

Ahupua`a: A Kanaka Maoli System
of Natural Resource Enhancement, Utilization and Preservation
Marion Kelly, Ethnic Studies Department, University of Hawai'i at Mānoa
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For its indigenous people (*Kānaka Maoli*) island life in Hawai'i encouraged the development of a subsistence economy, which in turn encouraged the ancestors (*kūpuna*), of the *Kānaka Maoli* to devote much of their time to studying the environment and discovering the most efficient and productive cultivation techniques for their crops. The *kūpuna* made certain that, whatever they did, options for future generations were kept open. Sustainability was a priority. Ability to achieve this goal, came primarily from their understanding that they must give to the land and the sea all the energy required for continued productivity. They must care for these natural resources and the crops they produced as if they were their children. Indeed, the story of *kalo* is the prime example of this concept. In it the elder brother, *Haloa*, produces the first *kalo* plant, and the younger brother, also named *Haloa*, is the ancestor of all the *Kānaka Maoli* and whose duty is to care for his older brother, the *kalo* plant (Malo 1951:244).

Resources Are Gifts From the Gods (*Akua*):

In their search for sustainability, their belief system helped them focus on essentials. It was this belief system that enabled *Kānaka Maoli* of ancient Hawai'i to succeed in their mission. In their daily lives they included their nature gods (*akua*), whom they believed were responsible for the land (*āina*), the sea (*kai*) and everything on the *āina* and in the *kai*. The *akua* of which there were many, had made all these resources available for *Kānaka Maoli* to use. In turn, *Kānaka Maoli* accepted the responsibility for taking care of all that the *akua* had created, the land and the sea, and everything on the land and in the sea. If the people cared properly for these resources, and made them productive, they believed, then the gods would be content, and everything would be fine (*pono*). If, however, people abandoned their responsibilities, treated the land or the sea wrongly (*hana hewa*) and failed to care properly for those things that the gods had created, then the gods would instigate some kind of retribution, possibly a drought, a flood, insect infestation, or some other disaster that might result in a famine. Such crop failures reminded people that they had failed to care properly for the gifts that the gods had given them. As Malo explained, "Food was a child to be cared for, and it required great care" (Malo 1951:206).

As it was believed that all these wonderful resources were gifts from the gods, who provided the people with their sustenance, the resources of the land and the sea belonged to all people, and could not be claimed as privately owned by any one person or group. No individual could claim that they "owned" anything, even the chiefs did not "own privately" what the gods had created. Thus, control by the chiefs over the land and its resources was short-term management, not private ownership.

The proper role of chiefs was to act as trustees who managed the gifts of the gods. The beneficiaries were all the people. Chiefs were responsible for correct land management, and they were required to share the productivity of the resources with the beneficiaries, that is, with all the people. A good chief made certain that everyone received a share of the products of the land and the sea, and also were required to

provide access to the natural resources, the land and its resources, the life-giving water, and the sea and its resources were available to all.

A young man learning to be a good chief would, according to David Malo:

learn to care for the people with gentleness and patience, with a feeling of sympathy for the common people, and at the same time to pay due respect to the ceremonies of religion and the worship of the gods, [and] to live temperately... (Malo 1951:53-54).

Productive Zones

Hawaiians recognized and named the various environmental zones of *Kapae ʻĀina*, the Islands of the Hawaiian Archipelago. Having left islands to the south, the Marquesas and/or Tahiti, and perhaps previous to living there, they had lived on many other Pacific Islands, undoubtedly some of them mere atolls with highly limited resources. They brought with them centuries of experience in island living.

