

MEDICINAL PLANTS OF TONGA

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MASTER OF SCIENCE

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By

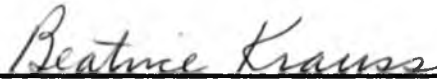
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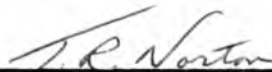
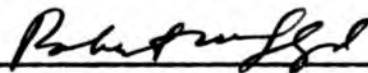


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## ACKNOWLEDGEMENTS

I had been intrigued by the curious scents and shapes of dried plant samples from Samoa at Leahi Hospital for several months but my work in Tonga really began when Ted R. Norton gave me the paper by R. E. Schultes "The Widening Panorama in Medical Botany" (25). Here I found a scientist and scholar who was able to incorporate his impressions of the physical beauty of the Andes into his strict ethnobotanical writings. This paper led me to wonder if the area of research known as ethnobotany might allow me to attempt to satisfy an early dream; to combine the elements of science with the elements of good literature.

Shortly after reading Schultes' paper I became interested in the drink called kava and contacted Beatrice Krauss who was teaching at the University of Hawaii. Miss Krauss and I discussed the possibilities of a field trip to the South Pacific for purposes of studying medicinal uses of plants and she suggested that I might secure funds for this purpose from the Hawaiian Botanical Gardens Foundation. They approved a research grant for my proposed study and I set out to make final arrangements for the expedition.

During May 1969 I was "xeroxing" in the room set aside for this purpose in Leahi Hospital when I began to randomly browse through the stacks of dusty medical and science journals that were stored there. My eye caught a two or three line reference to an offering by the Explorers Club of

the American Museum of Natural History. Small grants were available for the purpose of aiding scientific field exploration and communication with them resulted in very encouraging financial and emotional assistance. I am especially grateful to Hobart M. Van Deusen for securing this grant.

As if the above good fortune was not enough I was soon to receive additional financial assistance in the form of a salary in exchange for my collecting crude drug samples for the ongoing program Natural Products of the Pacific. For securing this assistance from PHS grant GM-15198 I am grateful to Ted R. Norton and Terence A. Rogers.

The source of all information pertaining to the uses of plants in Tonga is the people of Tonga. For their great friendliness I am profoundly grateful. I would especially like to thank King Taufa'ahau Tupou IV for extending to me all the courtesies of his kingdom.

As is commonly so in the projects of all men there are many other people who fit into the chain which extends to Tonga and back again to Honolulu. I would like to express my appreciation to them as a whole and my hopes to return the favors in the future.

Finally I owe to my faithful wife Janet Ann the promise of a new life for her continued support of my yearnings.

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## I. INTRODUCTION

"One of the first aspects of primitive culture to fall before the onslaught of civilization is knowledge and use of plants for medicines . . . our challenge is to salvage some of the native medicobotanical lore before it becomes forever entombed with the culture that gave it birth."

Richard Evans Schultes (25)

Historically there have been numerous botanical collecting expeditions organized specifically to gather plants used therapeutically by "primitive" peoples. In 1602 Sir Walter Raleigh chartered a ship and sent Bartholomew Gosnold to the coast of New England to gather the bark of Sassafras albidum Nees. In 1716 Peter the Great directed the botanist Breynius to examine the flora of Russia for new drugs. In 1885 Parke Davis and Co. initiated investigations in South America which resulted in the manufacture of cascara from Rhamnus purshiana DC. and cocillana from a species of Guarea. Both of these drugs are still used today (9).

Other expeditions conducted primarily by investigators, interested in the cultural attributes of primitive societies, have also yielded valuable information regarding the uses of plants for medicines. However, as is commonly the case in anthropological writings, specific references to the species of plants in question are not usually verifiable due to a lack of voucher herbarium specimens.

Individuals interested in the beauty of plants have also made valuable contributions. The botanical explorer Richard Spruce investigated the flora of the Amazon and the Andes



primarily to experience the beauty of growth and existence in an undisturbed environment. The thought of extracting plant substances with the goal of discovering pharmaceutical agents was uninteresting to him. Still, his esoteric investigations greatly increased our knowledge of the quinine tree Cinchona succiruba Pav. ex Klotzsch (24). He collected over 100,000 seeds of this species and several hundred live specimens were planted in India and Ceylon in the 1860's (16) from which a great industry has grown.

Veritably then, until this century, work within the field of ethnobotany was usually done as a secondary project by the professional botanist or anthropologist, and by interested laymen (24). It was not until 1895 that Harshberger created the term ethnobotany, the meaning of which has since been interpreted and used as a guiding force in the study of non-industrialized man and the plants of his environment.

As Schultes (24) points out this is a science that requires an interdisciplinary approach and may be pursued through several avenues; by an examination of the literature of missionaries and travelers, by a systematic survey of the notes on herbarium labels, through analyses of fossilized plant remains, and/or by investigating the uses of plants in the field.

Field work is fast becoming the most crucial area of concentration for ethnobotanists. With the rapid approach of civilization into once very remote areas, the therapeutic application of plants is being superseded by modern

pharmaceuticals. In the South Pacific this process of acculturation is occurring very rapidly. It is estimated that with the passing of one more generation little of this knowledge will survive in Polynesia.

It is for this purpose, to record the uses of plants in folk-medicine, that I went to Tonga during the months of September through November, 1969.

The literature on diverse native floras and the medical uses of each plant is voluminous, however, the flora of Tonga has never been surveyed for this specific purpose. Strict botanical investigation on the islands began with Banks and Solander who accompanied Captain Cook on his first voyage in 1769 (11). There have been numerous other collectors in the archipelago and four comprehensive reports of the flora of Tonga have since been completed (32, 10, 4, 11). Plants of Tonga by T. G. Yuncker (32) stands as the basic reference upon which this survey was based. Yuncker's carefully recorded list of native names was especially valuable.

The results of several ethnological and other first person accounts have been utilized in this paper (7, 17, 15). Although several interesting anthropological studies are recorded, information regarding Tongan medical practices is scarce.

Although it would be interesting to slowly decipher the conceptual structures which underly the mechanics of medical treatment in Tonga I have attempted only to describe the techniques and practices that are still employed. It has become a

question of salvaging the knowledge which still remains before it becomes too late to learn anything about traditional Tongan medicine.

The Tonga archipelago is situated in the south Pacific Ocean, between 15° and 23° south latitude and 173° and 177° west longitude. The islands are clustered in three main areas. The northern, central and southern groups are known as the Vava'u, Ha'api and Tongatapu groups respectively. Scattered over 20,000 square miles of ocean, the land area of the more than 150 islands is about 269 square miles. Only 36 of these islands are inhabited with a total population of 77,585 individuals (1966 census). More than 48,000 are living in the Tongatapu group. Tongatapu island is the largest in this group with an area of almost 100 square miles. Nuku'alofa with an approximate population of 15,000 is the largest city in Tonga and the capital (14).

## II. A REVIEW OF MEDICAL PRACTICES IN TONGA

A fairly detailed description of medical practices in Tonga is found in William Mariner's Account of the Natives of the Tonga Islands (17, pp. 240-273). This account was related to J. Martin by William Mariner who was shipwrecked somewhere in the archipelago in the early 1800's. (It is interesting to note that the first Europeans to arrive in Tonga were missionaries sent out by the London Missionary Society in 1797.)

Martin reports that around the year 1800 few plants were used in treating illness. Sickness was thought to originate from an outside force and all remedies used by the Tongan were reasonably categorized by Martin into three groups; invocation, sacrifice and external operations. When plant remedies were employed they had no effect, either upon the disease or the patient. Martin states that such remedies were held in "little esteem" for when the reigning king's daughter became seriously ill plant medicines were not considered (17).

Martin does refer, however, to the uses of three plants: to reduce ophthalmic inflammations the juice of the vi (Spondias dulcis?) was used; following circumcision the end of the penis was wrapped in the leaf of gnata'i (Erythrina spp.?); and the ulcerated sores of venereal diseases were treated with powder of turmeric, which is found in the fleshy rootstock of Curcuma longa.

Martin states that "the idea of giving (plant) infusions

was first taken from the natives of the Fiji Islands." The Tongan also learned the practice of surgery in Fiji where constant wars afforded great opportunities for practicing this art. The three most important operations then practiced in Tonga were cawso, or paracentesis thoracis (drainage of fluid from the chest cavity); tocolosi, or an operation to cure tetanus; and broca, or castration.

Charms and amulets were not employed in ceremonies for the patient. Sacrifices were common and horrors such as tootoonima and nawgia, the cutting off of fingers and the strangling of children respectively were frequently employed when a noble lay seriously ill.

A story is related by Martin which gives us insight into the attitude of one Tongan man toward disease. During an apparent conflict between a visiting Hawaiian and a Tongan both of whom had offered to cure Mr. Mariner of "a disordered state of the stomach and bowels, attended with headache and drowsiness" the Tongan laughed at the Hawaiian's infusion made of unnamed leaves and roots which was said to be powerful enough to kill a man if taken in a large dose.

To the Tongan, the idea of curing a sick man by means which would make a healthy man sick was absurd. He offered instead to let some of Mr. Mariner's blood by scarifying his arms and legs with shells.

The Hawaiian, to prove his own faith in the plant decoction, imbibed a dose equal to that prescribed for the sick man. Mr. Mariner followed the example and was well the following morning.

Apparently then, the use of plants in medicines must have flourished in Tonga sometime after Martin's report in 1817.

Today the uses of plants in medicines is vanishing. There are hospitals in each of the main island groups and dispensaries located in several towns. A new hospital with modern surgical facilities is near completion on Tongatapu. There are many people, however, who still carry the knowledge and use plant cures, but mainly for treating minor problems. (For a breakdown of infectious diseases and causes of deaths among the Tongan people, see Table 5 in Appendix A.)

One revered practitioner (Uia) refers his patients to the Government Hospital or the Catholic Sisters if they are suffering from what he thinks is a "European" illness. He discerns the origin of a disease by "touching the patient in the body and face" and disclaims himself from treating illnesses that originate outside of Tonga.

One woman practitioner was called upon to prepare a remedy for a patient only after the woman--suffering from a serious fungal infection on her hands and arms (Plate I)--had visited the dispensary six times. Ointments given to this patient by the local dispensary proved ineffective. It was learned through Mumui Tatola that the six different ointments that were prescribed were of the antibacterial variety. Only an antifungal antibiotic would have worked in this case. After treatment with the plant remedy, a concoction of the leaves of Solanum uporo, Evodia hortensis, and Capsicum frutescens the

patient reported that she was able to sleep, no longer kept awake by pain.

Collocott (7) believes that diagnosis proceeds by a series of trials with different medicines. He reports that one cure after another is tried until one is found that cures, or until the patient dies. As in Fiji different practitioners have their own special cures. For each of them the etiology of a disease is unimportant. What matters is knowing if a certain condition is one which they can cure (23). Each practitioner is highly specialized and may treat illnesses associated with only one body system. Some practitioners will treat all illnesses but are specialized in that they treat only children, or the aged. I did not encounter any practitioner who diagnosed a complaint through communications with the supernatural world, however, there is one reference in the literature which indicates that there is some belief in the psychological causation of certain diseases. Churchward's dictionary of the Tongan language defines the word sausau as a bundle of leaves buried near a tree and believed to cause sickness to anyone taking fruit from the tree. The word fula is defined as a swelling caused by breaking a tapu (a cultural restriction), especially by eating a chief's left-over food (6).

Few plants are cultivated specifically for their medicinal value and many useful species are found growing in villages. Most medicinal plants are collected in "the bush", or near the sea. There do not appear to be any special harvesting techniques and the leaves, bark and roots are taken from any plant

of the required species.

Most medicines are prepared in the form of infusions. Generally, a handful of the required plant part is wrapped in a clean white cloth or the stipule of Cocos nucifera and squeezed five or six times in a half coconut shell of fresh water. The resulting filtrate is usually taken once daily until the patient responds to treatment. In all cases where stem or root bark is used the cork layer which might contain foreign matter is removed by scraping. The inner bark is then removed and utilized in medicines.

An important ingredient in many plant remedies is "Tongan oil". This is prepared by pounding together the endocarp of the nuts of Aleurites moluccana with the leaves or flowers of Melastoma denticulatum, Decaspermum fruticosum, Cinnamomum spp. and Coleus amboinicus. Into the mixture is added the oil of grated coconut flesh and the intermediate product is allowed to sit overnight. The following day the mass is kneaded and pressed against a sheet of corrugated iron and the "Tongan oil" flows off the sheet into a waiting basin. Fragments of plant parts are strained out through a piece of tapa cloth and the remaining mixture is left in the sun to evaporate the moisture. The oil is then poured into glass bottles stopped with tapa and stored until ready for use (15). Massaging accompanies most remedies and the oil is usually used for this massaging.

Illnesses have been categorized into three divisions by Collocott (7). One large group is characterized by illnesses thought to be caused by ghosts of deceased relatives. The



second group contains disorders such as broken bones or sprains which are called fasi and are usually treated by massage. The third class is composed of skin disorders and include boils, ulcers, rashes and tumors. This class is known in Tonga as hangatamaki.

Several questions pertaining to folk medicine in Tonga remain unanswered. Why is there no record present or past of the employment of hallucinogenic or narcotic plants by the Tongan in his medical or religious rites? Has there been less need for these agents than in many areas of South America and Asia? Have these Pacific islanders been less inquisitive about their flora? There are several plants used as psychomimetics or narcotics in other parts of the world which are found in Tonga; Datura stramonium L. (5), Capsicum sp. (26), Solanum nigrum L. (21), and several species which contain ergoline alkaloids which are capable of producing psychomimetic reactions. The plants include Ipomoea pes-caprae (L.) Sweet, Argyrea nervosa (Burm.f.) Bojer, and Stictocardia tiliifolia (Desrou.) Hallier.<sup>1</sup> Barrau (2) reports the use of Zingiber zerumbet as one component of an hallucinogenic mixture used in New Guinea.

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<sup>1</sup>Hylin, J. Personal communication to author. February, 1970.

### III. TONGAN PLANT NOMENCLATURE

Although Tongans do not seem to categorize plants into botanical orders they make a distinction between Fungi, Lichenes, Musci, Pteridophyta and Spermatophyta and are usually able to recognize small differences between species. Most Tongans, from about age nine, can lead you to a plant given only its local name. However, Tongans are not always able to distinguish between similar plants and sometimes use the same name for more than one species. In some cases the same name is applied to several different genera. Table 1 in Appendix A lists Tongan plant names which are applied to different genera. If Yuncker (32) recorded these names from one or several locals who were unfamiliar with the flora the list would be of no value. However, assuming that these Tongan names are accurate, I believe that although Tongan morphological characteristics for distinguishing plants and their relatives may be different from ours, this list may provide insight into the relationships of genera whose relationships within the plant kingdom are still somewhat enigmatic. For this purpose I have also listed the respective plant families. Plants in Table 1 with identical Tongan names which are found in two closely related families deserve closer examination.

