

Observations on Varieties and Culture of Taro  
Written by Queen Emma.

Outline of paper on Taro.

The kalo or taro (Arum esculentum), differing slightly from the Arum maculatum, is the staple food of the inhabitants of these islands. It is generally steamed underground or toasted. Formerly it used to be cooked, sliced, and dried in the sun, as a substitute for bread for people employed in the fur trade on the northwest coast of America.

The culture is varied in different soils, different situations, localities, and is regulated by a supply of water from aqueducts, springs, marshy lands, or by rain and dew only. In this neighborhood, for instance, the soil is entirely volcanic, and requires oxydization by exposure to air and sun before it is fertile (pulu). A spot is selected, dug and left, the surface soil or oxydized portion is preserved, the pit or tank is then dug out, the bottom is reduced to a perfect level, the banks wet by a small aqueduct led around the sides of the patch (which (the floor of the water) also tends to prove its level nature). They (the banks) are covered with mats and beaten with stalks of coconut leaves or smooth pieces of heavy wood until watertight. The loose soil, formerly preserved by a species of trenching, is strewn on the bottom as level as possible and about a foot thick. The water is then let in, and when it covers the soil about 6 or 8 inches, as many persons or oxen as can be procured enter it and trample it into soft, almost liquid, mud in order to amalgamate the soil and allow it to find its own level and close up any leaks there may be in the bottom. This takes some hours, according to its size (the size of the patch), and the number of feet or hoofs employed. It is now left to settle. Refreshments and merry-making follow after this part of the performance, and by the next day the patch is fit for planting, and the sooner it is done the better, in order that the young roots may grow out before the soil becomes firm, in

which case much more labor is required to loosen the soil where each huli is planted.

Planting.

It is advisable to collect a sufficient supply of shoots to be ready to plant immediately, but this is not always possible. Formerly they were given reciprocally, but now they have to be purchased, unless supplied by some kind and rich friend. The shoots, or plants, are the tops of the offshoots or suckers of the main plant. When the kalo is gathered there are generally upwards of four offshoots from the main plant, called oha, like the main stalk, the tops of these are scalped, as it were, from the top of the bulb and deprived of their leaves, tied up in bundles of 40 or 400, and preserved in moisture for planting or for sale. This is what may be called the "seed" of the kalo, while the main stem will give only a single root, without any offsets, and is therefore thrown aside as food for the hogs. A sufficient number of shoots of the varieties known from experience to be best adapted to the location are provided. If the patch is a new one they are stuck singly in the mud in regular lines or fanciful forms at about two feet apart thus:

• • • • • Each line is called lalani, and so sold, -if sold while  
 • • • • • growing. But when the soil becomes impoverished from frequent use and shoot fallows, the mud is collected in heaps, called pupu kolea, and three or more plants are placed in each pile. When still more impoverished, for it is a very exhausting crop, larger heaps have to be formed and planted almost dry (and covered with rushed) fifteen or twenty in a bed or, as it is called pu'epu'e. After this the patch requires a few years of lying fallow.

Plants should be carefully selected from the varieties best adapted to the locality and nature of the soil. The usual way they are procured is to purchase a fine thriving patch in the neighborhood, (a patch) abundant with oha, while the plant is in a state of water fallow (see manure). The sale of the kalo will usually repay

the outlay and the shoots will repay the expense of clearing and re-planting your own patch. Of course, those who have a series of patches provide for thier own needs, but with this constant change the patches and plants will wear out, so that it is necessary to allow a period of dry fallow for the patches, and make them over again and regenerate your plants by transplanting into the wet vegetable soil in the mountains, and, vice versa, to take regenerated plants from the mountains to plant in your patches. Some people suppose these were different kinds, but that is not the case. When the patch or pond is intended as a fish pond the beds are made larger and bound together by various contrivances to prevent their flowing away, as the water is necessarily much deeper to allow room for the fish and weeds on which they are fattened.

