

ETHNOLOGY OF PUKAPUKA

by

Ernest and Pearl Beaglehole
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Turtles -
P105 - tracking eggs
P 69 - method # egg
197 - hooks
203

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Ethnology of Pukapuka

By ERNEST AND PEARL BEAGLEHOLE

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Scientific work on Pukapuka has heretofore been limited to two brief accounts by Gill (10, 13)*, a paper by Hutchin (18), manuscript notes of a short visit to the atoll by Bryan (5), and a brief account by Macgregor (20) based on a three-day visit to the island in April 1933. The work of Gill and Hutchin is slight and of no great value. Bryan's notes gave us a preliminary orientation and Macgregor generously placed at our disposal before we left Honolulu a manuscript copy of his paper on Pukapuka. We were thus able to check Macgregor's material in the field, and have not considered it necessary to refer to his work on every occasion where his observations are at variance with ours.

In the field, Ernest Beaglehole was especially responsible for collecting material on social and economic organization, religion, traditional history, and material culture; Pearl Beaglehole for string figures, material on children, intimate aspects of family and domestic life, the household census, stories, and other textual material. The bulk of the manuscript was written by Ernest Beaglehole.

Certain records on which this study is based are filed in the library of Bernice P. Bishop Museum: lists of place names, names of land divisions, household lots and talo gardens, statistical records, native texts and notes.

* Numbers in parentheses refer to Literature Cited, p. 415.

Further material awaiting publication includes studies of string figures, myths, stories and chants, and the life of children. A dictionary of the Pukapukan dialect and a study of Pukapukan anthropology are in preparation.

INTRODUCTION

We spent about seven and a half months on Pukapuka, from November 3, 1934, to June 13, 1935. For six months of this time we lived in a coral lime house in the middle of Yato village. During the copra-making period we lived for six weeks in a native house in the settlement of Ngake village on Motu Ko.

Everyone on the island was interested in our work and willing to help. Genealogies and traditional history were recorded at formal sessions in ethnology carried on in the schoolhouse and later in the courthouse; as many as 50 men attended these sessions. One man acted as spokesman. He was interrupted frequently by those who thought he had made a slight error, and many fierce arguments were conducted between upholders of conflicting views before a compromise was reached and the discussion could proceed. More select were later sessions in the courthouse, usually attended by about five of the best informants. The systematic consideration of each phase of Pukapukan culture was taken up in these more intimate sessions. Principal informants were: Veti and Mitimoa, both over 65 years old; Eliu and Pau, both about 50 years old; and Talainga, about 40 years old. Pau was undoubtedly the scholar of this group. Though comparatively young, he was a keen student of things Pukapukan, equally well informed on all aspects of the culture. Veti and Mitimoa were well informed in their own right but functioned more as consulting authorities than as original informants. The youngest of the group, Talainga, made up for disadvantages of age by keenness and conscientiousness. At our suggestion he wrote several notebooks full of old chants and stories which are models of Pukapukan prose and verse. Eliu was a reliable and willing informant. His wife, Motingi, about 33 years old, was a most capable and enthusiastic informant on the women's aspects of Pukapukan life. The high chief, Nawaui, whose great age—about 100 years—rendered his memory unreliable, was unfortunately not a very valuable informant.

Our arrival on the island and our stated purpose to study the life of the Pukapukan people with reference to the ways and customs of pre-missionary times created something of a sensation. The process of rethinking themselves, under our stimulus, back into past times and of recapturing past customs was necessarily a slow one, but, once started, informants went ahead with enthusiasm and interest. At first their memories were somewhat haphazard and vague, but after several months of inter-group discussions and revival of old chants, informants were able to speak with increasing assurance about old-time practices.

As a gift to Bernice P. Bishop Museum, the people of Pukapuka generously made a complete collection of objects of material culture, excepting only the few objects which they can no longer make. A day-to-day study of the processes of manufacture was of great value in clearing up many problems of technology.

Whatever success our work achieved, therefore, is due to the enthusiasm and cooperation of our informants, in the first place, and also of the people of Pukapuka as a whole. Our early work was done entirely with the aid of interpreters. Much of Ernest Beaglehole's later formal work was done with interpreters because he did not wish to risk losing material through inability to follow crucial explanations. Informants could speak much Rarotongan but required the use of Pukapukan when discussing language and various concepts of native Pukapukan life. Our interpreters could speak easily only the Rarotongan dialect. Thus a great deal of explanation between informant and interpreters was necessary before the final English version could be presented to us. For this reason and also because many subjects can not be discussed easily through the medium of a third person, Pearl Beaglehole accepted the necessity of doing without interpreters at the earliest possible moment.

CULTURE CONTACT

Pukapuka was discovered by Commodore Byron in 1765. Between that time and the landing of the first native missionaries of the London Missionary Society in 1857, the island was probably rarely visited by Europeans, presumably because of its isolation and the poverty of natural resources. Native tradition tells of three European ships which visited Pukapuka during these years. Between 1857 and the visit of the Reverend Wyatt Gill in 1862, most of the people of the island had been converted to Christianity. Peruvian slavers twice visited the atoll about 1863 and removed about 100 men and women, only one of whom, the late high chief, Pilato, returned to Pukapuka. In 1869, Captain English of the barque *R. W. Woods* (6, p. 33) landed in Honolulu 42 natives of Danger Island. The natives were unsatisfactory both as plantation laborers and as domestic servants and some time later 20 of them were sent back to Pukapuka by the schooner *Annie*, Captain Babcock. A man from Atiu named Tione, according to the Pukapukan account of this labor gang, returned with the Hawaiian party and later married a Pukapukan woman named Takele whom he had met in Hawaii.

The island was formally annexed to Great Britain in 1892 and included within the boundaries of New Zealand in 1901. The first resident agent visited the island in 1914, and since that year agents have been in residence most of the time. The majority of the people are members of the London Missionary Society church. A Seventh Day Adventist mission was started in 1919, a Roman Catholic mission about 1929. All three missions are

more personal aspects particularly is frowned upon by elders in open but tacitly approved in fact. In contact with white people the Pukapukans always speak and act as if they heartily believed and followed the missionary code. It took us many months to persuade them that we did not care to pass judgment upon what they thought and did but that what really interested us was to find out what these acts and thoughts were. As informants gained confidence in us, they dropped their usual attitude of "being on their best behavior" when we were present and were much more natural and free. This attitude of confidence was sufficient for us to gain insight into some of the more implicit phases of Pukapukan life, but even at the end of our stay we were baffled in our attempts to penetrate far below the surface. The cultural veneer of mid-Victorian morality is sufficiently deep to withstand any penetration save that based on long years of patient probing.

White contact has affected least of all the economic life and the manufacture of native articles. Though many Pukapukans today live in coral lime houses in the permanent villages, native houses still predominate, especially in the copra-making villages. The people wear European clothes; the women wear dresses, the men trousers and, when not working, shirts as well. The use of native clothing had almost disappeared by 1934. Because there has been little money available to buy fresh clothes some women now eke out the life of old rags by wearing coconut-leaf kilts over these during working hours. Boys under 12 or 13 years of age go naked for the most part, reserving pants and shirts for school and church wear. Girls wear dresses from the tenderest age onward. Presumably this tendency would be reversed if the first missionaries had been women.

Every household is supplied with knives, usually a cooking pot, tins as drinking utensils, and mosquito nets. Fishermen commonly use iron fish-hooks but they still largely retain the use of native fishlines. Native plank canoes, lashed with sennit, are in common use, the several flat-bottomed European boats being used only for transport of copra and cargo over the reef. Beyond these obvious changes, economic life functions today largely according to old patterns. The few items that could not be made for the Bishop Museum collection consisted mainly of plaited garments apparently infrequently worn in the old days.

LIMITATIONS OF MATERIAL

Data on the more personal and implicit aspects of the culture were obtained from special informants with whom we had built up a confidential friendship, usually without the medium of an interpreter. The material on formal social life, save where it relates to the old-time governing authorities, to the powers of the chiefs and elders, or to the general tapus surrounding the chiefs, is reasonably reliable. Questioning of informants has been sup-

served by native pastors. Communication with the outside world during the past years has varied considerably, depending on the rise and fall of the price of copra. For some time a Burns Philip trading schooner has visited the island twice each year to buy copra, to trade, and to carry mail, but this service is now discontinued with the closing of Apia as port of entry for Pukapuka. A warship of the New Zealand station usually makes an annual visit to Pukapuka. There is now occasional direct communication between Pukapuka and Rarotonga, headquarters for the Cook Islands Administration.

The effect of the contact with white culture upon native Pukapukan culture has been out of all proportion to the general lack of communication between the atoll and the outside world, due to the zeal of the native London Missionary Society pastors. Customs and practices associated with the old-time religion have been wiped out; religious structures have been destroyed, and the stones of which they were constructed used to build houses and the causeway that joins old and new Yato villages. Social organization has not been much affected beyond the breaking down of the power of the chiefs and their supersession as governing authorities by an authority set up under the Cook Islands Act. Old kinship avoidances show signs of falling into disuse among the younger generations, though they are strictly followed by the older people. Traditional history and genealogies are still well remembered.

The Pukapukan language is being gradually superseded by the Rarotongan as the language of church and government. The native missionaries have all been Pukapukan or Rarotongan, trained in the Rarotongan mission schools, and the Rarotongan dialect has been the language used by missionaries in the Cook Islands. The Bible used is in the Rarotongan dialect, and today Rarotongan is taught in the school by the present missionary and spoken exclusively by the resident agent. Very old people still speak fairly pure Pukapukan among themselves; some middle-aged people follow this example but use Rarotongan for church and state business; others tend to speak Rarotongan exclusively. Younger people who have passed through school tend to speak Rarotongan for all purposes and often find old Pukapukan speech or idiom difficult to understand. The old chants are remembered in Pukapukan, though they contain many archaic words which even those with a full and ready knowledge of Pukapukan can not understand. We insisted on informant's using the Pukapukan dialect as far as possible in their communications with us, as this was the only way to compile a vocabulary of the dialect; many were the arguments over the admission of various words to our lists of Pukapukan words.

The morality of the community has of course been vitally affected by missionary influence. As a result there is a wide breach between the moral theory on which the community is supposed to operate and the actual code of conduct followed by the majority. The life of the young people in its

plemented by an analysis of texts. The texts themselves, of which only a few examples are given in this monograph, and the vocabulary have been checked and rechecked with informants and may be taken as representing with fair accuracy the Pukapukan dialect. Data on economic life and the material culture are reliable. The material on Pukapukan religion and its interrelations with other aspects of the culture, particularly with economic and social life, is definitely weak and represents a type of historical reconstruction based on informants' accounts supplemented by textual material. None of the informants were living during the days when Pukapukan religion actually functioned.

This study of Pukapukan culture is, in the main, a presentation of the more formal patterns of behavior which have been abstracted from the total culture by ourselves or our informants. It is likely that the contents of this monograph, if imputed to one or all of our informants, would in no sense be recognized by him as significant formulations of all his cultural experience. We believe he would recognize that the majority of the statements contained herein hold true in one sense or another for some aspect of his experience, and it is this belief and the fact that the formal patterns of Pukapukan society configurate fairly well with the patterns of other Polynesian communities that are the sole guarantee of the measure of truth in the generalizations presented.

The ideas and action patterns grouped together under the title of Pukapukan ethnology would have endlessly different meanings for the various informants. It is just these personal valuations, symbolisms, and implications which the cultural set-up of modern Pukapuka makes so difficult to annotate and which attest to the continued vitality of Pukapukan culture as a functional entity. Much of Pukapukan culture as here presented is the peculiar property of but few individuals in Pukapuka today. The imprint of informants' personalities is contained in all the information so freely imparted, but it is woven into the context of the information in a fashion that defies analysis, though it is none the less real. This is most striking in the realm of religion or in the chants. Full participation in the latter as a cultural value is probably limited to no more than a few individuals of the 600 odd Pukapukans living on the atoll today. The remainder have vague or ill-defined ideas about the meanings of obscure passages in the chants, though any vigorous-minded Pukapukan will, on challenge, make up immediate rationalizations to cover his own lack of authentic understanding. This in no way vitiates the value of these chants as an aid to the recapture of old-time customs. These customs and symbolisms are preserved in them, waiting only for the analyst's attention.

The following pages attempt to work out the main forms of Pukapukan culture, to hint at certain time sequences, and to indicate a few geographical

affinities with other Polynesian systems. This provides the objective background for studying the meaning of these patterns for the personalities of those who live within the frame of reference called Pukapukan society. This task is touched upon in the data on children (2). If certain problems of symbolism, pattern status, emotional conditioning, and all that makes up the dynamics of culture have been largely overlooked in these pages, it is not through unawareness of the existence and importance of these problems but solely because the type of field work represented by this and other manuscripts is that which it was most practicable to carry to a conclusion.

NOTE ON PHONETIC STRUCTURE

Throughout this monograph Pukapukan words are written in the ordinary English alphabet, in accordance with standard usage for Polynesian ethnology. Obviously such recording represents only an approximate rendering of the true sounds and words of the language.

The symbols *k*, *p*, and *t* represent the intermediates between sonant *g* and surd *k*, between *b* and *p*, and between *d* and *t* respectively; *k* is pre-palatal before the vowels *e* and *i*, post-palatal before *a*, *o*, and *u*—it is never aspirated; *p* is aspirated only before the vowel *u*; *t* is always dental and unaspirated.

The lateral, *l*, is dental. The nasals are *m*, a dental *n*, and the front palatal *eng* (*ng*). The semivowel *w* functions as a major consonant; when it occurs within a word before *u* or *i* (as in the words *muawu*, *awu*) it has a guttural quality.

Finally, there are the bilabial spirant *v*, voiceless and unaspirated, and the voiceless interdental spirant, not previously recorded for a Polynesian dialect. This spirant (corresponding to the *th* in English "thin") is invariably palatalized, followed by a *y* slur ("thin" with a *y* inserted before the *i*, "thyin"). This compound sound (*θ^y* in certain phonetic systems) is rendered by the symbol *y* in this monograph, but is not to be confused with the ordinary *y* semivowel which does not occur as a Pukapukan consonant. The Pukapukan voiceless interdental spirant palatalized is the sound mistakenly described by Macgregor (20, p. 3) as a glottal closure accompanied by "an added breath . . . giving a sound of *i* consonant," and written by him 'i.

The glottal closure as an independent consonant is absent. The consonants are never long.

The vowels *a*, *e*, *i*, *o*, *u* all have the continental values. In rapid speech, however, a short *a* is pronounced as *u* in English "but"; short *i*, especially before *ng*, as *i* in English "pin". Final *i* after *t* tends to be voiceless.

Quantity and quality of vowels, presence or absence of diphthongs, and the location of stress are not indicated in native words. These phonetic characteristics are reserved for treatment in a Pukapukan dictionary which will include also the general rules of pronunciation governing accent.

the group of words in which Fijian δ appears between vowels is not properly distinguishable from the words where Fijian δ corresponds to Pukapukan θ^v .

In another category, however, Pukapukan θ^v is replaced by the Fijian s , said to be pronounced "as in English": *yanga* (to do), *sanga*; *yelu* (to comb), *seru*; *yeye* (foolish), *sese*; *yau* (to mix), *seu*; *yika* (netting needle), *sika*; *yinu* (oil), *simusinu*; *yua* (water), *suasua* (wet).

Like the δ sound, Fijian s occurs in some words where no Pukapukan consonant is now used: *ala* (path), *sala*; *angaanga*², *sangasanganga*; *olo* (to rub), *solo*.

I find no suggestion in the literature that the Fijian δ is ever palatalized, though this is invariable with the Pukapukan θ . But the semivowel y is another Fijian consonant used in some words where Pukapukan requires no consonant: *ate* (liver), *yate*; *atu* (row), *yatu*.

In a few Fijian words y corresponds to Pukapukan θ^v : *yala* (to encircle), *yala*; *yau* (to come), *yau* (to come or go); *yau* (dew), *yauyau* (fog or mist).

The sound θ appears in the Melanesian sound system as worked out by Ray (23,p.30). It is noted in particular for Nengone and Lifu of the Loyalty Islands and for Anetyum in the southern New Hebrides (23,pp.77,139). Because of inadequate linguistic material it is impossible to determine the relation between this Melanesian sound and the voiceless spirant of Pukapuka.

Pukapukan w is Fijian v . Other consonants seem to correspond in words common to both as follows (Pukapukan given first): k , k ; ng , ng (q); l , l ; ndr ; m , m ; n , n ; ng , ng ; p , mb ; t , t ; nd ; v , w .

It is regrettable that paucity of phonetic material for any Fijian dialect renders it impossible to draw conclusions, but when trustworthy phonetic and ethnographic material becomes available for the cultures crudely lumped together today as Fijian, it is not unlikely that phonetic and cultural anomalies found in the otherwise prevailing Polynesian culture of Pukapuka will prove no longer to be unique but part of a western sub-culture that may be traced from its eastern boundary in Pukapuka across to, and beyond, Fiji.

POPULATION

The population for the years for which figures are available (7) is as follows: 1906, 435; 1911, 490; 1916, 474; 1926, 526; 1935, 632.

The increase in population from 1906 to 1911, followed by a decrease in 1916, is at least partly explained by the fact that 52 Pukapukans were transferred to Karotonga in September 1914, in order to relieve distress caused by the tidal wave that swept Pukapuka in January of that year. The population today shows a great increase over the population figures of 1916 and 1926. Records for 1933 and 1934 show a total of 41 births as compared

² Pukapukan informants held that the reduplicated form of the word *yanga* is not *yangayanganga*, but *anganga*.

with 22 deaths, which indicates that the population is increasing steadily. The vital records of Pukapuka are not complete. An analysis was made, however, of the offspring for 16 marriages, where reliable figures were available. These 16 marriages produced 77 children, a ratio of 4.8 children for each marriage. Of these children, 39 died before reaching the age of 20 years, a mortality rate of 50.6 percent. This seems to indicate a stationary population, but the fact that the population is increasing shows that the analysis is not typical of conditions today, even though it was perhaps true a number of years ago.

The population of each village of Pukapuka (as of June 16, 1935) is:

	NGAKE		LOTO		YATO		ISLAND TOTAL	
	M	F	M	F	M	F	M	F
Adults	84	80	54	67	61	48	199	195
Children	164	101	121	64	109	73	394	238
Totals	265	185	182	632				

These village figures, supplied by Geoffrey Henry, are based entirely on village lists made up for divisions of food and of copra money. They include all the people who affiliate (*tau*) with the named village, irrespective of village residence. The figures for adults include all those males and females who have attained sociological adulthood (*wakatane* or *wakarawaine*), that is, all persons above the age of about 16 years, who receive adult shares in village food divisions.

From our own census data it was possible to work out the approximate sex ratio for 348 people:

	Adults	Adolescents	Total Adults	Children	Total
Male	88	18	106	77	183
Female	93	11	104	61	165
					348

In this list, the term "adults" includes all persons married or past marrying age; "adolescents" includes all persons between 15 years and marrying age; "children" includes all below 15 years.

The number of children does not agree, of course, with those given by the resident agent, because the villages do not list their children in terms of sex, which is unimportant for food divisions. The village figures show a ratio of 97.9 females to every 100 males; the census figures, 98.1 females to every 100 males.

PHYSICAL CHARACTERISTICS

Anthropometric measurements made on 230 living adults have been forwarded to Dr. Harry L. Shapiro for analysis. About 25 individuals measured were of mixed blood; the remainder were full-blooded Pukapukans, an equal number of males and females. The amount of racial or of early interisland mixture is not great. Two Manihikian women, castaways, married and settled down on the island about 10 generations ago. Recent intermixture with whites is readily observed. There is no discrimination against or in favor of those of mixed blood. The average stature of Pukapukan men and women is noticeably less than that observed for other Polynesian groups. Women are shorter than men. The presence of the epicanthic fold was noted in several individuals. The glabella is more prominent in men than in women. Face type seems to vary between a narrow, long face with a long nose and a wide face with a short, broad nose. It is possible that analysis will reveal two physical types based on these distinctions. Lips in general are thin or medium thick. The hair is black; low and medium waves are common. Body hair is scanty on both sexes. Skin color is a light brown which becomes very dark on prolonged exposure to the sun. The skin color of infants is extremely fair.

MOTOR HABITS

Little sex differentiation was observed in motor habits. The common position in sitting is "turkish fashion". The legs are crossed with knees bent and resting on the inside portion of the sole of the foot, the outside edges of the feet resting on the ground. A common variation is to raise the right foot and rest it on top of the left knee. This is the position for all sedentary activities, whether mat plaiting, food preparation, sennit making, or simple rest. Only a man braiding sennit sits with outstretched legs; he loops the free end of the sennit round the toe of an extended foot to obtain a tension on the cord.

The bent-knee gait is common in walking. Apart from individual walking habits due to previous yaws infection of feet and legs, the common habit is to walk with the palms hanging at the side and turned inward, the toes pointing straight ahead. Running and jumping habits seem to be similar to those of the ordinary unskilled white person. Children crawl on hands and knees and on hands and feet.

Both sexes lie and sleep (*moe*) in a wide variety of positions, on the side, prone, or supine. The Pukapukan distinguishes by descriptive names more than thirty-five different types of sleep according to position, movements during sleep, and soundness of sleep. The amount of sleep for adults varies from 4 to 8 hours each night, sometimes with an hour or more of extra sleep during the day. Young children sleep whenever they are tired. Children

from about 6 years of age onward average about 8 hours of sleep each night. Fires are occasionally kept burning late into the night when mosquitoes are troublesome.

Men micturate in a standing position; women squat on the heels or stand with knees bent. Both sexes defecate in a position squatting on both heels.

Cutting habits vary according to the instrument employed. In general, a knife is moved away from the body, a native cutting or scraping instrument toward the body. Adzing is, of course, toward the body.

Heavy weights, such as canoes, are lifted from the ground with the arms in front of the body and carried just clear of the ground. A house roof is carried on the shoulders of a number of men who get inside the roof while it is on the ground and hoist it onto their shoulders. A few coconuts are carried in the hands, with or without a basket; a large number are balanced on the shoulder. Many coconuts are carried on a rough carrying pole, weighted at both ends and balanced at its middle point on the shoulder. The right shoulder is generally preferred. Women generally carry weights balanced on the head, using a pad made of a bunch of leaves placed between the head and the burden.

Climbing coconut trees and coconut husking are described on page 86. Swimming is naturally acquired behavior and is not taught to children. Pukapukans are not great swimmers or divers, but use the sea mostly for bathing, when they run or wade from the beach and then suddenly duck. Children are in the water a great deal; they play at water splashing, surface diving, and underwater swimming games. Adults rarely play swimming games. In diving for *Tridacna* shellfish, adults dive from the surface by elevating the buttocks and depressing the head.

Casual observation indicates that left-handedness (*ima mayui*) is common in both children and adults. This was observed in adults in the use of implements and in the handling of darts in games, in children when dancing.

The toes are used extensively for picking up objects from the ground and for holding objects when both hands are engaged and when purchase is required.

Both men and women pole and paddle canoes today. The individual poles a canoe sitting, standing on the floor of the canoe, or standing with one foot on each gunwale. Paddling is done on either side of the canoe with equal ease. The paddle is grasped with both hands, fingers pointing to the front, thumbs to the rear. It is unusual for a canoe crew to sing or chant in rhythm to the paddling. The paddle is plunged vertically into the water and the stroke is fore and aft. Two types of strokes are used: *alo atu pele* is a long, even, powerful stroke with the full stretch and strength of arms and shoulders, dipping the paddle blade deep into the water, and used for long distances when consistent power is required; *alo wainga* is a short, quick, shallow stroke,

almost a jab of the blade into the water, used when a sudden spurt of speed is required to take advantage of a following wave to shoot across the reef. In steering, the paddle is struck into the water as far away as possible and then pulled back through the water.

GESTURES AND EMOTIONAL EXPRESSIONS

Various conventional gestures are used for communication without speech. Affirmation (*wakatika*) is expressed by raising the two eyebrows without moving the rest of the face. Used in answer to a negative question, the gesture indicates that the statement in the negative is correct. Doubt is expressed by screwing up the nose and mouth, wrinkling the forehead, at the same time nodding the head. A distant place or person is indicated by pointing with the forefinger. In beckoning to a person, the arm is flexed with the palm pointing toward the person addressed, and the fingers are closed against the palm and quickly opened. The motion is repeated if necessary. Height is indicated by the outstretched arm, palm pointing to the ground. The size of a fish is always indicated by marking off its approximate length with the fingers of one hand on the other arm. A gesture of insult consists in pointing the fundament toward the person insulted; at times the gesture is accompanied with words like "Tau kanokano" (Your anus). Pointing and shaking of the forefinger accompanies the hurling of verbal insults at another person. Other attitudes which occur in story telling are mentioned elsewhere (1). Concentration or the exertion of intense physical effort is marked by semi-protrusion of the tongue, grinding of the teeth, or contorting of the face. Shyness or embarrassment in the presence of white people is shown by women and children turning away the head, or lowering the head and covering the mouth, nose, and lower part of the face by the palm and spread-out fingers of the hand. No man was ever observed displaying this gesture. Naked children who become suddenly self-conscious at the approach of a white person cover the genitals with the hand.

Display of affection is marked by pressing the nose against another person's face or other part of the body, at the same time inhaling (*yongi*) through the nose. The nose is often applied to the back of the hand of a white person. An excellent account of leave-taking after a visit is given in detail in the story of Te Malo and Totoloa (1). The common greeting on the road is "Ka wano koe ki wea?" (Where are you going?). The person addressed answers in detail or in evasion according to his inclination.

Sneezing is a sign that someone elsewhere is talking about the sneezer, probably in a gossipy or scandalous fashion. Yawning merely expresses bodily fatigue.

Both men and women are noticeably given to the habit of leaning against each other in close bodily contact on every occasion. A group of men stand-

ing watching a competition such as coconut husking, or sitting and talking, wrap their arms about each other and lean on each other's shoulders. Though any adult adopts this position, it is particularly striking to the observer when it occurs among men. When relaxing, women lean against other women. A woman frequently lies with her head on the lap of another woman. Less frequently, a young woman, watching a group sport, leans against an older man and wraps her arms over his shoulder. Occasionally the older man may rest his head in her lap. These attitudes, taken up in large or small gatherings, occasion no comment of any nature nor any embarrassment to the parties concerned.

ENVIRONMENT

TOPOGRAPHY

The atoll of Pukapuka lies about 390 miles northeast of Samoa, 715 miles northwest of Rarotonga. Its nearest neighbor, Nassau, is about 42 miles southeast and was formerly occupied by a colony from Pukapuka.

Pukapuka consists of three islets with a land area of 1,250 acres, and a few sand banks grouped around a barrier reef (fig. 1, *a*) that encloses a lagoon about 5 miles long and 2 to 3 miles wide. Pukapuka, the northern islet, is about 1 mile wide and has a greatest depth of about 1/2 mile. The entire population of the atoll lives on the lagoon shore of Pukapuka (fig. 1, *b*). The word Pukapuka has no meaning but various etymologies. The old name for the atoll, Te Ulu-o-te-watu (Head-of-the-rock), refers to the legendary origin of the islands and is commonly used in old chants. The occupied part of this islet is generally called Wale (Home). The two southern islets, Motu Ko and Motu Kotawa, form reserve food lands (*motu*—translated throughout as reserve) and are visited occasionally for food and copra supplies. Each reserve has a small permanent settlement of houses occupied during these visits.

The landing passage (*awa*) on the western side of Pukapuka (Wale) is used by canoes and flat-bottomed boats only. All supplies and passengers are transferred outside the reef to native canoes for transport across the reef to the landing beach. The westernmost section of the islet is occupied by the people of Yato village. This village extends across the causeway which spans an arm of the lagoon and occupies further ground east as far as the present London Missionary Society church. Formerly this eastern site was the only site of Yato village. The building of the causeway about 60 years ago and an epidemic sickness suggested the transfer of part of the village to its present western site. The boundary of this village runs from the lagoon beach through the middle of the church and so to the outer beach. The section of land north of the village road embraces one reserve of Yato called Niua. The other reserve is Motu Kotawa.

The houses of Loto village are contiguous with those of the eastern section of Yato. They stretch along the lagoon and across the island to the outer beach, a location adopted after the tidal wave of 1914. North of the village road running through Loto stretches the only reserve of Loto, Uta, which extends to the outer beach. The third and eastern-

most village, Ngake, formerly occupied Utupoa, the southeastern arm of Wale. After the wave of 1914, houses were rebuilt on the lagoon frontage contiguous to the houses of Loto, and other houses were built on a section of land extending from the lagoon to the outer beach. This section of Ngake faces the outer beach extension of Loto. The two extensions occupy opposite sides of the village road. The reserve of Ngake is Motu Ko. Land at Utupoa is also used as a reserve, but sections here are owned by individual lineages and not by the village as a whole.

All three islets are intersected by paths and trails. The main road (*ngutuata*) of Wale extends from the landing beach, through Yato, across the causeway, and through Loto. One branch makes a right-angled turn and passes to the outer beach, to the court-house, residency, and the outer sections of Loto and Ngake. The other branch runs through the lagoon section of Ngake. Formerly it led to the Utupoa site of Ngake. This wide main road is well kept and bordered by coral stones. From it branch off trails and smaller paths leading to the outer beaches and the reserves. These paths, as well as the many paths on Motu Ko and Motu Kotawa, are named after persons, either contemporaries or those now dead, who originally cut the clearings through the bush. Contemporaries cheerfully accept the responsibility of keeping their paths clear, and descendants of those after whom the paths are named accept the same responsibility.

Each village and reserve has a number of alternate names that are frequently referred to in chants and conversation:

VILLAGE OR RESERVE	OLD NAMES	REMARKS
Ngake	Pana-tule Te Yawea Te Langaikula	'Erect-penis' — Refers to kilts (titi) of pandanus dyed red, worn by Ngake villagers at festivals.
Loto	Kilimanu	'Bird Skin', name taken when birds were plentiful on Motu Ko.
Yato	Avalua Kotipolo Yacmata Takanumi Ulekawa	Name of legendary land. 'Cutting of polo leaves'. — 'Circle'?
Motu Kotawa Motu Ko	Te Nuku-ya-o-Mataliki Te Nuku-loa-o-Mataliki	'Penis-of-semiit'? Sacred-isle-of-Mataliki Long-isle-of-Mataliki

The western half of the lagoon, including Motu Kotawa and the western half of Wale, is also called Te Lau-la-lalo no Te Ulu-o-te-watu (Lower-part-of Head-of-the-rock). The eastern half, including Motu Ko and the eastern half of Wale, is called Te Lau-la-lunga no Te Ulu-o-te-watu (Upper-part-of Head-of-the-rock).

PLACE NAMES

A list of 140 representative place names, including all the names of paths and trails, talo gardens, land section, household lots and other division names collected in Pukapuka, is on file in the library of Bernice P. Bishop Museum.

¹ Mataliki (*mata aliki*, chiefly eyes) refers to the lineage god supervising these reserves and is not to be confused with Mataliki (*mata liki*, tiny stars), the name of the Pleiades.