The application of similar names to plants within different genera by the Tongan is not always due to carelessness nor is it evidence that Tongans are unable to categorize plants

systematically. The same name is sometimes applied because of common use of more than one species. Curcuma longa (Zingiberaceae) is known as ango and Zingiber zerumbet (Zingiberaceae) is called angoango. These plants obviously belong to different genera but to the Tongan the fact that the rhizomes of both plants are used in similar medicinal preparations shows a strong enough relationship to indicate similar nomenclature. Similarly, the flowers of both Cananga odorata (Annonaceae) or mohokoi and Artabotrys uncinatus (Annonaceae) or mohokoi honolulu are used to scent oil.

Table 2 in Appendix A consists of a list of 13 cases where identical Tongan names are applied to different species. This list is derived from those medicinal plants enumerated in section V which have Tongan names that are applied to other species. Assuming the names are accurate and that there is a logical explanation I have attempted to determine why these plants are given identical names. By asking the question "How might an individual unfamiliar with the principles of plant taxonomy known by our culture categorize the plants of his environment?" I established the probable characteristics upon which the Tongan may derive his nomenclature. These characteristics may not represent all those used by the Tongan, although I am certain that some of the following are of importance to him. My hypothetical individual would probably first assess the gross morphological characteristics of a plant such as the type of plant (tree, shrub, vine, fern, grass, moss, fungus, etc.), the arrangement of the leaves, the

leaf shape, the flower color and arrangement, and the sexual characteristics (i.e., "male" plant or "female" plant). He might also evaluate the economic uses of a plant such as food value or taste, <sup>utility</sup> ~~use~~ as a component in the construction of shelters, use in the design or manufacture of clothing or ornaments, use as a fuel, use as a fish poison and the possible use of the plant in medicines. On the basis of these economic uses and the morphological characteristics listed above the individual might have sufficient data to classify the plants of his environment. The number of different species in Tonga is not large and therefore the potential for giving names to all species found in the archipelago through permutation and combination of the above features is theoretically possible.

Looking at the first example in Table 2, the Tongan name fue'aepuaka is applied to Ipomoea congesta (Convolvulaceae) and to Pueraria lobata (Leguminosae). Both plants are vines, but the similarity beyond this first category of identification is not apparent. The flower arrangement and color are different in these species. Since both plants are used in medicines I assume that this is why they share a common name. (See Plate II, Numbers 1A and 1B.)

The Tongan name kihikihi is applied to 2A. Oxalis corniculata (Oxalidaceae) and to 2B. Desmodium triflorum (Leguminosae). There is a strong superficial resemblance between both plants, however, on closer examination the leaves of these species are not at all similar nor is the color of the flowers or of the seed capsule. These differences leave me

with doubt as to why a common name is applied. Further, only O. corniculata is used medicinally, to cure convulsions.

(See Plate II.)

The ferns Phymatodes scolopendria (Polypodiaceae) and Nephrolepis hirsutula (Aspidiaceae) are not at all similar in appearance nor are they used for similar purposes. The leaves of P. scolopendria are pounded and an infusion prepared which is used for treating filariasis and boils. The other species is not used in medicines and the reason both are named laufale remains a mystery. (See Plate III, Numbers 3A and 3B.)

Catharanthus roseus and Nerium oleander, both members of the family Apocynaceae, are commonly found growing near dwellings in Tonga. C. roseus is used in medicines (32) and N. oleander is cultivated for its flowers; however, there is no apparent similarity in morphological characteristics nor in economic usage which explains why the name lolie is used for both species. (See Plate III, Numbers 4A and 4B.)

Although the leaves of Glochidion ramiflorum are generally larger than those of Glochidion concolor (both Euphorbiaceae) the flower arrangements of both plants are nearly identical, the flower colors are yellowish green in both cases and the fruit of both species is grooved. These common characteristics in addition to the fact that the leaves of both species are used in medicines interchangeably would explain why both are named malolo. (See Plate IV, Numbers 5A and 5B.)

Trema amboinensis and Trema orientalis var. viridis are

very similar in external characteristics and the leaves of both plants are used in medicines (32). The Tongan name mangele has likely been applied to both plants which are members of the family Ulmaceae because of these similarities. (See Plate IV, Numbers 6A and 6B.)

The Tongan name mo'osipo is given for Urena lobata (Malvaceae), Triumfetta bartramia (Tiliaceae) and Triumfetta procumbens (Tiliaceae). The families are closely related and it is not surprising that several key morphological features are similar. In all three species the leaves are alternate, the basic leaf-shape is ovate or round-ovate, the small flowers are arranged similarly and the fruit is covered with spines or bristles. Only U. lobata is used in medicines. (See Plate V.)

Both Erythrina variegata var. orientalis (8A) and Erythrina crista-galli (8B) are both members of the family Leguminosae and members of the same genus. In both plants the flower color is bright-red and the leaves are alternately arranged and trifoliate. Both are named ngatae, however, only E. variegata var. orientalis is used in medicines. An infusion of the leaves is used as a cure for convulsions and in treating stomach-ache. It is presumably due to the morphological similarities that these species share the same name.

The Tongan name polo is applied to Capsicum frutescens (Solanaceae) and Rivina humilis (Phytolaccaceae) because of the superficial resemblance of the fruits (32). There are other resemblances between the two plants such as leaf arrangement, leaf shape and flower arrangement. Whereas

C. frutescens is frequently employed in medicines in Tonga (see section V) the red juice of the fruit of R. humilis is used as a dye. (See Plate VI.)

The two species Calophyllum inophyllum and Calophyllum vitiense have several similar morphological characteristics. Both are medium to large trees, have oval leaves that are opposite, flowers that are nearly the same size and arranged in racemose clusters. Although the fruit of the former is globose and the latter subglobose in shape the differences are not severe. The oil from the seeds of C. inophyllum is used in treating rheumatism (4), while the timber from C. vitiense is strong and is used in construction work (32). In this case it is easy to understand why these plants, both members of the family Guttiferae, have been given the same name, tamanu.

Ageratum conyzoides (Compositae), Cassia tora (Leguminosae), Malvastrum coromandelianum (Malvaceae), Sida samoensis (Malvaceae), and Salvia coccinea (Labiatae) share the Tongan name te'ekosi. It is difficult to imagine why C. tora was grouped with the other plants since the leaves of this species are shaped unlike any of the others. Whereas A. conyzoides, M. coromandelianum and S. coccinea have crenate leaves, C. tora has obtuse, pubescent leaves. S. samoensis is even further removed from this group. It is a prostrate herb with solitary flowers on axillary pedicels. Of the five species only A. conyzoides is used in medicines. The crushed leaves are applied to infected wounds as one of the uses. There is

insufficient data (such as native names for these species in other regions of the Pacific, date of introduction to Tonga, etc.) to allow any conclusions regarding the nomenclature of these plants.

Centella asiatica (Umbelliferae) and Carinta herbacea (Rubiaceae) have many features in common (see Table 2) and they are both used in medicines. It is easy to see why they are both called tono. (See Plate VII.)

Finally, treating the last group in Table 2, the similarities between Premna taitensis var. rimatarensis and Premna obtusifolia (both Verbenaceae) leave no doubt as to why these plants share a common name, in this case volovalolo.

Going on to a clearer picture of Tongan nomenclature, a good example of Tongan plant recognition may be seen in the genus Syzygium. Of the nine species found in the archipelago three species are considered close relatives as evidenced by the Tongan names. Thus, Syzygium jambos is named fekika papalangi, S. malaccense is known as fekika kai and S. dealatum is named fekikavao. Further examples of fine distinctions between plants made by the Tongan may be found in Table 3 in Appendix A. If one variety of a plant is recognized a single word is commonly applied. If two or more varieties are recognized descriptive names are attached to a common base name. Some examples of commonly used descriptive names are:

1. Colors:  
hina, white; kula, red; uli, black
2. Locality:  
vao, the forest; tahi, by the seashore; utu, on cliffs;  
uta, inland; ano, swamp



3. Anatomical features:  
matolu, thick; hako, long; talatala, prickly, thorny;  
tolu, trifoliate; leka, dwarf; puku, short; lalahi,  
large; molemole, smooth; petepete, rough
4. Food values:  
kai, edible; kona, poisonous; fifisi, hot
5. Country of origin:  
fisi, Fiji; ha'amoa, Samoa; honolulu, Honolulu;  
initia, India; papalangi, European

Names sometimes refer to bodily parts or function, e.g., Te'ete'emanu (Ervatamia orientalis) is translated as "the animal that lives within the gum and causes tooth decay". This species happens to be used in treating toothache. Te'epilo'amaui (Geniostoma spp.) means "fecal matter of the god Maui" which refers to the bark which is used medicinally and has a very disagreeable odor.

There has been much borrowing of Western language in Tonga which is apparent in the Tongan names for cultivated plants.

<u>Tongan Name</u>	<u>Western Name</u>
kofi	coffee
kuava	guava
mango	mango
manioke	manioc
pasione	passion flower
tapaka	tobacco

Clearly then, there is little evidence to suggest an approach to plant taxonomy which resembles the Linnaean system in Tonga. It must be remembered that our conceptual structure is different from Tongan thought structure which does not seem to be based upon a syllogistic, dialectic or parabolic nature. Therefore, to search for a

pattern of taxonomy that is in agreement with our binomial system which is based upon phylogenetic evidence may not evoke a clear understanding of Tongan plant nomenclature.

#### IV. FIELD WORK

Upon arriving in Tonga I shared a taxi to Nuku'alofa with a businessman from New Zealand. This gentleman had apparently been to the archipelago before as he spoke authoritatively about the country, the relationships between the king and his people, business conditions in the South Pacific in general, etc. He suggested that I stay in the Beach House until I made contact with the Tongan men with whom I had made arrangements in Honolulu. This was a small boarding house that catered to resident Europeans on extended tours in Tonga. Though weather-beaten by American standards, I found the room to my liking and the food pleasantly familiar. After spending several weeks in a remote village in Fiji the taste of meat was encouraging. Through the course of several days of meals in the small dining room and tea twice daily I came to meet the other guests. Several of these people were instrumental in introducing me to some practitioners of Tongan medicine. These other guests were unusually well established on the island and I imagine that my good fortune in meeting as many practitioners as I did in so short a stay was facilitated by their contacts.

One of the guests was an officer with the World Health Organization who had been working in Tonga for four years. A co-worker of hers at the government hospital was a Tongan woman whose mother was an active practitioner of Tongan medicine. I was introduced to the older lady by my fellow boarder

as a trustworthy fellow from the University of Hawaii and it was a result of this introduction that this practitioner from Nuku'alofa shared many remedies with me.

About one week after I arrived in Tonga, Mumui Tatola returned from the Ha'apai group in the archipelago and I met him as planned. He is a doctor who was trained in Fiji at the medical school and we had first met at the University of Hawaii where he was in residence at the East-West Center for additional training. I had met with him about six months before leaving for Tonga and he had encouraged me to come to his country to undertake this study. He had told me that his mother was an active practitioner and that he would make arrangements for me to receive much information regarding plants and their medical applications. This loose agreement made in Honolulu turned out to be the actual case in Tonga. I prepared to move to the village of Mu'a where his mother was living but thought it wise to keep my "headquarters" at the Beach House. This turned out to be a fortunate arrangement because, when the townspeople came to know who I was and the nature of my work, this rooming house became a convenient place for would-be informants to leave messages for me.

I stayed in Mu'a until all of the best known practitioners described as many remedies as they wanted to divulge. No doubt they each held back their most valued remedies but this was to be expected since I was a newcomer to their village. In any case I expect that these people had to answer to the Tatola family if they withheld too many of their remedies

because Mumui enjoyed great status on Tongatapu and I had been introduced as a friend of his from Hawaii. I believe that in some way I was receiving the benefits of Mumui's free education in Hawaii. It appeared to me that while I was being introduced the reticence to cooperate almost always disappeared whenever the word Hawaii was mentioned in the laudatory introduction.

The director of the local radio station learned that I had been granted an audience with King Tupou IV at the Royal Palace in Nuku'alofa (Plate VIII) and he made a public announcement about my presence and the nature of my work. As a result of this unexpected publicity several people with information about plant medicines came to see me at the Beach House. One direct result of my interview at the palace is the original list of remedies included in Appendix B. These remedies were copied by Mrs. Olga Moa of Vava'u from a manuscript written by her deceased mother. King Tupou thought that this lady was very knowledgeable in Tongan medicine and suggested that I contact her daughter, Mrs. Moa, as I have done.

Through the kind efforts of a United States Peace Corps volunteer who had been living in Tofoa Village for nearly two years I was introduced to a practitioner in that village who spent many days with me, showing me plants and describing their medical uses. I am certain that the rapport established by my Peace Corps friend was offered in kind to me. This practitioner related to me in confidence, a situation improbable had I not had the good fortune of meeting her American

neighbor. (I came to see the potential value in working through the Peace Corps volunteers in Tonga and subsequent to my stay prepared a questionnaire which has since been distributed to over 20 volunteers scattered throughout the archipelago by the Deputy Director, Mr. William S. Miller. I am hopeful about this project and am planning to work out a similar arrangement on a Pacific wide basis if this initial effort proves fruitful. A sample questionnaire is included in Appendix C.)

During the course of my short three month stay on Taongatapu I believe that I interviewed all of the well known and some of the lesser known practitioners. Some of these people chose not to divulge their name; I include a list of those informants whose names I learned and who were responsible for much of the material on medicinal plants and their uses contained in this study.

**Mu'a:**

Violet Tatola	(An experienced practitioner.) Plants and medical uses.
Siafoou Tatola	(Daughter of Violet and teacher in the mission school.) Field work, translation, discussion.
Mumui Tatola	(Son of Violet, trained in Fiji at the medical school and at the East-West Center in Hawaii; a practicing medical officer at the Government Hospital, Nuku'alofa.) Translation, discussion.
Muasika Fakahafua	Plants and medical uses.

## Nuku'alofa:

'Anitelu Fielea	(Agricultural Officer.) Field work, discussions.
Tolu Ha'angana	(Agricultural Officer. Assistant to T. G. Yuncker when he was collecting in Tonga.) Field work, discussions, medical uses of plants.
Preben Kauffmann (Tavi)	(Expatriate from Denmark, 17 years in Tonga, friend of King Tupou IV and integral member of his community. Vegetarian.) Plants and medical uses.
Latu Toili	(Driver for Medical Depart- ment.) Plants and medical uses.

