now as the Hamakua district. Here she sported among mortals, meeting the chiefs in their many and curious games of chance and skill. Sometimes she wore a mantle of pure white *kapa* and rested on the ledge of rock overhanging the torrents of water which in various places fell into the sea.

There is a legend of Kauai woven into the fairy-tale of the maiden of the mist—Laieikawai—and in this story Poliahu for a short time visits Kauai as the bride of one of the high chiefs who bore the name Aiwohikupua. The story of the betrothal and marriage suggests the cold of the snow-mantle and shows the inconstancy of human hearts.

Aiwohikupua, passing near the cliffs of Hamakua, saw a beautiful woman resting on the rocks above the sea. She beckoned with most graceful gestures for him to approach the beach. Her white mantle lay on the rocks beside her. He landed and proposed marriage, but she made a betrothal with him by the exchange of the cloaks which they were wearing. Aiwohikupua went away to Kauai, but he soon returned clad in the white cloak and wearing a beautiful helmet of red feathers. A large retinue of canoes attended him, filled with musicians and singers and his intimate companions. The three mountains belonging to the snow-goddesses were clothed with snow almost down to the seashore.

Poliahu and the three other maidens of the white robe came down to meet the guests from Kauai. Cold winds swayed their garments as they drew near to the sea. The blood of the people of Kauai chilled in their veins. Then the maidens threw off their white mantles and called for the sunshine. The snow went back to the mountain tops, and the maidens, in the beauty of their golden sun-garments, gave hearty greeting to their friends. After the days of the marriage festival Poliahu and her chief went to Kauai.

A queen of the island Maui had also a promise given by Aiwohikupua. In her anger she hastened to Kauai and in the midst of the Kauai festivities revealed herself and charged the chief with his perfidy. Poliahu turned against her husband and forsook him.

The chief's friends made reconciliation between the Maui chiefess and Aiwohikupua, but when the day of marriage came the chiefess found herself surrounded by an invisible atmosphere of awful cold. This grew more and more intense as she sought aid from the chief.

At last he called to her: "This cold is the snow mantle of Poliahu. Flee to the place of fire!" But down by the fire the sun-mantle belonging to Poliahu was thrown around her and she cried out, "*He wela e, he wela!*" ("The heat! Oh, the heat!") Then the chief answered, "This heat is the anger of Poliahu." So the Maui chiefess hastened away from Kauai to her own home. [page 19]

Then Poliahu and her friends of the white mantle threw their cold-wave over the chief and his friends and, while they shivered and were chilled almost to the verge of death, appeared before all the people standing in their shining robes of snow, glittering in the glory of the sun; then, casting once more their cold breath upon the multitude, disappeared forever from Kauai, returning to their own home on the great mountains of the southern islands.

It may have been before or after this strange legendary courtship that the snow-maiden met Pele, the maiden of volcanic fires. Pele loved the *Holua*-coasting—the race of sleds, long and narrow, down sloping, grassy hillsides. She usually appeared as a woman of wonderfully beautiful countenance and form—a stranger unknown to any of the different companies entering into the sport. The chiefs of the different districts of the various islands had their favorite meeting-places for any sport in which they desired to engage.

There were sheltered places where gambling reigned, or open glades where boxing and spear-throwing could best be practiced, or coasts where the splendid surf made riding the waves on surf-boards a scene of intoxicating delight. There were hillsides where sled-riders had opportunity for the exercises of every atom of skill and strength.

Poliahu and her friends had come down Mauna Kea to a sloping hillside south of Hamakua. Suddenly in their midst appeared a stranger of surpassing beauty. Poliahu welcomed her and the races were continued. Some of the legend-tellers think that Pele was angered by the superiority, real or fancied, of Poliahu. The ground began to grow warm and Poliahu knew her enemy.

Pele threw off all disguise and called for the forces of fire to burst open the doors of the subterranean caverns of Mauna Kea. Up toward the mountain she marshaled her fire-fountains. Poliahu fled toward the summit. The snow-mantle was seized by the outbursting lava and began to burn up. Poliahu grasped the robe, dragging it away and carrying it with her. Soon she regained strength and threw the mantle over the mountain.

There were earthquakes upon earthquakes, shaking the great island from sea to sea. The mountains trembled while the tossing wave of the conflict between fire and snow passed through and over them. Great rock precipices staggered and fell down the sides of the mountains. Clouds gathered over the mountain summit at the call of the snow-goddess. Each cloud was gray with frozen moisture and the snows fell deep and fast on the mountain. Farther and farther down the sides the snow mantle unfolded until it dropped on the very fountains of fire. The lava chilled and hardened and choked the flowing, burning rivers.

Pele's servants became her enemies. The lava, becoming stone, filled up the holes out of which the red melted mass was trying to force itself. Checked and chilled, the lava streams were beaten back into the depths of Mauna Loa and Kilauea. The fire-rivers, already rushing to the sea, were narrowed and driven downward so rapidly that they leaped out from the land, becoming immediately the prey of the remorseless ocean. [page 20]

Thus the ragged mass of Laupahoehoe was formed, and the great ledge of the arch of Onomea, and the different sharp and torn lavas in the edge of the sea which mark the various eruptions of centuries past.

Poliahu in legendary battles has met Pele many times. She has kept the upper part of the mountain desolate under her mantle of snow and ice, but down toward the sea most fertile and luxuriant valleys and hillside slopes attest the gifts of the goddess to the beauty of the island and the welfare of men.

Out of Mauna Loa, Pele has stepped forth again and again, and has hurled eruptions of mighty force and great extent against the maiden of the snow-mantle, but the natives say that in this battle Pele has been and always will be defeated. Pele's kingdom has been limited to the southern half of the island of Hawaii, while the snow-maidens rule the territory to the north.

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July 28, 1964

**Dr. George P. Woollard, Director, Institute of Geophysics, University of Hawaii;
to The Honorable John A. Burns, Governor, State of Hawaii
(Regarding Proposed Management Measures and Restricted Access to
the Summit of Mauna Kea):**

The day after the dedication of the road to the crest of Mauna Kea, Dr. Gerard Kuiper met with Professor Walter Steiger, Professor Jerry Weinberg and myself to discuss the following:

How best to protect the Mauna Kea summit area against problems such as those that have plagued the Mt. Haleakala summit area as an observatory site

How best to get a first-rate observatory established at Mauna Kea

What sort of operations are compatible on Mauna Kea

What sort of programs should be located at Mauna Kea and what sort at Haleakala

In regard to Item (1), it was our unanimous opinion that the entire Mauna Kea summit area above the 12,000 ft. level should be made a restricted area and placed under the jurisdiction of a permanent board that you would appoint representing both the State's needs for scientific activity and conservation of natural resources. Although it was not discussed, I personally would recommend that the same board control the summit area of Mauna Loa as it is probable that both Mauna Kea and Mauna Loa in the future will have considerable scientific and conservation value to the State. For example, I can visualize the use of these two summits plus Mt. Haleakala in triangulation experiments for precisely studying on controlling the orbits of space ships or orbiting astronomical observatories.

This committee need not be large, but it should have representation from the University, conservation interests, federal scientific interests, local representation such as the Hilo Chamber of Commerce and, of course, legislative representation, as well as representation from your office.

In regard to Item (2), it was felt a joint proposal from Dr. Kuiper and myself to NASA submitted through the University of Hawaii would be the best way to try to get a permanent observatory established. This request would include a 60-inch telescope to capitalize to the utmost on the unique capabilities of Mauna Kea. We, however, are handicapped by not having an astronomer on our staff and, although I have added two

people in astrogeophysics out of our new positions of six approved by the Legislature, we can not allocate another one in this field for another year. With nine disciplines of geophysics needing to be developed, I am hung on the horns of a dilemma as to what should be pushed in terms of developing scientific balance, available research support and significance to the economy of the State. This year I am pushing oceanography and astrogeophysics with some help to solid earth geophysics.

In regard to Item (3), it was felt that the mistakes on Mt. Haleakala should not be repeated. There should be no TV, radar or radio installations, and although it was felt that the road should be open to the public, there should be restrictions on night use above the 12,000 ft. level, as car lights could seriously interfere with operations.

In regard to Item (4), it was felt that only those experiments requiring the extraordinary capabilities of Mauna Kea should be located there. These would be experiments requiring minimum water vapor in the atmosphere such as infrared studies, emission spectra and planetary photography. All others could be done equally well at Haleakala and under much easier environmental conditions. This last involves not only temperature, snow, ice, altitude effects and wind force on Mauna Kea, but also the fact that it will not be feasible to establish families much closer than Hilo because of the lack of schools, stores, etc., and the long drive from Hilo to the summit.

I believe that this covers our discussions with Dr. Kuiper, but if you have any questions, please do not hesitate to call on me. [HSA Gov 13-47]

December 1964

Proposal for the Design, Construction, and Installation of a 60-Inch Telescope on Mauna Kea, Hawaii

(Describing the proposed Telescope Project on Mauna Kea, and History of Research on Mauna Kea as an Astronomy Site in 1962-1964):

1. Introduction and Summary

This application for the construction of a 60-inch telescope for a high-altitude observatory on Mauna Kea, Hawaii, follows a test program directed by Dr. G.P. Kuiper which started in October 1962 on Haleakala, Maui, under the sponsorship of ARPA and NASA. The program was continued under NASA sponsorship on Mauna Kea (el. 13,800 ft.) after the construction of a road to the summit by the State of Hawaii, requested in a personal visit to Governor Burns, January 1964, and completed in May 1964. Under the Mauna Kea program a 12-foot dome, housing a 12 ½ inch telescope, was erected on one of the summit peaks (el. 13,630 ft.) in May 1964 and a regular test program was started June 1, 1964. The observatory and Mauna Kea road were dedicated on July 20, 1964, with Governor Burns; Mme. Hale, Chairman of the County Board of Hawaii; Mr. Stanley Hara, Chairman of the State Finance Committee; Dr. G.P. Woollard, Director of the Geophysical Institute of the University of Hawaii; and Dr. Kuiper making formal presentations.

The results of the test program have been extraordinary. No other site on earth has been found which compare with it in quality according to the three principal criteria of excellence of an astronomical observatory site.

A large fraction of absolutely clear (photometric) skies at night;
A large fraction of excellent seeing conditions (sharp images); and
Very low water-vapor content in the overlying atmosphere as determined spectroscopically.

To this may be added other exceptional advantages such as location in the tropics (93% of sky wall observable), location 3 hours west in longitude from principal U.S. observatories, complete freedom from industrial atmospheric contamination, with the trade winds being from the northeast, nearly opposite from the direction of Honolulu; favorable conditions for personal safety of observers, such as health; etc. These various aspects are developed more fully in Section 2 below.

A very important long-range aspect is that Mauna Kea is within the borders of the U.S. We know from personal experience the complexities of shipping equipment across international boundaries, of currency devaluation, and questions of health, language, etc. [page 1]

The Director of the Kitt Peak National Observatory, Dr. M.U. Mayall, has authorized us to state that he regards Mauna Kea as a potential site for a very large telescope ("X-inch") frequently discussed as the ultimate goal during this century for ground-based astronomy. Because of the large cost of a very large telescope (presumably in excess of \$100,000,000) a site can only qualify for the X-inch if it has proven its worth with telescopes of smaller aperture.

In selecting the design for the proposed telescope, a decision was needed regarding its aperture and its detailed requirements. The following are the main considerations governing this proposal:

- (1) A 60-inch telescope, with accessories, can be produced in two to three years, an 84-inch telescope in about five years. Because of the urgency of the programs to be carried out on Mauna Kea the more modest program is definitely preferred.
- (2) The very high altitude of Mauna Kea, one of its great merits, implies certain discomforts for the observers which, however, can be largely overcome by the use of the coude focus which allows the air to be enriched in oxygen (not pressurized, which would entail more difficult and unnecessary technical complications).

Because of these two considerations the design adopted in this proposal is that of the Kitt Peak National Observatory design for the Chile 60-inch telescope which has a coude installation (the 60-inch Catalina telescope does not). The Director of the Kitt Peak National Observatory has stated that he will make available, without charge, the full design drawings of the Chile telescope.

As is stated in greater detail in Section 3, Vice President Hiatt of the University of Hawaii, stated to Dr. Harold Johnson in a conference at that University of November 30, 1964, also attended by Mr. Stanley Hara and Mr. Akiyama (Executive Secretary of the Chamber of Commerce of Hilo), that the University Administration is prepared to submit to the Hawaii State Legislature budget requests for the dome and building on Mauna Kea, estimated to require roughly \$300,000; and supporting buildings at Hale Pohaku, the base camp at the foot of the summit area (el. 9,200 ft.), and Hilo, the port of entry and site of a two-year branch of the University of Hawaii; and Mr. Hara agreed during this conference to introduce the necessary legislation. [page 2]

Because of Dr. Johnson's experience with the development of Site II of the Catalina Station and the scientific programs carried out there and also his strong interests to extend these programs to the Southern Hemisphere under the superior conditions of Mauna Kea, it is proposed that he be the principal investigator; with Dr. Kuiper, who has

directed the test program since 1962, and who wishes to extend his lunar and planetary observation program, acting as coinvestigator. It is believed that direct participation with the Department of Astronomy at the University of Hawaii can be effected. We shall also welcome cooperation with other universities interested in the site and will agree to a sharing of observing time after the installation is complete.

Dr. Kuiper has consulted with Dr. Jerome Spar, Director of Research of the U.S. Weather Bureau, about their interest in Mauna Kea. Dr. Spar has stated that he wishes to transfer the Mauna Loa Weather Bureau Observatory (11,100 ft.) to Mauna Kea (13,800 ft.) as soon as possible and is prepared to add a program in atmospheric geochemistry which would be important to Dr. Kuiper's planetary program. It might be pointed out that during the past 2-year test period in Hawaii, the U.S. Weather Bureau, through its Honolulu and Hilo offices, has given much valuable advice and assistance. Attention is further called to the personal interest of Governor Burns in these programs, as may be seen from the two letters from the Governor to Dr. Kuiper, dated October 9 and November 24, 1964, of which photo copies are attached to this application.

The Mauna Kea Observatory would be the highest observatory not merely in the United States but in the world. It would be the first one to be "pressurized" or "oxygen-enriched," with the auxiliary equipment operated by remote control. The types of indirect instrumentation required can serve as prototypes for more difficult space operations to follow. The tropical latitude of the site is a tremendous advantage for lunar and planetary observations because they can be made when the objects are near the zenith. The nearest oppositions of Mars occur when the planet has a declination around -20 degrees, a serious handicap when observations are to be made from the mainland United States. Certain lunar programs also require observations when the moon has a southern latitude (selenodesy, using opposite librations). Similar problems exist with respect to the ring and satellite systems of the Planet Saturn; and the cloud belts of Venus. [page 3]

The proposed telescope is highly automated in setting, guiding and data acquisition. This is called for because of the high altitude of the site and the need for the observer to stay in an oxygen-enriched room if he is to be alert and not to endanger his health. The coude installation further allows the use of large recording equipment and accessories (counters, etc.). The techniques to be used will be intermediate between those common in ground-based astronomy and needed in space research. They will be adaptable to balloon astronomy and programs such as OAO. Because of this Laboratory's existing programs in these related fields the staff has a strong interest in such development and has already considerable experience with remote control balloon instrumentation.

The 60-inch telescope for the Catalina Station and its dome are scheduled for completion January 10, 1965. The optics for this telescope were produced in our optical shop under the direction of Mr. Robert Waland, formerly from St. Andrews University, Scotland, one of the most competent contemporary opticians. It is proposed that the optics of the Mauna Kea telescope also be produced in house which will affect very substantial savings and ensure top quality.