#### Varieties

I will here mention a few of the favorite varieties, prefacing, however, with the remark that they cannot be divided into hard and soft kinds, as that depends much on the nature of the location, as for instance, the haokea in the upland of Hawaii is the acrid, stinging, rose-colored, hard plant, while in the irrigated patches of the other islands it is white but firm. Planted in the patches, self-supplied by springs, called puhuwai, it becomes soft and flabby. One of the favorites is the ipu-o-Lono. The piko kea and the ipu-o-Lono-piko-ula are two of the most productive. The hardy apowai follows next, then the haokea piko. The prolific haokea-piko ula, the purple stalked makaopio, the three kai (varieties), -koi, ele'ele and ke'oke'o- with the larger oha varieties, the mahāhā, the two ku'oho-hai and piko, the splendid dark green leaved lehua, which makes the snow-white poi, the lauloa, the mamanu, the manini, the three manao (varieties)-piko, kea and ulu-, the heula, the red and black hoene, the red and black weo, the deep purple uahi a Pele, the kalola, the tabued dark piialii, the purple makohi, the dark red nohu, the hapuupuu, the white, prolific, quick growing kalaniu, the marsh loving, purple poni, the manauwea, the wild mountain ape, with its enormous leaves, the iliaa, the mokihana, the kapala,

the uhai, the naicea and the old favorite, lihilihi molina.

Having selected your huli, or plants, while the mud or rather clay, is barely covered with water, plant them in the manner before mentioned, taking care not to introduce too much water, as the plants will rot if the center shoot is under water, or float off and be drifted away by the wind (if not planted securely). After all the expense and trouble of preparing and planting a large patch, nothing is more provoking than to have strong winds and rain set in against you (threatening your work). Provide (against this) by making a drain to let off the water so that only enough will remain to keep the earth soft, but not stiff enough to hold the plants. As the plants take root, a little more water may be admitted in fresh soil, but not yet in old impoverished (soil). The plants now throw out leaves fast, and if not plucked off two or three times the plant runs to leaf without rooting (wele). The rushes (kohekohe) must now be pulled carefully as well as other weeds. When the plant becomes firmly rooted, and the offsets begin to shoot out, less care is taken of the quantity of water admitted. The small rushes are weeded out about once in three or four months. The plant continues to increase in bulb and leaf from six to twelve months, according to its location. It then flowers, the leaves begin to shrink in size. The rushes are suffered to grow, as it is said to ripen the kalo. The plant appears to dwindle daily and the leaves to sere. It is now called ripe. Some kinds, as the lehua, must be gathered at once or they rot in the earth. Other kinds, as the apowai, ipu-o-Lono and hackea, will bear a few weeks' delay.

(Gathering and preparing)

Having made the patch, planted and raised the kalo, we now gather and prepare it for food. In stiff soil the earth requires loosening before the tubers can be pulled, but in old patches all cohesiveness of the soil seems to be lost. When gathered they (the plants) are tied together in bundles by the tops, or leaves, and carried away on poles (mamaka) borne on the shoulders. The main plant and oha having been separated, the tops are cut off, and with them a very small portion of the root.

Those of the main plant are rejected but the tops of the offsets are preserved for seed. The root is then washed and prepared for cooking. A hole is scooped in the earth in which a quantity of firewood or turf of some combustible (material) is placed, a quantity of porous lava (rocks) are then very ingeniously arched over it, the fire is ignited and the stones are heated to a red heat. As the arch falls in, the kalo is piled on the hot stones, a quantity of water thrown on and (the pile) is immediately covered with ki leaves (*Dracaena terminalis*), or banana leaves,- if these are not procurable, with mats or rushes. The earth is then heaped on in the form of a cone. In a few hours the cooking is completed, the oven is opened, the hot steaming kalo contains all its nourishing juices, and its acrid ones are destroyed. It is taken out, again washed, and the outer coat taken off. After a third washing it is fit for food, and in some places used most frequently in this state, but (in general) the favorite manner of using it is in the form of poi. This is prepared in the following manner. The kalo root while yet hot is beaten on a large wooden trough into a mass called ai-paa, or "hard food", in which state it is sent from island to island for sale, and even exported to other countries where there are many Hawaiians living. In this state it will keep, if in tight casks, for many months quite fresh, but not unless headed up before fermentation commences. It must be a strong cask that is used to contain it. When sent among the island it is simply (but) ingeniously packed in ki leaves or in those of lauhala. It soon becomes sour and requires cooking over again before being made into the ever-beloved poi.