## Te'ekiu Village:

Amato Uia	(A renown practitioner with 45 years experience.) Medical uses of plants and discussions.
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A total of 91 remedies were recorded and included in these remedies were 59 different species of plants that were used by at least two different informants. References to an additional 17 species of reputed value but not met with in the field are included from the literature (29). (After Vestal and Schultes, 1939.)

The general procedure for gathering data consisted of interviewing informants in their villages. With the aid of an interpreter data were gathered in four categories. Tongan name of the plant, the part utilized in preparing the medicine, the illness, and the preparation, dosage and administration. Where the informant was agreeable a walk through the village

or surrounding "bush" usually allowed collection of described plant specimens. In the few cases where the informant was either too busy or infirm to accompany the investigator the described plants were collected under the guidance of a direct relative or friend who was familiar with the habitat.

In some cases it was necessary to collect the described species with the aid of an agricultural officer, going only by Tongan plant names. Although this method is open to doubt in other regions of the Pacific because of variations in dialects, the Tongan language is constant as far as plant names are concerned. There are variations on descriptive names but all base names of plants encountered were identical from one informant to another. This was verified through repeated checking. On many occasions strangers were approached and asked if they could tell me the name of a species in question. As names given were constant for given species it suggested that Tongan plant names are uniform within the population, at least on the island of Tongatapu.

Further reassurance regarding the consistency of plant names came while I was drying plant material which was later to be used as crude drug samples. As individual trays of dessicated leaves and bark were removed from copra driers Tongan workers who had inquisitively gathered would attempt to call out the identity of the dried contents before the attached identifications were exposed. Most men were able to identify the plant names correctly, relying solely on their ability to interpret the scents and shapes of the dessicated samples.



## V. ENUMERATION OF TONGAN MEDICINAL PLANTS

Specimens of 59 species of plants were collected on Tongatapu Island. The plants were identified by using Yuncker (32) and also by a study of specimens available at the Herbarium of the Bishop Museum. Final determinations were established by Dr. A. C. Smith of the University of Hawaii. Voucher specimens are on deposit at the Bishop Museum.

Following is an enumeration of plants utilized as medicines by the Tongan people. This list includes my own observations as well as those reported in the literature. Families, genera, and species are arranged alphabetically. Tongan vernacular names and geographical distributions of each species, as given by Yuncker (32), are included.

The medicinal applications of each species in some other regions of the Pacific and the Philippines are enumerated to gain some insight into their frequency and kinds of usage.

All information regarding Tongan medicinal uses was determined in the field, the few exceptions are cited.

I would like to thank Dr. A. C. Smith for verifying the identities of all voucher specimens.

AMARANTHACEAE  
(Amaranth Family)

Achyranthes aspera L.

tamatama

This species is commonly found throughout the archipelago and is distributed pantropically.

In Tahiti the roots are used in treating mouth sores, toothache and syphilitic sores (19). It is reported that the plant is used in medicines in Niue (31). In the Philippines the leaves and roots are used as diuretics and the sap for treating cataracts (21).

In Tonga the leaves are used to tie wounds after circumcision (32) and are applied to serious wounds after being chewed. The sap from leaves heated over a fire is valued in treating tetanus.

ANACARDIACEAE  
(Mango Family)

Rhus taitensis Guill.

tavahi

This tree is found throughout Tonga and is distributed from the Philippines to Polynesia.

In Tahiti this plant is used as an antidiarrheic but is considered a dangerous medicine (19).

In Tonga it is reported that the leaves are used in medicines (32).

Spondias dulcis Parkinson

vi

This tree is occasional in Tongan villages and is a native of Malaysia and of aboriginal introduction to Polynesia.

In Tahiti parts of this plant are made into a fermented drink which is valued as an antidiarrheic (19). In the Philippines it is reported that the fruit is used in treating dysentery (21).

In Tonga an extract of the bark is valued in treating diarrhea.

ANNONACEAE  
(Custard-Apple Family)

Annona muricata L.

apele

This small tree is occasional in Tongan villages. Originally from tropical America it is now cultivated in many tropical countries.

In the Philippines the ripe fruit is employed as an antiscorbutic and the unripe fruit in treating dysentery (21).

In Tonga the leaves are pounded and an infusion made for treating stomach problems.

Cananga odorata (Lam.) Hook.f. & Thoms.

mohokoi

This species is cultivated throughout Tonga and was originally from southern Asia.

Webb (30) reports that species of Cananga from the Yalu region in New Guinea contain alkaloids.

In Tonga an infusion of the bark is used for stomach problems while a remedy composed of the leaves is given to infants suffering from diarrhea. A concoction containing the leaves is used in cases of severe boils.

APOCYNACEAE  
(Periwinkle Family)

Catharanthus roseus (L.) G. Don.

lolie, valeti

*See SKANS in  
LLOYDIA (29):3*  
This small herb is a frequent ornamental throughout Tonga. It is native to <sup>Madagascar</sup> ~~tropical America~~ and now distributed worldwide.

In the Philippines a leaf decoction is used in treating diabetes while a decoction of the roots is used as an emmenagogue. (In South Africa a proprietary medicine called "Covinca" prepared from this plant is used as a specific for diabetes.) (21)

In Tonga it is reported that the plant is used in medicines (32).

Ervatamia orientalis (R. Brown) Turrill

te'ete'emanu

This is an occasional species in Tonga that is distributed from Fiji to Samoa and the Society Islands.

It is reported that Ervatamia sp. from the Yalu and Laloki regions of New Guinea contain alkaloids (30).

In Tonga the root is grated and an infusion made for treating toothache. The mouthwash is said to be an effective agent in relieving pain. Koch (15) reports that this treatment is often substituted for by the chewing of tobacco (Nicotiana tabacum L.).

ASCLEPIADACEAE  
(Milkweed Family)

Hoya australis R. Br.

matolu

This vine is frequently encountered in forested areas throughout Tonga. It is distributed from Polynesia and Fiji to the New Hebrides and Australia.

This vine is used in many other countries for treating wounds (21).

In Tonga the leaves are pounded and dipped in water--the solution used in treating rashes.

CASUARINACEAE  
(Casuarina Family)

Casuarina equisetifolia L.

toa

This tall tree is found occasionally throughout the archipelago. It is thought to be native to Indo-Malaysia and Polynesia and is now widely cultivated in most tropical countries.

In Tahiti an infusion of the bark is used for nervous disorders (19). In Niue it is reported that the fruit is used in

medicines (31). In the Philippines an infusion of the branches is said to be diuretic while a decoction of the bark is used as an emmenagogue. The bark contains 18% tannin (21).

In Tonga an infusion of the bark of the toa tree is used for coughs, ulcers, stomach-ache and constipation.

COMBRETACEAE  
(Terminalia Family)

Terminalia catappa L.

telie

This species is frequent throughout the archipelago. It is distributed from tropical Asia to Polynesia and is naturalized in America.

It is reported that Terminalia sp. from the Popondetta region of New Guinea contains saponins (30). In Niue a preparation made from the bark is used in treating mouth sores in children (thrush?) (31). In the Philippines the red leaves are used as a vermifuge, the fruit as a purgative and the leaves, mixed with oil, to relieve pains of the breast. It is also reported that a preparation of the bark is used against gastric fevers and as an antidysenteric. The tender leaves have been cooked with oil from the fruit and utilized in the treatment of leprosy (21).

In Tonga the bark and young leaves are pounded together and the plant juices applied to sores about the tongue and gums. An infusion of the bark is sometimes used in treating stomach-ache.

COMPOSITAE  
(Composite Family)

Ageratum conyzoides L.

te'ekosi

This herb is common throughout Tonga. It is native to South America and is now distributed pantropically.

In the Philippines the leaves are pounded and mixed with salt and the preparation used as a vulnerary. The leaves are also cooked in coconut oil and then applied to wounds. The plant is used widely in other countries (21).

In Tonga the leaves are pounded and the plant juices applied to infected wounds.

Bidens pilosa L.

fisi'uli

This plant is found throughout Tonga and is distributed widely in tropical countries.

In the Philippines flowers of this species are mixed with balls of boiled rice and set to ferment in the manufacture of crude spirits. Usage is reported from Brazil, Mexico, Malaya, Indo-China and Africa. The leaves are official in the Dutch and Mexican Pharmacopoeias (21).

In Tonga an infusion of the leaves is used in treating stomach problems and is also valued in cases of food poisoning.

Wedelia biflora (L.) DC.

ate

This shrub is found along rocky coasts throughout Tonga.

It is distributed from Malaya and southern Asia to Polynesia.

In the Philippines a decoction of the fresh roots is considered to be diuretic and to act as an emmenagogue. Other usage is reported (21).

In Tonga the leaves are pounded between two stones which have been preheated in a fire and the plant juices applied to serious wounds. Koch (15) reports that this remedy is used in cases of tetanus.

CONVOLVULACEAE  
(Morning-Glory Family)

Ipomoea congesta R.Br.

fue'aepuaka

This vine is frequent in Tonga and is distributed from Formosa to tropical Australia and Polynesia.

In Tonga the leaves are crushed and then squeezed through a cloth into a cup of water and the drink used to treat filariasis. In a similar preparation the roots are cut into small pieces and the drink used as an aperient.

EBENACEAE  
(Ebony Family)

Diospyros ferrea (Willdenow) Bakhuizen

kanume

This tree is found throughout Tonga and is distributed from India and Ceylon eastward to Hawaii

Diospyros sp. from the Wau region of New Guinea is reported



to contain steroids (30). In the Philippines the bark and leaves of D. ebenaster Retz. are used as a blistering plaster (21).

Yuncker (32) reports that in Tonga the bark is used in preparing medicines.

EUPHORBIACEAE  
(Spurge Family)

Glochidion ramiflorum J.R.&G. Forst.

malolo

This large tree is frequent in Tonga and is found from the New Hebrides to Samoa.

Glochidion sp. from the Lae, Wau and Nondugl regions of New Guinea is reported to contain saponins (30).

From the leaves of this plant the Tongans make a remedy for food poisoning. The pounded leaves are frequently applied to boils and a drink prepared from young leaves has been employed in cases where infants were suffering from a "furry tongue accompanied by a sleeping fit".

Jatropha curcas L.

fiki

This species is frequent throughout Tonga and is distributed pantropically.

In Samoa it is reported by Hunt (12) that the juice of this plant is used in treating yaws. In the Philippines the plant has many uses; the oil from the seeds is used to make a

violet purgative, a decoction of the leaves is used as an antidiarrheic and as a cough medicine, and the bark is pounded and applied to wounds originating from animal bites.

Quisumbing (21) also reports usage in other countries and states that the leaves are official in the Mexican and French Pharmacopoeias.

A drink made from the pounded leaves is employed in Tonga as a cure for stomach-ache.

Macaranga harveyana (Muell. Arg.) Muell. Arg.

loupata

This small tree is found in Tonga, Fiji, Niue, Samoa and the Society Islands.

In Tonga a drink made from the root bark (cambium layer) is utilized in treating hemorrhoids after pregnancy. A drink made from the boiled bark is used in treating constipation. It is reported by Yuncker (32) that the leaves are used in medicines utilized in treating stomach problems in infants.

Ricinus communis L.

lepohina

The castor bean plant is found in waste areas throughout Tonga and is distributed pantropically.

The seeds of this plant are the source of castor oil but also contain a highly poisonous substance named ricin. This toxalbumin is not dangerous when eaten but 0.01 milligram entering the circulatory system through a scratch has been

reported as fatal in a human (1). In Samoa it is reported that the oil is employed as a laxative (12). In the Philippines fresh leaves are applied externally for headache and the leaves cooked with milk are used in poultices for ulcers. Wide usage is recorded by Quisumbing (21) who also states that the leaves and seeds are official in many pharmacopoeias.

In Tonga the plant juices derived from pounded bark is applied in cases of skin rashes. A drink made from the pounded bark is used for tumors of the breast and also for boils.

GOODENIACEAE  
(Naupaka Family)

\* Scaevola taccada (Mill.) Krause, probably var.  
taccada

ngahu

This shrub is common throughout Tonga and is also found from India to Australia and is widely distributed on Pacific islands.

In Fiji a decoction of the roots is used for stomach-ache (20). In the Philippines juices from the ripe fruit are applied locally to cataracts, the roots are used in beriberi, syphilitic infections and in dysentery. The <sup>leaves</sup> ~~leaves~~ of this plant are smoked like tobacco. Usage in other countries is reported (21).

In Tonga the bark is pounded and the juices applied in treating ringworm.

GUTTIFERAE  
(Mangosteen Family)

Calophyllum inophyllum L.

feta'u, tamanu

This species is frequently found near the sea in Tonga. It is distributed from Eastern Africa and India through Malaya and Polynesia.

In Samoa it is reported that the oil extracted from the seeds is used in treating rheumatism (12). Quisumbing (21) reports that the Samoans use parts of the plant in preparing an arrow poison and that the plant is poisonous. In New Caledonia the sap is used on wounds, and oil from the seeds is used in preparing a digestive aid (19). In the Philippines the oil from the seeds and leaves is used in treating eye disorders; the oleoresin is applied to wounds and an infusion of the leaves is used in hemorrhoids. Oleoresin from this plant is official in the Mexican and Spanish Pharmacopoeias (21).

Crosby reports that in Tonga the oil of this plant is a well known remedy for rheumatism (4).

Garcinia sessilis (Forst.f.) Seem.

heilala

This tree is occasional in Tonga and is found in Fiji and Samoa.

In New Guinea Garcinia sp. from the Zenag, Nondugl and Popondetta regions are reported to contain saponins and other steroids (30). In the Philippines the leaves and bark of

G. mangostana L. are used in astringent and febrifuge preparations. The pericarp is used in curing chronic intestinal catarrh (21).

In Tonga this plant is used frequently in medicines. The leaves are squeezed into water and applied to skin rashes; a decoction of young leaves is used for stomach-ache in children or for infants suffering from a "sleeping-fit". When it is believed that ghosts have caused hallucinations in a patient an infusion of the leaves is prepared and administered. A common use for the leaves is in cases of infected eyes (conjunctivitis) where they are chewed and squeezed through tapa cloth into the affected eye. This use is also reported by Koch (15).

HERNANDIACEAE  
(Hernandia Family)

Gyrocarpus americanus Jacq. ssp. americanus  
pukovili

This tree is occasional in Tonga and is distributed pantropically.