2. The Hawaii Test Program

During the summer of 1962 Dr. Kuiper was approached by the ARPA-University of Michigan group (Dr. Zirkind; Prof. Boggess) on whether the Lunar and Planetary Laboratory was able and interested to provide an observer and a test telescope to examine the astronomical conditions on Haleakala, Maui (10,000 ft.). Having had a long-time interest in the unexplored astronomical potential of the high mountains in Hawaii, he accepted this responsibility on condition that the test program be sponsored jointly by

NASA (Office of Lunar and Planetary Sciences), to stress the Scientific rather than the service interests of this Laboratory. This program was agreed to by the Director of Lunar and Planetary Science of NASA and made possible by the generous assistance and cooperation of Dr. Walter Steiger, Director of the Haleakala Observatory. Dr. Steiger made available the newly constructed 16-foot dome that was to house the coronagraph beginning September 1963, and provided lodging for the Arizona observers on Haleakala and the university dormitory at Waiakea (4,000 ft.). Our observer was Mr. Alike Herring, a man of over 20 years of astronomical observing experience and an expert optician. Dr. Kuiper joined Mr. Herring during two of his three runs (Oct-Dec 1962; April-June 1963; Aug 1963) [page 4] for about one week each. He verified that Mr. Herring's seeing scale (0 very poor, 3 fair, 5 good, 7 excellent, 9-10 entirely perfect for many minutes without the slightest interruption) was stable and in agreement with the customary scale used by experienced double-star and planetary observers. The telescope used was Mr. Herring's personal property. It has superb optics showing for a bright star the OV36 stellar diffraction disk surrounded by at least 6 diffraction rings. These rings are extremely sensitive to seeing and give a sharp measure of it. The Haleakala tests showed that while the best conditions were truly superb (seeing 9), they occurred only during a single two-week period in October 1962. Often the trade wind would blow fog, accumulated in the great crater below at around 8,000 ft., over the rim causing the most irregular conditions of seeing and humidity. It was apparent that the much-higher mountains of Hawaii Island would be far better, at least at night.

The first tests on Hawaii Island was made in June 1963 from the Mauna Loa Weather Bureau Observatory, by invitation of the Weather Bureau, with a 6-inch telescope for this purpose shipped in from the mainland by Mr. Saul Price, Chief Scientist, Honolulu Office, U.S. Weather Bureau. He also arranged for a chartered overflight of the large mountains.

It was not possible to implement the desire to test on Mauna Kea, which was inaccessible, except on foot, until the State Government of Hawaii, supported the NASA-Arizona program with the construction of a 14-foot-wide graded and oiled access road to span the last 6 miles to the summit. Governor Burns graciously agreed during Dr. Kuiper's visit in January 1964 to have this road constructed and he honored us with his presence at the dedication of observatory and road on July 20, 1964. The road construction was completed about May 1, 1964, with Dr. Kuiper personally directing the grading of the upper part of the road and the observatory terrace.

*The site selected was not the summit (13,798 ft.) but **Puu Poliahu** (13,631 ft.) because of its steepness and isolation. However, to view of the steep gradient in the water vapor content and the large area needed for future developments it is proposed that the Mauna Kea Observatory be constructed on the real summit.*

The Mauna Kea test observatory was completed about June 1, 1964. The 12-foot dome is an Ash Dome and the telescope a Cave Telescope, but the optics used was Mr. Herring's excellent mirror. The test program has again been conducted [page 5] by Mr. Herring, assisted by Mr. William Hartmann, for a period in July 1964, and by Dr. Kuiper during short visits in July and October 1964.

The U.S. Weather Bureau installed near the Observatory an anemometer, a maximum and minimum thermometer, and a self-recording thermo-hydrograph. Typical night temperatures in summer are 24 deg. – 36 deg.; typical relative humidities 10-15%, typical wind velocities 0-10 mph and 20-35 mph in almost equal frequencies, with much higher winds (up to 70-80 mph) not experienced but certainly present occasionally on the basis of the Mauna Loa records.

It does not rain on Mauna Kea, but there is occasional snowfall in winter (Mauna Kea = White Mt.), and occasional fog in summer. The weather at night is about 60-70% photometric, as compared to 22% at McDonald Observatory and 33-35% at the Arizona Observatories (figures by Dr. H. Johnson). Gcirrus occurs about 25% of the time, often very light, not that 90% of the nights or more will allow spectroscopic observation. Cloudy nights account for less than 5% based on Weather Bureau data since 1958. The average seeing was found to be 6-6.5 as compared to 5 for the Catalina Station in summer and fall, 3-4 in winter, and 5 during test periods of five nights each at Cerro Tololo (7,300 ft.) and La Penieta (10,000 ft.), Chile (both during "good" summer weather). Seeing 7 and above occurs often on Mauna Kea.

The atmosphere pressure at Puu Poliahu is 590 mb; the transparency is fantastic to any one familiar with U.S. continental conditions. At present the limit is the Bali volcanic dust at very high altitude (about 70,000 ft.), visible from Mauna Kea much more clearly than elsewhere because of the clear lower atmosphere. This dust will probably settle in a year or two, as did the dust of Krakatao 1883-1885.

A most important consideration is that Mauna Kea will remain in pure air for many decades to come because of the favorable airflow pattern over the ocean; whereas the continental observatories are finding in steadily thickening atmosphere. Photometry and spectroscopy will be possible from Mauna Kea down to 60°S declination, which covers 93% of the entire sky. No artificial lights trouble the site and aurorae are absent at the latitude, 19° 49' N.

The seismic stability of Mauna Kea at 13,200 ft. level, between the summit cones, is the best in the Hawaiian Islands, according to tests directed by Dr. G.P. Woollard. The cinder cones themselves are composed [page 6] of rather loose material but no different from that on which the 60-inch astronomic telescope of the US Naval Observatory is built near Flagstaff. The foundations will have to be made adequate. Mauna Kea is an extinct volcano, unlike Mauna Loa, with no activity having occurred since the Pleistocene. Dr. Kuiper has reviewed the safety of this mountain with Dr. Gordon McDonald, chief volcanologist of the Islands, at the University of Hawaii, who sees no cause for concern on Mauna Kea.

3. The Proposed Research Telescope and Auxiliaries.

The exceptional observing conditions found on Mauna Kea make it urgent that the site be utilized for astronomical observations in support of the space program. The excellent seeing will make possible higher resolution, visual, photographic and spectroscopic, in lunar and planetary studies. Such higher resolution is essential if we are to obtain more information about the surface of the moon and planets. Because of the high percentage of "photometric" weather and the small amount of precipitable water, Mauna Kea should be the best known observing site for astronomical photometry and spectrometry, in visible, infrared and millimeter wavelengths.

As a first step in the development of the Mauna Kea observatory site, we propose to build a 60-inch telescope, equipped with attachments for making photometric, polarimetric and spectrometric observations over the range of wavelengths from 0.3 μ to 13 μ ; later extensions to 20 μ , 300 μ and 1 mm may be made. This instrumentation would be suitable for observations of the moon, the planets and the stars. The optical quality of the telescope must be as high as it can be made, in order to take advantage, especially for lunar and planetary observations, of the superior image quality that we have observed on Mauna Kea. Visual and photographic observations would also be provided for.

The great altitude of the summit of Mauna Kea, 13,800 feet, and the resultant [page 7] difficulty of working effectively there, make it important that the installation be such that the observers work in a pressurized (or oxygen-enriched) somewhat-heated room. The telescope and auxiliary instruments must be designed for remote operation, similar to radio telescopes. The Kitt Peak National Observatory has available designs for 60-inch and 84-inch telescopes. The 60-inch telescope is intended for Chile, with the 84-inch has already been put into operation at Kitt Peak, Arizona. Both designs can be used for the remote, automatic operations necessary on Mauna Kea. According to Dr. N.U. Mayall, Director of Kitt Peak National Observatory, the time of duplicating the construction of the 60-inch would be about two years, while it would take five for an 84-inch. We have chosen to copy the 60-inch design, in order to minimize the time required to get into operation.

The auxiliary instruments which we propose to construct would be based upon existing devices already developed and in use at the Lunar and Planetary Laboratory. Our present instruments are not suitable for Mauna Kea because they are not designed for remote operation.

The 60-inch AURA telescope design includes the coude focus, and we propose to carry out observations from the oxygen-enriched coude room. We do not at this time propose a coude spectrograph, although space for one will be provided. Thus, observations would be made either at the coude focus or, remotely, at the cassegrain focus.

It is now well-known that in the far infrared the variable "sky" background seriously limits the performance of photometric and spectrometric operations. The recent successful resolution of this problem by Low and Johnson has depended upon the addition to the LPL 28-inch telescope of an offset finder and a telescope "wobbler." The offset finder can be offset, from the pointing direction of the main telescope, by up to $+1^\circ$ and is used for finding objects too faint [page 8] for visual observation, and for offset guiding during observation with the main telescope. The telescope "wobbler" moves the telescope back and forth, star to sky and return, in synchronism with the integration cycle of the automatic photometer and data recorder. We propose to construct, as part of the photometers and spectrometers, as offset devices that can be remotely controlled from the coude-room. This device would be similar to that described by Johnson in Basic Astronomical Data (University of Chicago Press, 1963); it has been quite successful for offset finding and guiding. In addition to the adaptations of this design for remote offset operation and readout, we will substitute for the eyepiece an image orthicon TV-relay system. According to Dr. Livingston of Kitt Peak Observatory, it should be possible to see 18th mag. Stars with such a device. The slow motion controls of the telescope will be modified slightly to make the telescope "wobble" in the manner that has been successful with the 28-inch.

The budget for the construction, installation and testing of the proposed 60-inch telescope and auxiliary operation is given in Sec. 4. It does not provide for a dome and building to house the telescope, nor does it include necessary additional laboratory and office buildings at the lower altitudes. However, during a recent meeting, Vice President Hiatt of the University of Hawaii indicated that when the National Aeronautics and Space Administration decides to go ahead with this part of the project, the University of Hawaii will take steps to request from the Hawaii Legislature the funds for the necessary supporting facilities, such as dome and building for the 60-inch, laboratory and office building, roads, power lines, etc. The Hon. Stanley Hara, Chairman of the Finance Committee of the Hawaii House of Representatives, has indicated his belief that such requests by the University of Hawaii will receive favorable action by the Hawaii Legislature... [page 9; HSA Gov 13-47]

January 5, 1965

**Dr. George P. Woollard, Director, Institute of Geophysics, University of Hawaii;
to Major General Edmond H. Leavey, U.S.A. (Ret.), Chairman,
Governor's Advisory Committee on Science and Technology,
Department of Planning and Economic Development
(Regarding Determination of Roles of the University of Hawaii, NASA, Dr. Kuiper,
and others in the Development of the Mauna Kea Observatory; and Plans for
Lease of the Summit to the University of Hawaii):**

As you know, there has been considerable discussion about getting a major telescope installation on Mauna Kea, particularly since Professor Kuiper of the University of Arizona started conducting a site survey in Hawaii for the National Aeronautical and Space Administration in the hope that there would be a superior low latitude location in Hawaii for observing the transit of MARS in 1967. Professor Kuiper's recommendation to NASA on the basis of his studies to date with a small telescope is that Mauna Kea is not only the best site in Hawaii, but also probably the best site in the world for low latitude planetary observations.

NASA is now anxious to go ahead on a telescope on Mauna Kea, but has not reached a decision as to how to best handle the installation and its operation. NASA itself does not have an in-house operational group for this type of project, and has to implement its research program through grants and contracts. In the present case, the contract can be made directly with the University of Hawaii; the University of Hawaii in collaboration with another university; or directly with another university. We are submitting a proposal directly from the University, but also have been identified as a collaborating institution by both Harvard College and the University of Arizona in proposals that have been submitted by these two institutions. The situation is therefore a bit confused, and I think it wise to give you and the Governor's Committee both the background and outlook for the future at this time.

Professor Kuiper last summer approached me on the basis of the University of Hawaii submitting a proposal in collaboration with the University of Arizona, his institution, for setting up and operating a NASA supported telescope on Mauna Kea. As at the time there was no one on the staff of the University of Hawaii who had a background in planetary astronomy, and as I was reluctant to take on the housekeeping operations for such an installation without our taking part in the scientific program, I agreed to collaborate with him on the basis that he would help us find a competent planetary astronomer so that there would be scientific collaboration.

Since that time we have still not been able to find a top-level planetary astronomer, but have added significantly to our staff for work in other phases of astronomy. One of the new men who is now in charge of our astronomical program is Dr. John Jefferies. He was formerly at the National Bureau of Standards High Altitude Observatory at Boulder, Colorado, and is a recognized leader in solar physics and astronomy. In all, there are now nineteen persons in the astronomy-aeronomy group at the Institute, and our program at the Haleakala Observatory in solar physics, zodiacal light and ionization effects is one of the best in these aspects of astronomy.

In October Dr. Jefferies and I had another conference with Professor Kuiper, and again we reiterated our willingness to work with him on the basis of scientific collaboration, but not on the basis of housekeeping. Professor Kuiper appreciated our viewpoint, and in fact, stated that he would not have us even consider any other basis of collaboration.

I stress this background of amicable relations with Professor Kuiper, who incidentally is a personal friend of mine of some 15 years' standing, because it has come to my attention

that “rumor” has it that the University has been dragging its feet on cooperating with Professor Kuiper on the Mauna Kea project and even trying to sabotage it. Nothing can be further from the truth. Any reluctance on my part in collaborating with Professor Kuiper has been only in terms of our not being a scientific partner, and even here I have proceeded on the assumption that this would be resolved as evidenced by: (a) the seismic noise level study I had made of the top of Mauna Kea by our seismologists and the U.S. Coast and Geodetic Survey and which I forwarded to Professor Kuiper for inclusion with his test telescope observations in his report to NASA, and (b) the presentation I made to the U.S. Wildlife and Conservation group on the compatibility of observatory and conservation interests on Mauna Kea.

In November things were brought to a head when Dr. Kuiper announced that he had funds for a 60-inch telescope on Mauna Kea. As we had seen no proposal to NASA from Professor Kuiper for such a telescope, and as we were naturally curious as to what role we had been cast in his proposal, Vice-President Hiatt, who happened to be in Washington, made a point of visiting NASA to find out what commitment, if any, had been made in the name of the University of Hawaii. He found no funds had been given to Professor Kuiper for this telescope, although a tentative decision had been made to support a telescope on Mauna Kea. Professor Hiatt also found there was some aversion to have Professor Kuiper associated with the Mauna Kea project despite the fact that he had been commissioned by NASA to carry out the preliminary test observations. This aversion was not related to Professor Kuiper’s competence as an astronomer, but rather to the fact that since his present NASA supported program is so large, it was felt that he could not do justice to an additional program on Mauna Kea. It was suggested that we might consider some other partner, and NASA further offered to contact several astronomers who it was felt might make a more satisfactory partner than Professor Kuiper.

I wrote Professor Kuiper as to the status of things, and he was naturally upset and wrote the Governor implying that Professor Hiatt had not talked to a responsible official of NASA.

The only way to settle this was to ask for a conference at NASA to go over the whole Mauna Kea situation. Homer Newell, NASA Deputy Director for Science, is a personal friend of mine, and he arranged for all the cognizant officials to meet with Professor Hiatt, Dr. Jefferies and myself on December 10 in Washington. Newell was also able to sit in the latter part of the meeting which was a two-hour conference. It is possibly significant in view of Professor Kuiper’s letter to the Governor that he was not invited to this meeting, although Professor Menzel of Harvard was. All of the points made earlier concerning Professor Kuiper were reiterated, namely he is over-extended. Our position in insisting on scientific collaboration was discussed and endorsed as being both reasonable and sensible, and Professor Menzel presented the basis on which Harvard might collaborate with the University of Hawaii. It was also recognized that our problem in finding an A-1 man in planetary astronomy might well be quickly resolved once word gets out that there would be a major telescope installation on Mauna Kea. Up to this meeting, there was no definite assurance that there would be a telescope on Mauna Kea, and we had nothing really to offer a good man.

Since this meeting, we have received a draft of Professor Menzel’s proposal for a joint operation which allocates the University of Hawaii the role of a housekeeping agency. The Arizona proposal at least hopes that we can give half positions to people on their staff, so that it would be at least officially a joint scientific operation.