The Islands of *Ka Pae ʻĀina*, are volcanic, with most productive land located on the well-watered coastal plains and mid-lands of valleys leading to the central mountains. The distance between the mountain top and shoreline on most islands is relatively short. The earliest island residents observed the broad variety of resources that each valley offered. They observed that the land had a variety of zones, each with its own unique environment and that produced different types of plants. Broadly speaking, these zones were: *Ko Kaha Kai* (along the shore); *Ko Kula Kai* (on the seaward slopes); *Ko Kula Uka* (on the upland slopes); *Ko Ka Wao* (upland jungle) (Handy, E., 1958:213-222). Of course, the *Ko Ka Wao* was divided into the *Wao Kanaka*, "An inland region where people may live or occasionally frequent..." (Pukui & Elbert 1986:382) and above that the *Wao Akua*, "A distant mountain region, believed inhabited only by spirits..." (Ibid.). There, only the rocks prevailed. At the top of Mauna Kea, and other mountains, fine-grain basalt was available for making adzes, chisels, and other important tools.

Land Divisions

After, perhaps, the first millennium of occupation, I would presume that the population had increased considerable. In fact, perhaps to such an extent that, in order to provide responsible management of land use, it became necessary to delineate some land boundaries. *Kānaka Maoli* may then have created boundaries between valleys that were occupied by different families. Perhaps these later became what we know today as *ahupua`a*. The unique characteristics of the districts were recognized and given names. Thus *Kona* is the term used for the leeward areas of the islands, that in most cases are relatively dry, when compared with the windward, or the *Ko`olau* areas of the islands. In early post-European contact period, we find that these districts were governed by certain chiefly families who held management responsibilities over them. These districts, in a fashion similar to the *ahupua`a* divisions, provided their inhabitants with a variety of resources from the uplands to the coastal waters. The districts were called *moku-o-loko*, or *āpana* (Malo 1951:16). In addition, within each district there were the *ahupua`a* sub-divisions that provided families occupying these lands with rights to the resources from the mountains to the sea and beyond.

Thus, they designated *ahupua'a*, as we know them today -- many of them, but not necessarily all of them, from the tops of the mountains down to and including coastal plains, shorelines and ocean. Such a land-to-the-sea parcel provided the residents of an *ahupua'a* with access to its various resources, and within which they cultivated their carbohydrates, as well as obtained protein resources from the ocean, seaward from the shore, at least to the fringing reef, and in some cases, beyond it. The early inhabitants believed that each family had the right to and should be provided with access to the resources that sustain life.

Food Production

Lo'i a me 'auwai:

Where it was possible, because there was an abundance of flowing water, the *Kānaka Maoli* of ancient times constructed terraced pondfields, called *lo'i*, in which they cultivated their primary carbohydrate, *kalo*, or taro.

The terraced *lo'i* were well-constructed with rock re-inforced walls. An irrigation ditch (*'auwai*) was excavated from the main stream in the valley to bring water to the terraces. Using the length of an *'auwai* and its slope, the cultivators were able to build into the irrigation system the necessary controls that prevented, or at least minimized erosion, which might otherwise be caused by water flowing too rapidly through the terraces.

A loose-boulder dam was built across the nearby stream, raising the water level in the stream at the dam, thus allowing water to flow into the *'auwai*. No more than half of the water in the stream was ever taken.

This enabled cultivators downstream always to have water available for their *lo'i*. Control over the relationship between the depth of the ditch at the intake point and the water level in the dam provided water-volume control in the ditch. This avoided the destruction of the terraces in the case of flood waters caused by heavy rainfall entering the *'auwai*. The dam was constructed in such a way that it would self-destruct under extreme flood-water conditions. With a drop in the water level of the dam, water previously flowing into the *'auwai* and to the *lo'i* ceased flowing into the *'auwai*.

The best conditions for taro production includes cool water coursing slowly, but not too slowly, through the terraces. Still water becomes over-heated in the sun and tends to rot the *kalo*. Under ideal conditions, the water moves across the *lo'i*, and drops gently down into the next lower terrace.

In the *lo'i*, some water was taken up by the *kalo* plants, some evaporated by the sun, some sank into the ground water system and some was returned to the main stream at the end of the terraces.

Loko I'a:

Often, near the mouth of a stream, Hawaiians constructed a *loko kuāpā*, or walled fishpond. *Kanaka Maoli* were the only Polynesians who built these enormous walled fishponds in which they raised algae, and herbivorous fish, such as Mullet (*'ama'ama*) (*Mugil cephalus*) and Milkfish (*awa*) (*Chanos chanos*).