Yuncker (32) reports that in Tonga the leaves and bark are used medicinally. A drink made from the bark is used as a cure for edema following childbirth and in treating stomach-ache. Koch (15) reports that a similar preparation is used in cases of filariasis.

Hernandia moerenhoutiana Guill. ssp. campanulata Kubitzki  
pipi, pipitui

This large tree occurs throughout the archipelago and is found from the Society Islands to Fiji.

Yuncker reports that in Niue the flowers are used medically (32). In the Philippines the oil from H. ovigera L. is employed as a hair restorer and for dandruff (21).

In Tonga the leaves, bark and flowers are pounded together and applied to boils.

LEGUMINOSAE  
(Bean Family)

Calopogonium mucunoides Desv.

fuekala

This plant is found occasionally in villages throughout Tonga.

The leaves of this species are rarely used as a cure for filariasis in Tonga.

Erythrina variegata var. orientalis (L.) Merr.

ngatae

This small tree is frequent throughout Tonga and is found from India to Polynesia.

In Niue the bark and small twigs are used in medicines (31). The roots and the leaves are used in the Philippines as a febrifuge and it is reported that the bark is a depressant (8).

In Tonga the leaves are pounded and squeezed through a

piece of tapa cloth into a bowl of cold water. One teaspoonful of the resulting filtrate is used as a cure for convulsions in infants. The drink is sometimes used for stomach-ache (15).

Inocarpus edulis J.R.&G. Forst.

ifi

This plant is found throughout Tonga and from Malaysia to Polynesia.

In Tahiti it is reported that the bark is pounded and applied to bites of poisonous fish (19). In Niue the leaves of I. fagiferus are used in medicines (31).

Koch (15) reports that in Tonga the bark is used in treating diarrhea in children.

Pueraria lobata (Willd.) Ohwi

fue'aepuaka, aka

This vine is frequent in Tonga and is found from Asia and Malaya to Polynesia.

Yuncker reports that this plant is used medicinally (32).

Vigna marina (Burm.) Merr.

lautolu tahi

This long-trailing vine is common along beaches in Tonga and is distributed pantropically.

A drink prepared by squeezing the young leaves through a piece of cloth into a bowl of water is used in Tonga to cure "sleeping fits" in infants. An application of the crushed

leaves is applied to boils and steam which originates from the leaves when they are placed in a basin of boiling water is inhaled to cure fever and headache. Aches believed to be caused by ghosts of deceased relatives are treated by applying the crushed leaves to the sore body part.

LILIACEAE  
(Lily Family)

Cordyline terminalis (L.) Kunth.

si

This plant is found throughout Tonga and is widely distributed in Polynesia.

Cordyline sp. is used widely in the Pacific and its uses are reviewed by Quisumbing (21).

In Tonga the leaves are squeezed into water originating from a well and applied to cure eye infections. The ripe leaves are crushed in combination with Tongan oil and applied to abscesses of the gums.

LOGANIACEAE  
(Strychnine Family)

Geniostoma insulare A. C. Sm. & Stone var. insulare f.  
insulare

te'epilo'amaui

This plant is found in Tonga and Fiji.

Hunt (12) reports that members of this genus are used medicinally in Samoa. A drink prepared from the bark of this plant is used in Tonga to treat constipation.



LORANTHACEAE  
(Mistletoe Family)

Amylotheca insularum (Gray) Danser

kainikavea, topu'uno

This species is found growing on tree branches in forests throughout Tonga. It is also found in Fiji, Samoa and the Society Islands.

Yuncker (32) reports that the leaves are used in medicines.

MALVACEAE  
(Hibiscus Family)

Hibiscus tiliaceus L. ssp. tiliaceus

fau

This plant is frequent in Tonga and is distributed pantropically.

In Tahiti this species is reported to be an emmenagogue and the flowers emollient (19). It is reported that in Niue the flowers are used medicinally (31).

In Tonga the bark and young leaves are used in treating skin disorders (32). The leaves are chewed and then applied while the bark is pounded, water added and the solution squeezed through a piece of tapa cloth on the affected area.

Thespesia populnea (L.) Soland. ex Correa

milo

This tree is a frequent shore plant in Tonga and is distributed pantropically.

In Niue an extract of the fruit is used as a purge and is applied to swollen testicles (31). In Tahiti it is reported that a preparation of the green capsules is used to alleviate migraine headache and that the yellow latex is used on bites of insects (19). In the Philippines a decoction of the leaves is used as a cure for itches. Other usage is reported (21).

A drink prepared from the ripe leaves and bark is used in Tonga for teething children who run a fever and have an excess saliva flow.

Urena lobata L.

mo'osipo

This plant is a common weed in Tonga and is distributed pantropically.

In Samoa the leaves are used locally in filarial swellings (12). In Tahiti the plant is used for its properties as an emmenagogue (19). In the Philippines a decoction of the root is used for colic, the boiled leaves as a poultice in inflammations of the intestines and bladder, and a decoction of the roots and leaves as an emollient (21).

In Tonga the leaves are squeezed by hand and applied topically to burns and scalds. An infusion of the roots and leaves is used to cure diarrhea.

MELIACEAE  
(Mahogany Family)

Aglaia saltatorum A. C. Sm.

langakali

This shrub is found throughout Tonga and in Fiji and Niue.

In the Philippines a decoction of the roots and leaves of A. odorata Lour. is used as a tonic (21).

In Tonga the bark is used in medicines.

Dysoxylum forsteri (Juss.) C. DC.

mo'ota

This tree is found throughout Tonga and is endemic.

In New Guinea Dysoxylum sp. from several regions are reported positive in tests for saponins and other steroids (30). In the Philippines a decoction of the juice of the fresh bark of D. decandrum is used for coughs (21).

The steam arising from the leaves of this plant (when pressed in a basin of boiling water) is inhaled in Tonga to cure headache and to reduce fever.

Xylocarpus granatum Koenig

lekileki

This tree is found near mangrove swamps in Tonga and is distributed from India and Ceylon through Malaysia and Polynesia.

In the Philippines the bark is said to be astringent and a decoction of the fruit and seeds is used as an antidiarrheic (21).

In Tonga the bark is crushed and boiled in water. One tablespoonful taken three times a day is prescribed for any type of high fever but especially for fever accompanied by a "black, furry tongue".

MORACEAE  
(Fig Family)

Artocarpus altilis (Parkinson) Fosberg

mel

The breadfruit tree is cultivated throughout the Pacific Islands.

In Fiji an infusion of the root bark is used to treat internal fractures.

In Tonga an infusion of the bark is used in cases of relapsed illness. Boils are treated with the white gum which exudes when the steam is incised. The boil is then covered with a piece of tapa that has been soaked in Tongan oil. The dressing is changed daily and the boil washed with sea water until a cure is effected.

Ficus obliqua Forst.f.

'ovava

This large tree is frequent throughout Tonga, Samoa and westward to the New Hebrides.

In Tonga an infusion of the leaves is used to treat convulsions in infants. An infusion of the pounded bark is used for treating boils or tumors of the breast. Koch (15) reports

that the yellow leaves are chewed and placed on boils.

MYRTACEAE  
(Myrtle Family)

Psidium guajava L.

kuava

This tree is from tropical America and is fairly common in the Pacific Islands.

Papy (19) reports that this plant is used in preparing an astringent in Tahiti. In Niue it is reported that the leaves are used as "ghost medicine" (31). In the Philippines the leaves, bark and roots are used as a decoction for washing wounds and ulcers. The bark and leaves reportedly are astringent and antidiarrheic in decoction. Wide usage in other countries is reported by Quisumbing (21) and he states that the roots are official in the Mexican Pharmacopoeia and the leaves official in the Dutch and Mexican Pharmacopoeias.

In Tonga the plant juices derived from chewed leaves is swallowed as a treatment for stomach-ache.

Syzygium corynocarpum (A. Gray) C. Muell.

hehea

This small tree is an occasional in Tonga and is also found in Fiji and Samoa.

In Tonga the bark is used as one component of a general tonic but more importantly the chewed leaves appear to be used frequently as a topical treatment for tumors of the breast.

This species is worth detailed chemical and pharmacological analysis. (See VII, Discussion)

Syzygium malaccense (L.) Merr. & Perry

fekika kai

The mountain apple tree is a native of India and Malaya and is found on many Pacific Islands.

In Tahiti the leaves are used in treating bronchitis and the bark is considered tonic and astringent (19). In Niue the bark is used in treating mouth sores in children (31). An infusion of the bark is used in Fiji as a cure for the flu~~e~~. Quisumbing (21) reports wide usage of this plant in other countries (as a diuretic, for dysentery, as a mouthwash for thrush, etc.).

In Tonga the bark is used in a general tonic and an infusion of the bark is used for coughs (15) and to relieve constipation.

NYCTAGINACEAE  
(Four O'Clock Family)

Pisonia grandis R.Br.

pukovai

This tree is occasionally found in Tonga. It is distributed from the Moluccas through Borneo, Australia, the Marianas, the Philippines and Polynesia.

A drink made from an infusion of the bark is used in Tonga to treat fefi'aloto, which I am not able to translate.

OLEACEAE  
(Olive Family)

Jasminium simplicifolium Forst.f.

tutu'uli

This vine is occasional in Tonga and is found in Australia, the Solomon Islands, the New Hebrides, Fiji and Polynesia.

Quisumbing (21) reports wide usage of this genus in other countries.

In Tonga an infusion of the pounded leaves is used in cases of relapsed illness; an infusion of the bark is used in cases of liver problems ("person yellow") and for ulcers. Koch (15) reports that the leaves are used to cure headaches. The left or right side of the leaf is chosen according to which side of the head is aching and then six of them are chewed inside a piece of fresh tapa cloth until the plant juices mixed with saliva flow freely. This liquid is then dripped into both eyes and nostrils. This kind of preparation is rare.

OXALIDACEAE  
(Wood - Sorrel Family)

Oxalis corniculata L.

kihikihi

This small herb is common throughout Tonga and is distributed pantropically.

In the Philippines the leaves are considered antiscorbutic and the juice of the leaves is used for cleaning wounds and for itches. A decoction of the leaves is used for fevers and

dysentery. (It is also reported by Quisumbing (21) that the fresh juice of the leaves relieves Datura spp. intoxication.)

An infusion of the leaves is used in Tonga to cure convulsions in infants.

PIPERACEAE  
(Pepper Family)

Piper methysticum Forst.f.

kava

This shrub is found in most Tongan villages and is distributed widely throughout the Pacific Islands.

In Samoa it is reported by Hunt (12) that the root is used in treating gonorrhoea. In New Caledonia the leaves are chewed to cure bronchitis and in New Guinea the plant is used as a tonic and soporific and is said to be valuable in treating gonorrhoea and inflammations of the uterus (3). In Fiji the roots are pulverized and a drink prepared which has sedative properties. The use of the roots in the form of a drink is widespread in the Pacific Islands and detailed chemical and pharmacological analysis has been undertaken and is reviewed by Keller and Klohs (13).

The kava drink is used widely in Tonga. The yellow leaves are sometimes pounded and an infusion used to soothe crying infants.



Piper puberulum var. glabrum (C.DC.) A. C. Sm.

kavakava'uli

This variety is very common in Tonga and is also found in Fiji and Samoa.

In Fiji the leaves are chewed until moist and applied to wounds.

In Tonga the inner bark is boiled and the resulting liquid drunk in cases of filariasis and other inflammations. Boils are commonly treated by application of the pounded leaves.

POLYPODIACEAE  
(Common Fern Family)

Phymatodes scolopendria (Burm.) Ching

laufale

This fern is common in plantations and waste areas throughout the archipelago. It is also found in Africa, Australia, Ceylong, southern China, Madagascar, Malaysia and New Zealand.

The smoke given off when this plant is heated over a fire is inhaled in regions of New Guinea in cases of catarrh (27). In Niue it is reported that the leaves are used in medicines (31).

In Tonga an infusion of the pounded leaves or bark is prescribed for infants who are suffering from filariasis. It is considered a promising sign if this brings out a rash. The pounded leaves are also applied to boils.

RHAMNACEAE  
(Buckthorn Family)

Alphitonia zizyphoides (Spreng.) A. Gray

toi

This large tree is frequent in Tonga and is also found from Sumatra and the Philippines eastward to Polynesia.

In Tahiti the bark is used in lotions prepared for treating exzema (19).

In Tonga the liquid derived from the boiled bark is drunk in cases of constipation, for coughs, headache and menstrual pain.

RUBIACEAE  
(Coffee Family)

Carinta herbacea (Jacq.) W. F. Wight, ex Saff.

tono

This species is occasional in Tonga and is distributed pantropically.

In Tonga the leaves are crushed, placed in a cloth and then squeezed in a small quantity of water. The wet cloth is sucked by newly born infants. The liquid is thought to help make the meconium pass.

Gardenia taitensis DC.

slale

This plant is frequently planted in Tonga for its flowers. It is also found in Fiji and throughout Polynesia.

In Tahiti an infusion of the flowers is used as a remedy for migraine headache (19). In Niue the root-bark is used in treating headache (31) while in the Philippines the fruits of G. pseudopsidium (Blanco) Vill. are used in treating smallpox (8).

In Tonga an infusion of the bark mixed with sugar and lime juice is used to relieve nausea, headache and weakness in pregnancy. A plain infusion of the bark is used as a cure for hallucinations which are thought to be caused by the ghost of a deceased relative.

Guettarda speciosa L.

puopua

This tree is commonly found near the shore in Tonga, and is widely distributed throughout Polynesia.

In Tahiti it is reported that this species has anti-diarrhetic, febrifuge and anticholinergic properties (19).

An infusion of the inner bark prepared with boiling water is used in Tonga to treat epilepsy.

Morinda citrifolia L.

nonu

The Indian mulberry is common in thickets throughout Tonga and is distributed from India eastward to Polynesia.

In Fiji it is reported that the fruit is used in treating kidney problems (20). In Niue, Yuncker (31) reports that the bark, leaves and flowers are used in medicines.

Quisumbing (21) reports that in the Philippines the fruit is used as an emmenagogue, the sap of the leaves as an antidiarrheic, and that the fresh leaves are applied to external ulcers. In Samoa it is reported that the leaves are used to cure rheumatism and in cases of filarial swellings (12).

This is one of the most commonly used as a cure for diarrhea in infants, the crushed leaves moistened in water are applied to aching joints or massaged into aching muscles, the fruits are crushed and dripped on aching teeth or sore gums and the leaves are used in general tonics.

Tarennia sambucina (Forst.f.) Durand  
manonu

This species is frequent in Tonga and is found from Micronesia and New Caledonia eastward to the Tuamotu Archipelago.