Professor Hiatt, Dr. Jefferies and myself had a joint telephone conversation with Dr. Liddel of NASA on December 20, and the upshot was that we were encouraged to put in a proposal of our own for an 84-inch telescope and a Coude interferometer. Dr. Jefferies is now drafting this proposal.

All is not quite clear sailing as we are going to have to depend on the recommendations of an advisory panel of experts such as Professor Kuiper in coming up with the design, and sub-contract the construction. In addition, NASA can not underwrite the cost of the observatory, the paving of a road, bringing up power, or building support facilities as a dormitory at the 10,000 ft. level, or a laboratory on the Hilo Campus of the University. The most we can expect from NASA is the equipment, the foundation for the mount and the dome, and there is some question on the latter. The NASA contribution will be about \$2.5 million toward the installation and about \$0.3 million towards an annual operation budget. The State will have to put in about \$1.7 million or perhaps more, and also give me at least three positions which I do not have at present. *A lease for the entire mountain top above the 12,500 ft. level will also be required from the Board of Land and Natural Resources if this sort of investment is to be justified. We can't gamble on the kind of problems that have developed on Haleakala because of not having the area under our control. I visualize ultimately several observatories on Mauna Kea, but they will have to be compatible with each other, and although the present Land Board is sympathetic and doing all it can to protect the State's natural resources, a change in membership could conceivably wreck the usefulness of the entire project.*

Last week (December 30) I had an opportunity to discuss our plan to submit an independent proposal to NASA with Professor Kuiper in Seattle. He was naturally not too happy about not having a more active role in the development, but in a sense relieved that we were not going to throw in with Harvard. He is anxious to get his 28-inch telescope on Mauna Kea as soon as possible as part of the observatory complex, and is also willing to serve as a consultant on the new telescope which he hopes to be able to use as a visiting scientist.

Our present plans are to: (a) submit a proposal for an 84-inch telescope to NASA; (b) ask NASA for support for two test telescopes in carrying out a site study and for seismic depth measurements to see if any of the cinder cones extending above the 13,500 ft. level can be utilized for a major telescope; (c) if successful, ask the Land Board for a lease of the crest area above the 12,500 ft. level; (d) ask for State support for needed positions, the construction of the observatory and auxiliary facilities, paving of a 12 ft. road, and bringing in power. We shall try to get at least matching funds from NASA and NSF for the construction, but preliminary inquiries are not very encouraging. [HSA Gov 13-47]

February 16, 1965

**Homer E. Newell, Associate Administrator for Space Science and Applications;
to Dr. Robert W. Hiatt, Vice President for Academic University of Hawaii
(Reporting on Developing Agreement between the University of Hawaii and NASA
for Development of the First Observatory on Mauna Kea):**

...It was certainly good to see you and George Woollard again and to continue our discussions of common interest in furthering the observation of the planets. I felt that the meeting was very useful, and I know that all of the NASA people appreciated the very frank discussion that took place. I certainly hope that you felt the same.

It seems to me that a number of important points came out very clearly in the discussion. First of all, there seemed to be no question at all on the part of anyone about the value of moving forward to exploit the exciting potentialities of the Mauna Kea site for astronomical purposes. In this same connection there was agreement around the table that the NASA

interest in strengthening ground based planetary research in support of our Voyager program might be a useful means for initiating the use of the Mauna Kea site.

Another point was clearly made, that the proper development of the Mauna Kea site would require a considerable amount of time. About three years would be a minimum time, considering the necessity to be both wise in the planning of the use of the facility under discussion and thorough in the design and preparation work.

It was also clear that the mutuality of interest between NASA and the State and University of Hawaii was a very basic consideration to the plans being discussed. On NASA's part, it will be important to have from Hawaii assurance of intention to make a substantial investment in and commitment to the proposed astronomical facility. On Hawaii's part, there is need to have assistance from an agency like NASA, and a reasonable commitment to such assistance. It seemed clear from the discussion that this particular point may be a knotty one to come to grips with. Nevertheless, from NASA's point of view, I think that it is important to emphasize that we will want genuine assurances that Hawaii will make substantial investments in the enterprise.

There was, I believe, unanimous agreement that to establish a strong and competent committee to advise the University of Hawaii on the planning for and use of this facility was a good concept. At the same time, there was equally strong feeling that such an advisory committee could not do the job of the detailed planning and shepherding of the project that would be necessary to carry it through to successful completion. Furthermore, the astronomers felt very strongly that a competent director is required in the very earliest stages of planning and construction, and that it was absolutely essential to bring such a director aboard before the firming up of the final proposal for the project. On reviewing this discussion, and on further consideration of NASA's interests, I feel that NASA must agree with this point of view.

We left the discussion, as I recall, with the two major action items. On our part, we were to bring Mr. Webb up to date on these discussions, and obtain his guidance. We have done this, as I conveyed to you in our phone conversation of today, and Mr. Webb is in agreement with the desirability of moving ahead along the general lines we have discussed. NASA's commitment to the project will, however, have to await our review of your specific proposal and our assessment of the total picture at that time.

On your part, you have the action of pulling together the advisory committee, seeking an appropriate director, and drafting the proposal that you wish to have considered by NASA.

My very best regards. I shall be looking forward to hearing from you in the very near future... [HSA Gov 13-47]

February 25, 1965

**Robert Hiatt, Vice President for Academic Affairs, University of Hawaii;
to Mr. Mitsuo Akiyama, Executive Secretary,
Hawaii Island Chamber of Commerce**

(Update on Agreements Between the University of Hawaii and NASA; it Being Decided that a more Long-term Approach to Development be Undertaken, Instead of the "Crash Program" originally Proposed by Dr. Gerard Kuiper):

This letter concerning the present status of the development of Mauna Kea as an astronomical observatory will bring you up to date on the subject.

Two meetings between University of Hawaii and NASA officials have been held for discussions relating to developments on Mauna Kea. Attached herewith is the most recent

communication from Dr. Homer Newell which followed our last meeting. You will note NASA's interest in moving ahead with the project, but at the same time there are some fundamental matters to be worked out both by us and by NASA.

Foremost among the problems which has now been settled was the nature of the development—a crash program or one for longer range. All concerned are now agreed that the crash program date for completion (the next opposition of Mars in 1967) is impossible to meet, and that we should now plan for longer range objectives, always keeping in mind that NASA must base its support on their mission—planetary research for the Voyager program.

I should interject here that Harvard College Observatory has submitted a proposal to NASA for support of the same type of program we envisage, but would need the same measure of support from the State of Hawaii as would we. Because we believe that State support should be related to our own State University interests, we feel that NASA has little alternative but to move along with us providing we can carry out the program. We shall ask the cooperation of both Harvard and Arizona, as well as other centers. Dr. Kuiper was at the last NASA meeting and assures us of his continuing interest and cooperation, and will be a member of the consulting committee mentioned below.

As a result of our last NASA meeting we decided to invite several leading astronomers to consult with us (see p. 2 of Newell's letter) and to assist us with two main problems. First, what size and type of instrument should be the first installed on Mauna Kea? A conclusive answer to this question may not be possible until further intensive seeing studies and seismographic and meteorological measurements are conducted on Mauna Kea. The second question which they can help to decide is the nature of professional staffing we need. We do not have men on our staff with extensive experience with large telescopes, but we feel that Dr. Jefferies, a most competent solar physicist on our faculty and in charge of our Haleakala Observatory and astronomy in the Hawaii Institute of Geophysics, is of sufficient stature to direct this expanded program, even though we will want to add a couple of astronomers, perhaps with some lunar and planetary experience. Dr. Jefferies will meet with this committee of consultants and can demonstrate to them his ideas and capabilities. NASA will certainly follow the advice of the committee.

We hope to convene this committee at Tucson, Arizona at our expense in the latter part of March. At this time our proposal to NASA will be completed, and with the backing of the committee NASA will almost certainly approve our program.

You will note that NASA anticipates a substantial State commitment which includes a paved roadway, suitable observatory building, power supply and water supply. Additionally living quarters, either trailers or houses, will have to be provided at about the 9,000-10,000 foot level, with some supporting offices and work rooms on the Hilo Campus. Whether or not federal funds for highway construction might be made available I don't know. Perhaps it can be shown that the opening up of the top of Mauna Kea for space-age developments is in the national interest, and through some means or other federal aid can be gotten. It cannot be obtained through any of the usual granting agencies with whom we deal for research funds.

Our best estimates to cover the road, power, water, buildings, etc. is about \$2 million. This wouldn't all have to be appropriated in one year, and could most likely be spread over a three-year period. We do not propose to take this matter before the Governor or the Legislature until we have had the meeting of the consultants, and are assured of the size of the program and intentions of NASA. My personal belief is that should the State make such an investment Mauna Kea will have a sizeable cluster of observatories within ten

years, and may very well become the major astronomical center in the world, if all that we believe to be true now proves to be so.

With best regards... [HSA Gov 13-47]

July 2, 1965

**Richard L. Callaghan, Assistant Administrator for Legislative Affairs,
National Aeronautics and Space Administration;
to Honorable John A. Burns Governor of Hawaii**

(Notification that Funding from NASA for Development on Mauna Kea had been Obtained):

...The National Aeronautics and Space Administration yesterday signed a contract with the University of Hawaii, Research Corporation in the amount of \$475,000 for design, development, fabrication and installation of an 84 inch telescope suitable for lunar, planetary and stellar observations. I thought you would like a few further details inasmuch as the Hawaiian congressional delegation has shown much interest in this project over this past year.

The sum of \$475,000 represents expenditures for the first year and it is expected that over a three year period the total government support will amount to \$2,995,000.

As of this writing the exact location has not been determined but site surveys are being conducted and a decision should be made soon.

If you have any further questions, I will be glad to keep you informed on this project...
[HSA Gov 13-47]

April 29, 1966

**Thomas H. Hamilton, President, University of Hawaii;
to The Honorable John A. Burns Governor of Hawaii**

(Regarding the Proposed Science Reserve Boundaries on Mauna Kea):

...You may recall that when the National Aeronautics and Space Administration approved the Mauna Kea site for the 84-inch telescope the approval was with the understanding that the University of Hawaii would obtain control of sufficient adjacent land on Mauna Kea to guarantee isolation of the site. In earlier correspondence I indicated that at the very minimum the top of the mountain above the 12,000-foot contour should be isolated for this installation. This contour is marked on the enclosed sketch with a heavy line. At other observatories throughout the world the isolated site encompasses a radius of approximately three miles from the telescope installation.

To comply with NASA's request I have asked that the proposed reserve area be drawn on a contour map. The attached sketch was prepared. Two sites are under intensive study now—marked A and B. The three-mile radius centered on A lies for the most part above the 11,000-foot contour. Site B is also a distinct possibility for the observatory, and it lies much too close to the 12,000-foot contour. [Figure 65]

Our astronomers believe the best solution is to use the three-mile radius from point A. The absolute minimum, we feel, would be the 12,000-foot contour to the east and the 11,400-foot contour to the west.

Establishment of the Mauna Kea Science Reserve (1967)

Pursuant to the agreement between the University of Hawaii and NASA, and the communications above, the State Surveyor conducted field work to identify the Mauna Kea Science Reserve Boundaries. Record of survey, C.S.F. 15,343, withdrawing a portion of Mauna Kea Forest Reserve for this purpose was filed on September 22, 1967 (*Figure 66*).

September 22, 1967

C.S.F. No. 15,343

Withdrawal

Portion of Mauna Kea Forest Reserve Governor's Proclamation dated June 5, 1909

Kaohe, Hamakua, Island of Hawaii, Hawaii

Being a portion of the Government Land of Kaohe

Beginning at a point on the south boundary of this parcel of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "SUMMIT 1955" being 12,325.95 feet South and 471.84 feet West, as shown on Government Survey Registered Map 2789, thence running by azimuths measured clockwise from True South:

1. Along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 135° 00' 18,667.62 feet;
2. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 225° 00' 18,667.62 feet;
3. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 281° 18' 04.6" 5173.56 feet;
4. 207° 49' 06.5" 841.83 feet along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;
5. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 1200.00 feet, the chord azimuth and distance being: 297° 49' 06.5" 2400.00 feet; [page 1]
6. 27° 49' 06.5" 841.83 feet along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;
7. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 306° 59' 47.4" 1824.16 feet;
8. 227° 29' 00.9" 2805.06 feet along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;
9. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 1500.00 feet, the chord azimuth and distance being: 317° 29' 00.9" 3000.00 feet;
10. 47° 29' 00.9" 2805.06 feet along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;

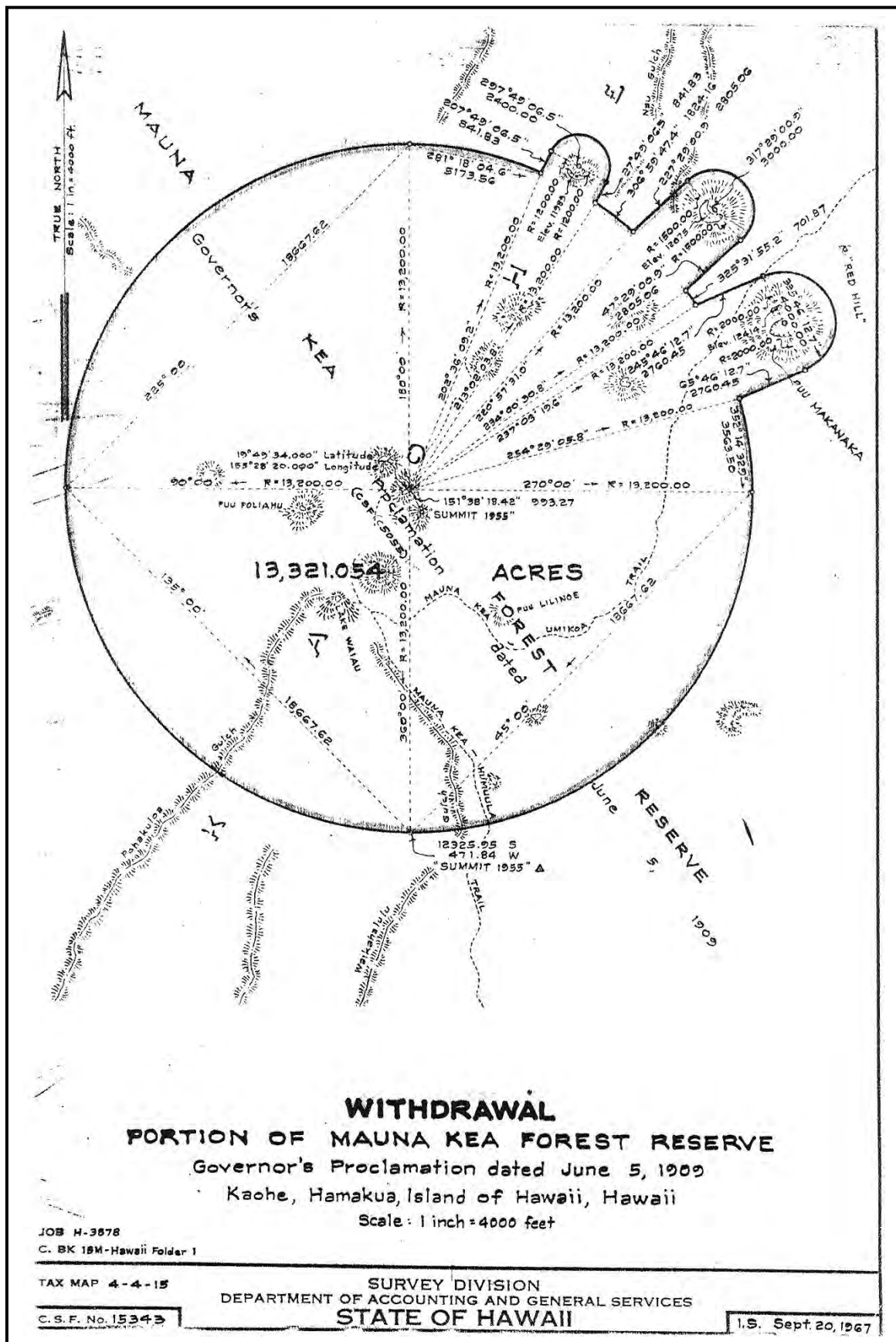


Figure 66. C.S.F. 15,343 - Survey of Mauna Kea Summit, Withdrawn from Mauna Kea Forest Reserve for the Mauna Kea Science Reserve (September 22, 1967)

11. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 325° 31' 55.2" 701.87 feet;
12. 245° 46' 12.7" 2760.45 feet along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;
13. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 2000.00 feet, the chord azimuth and distance being: 335° 46' 12.7" 4000.00 feet;
14. 65° 46' 12.7" 2760.45 feet along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;
15. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 352° 14' 32.9" 3563.50 feet; [page 2]
16. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 45° 00' 18,667.63 feet to the point of beginning and containing an Area of 13,321.054 Acres... [page 3; State Survey Division]

General Lease S-4191 Issued to the University of Hawaii (1968)

On June 21st, 1968, the Board of Land and Natural Resources granted State General Lease S-4191, to the University of Hawaii, with terms running from January 1, 1968 to December 31, 2033. The area of the lease generally conformed with the area depicted in *Figures 65 and 66*, and took in the entire summit of Mauna Kea, extending from about the 12,000 foot elevation to the summit. Item 4 – “Specified Use” required that:

“The land hereby leased shall be used by the Lessee as a scientific reserve being more specifically a buffer zone to prevent the intrusion of activities inimical to said scientific complex.”