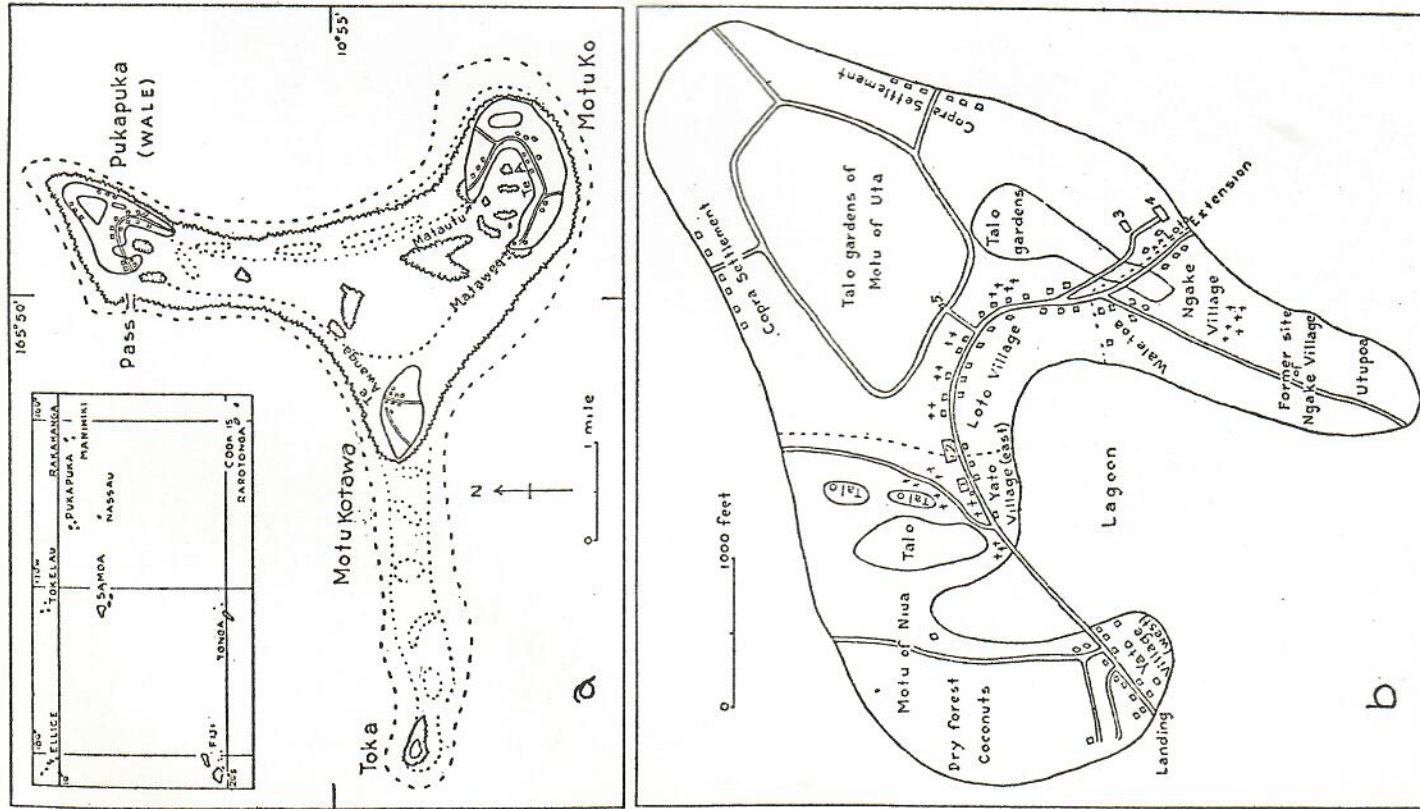


FIGURE 1.—Maps of Pukapuka. a, atoll of Pukapuka, showing relation of the three islets, and reef circuit. b, islet of Pukapuka or Wale; dotted lines indicate village boundaries, solid lines main paths, and crosses principal cemeteries. 1, school; 2, London Missionary Society church; 3, courthouse; 4, residency; 5, old watch house at Matala.

There are names for every section of land, reef, and beach on the atoll, indicating the close association of the Pukapukan with his environment. The most important place names are marked on the accompanying maps (fig. 1, a, b).

CLIMATE

Records for the years 1930-35 (21) show that the mean temperature ranges between 80.9 and 83.9 degrees F., maximum temperature between 86.8 and 92, minimum temperature between 67 and 75 degrees. The average maximum absolute temperature throughout the year is 92.2 degrees and the average minimum absolute temperature is 67.4 degrees. Both minimum and maximum temperatures vary but slightly from month to month throughout the year, and the climate in this respect is equable.

For the period of record, the annual rainfall varies between 113 and 156 inches with an average of 128.41 inches. The season of heaviest rainfall is October to March, but heavy rains are recorded for April and May (1932, 1934), May and June (1931). In January 1935, after three days of continuous rain, 10 inches of rain fell in the next 24 hours. The amount and distribution of rainfall are important in the cultivation of swamp talo. A heavy rain floods the talo beds. After a heavy rain, the most desired weather is shady, cloudy skies, for if the rain is followed by brilliant sunshine for several days the submerged talo swamps may be heated to such a temperature before the water drains into the ground that the talo is killed. During the dry months, May to September, the rainfall is generally insufficient to bring talo to maturity. In bad years, the talo swamps may dry up altogether and most of the tubers die. It then requires from 6 to 12 months before the new tubers are mature enough for food. Conditions brought about by scanty rainfall must often in Pukapukan history have approached a state of virtual famine. The diet on such occasions as these would be fish and nuts exclusively. With each adult on the island consuming from 7 to 10 nuts daily, and children proportionately fewer, the available supply of eating nuts must soon get very low.

Records for the year 1932 indicate prevailing winds from west through northeast blowing for 115 days in the year, from east through southwest for 226 days in the year. From May to October the prevailing winds (the trades) come from the east and southeast, and from November to April from the north and northwest. The northerly winds are much more variable than the trade winds, and the period from November to April is a time of storms, heavy winds, gales, and electrical disturbances. Pukapuka is just outside the regular hurricane belt, but there are records of severe visitations. A "tidal wave", probably accompanying a hurricane, which devastated the island about 300 years ago is mentioned in traditional history (p. 386). The

latest hurricane of which there is definite record (7, 1915) occurred on January 9, 1914. This was preceded by a severe storm on December 14, 1913. Visitors who landed on Pukapuka on April 24, 1914, recorded that the high seas had washed away all but seven houses and flooded all the talo swamps. The wind blew down from the trees all the mature nuts and swept them into the sea. The people took refuge in the higher parts of the talo beds and subsisted on immature nuts and fish. The government schooner transported 52 Pukapukans to Rarotonga and settled them there until the Pukapukan food supply should reach normal again. A hurricane, which swept the Cook Islands in February 1935, was marked by exceptionally high seas in Pukapuka, but did no damage.

In former times, when no relief from outside was available, tidal waves and hurricanes must have produced famines on Pukapuka, or else reduced the imminence of famine by drowning the majority of the population. Previous to the tidal wave of 300 years ago, the population of the atoll was probably between 1,000 and 2,000. After the wave swept over the island, the population was reduced to 15 men and their families. Famines gave rise to many of the killings recorded in Pukapukan history, owing to quarrels over the control of the available food supply. It was no mere coincidence, therefore, that formerly the morning rising of the Pleiades in late May, heralding a season of good weather, was accompanied by dancing and feasting. The London Missionary Society church merely continues an old pattern when it holds special services in March to render thanks for safety during the preceding hurricane season.

NATIVE WEATHER LORE

The compass directions are named after winds (fig. 2) which are associated with the villages as follows:

Ngake: Kailua, Mauake, Malangai, Malangai tonga, Tonga, Muiitonga, Keo, and Pua.
Loto: Wakalua.

Yato: Tokelau iti, Tokelau matua, Wakaitu, Palapu, Yulu, Laki.

The association of villages with wind names seems to be derived from the geographical location of the villages and the lands which they control. Ngake, lying to the eastward, controls all the winds that blow on the east and south side of the atoll. Loto, between the other two villages, controls the only wind blowing from the sea onto the outer beach opposite the reserve of Uta. Yato, to the westward, controls the winds that blow over the reserve of Niua and across the reef joining Wale to Kotawa. The names of these winds are used in the chants of each village for symbolic reference; no village, in composing a new chant, would mention the name of a wind belonging to another village. Though the matter is now very vague, it is possible that

formerly each village, through its power over specific gods, thought itself able to control the named winds by praying to the appropriate god. No special magical technique would be required for this purpose and the matter would be left to the routine duties of the priest when consulting the gods in the god house.

The gods exercise a general control over the winds from the four cardinal directions (p. 311). The story of Kaliwi (1) tells how a woman invokes each of the personified winds to blow her down from a tree top, but only the cold Tonga wind has strength to loosen her grip and send her tumbling to the ground.

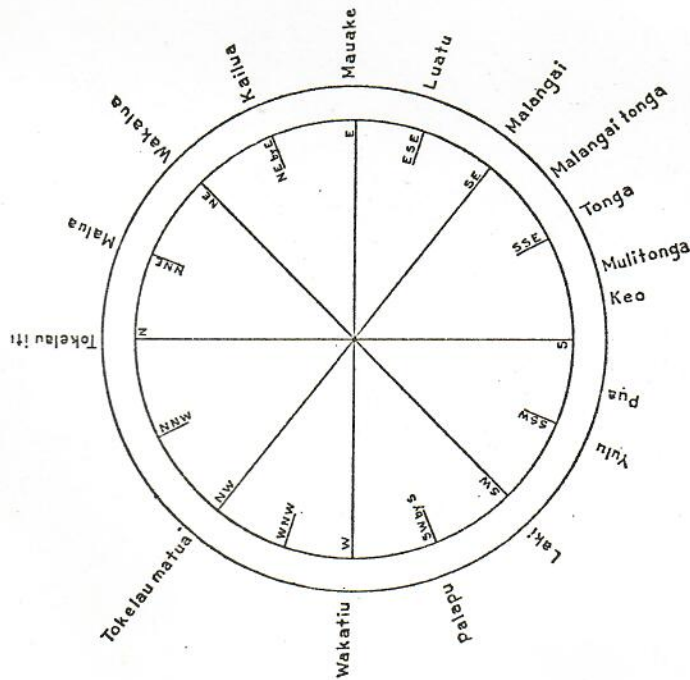


FIGURE 2.—Pukapukan winds and directions named therefrom.

The word for side or direction is *kaokao*. Hence a person says *kaokao tokelau* (northern direction), *kaokao tonga* (southern direction.) The term *punga matangi* refers to that portion of the beach which faces the direction of a wind blowing truly from *tokelau*, *tonga*, etc. To indicate precise directions when a wind is not blowing on the *punga*, the term *mao* is used. *E, mao tokelau* is a wind from the north blowing a little to one side or the other of the true *tokelau* wind. This direction may be specified by adding the name of the next wind direction to the name of the *mao* wind; thus a wind blowing

slightly to the west of *tokelau* is termed *mao tokelau wakatuu*; one blowing slightly to the east of *tokelau* is *mao tokelau matua*. A wind that chops and changes to several points in the same day is called *matangi tilivale*; a wind that shifts to another direction to blow steadily for a week or so before changing back again is *matangi tautaka*; a wind that shifts and blows only for a day or so before changing again is *matangi tautakataka*. As certain winds are valuable as two-way winds in sailing across the lagoon and back, the winds are classified: two-way winds (*matangi alahua*) from *Wale* to *Motu* Kotawa are *malangai* and *wakatuu*, from *Wale* to *Motu* Ko they are *mayake* and *palapu*; one-way winds (*matangi alatawi*) from *Motu* Kotawa to *Motu* Ko are *tokelau* and *wakalua* and the wind for the reverse journey is *yulu*.

Various beliefs are held about the relation of the weather to other phenomena. Black clouds (*kapuao uli*) low on the horizon, accompanied by thunder (*watititi*), are a sign that fresh fish have come inside the reef. A vigorous electrical storm was formerly considered to portend a time of violence. It was also believed to be the gods' warning of coming punishments for violation of tapus. When lightning (*uila*) strikes the ground or a tree or when a meteor (*mata zwai kave*) appears to strike the island, this is a sign that a woman has conceived a child in incest and has had an abortion or miscarriage in order to avoid a shameful pregnancy.

A rainbow (*mamua*) breaking through black clouds and a stormy sky is a sign that the bad weather has been broken by the bars of the rainbow and will soon blow away. A rainbow cutting through the clouds in a dull sky is a sign that turtles have come to the outer beaches, or that a shoal of fish is outside the reef. If the bonito fleet is fishing and the people see this rainbow, they comment that the fishing will be successful. A rainbow seen in the early morning or late afternoon is a sign that albacore fishing is good. For chiefly succession in the Muliwutu lineage the successful aspirant is the one who can make a rainbow appear in the sky when he strikes with his right hand on the sacred stone of the worshipping enclosure (*arawanga ya*).

If the wind blows hard from the southeast, then moderates and swings round to the northeast, this is a sign that flying fish are abundant. When red streaks appear to shoot up to the middle of the sky at dawn, this is a sign of heavy rain and hot weather to come. A halo or house round the sun (*te wale no te la*) signifies heavy rain on the following day.

If Yina, the woman in the moon (*maina*), is clearly outlined and easily seen, this means fair weather; if she is dark and obscure, a heavy sea will make fishing difficult. The crescent of the new moon turned toward the north means fair weather throughout the moon; the crescent turned to the south is a sign of bad weather; the moon lying on its back presages hot weather. An eclipse of the moon or sun (*maina kaina, la kaina*) is caused

24 by the events narrated in the story of Lingutaimoa and her pet *manini* fish (1).

SEASONS

The native Pukapukan year was divided into seasons (*vaiā*). The sign for the new year was the morning rising of the Pleiades, about the middle of May. This ushered in a period of six moons of pleasuring, *ono maina ututu* (*utuutu* is a jumping game, and presumably the word is a symbol of good feelings engendered by sporting contests). Some informants dated this period from the rising of the Pleiades, others from the first new moon after the rising. Hence it comes between the May-June and October-November moons. The cool trade winds blow steadily from the southeast, deep-sea fish are plentiful, and the sea outside the reef in the lee of the atoll is always calm enough to render it possible to catch these fish. This season, though marked at times by a shortage of talo, is usually well provided with fish and nuts. It is the time for competitive sports, for deep-sea voyages, and for well-being. The period is introduced by feasting and dancing.

The six pleasure months are followed by six tapu moons (*ono maina yā*) from November to April. It is a period of heavy and changeable winds, possible hurricanes, excessive heat, and sultry weather. Deep-sea fish are not plentiful, and heavy seas sometimes make fishing arduous. Food comes from reef fishing and beach fishing for smaller fish. The supply of talo is plentiful if there has been no destruction of tubers during the preceding season. There was formerly little dancing, feasting, or chanting during this period, except at deaths. Compared with the moons of pleasure, these moons mark a time of stagnation of group activities, when only routine matters are kept in hand.

Another native classification gives three seasons, cutting across the dual division. The rainy season (*te vaiā yua*), lasting from November to March, starts when the wind swings round from the south to the northwest and wild ducks are sighted flying southward. At this time the people of Yato village repair their houses and reroof them, because this village bears the brunt of the winds from the north and west. It is a season for good growth of trees, nuts, and talo; fishing is bad, but turtles come onto the outer beaches at the beginning of the period. The marine worm (*palolo*) is not known in Pukapuka so there is no *palolo* season to usher in this period. The season for fair weather (*te vaiā lelei*) lasts from March to June when fishing is good and there is still much rain and plenty of food. The season of scarcity (*te vaiā to te onge*) lasts from July to October. There is little rain, the talo turns yellow and does not produce tubers in any abundance. Growth of coconuts is marked by a midwinter pause; though not plentiful, they are generally sufficient for the needs of the population. Deep-sea fishing is good but water

and talo are scarce. At the present time, the island water supply from concrete cisterns is rationed out to the families of the island from July until the first heavy rains.

The seasonal changes, though important for living conditions, have not involved any great seasonal rhythm of labor. Whereas house repairing for the western village is in October and November, that for the eastern village is in April and May, when the steady winds blow from the south and east. There is a tendency to reserve activities centered round the building of new houses and canoes for the cooler midyear months, and at the beginning of this period there is a spurt of building in all villages. Other activities go on throughout the year. Twice each year, depending on the maturity of the plants, all the talo beds on Wale and Motu Ko are fertilized. With the arrival of May and the beginning of the best deep-sea fishing, there is a general repairing of the fishing gear, including canoes, paddles, hooks, fishline, and anchor line. Today there is seasonal activity in copra making, the people from each village going to their respective reserves from March to April, and a second time from August to September.

WATER

Water for domestic use was formerly obtained exclusively from seep holes and wells sunk close to the beach above high tide level. This slightly brackish water is still used for bathing and other purposes by all three villages when they visit their reserves and, owing to the distant location of a better supply, by most Yato villagers all the time. Today three concrete cisterns on Wale store water draining from the church and courthouse roofs. This water is used for drinking and washing in the rainy season, in the dry season for drinking only.

PLANT LIFE

The soil of the whole atoll is poor, mostly infertile sand and coral gravel, and in consequence vegetation is sparse. Tropical bush grows luxuriantly in a few sections. Of the food plants, coconuts grow well, but talo and bananas grow only in excavated pits that have been filled with plant material and must be fertilized with leaves and ferns twice each year. As an aid to growth of bananas, old pieces of iron are buried among the roots. A few papaya and limes grow on Motu Kotawa. The kava plant (*Piper methysticum*) does not grow on the atoll. Specimens of all plants growing in Pukapuka, as identified by Marie C. Neal, E. H. Bryan, Jr., and F. Raymond Fosberg, are recorded in the following list:

Kave (*Cassia filiformis*)
 Lakau yili (*Pemphis acidula*)
 Laukotawa (*Asplenium nidus*)
 Laupoue (*Ipomoea grandiflora*)
 Limu puniu (a moss) (?)
 Maile (*Polypodium scolopendria*)
 Moemoe (*Boerhaavia tetrandra*)
 Mouku (*Fimbristylis cymosa* variety
microcephala)

Nau (*Lepidium bidentoides*)
 Niu, coconut (*Cocos nucifera*)
 Ngangie (*Pemphis acidula*)
 Ngayu (*Scaevola frutescens*)
 Nonu (*Morinda citrifolia*)
 Nuna (*Fleurya ruderalis*)
 Ongoongo (*Euphorbia prostrata*)
 Polapuka (*Solanum viride*)
 Polo (*Hedyotis romanzoffensis*)
 Puapua (*Guetardia speciosa*)
 Puka (*Ceodes umbellifera*)
 Pukana (*Hernandia ovigera*)
 Pulaka (*Cyrtosperma merkusii*)

Pulumu (*Jussiaea erecta*)
 Taeyima (*Tournefortia argentea*)
 Taumakomako (*Achyranthes velutina*)
 Tiale (*Gardenia tahitensis*)

To, sugar cane (*Saccharum officinarum*)
 Vavai (*Triumfetta procumbens*)
 Vayavaya (? *Lepturus repens*)
 Vayavaya ui (? *Cyperus ferax*)
 Wakanaya (*Cordia subcordata*)
 Wala (*Pandanus* sp.)
 Wau (*Pipturus velutinus*)
 Wawa, talo (*Colocasia antiquorum*
 variety *esculenta*)

kele } native varieties of talo
 kiekie }
 kula }
 mawolawola }
 newunewu }
 peleua }
 polapola }
 pongi }
 Welo (*Ficus tinctoria*) }
 Wetai (*Psilotum nudum*) }
 Wetau (*Calophyllum inophyllum*) }
 Wuti (banana) (? *Musa sapientum*) }

malie } native varieties of banana
 mitiuku }
 pukapuka }
 taltua }

Wutu (*Fagraea berteriana*)
 Yamuti (*Suriana maritima*)
 Yulu (? *Pandanus*)

NOTE: Of the plants listed, *pukama*, *wakanaya*, *puapua*, and *wetau* are used for canoes, implements and utensils; *puka* is used mainly for canoe outriggers; the bark of the *wau* is used for fish-lines and cordage (termed *tau*) for fishnets. The coconut supplies material for the woman's kilt, the man's rough malo, sennit cord for fishlines, anchor lines, and general lashing, also material for rough mats, food platters, baskets, house thatch. It is one of the chief foods of the island. Pandanus is used for mats, for men's malos, today for house thatch. Its wood is valuable for house frameworks, and the ripe fruit is eaten. Pukapukans distinguish in terms of leaf shape two varieties of *Pemphis acidula*: *ngangie* and *lakau yili*. *Ngangie* is the preferred wood for fishhooks, for implements and outrigger connectives, but failing this wood, *lakau yili* is recognized as a valuable substitute. Botanically the two plants appear to be similar. The flower of the *tiale* is used for wreaths and decorations. The bark of the *welo* was formerly used for decorating ceremonial headdresses. *Nonu* makes the red dye used for mat designs. All the creepers such as *moemoe*, *laupoue* and *ongongo*, are used extensively for wreaths and decorations. The one *wutu* tree on the island is reported to have grown from a drift seed.

The general name for a plant is *lakau*. Root is *aka*. The trunk of a tree is *pu lakau*. A moss or lichen is *limu*. The fungoid "toadstool" growth on a fallen tree is termed *laulau talinga*. A seed is *wua*, a flower *pua*, a leaf *lau*. The name of the plant is added to these words to particularize: *wauapua* (*puapua* seed), *puaniu* (coconut flower), *akawala* (aerial root of the pandanus), *lawiniu* (coconut leaf, leaflet). The seeds of certain trees, however, have distinctive names: *pei*, seed of the *wetau* tree, and *kalaka*, *pukama* seed. The word *tiale* is used for both plant and flower of that name.

The Pukapukans are intimately familiar with the botany and horticulture of coconut and talo (pp. 81-90).

ANIMAL LIFE

The fauna of Pukapuka is similar to that of other Polynesian atolls. The pig, chicken, and European rat were introduced after white contact. The native rat was trapped, but not eaten. The native dog was unknown.

FISH

The Pukapukans empirically group the fish in their environment first into major classes of beach fish, lagoon fish, reef fish, reef fish outside the lagoon, and deep-sea fish, and second, into "families". In some cases, the larger fish of one family are given a different name from the smaller fish of the same family. In other cases, however, stages in the growth of the same fish from infancy to maturity are indicated by adding the following adjectives to the name of the fish: *liki*, *leveu*, *tino leveu*, *tawila*, for young fish; *torwolo*, *torwolo*, *wolo*, *puwua*, *tino wolo*, *tapulanga*, *tongi* and *palu*, for the large fish. With some fish again, the two systems for indicating development are combined, the name of the fish changing when maturity has been reached. The adjective *palu* associated with fish names, applies to a fish that inhabits very deep water up to 300 fathoms, though it is similar to another fish inhabiting shallower water. Thus, *palu malau* is a deep-water fish that looks like the smaller reef *malau*. The adjective *tawila* refers to small, newly-spawned fish that are driven into the lagoon shallows by bad weather.

The following list contains all the native names of fish that could be remembered by informants as being found in Pukapukan waters. Where possible I have also included scientific names, most of them obtained since I left Pukapuka by Robert Dean Frisbie. Mr. Frisbie asked a number of informants to identify the fish figured by Fowler (9). Other names I have procured from an examination of casts in Bernice B. Bishop Museum.

Akuaku: species of Belone, Strongylura, and Ablennes.

Akula panoko: Tetrapturus mitsukurii.

Akula toa: *Isiophorus orientalis*.

Aku pa: similar to aku tangata, but has a squarer body and upper and lower jaws of equal length.

Aku tangata: Strongylura indica.

Ali towolo: *Platophrys thompsoni*.

Aliki: silver mullet (? *Mullotidichthys*).

Ali niukatea: similar to pateletele.

Atu: *Euthynnus pelamis* (bonito).

Atule: *Selar crumenophthalmus*.

Aua: species of silver mullet, larger than the aliki.

Ava: *Chanos chanos*.

Ave: a long slim albacore.

Ayetoa: black deep-sea shark, sharp nose, single dorsal fin, single caudal fin, long pectoral fin, long upper fluke to caudal fin, a fast swimmer and a man-eater.

Ayiu: *Caranx lugubris*.

Ayole: a mulletlike fish, scaleless, white in color with a speckled dorsal fin (*Polydactylus*?).

Ayou: deep-sea shark, white belly, black head, very flabby skin, four dorsal fins, two anal fins, earlike protuberance on head.

Fye: species of rock or reef grouper, with smoother skin than the patuki (? *Gramistes sexlineatus*).

Ie: species of Hemiramphus and Hyporhamphus.

- Ika auttonu: a rare fish, very large mouth and large teeth; white tail turns red when the fish dies.
- Kaka: a species of rock grouper.
- Kaka tua: *Physiculus kaupi*.
- Kakaua: *Malacanthus hoedtii*.
- Kakai: *Germo macropterus* (cast identification) or *Euthynnus alletteratus* (identification by informants from plate), the common albacore.
- Kalevaleva: *Alutera scripta*.
- Kaloma: yellow mullet.
- Kalou moana: *Lycodontis flavomarginata*.
- Kalou uli: a black deep-sea eel.
- Kalou ulu akau puka: *Lycodontis mel-agris*.
- Kalou ululu akau: *Enchelynassa canina*.
- Kalou wolo kena: a black and white spotted deep-sea eel, conger eel (?).
- Kamai: *Elagatis bipinnulatus*.
- Kanae: a species of silver mullet (? Mulletichthys).
- Kanakana langi: dolphin.
- Kanakana koyikoyi: dolphin.
- Kanakana mulamula: *Coryphaena hippurus*.
- Kapa: *Promethichthys promethews*.
- Kata: a small reef and beach shallows fish.
- Katakata: a fish similar to the kata, a Serranus.
- Katu papa: *Salarias zebra*.
- Katuata: *Chonophorus genivittatus*.
- Katuli: *Apsilus zonatus* or *Upeneus porphyreus*.
- Kauputuwaio: a long, red, eel-like, deep-sea fish.
- Kawa: a species of silver mullet (? Mulletichthys).
- Kawulu: *Upeneus multifasciatus*.
- Kawulu wuluyauma: *Upeneus pleurostigma*.
- Kawuta: *Upeneoides arge*.
- Kayue: a lagoon or sea fish, similar to *Hepatus triostegus* (manni), reddish in color.
- Kikitua langi: similar to the malau, but with a longer head and a poisonous dorsal fin.
- Kiki yamoa: similar to malau, but rounder and fatter.
- Kili: *Meichthys buniva*.
- Kiokio tai: *Albula vulpes*.
- Kokili: *Balistapus aculeatus*.
- Kokili moana: *Balistes bursa*.
- Kokili tiapolo (modern name): *Balistas-pes rectangulus*.
- Kokili yiku kena: a white deep-sea trigger fish.
- Komuli: *Caranx elacate*.
- Kopeli: *Decapterus sanctae-helenae*.
- Kotimu: *Holacanthus potteri*.
- Kotimu moana: *Chromis verater*.
- Kupakupa: a small ocean fish, similar in appearance to *Ruvettus*, but inhabiting the surface waters, and caught occasionally when netting malolo.
- Lai: Similar to *Caranx kuhlii*, but lai has no white on tail.
- Lalaila: a small shark, light yellow with a white-tipped dorsal fin.
- Lalawi: *Cheilinus unifasciatus*.
- Lalawutu: *Gnathanonon speciosus*.
- Lali: a grouper, with red skin on which are small darker red spots.
- Launniu: *Sphyrna zygaena*.
- Launnuu: *Chaetodon trifasciatus*.
- Lawi: probably a parrot fish, but has dog-like teeth and yellow scales.
- Leileionge: *Caranx helvolus*.
- Loi: *Cephalopholis argus*.
- Lokie: *Eulamia melanopterus*.
- Lui: *Caranx ascensionis*.
- Lulu au: *Zanclus canescens*.
- Lulu: a scaleless, lagoon and coral fish, with a black and yellow stripe and a long, flowing dorsal fin.
- Lupo: family Carangidae.
- Ma: *Hepatus fuliginosus*.
- Ma pate: *Hepatus bariene*.
- Matto: similar to ma, but with red stripes on the back.
- Malali: *Anampses godeffroyi*.
- Malatea: similar to the parrot fish, but has tremendous blue scales, pronounced teeth, and feeds principally on *Tridacna* shellfish.
- Malau: *Myripristis multiradiatus*.
- Malau aniu: *Myripristis adustus*.
- Malau loa: a large kikitua langi fish.
- Malau watu: *Ostichthys japonicus*.
- Malava: a reef fish with a poisonous dorsal fin similar to the palangi. Very abundant during the first evening rising of the star Antares in June-July.
- Malolo: the common flying fish.
- Malolo punakau: a long, slim flying fish.
- Malolo yue: a flying fish with a large belly like the balloon fish, not eaten or caught.
- Malu: a shark with dark-colored back, pointed snout and black-tipped dorsal fin (*Eulamia*).

- Manini: *Hepatus triostegus*.
- Mango: Shark (generic name).
- Maono: *Hepatus leucoparctus*.
- Maono uli: *Hepatus guttatus*.
- Mata ele: a red rock grouper with black eyes.
- Matapula: *Taractes steindachneri*.
- Matapupula: a fish similar to the malau, caught when fishing malau outside the reef.
- Matauli: a small flying fish, with two large ventral and two large pectoral fins. Never seen in daytime and never hooked.
- Mataweco: the largest green turtle.
- Matawula: a short, very fat kakai, with short caudal fin.
- Mayi: a silver mullet with a silver spot under the pectoral fin.
- Memea, memea tawa, vetevete memea: names for species of yellow mullet (*Pseudopenus*) with slightly reddish skin.
- Moamoa: a yellow fish, almost perfectly cubical in shape, never fished or eaten.
- Moanga: probably a species of the yellow mullet family, though brighter in color than the kaloma.
- Moi: *Polydactylus sexfilis*.
- Moye: a reef fish.
- Mu: *Monotaxis grandoculis*.
- Mueke: squid.
- Mumu: probably a snapper, but with pronounced doglike teeth.
- Ngalio: probably the garfish or garpike.
- Ngangono: a large atu (bonito).
- Ngatau: a red snapper (*Pagrosomus* ?), but without the black spot characteristic of the taiva.
- Ngatala: a red snapper with a black spot forward of the caudal fin.
- Ngutuakao: the porpoise.
- No: *Scorpaenopsis caopsis*.
- No watu: *Merinthe macrocephala*.
- Pakeva: *Caranx sexfasciatus*.
- Pakou: a green reef fish, probably a parrot fish (? *Callyodon*), with black spotted stripes.
- Palala: *Acanthocybium solandri*.
- Palangi: a large manini fish.
- Palata: *Alopias vulpinus*.
- Palengalenga: a green reef fish, probably a parrot fish (*Callyodon blochii* ?).
- Palu (?): *Anampses cuvier*.
- Palu ave: large deep-sea fish, black, with a large mouth, perhaps a grouper.
- Palu kakai: *Sarda chilensis*.
- Palu katakata: a giant deep-sea spotted grouper.
- Palu kilitala: similar to the *Ruvettus*.
- Palu komuli: *Seriola purpurascens*.
- Palu malau: a large deep-sea malau.
- Palu mango: a large deep-sea shark, with very soft bones and flesh, grows up to 18 feet long, rarely comes to the surface.
- Palu matapula: a large deep-sea fish of the malau family.
- Palu mumu: *Monotaxis grandoculis*.
- Palu paniwi: a large deep-sea paniwi fish.
- Palu taeyi: *Ruvettus pretiosus*.
- Palu tavatava: a large albacore, one of the Scombroids.
- Palu tuna: a giant red grouper.
- Palu yiloa: a giant yiloa fish.
- Palu yue: the giant balloon fish.
- Palu uli: the giant uli.
- Palu ulua: a giant Carangoid.
- Palu wutu: a giant fish similar to the paniwi, has silver scales.
- Paniwi: *Beryx decadactylus*.
- Papa: *Variola louti*.
- Papata: a small coral fish, habits similar to the kaloma.
- Papo: one of the Pomacentridae.
- Pateletele: *Platophrys mancus*.
- Patuki: a variety of the reef grouper, *Serranus*.
- Patuki watu: *Cirrhitus pinnulatus*.
- Patuki yiva: a deep-sea grouper (*Serranus*), very strong and fierce.
- Peva: a striped kavali fish of the family Carangidae.
- Pilipili weke: octopus.
- Piopia: a reef grouper with red eyes.
- Ponepone: *Chaetodon reticulatus*.
- Pui: *Ichidna zebra*.
- Pula: a reef and lagoon fish with a red tail.
- Punga mangoe: *Cantherines pardalis*.
- Ta alo: *Holocentrus diadema*.
- Ta: similar to malau, but with longer body and poisonous; also has poisonous barb, gill sheaths and pectoral and dorsal fins.
- Taiva: *Lutjanus monostigma*.
- Talao: a variety of rock grouper (*Serranus*).
- Tanavei: a species of silver mullet, a small kawa fish.