In Niue a liniment is made from the fruit (31) while in Fiji this species is used to treat rheumatism and swelling of the groin (20).

A drink prepared from the boiled bark is used in Tonga to relieve constipation and as a general tonic.

RUTACEAE  
(Rue Family)

*J.R.+G. Forst.*  
Euodia hortensis *f. simplicifolia* (Rechinger) K. Schum.  
ex Lauterb.

uhi

This variety is occasional in Tonga and is widely distributed in the Pacific Islands.

It is reported that Evodia sp. from several regions in New Guinea contain alkaloids (30). In Fiji an infusion of the bark is used as an emmenagogue while in Niue the leaves are chewed to relieve toothache and stomach-ache (31).

An infusion of the leaves is used in Tonga as a laxative and to reduce fevers. Crushed leaves mixed with Tongan oil are applied to sores of the gum and Koch (15) reports that the leaves are massaged on aching heads and used to cure earache.

SAPINDACEAE  
(Soapberry Family)

Pometia pinnata J.R.&G. Forst.

tava

This large tree is occasional in Tonga and is found in Malaya, New Guinea and Polynesia.

In Fiji an infusion of the bark is used as a diuretic while Webb (30) reports that Pometia sp. from the Yalu, and Popondetta regions of New Guinea contain saponins and other steroids.

Koch (15) reports that in Tonga an infusion of the bark

is used to cure diarrhea in children while Yuncker (32) states that the bark is used in treating "stomach troubles". A bark infusion is also used to treat serious coughs accompanied by fever, constipation and is sometimes applied locally to diaper rashes.

SOLANACEAE  
(Tomato Family)

Capsicum frutescens L.

polo

The red-pepper plant is found around dwellings in Tonga and is distributed pantropically. (Plate I.)

The fruit is official in the Argentine, U.S., British and Indian Pharmacopoeias (21).

The fruits of this species are used in many remedies in Tonga, especially in diseases of the skin. The leaves are chewed and the plant juices swallowed as a remedy for tuberculosis; similarly the juices are applied to the eyes in cases of mild conjunctivitis. One remedy for a disorder of the liver characterized by "yellow face and eyes" consists of four fruits and one handful of bark mixed in one pint of water. The patient is advised to sip from this solution twice daily until cured.

Physalis angulata L.

polo pa

This herb is an occasional weed in Tonga and is distributed

widely in warm countries.

Yuncker (32) reports that in Tonga the leaves are used medicinally.

Physalis peruviana L.

ku'usi

This species is an occasional plantation weed in Tonga and is distributed pantropically.

In Tahiti parts of this plant are used as a diuretic, in abscesses and for conjunctivitis (19). Quisumbing (21) reports usage in other countries.

According to Yuncker (32) the leaves are used in medicines.

Solanum uporo Dun.

polo tonga

This plant is occasional in Tonga and is also found in Tahiti and Rarotonga.

Papy (19) reports that in Tahiti the plant is used as a sedative, as a diuretic, for conjunctivitis and in treating abscesses.

A drink made from an infusion of the leaves is used to reduce filarial swellings. The crushed leaves are applied to boils, fungous infections and tumors of the breast. Because of the wide usage of this plant detailed chemical and pharmacological analysis should be undertaken.

THYMELAEACEAE  
(Akia Family)

Wikstroemia rotundifolia (Forst.) Decaisne

lala vao

This species is found in Tonga and Niue.

Yuncker (32) reports that in Tonga a physic is prepared from an extract of the root.

TILIACEAE  
(Linden Family)

Triumfetta bartramia L.

mo'osipo

The bur bush is frequent throughout Tonga and is also found from Malaya through the Mariana Islands and Polynesia.

In the Philippines a decoction of the roots is used for treating intestinal ulcers (21).

In Tonga the leaves are crushed and applied to burns and scalds.

ULMACEAE  
(Elm Family)

Trema amboinensis (Willd.) Bl.

mangele

This tree is occasional in Tonga and is found from South-Eastern China to Australia eastward to Polynesia.

In the Philippines the softwood is pounded and the resulting fluid applied as a poultice to swellings (21).

Yuncker reports that in Tonga the leaves are used medicinally (32).



Trema orientalis (L.) Bl.

mangele

This species is frequent in thickets throughout Tonga and is found in other islands in the Pacific.

It is reported that in Tonga the leaves are used in medicines (32).

UMBELLIFERAE  
(Parsley Family)

Centella asiatica (L.) Urb.

tono

The Asiatic pennywort is found throughout Tonga and is distributed pantropically.

Hunt (12) reports that the leaves are used medicinally in Samoa. The plant is used medicinally in Niue (31) and also in the Philippines where the sap from the leaves is applied to wounds and the seeds are used for treating dysentery, fever and headache. This plant is used widely in other countries; as a tonic, as a hypotensive, and as a circulatory stimulant. The leaves are official in the Dutch, French, Mexican, Spanish, Indian and Venezuelan Pharmacopoeias (21).

In Tonga the leaves are used as poultices (32), in tonics and as an infusion for treating convulsions in infants.

URTICACEAE  
(Nettle Family)

Pipturus argenteus (Forst.f.) Wedd. var. lanosus Skott.

olonga, tou

This small tree is frequent on cliffs in Tonga and is also found in Samoa and Rotuma.

In New Guinea the plant juices are applied locally to wounds and used for tooth-ache (27). In the Philippines scrapings from the bark of P. arborescens are used on boils (21).

In Tonga the bark and leaves are used medicinally (32).

VERBENACEAE  
(Verbena Family)

Clerodendrum inerme (L.) Gaertner

tutuhina

This shrub is frequent near the shore in Tonga and is found from India through Malaya eastward to Polynesia.

Hunt (12) reports that the leaves of this species are used in Samoa in treating fevers. In the Philippines a decoction of the roots is used as a febrifuge and the leaves are used in poultices. Quisumbing (21) also reports other usage. The sailors of Macassar used a decoction of freshly pounded seeds to offset the effects of eating poisonous foods from the ocean--fish, crabs, etc. (21).

A drink made from an infusion of the pounded bark is used in Tonga as a remedy for liver disorders and in treating ulcers.

Lantana camara var. mista (L.) L. H. Bailey

talatala

This plant is occasional in Tonga and is distributed pantropically.

In the Philippines a decoction of the fresh roots is used as a gargle to relieve tooth-ache (21). Diguangco (8) reports that the pounded leaves are used to reduce inflammations and that in the form of a lotion this species is used to treat rheumatism. He also states that the active constituent--lantanine--is an alkaloid that acts like quinine in reducing fever and slowing the circulation.

In Tonga the leaves are chewed until moist and applied to cuts. A variation of the above treatment consists of warming the leaves near a fire and then applying the plant juices directly on the cut or wound.

Premna taitensis var. rimatarensis F.H.Br.

volovalo

This species is frequent in Tonga and is also found in Fiji and eastward to the Marquesas.

In Tahiti the leaves are used for treating tooth-ache and neuralgia (19). In Niue the leaves are reportedly used in treating tuberculosis (31). Hunt (12) reports that the plant is used in Samoa.

In Tonga boiling water is poured over the leaves into a basin and the steam inhaled as a cure for fever and headache.

The bark is boiled and employed as one component of a general tonic.

ZINGIBERACEAE  
(Ginger Family)

Curcuma longa L.

ango

The turmeric plant is occasional throughout Tonga and is distributed widely in warm countries.

In the Philippines a decoction of the rhizome is used in treating conjunctivitis (8) and a mixture of the rhizomes with coconut oil is used as a vulnerary (21). The rhizomes are official in numerous pharmacopoeias mainly for the turmeric.

Prior to partruition a solution of the rhizome was formerly painted on the mother's body as an antiseptic. This practice is no longer common in Tonga. Ango is presently found in "brick" form. These bricks are prepared by first removing the outer layer of the rhizome and then pounding it and adding water. The fine dye grains are separated from the rough starch grains and the dye grains dried in the sun until they have a "creamy" consistency. This mass is then placed in a bamboo tube and baked in a Tongan earth oven until dry. The circular bricks are removed as needed.

Zingiber zerumbet (L.) J. E. Smith

angoango

Wild ginger is frequent in Tonga and is widely distributed in warm countries.

In the Philippines it is reported that the pulverized rhizome is used as an antidiarrheic (8). Stopp (27) reports that in New Guinea juice derived from the rhizome is used for treating burns or cuts and that small pieces of the rhizome in combination with "other plants" is used for tooth-ache.

Yuncker (32) reports that in Tonga the rhizome is used medicinally.

## VI. LABORATORY WORK (METHODS)

A phytochemical survey for the presence of alkaloids was undertaken in both the field and laboratory. Alkaloids were singled out for detection because this group of compounds has been shown to be frequently active as drugs.

According to Swanholm et al. (28) new interest into the medical properties of alkaloids was instilled when the alkaloid reserpine was demonstrated to be responsible for the hypotensive action of Rauvolfia serpentina.

Several important drugs are derived as the alkaloidal constituents of plants (morphine, quinine, ergotamine, nicotine, caffeine, to name a few).

Although plant alkaloids have been isolated and studied for over 150 years only about 2% of all recorded plant species have been tested for alkaloids and even fewer of the isolated compounds have been carried to full elucidation of their structures. Schultes (25) estimates that at least 8000 new alkaloids (more than three times the number now known) remain to be discovered as a result of one survey of 20,000 species done by one American pharmaceutical company.

Raffauf's spot-test technique was used in the field (22). This consisted of slicing through the leaf blade or petiole of a freshly collected sample and squeezing a bit of the plant juices onto Whatman No. 1 filter paper. After drying in the air this spot was treated with a droplet of modified Dragendorff reagent. Field tests using Raffauf's technique

in all 59 species gave negative results.

While in the field, I carried the components of the modified Dragendorff reagent in two brown glass bottles, one marked "A" and the other marked "B". Component "A" was a solution of 0.85 g. of bismuth subnitrate in 10 ml. of glacial acetic acid and 40 ml. of distilled water mixed with a solution of 8 g. of potassium iodide in 20 ml. of distilled water. Component "B" consisted of a mixture of 100 ml. of distilled water and 20 ml. of glacial acetic acid. Before use one volume of solution "A" was diluted with 2.3 volumes of solution "B", as described by Raffauf.

Using both Mayer's and Ecolle's Reagents two separate tests for the presence of alkaloids were completed in the laboratory. The two reagents were chosen because of their variable sensitivities to different kinds of alkaloids.

All tests conducted in the laboratory for the presence of alkaloids in 15 crude drug samples were negative. The species tested are enumerated in Table 4, in Appendix A.

## VII. DISCUSSION

Apparently the Tongan prefers to be treated for serious ailments by doctors in the government hospitals. Plant remedies are employed in emergencies or when "European" medical practices have failed to effect a cure. Tongan folk-medicine is an art practiced mainly by the oldest people. Although one or two practitioners encountered on Tongatapu were about 30 years of age the other practitioners were well over 60 years of age. The young people generally consider plant medicine as a form of superstition; practices that are not really effective if not outright dangerous. There is no systematic schooling for transmitting these plant remedies from one generation to the next and for this reason I estimate that with the passing of one more generation little of this traditional knowledge will survive, except in occasional notebooks stored with other possessions of another age.

Martin's report on life in Tonga indicates that around the year 1800 few plants were used in treating illnesses (17). There is no reason to doubt his observations, however, the possibility that plants were generally used in medicines before 1800 must not be eliminated on the basis of this single report. Evidence from other regions of the Pacific and from ethnographic studies of primitive cultures in general suggests that plants were used in medicines by most peoples to some extent. By attempting to evaluate the relative date of introduction to Tonga of the species enumerated in section V



perhaps some conclusion as to the origin of plant remedies in Tonga can be determined. For this purpose I have divided the 71 enumerated medicinal plants into three categories: endemic, indigenous, and of recent introduction. For the purposes of this discussion endemic refers to species found only in the archipelago, indigenous plants are those species found generally throughout Polynesia and of pre-European introduction, and recently introduced species are those from tropical America, Africa, Asia, or India which were introduced after Europeans first arrived in Tonga. Table 6 in Appendix A lists those species which are indigenous to Tonga and which are used in medicines. Table 7 in Appendix A lists those species which are used in medicines and which are considered of recent, or post-European introduction.

Of the above listed species one is endemic, 49 species are considered indigenous or of pre-European introduction to Tonga and only 21 are of post-European introduction. Therefore, of the total of 71 species which are enumerated in this thesis, 68% are indigenous to Tonga and 30% are recently introduced. As the majority of enumerated medicinal plants are native or of pre-European introduction to Tonga and the use of plants in Tonga is assumed to have flourished after 1800 it is possible to conclude that the Tongan may have learned the many plant remedies enumerated herein from other Pacific islanders and/or from Europeans who learned some plant remedies in their travels and entered the archipelago after visiting these other island groups. The possibility

that plants were infrequently used by the Tongan prior to 1800 may be explained by assuming that he enjoyed extraordinary health and that he had no need to explore his flora to establish a pharmacopoeia. It is also possible to conclude that Martin's (17) observations were, in fact, incorrect and that medicinal plants were used by Tongans before 1800. Perhaps the Tongan did not exhibit these plant remedies out of respect for the foreigner or for fear that the foreigner would bring bad luck upon the patient.

It has been suggested to me that perhaps attempts were made to utilize some of the species with known psychomimetic or narcotic properties in Tonga (see page 10). Perhaps the reason these practices were discouraged is that due to climatic, or other ecological factors which are responsible for the development of plants and specific components within, the active principles which are responsible for these psychomimetic effects may have failed to develop. One other possibility is that due to variability of potency, use of these plants was considered dangerous and therefore discouraged among the people.

I do not assume to have collected all of the plant remedies used in Tonga. One agricultural officer bid me farewell with the casual remark "Well, I guess you got about 80% of them." Since my return to Honolulu I have made arrangements with the Director of the United States Peace Corps in Tonga to distribute questionnaires of the type contained in Appendix C. I am expecting to hear from some of those workers who

have established rapport with villagers scattered throughout the archipelago.

Of the crude drug samples collected I would suggest that intensive analysis be undertaken for the constituents of hehea, Syzygium corynocarpum. This species was used by three separate practitioners for treating severe boils or tumors of the breast. The interesting thing is that in all three cases this plant was just one component of a more involved remedy. This species was common to all three remedies while different plants made up each of the other concoctions. Solanum uporo is used widely in Tonga and it may also be worthwhile to analyze.

Regarding my listing of "medicinal plants" in section V, it must be remembered that although the individual plants and their uses are listed separately, in many cases remedies are compounded of two or more species. The possibility that activity of some of these remedies is derived in part from synergistic effects between plants must not be overlooked.