It appears that this condition of the general lease, in part attempted to address the concerns raised by Dr. Kuiper in 1964, regarding limited development in order to protect the integrity of the mountain as an observatory platform. Today, the level of development in the reserve—particularly in the Pu‘u o Kūkahau‘ula, summit cluster of cones—has resulted in a concentration of facilities on the mountain peaks, that was not envisioned by the early planners, nor by the community of Hawai‘i County (see section below, titled “*Mauna Kea (1980): Community Voices–Agency Debates...*”).

A number of conditions regarding cultural and natural resources, protection of Mauna Kea's topography, and use of water from Waiau, were made a part of the lease. General Lease S-4191 reads:

June 21st, 1968

GENERAL LEASE NO. S-4191

THIS INDENTURE OF LEASE, made this 21st day of June, 1968, by and between the STATE OF HAWAII, by its Board of Land and Natural Resources, pursuant to the provisions of Section 103A-90(b), Revised Laws of Hawaii 1955, as amended, hereinafter referred to as the “LESSOR”, and the UNIVERSITY OF HAWAII, a body corporate, whose post office address is 2444 Dole Street, Honolulu, City and County of Honolulu, State of Hawaii, hereinafter referred to as the “LESSEE”,

WITNESSETH THAT:

FOR and in consideration of the mutual promises and agreements contained herein, the Lessor does hereby demise and lease unto the said Lessee and the said Lessee does hereby rent and lease from the Lessor, all of that certain parcel of land situate at Kaohe, Hamakua, County and Island of Hawaii, State of Hawaii, and more particularly described in Exhibit "A", hereto attached and made a part hereof.

TO HAVE AND TO HOLD, all and singular the said premises, herein mentioned and described, unto the said Lessee, for and during the term of sixty-five (65) years, to commence from the 1st day of January, 1968, and to terminate on the 31st day of December, 2033. [page 1]

RESERVING UNTO THE LESSOR THE FOLLOWING:

1. Water Rights. All surface and ground waters appurtenant to the demised premises, together with the right to enter and to capture, divert or impound water; provided, that the Lessor shall exercise such rights in such manner as not to interfere unreasonably with the Lessee's use of the demised premises; provided, further, that *the Lessee shall have the right to use the waters of Lake Waiau for any purpose necessary or incidental to the use permitted by this lease on the following conditions:*
 - a. *No drilling or disturbance of Lake Waiau's bottom, banks or areas adjacent thereto shall be permitted;*
 - b. *No activity shall be permitted which will result in the pollution of the waters of Lake Waiau;*
 - c. *Lessee shall not take or divert any of the waters arising from springs which furnish the water supply for Pōhakuloa. and no alterations to said springs shall be made by Lessee.*
2. Access. All rights to cross the demised premises for inspection or for any government purposes.
3. Hunting and Recreation Rights. All hunting and recreation rights on the demised lands, to be implemented pursuant to rules and regulations issued by said Board in discharging its fish and game or state parks responsibilities, provided, however, that such hunting and recreation activities shall be coordinated with the activities of the Lessee on the demised lands; and provided, further, that such hunting and recreation activities shall be limited to day-light hours only. [page 2]
4. Right to use Demised Lands. The right for itself, and its successors, lessees, grantees and permittees, to use any portion of the lands demised and the right to grant to others, rights and privileges affecting said land; provided, however, that, except as otherwise provided herein, no such use shall be permitted or rights and privileges granted affecting said lands, except upon mutual determination by the parties hereto that such use or grant will not unreasonably interfere with the Lessee's use of the demised premises; provided, further, that such agreement shall not be arbitrarily or capriciously withheld.

THE LESSEE, IN CONSIDERATION OF THE PREMISES, COVENANTS WITH THE LESSOR AS FOLLOWS:

1. Surrender. *The Lessee shall, at the expiration or sooner termination of this lease, peaceably and quietly surrender and deliver possession of the demised premises to the Lessor in good order and condition, reasonable wear and tear excepted.*
2. Maintenance of the Premises. *The Lessee shall keep the demised premises and improvements in a clean, sanitary and orderly condition.*
3. Waste. *The Lessee shall not make, permit or suffer, any waste, strip, spoil, nuisance or unlawful, improper or offensive use of the demised premises.*
4. Specified Use. *The land hereby leased shall be used by the Lessee as a scientific complex, including without limitation thereof an observatory, and as a scientific reserve being more specifically a buffer zone to prevent the intrusion of activities inimical to said scientific complex.*

Activities inimical to said scientific complex shall include light and dust interference to observatory operation [page 3] ~~during hours of darkness~~ and certain types of electronic installation on the demised lands, but shall not necessarily be limited to the foregoing.
5. Assignments. *The Lessee shall not sublease, sub-rent, assign or transfer this lease or any rights there under without the prior written approval of the Board of Land and Natural Resources.*
6. Improvements. *The Lessee shall have the right during the existence of this lease to construct and erect buildings, structures and other improvements upon the demised premises; provided, that plans for construction and plot plans of improvements shall be submitted to the Chairman of the Board of Land and Natural Resources for review and approval prior to commencement of construction. The improvements shall be and remain the property of the Lessee, and shall be removed or disposed of by the Lessee at the expiration or sooner termination of this lease; provided, that with the approval of the Chairman such improvements may be abandoned in place.* The Lessee shall, during the term of this lease, properly maintain, repair and keep all improvements in good condition.
7. Termination by the Lessee. *The Lessee may terminate this lease at any time by giving thirty (30) days' notice in writing to the Lessor.*
8. Termination by the Lessor. *In the event that (1) the Lessee fails to comply with any of the terms and conditions of this lease, or (2) the lessee abandons or fails to use the demised lands for the use specified under paragraph 4 of these covenants for a period of two years, the Lessor may terminate this lease by giving six months' notice in writing to the Lessee.*
9. Non-Discrimination. *The Lessee covenants that the use and enjoyment of the premises shall not be in support of any [page 4] policy which discriminates against anyone based upon race, creed, color or national origin.*
10. General Liability. *The Lessee shall at all times, with respect to the demised premises, use due care for safety, and the Lessee shall be liable for any loss, liability, claim or demand for property damage, personal injury or death arising out of any injury, death or damage on the demised premises caused by or resulting from any negligent activities, operations or omissions of the Lessee on or in connection with the demised premises, subject to the laws of the State of Hawaii governing such liability.*

11. Laws, Rules and Regulations, etc. The Lessee shall observe and comply with Regulation 4 of the Department of Land and Natural Resources and with all other laws, ordinances, rules and regulations of the federal, state, municipal or county governments affecting the demised lands or improvements.
12. Objects of Antiquity. *The Lessee shall not appropriate, damage, remove, excavate, disfigure, deface or destroy any object of antiquity, prehistoric ruin or monument of historical value.*
13. Undesirable Plants. In order to prevent the introduction of undesirable plant species in the area, the Lessee shall not plant any trees, shrubs, flowers or other plants in the leased area except those approved for such planting by the Chairman.

IN WITNESS WHEREOF, the STATE OF HAWAII, by its Board of Land and Natural Resources, has caused the seal of the Department of Land and Natural Resources to be hereunto affixed and these presents to be duly executed this 21st [page 5] day of June, 1968, and the UNIVERSITY OF HAWAII, by its Acting President and VP for Business Affairs has caused these presents to be duly executed this 12th day of June, 1968, effective as of the day and year first above written.

State of Hawaii
 (signed) Sunao Kido
 Acting Chairman and Member Board of Land and Natural Resources...

University of Hawaii
 (signed) Robert W. Hiatt
 Its Acting President... [page 6]

***EXHIBIT "A" [Figure 67]
 MAUNA KEA SCIENCE RESERVE***

Kaohe, Hamakua, Island of Hawaii, Hawaii

Being a portion of the Government Land of Kaohe. Beginning at a point on the south boundary of this parcel of land, the coordinates of said point of beginning referred to Government Survey Triangulation Station "SUMMIT 1955" being 12,325.95 feet South and 471.84 feet West, as shown on Government Survey Registered Map 2789, thence running by azimuths measured clockwise from True South:

1. Along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 135° 00' 18,667.62 feet;
2. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 225° 00' 18,667.62 feet;
3. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 281° 18' 04.6" 5173.56 feet;

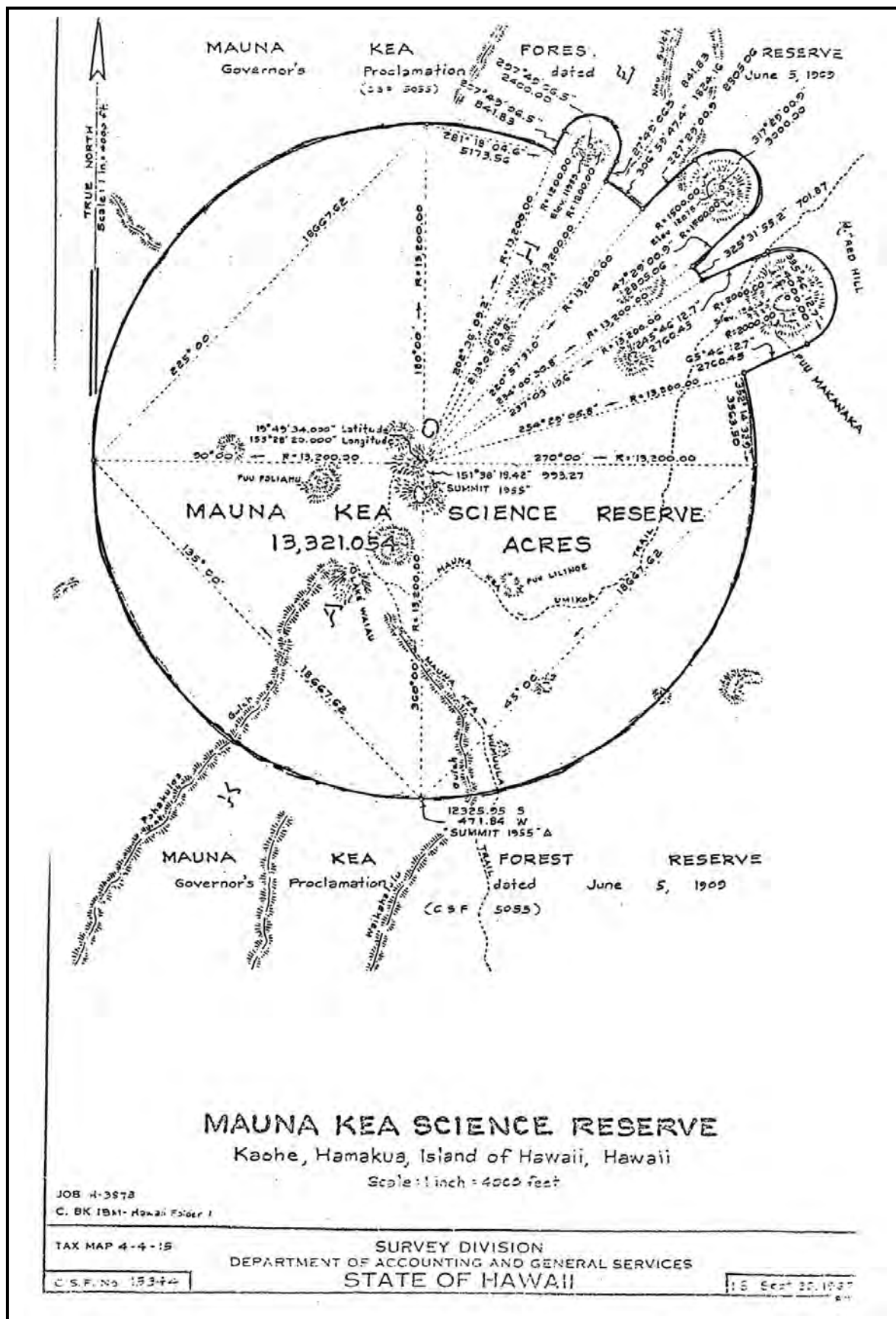


Figure 67. C.S.F. 15,344 – Mauna Kea Science Reserve (September 22, 1967)

4. 207° 49' 06.5" 841.83 feet along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;
5. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 1200.00 feet, the chord azimuth and distance being: 297° 49' 06.5" 2400.00 feet; [page 1]
6. 27° 49' 06.5" 841.83 feet along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;
7. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 306° 59' 47.4" 1824.16 feet;
8. 227° 29' 00.9" 2805.06 feet along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;
9. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 1500.00 feet, the chord azimuth and distance being: 317° 29' 00.9" 3000.00 feet;
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12. 245° 46' 12.7" 2760.45 feet along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;
13. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 2000.00 feet, the chord azimuth and distance being: 335° 46' 12.7" 4000.00 feet;
14. 65° 46' 12.7" 2760.45 feet along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909;
15. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 352° 14' 32.9" 3563.50 feet; [page 2]
16. Thence along the remainder of Mauna Kea Forest Reserve, Governor's Proclamation dated June 5, 1909, still on a curve to the right with a radius of 13,200.00 feet, the chord azimuth and distance being: 45° 00' 18,667.63 feet to the point of beginning and containing an Area of 13,321.054 Acres

EXCEPTING and RESERVING to the State of Hawaii and to all others entitled thereto, the Mauna Kea-Humuula and Mauna Kea-Umikoia Trails, and all other existing trails within the above-described parcel of land, together with rights of access over and across said trails.

ALSO, EXCEPTING and RESERVING to the State of Hawaii, its successors and assigns, the waters and all riparian and other rights in and to all the streams within the above-described parcel of land. [page 3; State Land Division]

In 1968, The University of Hawai'i broke ground, and began construction on it's permanent 88-inch telescope, marking the beginning of a multi-million dollar program in development on Mauna Kea (Figure 68).