Tamule: similar to *Lutjanus gibbus* save that head of tamule is not so pointed.
 Taniwa: perhaps the angler fish; a deep-sea, sharp-toothed fish.
 Tangau: a red snapper, similar to the ngatau.
 Taotaoma: a small white fish with a long dorsal fin.
 Tatatau: *Chaetodon quadrimaculatus*.
 Tatavelo: a small taotaoma fish.
 Tatala: similar to the malu shark, but with no color on the dorsal fin.
 Tatu: a fish that looks like a small barracuda about 2 feet long (*Sphyræna*?).
 Taukotikoti: *Chaetodon lineolatus*.
 Tavatava: *Scomber japonicus* (?).
 Tawola: whale; tawola tu, the Right whale.
 Tawonu: a scarce red fish, in appearance midway between a mullet and a grouper.
 Teataolua: similar to *Forcipiger longirostris* except that teataolua is purple, not pale brown.
 Teni: a short fat kakai, with a long pectoral fin.
 Tikava: a large red mullet with a red lateral fin.
 Titi taeyinu: *Chaetodon ornatissimus*.
 Tiwitwi: *Chaetodon setifer*.
 Totala: *Tetrodon stellatus* (cast); similar to *Chilomycterus affinis* (plate), except that totala has many more spines, at least 1 spine to ½ square inch.
 Tuna: a striped lagoon eel, toothless, edible.
 Tunaelenga: a snapper with yellow-black stripes on the body.
 Tuna taupulepule: *Uropterygius tigrinus*.
 Tuna wenua: an eel with a white belly, black head and a pectoral fin or earlike lobe on the side of the head; inhabits fresh water.
 Tupoupou: a small white fish, reef or lagoon.
 Tutuku: *Hemitarichthys zoster*.
 Tutupaku: a small reef fish.
 Ufi: a large red mullet, with red lateral fin; larger than the tikava (*Upeneus*?).
 Ufoulo: the common parrot fish (? *Callyodon*).
 Ulu: *Caranx sexfasciatus*.
 Ululenga: a green reef fish, probably a parrot fish (*Callyodon blochii*?).
 Ulu waku: probably the sperm whale.
 Ulu waku: a large putuki fish.
 Ume atu: *Naso hexacanthus*.

Ume pate: *Naso lituratus*.
 Ume tala: *Naso annulatus*.
 Ume tao: *Naso brevirostris*.
 Umulenga: *Balistes capistratus*.
 Unaliki: *Serranus fuscoguttatus*.
 Uwoa: a silver mullet with a silver spot under the pectoral fin; larger than the mayi (? *Mulloidichthys samoensis*).
 Uwoa tukutai: a species of silver mullet.
 Vete memea: *Mulloides auriflamma*.
 Wai: a tailless black ray (*Pteroplatea*).
 Wai kave: a black ray (*Dasyatis*); the base of the long tail is poisonous.
 Wai lepu: another black ray similar to the wai kave.
 Wakaulu: a very large red shark, brightly colored, two dorsal and two anal fins; follows the albacore schools.
 Walala: *Cantherines sandwichiensis*.
 Wang: a large yellow fish, perhaps a species of snapper.
 Wapuku: *Stereolepoides thompsoni*.
 Wawalua: *Manta birostris*.
 Weke: an octopus.
 Witiwiti: a lagoon and reef fish, similar to the manui, but with a very long anterior dorsal fin.
 Wo: a tiny deep-sea minnow, comes close to the reef in large schools.
 Wono: the barracuda.
 Wonu: *Chelone midas*.
 Wouu kea: *Chelone imbricata*.
 Wu: *Callyodon sordidus*.
 Wuakau: a light yellow fish, doglike teeth, large scales, two dorsal fins; similar to the parrot fish.
 Wuakula: the green duckbill fish.
 Wuatua: a giant member of the wu species (see below).
 Wuikamoyo: a parrot fish with red stripes along the back.
 Wukoti: similar to the wuakau, but has a stripe across the back.
 Wumanga: similar to the wuakau, but whitish.
 Wumomoe: *Leptoscarus vaigiensis*.
 Wunokila: similar to the wuakau, but has reddish scales and yellow teeth.
 Wutalaloa: similar to the malau, but has a black stripe across the back; poisonous barbs.
 Wuwavane: similar to the wuakau, but with scales of variegated colors.
 Yama kula: *Chaetodon fremblii*.

Yayaulua: one of the Carangoids.
 Yengayenga: a red striped fish weighing about 3 lbs. Perhaps 6 or more related fish vaguely known to the Pukapukan fisherman but not named.
 Yika kauluyauma: *Polymixia japonica*.
 Yika koti a poteka: *Histioporus typus*.
 Yika yawau: *Pterois sphex*.
 Yikutea: *Balistes vidua*.

Yiku moko (?): *Coris flavovittata*.
 Yiloo: *Aprion virescens*.
 Yimu: *Balistes ringens*.
 Yipa: a young flying fish.
 Yoke: a fish similar to the kavali *Carangoid*; distinguished from the yoke mango, a young shark.
 Yoyala: *Chaetodon sp.*
 Yue: *Tetrodon meleagris*.

Informants recognized the following fish as being present in Pukapukan waters, but they were unable to recall the native names: *Chaetodon unimaculatus*, *Hemiochus acuminatus*, *Lutjanus gibbus*. Informants recognized the following three fish as belonging to the *wu* family, but in default of colored plates, they were unable to give them definite names: *Thalassoma umbrostigma*, *T. trilobata*, and *T. ballienui*.

BIRDS

The following is a list of the birds found on Pukapuka:

Akiaki: a white tern with a black semicircle round the upper part of each eye.
 Ali: the sooty tern, a visiting, nonresident bird (*Sterna fuscata*).
 Kaka: the white or ghost tern. Two named varieties: kaka vai, with a small black spot on the top of the head; kaka tea (*Gygis alba*).
 Kaleva: the native cuckoo, apparently an indigenous bird (*Urodynamis taitensis*).
 Kawe: a curlew (*Numenius tahitiensis*).
 Kotawa: frigate bird (*Fregata minor*).
 Kiu: probably a variety of plover with a brownish-red beak.
 Koliti: another variety of plover or sandpiper.
 Laka: black tern with a white spot on the top of the head (*Anous minutus melanogenys*).
 Lewulewu: a small blue-grey beach bird, now extinct, which laid eggs in the sand; probably a rail.
 Lulu: a large white-breasted sea bird, larger than the booby (*Sula sp.*); rare.
 Lupe: said by natives to be the same as the Samoan pigeon (*Globicera pacifica*).
 Manu uli: a large, black sea bird, with a white breast, resembling the ngongo.
 Matiku: the reef heron (*Demigretta sacra*). Two varieties: matiku kenakena, the white heron; matiku uli, the blue heron.
 Noa: a large sea bird, with straight beak, and when young, one black stripe across the breast (*Sula sp.*?).
 Ngongo: the noddy tern (*Anous stolidus*).
 Popolouenga: a white and black spotted bird, probably a turnstone.
 Takupu: the booby (*Sula leucogaster*).
 Taiko: the dusky shearwater (*Puffinus obscurus*).
 Tala: *Sterna lunata*.
 Talakoka: another variety of plover with two stripes on the back coming together to form a V on the breast.
 Talawue: a sea bird with white breast and black back, in size midway between the tern and the booby; a visiting and nonresident bird (*Sterna lunata* or *Thalassus bergii*).
 Tavake toto: the scarlet-tailed tropic bird; it does not lay on Pukapuka and is a rare visitor today (*Phaeton rubricauda*).
 Toloa: the wild grey duck (*Anas superciliosa*).
 Tuli: a sandpiper (*Heteroscelus incanus*).
 Wili: a long-winged, spotted sea bird, probably a species of tern.

ECONOMIC ORGANIZATION

CONTROL OF WEALTH

In former times, the island as a whole apparently did not function in the control of land, reefs, or other native wealth. Today, however, there are on Wale five talo beds (*ui*) which are controlled by the island. These are termed *ui wenua*. After the tidal wave of 1914, the Island Council divided some of the talo lands owned by the maternal lineages among all the people of the island in order to tide over a temporary food shortage. These lands have remained under the control of the whole island since that time. Their names are: *Ui lua wunui* (2 beds), *Ui alapai*, *Ui kolonui*, *Ui angatonu*.

In economic matters today as formerly, the ultimate controlling units are the village groups. These are independent of each other and may utilize their lands and reefs in any way they wish; in practice, however, they all conform to the same pattern of control.

VILLAGE PROPERTY

REEFS

The barrier reef (*te ayanga loa*) and all fishing grounds on the reef, inside and outside the lagoon, are divided among the villages as follows:

The reef from Wale to Matautu, the northern point of Motu Ko, belongs to Ngake; no men or canoes other than those of Ngake are allowed on or near this part of the reef. The reef between Matawea, the western point of Motu Ko, and Motu Kotawa is divided into halves (*ihu*), one half belonging to Ngake, the other to Yato. The reef fishing from Motu Kotawa to Wale belongs to Yato, but because lagoon fishing in former times was controlled by Ngake, the men of Yato could fish only outside this reef. Without permission from Ngake villagers men of Yato could not go to their reserve by canoe across the lagoon but had either to coast along the outside of the reef or to walk along the reef shelf. The outer, northern reef, running round the reserve of Niua (the northwestern side of Wale) as far as the boundary of the Loto reserve of Uta, was controlled by Yato; the outer reef from this point to the eastern boundary of Uta was controlled by Loto; the rest of the reef running past Utupoa to the main reef was controlled by Ngake. Each village had the right to the beach and lagoon fishing on its own shore (*hukuitai*). The rest of the lagoon away from the village frontages belonged to Ngake.

The control of reefs, though apparently weighted heavily against the village of Loto, worked with a certain flexibility. The men of Ngake announced at frequent intervals to the men of the other two villages that they might fish in the lagoon for one moon. At the end of the period the lagoon was tapu for all save Ngake men. All economic tapus (*taui*) were supported by supernatural sanctions. The two villages benefiting by this generosity took gifts of food, usually nuts and talo, to Ngake in payment for benefits received. Special gifts were sometimes given as when Yato made an expedition to Motu Kotawa and returned with extra supplies of *takupu* birds (tern).

The open sea opposite each reef was controlled by the village owning the reef and only men from that village might go deep-sea fishing there. As the canoe channel on the western reef was controlled by Yato village, men from Loto and Ngake had to receive permission before taking their canoes across the break (*awa*) in the reef at this point. This was a frequent request, for the only other break close to the villages is on the northeastern side of Wale, rarely as sheltered and manageable as the western side. Permission was given as a matter of generosity. Trespassers in the fishing reserves of other villages were punished by fines in nuts levied by the guards (p. 37) of the village whose reef was violated.

Before the causeway (*kolo*) was built across the western arm of the lagoon on Wale, this lagoon indentation was considered a part of the reserve of Niua. After the causeway was constructed, Yato village still retained control of the "bay", and turned it into a fish pond. It is simply called *te loto*, the name for any enclosed water. This pond contains many *awa* fish (white mullet), which fatten on the algae growing on the lagoon bottom. The fish are tapu for most of the year, but at certain arranged times, generally at the end of each month, the pond is opened to fishing parties from Yato for one or more days. Fishing is sometimes an individual matter; at other times all the men of Yato fish together on the same day. The catch is divided among all the people of the village. Some of this fish finds its way through gift to other villages, but the sole right to fish in this pond is jealously guarded by Yato men.

LANDS AND BOUNDARIES

The land on the three islets is divided among the villages. Each village retains control of the lands specifically set aside as communal village lands. The rest of the land within the village boundaries is controlled by the paternal and maternal lineages. The village boundaries (*tuakoi*) on Wale are shown on the map (fig. 1, b).

The present boundary lines between the villages date from a period just after the great seismic wave of about 300 years ago. After this catastrophe, in the reign of the chief Maina or of his successors, Tuliayanganga and Alatakupu, it was decided to realign the boundaries to take care of population growth. The technique used is called *tutuki*, a form of stick wrestling. A weapon (*kaio*) of *wetau* wood, about 4 to 6 feet long, is held by two men facing each other, each trying to push his opponent backward. The boundary advances or retreats according to the position of the weapon. In the contest in question, all three villages participated, lined up along a provisional boundary running from lagoon to outer beach near the present church.

Loto faced Yato on the west and Ngake on the east. Before the contest commenced, the high chief (*aititi walo*) went to the sacred place of the goddess Tava and requested

her to punish any man who violated the rule that no man should become so enraged with his opponent as to do him physical injury. Fear of Tava's punishment, an affliction of tumors under the arm and on the stomach with possible death from these sicknesses, was sufficient to restrain those with short tempers.

At an agreed signal, pairs of opponents wrestled for possession of the *kaio* stick. Whenever a man wrestled the stick from an opponent, he placed it on the ground to mark the boundary for the moment. When one contestant relaxed, his vis-a-vis was in honor bound to stop wrestling and place the stick on the ground until the other had recovered breath. The expression "Yoka ki lalo te kaio ke makeke, ke wakamanava" (Trust the *kaio* firmly down—into the ground—to rest.) refers to this act. One might insult, grimace at, or threaten one's opponent, one might twist the weapon from his hands, edge his hands off the two ends of the stick, throw him off his balance by wrenching or twisting the stick or by grasping him round the waist—do anything in fact to secure possession of the stick save shed blood. At the end of the day the pushing was ended by mutual consent, and the provisional boundary line was marked by sticks or stones joining up the points where each weapon rested on the ground. For seven days or more this wrestling was continued, and when it was finally stopped, the line drawn from one weapon to the next was taken as the final boundary between the three villages. Insofar as the line of weapons was crooked, depending on the fortunes of the members of each village throughout the contest, so was the boundary line rambling.

At about the same time as the *tutuki* contest for village boundaries on Wale, further *tutuki* were held on Motu Ko and Motu Kotawa to decide village control of these reserves.

On Kotawa, the men from the three villages lined up and struggled as before. The Yato men had driven the other two villages as far as the reef joining Kotawa to Ko, when hard feeling arose and Loto men began to use their weapons as clubs, felling some of their opponents and drawing much blood. Just then a huge eel was seen swimming along the reef with wide open jaws as if ready to devour the wrongdoers. All the men became frightened at this apparition, which was either Tava in an animal incarnation or an animal sent by her to frighten the people. Yato men ran back onto Kotawa, while Loto and Ngake men fled along the reef to Ko. Hence Yato claimed control of Kotawa through ultimate right of possession, and this claim was conceded by the other two villages.

A contest was then held on Ko between Loto and Ngake to decide ownership of this reserve. After much struggle, a boundary was drawn on the reserve, such that Loto received a small section of the western end of the islet and Ngake a larger section at the northeastern end. This arrangement continued until some generations later when an arrangement was effected whereby certain lands on Wale belonging to Ngake were transferred to Loto's reserve of Uta in consideration for Loto's withdrawing entirely from Ko. Though the arrangement was actualized, there was dissatisfaction among some Loto men at the time, a feeling which still continues, Loto villagers thinking that an effort should be made before a Land Court to secure the return of land on Ko.

The *tutuki* contest was probably used at various other times in Pukan history to readjust boundaries when a shift or increase of population in the village made it imperative that one village should have more land. There are vague references to *tutuki* contests in traditions, but the one that settled boundaries much as they are today is that which is best remembered.

There are no boundary walls on Motu Ko or Motu Kotawa. Heaps of stones scattered across the ground are the only traces of the boundaries of

the two reserves on Wale, Niua belonging to Yato and Uta belonging to Loto, once marked by encircling walls of coral.

The wall (*pa*) surrounding the three land boundaries of Uta (the fourth boundary being the outer beach) was made of slabs of coral conglomerate set on edge, and served not so much to bar entry as to mark off tapu land from land over which all might walk. Those having legitimate business in the reserve were supposed to enter through one of the three gates or breaks in the wall; one (*te pu i te uia*) near the present residency, the second (*te pu i Matata*) at the site of the present watch house at Matata, the third (*te pu i te tuhunga wau*) on the western side.

The stone wall round Niua ran from the head of the western indentation of the lagoon, the present fish pond, northward to the outer beach. There were two gates through this wall, one (*te lawai alo ki kai*) at the lagoon end of the wall, and the other (*te lawai tua ki tua*) at the outer beach end of the wall. In some symbolism that informants could not clearly remember the lagoon end is called "the belly of the *lawa* (a strong ferocious fish) by the sea", the outer beach end "the back of the *lawa* by the outer beach."

The stone from both walls was freely used to build coral lime houses in the days of the early missionaries.

VILLAGE GUARDS

Village control over reserve food lands was implemented by tapus enforced by supernormal powers of village gods and by a guard of men called *pule*; these tapus were directed against outside villagers all the time and were lifted against home villagers only when it was decided by village council to take food from the reserves. When the tapu was raised the guard or all the people of the village were allowed to go to the reserve to collect a fixed amount of food. Visits to the reserve at other times for the purpose of cultivating talo beds were always by permission of the guard. The gods of each village interested in preserving the reserve from thieves sent sickness and other punishments to those who violated the sanctity of the reserve (p. 311).

Both Yato and Loto villages have a well-organized guard which watches the reserves on Wale throughout the year. Ngake, with no reserve on Wale, does not have an organized guard system. Individual villagers, often older men who are not tied down each day with food-procuring duties, are delegated to watch the reef between Wale and Motu Ko and to examine wayfarers along this reef coming from the direction of Motu Ko to see that they are not smuggling stolen foods into Wale. These single guards also watch canoes on the lagoon coming from the direction of Motu Ko. All Ngake canoes are required to beach at Waletoa, where they are examined for contraband articles by older men living at this place before being allowed to land their canoes elsewhere.

In Loto and Yato, all men who have reached sociological adulthood are drafted for guard duty. In Loto there are about 50 men able to serve as guards. Each guard is composed of about 25 men, serving for one month. Formerly only men served on Loto guard, but in recent years, when it was

thought that the men's guard was consuming privately from the reserve more food than it was preserving, the old men of Loto arranged that the men should serve for six months only, and that adult women should serve as guards for six months of the year. The rationalization was that the women would not be so expert at climbing nut trees as the men, and that they could devote spare time to talo cultivation. Hence in Loto today, the men's guard serves from January through June, each man acting for three months each year; the women's guard, two groups of 30 women each, serves from July through December, each woman also acting for three months each year. The Yato guard consists of men only, about 25 men for each guard. With 50 men in Yato village, each man serves for six months each year, usually in alternate months.

Six watch houses (*zvale palenga*) are scattered through the reserve of Uta. The guard is divided into six groups (*taka*); a group of four men or women watches from each house for one month, then moves in rotation to the next house, shifting houses thus each month. The single watch house in Niua at the head of the fish pond, the site of the former lagoon gate to the reserve, is used by the Yato guard as its headquarters.

There is a tendency in Loto to group the members of each guard according to age grades. Thus one guard will comprise the oldest men, the following one middle-aged men, and so on.

Much friendly rivalry exists between successive companies of guards. In Yato, at the end of every month, the guard fishes in the pond for the benefit of the entire village and much is made of the fact if one company catches more mullet than the preceding company.

The monthly guard change (*te uinga pulu*) is accompanied by a division of food from the reserves among the people of the village.

In Loto a division of drinking and mature nuts is made. In Yato nuts and, in season, papaya and limes procured from Motu Kotawa by guards who make a special trip to obtain the fruit are divided. The guards under the supervision of older men gather the nuts from Niua and Uta. The change of guard in Niua on January 9, 1935, was marked by the following typical food division: each man, woman, and child on the village rolls received two drinking nuts; the 48 women of Yato received papaya at the rate of one for every three women; 79 children received papaya at the rate of one for every four children. At other times, the division included men and not women, or men and women and not children. The conclusion of the month's guarding is accompanied also by a small division among the guard of fish caught by delegated members of the group and of talo foods prepared by their wives and relatives.

The duties of the guard are to patrol the reserve throughout the day and keep away thieves; to preserve the nuts, pandanus trees, and other flora of the reserve from depredations; to keep wandering pigs and chickens from destroying the talo beds. They put tapus (*lanu*) on young nut trees by tying coconut midribs round the boles of the trees. Formerly the breaking of such a tapu was punished by the gods of the reserve; today a thief

is known by the way in which the *lanu* is disturbed. In Loto the men sit in the guard houses where they command a wide view of the reserve and indulge in craft activities, gossip, drink, and eat nuts. The women guards plait mats, cook talo meals, eat nuts, and amuse themselves as they wish. The Yato men wander about the reserve, play games, and fill in the rest of the day with eating and sleeping. Three nights each week, usually after dark, the guard passes along the village road and reports to the village on the state of the reserve. One man is chosen to make the report (*vananga*). In a loud voice, he mentions the amount of thieving that the guard has noticed, the name of the culprits, if known, the fines to be levied; he warns the people to respect the reserve, not to go there to collect nuts, pandanus leaves, or firewood, until such visits are authorized by the village. When the report is finished, the guard members break into a chant, either an old chant or a new one that they have composed and practiced during the day. This finished, the guards move to another place in the village and repeat the report. A typical report made by the Yato guard on a day when no stealing has been detected is:

Wakalongongo mai kolua,⁴ e to taua⁴
lulu ki te vananga a te pule ko avatu ki
a kolua ia. I a kolua, awe tuku kolua i
a kolua tama ke wakatekateka wua i te
motu. Ke pukua maua i loto, e vayi loa,
ngapelepe. No i ai na aumai ia te va-
nanga ke longo kolua talinga. Wakama-
mala kolua wakalelei. Ko te vananga ia
na aumai ai ki a kolua. Tangi ai loa ia
te manu ia.

Listen you of our village to the report of the guard to be made to you. You, don't let your children wander about in the reserve. If we catch (them) within (the reserve), we shall whip them to pieces. Therefore we have brought the report, so that your ears may hear. Obey you well. That is the report we have brought to you. Let the birds now sing. (A chant follows.)

People who have been detected stealing are required to pay fines to the guard, either in nuts or in sennit or other craft objects. The amount of the fine depends on the amount of goods stolen. Once a culprit is detected, all will see to it that the guard, even when from another village, is supported in its efforts to collect fines. Though all believe that stealing from the reserve is immoral, few Pukapukans are above helping themselves to nuts in secret.

In the village of Yato where there are outside reserves to control, guards watch all canoes coming from Motu Kotawa. These must land at a special section of beach for inspection. When guards come back from Motu Kotawa with fruits for the monthly division, other guards, who have remained on Wale, help to carry the fruits to the place of division and are careful to look over the canoes surreptitiously for contraband foods. When the women of Yato are sent to the reserves to cut *kolawa* fern to use as fertilizer for village talo beds, each returning canoe is carefully inspected by guards who

⁴ Note the use of the dual pronoun of the first and second person plural, rather than the plural pronouns, *kotou*, *tatou*. The form is used in all public pronouncements.

poke about under the piles of fern and look into the corners of the canoes. The women are given permission to bring back a few nuts for their own households. All the nuts in the canoes are removed to the beach by the guard, counted out one by one, and (nowadays) the total written down on paper. Once when the guards doing this were two youths who had just attained adulthood (*wakaitane*), it was amusing to see the way they officiously examined the canoes of two elderly men who had gone to Motu Kotawa with the women. The older men, though obviously annoyed with the inquisition, did not dare to make any comment. It is only after the canoes have been given a clearance at this beach that they are allowed to proceed to another beach, nearest to the talo beds, to unload the cargoes of fern leaves. When a village meeting decides that the villagers shall go to the reserves Ko or Kotawa, for a period to work the talo beds or to procure nuts, the matter is announced to the village by the guard, because it is the guard that oversees this visit and makes sure that none brings from the reserves more than the agreed amount of foods. A typical announcement of this nature, made in Ngake, which has extensive talo beds on Motu Ko, is:

Wakalongo mai kolia ki te vana
nanga ko avatu ki to taua lulu. Ka wo
loa taua ki te motu. Ko taua mea ka
aumai: E takiyaca te niu papaku, e taki-
yepulupu te niu. Yau na mea a te
tiniu ka aumai: E takimatawelau te
wawa. E takiyepulupu te tamaliki. Ke
wo taua ki te motu nei, e ya te kavenu, e
ya te ngongo, e ya te lakia, e ya te kaka
ia, e ya te lupe, e ya te kaipea, e ya te
unga, e ya te wuti, e ya te ngangie. Ko
te wui mea ia e wakayatia i to taua motu.
Ka nono taua i ai e witu po, womamai
loa taua. Oti ai.

Listen you to the report to be given to our village. We shall go to the reserve. These are our things we shall bring back: 20 mature nuts each, 10 drinking nuts each. Next the things of the women which they will get: 100 tubers of talo each. For each child, 10 drinking nuts. When we go to the reserve, the crabs (enumerated) and the birds (enumerated), bananas, and *ngangie* wood will be tapu. Those are the things to be tapu in our reserve. We shall stay there for seven nights, then return. That is all.

Throughout the stay on the reserve, the guard reports each night the events of the day, makes sure by inspection visits during the day that the tapu foods are not being touched, and when the time comes to return, goes from house to house, counting the nuts piled up ready for the return trip. Visits to the reserve of Ngake were formerly made on such occasions as follows:

At times fixed by the chief of Ngake and the council of men, all the men would go to Motu Ko to collect nuts and to fish. Young men wishing to go to the reserve at other times to net birds or for whatever purpose, had to procure permission previous to the visit. At one time, it was customary for parties of three or four men to be given permission to fish from the outer reefs of the reserve. Permission was granted for a three days' stay only, and if the men stayed longer than this period, they were automatically considered thieves and treated as such on their return. At other times, at a meeting of the chiefs of the island, men of the other two villages were given permission by Ngake to go to Motu Ko for a set period in order to fish from the reefs.

This was a return for courtesies rendered to Ngake men by the other villages, particularly deep-sea fishing privileges off the western reefs of Yato.

That the reserves are well guarded is evident from two incidents:

In walks over the island with Yato informants, amazement was always expressed in their faces when I casually proposed taking a short cut to our objective across the reserve of Loto. Even though I thought that my presence was sufficient evidence that my informants were not likely to steal nuts or talo from the reserve, informants never set foot on the reserve without finding the nearest guards and informing them that their visit to the reserve was in my company only, and not for illegal purposes.

On one occasion we were taken to Motu Ko in a Yato canoe. The Yato men took the opportunity to inspect the reserve thoroughly before going on to Motu Kotawa. This was the first time that some of them had set foot on Motu Ko. Ngake friends were continually urging us to pay a visit to Motu Kotawa that they might visit Yato's reserve as canoe crew. When we finally went to Motu Kotawa, Ngake men launched the largest canoe available, and there was keen competition for the privilege of being one of the crew. Even old men, almost incapacitated through age, made a point of being fictitious crew members on this day, and during our few hours' visit on the islet, the Ngake men inspected every nook and cranny of the reserve, appraising the amount of nuts on the trees and the number of roosting birds with critical eyes. The results of the survey proved a topic of excited conversation for many days thereafter.

The villages have retained exclusive control over village reserve lands throughout Pukapukan history. At one period, however, in the reigns of the two chiefs after the seismic wave, the system of village control was temporarily in abeyance. In order to prevent widespread stealing, the law of *pule pae* was decreed whereby the guards had the power to kill by strangulation or drowning anyone caught stealing food from the reserves. Though centralized in one locality at this time, the villages still retained separate identities. Each village unit furnished a guard for the reserves. According to the severity or laxity by which these guard units enforced the law they were named: Te Pule-Wala-o-Yila-Wua (Pandanus-that-glitters-only), the guard of Ngake; Te Pule Tuli (the Tuli bird guard, or the guard that chases), the guard of Loto; Te Pule-Wala-Mangeo (the Guard-of-bitter-pandanus), the guard of Yato.

The guard of Ngake was kind-hearted because the people of Ngake had opposed the passage of the law of *pule pae*; this guard allowed thieves to escape from the reserve, thus earning the name of pandanus that glitters only but does not sting or catch people with the thorns of the leaves. The guard of Loto carried out the letter of the law, and allowed none to escape; they caught people as the *tuli* bird is caught in a trap. The guard of Yato was also strict, so they were named after pandanus that catches people with the thorns of the leaves. It is said that if the Ngake guard saw a man tarrying at the boundaries of the reserve, they told him to hurry inside, take what food he could, and hurry away while they turned their backs on the infraction of the law; that the Yato guard killed law breakers at once, and that the Loto guard killed them on the next day.

Besides accounting for the law breakers, the guard collected nuts and fished for food to divide among all the people. This was done by the guards stationed on Wale, on Motu Ko, and on Motu Kotawa. Other members went through the village each day to see that everyone was accounted for. Those missing had to prove that they were

not illegally fishing and that they were not stealing from the reserves. Incidents of this period are told in the stories of Tuiva and Kupolu, and in the story of the *pule pae* (pp. 387, 395).

Numerous references in the stories and traditions of the island show that stealing from the reserves was an ever-present problem that challenged both supernatural and secular supervision of these reserved areas. The only major sin in Pukapukan society seems to have been stealing from the reserves; beside this, all other types of antisocial conduct become mere peccadillos. Where the law breaker meekly accepted punishment, secular or supernatural, all was well, but a thief surprised by a guard and resisting arrest either in shame or in desperation might be killed outright in the succeeding brawl. Several ancient graves on Motu Ko are still pointed out as the graves of thieves who were surprised on the reserve and killed.

TALO BEDS

The center of the reserve of Uta is a communal talo bed controlled by the village of Loto (pl. 1, B). This large area is subdivided into 11 smaller areas (*ui lulu*), named after nine land divisions in the reserve. There are four similar *ui lulu* in the reserve of Niua. The people of Ngake have more than 15 large talo cultivations on Motu Ko.

Tradition states that the main talo beds on Wale were formed originally by Tumuliwaka, son of the god Mataliki. Tumuliwaka became troubled in his heart at the number of gods who were taking up residence on Pukapuka. He wished to be separated from the gods, so he stood at Te Auma, the northern point of Wale, and struck his foot in the sand. This made a big separation or channel in the land from Te Auma to the pond, Te Vaitaue, in Ngake village, and thence to the sea. As this follows the line of the present talo beds, it is common to refer to these beds as Te Akanga-vae (Striking-of-the-foot). Mataliki with his wife and the gods lived on the western side of the division, *te mui vaeuia*, so called because it faced the setting sun, while Tumuliwaka and his sister, Te Matakiate, lived on the eastern side, *te mata vaeuia*. As the island became more populated, this natural excavation, widened and deepened in places, was used for talo beds.

It is probable that the first migrants to the atoll found natural hollows in the land, caused by wave action when the atoll was being built up above sea level, and used these hollows as the basis for the talo beds. Successive generations continued the work of excavation, no light task with coconut shells, coconut baskets, and digging sticks as the only implements. Subsurface water seeped in and rain water helped to rot the artificial fill of dried coconut midribs, *kotarewa* ferns, and other plant material into a humus soil, which became in time excellent soil for talo cultivation. The results of the excavations are seen in the raised embankments (*tua motu* or *tua ui*) which follow the line of the talo beds and divide one bed from the next. That natural hollows were first used as beds is indicated by hillocks about 40 feet high running beside some beds. It is impossible to imagine that

these hillocks were raised as the result of human excavations with such primitive implements.

Traditions state that the talo beds on Motu Ko were started by the migrants from the legendary land, Yayake, and were continued later by the Pukapukans after the people of Yayake were all killed. Both on Wale and on Motu Ko, excavations continue to this day. The beds that a man digs out are his own property during his life; on his death they are passed on down the paternal descent line. Picks and shovels borrowed from the resident agent help to render excavation today less laborious than it must have been in earlier times.

The village-controlled talo beds (*motu*) are separated into three divisions, one each for the men, women, and children of the village. Each year the number on the village rolls is altered through birth, death, the addition of those attaining sociological adulthood, and affiliation (*tau*) of new members; and a redivision is made of the beds of the members of each class on the village roll. The shares of dead adults are taken by new adults (*wakatane* and *wakawawine*), whose shares in turn are given to new-born children. This redivision (*kotikotinga*) is made by a village meeting at the talo beds. All attend, even children, as a matter of course. The argument, discussion, and division are carried out by the guard and elders of the village; sitting on a near-by hillock, the others watch and assist with free advice and witticisms.

The new boundaries are marked by stones and coconut midrib butts. These soon fall down, but not before the new divisions have been memorized. The actual size of the village allotments varies somewhat from year to year, but in general a piece of land about 3 yards square is the average size of the division for man, woman, or child. Twice a year all the village women gather leaves and plants to fertilize the beds. Each adult cultivates his and his children's land how and when he pleases. The guards inspect the reserve land beds each month and fine each cultivator who has allowed his land to get weedy. The appropriate fine of three pennies or six mature coconuts is kept by the guards for their trouble in levying and collecting it.

The system is flexible and seems to work well. Each household receives an amount of talo land commensurate with its size. The system insures that none shall starve while others hoard up lands they cannot cultivate. Supervision by the guards keeps the land in good condition. The talo beds that a household derives from these village lands are supplemented by lands owned through lineage descent.