APPENDIX A

TABLES

TABLE 1

## TONGAN NOMENCLATURE: UNCLEAR TAXONOMIC RELATIONS

<u>Tongan Name (32)</u>	<u>Family</u>	<u>Scientific Binomial</u>
<u>ahivao</u>	Rutaceae	<u>Acronychia niueana</u> St. John
"	Meliaceae	<u>Vavaea amicorum</u> Benth.
<u>akataha</u>	Leguminosae	<u>Pueraria lobata</u> (Willd.) Ohwi
<u>akataha hina</u>	Leguminosae	<u>Alysicarpus nummularifolius</u> (L.) DC.
<u>akataha kula</u>	Nyctaginaceae	<u>Boerhavia diffusa</u> L.
<u>kahiva'e</u>	Gleicheniaceae	<u>Dicranopteris linearis</u> (Burm.) Under.
"	Polypodiaceae	<u>Hypolepis tenuifolia</u> (Forst.) Bern.
<u>kalakala'uli</u>	Flacourtiaceae	<u>Xylosma orbiculatum</u> (J.R.&G. Forst.) Forst.f.
"	Sapotaceae	<u>Planchonella costata</u> (End.) Pierri.
"	Ebenaceae	<u>Diospyros samoensis</u> A. Gray
<u>kavahaha</u>	Connaraceae	<u>Santaloides samoense</u> (Laut.) Schell.
"	Leguminosae	<u>Derris trifoliata</u> Lour.
"	Violaceae	<u>Agatea violaris</u> A. Gray
<u>kavahuu</u>	Leguminosae	<u>Tephrosia purpurea</u> (L.) Pers.
"	Euphorbiaceae	<u>Euphorbia atoto</u> Forst.f.

TABLE 1 (cont.)

<u>Tongan Name (32)</u>	<u>Family</u>	<u>Scientific Binomial</u>
<u>kihikihi</u>	Leguminosae	<u>Desmodium triflorum</u> (L.) DC.
"	Oxalidaceae	<u>Oxalis corniculata</u> L.
<u>langakali</u>	Meliaceae	<u>Aglaia saltatorum</u> A. C. Sm.
<u>langakali vao</u>	Phamnaceae	<u>Elaeocarpus tonganus</u> Burk.
<u>laufale</u>	Polypodiaceae	<u>Nephrolepis hirsutula</u> (Forst.f.) Presl
"	Polypodiaceae	<u>Polypodium scolopendria</u> Burm.f.
<u>loa</u>	Malvaceae	<u>Hibiscus abelmoschus</u> L.
<u>loa ano</u>	Onagraceae	<u>Jussiaea erecta</u> L.
<u>lolie</u>	Apocynaceae	<u>Catharanthus roseus</u> (L.) G. Don
"	Apocynaceae	<u>Nerium oleander</u> L.
<u>longolongo</u>	Cycadaceae	<u>Cycas circinalis</u> L.
<u>longolongo uha</u>	Amaranthaceae	<u>Amaranthus viridis</u> L.
"	Compositae	<u>Emilia sonchifolia</u> (L.) DC.
<u>mahelehele</u>	Cyperaceae	<u>Cyperus javanicus</u> Houtt.
"	Cyperaceae	<u>Rhynchospora corymbosa</u> (L.) Britt.
"	Cyperaceae	<u>Scleria margaritifera</u> Willd.

TABLE 1 (cont.)

<u>Tongan Name (32)</u>	<u>Family</u>	<u>Scientific Binomial</u>
<u>maile</u>	Apocynaceae	<u>Alyxia stellata</u> (Forst.f.) Roem. & Schultes
<u>maile mimiti</u>	Convolvulaceae	<u>Ipomoea cairica</u> (L.) Sweet
<u>mamaea</u>	Lauraceae	<u>Litsea mellifera</u> A. C. Sm.
"	Sterculiaceae	<u>Heritiera littoralis</u> Dryand.
<u>misimisi</u>	Cannaceae	<u>Canna indica</u> L.
<u>misimisi koka</u> <u>'anga</u>	Marantaceae	<u>Maranta arundinaceae</u> L.
<u>mohuku'apopoa</u>	Gramineae	<u>Digitaria pruriens</u> (Trin.) Buese
"	Gramineae	<u>Echinochloa colonum</u> (L.) Link
"	Gramineae	<u>Thuarea involuta</u> (Forst.) Roem. & Schultes
<u>mo'osipo</u>	Tiliaceae	<u>Triumfetta bartramia</u> L.
"	Tiliaceae	<u>Triumfetta procumbens</u> Forst.f.
"	Malvaceae	<u>Urena lobata</u> L.
<u>musie liku</u>	Gramineae	<u>Thuarea involuta</u> (Forst.) Roem. & Schultes
<u>musie matala pulu</u>	Commelinaceae	<u>Commelina diffusa</u> Burm.f.
<u>ngingie</u>	Simaroubaceae	<u>Suriana maritima</u> L.
"	Lythraceae	<u>Pemphis acidula</u> J.R.&G. Forst.

TABLE 1 (cont.)

<u>Tongan Name (32)</u>	<u>Family</u>	<u>Scientific Binomial</u>
<u>ngingie 'uta</u>	Leguminosae	<u>Desmodium heterocarpum</u> (L.) DC.
"	Euphorbiaceae	<u>Euphorbia atoto</u> Forst.f.
<u>olamaka</u>	Celastraceae	<u>Gymnosporia vitiensis</u> (A.Gr.) Seem.
"	Elaeocarpaceae	<u>Elaeocarpus tonganus</u> Burk.
"	Flacourtiaceae	<u>Xylosoma orbiculatum</u> (J.R.&G. Forst.) Forst.f.
"	Rubiaceae	<u>Canthium barbatum</u> (Forst.f.) Seem.
<u>ponga</u>	Marattiaceae	<u>Angiopteris commutata</u> Presl
"	Cyatheaceae	<u>Cyathea rugosula</u> Copeland
<u>puataukanave</u>	Myrsinaceae	<u>Maesa tongensis</u> Mez
"	Boraginaceae	<u>Cordia subcordata</u> Lamarck
<u>puko</u>	Hernandiaceae	<u>Hernandia ovigera</u> L.
"	Solanaceae	<u>Solanum vitiense</u> Seem.
<u>siale mohemohe</u>	Leguminosae	<u>Leucaena glauca</u> (L.) Benth.
<u>siale matalateau</u>	Rubiaceae	<u>Gardenia jasminoides</u> Ellis
<u>tamanu</u>	Leguminosae	<u>Maniltoa amicorum</u> A. C. Sm.
"	Guttiferae	<u>Calophyllum vitiense</u> Turrill



TABLE 1 (cont.)

<u>Tongan Name (32)</u>	<u>Family</u>	<u>Scientific Binomial</u>
<u>te'ekosi</u>	Leguminosae	<u>Cassia toro</u> L.
"	Malvaceae	<u>Malvastrum coromandelianum</u> (L.) Garcke
"	Malvaceae	<u>Sida samoensis</u> Rech.
"	Labiatae	<u>Salvia coccinea</u> Juss.
<u>tutuna</u>	Icacinaceae	<u>Citronella samoensis</u> (A.Gr.) How.
"	Ebenaceae	<u>Diospyros samoensis</u> A. Gr.
<u>vaine 'initia</u>	Passifloraceae	<u>Passiflora foetida</u> L.
"	Cucurbitaceae	<u>Momordica charantia</u> L.
<u>vitahi</u>	Olacaceae	<u>Ximenia americana</u> L.
"	Melastomaceae	<u>Memecylon harveyi</u> Seem.

TABLE 2

TONGAN NOMENCLATURE: COMPARATIVE MORPHOLOGICAL  
AND ECONOMIC CHARACTERISTICS

Tongan Name	Scientific Binomial (Family)	Plant Type	Leaf	Flower	Other	Economic Use
<u>fue'aepuaka</u>	1A <u>Ipomoea</u> <u>congesta</u>	vine	round-ovate	pale blue, short, pedicellate, funnellform		Leaves used in treating filariasis
"	1B <u>Pueraria</u> <u>lobata</u> (Leguminosae)	vine	pinnate, trifoliate	lilac-purple, in axillary clusters	pod	Used in medicines (32)
<u>kihikihi</u>	2A <u>Oxalis</u> <u>corniculata</u> (Oxalidaceae)	small herb	palmately compound, 3 leaflets	yellow, umbels	cylin- drical capsule	Leaves used to cure convulsions
"	2B <u>Desmodium</u> <u>triflorum</u> (Leguminosae)	herb	alternate, primary 3 foliate	purple; 1, 2 or 3	pods	
<u>laufale</u>	3A <u>Phymatodes</u> <u>scolopendria</u> (Polypodiaceae)	fern	triangular ovate		sori large on lower surface	Pounded "leaves" used for filariasis and boils

TABLE 2 (cont.)

Tongan Name	Scientific Binomial (Family)	Plant Type	Leaf	Flower	Other	Economic Use
<u>laufale</u>	3B <u>Nephrolepis hirsutula</u> (Aspidiaceae)	fern	serrulate obtuse		sori large, sub- marginal	
<u>lolie</u>	4A <u>Catharanthus roseus</u> (Apocynaceae)	herb	opposite, oblong, apex round	white, pink, in pairs, axillary, salverform		Plant used in medicines (32)
"	4B <u>Nerium oleander</u> (Apocynaceae)	shrub or small tree	whorled, narrow, oblong	in terminal cymose clusters		
<u>malolo</u>	5A <u>Glochidion ramiflorum</u> (Euphorbiaceae)	tree (up to 18 m.)	alternate elliptic	small on slender pedicel	fruit grooved	Leaves used in treating food poisoning
"	5B <u>Glochidion concolor</u> (Euphorbiaceae)	shrub- by tree (up to 8 m.)	alternate elliptic	small on pedicel	fruit grooved	Leaves used in medicines (32)

TABLE 2 (cont.)

Tongan Name	Scientific Binomial (Family)	Plant Type	Leaf	Flower	Other	Economic Use
<u>mangele</u>	6A <u>Trema</u> <u>amboinensis</u> (Ulmaceae)	tree (medium size) 7-8 m.	alternate oblong- ovate to lanceolate	very small in dense axillary clusters		Leaves used in medicines (32)
"	6B <u>Trema</u> <u>orientalis</u> (Ulmaceae)	tree (medium size)	alternate ovate- lanceolate	small in axillary cymes		Leaves used in medicines (32)
<u>mo'osipo</u>	7A <u>Urena lobata</u> (Malvaceae)	shrub (1 m.)	alternate ovate	on short axillary pedicels, white to pink	fruit with barbed spines	Leaves used to treat burns, scalds. Roots and leaves used to cure diar- rhea.
"	7B <u>Triumfetta</u> <u>bartramia</u> (Tiliaceae)	shrub (2 m.)	alternate round- ovate	small in axillary fascicles, yellow	fruit with hooked bristles	
"	7C <u>Triumfetta</u> <u>procumbens</u> (Tiliaceae)	pro- strate, semi- woody	alternate round- ovate	in axil- lary umbellate clusters, yellow	fruit with pubescent bristles	

TABLE 2 (cont.)

Tongan Name	Scientific Binomial (Family)	Plant Type	Leaf	Flower	Other	Economic Use
<u>ngatae</u>	8A <u>Erythrina</u> <u>variegata</u> (Leguminosae)	small tree	alternate, trifoliolate pinnate, triangular-ovate	bright red, numerous in racemose clusters	pod 25 cm. long, seeds dark red	Leaves used as cure for convulsions, in treating stomach-ache.
"	8B <u>Erythrina</u> <u>crista-galli</u> (Leguminosae)	tree up to 10 m.	alternate, trifoliolate	bright red on slender pedicels in racemose clusters		
<u>polo</u>	9A <u>Capsicum</u> <u>frutescens</u> (Solanaceae)	shrub (1.5 m.)	alternate, ovate-lanceolate	white, small axillary pedicels	fruit ovoid, 2.5 cm., bright red	Frequently used in many remedies
"	9B <u>Rivina humilis</u> (Phytolaccaceae)	shrub (1 m.)	alternate, ovate-lanceolate	white or greenish, on slender pedicels in terminal & axillary racemose clusters.	fruit red, fleshy	Red juice of fruit used as a dye (32)

TABLE 2 (cont.)

Tongan Name	Scientific Binomial (Family)	Plant Type	Leaf	Flower	Other	Economic Use
<u>tamanu</u>	10A <u>Calophyllum</u> <u>inophyllum</u> (Guttiferae)	tree	opposite, oval, subovate	white, in axillary racemose clusters	fruit glo- bose 3-4 cm. in diam., one seeded	Oil from seeds is used in treating rheumatism (4)
"	10B <u>Calophyllum</u> <u>vitiense</u> (Guttiferae)	tree	opposite, oblong- elliptic	pink, axil- lary race- mose clusters	fruit sub- globose 2 cm. in diam.	Timber is used for building purposes (32)
<u>te'ekosi</u>	11A <u>Ageratum</u> <u>conyzoides</u> (Compositae) (see Asteraceae)	herb	opposite, ovate	blue, in terminal & axil- lary clusters	pappus of 5 awned scales	Leaves applied to infected wounds
"	11B <u>Cassia tora</u> (Leguminosae)	woody plant (1 m.)	alternate, oval	yellow, in axillary pairs	Pods slender	

TABLE 2 (cont.)

Tongan Name	Scientific Binomial (Family)	Plant Type	Leaf	Flower	Other	Economic Use
<u>te'ekosi</u>	11C <u>Malvastrum coromandelianum</u> (Malvaceae)	shrub (1 m.)	alternate, ovate	salmon yellow, in axillary & terminal clusters		
"	11D <u>Sida samoensis</u> (Malvaceae)	herb	alternate, oval	solitary on slender axillary pedicels		
"	11E <u>Salvia coccinea</u> (Labiatae)	herb (60 cm.)	opposite, ovate, acute or obtuse	bright red or pink		
<u>tono</u>	12A <u>Centella asiatica</u> (Umbelliferae)	herb	clustered at nodes, orbicular ovate	white or pink, very small scant in axillary umbels	fruit round, compressed, ribbed	Leaves used as poultices (32), in tonics and for treat- ing convulsions
"	12B <u>Carinta herbacea</u> (Rubiaceae)	herb	opposite, rounded, cordate	white, small, scant in axillary umbels	fleshy, red	Leaves are used in medicines (32)

TABLE 2 (cont.)