Figure 68. University of Hawaii 88-inch Telescope Project Development, ca. July 1968
(Photo in Collection of University of Hawaii-Institute of Astronomy
(Copy Photo, KPA-N950)

Mauna Kea Ice Age Natural Area Reserve— Reduction of the Mauna Kea Science Reserve

While development of observatories was being undertaken in the Mauna Kea Science Reserve, concern for various facets of Mauna Kea's unique natural and cultural landscapes was being raised. It was feared that the unique ecosystems, geology—including glaciation—and cultural resources of Mauna Kea would suffer adversely from uncontrolled development and access on Mauna Kea. In the 1970s, the State of Hawai'i entered into a program of creating a Natural Area Reserve System, that would afford special localities with greater protection, and the opportunity for enhanced awareness by the public. Mauna Kea was one of the localities considered for such a designation. In May 1977, the Department of Land and Natural Resources published "The Mauna Kea Plan" (DLNR, 1977), the result of public hearings and the input of researchers, land managers, and concerned citizens. Subsequently, in August 1977, a formal proposal to establish the Mauna Kea Ice Age Natural Area

Reserve was made, and a draft Environmental Assessment issued by the Department of Land and Natural Resources. The assessment, including an overview of the varied resources of Mauna Kea and the proposed Natural Area Reserve (NAR), follows below:

Draft Environmental Assessment
State of Hawaii – Department of Land and Natural Resources
Natural Area Reserves System Commission
Proposed Mauna Kea Ice Age Natural Area Reserve (August 1977)

INTRODUCTION

The need to protect natural areas, as cultural and scientific assets, against intense population and economic pressures on a limited natural environment was recognized by the 1970 State Legislature in enacting Act 139 (Chapter 195, Hawaii Revised Statutes). The Act authorized the establishment of a Natural Area Reserves System to strengthen the existing conservation programs of preserves, sanctuaries, and refuges. The natural areas selected (primarily from State-owned land) would be irreplaceable examples of all aspects of the unique and varied, original Hawaiian ecological system.

Their undisturbed condition would be perpetuated by protective measures against any exploitive use or encroachment that would modify the dominance of natural processes. To achieve its objectives, the Act created an 11-member Commission, administratively within the Department of Land and Natural Resources (DLNR), to function as an advisory and policy recommending body to the Governor and the Board of DLNR. [page 1]

PROPOSED ACTION AND OBJECTIVES

The Natural Area Reserves System Commission (NARSC) is recommending that a 2,970 acre portion of the 80,000 acre Mauna Kea Forest Reserve (Tax Map No. 4-4-15:1) be established as the Mauna Kea Ice Age Natural Area Reserve (Fig. 1) [Figure 69]. The recommended site is at the south slope of the 13,784 foot high volcano between the elevations of 10,400 and 13,200 feet. The Mauna Kea Forest Reserve, which encompasses the volcano from the mid-elevations to the summit, is in the State's Conservation District, under the jurisdiction of the DLNR. [page 2]

The upper half of the proposed Natural Reserve would extend into the summit portion that is leased to the University of Hawaii as the Mauna Kea Science Reserve (Tax Map No. 4-4-15:9). The purpose of the proposed Natural Reserve is to preserve indefinitely some very exceptional geological and archaeological features of Mauna Kea volcano. Its establishment is consistent to the development and management program prescribed in DLNR's Mauna Kea Plan of May 1977.

As much as possible to be maintained so as to allow natural processes to dominate, the Natural Area Reserve would serve to be a viable example of an original heritage for present and future generations. It would serve as a long-term control against which to measure man-introduced stresses in adjacent or similar ecosystems elsewhere. It would provide an environmental and cultural appreciation site for citizens, teachers, and students. It would provide a research site for Hawaiian historians, archaeologists, geologists, and biologists. It would preserve a gene pool of native plant and animal species, particularly of rare and endangered species. [page 4]

In accordance with the requirements of Act 139, the NARSC recommends regulating policies for the protection, control, and use of Natural Reserves. A public review is required of the proposed regulation before it can be officially adopted by the DLNR and there is subsequent declaration of a Natural Reserve by a Governor's Executive Order.

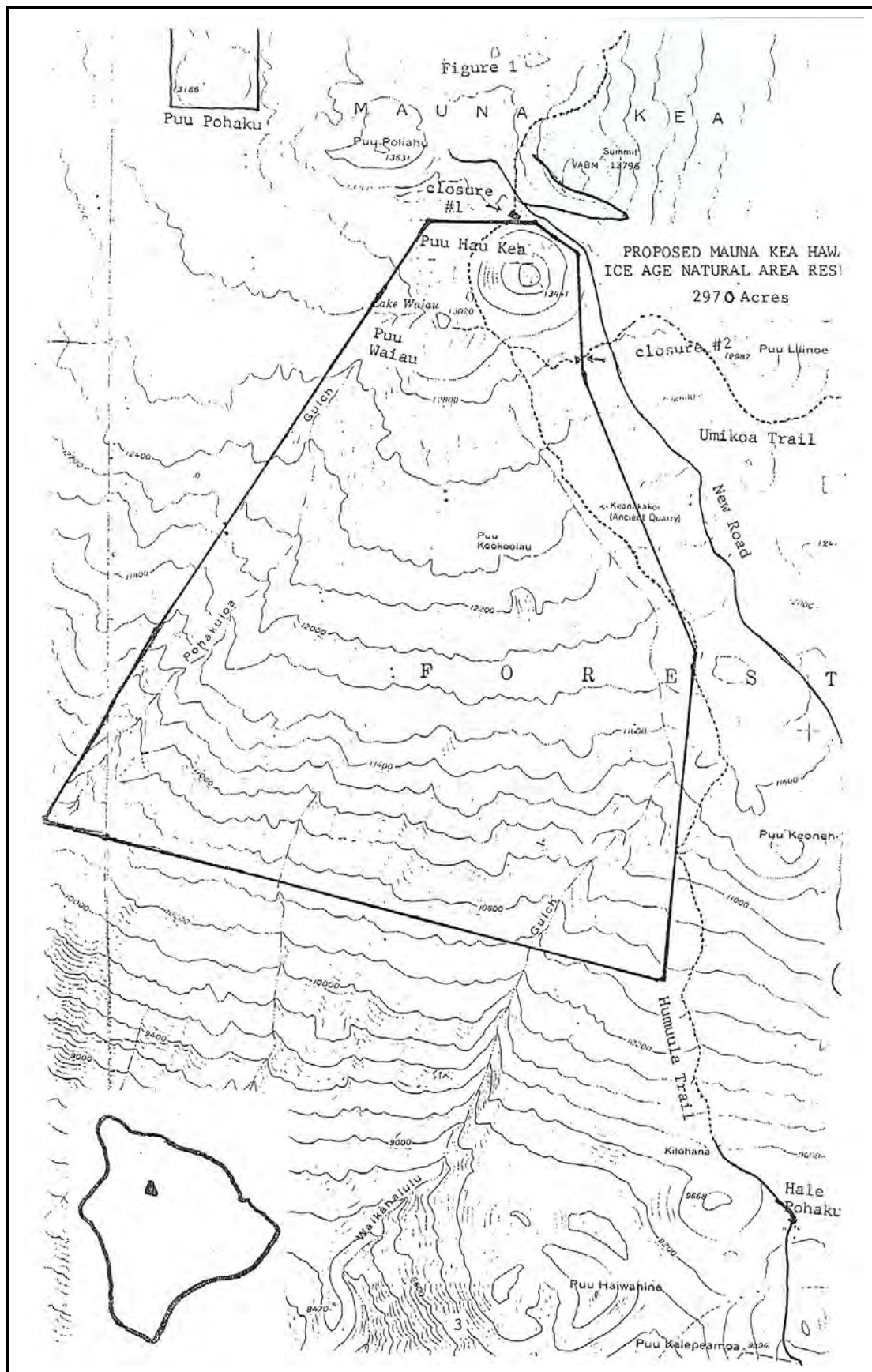


Figure 69. Proposed Mauna Kea Hawaii Ice Age Natural Area Reserve (Figure 1, August 1977:3)

The guiding principle in the formulation of regulations for Natural Reserves is the prevention of unnatural encroachment. Long-term protection of the natural and historical features of a given area can be assured only by imposing restrictive uses. Besides the explicit prohibition of destructive or damaging activities to the biological, physical, and historical elements, proposed Regulation 9 (Appendix 1) forbids camping or the setting of a fire. The only consumptive recreation allowed is hunting, subject to applicable regulations of the Division of Fish and Game.

Opportunities for public appreciation and education would be through interpretative walks explaining the geologic, archaeologic, and biologic attributes of the Natural Reserve. [page 5]

Guided walks would not only be advantageous in providing interpretations, but they would also offer a safer access to the generally unfamiliar high altitude, cold climate, and rough terrain. Existing trails, when compatible, would be improved and new ones established as required.

As indicated in the Mauna Kea Plan, management of the historic and geologic features would be the responsibility of the Division of State Parks, Outdoor Recreation and Historic Sites. Visitor access to the upper slope will likely continue to be controlled from Hale Pohaku. According to the Mauna Kea Plan, this mid-level park facility would be "...a day-use destination point for visitors and [would provide] primitive overnight camping facilities."

Signs stating the regulations for the Natural Reserve would be posted at strategic locations. Unobtrusive signs with interpretive storylines may be placed within the site should it be considered desirable.

DESCRIPTION OF AREA AFFECTED [page 6]

Geology

Mauna Kea, one of five massive shield volcanoes that make up the island of Hawaii, is the highest insular volcano in the world. Although it last erupted some 4500 years ago (Porter 1971), its present size and form was attained by the end of the Pleistocene, or Ice Age, some 15000 years ago (Macdonald and Abbott 1970).

Just as massive glaciers were forming and receding on the continents during the Pleistocene, the summit of Mauna Kea was being covered by ice at coinciding intervals. The Mauna Kea glaciers were relatively tiny averaging 200 feet in thickness and covering some 28 square miles down to the 11,000 foot elevation (Macdonald and Abbott 1970).

The features of erosion and deposition left by the action of four successive glaciers—the last had peaked about 20,000 years ago (Porter et al 1977)—are prime natural assets of the upper slope of Mauna Kea. They are also unique, for Mauna Kea is the only known mountain in the Central Pacific basin to have undergone glaciation. The proposed Natural Reserve [page 7] would protect and preserve such Ice Age features as, ***Pohakuloa Gulch*** (formed by glacial meltwater), glacial moraine and meltwater deposits of fine sediments, and the glacially sculptured features of cinder cones and lava flows.

Permafrost, recently discovered (Woodcock 1974) beneath the crater of ***Puu Wekiu***, the summit cone, could be present in one or more of the cinder cones to be protected by the proposed Natural Reserve. Typical of the subsurface of polar and very frigid temperate areas, permafrost on the relatively warm Mauna Kea summit is an odd and interesting feature.

Another northern latitude phenomenon, but requiring less frigid conditions, is the display of “patterned ground.” As discussed by Macdonald and Abbott (1970), the alternating freezing and thawing temperatures on the upper slopes of Mauna Kea fracture the rocks into ever smaller fragments as water that penetrated the rock during the day freezes and expands at night. The fragmented rock pieces produced by [page 8] this mechanical weathering lay in stripes or polygonal patterns designed according to the varying coarseness of the pieces.

No less unusual is the existence of **Lake Waiau**, another outstanding geological feature that would be protected by the proposed Natural Reserve. As elsewhere in the Hawaiian Islands, the porous basalt substrate precludes standing bodies of water. **Lake Waiau**, however, has a bottom substrate of fine sediments more than 25 feet thick (Woodcock et al 1966). The sediments, composed of volcanic ash and organic detritus, may have been accumulating at the bottom of the lake since the Pleistocene. At an elevation of 13,020 feet, the lake is one of the highest in the United States. It has a surface area of 1.7 acres and a depth of nearly 10 feet.

Perched water is contained in the interior of **Puu Waiau** itself, a few yards from the crater in which **Lake Waiau** is located. **Puu Pohaku** is also known to contain perched water (Woodcock and Groves 1969).

Archaeology

Scattered, throughout the proposed Natural Reserve is a [page 9] variety of ancient Hawaiian culture remains that date back to about 1400-1600 A.D. (McCoy 1975). They include religious shrines and rock shelters of different types, which were established in conjunction with a series of adz (tool) quarries and workshops that were the largest in Polynesia, and perhaps the world. They are the most complex and best preserved of all those found in the Hawaiian islands. The site is listed in the Hawaii Register of Historic Places. It has been also declared a National Historic Landmark, the boundary of which is expected to approximate that of the proposed Natural Reserve.

*During a recent 1976 field survey in his continuing research on the **Mauna Kea adz quarry**, McCoy (pers. commun.) found the first evidence of Hawaiian rock art on the upper slopes of the volcano. They were pictographs, or rock paintings, which are very rare in Hawaii, and a single panel of petroglyphs.*

The site was without doubt a very important and extensive center of Hawaiian adz manufacturing. The significance of this early enterprise to the cultural, social, and economic environment of the Hawaiian people of that period is being investigated (McCoy 1975). [page 10]

Bioecology

Located at elevations above the present treeline, the proposed Natural Reserve contains little vegetation. Temperature records are scanty, but those of the summit indicate a mean minimum at winter of 23° F and a summer mean maximum of 53° F (Environmental Data Service, US Dept. of Commerce). Together with low precipitation (4-10” annually at the summit) and substrate porosity, the area is an alpine desert (Hartt and Neal 1940).

Occasional patches of mosses, lichens, and grass species, including the native *pili-hale* (*Agrostis sandwicensis*) and *he'u-pueo* or *pili-uka* (*Trisetum glomeratum*), grow in sheltered pockets of the rocky substrate (Hartt and Neal 1940, Mueller Dombois and Krajina 1968). The moist shore of Lake Waiau supports thin growths of native species of grass and fern, and weed species introduced by pack animals (Hartt and Neal 1940). Dwarfed, shrub forms of *pukiawe* (*Styphelia douglasii*) are in widely scattered mats in the

lower region of the proposed Natural Reserve. Here the paucity of vegetation may be due [page 11] in part to past intense grazing by sheep and goats, which presently browse at lower elevations.

The waters of Lake Waiau contain diatoms and desmids (Hartt and Neal 1940), and perhaps other types of planktonic unicellular plants (Maciolek 1969). Several species of blue-green algae and one green algal species grow in dense floating or submerged mats (Hartt and Neal 1940). Only three faunal species, all primary consumers, have been identified (Maciolek 1969).

Existing Uses

A "Mauna Kea Entry Permit" is required to enter the Mauna Kea Forest Reserve and use the gravel road between Hale Pohaku and the summit. The DLNR-issued permit allows only 4-wheel drive vehicles on the road and limits public activities on the upper slope to day-use. The slope is presently being used for such recreational activities as hiking, sightseeing, and winter skiing and sledding. Hunting, perhaps the major activity in the mid and lower slopes, is somewhat marginal at the upper slope where the occasional sheep or goats are likely to be strays or hunter-chased. [page12]

Scientific geological and archaeological investigations are being conducted within the proposed Natural Reserve at various intervals by personnel from the University of Hawaii and the Bernice P. Bishop Museum.

Access

The recently realigned gravel road from Hale Pohaku to the astronomical site at the summit nearly conjoins with a portion of the anticipated northeastern border of the proposed Natural Reserve. At this region the road formerly veered eastward to within 10 feet of Lake Waiau.

Two trails lead to Lake Waiau. The Umikoa Trail, which starts as a jeep trail from Umikoa above the Hamakua Coast, transects the gravel road before it terminates at Lake Waiau. From the road to the lake the trail is 3/4 mile long. The Humuula Trail, originating about 1/2 mile from Hale Pohaku, enters the proposed Natural Reserve at about the 12,000 foot elevation and 1/2 mile later passes Keanakakoi, a major ancient quarry site. It continues for about 1 mile to the shore of Lake Waiau. [page 13]

POTENTIAL IMPACTS AND THEIR SIGNIFICANCE

As the purpose of having a Natural Reserve is to protect and preserve the existing natural habitat and all the natural things that occur in it and act upon it, the proposed action would neither degrade nor destruct the quality of the physical and biological environment. This favorable impact on the environment, in turn, affords the equally beneficial impact of retaining an original natural resource that will always be available for such things as heritage appreciation, environmental awareness, scientific study, and education.

The proposed regulation necessary to maintain the Natural Reserve would not adversely alter current public use of the area. Presently a part of the Mauna Kea Forest Reserve, the proposed site has been administered according to conservation measures outlined in Regulation No.1 of the Division of Forestry. Further to that Regulation, special precautionary restrictions, largely for public safety, allow only day-use of the upper slope.