PATERNAL LINEAGE PROPERTY

Lands within village boundaries not controlled by the village unit are controlled by the paternal and maternal descent groups. On Wale, each paternal lineage (*po*) controls a section of land (*karawa*) of indeterminate

width, depending on the amount of village-owned land and the number of paternal lineages that share in the division. Each section runs from lagoon (*tai*) to outer beach (*tua*) missing out the talo beds and reserve lands owned by the village. Thus the sections of Ngake run straight through from *tai* to *tua*; those of Loto run to Uta, then stop and pick up the line again on the northern side of the reserve whence they extend to the outer beach. The cemeteries of each paternal lineage and of each sub-lineage are situated on the section of the lineage. Through patrilineal residence, all male members of the paternal lineage reside on another part of the same section of land. The *karava* are named for the paternal lineages.

Besides the two sections running from *tai* to *tua*, the paternal lineages of Loto also own smaller sections in Uta. Four land divisions on the western side of Uta are controlled by the sub-lineages of the *po i Tua*. The names of these divisions (*na karava i te tarava lalo*) are: Te Pa, Taikaiana, Te Welo-i-te-kilikili, Te Auma. Four divisions (*na karava i te tarava ngake*) on the eastern side of the reserve are divided among the sub-lineages of Yangalipule *po*. Their names are: Te Utu, Wala-kakala, Te Welo, Te Puapua.

The lineage sections of Yato run from *tai* to *tua* on the strip of land east of the causeway, the only site of Yato in former times. Ngake informants recognize none other than these; Yato informants, feeling that the transfer of part of the village to the site west of the causeway and the opening up for residence of what was formerly tapu land enable them to speak legitimately of further sections in this western extension of Yato, state that by fiction if not by tradition, the three Yato lineages have second strips running from lagoon to Nua in the western section of the village.

The coconut trees, talo beds, and bush timbers on all sections are of two kinds: first, those owned by the people of the lineage in common and shared among all members; second, those individually owned by male and female members of the lineage who alone are allowed to plant or to own trees on the section. Coconut trees of the first type descend in the lineage corporation and are not alienable. Trees of the second type are inheritable among individual members of the lineage, but are not alienable outside of it.

Each section (*karava*) is further subdivided into homestead lots named *yikuauga*. These lots are the subdivisions of the sections on which, in general, male members of the paternal lineage live with their families. Through marriage, adoption, choice, or inheritance of a house, people of different lineages come to live together on the same homestead lot, but the tendency is for all living on the same lot to be related by some kinship tie, close or remote. Only people belonging directly to the lineage that owns the sections on which the lot is located may plant or privately own trees or talo beds or be said to own house sites on the lots.

The boundaries between the lineage sections and between the homestead lots are well marked by stones, coconut and *pukama* trees, and graves of ancestors. There is no record that a guard similar to the *pule* was used to protect these boundaries, which are nevertheless well known, well kept, and respected.

If a boundary tree dies or is blown down, another is immediately planted in its place and tended until it becomes an efficient boundary marker. People of the lot use only the trees growing on their own household lots for domestic purposes. If a nut drops from a tree growing on a homestead boundary and falls on the land of the next lot, it must be procured at once. If it is allowed to remain to grow into a tree across the boundary, the tree belongs to the man on whose land it grows. A person in theory has the right to keep nuts that have fallen on his property from trees growing across the boundary, but this is rarely done.

At the death of the household head, his house site and nut trees descend in the paternal line. The children of the deceased act as joint owners of the property through the trusteeship of the eldest male of the family. A man or a woman who may marry and live away from his or her paternal lot still has a claim to the nuts grown on the lot and expects to draw nuts from that lot in an emergency. Children of a man residing matrilocally retain an interest in their father's paternal lands. Children do not normally inherit coconut trees from their mother. According to Mitimoa, it was formerly the custom to divide coconut trees among men, giving them to women only when there were no sons in the family, but the custom today is to share coconut trees among both sons and daughters so that none will ever be deprived of nuts.

In former days, a well was sunk on each homestead lot for the use of the households living on the lot. Three lots in Yato still have their own wells, each used by the people of the lot. Others may draw water from these wells, but through courtesy right only, I think. If the water level in the well is low, outsiders drawing water are regarded with a somewhat unfriendly eye.

No story or legend is remembered which relates how the lineage sections or lots were originally formed. Pau believes that the paternal lineages of Ngake held *tutuki* contests at various times to settle boundaries, and cites as evidence the very irregular boundary lines. Loto informants have no memory of *tutuki* for the Loto sections, and add: "The Loto sections are so small and short, running across Wale as they do at its narrowest part, that they would not be worth quarreling about—the gain to one paternal group at the expense of the other would be so slight."

As a matter of speculation, it is likely that originally the people of the same paternal lineage congregated together on the same piece of land. Cemeteries would be placed there and boundaries marked off. Thus sections of land would come to be associated with certain lineages. But through patrilineal marital residence and personal choice,

people other than blood members of the lineages would come to live on the sections. To protect the food supply of its own blood members, the lineage might well make the rule that certain nut trees were to be shared among all associated with the constituent lineages through blood, marriage or choice; whereas only members of the lineages by blood or adoption might plant and own trees on the *kaewa* section. This would prevent the removal of wealth from blood members of the lineages by friends and distantly related affinal relatives, who might come to live on the section. The land is thus effectively owned in common by the lineage corporation, though sole right to the produce of the trees remains with individual members of the corporation.

Both paternal and maternal lineages, the *po* and the *wua*, control small sections of talo beds. There is no legend as to the origin of this control. These beds were probably dug first on land controlled by the paternal lineage or by the maternal lineage if the maternal descent group was originally a more important unit of social organization, as evidence seems to indicate. Then, as new paternal or maternal lineages were set up by the breaking away of men and women from the basic groupings, certain talo lands were transferred to the new, minor lineages, from those controlled by the major group. The twenty-three talo gardens on Wale owned by the paternal and maternal lineages are all named. These gardens are divided among male and female members of the lineages. In the next generation, children retain a share in the mother's maternal lineage beds, but receive no shares in the mother's paternal lineage beds. Similarly, they retain shares in the father's paternal lineage beds, but none in his maternal lineage beds. The talo lands are controlled by the lineages as corporate entities, and are redivided from time to time to include new members of the corporation.

INDIVIDUAL PROPERTY

The wealth objects controlled by the individuals are few. A man may own a house and a house site, a canoe, fishing gear and implements, clothing, pearl-shell ornaments, trees, and talo beds. A woman owns mats, prepared pandanus, ornaments, trees, and talo beds. Small canoes, one-piece dugouts or plank canoes, are owned outright by one man. Larger canoes which have required much time to make and wealth to finance are owned by household groups, or groups of closely related kin. The oldest man of the kin group is spoken of as the nominal owner of such a canoe, but all the members of the group refer to it as "our canoe". If relatives or friends wish to use the canoe, they ask permission of the nominal owner. A young man who does not possess a canoe of his own borrows one from a friend. When the fisherman returns, he gives fish, usually the best and biggest of his catch, to the owner of the canoe in payment for its use. The fish reserved for this payment is termed *ika ya* (sacred fish). When one man is invited to accompany another in a fishing canoe, there is an equal division of the catch and no payment of *ika ya* is expected from the guest member of the canoe.

Informants stated that in former days there were fewer canoes than today. A tapu (*laui*) for protecting a canoe tree was instituted by making four cuts on the bole of a tree, about 6 feet from the ground. Most canoes, especially the large ones, were the property of the paternal lineage groups, each of which might own from one to three canoes. As the canoes belonged to the corporate entity, no problem of inheritance arose.

The ownership of nut trees has already been mentioned. Like trees in the reserves, individually owned trees are protected by a tapu of a coconut midrib. *Pukama* trees are also individually owned and are very valuable in that the leaves provide the best plant material for fertilizing (*wakalepo*) the talo beds. *Pukama* and coconut trees are planted over the buried afterbirth of the new-born child along the boundaries of homestead lots. Individual control of *pukama* trees is carefully guarded. During the season for mulching (*wakalepo*) the talo, it is not uncommon for two women to enter into physical encounters over rights to *pukama* trees which both claim to control.

Individual named talo beds (*ui tangata taki tai*)—twenty-two in all on Wale (see pl. 1, A)—are inherited in the male line, or according to bequest. They have been excavated and named by individuals in the past. Some of the names of owners, as given by informants, refer to living people, others to the original makers of the beds, one or more generations back. Few Ngake talo beds remain on Wale; most private beds were situated close to the old site of Ngake village at Uruoa, and were destroyed by the tidal wave that overwhelmed the village in 1914. The beds were filled in with sand, and have since been planted with nuts; new talo beds are being excavated now on Motu Ko.

Inheritance of other items of personal property is according to rule or by right of bequest (*wakawiti*). When an individual dies, much of his property—adzes, pearl-shell hooks and ornaments, malos, sleeping mats—is buried with him. If he dies intestate, all that remains after the survivors have fulfilled the last duties to the deceased is divided among the children, blood and adopted. When an individual has made a bequest before death, his property is divided accordingly. Fear of retribution by the spirit of the deceased if the terms of the bequest are not strictly carried out insures that the last wishes of the dying man will be fulfilled.

The house is generally inherited by children or paternal male relatives of the deceased. Two exceptions in which the house was inherited by the wife of the deceased came to light in the census.

In one household in Yato, the mother is a Loto woman, twice married. Her first marriage was with a Yato man, and residence was patrilineal. When her husband died, the widow inherited the house and occupied it in Yato. When she remarried, her second husband came from Ngake to live with her in this house. In a household in Ngake, a widow and her children continue to reside in the deceased husband's house. The widow is referred to as the owner of the house, but since her children are young,

she may perhaps best be considered temporary owner until her children are old enough to control the house for themselves.

In theory, the adopted child inherits only from his adopted parents. If it should happen that the adopted child is the only child or the only surviving child of his blood parents, by arrangement he may also share in the coconut lands and other property of his blood parents.

PRODUCTION OF WEALTH

DIVISION OF LABOR

The division of labor is based primarily on sex, and to a minor degree on age. Table 2 shows the division of work between men and women. The division is fairly rigid in the sense that it is rare for a woman to go deep-sea fishing, or for a man to have much to do with talo preparation.

Table 2. Division of Labor

WORK OF MEN	WORK OF WOMEN	JOINT WORK
Fishing for all fish	Beach angling, lagoon groping, shell fishing	Torch fishing (occasionally)
Bird snaring		
Canoe building		
Making of sennit, implements, nets, weapons, artifacts, ornaments		
Building house framework		
House thatching		Making roof sheets of coconut or pandanus
	Plaiting of mats, malo, etc.	Plaiting of rough baskets and platters
	Planting, cultivation and harvesting of talo	Fertilizing of talo beds
		Excavation of talo beds
Preparation of pigs for cooking	Cooking of talo, pigs, fish	Water carrying
Making of food divisions		Care of pigs and fowls
Gathering and husking of nuts	Gathering of nuts by young girls (occasionally)	
	Husking of mature nuts	
	Domestic household duties	Training and care of children
Control and guarding of reserves	Guarding of reserve (Loto, modern)	
Political and priestly duties		
Practice of medicine	Practice of medicine (occasionally)	

One jealous woman is reputed to accompany her husband everywhere he goes, even going fishing with him. She is the butt of much private ridicule. A man in Ngake suffers from paralysis of the leg and is unable to carry out men's occupations. As his wife is bedridden, he devotes much time to preparing his own talo foods. This is no matter for ridicule; the village has pity for his misfortunes and rather admires the way he shoulders the burdens of running the household.

The heavy work of talo bed excavation was probably always joint labor. In Yato and Loto villages, little excavation is done at the present time. Ngake men labor strenuously with the women at enlarging the village and private talo beds on Motu Ko. In former times, when closely allied with priestly possession, the practice of medicine was almost exclusively a male occupation. Women practice medicine a little today, based on a limited knowledge of some herbal remedies for use in childbirth, inflammation, and the like.

Division of labor on the basis of age applies mainly to the very young and the very old. The participation of children in adult activities is slight, and follows in general the lines of adult sex division. A child's participation increases as he approaches adulthood. The only boy noticed who regularly helped with the domestic tasks of talo preparation had a mother with no female relatives to help her in the care of numerous small children. The tasks expected of an old man or woman are light. Most old people continue to putter with trivial tasks as if loth to feel that their days of active employment are over. The very feeble are cared for by children and relatives.

The amount of specialization in Pukapukan economic life is small. Every man considers himself able to perform adequately most adult male duties, and every woman considers herself a good enough cook or mat plaiter. Specialists (*tangata waiwa*) were limited to such occupations as canoe building, the practice of medicine, and priestly duties; they received recompense for their special abilities either in gifts or in added social prestige. All specialists save the priest participated in the daily routine of economic activities. Minor specialization occurs where one man in a group of relatives is recognized as being especially skilled in the making of sennit, or the lashing of house frames; when the kinship group is working on a joint project, work is allotted to those best able to complete it. Specialization depends on natural skill and training, not on inheritance or purchase.

ECONOMIC ROUTINE

Seasonal variation of work is very slight; deep-sea fishing is poor during the hurricane season, and not engaged in by the men as frequently as it is during the colder season; talo beds are fertilized about twice a year, depending more on the growth of the talo than on the season. There may be slightly less activity during the rainy months.

It is almost impossible to give an account of a typical daily economic routine for men and women. Activities vary greatly in terms of nights of the moon, conditions of tide and weather, number of members in the household and their ages, the occurrence of deaths, births, and marriages, and nowadays the day of the week. Fishing is governed almost entirely by moon and tide conditions; one day a man may fish early in the morning, the next day, late in the evening, and on a third day, he may fish all night and not at all during daylight. Deep-sea fishing is more frequent toward the end of the week, when it is necessary to lay in supplies to cover the workless day of Sunday, and just before feasts. Where there are several adult members of the household, some men fish while others gather nuts and work around the village. Where there is only one male in the household and several small children, the father is busy all the time with the most varied activities. The amount of cooking done by the woman depends on the amount of fishing done by the male members of the household, the occurrence of feasts, and the day of the week. The woman goes to her talo beds about twice a week to cultivate and to fetch talo for cooking. Cooking is simple at the beginning of the week, but for the weekly Sabbath feast much trouble is taken and cooking goes on for the most of the preceding day. Wet weather is best for mat making because the pandanus elements become soft and pliable. Continued rain throughout the day sends a woman to her plaiting, no matter what else she had previously planned to do.

ORGANIZATION OF WORK

The main occupations of Pukapukan economic life—fishing, house building, cultivation, canoe building, and today copra making—all require some form of cooperation, whether of a simple or complex type. The determining factors are the type of work, kinship, locality, and sex. The size of the working group depends on the importance of the event or the magnitude of the work. Deep-sea fishing, mat making, and cooking can be performed with only a simple combination of labor, that is, all workers carry out the same activities. The fishing may be simply cooperative, as when men from one or more households fish together to provide food for a prospective feast, or competitive, when the men of each village fish together as a group in competition with men from the other villages. Mat making is usually done by only one woman, but when the household supply of mats is depleted and it is necessary to make mats for a coming wedding, a woman invites her friends or relatives to participate in a small working party. Several women come together and each works on a section of the mat, or else one takes over the plaiting when the first worker tires. The workers are fed during the time they are assisting in the task.

Typical activities which involve complex combination of labor are bonito and flying-fish fishing, seine fishing, house building and thatching, canoe making, talo bed excavating, and today copra making. Bonito and flying fish may be fished by a small group of friends in one or two canoes, or else may involve village cooperation. Some men in each canoe are paddlers, others the netters or rod wielders. Women relatives provide the food for the crew. Seine fishing is carried out by groups of men, usually by a village group. When the net is used on the reef controlled by another village, however, men from this village also participate and share in the fish division. House building involves complex household or village cooperation, depending on the building constructed, whether for use as a private cook or sleep house or for a village meeting house or reserve land guard house (p. 76).

Canoe making is the work of an expert canoe builder and a number of assistants whom he directs. The group for whom the canoe is being built provides the food for the workers and makes the gifts that recompense the workers at the conclusion. Talo beds are excavated by men and women, the men doing the heavy digging, the women carrying away the sand and coral. Copra making is a village undertaking, involving both men and women. During the stay on the reserves, men and women collect and husk the nuts; older people and women split the nuts; men and women put them on the drying platforms; and children and old people later remove the copra from the shells. The men transport the copra to the villages and store it in village-constructed storage houses to await shipment.

Work is initiated by those who experience needs and require assistance to fulfill them. The needs may be biological, such as the need for food or shelter, or else social or ritual, as in the preparation for feasts, the building of village or religious houses, and village competitions. Village work is initiated by the informal village council, by inter-village discussions, or by household heads who anticipate the occurrence of large feasts. Specific works which involve the welfare of the village as a whole, such as copra making, the care of village talo beds, or preparations for village contests, are controlled by the guards (*puile*) acting as executive agents for the village. The work is so organized that all have specific tasks allotted to them. The guard sees that the work is carried out and is up to the required standard of efficiency. In work on the village copra storehouse for example, the guard arranges for some men to fish for the village workers and for the women to prepare talo to feed the workers; the older men so arrange the work that those best skilled for certain tasks are given the direction of these tasks and are adequately helped by less-skilled workers.

The native Pukapukan pattern functioned in typical fashion when the people made the collection of material culture objects presented to Bernice P. Bishop Museum:

A list of all the objects it was proposed to make was first prepared by a group of representatives from each village. This number was then equably divided among the three villages. Village meetings were next held, and the work for each village was allotted to individuals or groups of men working under a supervising expert. On the day appointed for the commencement of the work, young men were sent out fishing, and selected women prepared foods for the group. All the workers assembled, men and women in separate groups, and worked throughout the day. At dusk, a food division was made and arrangements discussed for the next day's work. Experts were recalled from guard duties in the reserves where younger men substituted until the special work was completed. Cooperative work continued until all the objects were completed. As in other group activities, there was little direction of the work beyond its formal initiation. Most techniques were well known, followed traditional rules, and were easily carried out. Where work involved more complicated or uncommon techniques, someone recognized as specially skilled assumed the duties of director. Uncommon techniques were sometimes submitted to a sort of informal commission of old men, who discussed the matter thoroughly among themselves and then issued directions for the work as it proceeded.

Work of all kinds is not without its stimuli. Individual work has its own reward, and work that is specially commissioned by others, as in canoe building, is paid for in food and gifts. Cooperative work on a small scale is recompensed by a feast; on a larger scale it depends for its stimulus on a sense of the fact that village welfare reacts on the welfare of the individuals composing the village, and, also, on inter-village rivalry and the consequent outlet for aggressive feelings. All types of cooperation are marked by sociability, good-natured banter, gossip, and joking. Chanting or singing is rare. There is no use of drugs, other than tobacco, as work stimuli.

Laziness in communal work is rare, but where it occurs there are several ways of dealing with it. The person who does not join group work does not share in the subsequent food division. If a person is persistently lazy in village works, he is deprived of his adult's share and is given only a child's share of village food divisions. This is a matter for intense and long-continued ridicule by both children and adults and continues until the person mends his ways. Two songs ridiculing the lazy person were quoted to me with the remark that the guard sang them outside the lazy one's house at night, and that children chanted them whenever the person appeared in the open. Both make pointed reference to the laziness with an insinuation that this carries over into personal habits. The songs are:

Te piva⁵ elo, malo pipilo,
E kiai ya wano la tua

Tuku la ki te wakayaya
Kae mea loa e ao ai.

Pig smelling, malo stinking,
(He) has not gone to the back (beach to defecate)
(He has) placed himself in sacredness
No thing (body) visible (through the filth).

Te malu, te malu, te malu
Te wewei, te wewei, te wewei,
Tuku loa ki te vananga
Puke atu enuenu pe te poi⁶
E koa yinga wua ia.

The weak (one, "softy"), the weak, the weak,

The lazy man, the lazy, the lazy,
Given (out his name) in the report (of the guard)

Overtaken (by laziness) squashy like pudding,

Flops down completely.

FISHING

GENERAL FEATURES

Information on fish and Pukapukan fishing methods was obtained mainly from Veti and Ejiu. It has been supplemented by general observation of some of the fishing techniques described. The material is not only interesting to the student of comparative Polynesian fishing methods, but it also gives an insight into the amount of control exercised by the Pukapukan fisherman over part of his environment. This control is much more complete than the following information suggests, because the actual amount of information collected represents a mere surface-scratching of the knowledge possessed by native fishermen. Two other limitations, imposed by lack of time and by comparative ignorance of the field worker in all that concerns fishing, conspired to prevent the collection of complete data on Pukapukan fishing. The classifications adopted in the following sections are those used by informants in presenting the material. Identifications of native fish names are given elsewhere (pp. 27-31).

The waters within and without the reef are used equally in fishing. The inner waters of the lagoon are combed over and over again each day by all the methods of lagoon fishing. Deep-sea fishing outside the reef is indulged in at least twice a week, depending on the amount of other work to do, the state of the sea, the winds and the weather, and the season of the year. Deep-sea fishing is relatively poor from November to March. In former days the amount of lagoon and outside reef fishing a man did depended also on the village to which he belonged. The division of reefs and lagoon among the three villages and the exclusive control exerted over these properties meant that the men of Ngake and Yato could fish more extensively than the men of Loto.

The habits and movements of all the fish were studied and correlated with the rising and setting of certain named stars (p. 350). All parts of the reef, inside and outside, as well as the lagoon deeps and shallows, are well known in terms of fish habits. Names for sections of the reef and for the parts of the ocean immediately outside the reef are given in figure 3.

⁶The chants are modern, hence the use of the Tahitian *piva* for pig (first song) and *poi* for pudding (second song).

The Pukapukan fisherman never does random fishing (*yi ika*). If asked where he is going, he replies, "Ka wano au *yi kaloma*, *yi kakai*, *yele pala*..." (I am going to fish *kaloma*, to fish *kakai*, to noose *pala*...); he is always going to fish specific fish. If the particular fish is caught in more than one place, he usually tells where he is going to fish. It is rare for a fisherman to return from an expedition with conglomerate varieties of fish. He usually brings home fish of a few related varieties that were all caught by the method he proposed when he first set out.

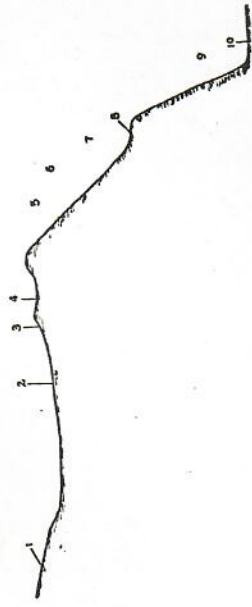


FIGURE 3.—Cross section of reef rim: 1, land, *wenua*; 2, lagoon, *alo*; 3, inner side of reef shelf, *taratawa*; 4, reef shelf, *uluka abau*, the reef circuit being termed *ayanga*; 5, surface water, *kilitai*; 6, sub-surface water, *waiti*, 3 to 10 fathoms deep; 7, deep water, *puongangutu*; 8, lower, outer reef shelf, *papa o te akau*; 9, greatest depth of water, *yola-ongangutu* (also called *newu*); 10, ocean floor, *papa o te moana*.

Men are customarily the fishermen, but women do beach angling, groping, shell fishing, and assist in torch fishing inside the lagoon. Turtle, *kakai*, *akula*, *atu*, and *pala* fish were formerly always taken to the meeting place (*malae*) of the old men's group (*tupele*) for division. These fish were caught by the young men's (*tanganaga*) fishing group or by the fishing group of older men (pp. 67, 281). The old men divided these fish among the people of the island. If the *tanganaga* men caught 30 *kakai*, the old men kept 10 for themselves, gave the chief special cuts from the body of the fish, and divided the rest equally among the people.

Certain habits are characteristic of all fishermen. In reef angling, beach angling, and submerged reef fishing, the fishing basket is held between the legs. The mouth of the basket is invariably tied with coconut fibers to prevent loss of the fish, if by chance the fisherman moves about, he often ties the basket to his belt or suspends it from the shoulders. In beach angling, especially for *kaloma* fish, the fisherman sits on a coconut husk, a coconut midrib, or a stone. When he is fishing for *kaloma* and the fish are biting fast, he throws the catch down on the sand beside him. It is important not to waste time under these conditions, because the fish are soon satiated with the chum (*katikati*) thrown to them. But when fishing for *kaloma* to be

used as live bait, he places the basket in a little hollow scooped out in the sand, half submerged in sea water. In spearing, torching, clubbing, and the modern method of iron spear catapulting, fish caught are tied together with coconut fiber (*kalawa*) passed through the gills. The fish are laid on a convenient coral head when the fisherman moves or dives. To carry them greater distances, he strings them around the waist to make a malo of fish (*malo ika*) or loops them over the arm. Chants which celebrate the winning of fishing contests make frequent reference to the men coming home with strings of fish around head, waist, and shoulders.

The following list gives several common terms employed in fishing:

Tukutuku or wakayeke: to pay out a line.

Wuwuti: to pull in a line (general); to pull in a short line with overhand strokes.

Tupe or langa: to pull in a long line with long overarm strokes.

Totoi: to take the strain on a line when a fish is fighting and cannot be pulled in.

Wakamatala: to jerk a line to disengage the sinker.

Tae: to net fish in the air or to make an outward sweep of the net.

Toli: to make an inward sweep of the net to scoop fish into the canoe.

Yoka or monono: to plunge the net into the water with a downward sweep in order to net a fish.

A lazy man who does not go fishing is termed, in ridicule, *atua wawine* (female god), because he seems more concerned with the sphere of activities presided over by female gods who never interfere with the fishing pursuits of men. Another expressive phrase used to describe a bad fisherman is: "Ja koe i te maunu kava" (You have a bitter bait).

In general, bad luck in fishing is attributable to the breaking of tapus or to the domestic circumstances of the fisherman. If a wife commits adultery while her husband is out fishing, he will have bad luck; formerly he might repair his luck by prayers to his god. If a man quarrels with his wife before fishing or if he goes fishing while there is a corpse in his house, he will be unsuccessful (*ka kaya*).

Before going fishing in former days a man was careful to pray to his god or ask the priest of his paternal lineage to pray to the lineage gods for success in his undertaking. When a man went fishing for special fish, controlled by certain gods, he always prayed to these gods and again to the gods that control the winds. As his canoe passed the place where the sacred clearing (*yionga*) of an ancestor god was visible, the fisherman stood up in his canoe and prayed to this god that he might procure plenty of fish and lose none of his pearl-shell hooks. Canoes going deep-sea fishing off the western side of the atoll, especially when trolling for bonito, always stopped opposite the stone of the god, Malokitelangi, near the western reef channel to leave on this stone a gift for the god—a malo, some sennit, or a fish-hook. The gift (*wakatetea*) was later removed from the stone by the priest

ama fish, and especially *tau moemoe* which never move at the approach of a fisherman or a canoe.

Flipping is employed for *kata* and *kataua* fish, usually by children. A piece of *unga* crab meat is tied to a coconut husk with a strip of fiber. The husk is held in one hand and lowered into the water. When the fish bites, the husk is flipped from the water with the fish on it. Another technique is to tie crab meat to a length of coconut fiber and jerk the fiber from the water when the fish has the bait in its mouth.

The wooden fish club (p. 189) is used to kill large deep-sea fish as they are hauled into the canoe. It is also used as an adjunct in seine netting, all types of reef fishing, and torch fishing. One who finds fish stranded in shallows of the lagoon or beach may club them to death with a wooden club (*patu ki te lakau*). Fish commonly killed in this way are *vete*, *manini*, squid, and angler fish.

GROPING, SPEARING, TORCH FISHING

Groping (*tulituli*) for reef fish is done by men, women, and children, mainly during the full moon and spring tides. Fish spearing (*yoka ki te tao*), formerly done with a wooden spear (*tao ika*) or with a rough spear made by pointing a stick of *puapua* (*tao puapua*), has been largely superseded today by the introduced method of catapulting a light, pointed iron rod. Torch fishing (*lamalama*) is done on dark nights by two men, or a man and wife, or a young man and woman.

1. Groping. Each person takes with him a basket (*ola*) and a fish spear (*tao ika*) or a piece of sharpened *ngangie* wood about 3 feet long (*yukiyuki*). He gropes about with his hands in the branching heads of the antelope coral, in crevices, reef channels, and pools of the reef shelf (*utuauakeu*). When he comes to a deep crevice, he gently pushes his stick towards the hole to make the fish come forward and bite. If he sees that the fish is not dangerous, he grasps and kills it with a bite behind the head; if it is not safe, he spears it or leaves it alone. Groping at high tide, the fisherman submerges and swims under water to explore deeper holes.

Artificial rock piles (*au weatu*) are built for basket groping (*tata ki te ola*). Piles of stones are placed in appropriate parts of the lagoon, about 35 yards from the shore in shallow water. A large slab of coral conglomerate is supported by four smaller stones, and the whole covered by other stones. The pile is left for about two weeks, when two fishermen return with a cone-shaped fishing basket and a coconut-leaf mat (*polapala*). They place the basket (*ola*) close to the pile and surround both basket and rock pile with the mat. One man knocks aside the smaller stones and larger slab and drives the fish into the basket. They close the basket and replace the stones before proceeding to the next *au weatu*.

A basket is also used for the ordinary method of groping under coral heads. One fisherman holds it near a crevice while the other beats the water or pokes into the hole to drive out the fish. Children are adepts in the use of this method; their mothers or sisters make them small baskets for catching the smallest reef fish. Fish caught by the groping method are: *manini* (about three times each year, when very young), *ere*, *unafiki*, *talaa*, *kotinu*, all the parrot fishes, *laru*, *pareva*, *peva*, *lalawatu*, *lai*, *une*, *palangi*, *malava*, *kayuye*, *ma*, *maito*, *ngatala*, *tanganu*, *tunaelanga*, *mutonga*, *minu*, *malau*, *kokili*, *kili*, *unulenga*, *yinu*, *weke*, *woireviti*, *oyuala*, *palauti*, *popio*, *matacle*, *tali*, *papa*, and *yilaa*.

2. Fish spearing. Save for one or two fish, spearing is carried out in the shallows

of the god and placed in the god house. These prayers for good luck survive today in the prayer meetings that are held in the several villages before the fleets set out for a fishing contest and in the prayers that are said at sea before the first line is thrown overboard. In the story of Pania (1) a fisherman gives some fish to his god after returning from an expedition, in order to thank him for his services. Informants were unable to state whether this was a common custom in former days.

A curious story is that of the man Taewa who became a successful fisherman even though he did not observe any of the fishing tapus:

Taewa tried many times to be a good fisherman, but without success. Disgusted with himself after many years of effort, he decided that the only way to improve his fortune was to circumcise himself. He was the first and only Pukapukan man to do this. With a clam shell, he made a longitudinal slit in the foreskin, then slashed the skin till it hung in tatters. The wounds healed, and ever after Taewa had good luck in fishing. So fortunate was he that he could afford to disobey all the fishing tapus without suffering any penalties from the gods. He named the Black Nebula below Crux, Te Paniwi, because the shape of the nebula reminded him of the shape of the *paniwi* fish. Some say that Taewa was protected by a spirit in this nebula when he broke tapus, though none knows how this protection was exercised. Others say his luck was due to the fact that he always fished when Te Paniwi rose above the horizon and not at any other time. None could explain the effect of his voluntary circumcision upon fishing luck.

There was no method of catching whales. When a whale was stranded on the reef, a call was sent through the three villages. The women rushed off to the talo beds to bring back talo which they prepared for the men who went to cut up the animal. The work of cutting up was supervised by a priest of Te Maungatu, the god who was supposed in some ill-defined way to control the stranding of whales. The blubber was divided among all the people of the island. The vertebrae were used as seats; no use seems to have been made of the whalebone.

SIMPLE METHODS

Ill-defined methods of fishing—stone throwing or stone clubbing, stepping on fish, hand scooping, and hand flipping—are employed only incidentally to other activities.

Stone throwing (*kamu ki te weatu*) or stone clubbing (*patu ki te weatu*) is performed by a man walking through the lagoon shallows who sees lagoon fish near by, often sleeping undisturbed at his approach. Fish killed by this method are yellow mullet, rock groupers, parrot fish, and flounders.

When a man fishing other lagoon fish comes across a flounder resting on the bottom, he makes a quick jab with his foot to pin down the fish, then picks it up, and kills it by biting it behind the head.