The water, having flowed through the *lo'i* and returned to the stream, was highly nutritious. It was often directed into the fishpond at the shoreline. The highly nutritious water provided nutrients for the algae that grew best in brackish water. Thus, a traditional fishpond was primarily a pasture growing algae as food for herbivorous fishes.

Herbivore Food Chain:

Why did Hawaiians spend so much time and energy building walled fishponds where there were many fish in the ocean waiting to be caught. Actually, raising herbivorous fish is the most efficient way to produce protein for human consumption. From algae to large fish to man skips two links in the food chain (see fig. 1)

In addition, the protective wall of a fishpond provided excellent nursery conditions for the growth of many different, inshore, juvenile fish, and it enhanced the natural environment of the shoreline, protected the herbivores from the carnivores and thus, increased the general fish population.

Undoubtedly, *lo'i* constructed in the valley, along with all the other types of cultivated crops, and the fishpond at the mouth of the valley was the ideal Ahupua'a System that runs from *mauka* to *makai*, or from the upland to the sea, and even out into the sea.

Loko Wai:

If conditions were not appropriate for a brackish water fishpond, Hawaiians constructed fresh-water fishponds, such as were found throughout Waikiki. A brief paragraph from the journal of the naturalist, Archibald Menzies, who, with Capt. George Vancouver, walked among the Waikiki taro gardens and around the fishponds in 1792:

We pursued a pleasing path back into the plantations which were nearly level and very extensive, and laid out with great neatness into little fields planted with taro, yams, sweet potatoes and the cloth plant. These in many cases, were divided by little banks on which grew the sugar cane and a species of *Dracaena* without the aid of much cultivation, and the whole watered in a most ingenious manner by dividing the general stream into little aqueducts leading in various directions so as to supply the most distant fields at pleasure, and the soil seems to repay the labour and industry of these people by the luxuriancy of its productions (Menzies 1920:23-24).

Waikiki had many fresh-water fishponds with ducks swimming on and living in the pond, while various kinds of wild birds nested nearby.

Productivity of Mala Kalo vs. Lo'i kalo:

We might ask the question: Why did Hawaiians spend so much time building these pondfield terraces, and their irrigation systems when *kalo* can also be grown in gardens on unirrigated land?

In 1846, Robert C. Wyllie, Minister of Foreign Relations for the Kingdom of Hawaii, conducted a survey among the missionaries who lived on several of the islands, asking them to reply to over a hundred questions on Hawaiian society, past and present. To the question: How many people can be sustained off of an acre of *kalo* land? answers varied. Some claimed that 2 to 3 persons, could be sustained from an acre of *kalo*, while others claimed 25 to 30 persons. An analysis revealed that missionaries who lived where *kalo* was grown in dry unirrigated conditions, reported that only 2 or 3 persons could live off an acre of *kalo*; whereas, missionaries living where *kalo* was grown in irrigated gardens, or *lo'i*, could sustain 25 to 30 persons. The

reason for the great difference was that unirrigated gardens need to lie fallow for one, two, or more years after each harvest, whereas irrigated gardens needed little time, if any, to recuperate between crops.

Breadfruit Forest of Kona:

Some parts of the islands were highly desired living areas, with great access to large fish, such as Kona, Hawai'i, but were without running streams. Hawaiians addressed the problem by providing conditions that encouraged moisture, both rain and dew.

Take Kona, Hawai'i as an example: at about 800 or 900 feet elevation, Hawaiians planted a forest of breadfruit (*'ulu*) trees and cultivated their *kalo* at elevations above the *'ulu* forest. Several eye-witness accounts confirm the existence of the *'ulu* forest, which was estimated to be at least a half-mile wide from *makai* to *mauka* and as long as the eye could see, north to south from Kailua, Kona. A drawing made in the early 1840s by a daughter of Asa and Lucy Thurston captured the forest for us (fig. 2).