Non-destructive and non-consumptive day utilization [page 14] involving hiking and sightseeing, especially if related to environmental and cultural education, is wholly compatible with the earlier mentioned scope of objectives of a Natural Area Reserves

System. The desired effect of a public educational program would be environmental and cultural heritage understanding. Teacher, student, and citizen appreciation would help to ensure—beyond any legal measure—that the unique qualities of the site would be preserved for future generations.

DETERMINATION AND REASONS THEREOF

This assessment indicates that an environmental impact statement is not required. The proposed action would not entail the loss of an economic or social benefit. Its objective being to preserve natural features, the proposed action would have no adverse effect on the quality of the environment. [page 15]

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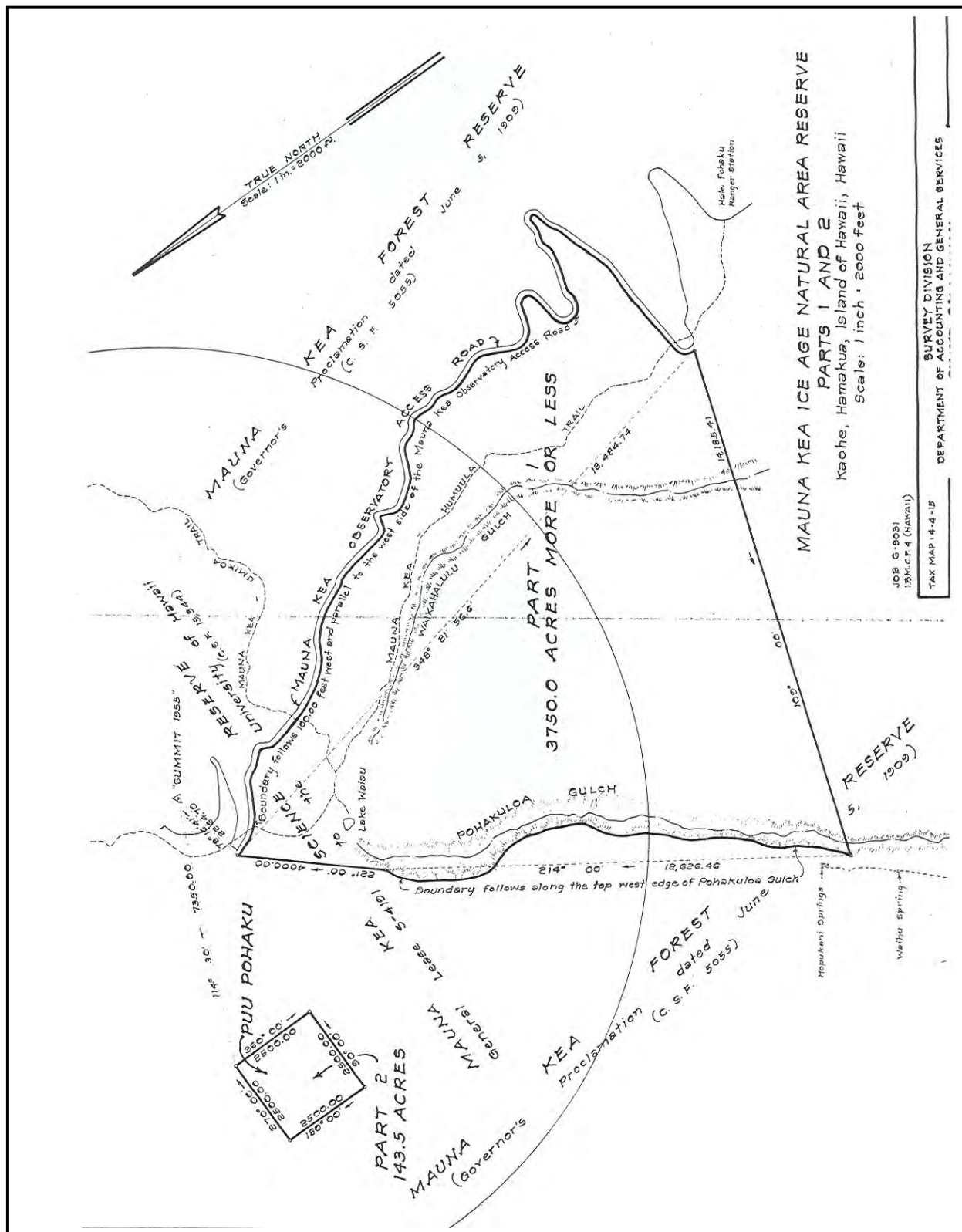
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Survey of the Mauna Kea Ice Age Natural Area Reserve (1979)

The survey of the proposed Mauna Kea Ice Age NAR was recorded in C.S.F. 18,645, dated May 4, 1979 (*Figure 70*). On May 8th, 1981, the Board of Land and Natural Resources adopted a resolution to establish the Mauna Kea Ice Age Natural Area Reserve, and Governor's Executive Order No. 3101, set aside the land for that purpose, on November 16, 1981. The notes of survey recorded in C.S.F. 18,645 record the following metes and bounds:



**May 4, 1979
C.S.F. 18,645
PARTS 1 AND 2**

***Kaohe, Hamakua, Island of Hawaii, Hawaii
Being a portion of the Government Land of Kaohe.***

Being also a portion of Mauna Kea Science Reserve covered by General Lease S-4191 to the University of Hawaii.

PART 1:

Beginning at the north corner of this parcel of land, being also 100.00 feet west from the west side of Mauna Kea Observatory Access Road, the direct azimuth and distance from Government Survey Triangulation Station "SUMMIT 1955" being 78° 16' 41" 2264.70 feet, thence running by azimuths measured clockwise from True South:

1. Along the remainder of Mauna Kea Forest Reserve (Governor's Proclamation dated June 5, 1909), the boundary follows 100.00 feet west and parallel to the west side of the Mauna Kea Observatory Access Road, the direct azimuth and distance being: 348° 21' 56.6" 18,484.74 feet;
2. 109° 00' 14,185.41 feet along the remainder of Mauna Kea Forest Reserve (Governor's Proclamation dated June 5, 1909), to the top west edge of Pohakuloa Gulch;
3. Thence along the remainder of Mauna Kea Forest Reserve (Governor's Proclamation dated June 5, 1909), along the top west edge of Pohakuloa Gulch, the direct azimuth and distance being: 214° 00' 12,626.46 feet;
4. 221° 00' 4000.00 feet along the remainder of Mauna Kea Forest Reserve (Governor's Proclamation dated June 5, 1909), to the point of beginning and containing an AREA OF 3750.0 ACRES MORE OR LESS. [page 1]

**PART 2:
PUU POHAKU**

Beginning at the northeast corner of this parcel of land, the direct azimuth and distance from Government Survey Triangulation Station "SUMMIT 1955" being 114° 30' 7350.00 feet, thence running by azimuths measured clockwise from True South:

1. 360° 00' 2500.00 feet along the remainder of Mauna Kea Forest Reserve (Governor's Proclamation dated June 5, 1909);
2. 90° 00' 2500.00 feet along the remainder of Mauna Kea Forest Reserve (Governor's Proclamation dated June 5, 1909);
3. 180° 00' 2500.00 feet along the remainder of Mauna Kea Forest Reserve (Governor's Proclamation dated June 5, 1909);
4. 270° 00' 2500.00 feet along the remainder of Mauna Kea Forest Reserve (Governor's Proclamation dated June 5, 1909), to point of beginning and containing an Area OF 143.5 ACRES. [page 2; State Survey Division]

Mauna Kea Ice Age Natural Area Reserve – Draft Management Plan (1982)

Following establishment of the Mauna Kea Ice Age NAR, a draft management plan was prepared by the Department of Land and Natural Resources in 1982. The draft remains as a guideline for management and protection of the NAR, and all actions on Mauna Kea, are reviewed by the NAR

program, and enforcement of protection measures in the NAR are coordinated by the DLNR program. The draft management plan provides the following overview of the significance of Mauna Kea and the NAR, in the natural and cultural history of Hawai'i:

Following the Board of Land and Natural Resources' resolution on May 8, 1981, to establish the Mauna Kea Ice Age Natural Area Reserve, Governor's Executive Order No. 3101, which sets aside the land for that purpose, was issued on November 16, 1981.

The reserve is in the land of Kaohe on the south face of Mauna Kea between the 10,400 and 13,200 ft. elevation (Appendix 1). From about the 11,500 ft. elevation, the reserve is within an area that is leased to the University of Hawaii as a science reserve. The western boundary is the western ridge of Pohakuloa Gulch and the eastern boundary is along the summit road from a 100 ft. distance. The reserve encompasses 3,893.5 acres, of which 143.5 acres is a satellite portion that consists of the cinder cone, Puu Pohaku. It is in the Conservation District and was part of the 82,669 acre Mauna Kea Forest Reserve.

Two trails, both leading to Lake Waiau, are present. The Humuula Trail, which originates about a half mile from Hale Pohaku, enters the reserve at the 10,500 ft. elevation and a half mile later passes Keanakakoi, a major ancient quarry site. It continues for a mile before joining with the Umikoa Trail near lake Waiau, after which it goes over the summit and beyond. [page 1]

The Umikoa Trail, which starts as a jeep trail from Umikoa above the Hamakua Coast, crosses the summit road before it terminates at the lake. This portion of the trail, between the summit road and Lake Waiau, eventually developed into a road. In compliance with the Department's 1977 Mauna Kea Plan, which states that roads not part of the summit road are to be removed and that there will be "only a walking trail" to the lake, vehicular access to the lake has been terminated by rock barriers.

The annual rainfall average is 15-20 inches, which in the high elevations is in the form of snow during most winter months. The mean temperature at the summit region hovers above freezing and at the lower elevations of the reserve it is 40° F. Volcanic ash and cinders amid clinkery aa lava cover a slope that generally exceeds 30 percent. The extremely porous substrate prevents surface water accumulation. Situated within this physical environment, Lake Waiau is an exceptional perennial body of water.

Lake Waiau, located on Puu Waiau at the 13,020 ft. elevation, has a bottom substrate of fine sediments more than 25 ft. thick. The lake has a surface area of about 1.7 acres and a maximum depth of about 9 ft. With snow-melt the lake overflows into Pohakuloa Gulch. The thick sedimentary layering of the bottom of Lake Waiau, which may have been occurring since the Pleistocene, is of scientific value in helping to reconstruct Mauna Kea's volcanic history, its climatic history, and the history of the earth's magnetic field. The crater of Puu Pohaku also contains perched water on occasion.

The other significant and exceptional geological feature of the reserve is that just as massive glaciers were forming and receding on the continents during the Pleistocene, or Ice Age, the summit of Mauna Kea was being covered [page 2] by ice at coinciding intervals. The features of erosion and deposition left by the action of four successive glaciers, the last of which peaked about 20,000 years ago, are prime natural assets of the volcano. They are also unique, for Mauna Kea is the only known mountain in the Central Pacific basin to have undergone glaciation. The glaciers were relatively small-sized, averaging 200 ft. in thickness and covering some 28 square miles down to the 11,000 ft. elevation. The main Ice Age features evident today include Pohakuloa Gulch (formed by glacial meltwater), glacial moraine and meltwater deposits of fine sediments (present

down to the 10,500 ft. elevation), and the glacially sculptured features of cinder cones and lava flows.

Along with these outstanding natural geological components, there are a variety of ancient Hawaiian cultural remains dating back to about 1000 A.D. They include religious shrines, rock shelters (with such artifacts as wooden fire ploughs, tapa fragments, braided sennit cordage, and pandanus matting), food remains (such as marine limpets, sea urchins, fish, birds, coconuts, and kukui nuts), pictographs (rock paintings), and a single panel of petroglyphs. These evidences of habitation, which were apparently intermittent and short-term, are associated with a series of adz (tool) quarries and workshops that were the largest in Polynesia, and perhaps the world. Containing the most complex and best preserved archaeological site found in the Hawaiian Islands, the area is listed in the Hawaii Register of Historic Places and has been declared a National Historic Landmark.

Located above the treeline, the area is an alpine desert with occasional patches of mosses, lichens, and grasses, including the *pili-hale* (*Agrostis*) and *he'u pueo* (*Trisetum*). The lower portion has scattered growths of [page 3] *pūkiawe* (*Styphelia*) and *kūpaoa* (*Raillardia*). Lake Waiau contains diatoms, desmids, blue-green and green algae, and planktonic animal species.

Management Principles

Two basic principles should guide the direction of management of all Natural Area Reserves. As the purpose of establishing the reserve is to preserve and protect the area's irreplaceable naturalness, the first principle is to allow natural processes to dominate and control the natural ecosystem. The second principle is that the indigenous naturalness is a resource, which is to be utilized for its esthetic, heritage, educational, and scientific values.

These two principles provide the conceptual base for the formulation of the management objectives and programs for the Mauna Kea Ice Age Natural Area Reserve... [DLNR, 1982:4]

Mauna Kea (1980): Community Voices–Agency Debates, County of Hawaii Recommends that Development be Limited to Six Observatories

In 1974, concerns about development on Mauna Kea had been brought to the attention of George Ariyoshi (then, acting Governor). As a result, he directed the Board of Land and Natural Resources to investigate, and develop a plan for management of the "priceless qualities" of Mauna Kea. The plan was to address "scientific, recreational and other purposes" that posed a "threat" to the integrity of the mountain landscape. The result of Governor Ariyoshi's direction was the "Mauna Kea Plan" (1977).

The "flurry" of development of observatories on Mauna Kea between 1968 to 1979, was also causing great concern among community members on the island of Hawai'i. The "Mauna Kea Foundation" was organized, and chaired by Helen Hale, in cooperation with community members, the County of Hawaii, the University of Hawaii, and the Mauna Kea users (representing various observatories). The foundation developed an outreach program to collect information pertaining to the history and natural environment of Mauna Kea, and elicit recommendations to further develop the 1977 "Mauna Kea Plan," and ensure protection of the unique natural and cultural resources of Mauna Kea.

On January 27th, 1980, the Hawaii Tribune-Herald published a special section of the paper, titled "*Mauna Kea (Past, Present and Future)*," in which an overview of the topics raised by members of the

community (including the Native Hawaiians³⁹); various County and State agencies; and the University of Hawaii and Institute for Astronomy, were described. Notable issues identified, and recommendations included, but were not limited to:

Based on community input and best planning practices, the County of Hawaii recommended that development on Mauna Kea be limited to six observatories.

- This recommendation was “rejected” by the State Board of Land and Natural Resources, and no limit was placed on development as of 1980.

Definition of jurisdictional responsibilities, as an inter-agency program.

Identification of areas of cultural significance to Native Hawaiians, and designated preservation zones.

Identification of unique biological and geological resources, and designated preservation zones.

“The main thing is we have to treat it (Mauna Kea) with sensitivity.”

There follows below, selected articles from the special Mauna Kea insert, published in the Hawaii Tribune-Herald. The articles focus on the background of the Mauna Kea Foundation program, the planning processes of the State and University of Hawai‘i, the County of Hawai‘i, and comments from the Hawaiian community. In addition to these articles, there were also articles covering archaeological and historical resources; the geology and glaciation of Mauna Kea; the natural resources of the mountain; hunting practices; and development of astronomy.

Mauna Kea (Past, Present and Future)

The Mauna Kea Project was triggered by the desire of the Mauna Kea Foundation to bring about a sharing of information and concerns about “White Mountain.” Many people are aware of their own interests but lack the opportunity to bridge these separate interests in consideration and respect for the total concern of this great natural resource.

Spurred by President Helene Hale, others participating in the initial meeting were Terry Lee, Roger Cayrel, Pierre Bely, Ginger Plaish and Mary Matayoshi. The result was the formation of a Mauna Kea Advisory Committee composed of Tom Krieger, general manager, Mauna Kea Observatory Support Services; Helene Hale; Mary Matayoshi, director of the Center of Continuing Education and Community Services (CCECS); John and Sheila Dobovan representing the video production aspects; and Nahua Maunakea, CCECS program coordinator who was designated project director. They, in turn, have solicited input from the many individuals and groups who have expressed concern about Mauna Kea. Some of these views are contained in this section... [page B-1]

Plans drawn for majestic Mauna Kea

“Mauna Kea was important to the early Hawaiians. There they quarried its rock, and there lived Poliahu, their Goddess of Snow, rival to Pele. Today, Mauna Kea remains important, although the reasons differ.” Northeast Hawaii Community Development Plan, County of Hawaii.