Tongan Name	Scientific Binomial (Family)	Plant Type	Leaf	Flower	Other	Economic Use
<u>volovalo</u>	13A <u>Premna</u> <u>taitensis</u> var. <u>rimatarensis</u> (Verbenaceae)	shrub or small tree	opposite, ovate, acute, or obtuse	greenish white, small, in ter- minal puberulent panicles	fruit globose (6 mm. diam.)	Bark is used in tonics.
	13B <u>Premna</u> <u>obtusifolia</u> (Verbenaceae)	shrub or small tree	opposite, oblong- ovate	greenish white, small, in ter- minal branching clusters	fruit globose (3 mm. diam.)	



TABLE 3

## TONGAN NOMENCLATURE: CLEAR TAXONOMIC RELATIONS

<u>Tongan Name (32)</u>	<u>Scientific Binomial</u>
<u>'apele'initia</u>	<u>Annona muricata</u> L.
<u>'apele papalangi</u>	<u>Annona squamosa</u> L.
<u>fa</u>	<u>Pandanus tectorius</u> Park.
<u>fa hina</u>	<u>Pandanus odoratissimus</u> var. <u>pseudo-linnaei</u> Martelli
<u>fa kula</u>	<u>Pandanus corallinus</u> Martelli
<u>fa vula</u>	<u>Pandanus odoratissimus</u> var. <u>pyriformis</u> Martelli
<u>falahola</u>	<u>Pandanus odoratissimus</u> var. <u>sinensis</u> Warb.
<u>faina</u> (Pineapple, fruit of medium size, leaf margins spiny.)	<u>Ananas comosus</u> (L.) Merr.
<u>faina ha'amo</u> a (Fruit large and not as sweet as others.)	
<u>faina 'initia</u> (Leaves at top of fruit red.) (Y)	
<u>fau</u>	<u>Hibiscus tiliaceus</u> L.
<u>fau'ingo</u>	<u>Hibiscus abelmoschus</u> L.
<u>fekika kai</u>	<u>Syzygium malaccense</u> (L.) Merr. & Perr.

TABLE 3 (cont.)

<u>Tongan Name (32)</u>	<u>Scientific Binomial</u>
<u>fekika papalangi</u>	<u>Syzygium jambos</u> (L.) Alston
<u>fekikavao</u>	<u>Syzygium dealatum</u> (Burk.) A. C. Sm.
<u>fiki</u>	<u>Jatropha curcas</u> L.
<u>fiki papalangi</u>	<u>Jatropha multifida</u> L.
<u>filo</u>	<u>Plantago major</u> L.
<u>filohako</u>	<u>Plantago lanceolata</u> L.
<u>kava</u>	<u>Piper methysticum</u> Forst.f.
<u>kavakava'uli</u>	<u>Piper puberulum</u> var. <u>glabrum</u> (C.DC.) A. C. Sm.
<u>mo'ota</u>	<u>Dysoxylum forsteri</u> (Juss.) C.DC.
<u>mo'ota kula</u>	<u>Dysoxylum tongense</u> A. C. Sm.
<u>polo</u>	<u>Capsicum frutescens</u> L. <u>Physalis angulata</u> L. <u>Solanum nigrum</u> L. <u>Solanum uporo</u> Dunel
<u>polo pa</u>	
<u>polo kai</u>	
<u>polo tonga</u>	
<u>telie</u>	<u>Terminalia catappa</u> L.

all Solanaceae

TABLE 3 (cont.)

<u>Tongan Name (32)</u>	<u>Scientific Binomial</u>
<u>telie'amanu</u>	<u>Terminalia litoralis</u> var. <u>tomentella</u> Hemsley
<u>vaine 'ae kuma</u>	<u>Passiflora laurifolia</u> L.
<u>vaine 'initia</u>	<u>Passiflora foetida</u> L.
<u>vaine kai</u>	<u>Passiflora maliformis</u> L.
<u>vaine tonga</u>	<u>Passiflora edulis</u> Sims

Other clear examples of plant recognition by the Tongan may be observed in the native names for varieties of the following:

- a. Saccharum officinarum L.
- b. Artocarpus altilis (Park.) Fosberg
- c. Ipomoea batatas (L.) Poiret
- d. Carica papaya L.
- e. Mangifera indica L.
- f. Manihot esculenta Crantz
- g. Citrus maxima (Burm.) Merr.
- h. Cocos nucifera L.

TABLE 4  
SPECIES TESTED FOR ALKALOIDS (ALL NEGATIVE)

<u>Binomial</u>	<u>Plant Part</u>
<u>Annona muricata</u>	leaves
<u>Cananga odorata</u>	leaves
<u>Casuarina equisetifolia</u>	bark
<u>Clerodendrum inerme</u>	bark
<u>Erythrina variegata</u>	leaves
<u>Euodia hortensis</u>	leaves
<u>Ficus obliqua</u>	bark & leaves
<u>Glochidion ramiflorum</u>	bark
<u>Hernandia moerenhoutiana</u>	leaves
<u>Jasminium simplicifolium</u>	bark
<u>Lantana camara</u> var. <u>mista</u>	leaves
<u>Syzygium corynocarpum</u>	leaves
<u>Syzygium malaccense</u>	bark
<u>Tarenna sambucina</u>	bark
<u>Thespesia populnea</u>	leaves

TABLE 5

## INFECTIOUS DISEASES REPORTED IN TONGA (1967)\*

<u>Disease</u>	<u>Number of Cases</u>
Influenza	16,428
Gastro-Enteritis	2,539
Infantile Diarrhea	1,961
Conjunctivitis	1,858
Scabies	1,103
Dysentery (unclassified)	691
Broncho Pneumonia	482
Lobar Pneumonia	391
Intestinal Worms	317
Chicken Pox (Varicella)	193

## CAUSES OF DEATHS IN THE HOSPITALS (1967)\*

Congestive Heart Failure	7 persons
Tetanus	6
Broncho Pneumonia	4
Senility	4
Pulmonary T.B.	3
T.B. Meningitis	3
Malignant Neoplasm (lung)	3
Cerebral Embolism	3
Myocardial Infarction	3
Intestinal Obstruction	3

\*Source of both lists is from Report of the Minister of Health for the Year 1967 by the Gov. of Tonga, Nuku'alofa.

TABLE 6

## MEDICINAL PLANTS OF PRE-EUROPEAN INTRODUCTION TO TONGA

<u>Aglaia saltatorum</u>	<u>Syzygium malaccense</u>
<u>Alphitonia zizyphoides</u>	<u>Tarennia sambucina</u>
<u>Amylothea insularum</u>	<u>Terminalia catappa</u>
<u>Artocarpus altilis</u>	<u>Thespesia populnea</u>
<u>Calophyllum inophyllum</u>	<u>Trema orientalis</u>
<u>Carinta herbacea</u>	<u>Vigna marina</u>
<u>Casuarina equisetifolia</u>	<u>Wikstroemia rotundifolia</u>
<u>Centella asiatica</u>	<u>Xylocarpus granatum</u>
<u>Clerodendrum inerme</u>	<u>Zingiber zerumbet</u>
<u>Cordyline terminalis</u>	
<u>Diospyros ferrea</u>	
<u>Ervatamia orientalis</u>	
<u>Euodia hortensis f. simplicifolia</u>	
<u>Ficus obliqua</u>	
<u>Garcinia sessilis</u>	
<u>Gardenia taitensis</u>	
<u>Geniostoma insulare var. insulare</u>	
<u>f. insulare</u>	
<u>Glochidion ramiflorum</u>	
<u>Guettarda speciosa</u>	
<u>Gyrocarpus americanus</u>	
<u>ssp. americanus</u>	
<u>Hernandia moerenhoutiana</u>	
<u>Hibiscus tiliaceus ssp. tiliaceus</u>	
<u>Hoya australis</u>	
<u>Inocarpus edulis</u>	
<u>Ipomoea congesta</u>	
<u>Jasminium simplicifolium</u>	
<u>Macaranga harveyana</u>	
<u>Morinda citrifolia</u>	
<u>Phymatodes scolopendria</u>	
<u>Piper methysticum</u>	
<u>Piper puberulum var. glabrum</u>	
<u>Pipturus argenteus</u>	
<u>Pisonia grandis</u>	
<u>Pometia pinnata</u>	
<u>Premna taitensis var.</u>	
<u>rimatarensis</u>	
<u>Rhus taitensis</u>	
<u>Scaevola taccada var. taccada</u>	
<u>Solanum uporo</u>	
<u>Spondias dulcis</u>	
<u>Syzygium corynocarpum</u>	

TABLE 7

## MEDICINAL PLANTS OF POST-EUROPEAN INTRODUCTION TO TONGA

Achyranthes aspera  
Ageratum conyzoides  
Annona muricata  
Bidens pilosa  
Cananga odorata  
Capsicum frutescens  
Catharanthus roseus  
Curcuma longa  
Erythrina variegata var. orientalis  
Jatropha curcas  
Lantana camara  
Oxalis corniculata  
Physalis angulata  
Physalis peruviana  
Premna amboinensis  
Psidium guajava  
Pueraria lobata  
Ricinus communis  
Triumfetta bartramia  
Urena lobata  
Wedelia biflora

APPENDIX B

ORIGINAL MANUSCRIPT OF TONGAN REMEDIES



NGAHI FAITO'O FAKA-TONGA.

- VAI PALA NGAKAU & PALA KAI. NGAHI FAKA'ILONGA. 'Oku mofimofi fakahoua pea ta'eta'e-fiekai. Vau 'ae sino 'oe Te'epilo 'a Maui, fakafuofua koe faluku 'e taha, vilo 'aki ha vaeua ipu ti vai momoko, inu pongipongi, pea toe vilo 'o inu efiafi. Kapau koe tamaiki 'oku puke, pea 'uluaki vilo 'o si'aki pea toki vilo hono ua 'o inu. 'Oku fu'u malohi 'ae 'uluaki vilo ki he tamaiki.
- VAI TU'UTU'U KI LALAHU & IIKI. Lau'i Te'ehoosi totolo, lau'i 'akau 'e 40 pea moe ki'i kili'i milo si'isi'i pe, tukituki pea vilo vai momoko 'aki ha sepuni lalahi vai 'e ua, inu tu'o tolu 'i he 'aho.
- VAI 'AVANGA LOTO MOHE MIMI. Sino 'oe Tuitui moe Sino 'oe 'Ovava, vau ke vahevahe tatau fakafuofua koe vaeua ho'o faluku, vilo vai momoko 'aki ha sepuni vai lalahi 'e tolu, Inu tu'o ua he 'aho. 'Osi 'ae inu pea tatau 'ae fo'i vai 'o amo'aki 'ae kona. Koe faka'ilonga 'oe mahaki . Koe fa'a fakaviku 'i he po'uli
- VAIKAHI MATAKILOMA. Faka'ilonga, 'Oku fa'a langalanga 'ae kete, pea si'i 'ae 'alu ki tua'a.taimi ni'ihi 'oku 'asi ha fanga ki'i me'a 'i mui hange ha fanga ki'i fo'i polo fifisi, ko'ene lahi ia. VAI: Vau 'ae Tava moe Fekika, vilo vai momoko 'aki ha vaeua ipu pea inu tu'o ua he 'aho, kimu'a pea toki kai. Pea ka lahi leva, pea inu tu'o tolu he 'aho, pea 'ai mohono Vali. Lau'i Puko, Lau'i Manonu, Kosi momoiki 'i ha lau'i mamae hu'i'aki ha lolo Tonga, pea tunu, pea sikesike kiai ko hono faka 'ahu ia.
- MATA'IIKA MOE HULUPA. KOE HANGATAMAKI. Koe hangatamaki koeni 'oku fa'a tu'u pe he nima, 'oku langa 'aupito, pea tuai ke ha hono mata. Koe fo'i tuitui 'e ono moe foha'i ango 'e ua, tuki ke molu 'aupito hange 'oku mama, ka si'i 'ae huru'a pea hu'i 'aki ha me'i lolo tonga, 'ai ha kofukofu 'e ua, kofu 'aki ha lau'i nonu pe lepo, tunu pea tolotolo 'aki 'ae hangatamaki ko tulu'i'aki 'okapau kuo 'asi 'ae mata.
- VAI KAHU MOE TOENGA-TOTO. Koe lau'i tono 'e 40 mo ha ki'i kili'i milo. Vilo 'aki ha vai mafana sepuni lalahi 'e ua, inu tu'o tolu he 'aho.
- VAI TE'IA 'OKU ENGEENGA Faka'ilonga, 'oku engeenga 'ae mata pea momohe 'ae tamaiki. Faito'o: vauvau 'ae sino 'oe uhi moe Siale('oku fai'aki 'ae tui Siale lau lalahi)'ai ha fo'i kaka fuo si'i pea tulu'i 'ae mata moe ngutu 'oe tamaiki. Kapau koe kakai lalahi pea tulu'i moe ihu, pea inu 'ae vai koe vau 'ae sino 'oe manonu moe ngatae, fakafuofua koe vaeua ho'o faluku vilo vai momoko vai sepuni lalahi 'e tolu.inu tu'o tolu.
- VAI KAHU TAUTAU Faka'ilonga: 'Oku fakafefeka 'ae kete, pea langalanga: Vau 'ae sino 'oe tava moe fekikavahe tatau, fakafuofua koe faluku 'e taha, vilo vai mafanape momoko 'i ha vai sepuni lalahi 'e fa, pea nusi 'ae lau 'oe uhi 'o amo'aki 'ae kete.
- VAI KAHU MAHANGALEI. 'Oku langalanga 'ae kete pea fakafefeka 'ae ongo tafa-'aki kete. Koe vai. kili 'oe Nonu moe manonu vilo vai momoko 'iha vai sepuni lalahi 'e ua inu tu'a tolu pea toe lahi ange kapau 'oku langa lahilahi.

VAI MANAVAMOLE.:- Faka'ilonga 'oku ta'efiefiekai. Sino 'oe moengalo 'e uangahoa, moe sino 'oe uhi, vauvau 'ae uhi pea tuki 'ae moengalo, pea 'ai ha kaka vilo vai momoko pea inu. Lahi 'ae vai Sepuni lalahi 'e ua.

VAI MAKEHEKEHE. :- Sino 'oe tava moe Sino 'oe Mei koe Loutoko, Vau 'ai ha kaka pea vilo vai momoko 'o inu. Koe faka'ilonga koeni 'oku fa'a mafuta 'ae kete pea fufuta 'ae pule. Tapu ke kai me'a melie pe kai me'a ngako.

VAI MAKEHEKEHE 'E TAHA:- Lau 'oe Volovalu tuki 'ai ha kaka vilo vai momoko pea inu. Koe vai koeni 'okapau 'e tuai hano ma'u 'ae vai 'e taha.