Archibald Menzies also recorded this forest in his journal in 1794:

We commenced our march with a slow pace, exposed to the scorching heat of the meridian sun, over a dreary barren track of gradual ascent, consisting of little else than rugged porous lava and volcanic dregs, for about three miles, when we entered the bread fruit plantations whose spreading trees with beautiful foliage were scattered about that distance from the shore along the side of the mountain as far as we could see on both sides (Menzies 1920:154).

Menzies continued his journal as he walked inland through the *'ulu* forest and above and beyond it, he came upon the dry-land, *mala kalo* gardens.

As we advanced beyond the bread-fruit plantations, the country became more and more fertile, being in a high state of cultivation. For several miles round us there was not a spot that would admit of it but what was with great labor and industry cleared of loose stones and planted with esculent roots (taro) or some useful vegetables or other. In clearing the grounds, the stones are heaped up in ridges between the little fields and planted on each side, either with a row of sugar cane or the sweet root of these islands [he refers to the ti plant] (*Dracaena ferrea*, Linn.) where they afterwards continue to grow in a wild state, so that even these stony, uncultivated banks are by this means made useful to the proprietors, as well as ornamental to the fields they intersect (Menzies 1920:75).

These *'ulu* trees (*Artocarpus altilis*), of course, grow 80, 90, to a hundred feet high. Planted far apart, they spread out their branches and large leaves to cool the earth below. At the proper distance apart, they allow for double cropping. In addition the *'ulu* trees provide two food crops annually. *Mauka* of this forest the dry, *mala kalo*

gardens flourished and above them the banana plantations were cultivated on the edge of nature's treefern forest.

Conclusions

Perhaps we should take a verse out of a Hawaiian planter's chant and develop our own nature-enhancement program that preserves resources for the future, rather than destroys them. Surely, there are things we can learn from the ancestors of the indigenous people of these islands, the Hawaiian planters.

Three events that bear the greatest responsibility for destroying the *ahupua'a* system was the Mahele of 1848; the law enabling foreigners to own land in Hawai'i passed in July 1850; and the Kuleana Act, passed the following month, August 1850. It was the Kuleana Act that permitted the Board of Commissioners to Quiet Land Titles to determine who, among those who had registered their *kuleana* claims between February 1846 and February 14, 1848, were eligible to receive *kuleana* awards.

In order to be determined eligible to receive an award, claimants not only had to have registered their claims during the two years preceding the deadline of February 14, 1848, but they also had to attend hearings that were held, beginning in August 1850, and continuing for some months.

At the hearings they had to present two witnesses who were willing to testify as to the claimants' right to the occupation of the land identified in the claim. The claimant had to have the permission of the chief (*konohiki*) whose land surrounded the *kuleana* parcel, claimed by the *hoa'aina*, the cultivator. He also had to have two witnesses that confirmed his occupancy of the parcel he claimed for at least two years prior to registering his claim. The witnesses also had to confirm that there were no other counter claims to the parcel of land. The chiefs who received the *ahupua'a* land that surrounded the *kuleana* being considered, were allowed to be at these hearings and to give testimony against the claimant if they so wished. And they did so in some cases.

The rules adopted by the Board of Commissioners restricted the awarded land to that cultivated to feed the owner and his family. Any land, the produce of which was taken to market, that land would not be awarded to the claimant. This, of course, prohibited the *hoa'aina* from participating in the market economy at a time when it was important to have access to money.

If a cultivator (*hoa'aina*) received an award, then it had to be surveyed and the surveyor paid for his services. By 1859 the government instituted a land tax, to be paid only in money, cash. No longer were government officials willing to be paid in bark cloth (*kapa*), dogs (*'ilio*) or pigs (*pua'a*). The result was that people living in the rural areas often had to leave their land to get a job that would pay money, so they could pay the tax on their land. If there were no one to leave on the land, it was sometimes used by others, a sugar plantation, for example, and then claimed through the adverse possession law, even though the owner continued to pay taxes on his land.