The importance of Mauna Kea as an international astronomical research center was at no time brought into a clearer focus than when a flurry of dedications of observatory projects

³⁹ A copy of the Hawaii Tribune Herald insert was provided to Maly by *Kupuna* Emma Kauhi in 1997, as part of discussion of Hawaiian traditions and practices associated with Mauna Kea.

took place on top of the lofty mountain last summer and early fall. With six observatories atop the 13,976-foot summit, and with the possibilities of more observatories to come, Mauna Kea now can unqualifiedly claim its world leadership in astronomical studies.

But Mauna Kea means more to the Big Islanders than a haven for professional star gazers to explore man's last frontier, the universe. It is a natural beauty, it is the habitat of precious Hawaiian birds and plants, and it is a playground for the islanders.

Against this background, both the State and the County of Hawaii planners have been trying to formulate a plan that will protect the mountain's natural resources and, at the same time, allow the scientific development to continue atop the mountain. The task has not been easy.

Mauna Kea, meaning the "White Mountain," extends 16,000 feet from the ocean floor to the sea level before continuing another 13,796 feet, making it the tallest mountain in the world. Commonly, however, the mountain region begins from the 6,000 foot elevation and extends to the summit.

The mountain has two distinctive zones. One covers an area from the 6,000-foot to the 10,000-foot elevation within which lie the fragile ecosystems of rare birds and unique plants, and where hunting of sheep, goats and pigs ranks among popular sporting activities on the Big Island.

The second zone covers from the 10,000-foot elevation to the summit. It is here astronomers have found the finest spot in the world to open up windows in the sky. Winter snow that dons the summit region provides breathtaking scenic beauty and rare recreational opportunities on the mountain slopes towering above the tropical Pacific.

Serious considerations for drafting a master plan for Mauna Kea were triggered in late 1974 by Acting Governor George Ariyoshi in a memorandum to Sunao Kido, chairman of the State Board of Land and Natural Resources. The memorandum stated:

"I am concerned that social pressures for more intensive uses of Mauna Kea for scientific, recreational and other purposes pose a threat to the priceless qualities of that mountain...

To assure that full consideration is given to all aspects of permitted, controlled and prohibited uses, you are hereby directed to develop and promulgate, as expeditiously as possible, a Master Plan for all of Mauna Kea above the Saddle Road.

Finally, the promulgation of the Master Plan should include its adoption by the Board of Land and Natural Resources following public hearings, and should provide for both the enforcement of the Plan and procedures for its amendment." [Ariyoshi to Kido, November 1, 1974]

After more than two Years of study, public hearings, conducted by government and private groups, including a Mauna Kea Advisory Group — all not without controversies, "The Mauna Kea Plan" was adopted February 11, 1977 by the Board of Land and Natural Resources at a meeting in Kona.

The Plan is in no way considered a definitive planning work for the mountain. It is a set of broad guidelines to be reviewed and updated from time to time.

The plan “is a policy framework for the management of Mauna Kea.” It outlines the jurisdictional responsibilities of various government agencies for specific resources and uses.”

The plan spells out five management areas within each of which guidelines, on specific uses of the mountain’s resources are laid down:

- I. *Mamane / Naio* Forest Ecosystem Management Area, which is the region extending from the 6,500-foot elevation to 9,500-foot elevation; where hunting of sheep, goats and pigs take place; and where Hawaii’s *Palila* birds depend on the *Mamane* trees for its habitat and food.
- II. Science Reserve Management Area, which is a region from the 10,000-foot elevation to the summit and is leased to the University of Hawaii for scientific research, and where snow play and skiing, is permitted during winter months.
- III. Special Natural Area and Historic/Archaeological Management Area, which, includes such historic sites as Lake Waiau, Puu Hau Kea, Adz Quarry, and Puu Pohaku.
- IV. Silversword Management Area, which includes all lands now fenced off to protect the silversword plants, and which “will be managed as a nursery for supplying plants in interpretive areas or for future reestablishment in other areas of the mountain,” when desirable.
- V. Military Management Area, which covers the lands within Pohakuloa Military Training Area, managed by the Army under a lease agreement with the State.

In addition to the five management areas, the plan also sets out guidelines on several “special problems” affecting the use of the entire mountain.

One is the development of Hale Pohaku at the 9,200-foot elevation. As State master plan for the area calls for the setting aside of nine acres for the University of Hawaii, Institute for Astronomy for development of mid-level support facilities for the scientists.

Presently, four acres of the proposed site, near the access road to the summit, are occupied by structures temporarily serving as mid-level facilities for the scientists. The master plan for Hale Pohaku proposes to replace the existing temporary buildings with new ones.

The new buildings “will be used for sleeping, eating, lounging, research, support, and minor maintenance functions, directly related to telescope operations at the summit.”

About 700 feet down slope from the proposed mid-level support facilities area is an eight-acre area the State proposes for a park development.

Initially, two acres of this proposed park site will be developed with an information and interpretation station, parking area, and 10 picnic sites. Six acres will be reserved for future expansion.

The 8.5-mile access road to the summit from Hale Pohaku poses another special problem. The Mauna Kea Plan forbids paving of the gravel road but calls for road safety devices. Only four-wheel drive vehicles are allowed to go from the picnic area above Hale Pohaku to the summit. The summit access should be maintained by the State Department of Transportation, according to the Plan.

Electricity is produced by on-site generators to supply power to the observatories and support facilities. The Mauna Kea Plan prohibits the installation of overhead power lines to prevent the adverse effect on the visual quality of the slopes. Underground power lines, however, may be allowed.

The Pohakuloa State Park also is a special area which is not included in any of the five management areas. The Mauna Kea Plan calls for no change in the type of recreational use of the park. Any expansion will depend on additional water supply development.

Administration and management of Mauna Kea cuts across the jurisdictional boundaries of several government agencies, although the land mass falls within the conservation district jurisdiction of the State Department of Land and Natural Resources. For instance, the DLNR's Divisions of Forestry, Fish and Game, and Parks, Outdoor Recreation and Historic Sites, are directly involved in the Management of all the mountain's resources.

The University of Hawaii has the responsibility for management and upkeep of Hale Pohaku area where permanent mid-level support facilities will be located. The University also is responsible for the management and upkeep of the ' Mauna Kea Science Reserve at the summit.

The State Department of Transportation is responsible for the maintenance of the access road from the Saddle Road to Hale Pohaku and eventually to the summit.

Although the County of Hawaii has no jurisdiction over the mountain, it nevertheless is responsible for processing permits for building and grading and for site or design reviews. The County's Planning Department also is asked to provide comments and recommendations before the DLNR makes a land use decision affecting Mauna Kea.

In formulating the Mauna Kea Plan, differences between local and State planners developed. Until this day some of the differences still have not been settled while the three-year-old plan is being reviewed by the DLNR for rewriting and refining.

The most noticeable difference is over the limit of the number of observatories that should be allowed atop the mountain. The Mauna Kea Citizen Advisory Committee's recommendation, which is endorsed by the County Administration, was six observatories. The recommendation however was rejected by the Land Board, and at present, no limit on the number of the observatories is placed by the State agency.

Besides its scientific significance, the Big Islanders, both inside and outside of government, are concerned about the natural beauty of the mountain and about its historic and cultural heritage. Sites such as Puu Poliau [Poliahu], home of the Hawaiian [page B-2] Goddess of Snow, and Lake Waiau atop the summit, "regarded by Hawaiians as a sacred place and a cultural tie with the past," should not be obliterated by haphazard development. And, the rarefied atmosphere on the mountain's higher slopes and summit and its surrounding unique Hawaiian ecosystems should not be unreasonably disturbed in the name of progress or scientific development.

How Hale Pohaku should be developed remains unsettled, despite the fact that the State has drafted an environmental impact statement for its proposed development in the area. Hawaii County Planning Director Sidney Fuke, for instance, thinks that until there's agreement on the extent of development in the Science Reserve at the summit, the Plan for Hale Pohaku cannot be finalized.

Whether the summit access roads should remain unpaved is another unsettled problem. There is pressure for paving the 8.5-mile winding, one-lane road, as the traffic between

the observatories and Hale Pohaku is increasing. The University in fact has asked the DLNR to reverse its policy and to allow pavement.

So it is understandable why government officials have been cautious in making comments on the uses of the mountain.

“Mauna Kea is like our shoreline,” says Planning Director Sidney Fuke. “It is a natural beauty, and at the same time, it has economic and boundless recreational potentials.

To assure its balanced and orderly development, a comprehensive plan should be developed. The need for such a plan has been the County’s position, a position well-expressed in the Northeast Hawaii Community Development Plan.

This plan would determine the capacity of Mauna Kea and then set some maximum limit to astronomy and its related developments. At the same time, it would look at means to preserve the natural character of the mountain and provide for its diversified use.”

Fuke has suggested reactivation of the Mauna Kea Citizen Advisory Committee for updating the Mauna Kea Plan and for developing a more specific management plan.

The University presently is drafting a management plan for the Science Reserve Area on the summit. The plan will set forth specific criteria for the use of the summit area as an international research site.

Chancellor Durward Long, addressing the subject of the place of astronomy in the present and future of the University, has made the following remarks:

In seeking the most effective way to develop programs of international quality, it has been natural for the University to look to these academic areas where the particular geographical, environmental, economic, or sociological characteristics of Hawaii give it a special advantage.

In this way it was recognized early in the 1960s that astronomy had a great potential for development as a first-class research and training program and, at the same time, could bring significant economic and cultural benefits to the Islands.

The wisdom of the choices made by the political and academic leaders of that time has been shown in the dramatic growth of astronomy as an enterprise on Mauna Kea and Haleakala, and the rapid growth in stature of the UH research and training program within the Institute for Astronomy and Department of Physics and Astronomy.

Our aspiration is (and can be) no less than to develop an academic program matching the excellence of our sites; at the same time we recognize the great responsibility we have to serve as a wide and responsible custodian for the international resource represented by our high mountain peaks and especially Mauna Kea.

The astronomy program at the University began 15 years ago and has developed through the dedication of its staff and the constant support of the University and State administration. Today, new programs in the University which show similar promise in fields such as energy development, marine biology, and agriculture, are in the early stages of development. We look forward to seeing their growth to national and international significance as well, following the same kind of development as we see in the astronomy program.”

Since the meager beginning 15 years ago, Mauna Kea now has six observatories — a UH observatory with an 88-inch telescope; two 24-inch telescope observatories; a Canada-Hawaii-France observatory with a 140-inch telescope; an 120-inch infrared observatory built by the National Aeronautics and Space Administration; a 155-inch infrared United Kingdom observatory. And, there may be more to come.

Susunu Ono, chairman of the Board of Land and Natural Resources, expects the review of the Mauna Kea Plan to be completed within the next six months.

“There are a number of considerations equally important in making recommendations for land use (affecting Mauna Kea),” said Ono. These considerations include the “need of the scientific community, the role the University plays, the recreational needs of our people on the Big Island, as well as the input we’ve received from the county in terms of its overall objectives and goals regarding the use of the mountain.”

“At present, the ultimate goals for the mountain use are under review by the Department as part of the review of the Mauna Kea Plan,” Ono says.

“Hopefully, the results of this review will further specify the kinds of goals that all of us are working to achieve in terms of mountain use.”

In reviewing, Ono says his department is listening “very closely” to the University, the County government, as well as the general public.

And, the State chief protector of the natural resources in the Islands promises:

“The main thing is we have to treat it (Mauna Kea) with sensitivity.” [Hawaii Tribune Herald, Sunday, January 27, 1980:B-3]

Perspective: reflections of Mauna Kea

(by Mrs. Faith Bean and Mrs. Brenda Duquette)

From the slopes of the Kohala Mountain, members of the Waimea Hawaiian Civic Club are able to view Mauna Kea and introspectively reflect their “*manao*” (or thoughts) about the great “White Mountain.” Many members have one time or another used the mountain for the purpose of exploring, hunting, or sightseeing.

In 1971, the club with about 20 four-wheel drive vehicles, took an historical Hawaiian tour of the mountain. Their guide showed them several caves where the ancient Hawaiians carved the adzes for their tools. Some of the members were awed by the sight of the *opihī* shells found in the caves. It was soon explained that the ancient Hawaiians lived by the beaches and in their preparation for their stay on the mountain would probably take *opihī*, dried fish, perhaps some bananas and, of course, *poi*. Hopefully, this food would last them until they had completed the new adzes for their tools. However, all that was left for the modern-day Hawaiians to view were just some adze chips and *opihī* shells.

Later, the group visited Lake Wai‘au, a lake caused by the melting of snow. A member of the club shared her family tradition of putting the umbilical cord of a newborn baby into a bottle and throwing it as far as possible into the middle of the lake. She and her mother and probably her mother’s mother had done the same thing. Many of the others in their company agreed with her for all Hawaiians know that the umbilical cord if not properly disposed may alter the destiny of a child’s life. For example, if the cord is stolen by a rat, the child could become a thief.

Recently some members mentioned how fortunate Hawaii had been chosen to facilitate the Mauna Kea observatories, our own “White Mountain” above all others in the world. Others said progress is good but “no more building.” The mountain should not be “overcrowded;” it may bring more building.” The mountain should not be “over crowded;” it may bring more cars, and outsiders who do not have good “mana’o” (thoughts) about preserving the valuable history of the mountain. Then, too, as mentioned by another member, the existing road has been traveled so extensively that by the time the other observatories open, there will be irreversible effects such as full-scale erosion of the mountain itself, not to mention the devastating effect it has on the existing historical sites.

Between the 6,000-foot and 10,000-foot elevations are native Hawaiian ecosystems, including rare plants and birds. Many species are found nowhere else in the world.

Hunting of feral goats, sheep, pigs, and game birds has become a traditional use within (and on the perimeter of) the Mamane/Naio Forest. With this in mind, the Waimea Hawaiian Civic Club introduced a resolution at the 1979 Association of Hawaiian Civic Clubs Convention on Maui, to implement and expedite the Mauna Kea Master Plan. Included in the resolution, was the request to have the entire Mamane/Naio Forest fenced off, for the purpose of preserving the critical habitat of the threatened and endangered “Palila Bird.” However, since May 1979 at the Annual Convention, the Waimea Hawaiian Civic Club has received only one reply: that of Susumu Ono in his acknowledgement of our resolution and of his endeavors to act on the Mauna Kea Master Plan.

In short, the members of the Waimea Hawaiian Civic Club continue to hold in awe the magnificence and unique landmark of Mauna Kea. Another historical tour is being planned by the club sometime this year at the 9,000-foot level. They will tour many historical house sites, caves, and perhaps share more mo’olelo (stories) of the area by reminiscing members. Our club’s motto reflects the overall feeling of our great “White Mountain:” “Ua Mau Ke Ea O Ka ‘Aina Ika Pono.” “The Life of the Land is Perpetuated in Righteousness.” [Hawaii Tribune Herald, Sunday, January 27, 1980:B-8]

Personal Recollections of Mitsuo Akiyama— Mauna Kea and Early Years of Astronomy

Hilo-born, Mitsuo Akiyama⁴⁰, is perhaps the individual most responsible for setting the foundational work of developing Mauna Kea into an astronomical platform. Following the *tsunami* of 1960, Hilo was in an economic slump. By 1963, Akiyama settled upon astronomy upon the high mountains—either Mauna Loa or Mauna Kea—as a means of rejuvenating the economy of Hilo. He believed that the science was honorable, and that it would be one by which many local citizens could benefit. As noted in communications cited earlier in this section of the study, Akiyama played a key role in facilitating Dr. Gerard Kuiper’s research on Hawai’i, and developing a support base for astronomy on the community, County, State, and National levels.