VAI KAHU TU'UPULE:- Vau 'ae sino 'oe Manonu moe Malolo, 'ai ha kaka vilo vai momoko pea inu. Koe mahaki koeni 'oku 'oho pe 'o hange ka mapuni 'ae pule, ke 'ikai toe lava ke manava.

FAITO'O FAKATAFE KI HE LAVEA LALAHU. Tutu 'ae makahunu, pea fola leva 'ae 'u lau'i 'akau koeni taupotu kitu'a 'ae lau'i nonu, hoko 'aelau'i ate, lau'i tutuhina, lau'i laufale. koe vela leva 'ae maka pea 'omai leva 'o 'ai he lau'i 'akau, pea kuku ke mafana pea fakatafe hono vai ki he lavea, pea ka hili 'ene mafana pea to'o leva 'ae lau'i laufale 'o mili 'o tulu'i 'aki 'ae mata'i lavea.

FAITO'O NGUTU PIKO:- Faka'ilonga 'oku si'i ke langa, pea 'oku mate fakavaeua KULOKULAPATANIVAI & SAUSAU LOKUITA. 'ae 'ulu, piko moe ngutu, pea 'ikai fa'a kuikui 'ae mata 'e taha. Lau 'oe kavakava'ulie 'e 8 moe kava huhu. Fakamae ha lau'i Mamae 'e ua, mulu kiai 'ae kavahuhu ke lahi, pea kosi momoiki kiai 'ae lau'i kavakava'ulie pea hu'i 'aki ha lolo feta'u ke failolo, toki kofu'aki ha lau lepo hina, tunu 'iha malala mavahe pe, pea koho'o faka-fuofua kuo mafana 'aupito pea fukefuke leva 'o faka'ahu ho 'ulu tautefito ki he fa'ahi 'oku mate, pulou ha me'a ke nofo 'ae mao 'i loto, ka hili ho'o faka'ahu pea fota 'aki 'ae vali 'ae feitu'u 'oku mate. 'Oku tapu 'aupito ke 'alu ki he havili pe la'a pe kai ha me'a konokona.

VAI KI HE TOTO KOVI:- 'Oku fa'a mohe tangi mo mohe valelau. vau 'ae sino 'oe Manonu hoa'aki 'ae lautolu 'ai ha kaka vilo vai momoko pe 'o inu.

VAI PALA 'AVANGA:- 'Oku tupe 'ae fatafata pea ta vave moe mafu. Vau 'ae Te'epilo'amaui pea tuki moe fo'i foha'i moengalo 'e ua 'ai ha kaka pea vilo vai momoko sepuni vai lalahi 'e tolu pea inu. taimi ni'ihhi 'e lua pe hinga.

VAI KITA FA'ELLE:- Lau'i Masi kona, (kae tapu 'aupito ha fo'i fua) moe lau'i moli tonga 'e fa tuki 'o 'ai hakaka vilo vai mamafana, vae-ipu ti, tou tou inu, tete tokakovi pe lua.

14th Jan., 1970. I will post this to you to-day and I will post some more  
*next week. From Mrs Olga Moa.*

NGAHI FAITO'O FAKATONGA.

TULU'I TUHU'I:- 'Oku kula 'ae mata pea lo'olo'a hange ha matakovi.  
Muka'i nonu 'e 12, tuki 'o 'ai ha konga tupenu pea tafitafi'aki 'ae mata, hili ia pea tulū'i'aki 'ae lau'i fisi'uli 'e 12, tuki 'o 'ai ha konga tupenu 'o tulu 'i'aki 'ae mata, pea tapu 'ae havili moe la'a.

---

VAI KULOKULA 'OHUAFI. Ko hono faka'ilonga 'oku kula hange ha vela, kae 'ikai 'asi ha mata.  
Koe vai, vau 'ae sino 'oe fekika 'o vilo vai mo oko 'o inu tu'o tolu 'i he 'aho.  
Kohono vali, muka 'oe hehea 'e 6 mama pe tuki 'o vali 'aki 'aefaitu'u 'oku kula hange ha vela, tapu 'ae lolo.

---

VAI PALA MATAKA:- 'Oku kula 'ae mui 'oe fanga ki'i tamaiki, pea mo honau ngutu, Vau 'ae tava 'o 'ai ha kaka, pea vilo vai momoko 8o inu pea vali 'aki 'ae faitu'u 'oku kula.

---

VAI TA MOE KULOKUEA:- Vai ki he tamaiki, 'okuhamu pe 'a piko'i 'ae 'ulu moe matahamu moe nima moe va'e, Ko hono vai, koe hongohongox ta'aki kotoa 'ae fu'u 'akau mo hoho aka 'o fufulu ke ma'a , pea tuki 'o 'ai ha kaka vilo vai momoko pe 'o inu, 'oku toe 'aonga ki he kakai lalahi.

---

HANGA TAMAKI KOE TULIEFU. :- 'Oku tu 'u pe he hokonga hui , hange koe tunga'iva'e tui'i nima, tui etc., 'oku langa 'aupito pea lava ke piko'i 'ae hui 'ehe hangatamaki koeni. 'Oku fufula faka-kulokula 'ikai hano mata, kohono vali ke kosi momoiki 'ae lau'i uhi pe nusi 'ai 'i ha lau'i 'akau 'o hu'i'aki ha lolo, pea vali'aki 'ae hangatamaki. Ko hono kaukau nusi 'ae lau'i uhi 'i ha vai mamafana 'o 'ikai ke fu'ū vela pea kaukau ai, tapu 'ae me'a konokona.

6

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FAITO'O KULOKULA, MEA. 'Oku kamata petepete pea veli pea pala, kohono vali koe lau'i polo tonga fua potopoto, moe muka 'oe hehea vahevahe tatau pe, mama 'o 'ai ha lau'i nonu, 'o tauhi 'aki hono vali 'oe hangatamaki. Kohono tapu koe me'a konokona.

---

VAI MAKEHEKEHE:- 'Oho 'ae pule 'o 'ikai ke meimei lava ke manava pea 'oku langa, tuki 'ae kili'i tuitui moe puko, vau moe ngatae fisi 'o 'ai fakataha fakafuofua ke vahevahe tatau, vilo vai momoko pea inu, pea amo 'ae kete 'aki 'ae vai.

---

VAI KI HE TU'UTU'U:- Koe tupunga 'ae tu'utu'u koe lahi 'ae kahi mataki-loma, Vau 'ae sino 'oe telie pea tuki ha va'a si fute taha hono loloa tuki 'omai moe lau'i malolo moe lau'i ma'osipo tonga 'o tuki pea 'ai fakataha 'o vilo vai momoko 'o toutou inu kae'oua ke si'i , 'oku t apu ke kai ha me'a kiki pe inu ha vai mafana, kai pe 'ae me'a 'oku tunu.

VAI MAKEHEKEHE TU'UPULE:- 'Oku fakafefeka 'ae Pule.Koe lau'iApele tonga moe lau'i fiki lau'i kaute tonga moe lau'i ngatae faka-si'isi'i 'ae lau'i fiki tuki katoa 'o vilo vai momoko 'o inu, amo'aki 'ae pule, pea 'oku hinga.

VAI 'AVANGA PULONU:- 'Oku lalave 'ae monga, Vau 'ae sino 'oe Nonu moe Manonu Vilo vai momoko pea Inu mo tulu'i ki he loto monga.

Vai KI HE FAKAAKEAKE 'AE KETE:- Fo'i niu me'alava 'e taha lau'i hehea 'e 6 moe fo'i topukie 'e taha, hae 'ae pulu 'oe niu pea tuki moe hehea , pea momosi 'ae topukie, fakafuopoto opoto 'ae pulu'i niu, pea 'ai 'i loto 'ae lou'akau moe topukie tatau ki ha me'a pea 'ai ha pelu loufusi 'e ua pea inu. Koe vaini 'oku hinga.

VAI TA'OFI HANA:- 'Omi 'ae lau 'oe Vi tuki 'o vilo vai momoko pea inu.

VAI TALAU Koe mohuku Vai 'omi 'ae sino moe aka tuki pea vilo vai momoko 'o inu 'ai ke folahi 'ae fo'i vai. Koe Mohuku koeni 'oku fa'a tupu 'i he ano.

FAITO'O MEALAFI:- 'Oku fa'a pala 'ae telinga pe kou'ahe 'oe tamaiki 'Omai 'ae muka'i telie 'oku kei mohemohe moto 'uli'uli Mama 'o pu'aki 'i ha nge'esi kaloa'a pea heu ai ha me'i enga, pea 'ai ha tu'aniu moha me'i vavae 'o takatakai ki he tu'aniu 'o fai'aki hono vali.

VAI MANAVAMOLE:- Sino 'oe moengalo 'e ua ngahoa moe sino 'oe uhi, tuki 'ae moengalo pea vau 'ae uhi, 'ai 'i ha kaka vilo vai momoko pea inu.

FAITO'O HULUPA:- Koe fanga ki'i hangatama'i 'oku fa'a tu'u 'i he motu'a tuhu, pea 'oku fa'a langa lahi 'aupito. Fo'i tuitui 'e uangahoa, mama pea 'ai ha konga tupenu kofukofu 'e ua, kofu'aki ha lou nonu, pea tunu pea koe mafana pea 'omai leva 'o vali takai'aki 'ae hangatamaki

VAI MATAKELUA; 'Oku kula 'ae mui 'oe tamaiki, Sino 'oe takafalu vau faka-si'isi'i pe pea 'ai ha ki'i kaka vilo vai momoko 'o faka-inu'aki 'ae tamaiki, pea 'omi pe hono la 'e uangahoa 'o mama , pea 'ai ha ki'i konga tupenu 'o tulu'i'aki 'ae tu'ungaiku.

TO: peace corps people  
in Tonga

RE: medicinal plants



You might want to help me record some of the vanishing lore that surrounds the use of plants for treating illnesses in Tonga. I just returned from Tongatapu, where I collected about 75% of the existing information on Tongan medicine. If you are in a remote area and have good rapport with some of the villagers could you perhaps ask one of them to tell you some or all of what he (she) knows about plant remedies?

It may be convenient to use the reverse of this sheet to record the information. If you're not able to translate a few words please write in the Tongan language; I'll have it translated.

\*\*\*\*

\*\*\*\*

The reason I'm trying to record this information now, is that within 30-40 years most of the people who still use these plants will have died. It will be impossible to analyze these remedies with any idea as to which illnesses they might be useful. Now, it is still possible to find out the essential facts and make a permanent record (see column headings on reverse). When I have this information it will become easier to assess these plants for their potential medicinal value.

\*\*\*\*

\*\*\*\*

If you do find the time to record this information would it also be possible for you to fill in the blanks below?

Your name:

Informant's Name:

His (her) village:

How long there?

Their age?

Thank you,

*Michael A. Weiner*

Michael A. Weiner  
Botany Department  
University of Hawaii  
Honolulu, Hawaii 96822

Tongan  
Plant  
Name

Part  
Used:  
(bark,  
root, etc.)

ILLNESS

How medicine is  
prepared: psychic  
associations, etc.

Plate I. Application of Remedy by Practitioner



Plate II. Ipomoea congesta R. Br.  
Pueraria lobata (Willd.) Ohwi  
Oxalis corniculata L.  
Desmodium triflorum (L.) DC.





Plate III. Polypodium scolopendria Burm.  
Nephrolepis hirsutula (Swartz) Presl  
Catharanthus roseus (L.) Don  
Nerium oleander L.



Plate IV. Glochidion ramiflorum Forst.f.  
Glochidion concolor Muell. Arg.  
Trema amboinensis (Willd.) Bl.  
Trema orientalis var. viridis Lauterb.



Plate V. Urena lobata L.  
Triumfetta bartramia L.  
Triumfetta procumbens Forst.

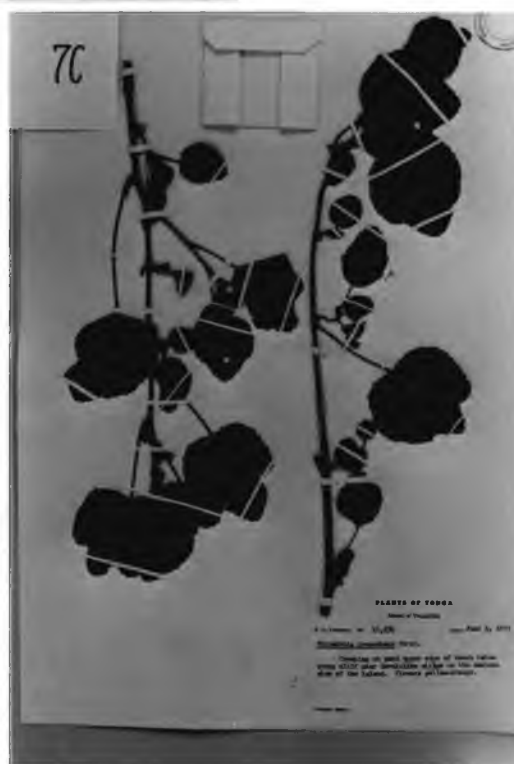


Plate VI. Capsicum frutescens L.  
Rivina humilis L.



Plate VII. Centella asiatica (L.) Urb.  
Carinta herbacea (L.) W.F. Wight

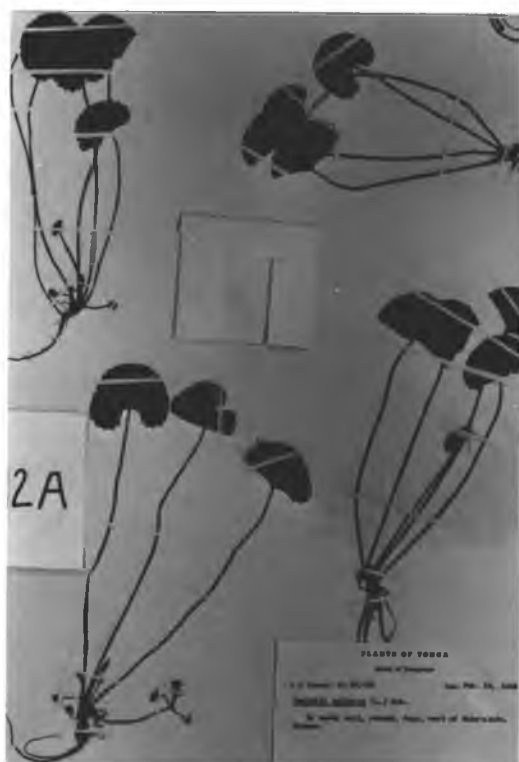


Plate VIII. Royal Palace, Nuku'alofa,  
King Taufa'ahau Tupou IV



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