By my figures approximately 25 to 30 percent of the males received awards and the remainder were made landless as the primary result of the Mahele of 1848, and the Kuleana Act of 1850. A law passed in 1850 called the Vagrancy Law, allowed people found wandering and not being able to explain satisfactorily how they made a living, could be jailed for a year to do hard labor building roads, or they could be assigned to a sugar plantation to work out their jail time.

Kuleana are still being lost by Hawaiian families today through laws that allow taken lands from rightful owners through court action, even though the family has

continued to pay the taxes on their land. Laws of inheritance allow land to be alienated relatively easily. It is a very sad story.

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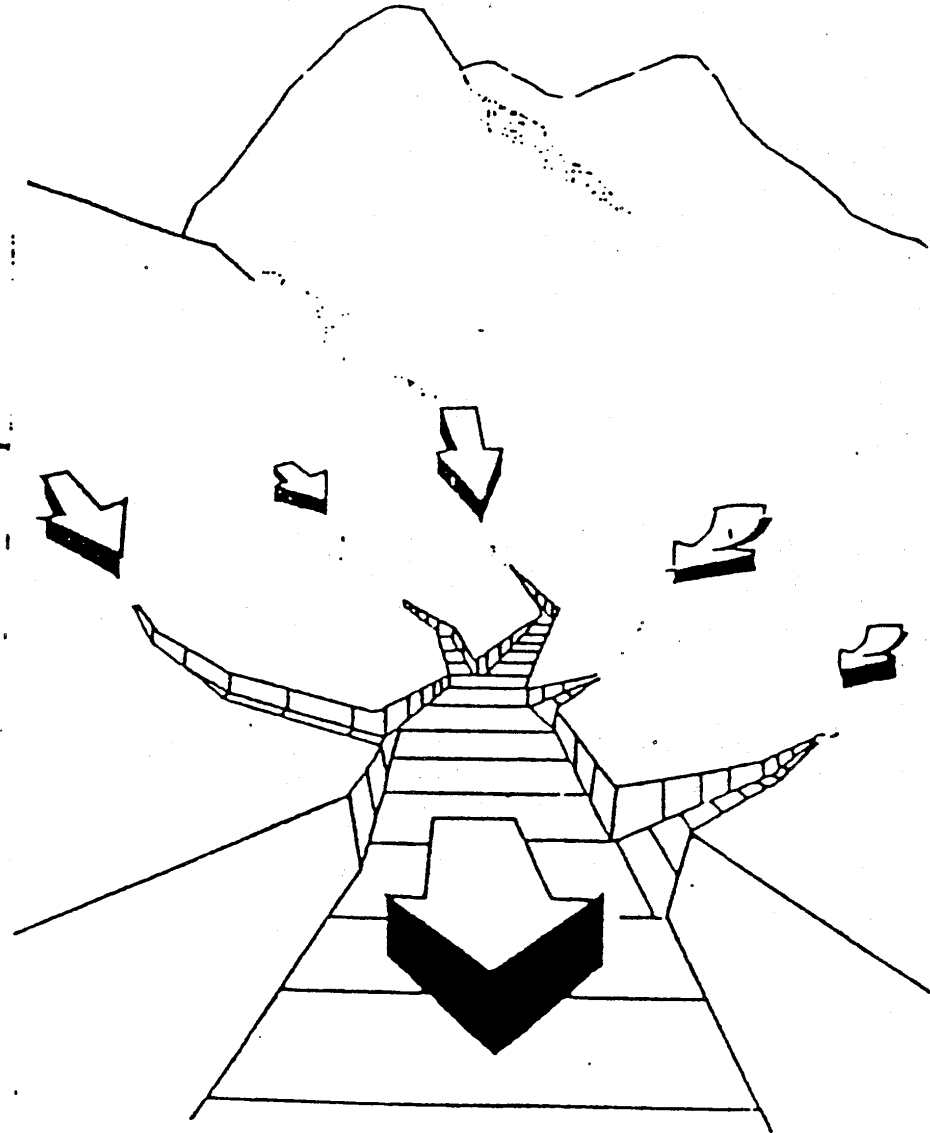
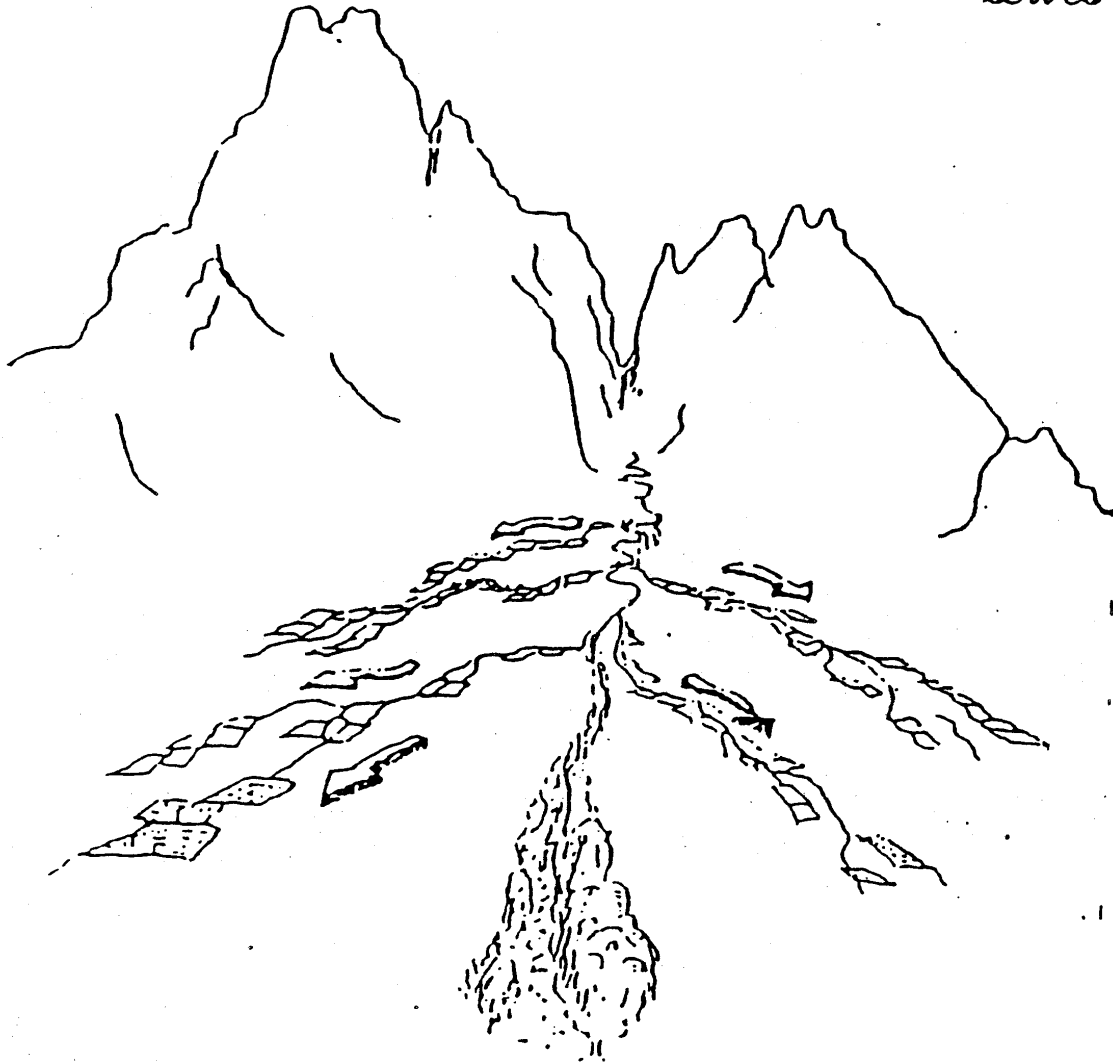
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PRESENT DAY FLOOD RUNOFF