In 1980, recognizing his role in the development of astronomy on Mauna Kea, the Hawaii County Council issued a resolution, honoring Mitsuo Akiyama, and acknowledging the significant roles of Dr. Gerard Kuiper, and Governor Burns in the process. The resolution reads:

⁴⁰ Mitsuo Akiyama was born in 1920, and died on May 28, 2004. Unfortunately, we were unable to interview him as a part of the present study. A number of his letters were located in public collections, and recollections of his efforts shared by other participants in the oral history program (Volume II). At the time of this writing, arrangements are being made to house Mr. Akiyama’s collection of Mauna Kea documents in the library of the Office of Mauna Kea Management.

January 23, 1980

County Council Resolution No. 536

WHEREAS, the developing of an astronomical science base atop Mauna Kea in 1963 began as a dream of Mitsuo Akiyama, then Executive Secretary of the Hawaii Island Chamber of Commerce, who personally sought relentlessly for scientists who would help fulfill his dream and thus expand the economic base of the Big Island; and

WHEREAS, in response to Mr. Akiyama's call, Dr. Gerard Kuiper, Director of the Lunar and Space Planetary Laboratory of the University of Arizona, the key advisor to the then burgeoning National Aeronautics and Space Administration, arrived in Hilo in 1964 with a 12 ½ inch astronomical telescope which instrument became the forerunner of the six existing telescopes, atop Mauna Kea; and

WHEREAS, prior to his death six years ago, Dr. Kuiper reverberated his discovery to the scientific world that the Big Island, with its lofty 14,000-foot island mountain, should be developed as the astronomical science base of the world, however, he never lived to see the seed that he planted grow; and

WHEREAS, Mr. Akiyama's dream may not have come true without the support of our late Governor John A. Burns who not only made available \$40,000 to build the road to Puu Poliahu, second highest peak where the planetary domes sit, but who was also instrumental in pushing for the expansion of the Institute of Astronomy at the University of Hawaii.

NOW THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE COUNTY OF HAWAII that it congratulate Mr. Mitsuo Akiyama for his untiring efforts in making his dream come true, thus bringing recognition to the Big Island of Hawaii and the scientific community of the world.

BE IT FURTHER RESOLVED that the late Dr. Gerard Kuiper and the late Governor John A. Burns be recognized posthumously for their contribution in fulfilling Mr. Mitsuo Akiyama's dream.

BE IT FURTHER RESOLVED that the Clerk of the County of Hawaii remit true copies of this resolution to Mitsuo Akiyama; to the families of the late Dr. Gerard Kuiper and the late Governor John A. Burns; to the Honorable George R. Ariyoshi, Governor of the State of Hawaii; Director John T. Jefferies, UH Institute of Astronomy; Dr. Terrence Lee, United Kingdom Infrared Telescope; Mr. Claude Berthoud, Canada-France-Hawaii; and to the National Aeronautics and Space Administration.

Dated at Hilo, Hawaii, this 23rd day of January, 1980.

In 1991, The Hawaii Herald published an interview with Mitsuo and Shizue Akiyama, regarding the early days of astronomy on Mauna Kea. Through the interview, and Mr. Akiyama's candid observations, we learn of the events that led to the first "test" telescope on Pu'u Poli'ahu, and efforts to ensure that development of the science complex on the summit of Mauna Kea would occur. In those early years, the "dream" of Mitsuo Akiyama apparently met with no opposition—the economic well-being of Hilo was foremost in the minds of the participants. While the dream did not manifest itself in the manner Akiyama originally envisioned and passionately sought after, the results were the same. Mauna Kea has developed into a "Mecca for scientific research." On June 7, 1991, Bernadette Kagawa, of the Hawaii Herald reported:

Mitsuo Akiyama, Wind Beneath Mauna Kea's Flight to the Stars

If Hawaii was giving out Academy Awards for science, then Mitsuo Akiyama would be a shoo-in for "Best Supporting Actor" for his part in the early astronomical development of Mauna Kea.

No, Akiyama's role was not always glamorous, but he nevertheless carried out his duties very conscientiously—helping others to develop Mauna Kea as the world's premier site for astronomical studies.

Akiyama's adventures all started in June 1964. At the request of Howard Ellis of the U.S. Weather Bureau's Mauna Loa Observatory, Akiyama, then executive secretary of the Hawaii Island Chamber of Commerce, took up the task of finding universities which had astronomy departments and writing to them about possibly doing research atop Mauna Kea or Mauna Loa. He sent word out to such places as the University of Tokyo, the Massachusetts Institute of Technology and Caltech. Several months passed without any serious inquiries.

Then Akiyama's big break came when Dr. Gerard Kuiper entered the scene. You see, Akiyama had finally attracted the attention of a "big gun" in scientific circles. Kuiper, then director of the Lunar and Planetary Laboratory at the University of Arizona, was a Dutch-born scientist who previously headed astronomy departments at the universities of Chicago and Wisconsin. He had made such milestone discoveries as the fifth moon of Uranus and second moon of Neptune. And at the time, he was a key advisor to a then-growing National Aeronautics and Space Administration (NASA).

Kuiper and his staff spent several days inspecting and testing Mauna Kea in January 1964. He liked what he saw so much that he requested a road be built there for scientific-related traffic only.

Such scientific talk came at a time when the Big Island was in an economic slump, and officials were looking for new industries. Science itself was big news back then.

Gov. John Burns supported the road request and the scientific idea itself. After Kuiper discussed his ideas with other officials, the State set aside money to build a road from Hale Pohaku to Puu Poliahu. Kuiper himself chose Puu Poliahu (elevation 13,612 feet) as the site of the observatory.

After about a month and several inspections, the road was completed at a cost of approximately \$40,000, and work to build an observatory began. Kuiper got a \$25,000 grant from NASA. That wasn't enough, so he asked Akiyama to find people to help build the dome. Akiyama asked some of his friends to help contractors put up the 12 ½ foot dome and test telescope. That was a solid two-week assignment. By June 11, 1964, the foundation, dome and 12 ½ inch telescope were in place.

The University of Hawaii did not even have an astronomy department back in 1964, so Kuiper utilized his resources at the University of Arizona, which boasted a staff of 175.

"We visited Dr. Kuiper at the University of Arizona—a beautiful setting." Akiyama remembers. "He took us to see the 60-inch telescope. Real nice fellow. So I said, 'Gee, by all means, I gotta help this man.' He's such a nice man. He used to write to me every week. He used to telephone me from Tucson, Ariz., every week to tell me about this and that and how about this, check up on this for me, do this for me. And I said 'Sure, anytime.'"

Tests were conducted and on July 20, 1964, the observatory road and dome were dedicated. The establishment of the first observatory atop Mauna Kea—albeit a modest forerunner to today’s giant telescopes—was a big push for science and the Big Island.

At the dedication ceremony, attended by about 200 people, Kuiper extolled the attributes of the site as probably the best for astronomical studies in the world—free from industrial pollution. Kuiper also acknowledged the support of Burns, Ellis and others, including Akiyama; “I want . . . to express appreciation to the citizens of Hilo for [page A-1] their tremendous help. In particular to Mr. Akiyama, who has been our counsel and guide throughout this program. What we attempted here was unprecedented—but with Mr. Akiyama’s guidance and almost daily participation it was accomplished.”

Carl Gillespie, too, had kind words for Akiyama. In an Aug. 8, 1964, Gillespie, Kuiper’s assistant at the Luna and Planetary Laboratory, wrote to Akiyama; “I want to take this opportunity to extend my personal thank you and gratitude for the enormous amount of help you have provided the Lunar and Planetary Laboratory. Your personal participation in all aspects of this Mauna Kea development program has saved the taxpayers a very considerable amount of money and the scientists at least six months’ time...”

Both Kuiper and Gillespie appreciated Akiyama’s thankless, behind-the-scenes efforts; putting together detailed monthly reports for the Board of directors of the Chamber of Commerce; and periodically corresponding with the Hawaii County Council to keep them informed of what officials were saying, as well as recommending certain actions be taken.

Akiyama also scheduled pertinent appointments and made sure Kuiper got to where he was supposed to be. For example, in January 1964, Akiyama and his staff:

- arranged for Kuiper to speak with various officials about the project, including Gov. Burns, UH President Thomas Hamilton, Dr. George Woollard of UH’s geophysics department, the State Land Division, State Forestry Division, and Hawaii National Guard;
- transported Kuiper to study and visit the Volcano Observatory;
- have him flown over Mauna Kea and Mauna Loa several times for thorough surveys;
- scheduled a jeep ride to Mauna Kea with state Fish and Game Division officials;
- slotted various dinners; and
- helped to draft a letter for Burns which Akiyama personally delivered to the governor.

Akiyama accompanied Kuiper on many of these excursions, including field tests in the oxygen poor, cold and remote Mauna Kea area, to help him discuss and fill in the blanks with officials, or otherwise provide moral support.

“I’m just another guy that helped Dr. Kuiper,” Akiyama said humbly. “I provided the transportation, I ran around with him all over the place...” He accompanied Kuiper when he gave a talk at the University of Kansas, to Hawaii County Council meetings...

“He explained to them about the current setup—trying to get community support. (He) talked to all kinds of people. Everybody’s all for it. Even the newspaper backed us. Things looked all right as far as we didn’t have any opposition at the time.”

Akiyama set up the 1964 dedication program. He invited the Governor here, and put together a special pamphlet recognizing Kuiper’s efforts and describing Mauna Kea’s geology, topography, drainage system, climate, vegetation and history, including Hawaiian legends and stratigraphic rock units.

"I mentioned in the pamphlet that we should dedicate this thing (the summit road) to Gov. Burns because he was instrumental in getting the money for us to build the road. So we proposed to name the road Burns Highway."

But in a newspaper report, Burns said, "Don't name it after me. I'm still living. Name it (after) this guy Akiyama." The matter sat quietly until it recently resurfaced 25 years later when two County council members introduced such a proposal. Today, the road apparently still has not officially been named.

Kuiper used his clout to spread the word to NASA and others in the scientific community, attracting national attention to Mauna Kea and the state of Hawaii as a whole.

But in spite of his scientific reputation, Akiyama remembers Kuiper as a warm and personable friend. "He took us around one time when we visited him in Tucson, Ariz." Akiyama recalls. "We spent some time at his home. We had him over a couple of times. One time we had a Christmas or New Year's party gathering in Hilo. We invited him and had bingo. To think a guy like him never played bingo in his life! We made him sit down on the floor and play bingo. He won the prize; I laughed. It was a cute thing."

By 1967, however, the blues skies over Mauna Kea had begun to turn gray. Following the testing and establishment of Mauna Kea's first telescope, Kuiper proposed another cooperative venture involving UH. But this time, NASA was not receptive to the idea of his involvement in Mauna Kea activities because he already had a large slice of NASA support at the University of Arizona and a heavy work load. Woollard added that NASA would not support Hawaii's astronomy program on Mauna Kea while Kuiper was a key player.

The University of Hawaii and University of Arizona thus parted ways. Both sent in separate proposals for more telescopes though at the time UH still had no department of astronomy.

NASA funded the UH proposal, and 88-inch, \$3-million telescope. From there, the UH Institute for Astronomy picked up the baton and led scientists in the race to help Mauna Kea grow.

UH kicked off the project with groundbreaking ceremonies in 1967. The dignitaries in attendance included the director of IFA, a Burns assistant, project manager, UH regent, State representative, other UH personnel, and a state accounting official. Akiyama and Kuiper, however, were conspicuously absent. They apparently weren't even invited.

Still, Akiyama does not regret getting involved—except when it comes to Kuiper's role. "I'm happy to see something like this (the Mauna Kea project) happen," he said. "I was fortunate that I was associated with that. Maybe any other person would have done the same thing. But I was one of the lucky guys that helped Dr. Kuiper. Of course Dr. Kuiper toward the end was squeezed out of the whole thing here by University of Hawaii. I guess (there was) a certain amount of professional jealousy. He was left out and University of Hawaii took over the whole thing. Now the whole area is owned by University of Hawaii. All the different countries that want to provide (observatories)—Canada, France, Great Britain, Japan eventually wants to put a big telescope there—have to get permission from University of Hawaii."

Kuiper returned to the University of Arizona in 1967 and continued as a consultant to NASA. He kept very active in trying to develop astronomy facilities until his death in 1973 in Mexico City at age 68.

Akiyama's unhappiness at the treatment those early founders received, especially Kuiper, led him to write to the Honolulu Star-Bulletin in 1972; "As a former active participant and booster of Mauna Kea's potential 'Mecca for scientific research' first envisioned and discovered by the nation's most eminent astronomer, Dr. Gerard Kuiper, I want to share with you some newspaper clippings and other materials I have kept in my voluminous scrapbook of my past undertakings a few years ago when we assisted the pioneer work of Dr. Kuiper.

"I can say without any hesitation that if not for Dr. Kuiper's diligent search to find the so-called 'best site' in the world for NASA, our beautiful Mauna Kea would still be just another site to see when we have some snow.

"Your editorial of March 28 was outstanding, and we are thankful that your newspaper is pursuing the idea first proposed by Dr. Kuiper that the State should set up the Mauna Kea High Altitude Research and Recreational Facility Committee to preserve and protect our great asset."

In 1984, Akiyama tried one last time to garner recognition from the local community to fit the catalytic work Kuiper did to establish the astronomy program in Hawaii. Akiyama wrote to the Hawaii County Council, thanking them for [page A-18] passing Resolution No. 536. He then took it upon himself to inform the various council members of the 20th anniversary of the dedication of Mauna Kea's first observatory project. He reminded them of Kuiper's key role in Mauna Kea's early astronomical development, and enclosed information on more recent events there. He also informed them of a planetary science prize named after Kuiper, the first of which was presented by his widow, Sarah Kuiper Roth, in October 1984, in Kona.

He then suggested that, in order to make Mauna Kea a "Mecca for astronomical development," the Hawaii County Council should support IFA's idea of having the University of Hawaii at Hilo include more technical courses in its curriculum to be used in training potential Mauna Kea staffers, and have more local residents involved in Mauna Kea operations.

Akiyama further believed the Council should go full tilt in helping to establish more telescopes on Mauna Kea. Akiyama sent background information about Mauna Kea's first observatory and dedication ceremony plus pictures, and dispersed copies of his correspondence with the council to UH-Manoa, Mauna Kea, UH-Hilo, the Hawaii Island Chamber of Commerce.

"I think he (Kuiper) got such a raw deal," Akiyama said. To think he did all the investigations, all the hard work for a good six months to a year... It's really a shame. To think that a person like that who more or less dedicated his time trying to find the best site in the world... He said, 'I found this place. I think I have found the best site in the world.' Yet they just give him the good old shaft. It strifes me to no end."

So how did all of this Mauna Kea business affect Akiyama's family? Although he went to Mauna Kea often, his wife Shizue (the former Shizue Ushijima) tried but couldn't stand the altitude. Their son, Alvin apparently fared better.

One night, Mitsuo Akiyama remembers taking Alvin up there when Gillespie was desperately trying to prepare a site because the contractors were coming the next day. At about midnight, they drove up and used their car lights to take various measurements.

Shizue Akiyama added, "He (Mitsuo) feels that Dr. Kuiper doesn't get enough recognition, so his life seems to be dedicated to getting recognition for Dr. Kuiper..."

Mitsuo Akiyama reflected, “Gee, I’m happy that something like this happened, because there are over eight observatories up here now, and maybe about 200-300 employees. They don’t make only \$10,000-\$15,000 pay. They’re all big earning people. Eventually, I hope more high-paying (local) people—niseis and sanseis—will be able to get a job (at Mauna Kea).

“Then of course if local people get training (and) show some interest, you’ll find more local people with jobs up there (which) is a good sign instead of only plenty haoles.”

...Now retired, former 442 RCT veteran Mitsuo Akiyama can take comfort when he steps out of his home in Hilo on a clear day and looks up at Mauna Kea, knowing he worked hard and tried his best. No one can ask for more than that. [The Hawaii Herald, Friday June 7, 1991:A-19]

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