If a man sees a fish resting close by but can not find a stone or stick with which to kill it, he approaches quietly and, quickly dipping his hands into the water, scoops the fish onto the beach. This method is often successful with *tamaye*, *tupouponu*, *taotao*

of the lagoon or on sandy bottoms close to the beach. The following fish are commonly speared: *pula*, *ali*, *patetele*, *uluu* (a deep-water fish speared outside the lagoon), *tupoupuu*, *taolaama*: the eels; the trigger family, deep-sea members of which are sometimes found inside the lagoon; *weiwii*, *yoyala*, *pulu uli*, *piopio*, *mataale*, *lali*, and *papa*. The various rays are speared with a *tao*, to the base of which a semit cord is tied so that the spear will not be lost.

3. Torch fishing. Torches (*lama*) are made late in the afternoon preceding the fishing. Two dry coconut midribs are used for the reef fishing torch (*lamalama akau*), three midribs for the *malau* fishing torch (*lama malau*). To make the reef fishing torch the broad butt is cut from each midrib. The first midrib is laid on the ground, the dull side (*lua*, back) down, the smooth side (*muivakevake*) facing upward. The second midrib is placed on top of the first, the dull side of the second leaf next to the smooth side of the first. Starting from the butt end, the worker gathers together with both hands the leaflets for a length of about 18 inches. Holding these with the left hand, he takes with the right hand two leaflets from the underneath leaf and twists these several times around the gathered leaflets of both leaves. Then he picks up with the left hand two leaflets from the top leaf and twists the first two leaflets three or four times around the second two leaflets and buries the twisted leaflets under the general gathering of leaflets. He gathers up all the leaflets for a second fastening about 18 inches from the first, and proceeds thus until he has made a compact bundle. When fired, the torch burns down to the fastening and then smoulders. The buried leaflets are then loosened by a shake or by a flick of the hand and flame up again. To dim a torch by lowering the head and then make it flame again by raising the head is termed *wakapuhapula*.

Of the two fishers, the assistant holds the torch and carries the spare ones so that the fisherman is free to catch the fish. The light of the torch shows the sleeping fish or attracts them to the surface, where they are speared or clubbed to death. The partners progress along the reef shelf, probing with the torch on the inside of the reef. The fish caught are strung together on a coconut fiber or placed in a basket. Fish caught by reef torch fishing are: *kaloma*, *ie*, *maono*, *unahiki*, *mayi*, *kanae*, *uloulo*, *kotimui*, parrot fishes, and all the reef fish caught by reef groping.

Torching is also used in catching flying fish and *malau* (p. 58) and for canoe fishing outside the reef (*yi wakapuhapula*). The canoe is either stationary or allowed to drift slowly down the reef. A torch is held by one member of the canoe crew to attract to the canoe such fish as night-feeding cangaroids, barracuda, dog fish, and tuna. The bait and hook used depend on the type of fish to be caught.

WEIRS AND SWEEPS

The walled stone fishweir (p. 159), used for catching reef fish in the shallow waters of the lagoon, is called *pa watu ika* or *taewenga*; the method of using it, *tali taewenga*:

The weirs are placed in the reef shallows at places where the water at ebb tide is not more than 1 foot deep. The fish come inshore from the reef at high tide. At the ebbing of the tide, when they are carried out again, the exit of the weir is blocked with a scoop net (*tae yaeke*) or with a cone-shaped fishing basket (*ola wau* or *au*) weighted down with a stone. The fisherman watches the course of the weir and has his net or basket ready when the fish enter. His partner beats the water behind the fish and drives them to the exit. The mouth of the basket is closed as soon as the fish enter and then the basket is raised from the water. The fish are lifted out, transferred to another fishing basket, and the basket reset for more fish.

Stone weirs are the property of the village on whose stretch of lagoon shallows they are built. All men of the owning village use the weirs freely at any time. Fish

caught with the stone weir are: *unahiki*, *taao*, *lupo*, *pakeva*, *lalawutu*, *lai*, *ume*, *palangi*, *malava*, *kayuye*, *ma*, *matlo*, *ava*, *kiokiotai*, *atule*, *yoyala*, *pulu uli*, *piopio*, *mataale*, *lali*, and *papa*.

Coconut-leaf weirs (*pa lama launuu*), less permanent than stone weirs, may be easily moved about the lagoon shallows according to the running of the fish:

To make a weir, dried coconut midribs are split longitudinally. Three or more half-leaves are placed on top of each other, and the leaflets gathered together and tied with *kalava* coconut fibers. An appropriate section of lagoon or fish pond is chosen and stakes are driven into the bottom in pairs. The space between the two stakes of each pair is about 18 inches, and the series of pairs are about 6 feet apart. A sufficient number of pairs is set up to give the required length to the wings of the weir, the base toward the beach and the exit toward the reef. The bundles of coconut midribs are laid between the pairs of stakes to make the walls about 18 inches high. Some weirs (*matuu*) have a permanent stone mouth to which the leaf walls are linked.

The mouth of the simple leaf weir or of the composite stone-and-leaf weir is blocked with a scoop net or basket. Men inside the weir advance toward the closed exit, pounding the surface of the water with coconut midrib butts to drive the fish to the exit where they are caught. The fish caught in these weirs are the same as those caught in stone weirs.

Movable coconut-leaf sweeps (*pa lama launuu* or *kupenga lama launuu*) are used in the lagoon:

Bundles of dried half coconut leaves are fastened together to make a long sweep about 18 inches high and 20 to 30 fathoms long. The sweep is carried to the lagoon and used to surround (*liwa*) a lagoon pool where the water is about knee deep. The wings are drawn together (*wawawii* or *lanilau*) and the fish clubbed or speared. Alternately the sweep is dragged over shallow water to the beach. Small fish are swept onto the beach or caught in the interstices of the midrib sections. The sweep is shaken out on the beach to dislodge the fish. Fish caught by this method are: *kaloma*, *veve*, *memea*, *ie*, *wawa*, *kotimui*, *lupo*, and *atule*.

Semi-permanent fish runways (*alai lama*) made of *pa lama launuu* set between rows of stakes are used in the Yato fish pool at the causeway. These runways accustom the fish to go toward places where the fishermen set nets or lines when the tapu is raised from the pond and it is open for fishing. Rougher runways are made by placing bundles of coconut leaves in the water and weighting them down with heavy stones.

NETTING

A net full of fish is *puto ika*. The use of nets in fishing is limited to the hand fishnet (*tae yaeke*), seine net (*kupenga*), arched net with line (*tata iwitiwiti*), long-handled dip net (*tae malolo*), and the flying-fish practice net (*tae penu*). (See pp. 208-209).

1. The hand fishnet (*tae yaeke*) is shaped like the *tae malolo* but is much larger, having a larger mouth and longer handle. I did not see one in use. It is employed as a scoop net to block up the seaward faces of short reef channels (*yi*) or of long reef

channels (*awa*) leading to the open sea. Suitable channels on the reef shelf through which the water from the lagoon flows back to the ocean with the ebbing tide are blocked (*yake*) and the fish caught. Fish caught by this method are the common reef and beach fish mentioned for weir trapping.

2. The seine net (*kupenga*) is used for beach and reef fish. Because the irregular coral bottom of the lagoon would soon rip the meshes of the net if dragged over the bottom, it is set, not hauled, for reef fish. Nets used for the small beach fish (*kaloma*) are dragged over the sandy bottoms close to the beach. Nets for reef fish are set on the seaward side of the reef shelf. Some men walk inward with the wings of the net while others on the lagoon side of the reef shelf walk seaward, beating the water with coconut-leaf butts to drive the fish toward the net. The wings are closed around the fish, which are clubbed to death in water about 4 feet deep. To use the seine net, whether by setting or hauling, is *yahi kupenga*. The one net on the island at present is owned by the men of Ngake who sometimes use it on the reef off Ngake, at other times on the reef off Yato. When it is set off Yato, Yato men are always present; and the fish caught are fairly divided among the men of the two villages. Fish caught by this method include all the reef fish caught by spearing and by fish weirs.

3. The arched net with line (*tata tawitawi*) is used for reef fish. It is constructed on the principle of the Samoan arched net with line (27, pp. 477-478), but with different materials. As I did not see one in use, the description is based on informant's account. A special net is not made; the net from the *tae malolo* is unlash and used. It is laid flat on the ground. A semit cord passes from each of the four corners of the net to make a sort of bridle which takes the place of the thin rods used in the Samoan net. To the apex of this bridle is fastened a hand line of sennit. The surface of the net is baited with *Tridacna* meat, and *Tridacna* shells are placed on the net mesh to act as sinkers. The net is let down from a canoe and laid on the bottom (*teoloto*) in about 2 or 3 fathoms of water. The fisherman then dives to the bottom to spread out the net. When coral or reef fish swarm into the net to get the bait, it is quickly pulled up. The natural sag in the *tae malolo* net is increased as it is drawn rapidly to the surface, making it a fairly deep bag net.

4. The scoop net (*tae malolo*) is used from a canoe on the outside of the reef to catch all kinds of fish. The classic example of this type of fishing is flying-fish netting. The best time to catch flying fish is after a big squall (*tinnu ongo*) which has the effect of bringing together the fish. Flying fish are sometimes caught by individual fishermen in single canoes, more often by a fleet of canoes (*awa vaka*) which goes out by arrangement to fish competitively. For the purposes of this fishing, members of the crew are named according to the functions they perform. In a six-seater canoe (*yake ouo*) the crew members, starting from the steersman and moving toward the bow are: the captain, who is steersman and principal netter (*tae mui*); the *waitevuli* ("mate"), who has charge of the canoe when the *tae mui* is netting but paddles at other times and is also referred to as *te ola no te tae awi*, because he gathers together the fish as the netter throws them into the canoe; the *tae awi*, who paddles and also nets when the canoe is on a big shoal of fish; the *o lama* or *te tata yua*, who paddles, bails, and gathers in the fish thrown by the second netter and is also responsible for the torches (in a six-seater canoe there is one torcher; in an eight-seater, two torchers); the *ola no te ulu* or *te latavei*, who paddles and gathers the fish together and who with the second man (*waitevuli*) is responsible for keeping the canoe straight to the reef and moving it as required when the other members of the canoe are netting or bailing; the *tae ma* or *tae ulu*, who paddles, acts as a netter, and is responsible for warping the canoe (*lolo te vaka*) as it is swung head-on to the reef, so that the canoe is kept dead head-on to the reef and swings neither right nor left from this position. In smaller canoes with a crew of only three men, the netter is in the bow, the torcher in the center, and the steersman in the stern. Previously only men fished flying fish, but today women and girls occasionally go out with the fleet to act as paddlers and torchers.

The canoes of the fishing fleet line up outside of and parallel to the reef. The leading canoe (*ibi*) turns toward the reef, pointing bow-on to the reef. The torcher in this canoe raises his torch so that it bursts into flame (*awakayila te lama*). All the other canoes in succession turn bow-on to the reef and raise their torches. The fishermen make booming noises by beating the washstrakes of their canoes with their hands, and produce loud sibilant sounds by sucking in the breath quickly through pursed lips. These two sounds, together with the glare of the torches, attract the fish to the surface. They skim through the air and are caught by the netters, who net on the starboard side of the canoe. As soon as the shoal of fish has been caught or frightened away, the torches are lowered and allowed to smoulder. The canoes turn parallel to the reef again and paddle farther along. The last canoe in the line now races up from behind the fleet and takes its place at the head of the fleet (*awakalaka te vaka mukupi ma*). Each canoe in turn leads (*ibi*) the fleet until all canoes have had their turn as leaders of the line. When the last canoe has reached the lead, it turns toward the reef and raises its torch. All the canoes follow suit, and the whole process is repeated. During an evening's fishing along the western reef, the canoes work down the reef from Wale until they are opposite Motu Kotawa or Motu Ko. A canoe which has an expert netter may catch about 200 fish during an evening's sport.

Fish caught by the scoop net on these occasions are: *ie pa*, *yipa*, *aku*, *malolo*, *ngatio*, *kupakupa*, *mueke*, *matauli*, *uli*, *vo*, and *witwiti*. All these fish, save *ie*, of which the schools are so big that the fish is easy to catch, and *aku*, which is a very big fish, are counted as scoring fish in village flying-fish competitions. The height of the flying-fish season is from August to December.

ROD ANGLING

Angling, a common Pukapukan method of fishing, is of three types: beach angling, reef angling, or stationary canoe angling inside or outside the reef. The type of rod and hook used depends on the fish to be caught.

1. In beach angling the fisherman usually uses the *matila kaloma* rod and small *yeki* hook. He stands on the beach or in the beach shallows and casts his hook into the shallow waters. Women, as well as men, are skillful beach anglers. Small fish are caught by this method. All members of the *kaloma* and *vete* family are caught with a *yeki* hook, with bait of red *uiga* crab and chum of *kaiepa* crab. These fish are caught in daytime throughout the year. They are especially abundant at the new moon, during the southern solstice, and after a thunder storm. Other fish caught are: *manini*, *papata*, *kata*, *katihi*, *hupo*, and *uli*. The bait and chum are those used for *kaloma*.

2. Reef angling includes angling from the reef shelf where the hook is cast on the outside of the reef, angling on the reef shelf itself, angling on the inside of the shelf where the hook is cast into the deep water of the lagoon, angling from coral heads inside the lagoon, and angling from the lagoon. In lagoon angling (*awakalukukuku*) the fisherman stands in water up to his neck. Holding the rod with one hand, he submerges his head to look for fish and then casts the hook in the direction of the fish.

The rod used in these methods is the *matila patubi*, which is about the same in size as the *matila ahukuku* (p. 187). The type of hook varies for the kind of fish to be caught. Fish caught and hooks and bait used are:

FISH CAUGHT Maono and pula	HOOK Yeki	BAIT Abdomen of unga crab (pala unga) Crab or kaloma fish
Patuki, lenga, kaka, and pakou	Yeki	Crab, ie fish, or kaloma
Eve and unaliki	Yeki or tope (depending on size)	Crab, ie, or kaloma
Talao, moye, and tutupaku	Tope or composite pearl-shell hook	Crab and kaipea crab chum Live or dead kaloma
Uwoa, aliki, kanai, and kawa	Tope	Live kaloma
Pakeva, peva, and lalawutu	Tope or composite pearl-shell hook	Crab
Komuli (caught only at night; lai fished incidentally to komuli)	Composite pearl-shell hook (pa komuli)	Unga crab, kaloma, or ovum of Tridacna shell fish, and kaloma chum (sun-dried black portion of Tridacna best for catching ma)
Yoke, moi, and ayole	Tope or composite hook	Live kaloma
Ume, palangi, malava (best caught during evening rising of Antares in June or July), kayuye, ma, and maito	Yeki with especially wide space between point and shank	Live or dead kaloma
Tupoupou, taotaoama, and tawonu	Small tope	Unga crab or kaloma (especially on moonlight nights)
Ngatala, tangau, tuna-elenga, and mutonga (best caught in early morning or early evening)	Tope	Black unga crab meat or seaweed (limu)
Malau, malau loa, and kikiyamao (especially moonlight nights)	Tope or composite hook (pa malau)	Unga crab or kaloma and chum (where used) of unga crab meat
Ava and kiokiotai	Tope	
Kokili, kili, umulenga, yimu, weke, atu (small bonito only), yipa, malolo, witiwiti, atule, matapuia, paniwi, yoyala, palu uli, piopio, mataele, lali, papa, wapuku, and kaka	Yeki or tope	

3. Stationary canoe angling, with the canoe anchored inside or outside the reef, is the method used for catching the following fish:

FISH CAUGHT Akuaku and ie	HOOK Fishbone gorge (au)	BAIT Dead kaloma fish
Atu, yipa, and malolo	Yeki	Unga crab bait and chum
Witiwiti	Tope	Unga
Kopelu (when near the surface)	Short rod and line, small yeki hook	Bait and chum of chewed drinking nut flesh
Rock groupers	Tope	Crab or kaloma

4. Reef angling with a lure, but without baited hook, from the outer edge of the reef shelf into the breakers on the outside of the reef is *yí yeyeyen*. An unbaited composite hook is used, sometimes also today a feather fly of pigeon, tern, or tropic bird.

The few fish that may be caught in this way include: *pakeva, peva, lalawutu, komuli, malau, small atu, and ngangono* (bonito), *matapuia*, and *paniwi*.

FLOAT FISHING

Line fishing from beach or stationary canoe, the line lying horizontally on the top of the water and the hook supported by a float, is termed *wakamoe* fishing. The line is usually of two-ply twisted sennit (*uka*), and the float (*wakai*) is of *wakanawa* wood.

1. In beach *wakamoe* fishing the fisherman either casts the line from the beach or wades out about 20 yards into shallow water and then casts the line. The float is watched, and when it begins to bob up and down, both line and float are hauled in. The hook is rebaited, the line recoiled, and cast with an underhand throw. Fish caught by this method are:

FISH CAUGHT Mayi, uwoa, aliki and kanae (best fished during full moon at spring tide, in early morning or early evening)	HOOK Small tope	BAIT Red unga crab and chum of kaipea crab
Kawa (best fished during full moon at spring tide, in early morning or early evening)	Tope or kawilo hook of turtle shell	Black unga crab
Moi and ayole	Small tope	Unga
Tupoupou, taotaoama, and tawonu	Small tope	Kaloma
Small taiva, tangau, tunaelenga, mumu, and malau	Small tope	Kaloma and unga
Large ava and kiokiotai	Very round tope	Black unga meat or seaweed
Fresh-water eel (tuna wenua)	Tui wua	Bird intestine
Tamule	Tope	Live or dead kaloma
Yiloa	Tope	Octopus flesh

2. Canoe *wakamoe* fishing is done inside or outside the reef, the hook being supported by the *wakai* float. The fish caught by this method are:

FISH CAUGHT Aku tangata and aku pa	HOOK Barbed hook (matau wakavae)	BAIT Crab or kaloma
Pakeva, lui (best fished in early night or before dawn in new or full moon)	Tope wanga and heavy line	Live kaloma, needle fish, or flying fish (lui brought to surface with live kaloma chum)
Tatu	Barbed hook	Live kaloma bait and chum
Malatea (in lagoon waters up to 10 fathoms, 300-400 yards from beach, at high tide in new or full moon)	Wooden hook (kau)	Live tupa crab, kaipea crab, or octopus flesh
Barracuda	Wooden Ruyvetts hook	Flying fish, chummed to surface by refuse from bait

A float (*makai*) used for catching flying fish from a stationary canoe was described by informants:

The float consists of a section of *wakanawa* wood about 9 inches long and 3 inches in cross section. To each end of the float is fastened a line ranging in length from 18 inches to 6 feet. The two lines on the same float are of unequal lengths to avoid tangling when fish are hooked. Each line has a *yeki* hook which is baited with *uiga* crab, *kaloma*, or flying-fish meat. Several floats (*makai*) are allowed to float unattached around the canoe. When a float begins to bob, the fisherman paddles to it, disengages his fish and resets the float. Chum of *uiga* crab meat is used to attract the fish to the float. The only fish caught by this method are members of the flying-fish family: *yipa*, *malolo*, *malolo pua akau*, and *maloloywe* (large-bellied balloon *malolo* fish which is not eaten and only caught incidentally).

STILL-CANOE FISHING

Still-canoe fishing with a vertically descending line and dead bait is termed *taualo*; similar fishing with live bait is called *lulu*. When the *taualo* system is used with a *yeki* hook for small fish, the method is called *yekiyeki*. In both types of fishing not more than 50 fathoms of line are paid out and the canoe is anchored inside or outside the lagoon.

Outside the reef the canoe is kedged onto the reef. The anchor line (*kawatawa*) is buoyed up from reef to canoe with dry coconut husks. A quarter husk is split longitudinally for about 6 inches and the line wedged into this split. The natural spring of the husk serves to keep the line fast. About 12 husk buoys (*pulu langalangai*) are used for each 100 yards of anchor line. Several canoes fishing together are lined up in single file. The first canoe is kedged to the reef, and each of the other canoes is attached by about 10 yards of anchor line to the one in front. Canoes are kedged to the reef only in an offshore wind. Canoes anchored inside the lagoon are usually kedged with two anchors (any large stone serves as anchor), one at the bow, the other at the stern. In both *taualo* and *lulu* fishing the canoe is faced to windward, and the line is dropped in the lee of the canoe. Both types of fishing depend for success on an ability to see the fish biting the hook. To make the leeward surface of the water calm and devoid of surface rippling, the fisherman chews coconut flesh, which he spits on the sea. The oil in the flesh spreads over the water and effectively calms it. Today a waterglass is often used instead of chewed flesh. Some fishermen prefer to fish the smaller lagoon fish when the sky is overcast and likely to rain, using composite shell hooks. Where *Tridacna* is used as chum, the backs of the opened shell are rubbed together, making a grating noise (*kulukulu*) to attract fish; the two half-shells with meat attached are thrown into the water near the canoe. Fish caught by the *taualo* method are:

FISH CAUGHT	HOOK	BAIT
Eve, unaliki, talao	Yeki or tope	Kaloma, ic, or crab
Ufoulo	Tope or small composite hook	Crab or kaloma
Parrot fish	Yeki	Tridacna, crab, or seaweed
Pakeva, peva, lai, and lalawutu	Tope or composite hook	Dead kaloma
Ume, palangi, malava, kayuye, ma, and maito	Yeki	Crab, kaloma, or Tridacna
Malali and lalawi	Tope	Unga and kaloma
Malatena and eels	Wooden hooks	Tridacna, octopus, or sea urchin (vana)
Wuakula, luluau, tiwitivi, tataau, launuuui, yama, tiitaeyinu, taiva, kokili, kili, umulenga, yimu, atule, rock groupers, wapuku, and pakeva	Plain or barbed tope	Crab or kaloma (grouper papa best caught with bait of flying fish or octopus)
Sharks (occasionally when troubling albacore fishing; not eaten)	Large wooden hooks	Any dead bait

The method of attaching dead bait (*manuu male*) to any type of single-piece fishhook is shown in figure 4. Live bait used in *lulu* fishing is any small fish. The point of the hook is passed through the back of the fish or the fish is tied to the hook shank by the bait string (*takele manuu*) so that it wriggles about in the water. *Kaloma* bait is preferred in *lulu* fishing for the fish also caught by the *taualo* system, except for *uhua* and *lai*, which bite best with live *malolo* bait on a wooden hook. *Komuti* is fished only at night with a composite hook. *Lui* is fished only at night in the full and new moon, with *tope* hook. For *lulu* fishing the bait is caught before the planned expedition and kept alive in a submerged basket tied to the cross booms at the side of the canoe, within easy reach of the fisherman. The mouth of the basket is securely fastened to prevent the escape of the bait fish.

A special method of attaching sinker to line is employed in *lulu* fishing for *kakai* and *pala* fish:

The hook (*wakaalo*) is barbed. A secondary snood (*matai*) of two- or three-ply twisted *wao* fiber about 7 feet long joins the hook to the fishline of sennit. Unlike sennit which hardens in water, *wao* line becomes soft and slips easily from the sinker when jerked. Live bait of *kaloma* or *atule* is fastened by the tail to the shank of the hook. Hook and bait are laid on the surface of a smooth coral stone sinker, and chum placed on top is covered by a *puapua* leaf so that it will not scatter until the requisite depth is reached. The *matai* snood is passed around the sinker away from the barb of the hook, making two or three transverse turns to secure both hook and bait. The *matai* is then caught in a bight with the left hand and passed around the sinker once in the opposite direction, passing over the right thumb that holds the first transverse turns in place. The bight and the running part of the *matai* are tied together in a single overhand knot; sometimes a single slip noose is made on top of this overhand knot. Hook and sinker are paid out until the required depth is reached, when a sharp jerk on the line releases the sinker which falls away, leaving the hook, bait, and chum at a favorable depth.

Many men go outside the reef two or three times each week to catch *kakai*, the fish usually caught in fishing competitions. *Kakai* fishing is the favorite deep-sea fishing of the Pukapukan today:

A man catches his *kaloma* bait in the morning. Besides his fishing gear and two or three coconuts for his day's lunch, he takes with him coconut-leaf mats (*pola lawiti*) which provide protection from sun and rain and serve as sails. A mat leaning against the fisherman's back while he waits for a bite is easily thrown aside when strenuous activity is required to haul up the fish on the line before the sharks can take the fish from the hook. When the canoe is kedged to the reef and there is only a gentle breeze blowing offshore, a mat sail is used to prevent drifting onto the reef, thus obviating the necessity of paddling out from the reef again and again. A big sail in a fishing canoe would be cumbersome and would catch too much wind. A mat standing up in the canoe, with vertical midrib base and light guys running to outrigger booms providing support, gives sufficient belly to catch the wind and keep the canoe off the reef without dragging anchor.

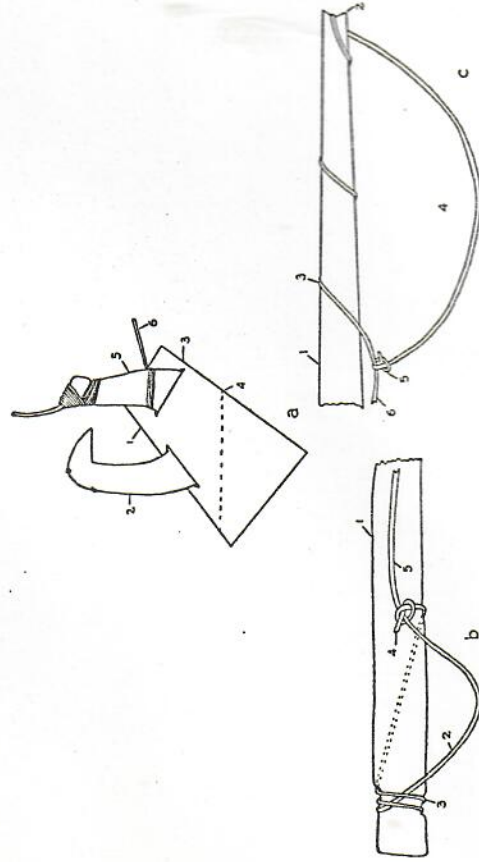


FIGURE 4.—Implements for fishing and bird noosing. *a*, fishhook with bait attached: any dead fish bait (*manu manu*) is attached to old style hook by removing head from bait fish and stripping off fillet (1), excluding backbone from belly backward so that flesh remains whole; hook (2) thrust through tail end (3) of fillet from flesh side, back through head end of fillet from skin side; fillet folded (4) along hook (dotted line), flesh side outward, skin side inward, and tail end of fillet lashed to shank (5) of hook, near shank knob, by transverse turns of bait string (6), fastened with half hitches. *b*, bird noose (*ya'e manu*): pole (1) about 12 feet long, 2 inches in diameter; noose (2) two-ply twisted sennit; one end of sennit passed transversely around notch end of pole (3), then down underneath two transverse turns; short free end (4) tied in square knot on bight; running end (5) passes down pole to bird catcher's hands at proximal end. *c*, fish noose (*kauyele*) (CS:52): wooden support (1) of *huapua* wood about 6 feet long, ½ inch in diameter at proximal end, ¼ inch in diameter at distal end which is notched (2); noose cord (3) of strong, three-ply twisted *wao*, wound around support, passed over notch (2) to form noose (4); free end knotted on bight (5) and cord (6) passes to proximal end of support.

Tuku moana fishing from a stationary canoe outside the reef with dead bait differs in two respects from both *lulu* and *tamalo* fishing: *tuku moana* fishing is deep-sea hand-line fishing up to about 300 fathoms and involves

the use of a special composite fishing apparatus (*taumakomako*) consisting of four or more hooks fixed by spreaders to a single line. Two types of *taumakomako* are described elsewhere (p. 188). The hooks of both types are baited with dead *malolo* or other dead bait.

The *taumakomako* is lowered over the side of the canoe and line paid out until it is felt that the sinker has touched bottom; it is then heaved up a few feet. When the first fish is felt, the line is hauled in a little. This is repeated until all hooks have caught fish, when the whole apparatus is pulled to the surface. A strong fisherman is required to pull up the apparatus, weighted down with fish, from a depth of 200 fathoms to the surface with sufficient speed to avoid losing the fish to sharks. I did not see a *taumakomako* in use; it is said to be used occasionally by expert fishermen. The deep water fish caught by the *tuku moana* method are: *palu munu*, *palu wotu*, *palu ave*, *palu panitai*, *palu matapula*, *palu malau*, *palu una*, *palu tavatava*, *palu ulua*, *palu komiti*, *palu kakai*, and *palu katakata*. The giant *kakai* (*mataenula*), which is so large that no fish-line is strong enough to hold it, is always noosed. An account of *tuku moana* fishing with a detailed explanation of the hooking and pulling in of fish is given in the story of Maui (1).

RUVETUS FISHING

The method of fishing for *Ruvettus* (*palu kilitata* or *palu taeyi*) with a wooden hook (*kau*) is termed *yi palu*. It has been practiced in Pukapuka from very early times. An ancestor, Yaki, is remembered as the man who first fished *Ruvettus*.

The hook is attached to the line of sennit by the secondary snood (*matai*) with an ordinary double overhand knot. The sennit line may be 300 fathoms long, though the usual fishing depth is about 200 fathoms. Two methods are adopted for attaching the sinker (*watu yi palu*) to the wooden hook. In the first method the sinker line, a strip of pandanus leaf (*wao tta kie* or *wao lawititu*), is fastened to the sinker by a simple slip noose and to the bend of the wooden hook by a similar slip noose (overhand knot on a standing line). When the fish worries at the bait it bites through or snaps the frail pandanus, and the sinker falls away from the hook. In the second method the sinker line of pandanus is fastened to the sinker by a simple slip noose, but the free end of the sinker line is laid on the bend of the hook, and two turns of the line are taken around the bend of the hook and over the free end. When the sinker touches the bottom, the bottom takes the weight of the sinker, the two turns around the hook loosen, and the sinker falls free. The second method is used only by the expert. The non-expert, unable to judge accurately by touch when the sinker has touched the bottom, would pay out too much line, foul his hook on the bottom, and lose it.

Special bait attachment is used for the wooden hook. A fillet of *malolo* fish is laid on the point limb of the hook and tied halfway down the point limb with several transverse turns and an overhand knot. The remaining part of the fillet is laid back along the point limb so that it covers part of the functional point. The fastening of fillet to limb is with a strip of coconut midrib fiber (*kalata*). This is used in preference to the ordinary bait string (*takete manu*) of *wao* cord, because the sharp teeth of the *Ruvettus*, which can bite through the *wao* and destroy the *takete manu*, are not sharp enough to destroy tough coconut fiber. The lashing of the point of the wooden hook to the point limb is protected from the teeth of the *Ruvettus* by a covering of sharkskin wrapped over the lashing and tied above and below with coconut midrib fiber. The bait fillet is fastened to the hook on top of the sharkskin protective wrapping. No chum is used for *Ruvettus*.

Palu fishing is carried out only at night after moonset of the first nights of the new moon. A man fishes alone or with several men in one canoe. After flying fish for bait are caught, the canoe is kedged to the reef by about 200 fathoms of line. The hooked *Rivettius* is speared before being drawn into the canoe.

Other fish caught at the same time are *katakata*, *kapoa*, the giant *malau*, and a few other large-eyed, night-feeding fish. *Kapoa* and *Rivettius* are considered sweet eating fish, though *kapoa* is said to have better flavor.

TROLLING

Three systems of trolling (*taki*) for fish are used in Pukapuka:

1. Trolling while swimming (*taki ie*, *taki ahitaku*, according to the fish caught). A man swimming in the deeper waters of the lagoon at dusk holds in one hand a few fathoms of fishline to one end of which a bone gorge (*au*) and bait are fastened. He pays out the line and lets it troll behind him as he swims. This is a method of catching needle fish.
2. Trolling from a canoe with a line (*takitaki*). One end of a fishline is held in the hand or fastened to the cross boom of the canoe outrigger; the other end is paid out over the stern of the canoe and left to trail behind. The line is sometimes jerked by hand to add movement to the lure. At other times the line is paid out fully and then rapidly pulled in again. A composite shell hook, sometimes today a pigeon, white tern, or tropic bird feather, or a baited hook serves to attract fish. The bait is alive or dead according to the fish to be caught. The trolling is across the lagoon by canoes going to the reserves, along the outside of the reef, or farther out to sea.
3. Trolling with a rod (*malila*) over the stern of the canoe (*taki*). An unbaited composite hook, a feather fly, or a baited hook is used. If the fishing pole is not oscillated with the hand, movements of the hook or lure derive only from the motion of the canoe. Rod trolling may be inside or outside the reef. Fish trolled are caught equally well with rod or line except bonito, *pala*, *kamati*, and *akula*, which are caught exclusively with trolling rod and unbaited hook.

