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 approtation 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. Cushingham," 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, Cushingham, 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 Kīlauea.

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 fleaded 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 40º. 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 30º, 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 pacings, lines, &c., which was a source of great vexation to us…

Douglas speaks also of the "apparent non diminunon 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 48º. 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, yelept "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 form 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.

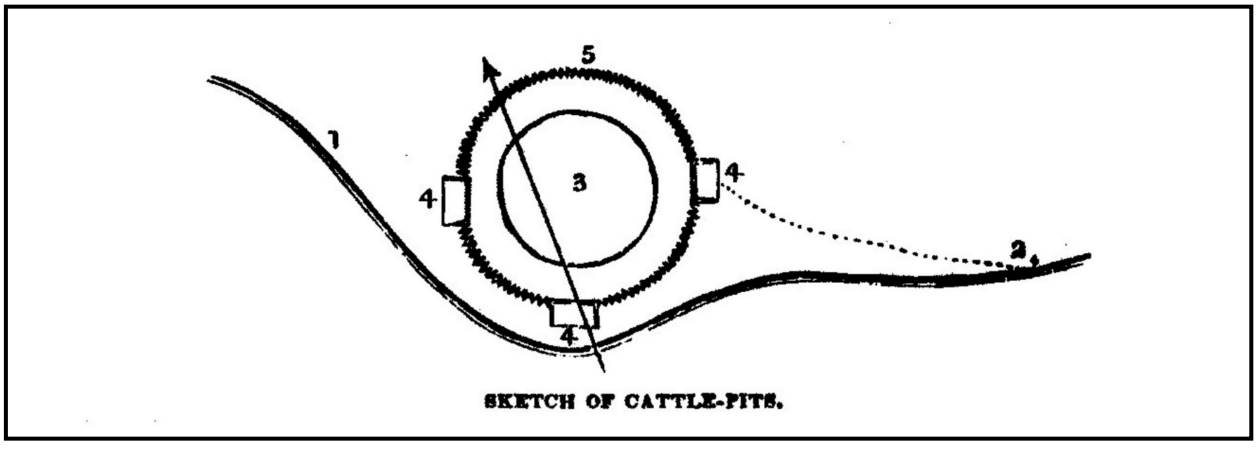
Mauna Loa and ***Mauna Kea*** differ essentially, both in form and apparent composition. Mauna Loa, as has been seen, is one mass of lava streams for the distance of four or five thousand feet from its summit; while ***Mauna Kea*** is found to consist almost entirely of scoria without any craters, unless 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.



SKETCH OF CATTLE-PITS.

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 *Lobelia*s, 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 strewed 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 wonderous 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 boothe 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 vibuscent 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 places 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 vitrifactions, 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]

Kalaiʻeha-Humuʻula-Kaʻohe 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 Hawaiʻi 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 Humuʻula on the Laumaiʻa 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 Kalaiʻeha. 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 hawaiensis*, 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 [ʻĀhinahina, 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 Kalaiʻeha 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 Kalaiʻeha (De Varigny in Korn, 1981:93).