CENTRALIZED LOWLAND CEMENT DIKE SYSTEM

serves bureaucratic-capitalist agencies



DECENTRALIZED UPLAND AUWAI SYSTEM

communal-served people land & sea

by

John Kelly

Figure 1

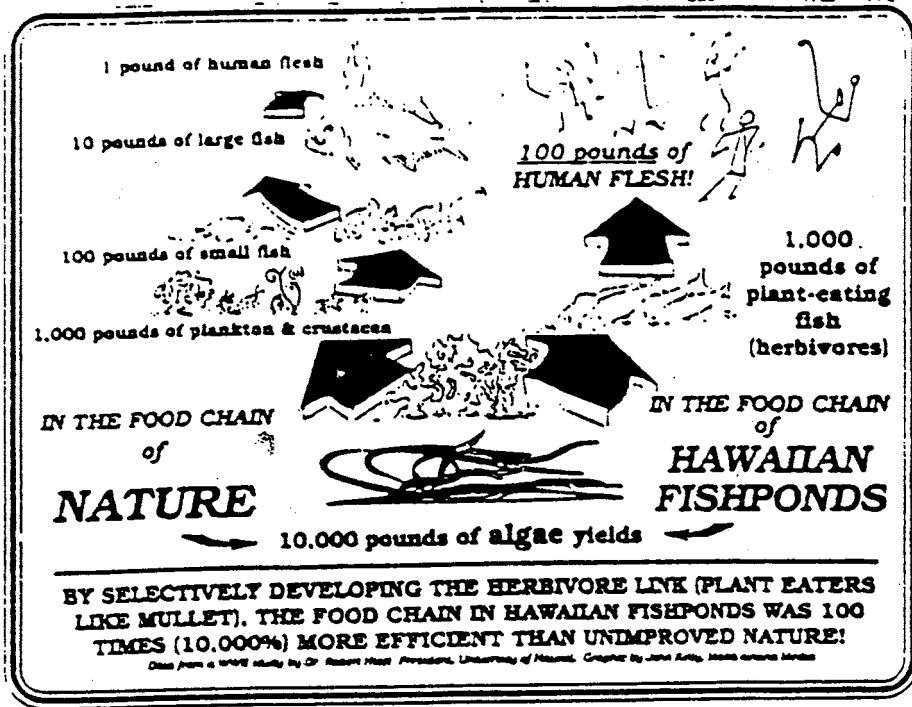
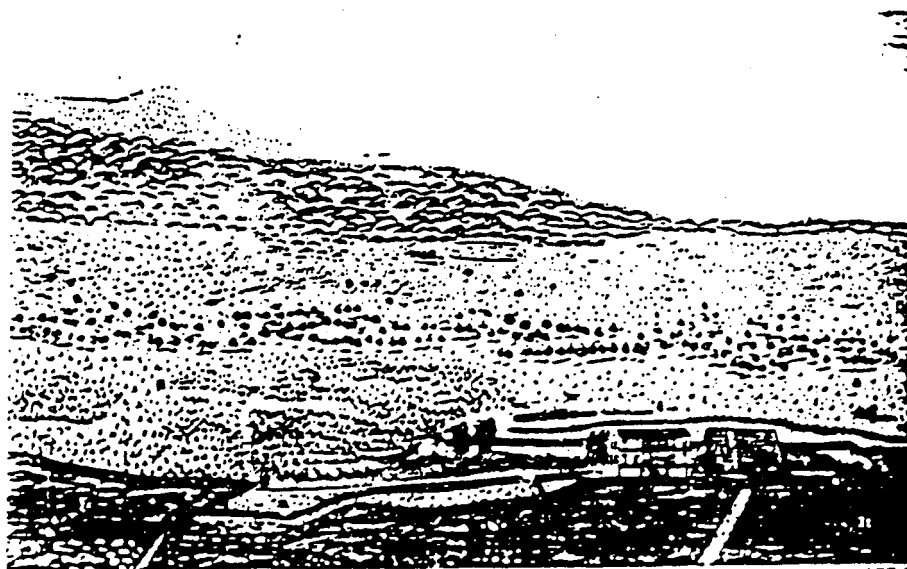


Figure 2



Engraving of the "View of the Country back of Kailua" after a drawing by Miss Thurston