But when it is made into poi at once after coming from the oven, it is pounded into an unpalatable mass and gradually reduced, by the addition of water, to the required consistency and used in that state. If consumed, as it usually is, before fermentation takes place, it gives a placid, sleepy sensation of repletion, so conducive to idleness, but when fermented by the process it naturally has to undergo in the stomach, it forms a light, nourishing food, and the quantity of undigested matter is much diminished. Nevertheless, it contains a large quantity of waste matter and, like all substances containing much carbon, tends to increase obesity rather

than (produce) muscular fiber.

It is singular, but nature seems to have implanted in the native the intuitive knowledge of the gastric fluid, for although his poi may be fresh or acid, he always eats his poi with the accompaniment of salt. (literally: makes the addition of salt with his poi.)

When the kalo is used as an article for the table by foreigners, it is usually boiled, cut into slices, and fried in lard or butter, and it makes one of the most delicious and satisfying vegetables that I know of. The hard poi, or ai paa, is also fried like fritters and, with a little banana enclosed, makes a very delicious dish. When simply boiled, I think it is preferred by many to the Irish potato.

But the use of the kalo as food is not in the root alone. The young leaves when raw are intensely acrid, but not so when cooked in the earth oven, alone or with other foods. The national dish, which has often been written about, called luau, when enveloped in ki leaves and roasted on the coals, is equally palatable. When boiled in water and served, it forms a dish equal, if not preferable, to spinach. The central shoots are called haha, and are tender, delicate, and similarly cooked, quite resemble asparagus. Every part of this plant is used medicinally, the raw root, the papaa, or baked crust, and the luau are all used in bowel complaints, while the haha, cooked and eaten hot, are used as a demulcent and expectorant in coughs. I need hardly add that most varieties of this genus of plant are extremely acrid and disagreeable before being submitted to the action of heat.

(Productiveness)

Much has been written and more said about the productiveness of the kalo. I allow that it is a very productive plant far exceeding rice, wheat or potatoes in returns, but not without a proportionate expense of labor. Labor expended on the taro plant and properly applied will, with the assistance of good irrigation,

give a return in produce far greater than any other farinaceous plant that I am acquainted with. But the question naturally arises, are the returns in produce and actual nutrition in the same ratio, and this question I confess myself unprepared to answer. The world has been much misled by an article published some years ago in the "Hawaiian Spectator" in which it is stated (and it has been copied into various other works) that a mere forty feet of taro patch were sufficient to support a single individual. This is a complete fallacy, entirely devoid of possibility of verification. The richest land in the world could not sustain a depletion similar to that occasioned by the cultivation of kalo for more than a few successive years without manuring or fallowing, supposing it to be constantly planted. Even in the most fertile spots, fed by water courses bringing down a constant supply of silt, the patches have to be vacant for some months between each planting, as is the practice usually with the natives, who are accurate observers of such things. During a period extending, according to their simple calculations, through three growths of kohekohe, which is the only manure (the patch lies fallow). The usual procedure by them is to dig it up and turn it over, although a thick layer of kukui leaves is said to be a particularly good fertilizer for an old patch, but this I learn from tradition not practice. Then after a while the dry fallow becomes necessary and all the labor has to be done over again, during these fallows, wet and dry. Where does the poor occupant of forty square feet derive his sustenance (during this time) even if he could be sustained by kalo alone, without salt or any other change in his sumptuous diet? In the neighborhood of Honolulu the kalo arrives at perfection in a much shorter time than it does in the valleys close by, in which it requires a period of not less than thirteen months, frequently a longer period. But in the upland of Hawaii, watered only by the rain, the growth extends during a period of several years, the main plant being suffered to remain (in the ground) while the oha are gathered. These koele, or plantations are called, I believe, Pahūpahū maloo. Of course, the size of the roots depend upon the depth of loose soil, and the care bestowed on its

cultivation. I have produced kalo which averaged twenty-two inches in length and the same in circumference when it was cultivated under my own eye, but far less in the same locality when the cultivation was somewhat neglected by my konohiki. (steward)

Perhaps no plant has fewer enemies to its culture than the kalo. This is probably on account of its acidity in its uncooked state. However, hogs and ducks of all kinds are very destructive visitants in kalo patches for they devour the plant. Cattle injure it by trampling down the leaves, and that retards the growth of the root.