A Trip to the Mountain Lands of Hawaiʻi (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 Hawaiʻi, 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 Waikiʻi. The party then traveled to, and camped at Pōhakuloa; and then continued on to Kalaiʻeha. The first two of Hualalai's narratives provide us with an early description of the Kalaiʻeha 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 cojointly 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 [Kalaiʻeha], and those of another [at Kealapūʻali] 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 Puʻu Lāʻau], and a short descent brought us out upon [page 231] this vast tableland [the Puʻu Keʻekeʻe-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 liked 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 30º. 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 it's 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 owning 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. Owning 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 hoohialaai 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 hoohiwahiwa 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 papaaina 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 'lii, a me na hoahele, 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	Those birds that dwell upon the Mountain.
Kikaha o ka Iwi-Polena	The *ʻIʻiwi-polena* soars overhead,
Ko Hoa ia e like ai	It is like your companion.
Hoolulu Kapena Kaulani	Captain Kaulani called us to shelter,
Ina ae hoi kakou	If we should continue.
Kaalo ana Ahumoa mamua	We then passed before Ahumoa,
A kau i ke one heehee	Rising to the sliding cinders (Onehehe‘e).
A imua, a i hope o ka Lani	The Chiefess moved forward and backwards.
He ihona loa ana Kilohana	Descending the length of Kilohana.
Noho ana o Pumauu i ka lai	Pu‘u Mau‘u sits in the calm,
Au mai ana o Puukapele	Pu‘ukapele juts out,
Kaala i kuu maka ke aloha	My eyes rise up with love.
Komo i ka olu o Kalaieha	We entered the cool of Kalaieha,
Eia mai ke Kuini Emalani	Here is Queen Emalani
Ua wehe i ka pua mamane	The blossom of the māmane has opened.
E o ke Kuini Emalani	Respond Queen Emalani
Kaleleonalani he Inoa	Kaleleonalani is the name.
	[BPBM Archive, *Mele* Collection; call # fHI.M50; Maly, translator]
Hau kahiaka nui ʻo Kalani	The Royal One rises like an early morning dew
I ka huakaʻi mākaʻikaʻi	On a journey to tour and visit
Inā kākou e ʻapa nei	We who are dallying should get in motion
Nā ukali o ke Kuini Emalani	The attendants of Queen Emmalani
A kau i Kalaʻiʻehā puʻu	And rising on the hill, Kalaʻiʻehā
ʻAlo mai huikau [Huikau[16]] i ke anu	Huikau is there in the presence of the cold[17]
Huikau ka helena, e Kalani	The travel is uncertain oh Royal One
A kau i Puʻuhoʻokomo	Until we rise onto Puʻuhoʻokomo
Kāʻalo ana ʻo ka ʻōnū	The rise has passed on by
Molemole o kaʻe koa	Lingering along the fringe of the *koa*[18]
Liʻu nā keiki o ke anu	The children of the cold are slow moving
Hoʻolale ke kaula ʻili pipi	The cattle whip urges us on
Ka lelena o kuʻu kīpuka	My lasso is flying
Hāwele paʻa i ka ʻōkumu	Lashed tightly to the pommel
E ake aku ana ʻo Kalani	Her Highness has a great desire
ʻO ka ʻike maka iā Waiau	To see Waiau with her own eyes
Kau pono i ka piko o Wākea	There at the navel of Wākea, the sky father
I ka hena o nā kuahiwi	In the hollow of the mountain peaks

[16] Huikau is the name of a prominent *puʻu*, a short distance east of Kalaiʻeha *puʻu*. So named because when the mists settle on the ground, travelers are easily confused by the contours of Puʻu 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. Humuʻula being the land on the fringe of the sheltering *koa* trees.