Fish trolled with rod or line from canoe and with baited hook: *uluu* with live *malolo* bait and wooden hook; *tatu* and *lai* with live or dead *kaloma* bait; *lavataava* with live *malolo* bait; *atule* (close to the reef) with live or dead bait; rock groupers (along the reef) with any bait; *pakeva* with a *tope* *vaanga* hook and live bait of needle fish, *kaloma*, or *malolo*.

Fish trolled with rod or line from canoe and with unbaited hook or feather fly: *uloulo*, the parrot fish, *pakeva*, *peeva*, *lalawenuu*, and *lai* (with fly of pigeon feather); *malau*, the rock groupers, *pakeva*, *lui*, *tatu*, and *wonu* with a fly of white tern or tropic bird feather.

BONITO FISHING

Fishing for bonito (*yi atu*) requires special techniques and was formerly tied up with much ceremonial. The bonito (*atu*) fishing season opens with the morning rising of the Pleiades and lasts for three to four months thereafter. As bonito schools (*livanga atu*) are believed to follow the schools of flying fish, bonito fishing comes after the flying-fish season has already commenced. Bonito bite best in the new and full of the moon.

At the rising of the Pleiades the men of the island formerly gathered together to decide what fish were to be specially fished during the coming season and what was to be the composition of the crews for the various fishing groups. There was no special religious ceremony to open the season but the priest of the god *Matokitelangi*, protector

of bonito, communicated with this god to insure his favor during the coming bonito season. The old men (*tupete*) decided which of the younger men should make up the bonito-fishing group (*notanga*) for the season. None but the men of this group might fish *atu*. The *notanga* fishermen were fed by the old men, who gave them cooked *talo* to take with them each day they went fishing. The fish caught were all brought to the meeting place (*malae*) of the old men and there divided among the people of the island with the proviso that each man of the fishing group was allowed to have the head of the fish he caught in addition to his share of the flesh. The group which caught *atu* one year automatically became the group for noosing *pala* fish the next year. All fish noosed were similarly divided by the old men among the people. The men of the *notanga* group, which consisted of about four canoe crews, each of five or six men, were taught the elements of *atu* fishing, the rules, *tapus*, and skills before the season started. There were no special names for the crew members. The best fisherman (*tangata tau vaiva*), who was usually also the oldest man of the group, became captain. His was the canoe that always shot the reef passage first. The next canoe to follow had the next oldest man of the *notanga* as captain, and so on for all the canoes of the *notanga*.

Besides having care of the canoe and fishing gear, the captain of each canoe was responsible for providing bonito hooks. He had to provide one hook for each member of the crew, including himself; in a six-seater canoe the captain went fishing with six bonito hooks on his bonito rod. If, while the canoe was fishing, a storm arose that seemed likely to break the canoe up, the captain gave to each member of the crew one bonito hook from those on his rod. Each man tied his hook around his neck to act as a breast ornament (*yana*); were the men drowned thereafter, each went to his death provided with his death ornament. If there were too few hooks to go round the crew, as might sometimes happen if hooks were lost from the line while fishing, the captain gave to those without hooks any article of value in the canoe—a section of anchor rope or ordinary single-piece hooks. In this way no member of the crew lacked a death gift. The theory behind this was that the captain was responsible for getting together his crew, for their safety in this life, and for their dying at sea as well provided with gifts as if they died on land. To give out the gifts was *wakayana*, and the gift itself was *yana*, as distinguished from the death gift on land, *witonga*.

Atu fishing was a somewhat perilous occupation because the canoe might press out far from land in pursuit of a shoal of fish and, caught in a storm, be unable to make a landfall again.

The canoes of the *notanga* left the village early in the morning. As they passed the rock called Te Ulu-manu-o-te-tokaita, which juts out of the water opposite Yato village, the captain placed a malo, hook, or simple coconut leaf on this rock as a gift (*avakateva*) to the god Malokitelangi, that the god would give the canoes good fortune. It was *tapu* for any canoe going across the reef to scrape the bottom on the coral. If a canoe did this, it could not proceed farther but had to return to the village without fishing during the day. Rain drives away bonito fish from the surface, and if the canoes did not sight fish after patrolling for some time, it was permissible for them to return to the reef to rest. All the crew, save only the bowman, might step out on the reef and walk about; if the bowman forgot the *tapu* and stepped out, the whole crew had immediately to return to the village without further delay, even if meantime a shoal of fish had been sighted. If this *tapu* was disobeyed, the canoe was likely to be destroyed by lightning. When the victims of such a mishap as the breaking of a *tapu* returned to the village, they were greeted with insults and labeled *ngougo eto* (stinking *ngougo* birds). The shame of the crew was great if later in the day the other canoes of the group returned loaded with *atu* fish.

Bonito was not regarded as a fish (*ika*) but as an animal (*manu*). Fishermen located bonito schools by the flocks (*inao*) of seabirds following them. Canoes trolled up and down outside the reef. The captain sat against the bonito rod, which was sup-

ported by the notch in the rear seat (*yulunga matila*). When a bonito engaged the hook, the rod pressed against the captain's fundament. He reached out with his right hand, grasped the rod, swung it around to the right side of the canoe, and landed the fish in the canoe. When the crew sighted a school of fish, the men paddled furiously to reach the school and kept paddling to remain with it. The captain stood up and faced the rear of the canoe. He held the handgrip (*tukau*) of the rod against the thigh with the left hand, grasping the rod some distance toward the point with the right hand. The man next to the rodman gently splashed (*tapipi*) water on the hook which trailed on the surface. When a bonito bit the hook, the rod was flipped up and the impact came flying in toward the rodman. It struck him on the chest or belly, and the bottom of the striking disentangled the fish from the hook. As the fish fell into the bottom of the canoe, the rod was immediately swung out again. To swing the fish to the belly is *yi tata*. A bungling or inexperienced rodman who lost his fish in mid-air was referred to as *yi kovikowi*.

While the canoe was on or near a bonito school, it was tapu to drop anything overboard, whether paddle or other article, or a fish from the rod. The dropped object or the dropped fish, by its rapid tail-spin descent through the water, frightened the school. The man who dropped anything overboard was reported to the old men and was fined by this body 50 talo puddings (*marui*) or the equivalent. Today, when one man has a grudge against another, a pleasant form of revenge is to wait until the enemy is on a school of bonito and then to come up quietly from behind and drop a paddle overboard. It was also tapu formerly to let the rod slip from the thigh. The rodman who allowed his rod to slip was reported by his crew to the old men and by them fined 1,000 talo puddings. The slipping of the rod was extremely serious: it not only allowed a fish to drop and frighten the school but might also entangle the hooks and waste precious time. If such an incident was not reported to the old men, the god Malokitelangi punished the crew by striking the canoe with lightning.

When the canoes came back to the reef after a day of fishing, the crew signalled the people waiting on the western beach the number of fish caught during the day. These signals were made by holding a wet paddle in the air and twisting it so that it flashed (*apa*) in the sunlight. One flash given by a man standing upright in a canoe meant that the canoe had caught 100 fish, two flashes meant 200 fish, and so on. If one canoe had caught 150 fish and another canoe 50, then 50 fish from the first canoe were transferred (*tanukolo*) to the second canoe. The man in the first canoe stood to flash his paddle, but the man in the second canoe remained seated when he flashed. If two or more canoes caught between them more than 100 fish but less than 200, then only one standing flash from one canoe was allowed. Those canoes allowed one or more flashes each approached the reef first.

The captains of the returning canoes carefully washed their bonito hooks and lines in fresh water after arriving home. This act is *wakamangalo*. Hooks were soaked in a bowl (*kunute*) of fresh water, or submerged in a fresh-water pool. Placing hooks in a pool of water was sometimes perilous as storied tell of men whose hooks were stolen from these pools while they attended to other duties. Hooks lost from the rod at sea were believed to be taken by fish to the undersea house of the god Totoloa and there stored by him in the rafters of his house.

Bonito fishing is dying out in Pukapuka today, because, it is said, the fish are vanishing from Pukapukan waters. The old ceremonial is already gone. Whereas formerly a canoe might easily catch 100 or more during one day, now a canoe is lucky to return with three or four fish, an inadequate return for the hard physical labor involved. Bonito hooks are hoarded as valuable heirlooms and for use as death gifts.

NOOSING

Noosing (*yele*) is a common Pukapukan method for catching eels, sharks, swordfish, *mataruwa kakai*, and *pala*. No bait stick, whole fish bait, or special type of noose is used for the eels in Pukapuka, nor are sea centipedes or crayfish caught by this method, as is reported for Samoa (27, p. 421). The Pukapukan noose of three-ply twisted cord of *wao* fiber is made by passing a free end of the cord around the running section of cord and tying it around itself with an overhand knot. The noose is made about 3 feet in diameter. (See p. 188). Fishing is outside the reef:

A teaser bait (*pabepabepu*) of bonito flesh is tied to a line and trolled behind the canoe to attract the fish. As the canoe trolls the teaser, the crew make their paddles resound (*anagi*) by hitting the water and beating the sides of the canoe with them. When the fish is seen, the teaser is pulled into the canoe, the noose placed on the *kanyele* stick, and the stick put into the water. Chum is thrown out to attract the fish toward the noose. The stick is withdrawn and more chum thrown into the water on the farther side of the noose. The noose is thus between two chums and is maneuvered so that even a wary (*kaitoapa*) fish comes up on the starboard side of the canoe. When the fish moves through the noose to reach the second chum, the noose is pulled tight around its tail. The fish is hauled to the canoe and clubbed before being lifted in. This method of noosing fish corresponds to similar methods described for Samoa (27, p. 422) and Vaitupu (19, pp. 56-60). In Pukapuka however there is nothing corresponding to the hurling of insulting remarks (*tapatapa*) to the fish to make them indiscreet, as Kennedy reports for Vaitupu.

TURTLES

Three varieties of turtle are common in Pukapukan waters: *mataruwa*, the largest green turtle; *wonu*, the ordinary green turtle; and *wonu kea*, the hawk's-bill turtle. When turtles are sighted from the shore, the news is called out through the village and the people ask, "E talau? E taepu?" (Is it big? Is it small?). There are three methods by which turtles may be captured:

1. *Puke wonu*, overtaking or seizing a turtle. A man swims out to sea in the season for turtles. He may swim several miles before he sights the animal. Coming up to a turtle, he gets on its back and gouges out its eyes with his thumbs, at the same time forcing the head of the animal upwards with hand pressure. As long as this pressure is continued, the turtle will keep to the surface and will not sound. Alternately the fisherman catches the foreflippers of the turtle with his arms and holds them up; this also prevents the turtle from sounding. If the fisherman is expert, he steers the turtle over the reef to the beach; otherwise he holds the animal until a canoe arrives from shore. An expert who is a good swimmer, strong and skillful, can bring a turtle ashore unaided. When turtles to be caught by this method are seen from a canoe, the first command is for absolute silence, for the turtle sounds immediately noise is heard. One of the crew slips into the water, swims up to the animal, and grips it as just described. His companions stretch apart the foreflippers, tie them to a stout stick, and lift the animal into the canoe.

2. *Yele wonu*, noosing. A man swims out to sea, often with a canoe outrigger as a float, while he waits to sight a turtle. When he sees one, he takes a line with a running noose in the end and dives and slips the noose over the foreflipper. The noose is pulled

tight and the free end tied to the outrigger. As long as the turtle is attached to the outrigger, it will not sound. The fisherman waits for a canoe from shore. The turtle is lifted into the canoe and taken ashore.

In both these methods great care is taken to prevent the penis tail of the male turtle from locking the fisherman's leg against the carapace. Once this is done, the grip is viselike; the turtle sounds, drowning the fisherman. The tail is also a formidable weapon. If it pierces the body of the fisherman, priapism and death are extremely likely. The male turtle is much more difficult to catch than the female.

3. *Wali wami*, turning over the female turtle on the beach. The turtle-laying season begins with the morning rising of the Pleiades and continues until their evening rising. Only the two green turtles lay eggs on Pukapukan beaches. The fisherman goes to the outer beaches and watches for turtle tracks or turtle nests in the sand. When he finds a nest, he counts the eggs. It is believed that the female turtle returns to her nest after a given number of days depending on the number of eggs in the nest. Thus if there are 120 eggs or more in the nest, she is expected to return in 8 nights to lay again; if there are 100 eggs, she will return in 10 nights; if there are 80 eggs, in 11 or 12 nights; if 60 eggs, in 14 nights. The outer beach is then watched on the appropriate night at the full of the tide. When the female turtle comes ashore, she is turned over on her back and rendered helpless.

Formerly all turtles were taken to the meeting place of the old men and there the meat, fat, eggs, and shell were divided among the people of the island. The man who caught the turtle was given its head besides his share of the flesh. For the old men were reserved the belly fats (*pukualanga*) and the major internal organs (*ngakau matua*). It was tapu for any others but old men to eat these parts on pain of sickness and grey hair. The custom of dividing a turtle among all members of the community survives today.

OCTOPUS AND CRAYFISH

The Pukapukan levies on other creatures of the sea or reef besides fish to provide him with food. The long-tentacled octopus (*weke makave loa*) and the short-tentacled octopus (*weke makave poto*) are caught for bait, but they are not eaten.

Formerly they were speared or fished with line and hook. Today a common way to catch them is to throw several handfuls of coral lime (*punga*) into an octopus hole. The lime dissolves and causes the animal to emerge, when it is speared or grasped with the hands. Squid (*muete*) is eaten and used as bait. It is speared or caught with a hook.

Saltwater crayfish (*ula*) live in communities in large holes in the reef. Knowledge of these holes is kept secret by those fortunate enough to know them. One who knows where they are can pick out a crayfish from his hole at any time; others fish for *ula* in any likely hole on the reef shelf.

The best time for finding crayfish is on the first three nights of the new moon after moonset. Using a torch, a man visits holes of the reefs and picks out the *ula* with his hands (*lalao ula* or *tango ula*). Crayfish are caught also during the nights of the full moon at high tide. They are sometimes caught in torch fishing (*lamalama*) or in seine netting at dusk. A final method is to fish for them in holes, with a rod, a single-piece barbed hook, *kalomā* bait, and plenty of chum.

SHELLFISH

Tridacna shellfish (*payua*) is obtained from the lagoon corals with the aid of a cutting implement (*kalo payua* or *manu payua*) of *ngangie* wood about 12 inches long. One end is a double-edged, pointed, sharpened blade (*kalo*). The other end (*kalokalo*) is square and has a cutting edge on one side only. Between the two blades is a smooth section of wood used as a handle. Today a piece of iron with wood lashed along the median line is preferred to the wooden implement. Both men and women procure *payua*. Groups of girls or mixed parties of young men and girls go shellfishing together. An outrigger is often taken out from shore to act as a float.

By one method the fisherman dives for *payua* in deep water. He cuts the membranes on the two open half-shells with a twist of the *kalo* blade of the knife to prevent the shell from closing. Then with the *kalokalo* blade he makes a circular sweep around both shells and severs the flesh from the shell. He brings the flesh to the surface, leaving the shell below the water. The flesh is placed in a basket tied to the outrigger float. Considerable skill is required to remove *Tridacna* meat with the implement in the time the fisherman can remain submerged.

Another way to procure *payua* is to swim or canoe out to the coral heads of the lagoon and pry (*napehape*) the shells from the coral with a digging stick. Today an iron crowbar is preferred for this work. The shells are loaded into the canoe and brought ashore, where the flesh is cut out with a *kalokalo* or knife. On coral heads in the lagoon close to Motu Ko are huge piles of *Tridacna* shells (*ngatipayua*) which testify to the value placed on *payua* meat in past times.

The flesh of the pearl shell (*veua ui*) is not eaten. The shells are grasped in the hand and twisted so as to break off the tentacles anchoring the shell to the coral. Pearls were of no value when found inside the shell and were commonly thrown away.

The general name for clams is *pipi*. Various varieties are *pipi yeyenga*, *pipi kula*, *pipi tonga*, and *ngu*. They are not eaten but the shells were formerly valued for cutting implements, coconut graters (for which the clam *ngu* was used), talo scrapers, and occasionally for lancets in surgery.

Periwinkles (*alii*) come over the reef in large quantities at the full of the moon and are especially numerous during the time of the morning rising of the Pleiades. They are collected on the reef by hand by children and adults and form an occasional article of diet, roasted in the shells. The flesh is pulled from the shell with the fingers or a pointed stick. Periwinkles are considered hard to eat and not very satisfying but pleasant enough for a change.

REEF CREATURES

Reef creatures found on Pukapuka but not eaten, though sometimes caught on other Polynesian islands for food, are sea porcupines, of which the Pukapukan names four: *wetuke* (a blunt-spined sea porcupine); *vana* (a

sharp, long-spined porcupine); *tala pu mutumutu* (a short-spined porcupine); and *utulu akau* (a small, bluish-spined porcupine). If a fisherman steps on the *kalamea*, a sharp-spined starfish, when walking on the reef, his foot is stuck full of spines. He turns over the *kalamea*, places his foot on the suction pads of the creature, and allows it to suck out the spines from his foot. Five varieties of béche-de-mer are: *matua kalou*, *louiti kula*, *louiti uli*, *louiti akau*, and *louiti tapulepule*, which live under the sand. *Umukoa* is a mollusk that lives in a tapering tunnel in the coral. If stepped on, its poisonous shell produces terrible sores in the foot. The shellfish *valuvi* (*Nerita polita*) found on beach or reef, is used as a head for the water bottle scraper, also called *valuvi*. If a man found a jellyfish (*kalukalu moana* and *ngako*) on the reef, he took it home, carefully sun-dried it, and hung it up to the rafters inside the house, for it was believed to have been sent by the god of the paternal lineage and was taken as a sign of the god's good favor. Two varieties of sea centipede are *mokau tai* and *valou*. Only the *valou* are caught and eaten. To obtain them a noose is made in a piece of two-ply twisted sennit and held over the entrance of the sea centipede's hole. Chum of any kind is placed in and around the hole. When the *valou* comes from the hole to get the chum, the noose is drawn tight. Another method is to spear the *valou* through the head as it comes forth to get the chum.

CRABS

Three varieties of crab (generic name *tupua*) are caught on the outer beaches on certain nights of the moon and two stages are distinguished in the monthly growth of the three varieties:

Kaipua are caught on the thirteenth and fourteenth nights; *tupa*, on the fifteenth and sixteenth nights; and *kaveu* (robber crab) on the seventeenth and eighteenth nights. During these nights the crabs move from the bush to the sea to wash and change their shells. On other nights of the moon crabs for bait can be obtained inland with more difficulty. On the evening before a man plans a fishing expedition, his children go out with torches after dark, hunting around trees in the bush and in holes. The crabs are put into a basket and kept until ready for use. Enough crabs for one or two weeks' fishing may be collected at one time.

In the first stage of growth (*tava te tupua*) during the new and full moon the crab is filled with fat much esteemed as a food delicacy. In the second stage (*pupu te tupua*) the fat has turned into yellow masses of eggs that are bursting from the abdomen of the animal. Crabs are not eaten at this time because neither eggs nor fat are considered tasty. *Kaveu* is protected at the present time by a general agreement because it is thought to be dying out. Only large *kaveu* are killed; young ones caught accidentally are freed. Robber crabs in the reserves are kept as reserve food supplies and are caught only by arrangement by the people of the village. This communal catching and distribution of crabs among the people of the village (*laevya kaveu*) enable all the people of the village to share in the food delicacy. If *kaveu* were not reserved (*wakaya*), children and active young people would hunt them all the time, and the older people might not receive their fair share.

Three methods are employed to catch *kaveu*:

The first method is *lanalama kaveu*. A lighted torch is thrust into the crab hole. The torch smolders and the smoke forces the crab from its second hole, when it is promptly caught. In the second method (*yokayoka kaveu*) a pointed stick is thrust into the ground or into holes to locate the crab. The hand is then put down into the hole to draw out the crab. The third method is *wakapoa kaveu*. Coconut gratings are roasted over a fire until they become highly odorous and are then placed in the bush to attract the crabs. A few hours later a man visits the place and picks up the congregated crabs.

Crab hunting and killing is *zewi tupua*. The crab is picked up by the shell and, with a quick twist, the head is bent back from the mandibles and broken off. It is prepared for eating by roasting.

BIRD CATCHING

Of old, birds were caught principally for food, though the feathers were used secondarily as decorations for the hair and for the malo made of sennit. Today feathers are used as flies in fishing.

Birds are part of the reserve land foods and are tapu for most of the time. A decision to lift the tapu is announced to the people by the guards. The young men communally gather the birds which are divided among the people of the village. Small land birds are occasionally caught privately.

All birds are considered a great delicacy, but the young *lakia* bird is preferred. The owner of a new canoe might formerly obtain permission from the village to visit the reserves to procure quantities of *lakia* for the feast which marked the conclusion of the work on the canoe. The birds were shared among the people of the village and the canoe afterward referred to as *waka kai lakia*.

Birds were never kept as pets or decoys. When caught as a fledgling, a bird was placed alive in a cone-shaped coconut-leaf basket (fig. 16), and transported back from the reserve therein. The basket with the bird was suspended from a tree near the cook house. The bird was fed with coconut flesh; a new basket was made when the bird grew bigger. When the bird matured, it was killed and eaten. Today a bird is occasionally kept in a small four-sided wooden box hung on a tree near the house. Its wings are broken to prevent escape. It is fed by the children and killed when mature. One man in Yato keeps two semi-wild *noa* birds tied by the leg to a log near his house. When they escaped one day and walked through the village, everyone ran before them with shouts of "Kai tangata!" (Man-eater). It was some time before the birds were recaptured and the village settled down again to normal routine.

1. Netting. The method of catching birds by use of the bird net (*wuata*) is termed *wakavei manu* (to encircle the bird with a net). (For technical details of the construction of the net, see p. 209).

The catcher goes during the day to a suitable pandanus tree close to other trees where the birds are wont to perch overnight. He trims the tree so that he can climb to the topmost branches without lacerating his body on the sharp spines of the pandanus leaves. Trimming away the leaves and projecting branches also makes it easier to drag the bulky bird net to the top of the tree. At dusk, he again climbs the tree. Then as the birds return from their sea feeding grounds, the catcher utters a guttural mimic cry. The bird is attracted within the radius of the net by the call, and is secured with a sweeping, downward scoop of the net. The mesh of the net is drawn in and the bird removed. It is killed by a sharp bite of the teeth on the back of the neck and thrown to the ground. Birds are caught by this method for about two hours at dusk. The birds caught are principally *ngongo*, but also *kotawa*, *noa*, *takupu*, *lakia*, *kaka*, *ali*, *akiaki*, *wili*, *manu uli*, *tavake toto*, *tavake mokomoko*, and *matiku*.

An alternate use of the net is mentioned specifically for one bird, *kaka*. The method is termed *popo hi te toe* (slapping down the net). The *kaka* bird comes ashore at night to nest in the sand on the back beaches. The catcher, carrying his net, crawls up to the bird. When close, he pushes the net forward and places the belly of the net over the bird as it nests asleep. Then he takes the bird from under the net and kills it. The emphasis is on quietness and speed so as not to alarm other birds nesting close by.

Some nonresident birds, *ali* and *levulevu*, come to the outer beaches, not to lay, but to rest, flying low, and to feed. The catcher advances with his net toward a flock of birds, and scoops the birds into the net as they rise and fly low about him.

2. Hand catching. Birds are taken by hand (*tango manu*, *tango kotawa*, etc.) when it is quite dark and they have flown in from the beaches.

Before the birds have returned, the catcher climbs a suitable roosting tree, *puka*, coconut, or pandanus. He waits quietly until the birds are roosting. Then he reaches out his hands and grasps the birds. He wrings each bird's neck with a quick twist before it has time to squawk, drops it to the ground, and seizes the next. Most birds are best caught by this method when a fresh wind blows, whether or not there is a moon. The wind makes the outer ends of the coconut and pandanus branches sway so much that the birds come to roost close in to the trunk, where they are easily caught. Climbing bandages are used if the catcher has to wait for a long time in the trees. The hazards of bird catching by this method are well brought out in the conclusion of the story of Te Nana and Yi (p. 402). Birds caught by the *taigo* method are: *kotawa*, *noa*, *takupu*, *ngongo*, *lakia*, *kaka*, *akiaki*, *manu uli*, *tavake mokomoko*, and *matiku*.

Catching by hand is applied in a special way to the wild grey ducks which rest temporarily in Pukapukan ponds or calm waters in their migrations southward over the atoll during November and December. The catcher places a basket (*ola*) over his head. Peering through the basket, he swims (*kakau*) with the minimum of effort, toward the place where the birds are resting, taking every precaution to make the basket look like drift material. When he comes close to the birds, he grasps them with his hands and kills them.

3. Striking. Knocking birds off branches with the hands or a stick is used especially for catching young fledglings nesting on the branches of the pandanus tree.

Two men go bird catching. One mounts the tree and catches the birds with the hand or knocks them (*tui* or *yev*) to the ground with a stick. His partner stays on the ground, catches the birds as they fall, and kills them. This method is used for *lakia*, *kaka*, *ali*, *akiaki*, *manu uli*, and *tavake mokomoko*.

The method of striking down the birds with a pole is used for low-flying, nonresident birds. Two men go to the nesting places on the outer beaches. As the birds are disturbed and fly away very low, the catcher strikes them down with a long pole.

His partner catches the birds on the ground and kills them. Birds caught thus are *ali*, *wili*, *manu uli*, *tavake toto*, and *tavake mokomoko*.

Catching birds by throwing stones or sticks is common. The catcher goes to the beaches armed with throwing stones or sticks with a number of short, heavy sticks about 2 feet long. He comes near the feeding or nesting places of the birds and attempts to kill them by throwing (*kamu*) his missiles. This method is used for *wili*, *manu uli*, *tavake toto*, *tavake mokomoko*, *kotawa*, *lupe*, and *matiku*.

4. Lure used for the tropic birds.

The catcher collects a handful of the young white leaves of the pandanus tree. He goes to the place where the birds are resting or feeding and waves the leaves in the air (*avakakaika*), at the same time uttering a guttural cry, "I ka! i ka!" The waving of the lure and the cry attract the birds which come fluttering overhead. They are then netted, knocked down, or caught in the hands of the netter or his assistant.

5. Noosing and snaring.

A noose (*yele manu*, fig. 4b) of the required size is attached to a pole which is thrust out along the branches to the place where the bird is nesting. The noose is placed over the neck of the roosting bird and pulled tight, strangling the bird. Then the pole is pulled in while the bird is disengaged and thrown to earth. The pole noose is reset and pushed out again for the next bird. This technique is used for *kotawa*, *noa*, *takupu*, *ngongo*, *lakia*, *kaka*, *akiaki*, *wili*, *manu uli*, and *tavake mokomoko*.

A variant method is to use the noose without the pole. The noose (again called *yele manu*) is made with a square knot on a bigit and held in the hand. The catcher crawls up to the bird nesting in the sand and drops the noose over the bird's neck, pulls it tight, and strangles the bird. Noosing by this method is used principally for *tulu*.

Two methods of snaring birds also involve the use of the noose principle. The bird snare (*maenga*) is described in figure 48b. A piece of beach is chosen which the birds are in the habit of frequenting. The *maenga* is placed on the ground and firmly anchored by a semit cord passing from one end of the snare pole to a large coral stone near by. The catcher gets behind a group of birds and gently drives them in the direction of the snare. Whenever the birds stop moving, the catcher stops; when they move again, he directs them toward the nooses. The birds hop along, come to the *maenga*, which they are unable to avoid owing to the projecting wings, advance through the nooses, and are caught by the feet. The catcher comes up to kill them. Birds so caught are *kareve*, *tuli*, *kolili*, *popopolouenga*, *kiu*, *talakoha*, and *taiko*.

A second type of snare is the coconut-shell *maenga ngaipe* (fig. 48a). Five or six of these are set up on a suitable beach and coconut flesh is strewn about the ground. The bird is attracted by the coconut, inserts its head into the nut to peck at the flesh and entangles its feathers in the semit fiber nooses. The bird struggles to escape, usually overturning the coconut which falls on top of it. The bird is removed and the snare reset. This snare is used for *tuli*, *kolili*, *popopolouenga*, *kiu*, *talakoha*, and *taiko*.

6. Line catching. Birds are also caught by a method involving the use of fishline. One variant of this method is used for birds (*talaveue* and *tala*) that skim the water close to shore looking for small fish food.

To the end of a small fishline a gorge (*au*) of fishbone is fastened. *Kalonia* bait is tied to the gorge and the line is laid along the beach at water's edge. The birds come down for the bait, the gorge sticks in their throats, and they are firmly caught. A second variation of this method, called *avakaolo manu*, is used for birds that hop about feeding in the shallows and wet beaches. A piece of the abdomen of the hermit

crab (*unga*) or, alternately, a bait of small periwinkle meats or centipedes (*veli*) is tied to the ends of each of several lines which are laid across the beach, the other ends being fastened to a near-by tree or to stakes. The birds swallow the baits, are unable to disgorge them, can not fly away, and are caught. *Kavee* and *manikū* birds are caught thus with *unga* bait, *tūli* with periwinkle or centipede bait.

7. Fowling line, generally used to catch sea birds.

A length of *wao* line is attached at one end of a pole from 6 to 9 feet long. A piece of coral stone weighing about 2 ounces is fastened to the free end of the line. When a bird has been attracted close to the tree in which the catcher hides, or when it circles low over the beach, the line is thrown out. The weight of the stone carries the line round the bird. The line encircles the bird several times and entangles its wings. It is then drawn to the catcher. No decoy birds were used in this method of bird catching, nor was the stone weight shaped in any way. The use of line, shaped stone, and decoy bird is reported for Apemama by Woodford (19,p.294), the use of line and shaped weight for Vaitupu (19,p.294), and for Nauru (14,p.289).

HOUSE BUILDING

The framework for small houses is erected by the owner and a few of his friends. If a big house is contemplated and speed is required, the kinship group is mobilized and the work continued until the frame is completed. The able-bodied men work on the frame while the older men work near by making the sennit for the lashings. Today the framework of most small houses is fitted together in some shady, cool place whether the actual site of the new house is unoccupied or already occupied by an old house which is to be replaced. When the frame is completed, it is taken to pieces, transported to the house site and there put together again. The roof framework is fixed together permanently at the work site and then bodily transported to the house site. In big houses, however, the frame is usually erected on the house site in the first instance. The house framework is usually built during the cooler weather just after the winds swing round to the southeast.

Unless the house is very small, the thatching (whether of a new or old house) is done by a working party. The sides and ends of each roof are divided into sections (*wononga* or *tuta*) of a certain width running from eaves to ridgepole. Two to three sections are generally reckoned for the side of an average house. The pile of roof sheets for each section is termed *yinaki lau*. The type of thatching desired, whether *ato tele* or *ato yinaki*, and the distance between each successive roof sheet is specified beforehand. The owner of the house arranges with as many friends as necessary, each to assume responsibility for preparing the roof sheets and sennit, and for thatching one section of the house. Each man may elect to do all the work himself or he may call in a group of friends to help him with his section. The work is paid for by a food division, one share being set aside for each section that has been contracted out. This share is redivided among the helpers in each section. The amount of food constituting a share depends

on the owner's generosity, but no man who expects to call on friends again can afford to be stingy in his food division. The amount of food in each share is slightly increased for the more laborious types of roof thatching.

The same method of contracting is used today in building the slat walls for a modern house. The space between the uprights is divided into sections (here called *maleva*), and one food share is set aside for those who complete a section (*puipui na maleva*). The food division at which the shares are handed out to the workers is termed *ngahuenga*. That this division may be made immediately the work is completed, the more farsighted arrange for it ahead of time by placing a tapu on their talo and nuts, and by fattening pigs. Others, not so far-seeing, wait until the work is completed before beginning to gather food, and the workers may have to wait patiently for some time before the payment is made. Informants seemed to think that a two-year wait would be the limit. If the owner showed no signs by this time of preparing his food division, it would be legitimate for the workers to make pointed comments about his stinginess. In any case, no man who was at all proud of his reputation in the community could afford to wait as long as two years.