E ō ke Kuini Emalani	Respond, oh Queen Emmalani
Kaleleonālani he inoa.	Kaleleonālani, a name song. [page 112]
A Maunakea ʻo Kalani	The Royal One is at Maunakea
ʻIke maka iā Waiau	To see the lake, Waiau
Kēlā wai kamahaʻo	The amazing body of water
I ka piko o ke kuahiwi	At the very peak of the mountain
Huli hoʻi mai ʻo Kalani	The Royal One turned to come back
I ke ala kāpekepeke	Along that unwieldy path
A he ala nihinihi ia	And it is a narrow, treacherous trail
A hiki a i ka mole [Kamole or Kemole[19]]	To reach Kemole[20]
Ui aʻe nei oʻo Kalani	And the Royal One offered encouragement
"E ʻuleu mai ʻoukou"	"Be lively, all of you"
"He ihona loa ana ia"	"It will be a very long descent"
"A hiki i Wahinekea"	"To reach *Wahinekea*[21]"
ʻEmalani nō he inoa	For Emmalani indeed, a name song
Ke aliʻi ʻaʻe kuahiwi.	For the chiefess who traverses the mountains. [page 115]
…Ō mai ʻo Emalani ke aliʻi nona ia inoa	Emmalani responds, the chiefess for whom is the name
Ia hana i Waimea i ke kapa a ka ua	That activity at Waimea in the blanket of the rain
I kukua mai e Lilinoe	Beaten out as a coverlet by Lilinoe
I humu ʻia mai e Kūkahauʻula	Sewn together by Kūkahauʻula
E ka piko lālāwai o nā manaʻo ā	By the fertile center of the thoughts, ah
E ka wai māpuna o ke kuahiwi	By the upwelling waters of the mountain
I hū nō piha i luna o Paliahu [Poliahu]…	Which gushed forth to overflowing atop Poliahu… [page 180-181]
…Ka helena a Kalani ʻimi pono	…On the journey of Her Highness who strives for goodness
Ua wehe mai nā kumu lani	The foundations of the heavens have opened
Ua ahuwale ka pae ʻōpua	The banks of the clouds are in clear view
Ua kālaʻe nā kualono	The mountain ridges are prominently visible
Ua lono Hawaiʻi a puni	Throughout Hawai'i, all have heard
I ka huakaʻi mākaʻikaʻi	Of this famous sightseeing tour
Uluhua ʻo Kalani i ka lono	Her Highness is vexed at the rumor
Ke kaulana o Kawaihū	Of the fame of Kawaihū
Ia wai ia ka loʻu pali o ka pali	That water on the hanging brink of the cliff

[19] Kemole (Kamole), a *puʻu* 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 Kāne[22] *ka i luna*	Ka houpo o Kāne lies there above
'O ka lua kā ko'i[23] *ka i lalo.*	Kaluakāko'i lies below[24]. [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.

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[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 Puʻu 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, ***Waiʻau***?" My papa said "Yes." To get to the top of that place, Waiʻau, 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 *puʻu*, all over, the same, when you look, and then, when mist settles, this *puʻu* looks like that *puʻu* [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 *puʻu*. 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 Waikiʻi…there were many times that my papa went by Waikiʻi side. And from ***Keanakolu*** you can too. And from ***Humuʻula***, 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 ***Waiʻau***. About six miles, it had a name…

LK: Hale Pōhaku?

JKL: That's it!… By about ten ʻo clock, you can see the sugar plantations at Hilo and Hāmākua, Honokaʻa. You can see Kaʻū side. When you get on top, the piko of ***Mauna Kea***. ***Piko kaulana o ka ʻāina***. 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, ***Waiʻau***, 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 ***Waiʻau***. 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 ***Waiʻau***. Because ***Waiʻau*** is where we are going."

But ***Waiʻau*** is the one that died first, though we were born at about the same time. October. Waiʻau 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 Kaʻapuni-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 Hawaiʻi Island, and your elder was the guide. He took Queen Emma up to reach the top at ***Waiʻau***. Yes. Queen Emma went into the ***pūnāwai o Waiʻau*** (spring of Waiʻau), she went upon the back of Waiʻau Lima. He was a man of Kawaihae. He is a relative. She went upon his back, Waiʻau's back, and he swam across this spring, Waiʻau. 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 ***Kahalelāʻau*** (***Puʻu Lāʻau***), 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 Kaʻaluwea [i.e., James (Kaʻaluwea) Kahalelaumāmane Lindsey].

EKP: Yes. That name was from Queen Emma… from when Queen Emma swam across ***Waiʻau***, on the back of the man, Waiʻau Lima. He was from Kawaihae. He was of chiefly class (*kaukau aliʻi*), 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 Humuʻula, Kalaiʻeha, Kaʻohe, 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 Hawaiʻi was the district of Kaʻū, then on to Kīlauea, and the Puna District. He then traveled into Hilo, and via the old Hilo-Kalaiʻeha 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 Humuʻula area, by the route ascended, and went to Kalaiʻeha, where his party stayed at the sheep station. Dutton and party then departed from Kalaiʻeha, 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 intervale 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 intervale 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, *maniania* 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 intervale 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