There is no specialization in Pukapukan house building, and not the slightest suggestion of any guild organization. It is for this reason, perhaps, that an average-sized dwelling house takes from seven months to a year to build. The actual labor involved is not great, but the owners must frequently put aside work on the new house in order to engage in other activities. Delay is also caused by the necessity of laying in reserve food supplies to pay the workers in the next stage of construction. It is possible that the time taken to build a house today with iron tools (as also a canoe), is conditioned by the carry-over of temporal patterns from an earlier time when work was done with shell adzes and must of necessity have proceeded slowly. Also a work in hand gives a man a feeling that his time is valuable, and increases his importance in the community as one who has undertaken a work of magnitude and who is theoretically busy at this work when others may be idle.

There is no record in Pukapuka of any rites, tapus, chastities, prayers to the gods, or other ceremonies connected with house building. The completion of a new god house was marked by a feast, but there was no consecration of the house before it was used.

CANOE BUILDING

There is no name for the expert canoe builder other than the general descriptive terms, *tangata mawutu* or *tangata tau waiva*, applied to any expert craftsman. Expertness in canoe building is associated with families of canoe builders by whom most of the canoes on the island are made.

Formerly wood was too precious for any man to risk failure and wastage of wood by building a canoe himself; and today, when most men consider themselves fairly skilled with the iron adz blade, the tendency is for the layman to make for himself only a rough dugout, retaining the services of the expert for his plank canoe. The following men are considered the expert canoe builders on the island today: in Ngake village, Tiele, Iti, Iliilia, Te Ingoa, Tualai, Veti; in Loto village, Pau and Nawau; in Yato, Tuli. The men of the Ngake group are all related. Iliilia and Tualai began as helpers (*kau waiuga*) to Pau and Te Ingoa. They have since set themselves up as independent experts. Iti has just finished his first plank canoe which is generally conceded to be of the first quality. Hence Iti will soon be given his first commission, probably by a relative. Nawau is now too old to build canoes himself, but gives advice when required and is generally considered to have passed into the class of consulting experts. Tuli is the only man of his family group who is an expert. The largest canoe on the island (60 feet long, 13 seats) was built by Te Ingoa, believed by some to be the cleverest builder on the atoll today.

In general, a craftsman draws his assistants from his sons, brothers, or relatives, who serve voluntarily and are taught by the master all the skills of the craft, thus keeping the knowledge within the same family group. The assistants begin by sharpening the edges of the adzes as these are blunted and handed to them by the experts. They are given small jobs such as roughing out the shape of the stern piece, or making the preliminary adzing of the hull interior. Later they graduate to the more difficult finishing and fitting jobs where much skill is required to avoid bungling and wastage. In order to become a master, an apprentice must make himself a plank canoe. People come to watch his work, closely examine it from stage to stage, and entrust their own work to the would-be master craftsman only if the completed canoe passes a final criticism.

The chief craftsman directs all his assistants and is solely responsible for the completed canoe. He selects from the bush the principal tree for the hull and the other trees necessary for hull and superstructure. The felling and rough trimming of these trees is done in the bush. Bark is removed and sections of trunk with short grain are set aside for the canoe hull, sections with longer grain for superstructure. Formerly the hull was roughly shaped in the bush by firing and adzing. Today this is done by adzing only and the hull is carried or hauled to the shady place near the beach which has been set aside as a workshop. The place Matatoki on Loto beach was a well-known canoe-building yard in former days. Each expert has his own favorite workyard (*tanga vaka*) where canoe timbers may be slowly seasoned in the shade before use. Today the owner has his canoe built near his own house that he may more directly oversee the workmen's

labors. If this place is not shady, the owner erects a shade of coconut mats (*takapu*) on poles to protect workers and canoe timbers. Caulking material, lashing semit, and canoe timbers are provided by the owner. The expert provides his own implements. (For the food financing and payment for the completed canoe, see p. 92).

Expert carpenters value their good name as quick workers and rarely dawdle over a job, because this would lay them open to criticism and would militate against further building contracts. As long as the expert and his assistants work conscientiously they are well fed. There are no songs or sayings about lazy carpenters, but a quick and skillful expert will be sure to have his name praised in a chant. Informants suggested that about one moon of continuous work with shell adzes was formerly required to finish an average-sized canoe.

Some experts possess a trade mark (*wakamailongo*) which they carve roughly on the front of the bow piece of canoes they build. Such a mark is the head of a fish, the beak of a bird, or some other part of an animal. Tualai puts a sign of two crossed hands on the wave guard (*malae puka*) of each canoe he builds.

Canoes may be named by their owners. An appropriate canoe name is *Te Mango* (Shark) or *Te Punga-o-Witi* (Coral-rock-of-Fiji). This name is mentioned to the people who attend the canoe-finishing feast (*imu kai wakamalienga*) and the canoe is henceforth known and referred to by this name. Today some men roughly carve or paint the name on the bow of the canoe.

CANOE CREW

The canoe crew is known collectively as *waoa vaka*. Specialized names for crew members of the flying-fish canoes have already been mentioned (p. 58). In general, the captain of the canoe crew is termed *tau muli vaka*. He is the steersman and leader of the crew. Formerly, especially for long distance voyages, he was usually a priest (*wata*). If he did not have priestly powers, one of his crew, who was a priest, consulted the gods in times of need.

The second member (*waiweweli*) of the crew (moving from stern to bow) who sits on the aft cross boom (*kaukau ki muli*) is second in command and corresponds to mate. Should the captain die on a long voyage, he automatically takes command of the canoe. If the captain lays down his steering paddle to fish or rest, the *waiweweli* takes up the steering. He helps to steer in strong seas or a high wind, and uses his paddle as a make-shift leeboard when the canoe is sailing by the wind. He further tends the main sheet (*waraa*) when the sail is up, watching wind pressure and direction.

The group of paddlers amidships are termed collectively *tatani*. They are

charged with paddling the canoe and keeping it clear of water. In small canoes the man directly amidships is the bailer and is termed *tata yua*. The bowman is known as *kayyu*. He is responsible for keeping a good lookout ahead, an especially important duty in shoal waters when he cons the canoe through the lagoon channels by directing the steering of the captain. He sits on the forward outrigger boom (*kaukau ki mua*) to keep the float down when the canoe is heeling over to a fresh wind. He alters the angle of the mast as required by the strength of the wind and uses his paddle as a lee-board if necessary. When it is necessary to turn the canoe quickly, he paddles at right angles to the canoe and thus helps the steersman. He is usually a strong, lively man as is demanded by his position.

Formerly tapus existed against the presence of women in canoes (p. 309) and against desecrating a canoe by capsizing it. When work began on a new voyaging canoe and again when the work was completed, a priest commended the canoe to the protection of the gods of the owner's paternal descent group. No details are remembered of these ceremonies, but they appear to have rendered the canoe in some measure tapu. Before starting a canoe voyage, the priest went to the worshipping place again to recommend the canoe to the protection of the god. No record is preserved of the type of god consultation carried out at sea, but informants suggested it was similar to consultations in the god house of the religious structure. The canoe priest probably took with him on the journey a stick or stone representative of his god to which a malo or coconut leaf could be tied when the priest communicated with the god. This would render the canoe still more sacred because in a sense the spirit of the god was considered as traveling with the priest on the canoe. To capsize a canoe by carelessness, lack of skill, or general bad temper was to treat the sacred canoe with less than proper consideration; it made the canoe *lepu* (violated the sanctity of a god), and the god was quick to punish this slight.

CARE OF CANOE

When canoes return from a fishing trip or other expedition, they are carried up the beach well above high-water mark and the hull, bow to the sea, is rested on chocks (*lango*). Sections of pandanus logs are split into halves longitudinally. The flat side rests on the ground. A notch is cut in the rounded upper surface of the chock and the hull of the canoe rested in this notch. Dry butt ends of coconut midribs and dry half coconut husks are also used as canoe chocks. Stern and bow pieces may be further supported by dry coconut midribs, the broad end of the butt with its natural notch serving to support the canoe piece. Small canoes and dugouts are sometimes turned hull up before resting outrigger booms on chocks.

Canoes are bailed dry and excess moisture is wiped out with wringers of coconut fiber. They are covered with old coconut-leaf mats (*pola*), unplaited dry coconut leaves, and pieces of pandanus matting. This canoe covering is termed *kaukau lama* or *tapola*. Coconut-leaf butts and lengths of timber are leaned against the covering to prevent its blowing away in the wind.

Formerly canoes were never anchored with a cable to prevent them from drifting. A stick, called *iki tawia*, was driven into the sand of the resting place of the canoe just forward of the stern cross boom on the port side of the canoe between the hull and the longitudinal spar. This served to anchor the canoe securely because the top end of the stick projected well above the cross boom.

CULTIVATION AND HARVESTING

The vegetable foods of the Pukapukans are limited to coconuts, talo, *putaka*, bananas, and pandanus. Today a few papayas and limes grow on Motu Kotawa. Coconuts and talo were and are the staple vegetable foods; the coconut is immeasurably the more important. All parts of the coconut tree were used for food as well as clothing and sennit; its value led the people to study every phase in growth of fruit and tree. Any Pukapukan can distinguish stages in the growth of the nut by a glance at a tree, however high; and he will climb only that tree which has on it the particular fruit for his purpose.

COCONUT

The origin of the coconut is told in the following Pukapukan version of a widespread Polynesian myth.

Maueili and Mauepopo were a Pukapukan man and wife. Mauepopo conceived a child by her husband and, as is the habit of women at this time and in this condition, she longed for special and strange foods to eat. She had tasted everything that her husband could bring her, but still she longed for other foods. Her husband fished and brought her home his catch, but she refused to eat it, saying, "This fish smells rotten to me. Take it away. I do not like it. Go fishing again and bring me some other fish." So he went fishing again, and this time brought home some sweet fish, fat and delicious. But again his wife refused to eat, saying, "This fish is too sickly sweet. I don't like it." This went on for many days, the husband procuring all kinds of new fish, the wife refusing them all, until he was worn out with his toil, while his wife pined away for food. At last he said to her, "Tell me what kind of fish it is that you long for, and then I will try to bring it to you." She replied, "There is one fish only that I desire and that is a piece of the *tuna* eel."

The man got his bait and hooks and went to the hole of the *tuna*. He baited his hook and threw it into the hole, but the *tuna* would not bite. He tried many kinds of bait fish in turn but with no luck. At last in despair he tried a bait of flowers and leaves, but still the *tuna* would not bite his hook. In the end, when he was about to give up altogether, he thought of his wife sitting at home waiting for him and decided to make one more try. For this last effort he baited his hook with the strong-perfumed

flower of the *vetau* tree. As he baited his hook and dropped the lime into the hole he made this chant: "Maiteuli, Maitepopo, ta te matau, e matau lave" [Maiteuli, Maitepopo, (we) prepare the hook, the fast-gripping hook]. The *tuna* took the bait and was soon fast fixed to the hook. The man hauled the fish from the hole, and when he was about to club it to death the fish spoke, saying, "Hear my words before you kill me. When I am dead, cut off my head. Let your wife eat my body, but my head you must plant in the ground in front of your house." The man listened well to the words of the *tuna*. Then he killed the fish, cut off its head, and planted it in front of his house. The body he wrapped in leaves, cooked in the oven, and took to his wife. She saw the eel and said, "Here you are at last with just the kind of fish I have been longing for." With these words she ate the fish and was satisfied.

After a time the head grew up into a tree which later bore nuts, one nut on the topmost stem, two nuts on the second stem, three nuts on the third stem, and so on up to ten nuts on the tenth stem. Then later it had twenty stems and on the twentieth were twenty nuts. Finally the tree bore a heavy crop of nuts. As the earliest nuts ripened and became hard, they dropped from the tree to the ground. Maiteuli collected all the nuts. Then he had the idea of giving nuts to all the islands in the Pacific. He divided the nuts into two parts; one part for the islands of the western Pacific, the other part for the islands of the eastern Pacific. Then he took one nut at a time from the western pile and threw it into the air. As he threw he called out the name of an island and there the nut landed. When the western pile was finished he started on the eastern pile, throwing a nut into the air as before for each island in the eastern Pacific. In this way all the islands of the Pacific received the coconut. After he had used all the nuts from the tree, he thought, "In this division I have forgotten all about Pukapuka, which is neither east nor west. Te Ulu-o-te-watu has received no nuts from this division." He looked around on the ground and found one very small, dry nut. He held up this nut and said, "This shall be the nut for Pukapuka." Thus in the end all the islands shared in the nuts from the tree that grew from the head of the *tuna* fished by Maiteuli.

After telling this story, informants added that the first nut was planted in the reserve of Uta. It is a characteristic Pukapukan touch to say that Pukapuka received only a wizened nut after almost being left out of the division altogether. In the story of Lata, when Lata divided the huge *Tri-dacna* shellfish (*payua*), he forgot Pukapuka in the division and was able to give the island only the rock to which the *payua* was growing. Similarly Pukapuka was the last Polynesian island to receive Christianity and among the last islands to receive a visit from anthropologists!

Coconut trees are empirically divided into 17 classes in terms of the bearing qualities of the tree and the shape or quality of the husk:

- Niu lakita: produces nuts that are small but abundant; it sometimes ceases bearing for a long time but usually bears again after this pause.
 Niu wata: bears well and continuously but not abundantly.
 Niu tauiti: does not bear well and is not often planted.
 Niu koalia: bears well but the nuts show a tendency to fall from the tree before they are mature.
 Niu waiakole: a non-bearing tree with male flowers.
 Niu maie: bears well and has good eating nuts.
 Niu mangalo: bears the sweet eating coconut with edible husk.
 Niu lafiliki: bears very small nuts.
 Niu lanunui: very large nuts.
 Niu kawa loloa: nuts with long husks.

Niu kawa nunui: nuts with coarse thick husks.
 Niu kawa lapalapa: nuts with thin husks.

Niu kawa pukupuku: nuts with round husks.

Niu kawa iliki: nuts that are small and have small husks.

Niu kawa pipiki: nuts of which the husks are tough and hard to remove.

Niu mawakiwaki: nuts that are enclosed in a soft husk easily removed.

Niu pulu venu: the best nuts for making sennit.

Coconut trees are also classified in terms of the color of the nut. Six types are recognized:

Niu uyi: dark green.

Niu kawa kenakena: pale green.

Niu kawa melomelo: brownish red.

Niu melo: deep brown, almost red.

Niu melo toto: almost blood-red.

Niu kawa uyuyi: midway between dark and pale green.

Most nuts are self-planted, but when a man wishes to plant one for himself he makes his selection of planting nut in terms of the above empirical classes. Similarly when a boy is sent to gather nuts, the stage of the nut is mentioned or the purpose for which it is desired; and the boy is told to get it from one of the above types of trees. A man is familiar with all the trees that he controls and with most of the trees on the land sections (*kavaa*) of his paternal lineage; by giving specific directions to the nut-gatherer, he can always be sure that he receives the nut best suited to the purpose in hand.

Nuts planted by hand should be planted at the new moon; as the moon grows bigger, so will the tree grow larger and never cease to bear. Trees from nuts planted at the time of the full moon will at first bear well, but in successive bearings the number of nuts will be fewer and fewer, until the tree ceases to bear. Informants say that the young people do not pay attention to this planting rule today; hence the fertility of the coconut trees on the island is slowly waning. Formerly when nuts were planted a simple prayer was said to the god Tamayei, that he make the tree grow well. At the time of the *laukava* food division of the chief, gifts were made to Tamayei to thank him for his assistance in producing fertile trees.

A tree that does not grow well is *niu tau makulu*. Only certain trees bear the sweet-husked nut (*niu mangalo*); the majority bear a nut with a bitter husk (*niu kava*). Though he can give no reason for this difference, every man knows which of his trees is a *niu mangalo*. As there are no obvious distinguishing features about the tree or the nut, save that of taste, ability to distinguish a *mangalo* tree is based on experience over a number of years. It is not uncommon to allow coconut trees to grow from nuts planted near the cook houses. These grow into small trees and provide a ready supply of leaves and leaflets for use in making platters, baskets, mats, and mosquito switches.

The names for the parts of a coconut tree (*niu*) are:

Pu niu: trunk.
 Launiu: leaf and leaflets.
 Kauaniu: leaf midrib.
 Tuaniu: leaflet midrib.
 Palalawa: midrib butt.
 Kalava: fibers from leaf midrib.
 Kaka: fibrous stipule.

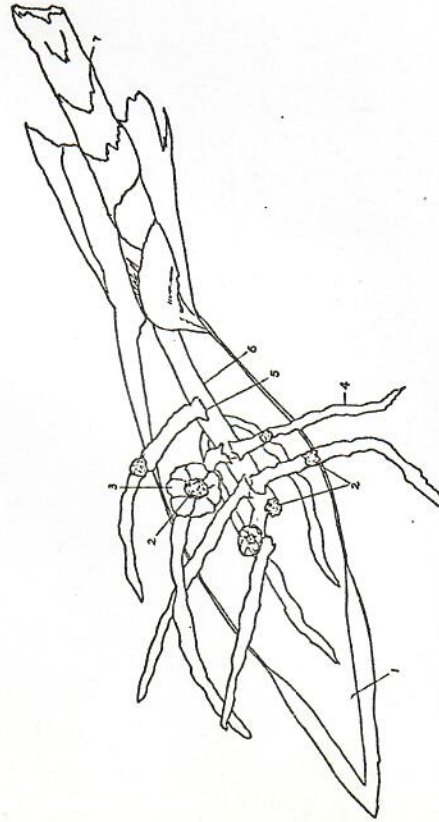


FIGURE 5.—Flower stalk and sheath of coconut tree: 1, flower sheath, *taume*; 2, base of bract, *me*; 3, floral bracts, *matabitavi*; 4, flower stalk, *kauileveleve*; 5, base of flower stalk, *pu o te kauileveleve*; 6, flower stem, *kailoalooa*; 7, base of stem, *pu o te kailoalooa*.

Names for spathe and flower stalks are given in figure 5. Informants had no ideas about the reproduction of the coconut nor could they give any names for the sexes of the flowers.

Stages in Growth

Five stages are named in the growth of the tree from the seed nut to the small tree:

Yemo: the nut sends its roots (*akaniau*) into the ground, and stem and leaves grow upward.
 Angapau: young stem tissues (*miko*) have shot upward to a height of about 6 inches.
 Uto: sprouts have grown to a height of about 2.5 feet, and the absorbing organ of the coconut cotyledon (*uto*) has filled the entire cavity of the nut.
 Lauka: the tree has taken firm root in the ground and the leaves have attained a height of 4 to 5 feet.

Yae: the leaves are growing vigorously and the young coconut tree is well established.

The 15 named stages in the growth of the fruit are:

Pua kouna: the fertilized female flower of the coconut has developed into a flower bud.
 Koua: the immature nut, an inch or more in length. If the koua falls from the tree, it is used in the game of juggling (*tiititii koua*).

Wuauhi: the nut is a little larger than koua and has a dark green husk.

Uivaka: the immature nut has grown still larger but is still not used as food. Children use nuts at this stage as crude dolls.

Moto katia: the husk is well formed; the cavity is filled with a clear fluid which is bitter and undrinkable; no flesh has yet formed. If the husk is flicked with the fingers it gives off a hollow resonance.

Mukomuko: a thin, slimy, easily detachable flesh begins to form over the inner surface of the nut. The mukomuko flesh forms inside the mesocarp at the point of attachment of stalk to nut. When the green outer husk is stripped off, the edible husk is exposed—a white, meaty substance around the outside of the eyes. Mukomuko from certain trees (*niu melo*, *niu kawa kenakena*, and *niu uyi*) is sweeter and more desirable than others. The fluid from the advanced mukomuko nut may be drunk but is more often added to talo puddings.

Niu katikati: the shell is harder, the flesh thicker though still slimy. The liquid ceases to be bitter and may be drunk.

Niu mata motomoto: the drinking nut in its earlier stage. The liquid is not so sweet as in the next stage. The flesh is soft and thick and is eaten after the liquid is drunk. The husk is dry and unfit for food.

Niu mata: drinking nut at its best stage. The liquid is sweet (*leka*) and the flesh tasty (*malie*). When this nut is shaken, the liquid inside can not be heard.

Niu mata matua: the nut a little past its best drinking stage. The flesh has become hard, especially about the base of the nut; but the liquid is plentiful and sweet.

Niu katea: the flesh is thick and hard; there is less fluid. The husk is darker than the *niu mata*, and the liquid rattles inside the shell when shaken. It is not particularly desired as food, but the liquid is drunk and the flesh eaten if the nut is husked. A nut at this stage is normally allowed to develop into a yakali nut. The flesh is specially used now as pig food.

Niu uli: the husk turns brown; the liquid becomes slightly bitter and the flesh hard. The embryo develops.

Niu papaku (modern name, yakali): The flesh (*ipiipi*) is mature, thick, and hard. Liquid is bitter and unfit to drink. The embryo has developed into an absorbing organ. This is the stage used in copra making. The *ipiipi* flesh is eaten with fish or other foods in the absence of talo; from it coconut cream (*lolo*) is made.

Uto: the yakali nut left on the ground to germinate becomes filled with the spongy absorbing organ (*uto*). The liquid is absorbed and the flesh (*ipiipi*) is very thin or entirely absorbed. Leaves, stem, and roots develop. The *uto* is an important everyday food.

Takataka: stored yakali nuts. The embryo is undeveloped; the flesh thick, hard, and sweet; there is no fluid. After 6 months' storage, when the nut is dry but the flesh still fairly soft, the nuts are said to be *mamaya*. After a year the flesh changes its color from white to yellow-brown and the nut is described as *koa ata* (coloring). After 3 years the flesh is brown or red and the nut is described as *koa kula* (red-brown). The flesh is eaten by itself or as a food complement (*kinaki*) to pandanus fruit or edible mukomuko. It is also used in the preparation of coconut oil.

Takataka nuts are stored on the high platform of a storage house (*wale takataka*) in one of two ways:

In the first method the *yakali* nuts may be left unhusked (*wai karea*) so that rats can not bite through the husk to the flesh within. The drying process hardens and strengthens the husk fibers which are later soaked in salt water and used to make senit. By the second storage method the *yakali* nuts are husked and a piece of *punga* coral of appropriate size is driven into each eye of the nut, effectively closing the eyes so that rats cannot gnaw through the shell. Nuts are stored for five years or more

according to the quality of *takataka* desired. An excellent food reserve against hard times, households formerly had one or several houses stored exclusively with *takataka* nuts.

The various parts of the coconut are named as follows:

- Mata: eyes of the nut.
 Mumimuli: base of nut opposite eyes.
 Pulu: husk.
 Pulu kawa: husk fibers.
 Kiko: endosperm when soft.
 Ipipi: endosperm when hard.
 Ngaipu, plural na ngaipu: endocarp (shell).
 Uto: absorbing organ.
 Yua: coconut liquid.
 Kanava: fatty deposit on surface of flesh of yakali nut.
 Tuatua: brown sheath separating flesh from shell in yakali nut.
 Uto wai kawa: unhusked nut at uto stage.
 Uto: husked nut at uto stage.
 Kili uto: sheath between hard endosperm and absorbing organ.
 Mata uto: sprouting stem, radicle and roots together.

Harvesting

The three articles used in harvesting and husking coconuts—climbing bandage, husking stick, and carrying pole—are all described elsewhere (pp. 123, 146).

In coconut-tree climbing, the right arm is passed around the trunk of the tree and holds the body close to the trunk. The flexed left arm grips the near surface of the trunk and is used to lever the body as the climber progresses up the tree with a series of short springs. Alternatively, both arms are passed around the trunk of the tree, but the former method is preferred where speed is desired.

Throwing nuts down from the tree is termed *maka te niu ki lalo*, *totoli te niu ki lalo*, or *takavili te niu*. Nuts are usually harvested by young boys, occasionally by girls. The nut is grasped with the hand from below and twisted off the stem. As the nut is released, the hand is given a rotary twist (*iti*) so that the nut spins around as it falls and drops in a vertical line. It hits the ground on the base of the nut and does not split open with the impact. The spin also prevents the nut from rolling when it hits the ground and so becoming lost in the undergrowth.

Whenever a special gift of nuts is to be made, the nuts are lowered in a cluster from the tree, so that none will be bruised. They are given to the recipient unhusked. Besides receiving a gift with this special mark of status, the recipient receives also the edible husk of the nut.

From 20 to 40 nuts are usually harvested at one time. The husking stick (*koyo*) is next set up.

In husking (*yoka*), a nut is brought down on the point of the stick so that the line of penetration is through one of the three longitudinal ridges (*paunga*) in a horizontal plane. A longitudinal section of husk is removed by levering the nut outward and downward from the stick, and the process of inpaling and levering is continued until all the husk is removed. When it is desired to preserve the edible husk (*mukomuko*) much care is taken and the husk is torn off (*yaekili*) gently rather than levered off in large sections.

Drinking nuts are husked completely smooth (*yoka motomole*) or so as to leave a longitudinal strip of husk attached to each nut (*yoka ma te kayani*). A thin length of fiber is raised from this strip. Pairs of nuts are tied together (*kayani*) by these fibers, making it possible to throw them over a rough carrying pole (*amonga*) of coconut midrib and thus conveniently carry (*amo*) them from the bush to the home.

A heap of *yakali* nuts gathered together from the ground where they have fallen is termed *putunga* (pile), whether it is a large or a small heap. Reference to these piles is in terms of the number of nuts gathered, whether 100, 200, or more. Thus a man asks about a pile of nuts, "Na ai te lau nei?" (Whose hundred is this?).

The husked drinking nut is opened by piercing or by cracking:

The eye (*mata*), which is in the widest of the spaces between the three longitudinal ridges on the surface of the nut and which is filled with soft tissue through which the nut sprouts, is pierced (*take*) with a coconut leaflet midrib or with the pointed end of the *kalokalo* implement. To open the nut by cracking, it is held in the hand and the shell at the base (*mumimui*) is cracked against a stone. When done by a skillful hand, the base of the nut cracks evenly all around and is lifted with the fingers without loss of the liquid. Today nuts are more often cracked by three sharp blows with a knife blade on the base. After the liquid is drunk, the nut is broken open (*rovo*) by knocking it against a stone. The soft flesh is scooped out with the thumb and fingers; harder flesh that does not yield readily to the pressure of the thumb is scraped out (*vakama-taka*) with a scraper (*kalokalo*).

TALO

The following named varieties of talo are indigenous to Pukapuka: *maivolavola*, *wakaravotu*, *wakena*, *kele*, *pongi* (slow-growing species), *peleua*, *talaki*, *kalelea*, *nerueneru* (slow-growing species), *kula*, *kiekie*, *uli*, *koyikoyi*. All are grown on Pukapuka today save *talo koyikoyi* which was practically all destroyed by the tidal wave of 1914. Introduced varieties are named after the land of importation; as talo Tawiti (Tahiti), talo Polapola (Bora-bora), talo Niue, and so on.

The origin of talo and *pulaka* in the world is recounted in the story of Maui (1). Some informants incline to the belief that only one variety of talo was introduced by the gods in the first place and that all other varieties sprang from this one by some power of the gods—a rationalization perhaps of the fact that strains of talo are so mixed today that it is hard to grow one true to type. This causes trouble on talo bed boundaries. One woman plants one variety on her boundary, and her neighbor plants another variety on her side of the boundary, hoping thus to keep the boundary between the

two beds well demarcated. When the talo grows, however, the two varieties are often so intermixed that the boundary is unclear. A single talo bed may be planted with one variety or with several varieties planted in sections running crosswise over the bed.

Any and all of the varieties are used indifferently in preparing the talo dishes. All are considered equally fertile. The only reason for planting one variety rather than another is to get the benefit of the slight differences in taste and flavor between varieties.

Native terminology for talo and *pulaka* is:

Pulaka: the whole plant.

Talo: the whole plant.

Wawa: old name of the talo corm; *wawa* is used interchangeably today with talo for both plant and corm.

Kau a pulaka, kau a talo: the petiole.

Tingapula: the cutting, top section sliced off the mature corm with petioles and leaves. *Lau talo*: talo leaf.

Laumea: *pulaka* leaf.

Lito: delicate young leaves protruding from the base of the innermost talo leaf.

Pikopiko: the lateral cormlet or sucker produced at the side of the corm and bearing a crown of leaves.

Aka: root.

Wutuvalu: rootlets of the corm.

Palapala: swampy mud in which the plants are grown.

Ui talo, ui pulaka: bed or garden.

Wua: talo bed of a single man, woman, or child in communally owned talo land.

There is no elaborate garden magic in the planting and cultivation of talo. New moon planting was favored to produce plenty of talo with large and good-flavored corms. Full moon planting was also good, but after a few replantings the corms tended to grow smaller. Formerly a bed was stripped (*wawai*) and replanted at the new moon, but a few tubers were removed (*matauyu*) from a field at any time.

The complete process of going to the garden, harvesting, planting, and bringing home talo is termed *tope wawaa*.

When a woman or girl goes to the talo bed, she takes with her a coconut-leaf basket (*kele launuu*); formerly also, a turtle-bone cutting implement (*taku*). She recognizes the mature (*kivi*) corm by the yellowing and curling up of the leaves. She pulls out (*langu*) the talo plant and slices off (*tope*) the top section, tossing the corm to the embankment of the bed. She loosens the soil from which the plant was pulled, digging it up (*toki*) with a stick (*kooyo ui*). She slices most of the leaves from the petiole, usually leaving one leaf, and sets the cutting back in the ground. She tramps the soil around the slip to make it firm, planting in rows, not in hills. She throws the leaves stripped from the petioles back on the ground and tramps them into the soil. She repeats the process until she has sufficient tubers. When a whole bed is being stripped by two workers, one pulls the corm and throws it to the side; the other cuts the top section from the corm and throws it back to the harvester, who replants it. In former days after harvesting sufficient talo, the worker set aside from 4 to 10 corms for the gods of the garden, saying, "Matalolau e, Matalomea e, here is your share of talo to help increase the yield of my garden." Then the cuttings from these corms were

replanted, and the corms themselves buried in the ground and left for the gods. The workers place the corms in their baskets which they carry to the village balanced on their heads (*waku ki lunga o te ulu*).

There is no rotation of talo with other plants nor any system for leaving lands fallow between planting. At the time of greatest famine after the seismic wave, cultivation was alternated between reserve land and private talo beds to ensure that each bed of talo was put to best use and that the corms were allowed to mature properly.

Cultivation further consists in weeding (*langai i te wawaya ui*) and fertilizing (*wakalepo* or *tilikao*) the talo beds:

The gardens are weeded by women about once each month during the early stages of growth. Weeds are tramped into the soil or allowed to rot on top. When six or seven leaves are fully unfurled, the beds are fertilized with *pukama* leaves, *lau kotarua* fern, grasses, coconut leaves, or any other vegetable matter. The fern leaves are cut off at the base of the plant and wrapped for transport in coconut-leaf mats (*polapola*). All the subsidiary branches are cut from the *pukama* tree, and the leaves stripped by hand from each branch and placed in baskets. The branches are replanted or dried and used as firewood, canoe poles, etc. The vegetable matter is taken to the garden and spread over the ground around each talo plant. Some is tramped in, but the larger vegetable matter is allowed to rot on top. This is mainly women's work, but the men sometimes assist, especially in the cutting down of the *pukama* branches. Normally there are about two crops of talo from each bed during each twelve-month period. This means fertilizing each year about two months after each planting.

In the old days a little dryland talo (*kape*) was cultivated. Killed by the tidal wave, it has not been replanted.

At least eighteen stages in the growth of talo or *pulaka* are recognized:

Toki te tingapula: the cutting is planted.

Po lua, koa tupu te aka o te wawa: 2d day, the roots grow.

Po tolu, koa velo te lito: 3d day, the young leaves begin to protrude from the base of the innermost petiole.

Po lima, koa loa te lito o te kau: 5th day, the young leaves grow tall.

Po angaulu, koa velo te lito wou: 10th day, new petioles and leaves shoot up.

Taeyao atu, koa kau lua: the next day, there are two petioles and leaves.

Koa velo mai te tolu o te lito: (15th day) the third petiole and leaf start up.

Koa kau tolu: (20th day) there are now three petioles well grown.

Koa kau wa: (22d day) there are four petioles. This is the time to cultivate and fertilize the young talo.

Koa kau lima: (23d day) there are five petioles growing.

Koa wakalaungavali: (24th day) the leaves sway freely in the wind.

Koa toaki te kau lima, koa uyi, koa tupu mai olu te lau kaua, koa ono lau talo, koa

ola: (30th day) petioles spread and darken in color, the leaf grows large, there are six main leaves, the plant flourishes.

Koa utouto ki lunga: (35th day) the petioles grow high.

Koa ola loa ki lunga: (45th day) the petioles grow high indeed.

Koa tuku te ulu: (2d month) the head is left, the petioles and leaves stop growing, and the corm begins to grow.

Koa matapu te wawa: (3d month) the corm is two finger-joints long.

Oko ki te wavenga o te wawa: (4th and 5th months) the time when the corm grows rapidly.

Koa kivi, koa wowolo: (6th and 7th months) the corm is mature and large.

The sizes of the talo tubers are: *piki* (small corms), *vavenga* (slightly larger corms), *vavai vavai* (still larger corms), *ulupoko* (very big corms), and *puniu* (enormous ones, as big as *pulaka* corms and no longer good for eating).

A good commentary on the cultivation of talo is found in the first section of the chant, "Maka te kupu ki te tonoanga", in praise of a woman's skill at talo growing (1).

DISTRIBUTION OF WEALTH

GIFTS

Much of the produce of labor is used for immediate consumption by the worker and his household. The talo harvested by the women of the household, the mats they plait, the fish and nuts produced by the men, the house that is built by a man, are all consumed by the household group. Some of the wealth of the household—whether food or more durable articles such as pearl-shell fishhooks and ornaments—is distributed through the gift exchange or as payment to workers who are producing other objects of value for the household. Another part of this wealth is distributed through the feasts that mark crises in the lives of the individual members of the group.

Most gifts require a reciprocal gift of equivalent value. When members of one household have more than they can immediately consume they give staple articles such as food, fish, talo and nuts to relatives and friends, but only on the assumption that everyone in the community is following the same social principle and that the gift will be reciprocated at some later occasion when the recipients are well provided with food. One widow and her young children are frequently given gifts of food, fish especially, by relatives and neighbors without, I think, any feeling that the widow should or could reciprocate. The villagers are sorry for her plight and give out of pity and neighborly feelings. Gifts to transient visitors on the island are made freely and without thought of return; the tradition of hospitality requires the expression of friendship through the making of gifts. Gifts to more permanent visitors are made within terms of the implicit system of gift exchange, but insofar as the givers are many and the recipients are few, the return gift is not expected to equal the value of the first gift. The return gift in this case merely symbolizes the completion of the transaction, and honor is satisfied on both sides.

Various types of gifts are named according to the way they enter into the system of exchange:

The word *kauuataoa* is applied to a family heirloom, a pearl-shell ornament for instance, an appropriate gift to a living person. *Taungaloa* is also a gift of remembrance when two friends part from each other. Such a gift is referred to metaphorically

cally as *mili tuluua* "the rear (bottom) of the covered satchel", the implication being that the gift is one of the very precious articles which are always kept hidden in the bottom of the *tuluua* satchel. Such a gift demands in exchange another *taungaloa*. *Witonga* is a gift made to a dead friend or relative's body. The gift will be recompensed in part by a food division accompanying the mourning ceremonies, in part by an expected return from the family of the deceased when the giver himself dies. *Tapu* is the name for a gift of food or mats to the bride or groom at a wedding feast. It, too, is recompensed by a food division and by return gifts when there is a wedding in the household of the giver. The same word, *tapu*, is applied to a gift to the gods, whether a gift of coconuts to the god Tamavei, a gift of talo to the gods Matalomea and Matalolau, or a gift of fish to a priest, ultimately to be given to a god. These gifts are made to procure the good will of the gods. A *wakatapu* is a gift made by one lover to another and carries with it the expectation of a return gift. The lovers' gifts thus symbolize a temporary or permanent relationship between the two persons who are attracted to each other (p. 292).

Gifts which are given at birth, wedding, or death celebrations imply a greater degree of compulsion than other gifts. They are termed generically, *mea* (things), and the cultural implication is that they are required of relatives no matter what the personal relations between giver and recipient may be. Other gifts are, culturally, supposed to be free gifts. Whether the gift is free or compulsory, the expectation of return varies only slightly in binding force; the ethical obligation is equally strong.

A return gift of lesser value than the first gift is termed *tali*; one of equal value to the first gift is *yoani*, and one of greater value, whether given through excessive generosity or to shame the first giver, is *yauyau nunui*. To refuse to accept a gift is termed *pa tali*; such refusal is tantamount to an open declaration of ill-feeling between the two groups concerned. The generous man is *atarawai*, the mean or stingy person, *kakionge*. There is no record of reciprocal gifts between paternal or maternal lineages at any personal ceremonials.

A marked temporal discontinuity in the gift exchange system occurs in the return of compulsory gifts. Death or marriage gifts may not be returned until an interval of many months or years has elapsed. The giving of the return awaits the occurrence of a life crisis in the household of the original giver, and until this crisis occurs, the debt remains unpaid. There is no such discontinuity in more personal gifts given in less formalized situations. Gifts between lovers or gifts of remembrance evoke immediate return gifts, so that the relation between the two parties to the exchange is defined once and for all at the earliest possible moment.

Owing to lack of contact with outside peoples, trade played no part in native Pukapukan economy. The village copra crops are disposed of today to traders for money, which is divided among all the men, women, and children of the village, to be disposed of according to individual choice.

PAYMENTS

Mention has been made of services which are paid for. A man who borrows a canoe gives fish in payment. A man who engages a medicine man may make a return of food for his services. Distribution of food and gifts accompany the building of a house or canoe:

When a man decides to have a canoe built and has assured himself of the necessary timber, he makes arrangements with his relatives to have a stocktaking of available food supplies. They then increase supplies deemed insufficient, by planting more talo, placing a prohibition over growing talo, and by acquiring more pigs which are fattened by a diet of coconuts. When the food is sufficient and has all been mobilized, the work is started. Groups of relatives assume responsibility for providing food day by day for the carpenters, bunches of nuts in the early morning and staple foods in the afternoon. The prospective owner of the new canoe is obliged to provide liberal quantities of food in order to avoid the reputation of stinginess and meanness. When the canoe is finished, it is launched and taken fishing for one or two days. This fishing is termed *wakajuu te vaka* (oiling the canoe). The biggest fish caught is given to the head carpenter, the remainder, after gifts (*matanga*) have been made to the chiefs, goes to the feast (*wakamalienga*) for the canoe builders. A good catch of fish for the new canoe is called *wakajuuunga mataala* (lucky oiling). At the final feast (*matenga*) for the workers and for those who have assisted in providing food to finance the construction, every endeavor is made to have a great display of food. At this time gifts, depending on the size of the canoe and the wealth and status of the owner, are given to the builders. Average gifts in former times for a large canoe were: for each assistant carpenter, one fishing line of *wao*, one anchor line of sennit, one paddle, and one pearl-shell fishhook; for the chief carpenter, the same in addition to one semmit malo and one fishing rod, preferably a bonito rod, complete with four or five bonito hooks.

The amount of food distributed to recompense workers building or thatching a house depends on the size of the house.

For one average-sized sleeping house, 1,600 nuts, 800 *mawu* (talo puddings, each weighing about 8 ounces), and four pigs were provided; 100 nuts, 100 *mawu*, and one pig were distributed among the staff that killed and cooked the pig and prepared the talo; of the remainder each man and woman received two *pona* (pieces of pork 5 X 4 X 2 inches); each man received seven *mawu*, each woman five *mawu*, each child one *mawu*; each man and woman received 20 nuts, each child one nut. This feast, originally prepared for the workers, who were drawn from the hymn-singing group (*pupu imine*) of the village, was divided among the village as a whole because of the great quantities of food. The owner of the house acquired increased status through this inclusion; everywhere remarks were made about his generosity.

To celebrate the completion of the present London Missionary Society church, each village in turn feasted the whole island. These feasts were the largest that are remembered within historic times on Pukapuka. Four talo puddings, each weighing about 5 pounds, were provided for each man and each woman; one pig for each man; 1,000 nuts for each man and each woman, with proportionately smaller amounts of all these foods for each child. Even though quantities were given away to a trading schooner that happened to be visiting the island, large amounts of the food were left to rot, proof that the time was one of great feasting and abundance.

Feasts are held in each village at Christmas time, when in alternate years groups of men and of women visit and dance in the villages away from home. Each village is host to these groups of visiting dancers, and provides food

to distribute among them. The food prepared by Yato village for Christmas, 1934, is typical of the amounts distributed: 104 *awa* fish from its fish pond, 500 cooked talo tubers, 100 limes, and 37 papayas from Motu Kotawa, 210 drinking nuts and 20 bottles of coconut and salt-water sauce (*tai*). This was divided among about 100 visiting women.

FEASTS

The important part played by the food division in distributing wealth throughout the community may be best seen in a summary of the characteristic features and types of feasts. The Pukapukan feast (generic name, *inu kai*) does not connote an eating together by the parties to the feast. The essence of the feast is a food division. The food is collected and then divided among all concerned, often among the people who have themselves provided the food. It is then taken away and eaten by each household group in the privacy of its own cook house or near by. The Pukapukan *inu kai* is a mechanism whereby stimulus is provided for the extra production and distribution of food on socially set occasions, that all concerned may eat more abundantly than usual and by this eating symbolize a bond of relationship between two groups of people.

To honor another person, a man or woman sends chicken, nuts, and uncooked talo. The gift, also termed *inu kai*, is cooked and eaten in privacy. On an enlarged scale, the same mechanism prevails for feasts, save that the division of collected food operates to give back to each approximately the amount of food that he has contributed. The amount of food expected from each household is settled beforehand. Anyone who fails to contribute accordingly does not share in the division. In this way, it is assured that the contributions will be equal in amount and quality and that no one will be unfairly favored in the subsequent division. All contribute, share, and eat the same foods. For feasts to pay workers for their services, relatives are expected to contribute food. The person for whom the work is being done is expected to contribute in quantity or quality sufficient extra food to ensure that relatives do not suffer too severely in the division.

Named Pukapukan feasts are:

1. *Monotanga*, a big feast for the island. Occasioned in former days by the induction of a chief, today it marks the completion of some village or island enterprise, such as the building of church or meeting house. The feast might be provided by all three villages at one time or by each village in turn for the other two villages. At a chiefly induction, arrangements were handled by the sub-chiefs and the group of elders (*tupele*), who decided the nature of the contributions (amount of food, size and variety of talo dishes, kind of fish, etc.) to be made by each village. For such an occasion as this, the paternal lineage of the chief might provide the *monotanga* for the rest of the island, if the lineage were wealthy in food supplies and wished to make a grand gesture indicative of its wealth. A well-remembered *monotanga* feast occurred in 1916; the talo harvest

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on Motu Ko was so large that Ngake village made a present of 2,000 talo tubers to each canoe from the other two villages that went across to Ko to get the food. This was an act of generosity, marking no set occasion.

2. *Lavaya*, a village feast held today on the completion of some village activity. It formerly occurred on the rising of the Pleiades to celebrate the beginning of the season of plenty. It was timed to coincide with the lifting of the prohibition (*au*) on village food reserves. The communal gathering of food for such a feast is also called *lavaya*, as *lavaya kavu* (crabs), *lavaya manu* (birds). A *lavaya* after a tapu period ensues that after the period of privation the special foods will be shared among all the villagers. If talo, nuts, and fish are plentiful when the tapu is raised, the *lavaya* feasting may last for one or two moons. After a preliminary survey of the food resources, the village men decide how many divisions there are to be in each moon and how many moons the food is likely to last. Starting with the first night of the new moon, divisions may be made every 10 days, the last one to coincide with a new moon, either in the first or second month after the commencement of the feasting. This emphasis on the moon as a governing factor in the *lavaya* feast links with the custom of replanting talo and other food plants on the days of the new moon to ensure good growth.

3. *Ngatuenga*, the feast which is held for a village guard at the end of its service in the reserve land or to pay the workers thatching a new house (pp. 36, 70).

4. *Wakamaitenga*, the feast provided by the owner of a new canoe or of a new sleep house (not cook house) for the food contributors, the workers, and the principal people of the island. It is a bigger and more elaborate food division than the *ngatuenga*, though not elaborate enough to be classed as a *monotanga*.

5. *Kavekave*, a feast celebrating the end of a fishing contest (*malama*) or other inter-village contest. The food is provided by the whole island. Formerly the old men's group and the sub-chiefs decided on the contribution to be levied from each household. Today this levy is fixed by an informal meeting of village representatives.

Other feasts discussed in their special context are:

Waele, *tawawavanga*, and *puaki*, food divisions for the birth of children; *waikimua*, food division on the occasion of an important marriage; *puvia wale* and *lutukanga*, feasts at death ceremonies; *laukava*, food divisions held at the command of the chief to mark his induction, the birth of an heir, or a death.

Imu kai o te vava is a food division among members of the maternal lineage held on no set occasion, but whenever there is abundant growth of talo in the gardens controlled by the lineage.

Special names are given to the feasts of the paternal lineages:

Lamataangi (animal intestines), feasts of the two Ngake paternal lineages; *malolo alai* (flying fish on the reef), feasts of the Yato lineages; *lingolingo* (land shells), feasts of the Loto lineages. These three names refer to the fishing set-up of the three villages. Ngake and Yato are the rich fishing villages with plentiful supplies of fish for their feasts; Loto is poor in fish supplies and the reference to land shells is indicative of the small amount of flesh food that this village could supply its guests. For these feasts, the reserve lands of the villages are opened by special arrangement, and special delicacies are expected—birds from Kotawa, turtle from Ko, and extra supplies of nuts from Uta. A paternal lineage gave a feast of this type at the conclusion of some special work—the building or rethatching of its god house, clearing the ground around its religious structure, clearing up its cemetery, building a new *yiunga* (religious avenue). When other paternal lineages learned that one group proposed to hold a feast, they all joined in sending courtesy gifts of food.

The mechanism is: a Ngake lineage is giving a feast; each household of the Ngake group is levied so much prepared talo; each household makes this amount of talo food and extra talo puddings for friendly households in the other villages which have inti-

mated privately that they will make a food contribution. The levied amount is sent to the main food collection along with the food received from the friendly households; when the food division is made, each friendly household receives in return from its Ngake friends the amount that it contributed, but the return gift is taken from reserve stocks that the Ngake household has made, over and above its levied contribution. A little extra food may be taken from the share of the Ngake household and added to the return gift so that families from other villages may receive the precise amount of food that they contributed plus a little more from the main division. The reciprocity is complete, but the addition to the return gift, a bit of fish or a few nuts, creates the cultural fiction that the host lineage has fulfilled required patterns of generosity. The food exchange has helped seal bonds of friendship between two households, without seriously impoverishing the hosts.

Official food dividers (*tangata tau popoa*) function for the big feasts:

Formerly, the group of elders (*tupete*) chose its own food dividers for the fish brought to it by the men's fishing groups. The chiefs had their own dividers for *laukava* feasts, as did the paternal lineages and villages for their feasts. The food dividers were skilled men. Their position was not hereditary; if they were careless or cheated, they were summarily dismissed. With the exception of the dividers for the old men, who received certain pickings but who might not share in other foods reserved solely for the chief, the food dividers were supposed to share equally with the people for whom the division was made, though in fact they might secretly reserve for themselves as their own share better portions of fish or slightly larger talo puddings.

When the *tanganga* group of fishermen (p. 281) returned each day from fishing, the canoes were met by the two food dividers for the old men, who carried the fish from the canoes to the dividing place. When neither of the food dividers was able to carry a big fish to the meeting place (*avanga*), the old men called for volunteers, and the man who could carry the fish was given the privilege of dividing it.

FOOD PREPARATION

The staple foods of Pukapuka are fish, coconuts, and talo. Fish and coconuts are eaten every day, talo less often; but talo is important as a quality food which gives variety to an otherwise monotonous diet. Most talo dishes consist basically of a mixture of talo and coconut cream (*lolo*). Two standardized methods of wrapping food in bundles preparatory to baking are used only for talo dishes (fig. 6). Each food eaten, whether fish, talo, or coconut has a definite food complement (*kinaki*) which is eaten with it to make a complete meal.

The two methods of cooking food are oven baking (*tao*) and grilling (*tumu*) on hot stones or embers. Grilling is the preferred method for cooking fish.

FIRE

Fire (*avai*) was formerly produced with the fire plough. The method was demonstrated to me. The hearth stick of *puapua* wood is called *laku ika avai*. The rubbing stick, also of *puapua* wood, is *kamaiti*. The hearth groove is *ikanga*. To rub the stick on the hearth is *ikaika*, and to make fire thus is *mata avai*.

The operator procures a piece of *puapua* wood from which the bark has been removed. This wood is about 4 feet long and 1 inch in diameter and has numerous grooves on it from previous use. The operator splits the end of the stick and cuts off a section to use as a rubbing stick 9 inches long, $\frac{3}{4}$ inch thick at the proximal end (*mulimuliu*), and about $\frac{3}{8}$ inch thick at the distal end (*maia*). The distal end is shaped to a mesial point by a transverse cut with a knife. A few slices of wood are also taken off the hearth stick to form a flat surface to rub on. The point of a knife, formerly a sharp pointed shell, is pressed into the distal end of this flat surface to form a hole which serves as a blockage point for the farthest distal movement of the rubbing stick. An assistant crouching over the stick firmly holds the distal end of the hearth stick (*yoliyoli te lakan*) with foot and hand. The operator sits on the floor and locks one leg over the hearth. He holds the rubbing stick so that the crossed thumbs are placed beneath the stick; the flexed fingers of the right hand are placed over the stick and on them are laid the flexed fingers of the other hand. The grip is close to the distal end of the stick, $3\frac{1}{2}$ inches from the point. He crouches over the stick, leaning the whole weight of his body on it while moving the stick to and fro at an angle of 45 degrees to the hearth. The groove is about 3 inches long. The operator rubs slowly at first, increasing the speed of the rubbing as the dust collects and begins to smoke. When the dust smoulders he cries, "Na tu" (It burns). The smouldering dust is carefully tipped onto a dry coconut husk and fanned or blown until the husk blazes. Some fire-makers prefer a very short rubbing stick and hold it close to the end so as to exert maximum pressure on the stick. An informant, holding his stick $3\frac{1}{2}$ inches from the point, produced fire only on a second attempt.

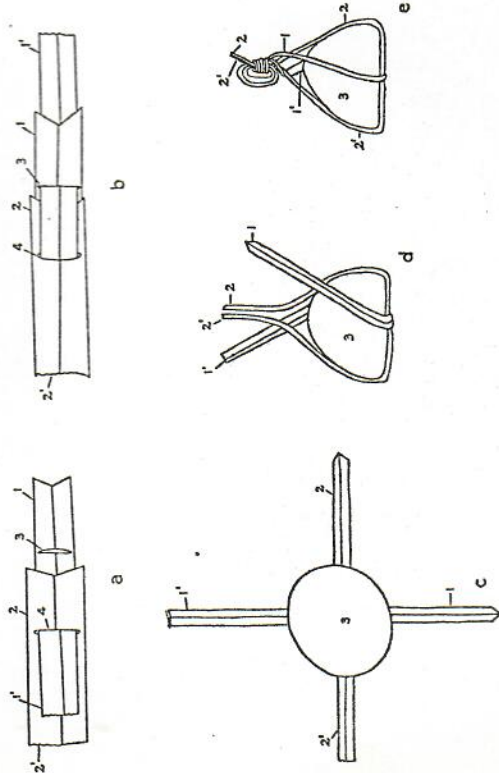


FIGURE 6.—Food packages: *a-b*, *lulu* food package; *c-e*, *toloi* food package. *a*, leaflet midribs stripped from butt ends of two coconut leaflets (1, 1' and 2, 2'), slits (3, 4) made with thumb nail in butt ends of the leaflets, tip end of leaflet (1') passed through slit (4) in leaflet (2); *b*, tip end of leaflet (1') folded back, passed through slit (3) in butt end of leaflet (1) and pulled tight, length of joined leaflet placed under food package, two ends make transverse turns around package and tie with overhand knots. *c*, two coconut leaflets (1, 1' and 2, 2') crossed and food package (3) placed on crossing; *d*, leaflet ends (2, 2') brought together and held with one hand; *e*, leaflet ends (1, 1') twisted around ends (2, 2'); then ends (2, 2') bent down over transverse turns, pushed up under transverse ends, and pulled tight.

The origin of fire is told in two stories:

In the very beginning of time, fire was procured for the Pukapukans by a man named Mauikatoto, a medicine man who was visited by his god in a dream and instructed how to make fire with the hearth and rubbing stick.⁶ Mauikatoto made fire according to the directions of his god. The *kaka* bird (ghost tern) was the assistant who held the far end of the hearth stick. When Mauikatoto had made fire, the tern flew up into the air and circled around him. Mauikatoto hit the tern over the eyes with the hot rubbing stick, making the black marks over the eyes which the *akiaki* bird (a white tern with a black semicircle around the upper part of each eye) carries to this day. A second version says that Mauikatoto's hands were covered with ashes, and as he grasped at the tern, the ashes marked the bird over the eyes. The following part of an old chant is quoted in support of this origin of fire:

Tutu ia i te awi na Mauikatoto,
E yolia e te kakawai,
Naku kotia te vaimata o te akiaki.

Flamed the fire (made) by Mauikatoto,
Hearth holder the *kaka* bird,
I striped the outer corners of the eye of
the *akiaki* bird.

The seismic wave of about 300 years ago was so disastrous that all fire was extinguished. Another legend tells how fire was brought back to Pukapuka after this catastrophe:

The god, Ngaliyeyeu, brought fire to the priest, Te Ule. There was no fire in this land. Ngaliyeyeu brought it to Te Ule. Then fire was known. At that time there were no fires belonging to the priests of the gods. Earlier they had lit their fires at the fire of Te Ule. The god of Te Ule, Ngaliyeyeu, became angry. The god said to him, "Put out your fire, that the priests of the gods won't come here to take fire to cook their fish. Leave them to eat their fish only raw. If they are without fire to cook, they won't live. They have been boasting, they fancied that the fire belonged to them." Te Ule put his fire out. The priests became frenzied. They went to Te Ule to seek fire, "O Te Ule, where is the fire?" Te Ule answered, "There is no fire." The priests of the gods ate only raw food. Te Ule got his fish, rubbed his fire till it burned, grilled his fish till cooked, put out the fire. Such was his practice.

This is the technique by which the god succeeded in getting fire: a stick, *puapua*. Split the *puapua*. Cut the one portion into a very small piece. The name of the small piece is *kamawai*. The other half of the stick, place beneath. Shave the part on top of the bark of the stick. Place the *kamawai* on this place, the name of which is *ikanga*. Then rub. There are two types of rubbing; short, rapid strokes (*patumate*) the one, longer, slow strokes (*wakanati*) the other. Arrived at another, later time, Te Ule told the technique for making fire.

For firewood, which is fairly scarce, many parts of the coconut tree are utilized: flower sheath, dry flower stems, small dry coconut shells, and occasionally very dry coconut husks. Firewood is also obtained from other trees, dead branches of which are broken from the trunk or picked up from the ground and broken by beating against a tree trunk or stone. Wood obtained from the reserves is placed in coconut mats, tied with coconut fibers in a bundle, and carried home on top of the head. Gathering firewood is women's work. Today, as formerly, fresh fire is made only if it is im-

⁶In another version of the story, Mauikatoto is said to be a god, but apparently not related to any of the three Maui brothers. Informants giving this version could not remember how Mauikatoto procured fire in the first instance.

possible to transfer fire from one cook house to another. It is a common sight in any village to see children and adults carrying fire from one cook house to another in order to start a fresh blaze.

To procure fire, one end of a coconut spathe (*taume*) is placed in a burning fire until it ignites. As it is carried away, it is moved gently in the air to keep it flaming. To transfer fire from smouldering cinders or ashes another technique is used: a coconut spathe is held with the tip toward the body, and the butt end is folded back on itself about 12 inches from the end; a section of the spathe at the fold is shredded with the fingers; cinders or smouldering wood are picked up in the fold and carried back thus to the cook house, or else the cinders are blown upon and the shredded spathe ignited. This method is used regularly for starting fire with a match.

OVENS

Kitchens (*wale imu*) are small houses set back from the dwelling houses. In the villages they are permanent structures, well built, of the *wale wakaymoa* type (p. 111). In the copra settlements they are smaller, of rougher build, and, in the main, of the *wale toimuku* style (p. 109). The kitchen shelters the oven (*imu*) which is situated at one end, often under a lean-to shelter, so that the prevailing winds blow the smoke away from the cooks.

The oven ground is excavated to form a sunken space about 4 feet square and 18 inches deep. The edges are lined with logs to prevent the sand from falling in. The bottom is filled with oven stones (*watu imu*), blocks of coral conglomerate (*kaukapa*), or, when available, imported volcanic stones (*kala*). Because the coral does not last long under heat and must be frequently renewed, *kala* stones are highly valued. *Tridacna* shells are not used as heating material.

To build the oven (*pu te imu*), coconut shells (*ngaihu*) are piled on the floor of the oven, dry coconut husks (*pikipiki*) are stowed around them, and the oven stones are piled on and around the sides of the husks. The shells are lighted by a burning coconut sheath inserted under them. When the fuel has burned out (*koa matamata te imu*), the hot stones are pushed aside (*tolo te imu*) with the butt of a coconut midrib (for this purpose called *toa*). Bits of burning wood and charcoal are thrown away. So as not to burn the food a few cold coral pebbles are sprinkled on the hot ground, and the floor of the oven is covered with *puapua* leaves (*lauitao*). Food packets covered with leaves are placed on the *lauitao*. The hot oven stones are piled on top of the food packets and covered with flat bundles of *puapua* leaves tied with coconut leaflet midribs. Green coconut husks are carefully arranged on top of the leaves so as to cover them entirely. The whole is covered again with several layers of *polapola* coconut-leaf mats arranged so there are no cracks through which heat may escape. Today old copra sacks form a convenient and valued substitute for *polapola*. The whole oven covering is termed *tulao*; to cover the oven is *wai te imu* or *tui te kutao*. Whenever a woman comes back from the talo beds, she places a bundle of *puapua* leaves on her head to serve as a pad to cushion the weight of the basket of talo and tucks more leaves into the top of the basket to keep the talo from falling out. The leaves thus brought back to the cook house are preserved for use as oven covers.

COOKING

Cooking is done by women. On certain rare occasions a man may prepare food without disgrace: when in a group of men alone on the reserve

lands, he grills fish for a meal; when a feast is being cooked, a man assists his wife and children; when his wife is sick or gadding about, he may cook because no one expects him to go hungry; if a man is a cripple and debarred from men's work, he may cook; if there are no older sisters, a boy may help his mother prepare the Sunday feast. The one berdache on the island spends much of his time cooking with the women. Men always prepare pigs for cooking.

In former days it was tapu to eat or to carry food into the sleep house. All eating was done inside the *wale imu* or out-of-doors. Even today an adult Pukapukan rarely eats in a sleep house, though children often carry food into the house.

COCONUT DISHES

Coconut has always been the basic food of the Pukapukans. Unlike talo and fish, which are not sufficiently plentiful, coconut in some form is eaten every day. Informants regard it as the best of Pukapukan foods because it gives the greatest variety of dishes. They say that the minimum number of nuts a man in good health requires each day to keep him strong and healthy is 10 large-sized drinking nuts, besides plenty of fish. During the great famine the daily ration of each person was four nuts which, with a little fish, was the only food. This was enough to maintain life but not enough to keep the people strong.

Coconuts are eaten exclusively by sick persons because of the tapu on their eating fish and because of the scarcity of talo. No stage of the nut or any portion of it is tapu at this time.

The coconut in its various stages is most often eaten uncooked. Methods of eating and preparing are:

1. The sweet husk of the *mangalo* is chewed (*nganngau*) and sucked until it is dry. The edible husk is not grated for use as a flavoring in other dishes, as it is elsewhere, but is eaten ungrated and uncooked by itself or with a complement of hard, mature coconut flesh (*ipipi*) or fish.
2. Occasionally *mukomuko* is baked (*mukomuko tao*) and eaten with *ipipi*. The leafy growth or tissue (*miko*) in the heart of the coconut tree is eaten only when a tree is blown down or cut out. It is never taken from a living tree; to do so would kill the tree.
3. Nuts at the *mata* and *katikati* stages are eaten raw or are baked (*niu mata tao* and *niu katikati tao*) and eaten without a food complement (*kinaki*).
4. The following is the method employed in making *niu kalokalo* from the *niu mata*: The drinking liquid is poured into an empty shell, and the nut is grated with the *kalokalo* implement. Then the liquid is poured back, and the grated flesh and liquid are stirred together (*yuu*). This is especially an infant's food. From the *niu mata* is also made *ipu niu kalokalo* by baking the unopened nut in the oven or by cooking on hot coals or stones a nut opened at the eyes and propped up on stones. After baking or cooking the flesh is grated and mixed with the hot liquid. This is prepared especially for sick persons. The unopened *niu mata* is cooked on hot stones (*niu mata tunu*). The hot liquid is considered especially beneficial for parturient women.

5. The absorbing organ of the coryledon (*uto*) of the nut at the *uto* stage is eaten raw (*uto mata*) with a *kinaki* of the *ipipi* flesh that surrounds the *uto* or is baked (*uto tao*) without being removed from the shell.

6. A recipe (probably an importation from the Cook Islands) was given for *uto poi*. Baked *uto* is removed from the shell and pounded with the *tuki* in a *kumete* until soft, then coconut liquid of the *nii mata* or *nii katohalo* is added to the soft *uto* and the whole thoroughly mixed and eaten.

7. A dish called *yami* was prepared in former times by allowing the flesh of a drinking nut at the *nii matamotomoto* or *nii mata* stage to rot in sea water for 8 to 10 days or until the flesh was thoroughly decayed. Coconut cream was mixed with the flesh, the whole was baked, and *yami*, a thick, sour, creamy food resulted. Tradition states that *yami* was the favorite food of the Yayake people when they lived on Motu Ko and was served by them with a *kinaki* of *likoliko* talo pudding.

8. From the nut at the *yakali* or *nii papaku* stage is obtained the *ipipi*, a common *kinaki* for fish or other foods in the absence of talo. From this *ipipi* also is made *lolo* (coconut cream). The nut is split into two and grated (*vatu*) on the grater (*tuati*). The *ipipi* is grated either finely or coarsely, depending on the excellence of the grater, whether the teeth are perfect and closely set or imperfect and irregularly spaced. To grate finely is *vaiu vakaliliti*; to grate coarsely, *vaiu vakapapapata*. These two types of grating are merely the characteristic results of particular *tuati* and are not related to the preparation of special dishes. It is desired at all times to avoid coarse grating: in proportion as the grating is coarse, the amount of *lolo* wrung from the gratings is less; and the finer the grating, the more the *lolo*. The gratings are picked up in the wringer of coconut husk fibers (*tawanga*) and wrung (*kuku*) into wooden bowls or coconut shells. The refuse (*ota*) left in the wringer after the oil is expressed is thrown away.

COCONUT OIL

Coconut oil is used as a hair beautifier and skin perfume. To rub oil into the hair is *omoomo*; to perfume the skin, *puni*. Oil was used mainly in the evening after bathing, when the day's work was finished. The three kinds of coconut oil are made as follows:

1. *Valikonga*: *yakali* flesh is grated and wrung out into a coconut cup; shredded leaves and flowers of sweet-scented plants are added to give fragrance; according to preference, *tiale*, *nau*, *nouu*, or *maile* leaves and flowers are used. The preparation is baked over night in the oven and is ready for use the next day.

2. *Yinu tutu*: *yakali* flesh is grated; leaves and flowers are added; the gratings are not wrung out but are placed in a coconut shell and exposed to direct sunlight for two or three days or until the gratings disintegrate and the oil separates; the oil is then wrung out into a shell. A hot stone previously fired in the oven is dropped into the oil, which is allowed to cool before being used.

3. *Yinu takataka tutu*: the flesh of the *takataka* nut, which can not easily be grated, is rubbed (*olo*) on the *punga talatala* rubbing stone. Flowers are added to the rubbings and the whole is wrung out and placed in the sun until the oil disintegrates. It is then fired with a hot stone.

All types of oil are considered equally desirable. A woman makes the one she prefers. The most common is *valikonga*, as *yakali* nuts are more readily available than *takataka* nuts. The importance of oil to the Pukapukans is well brought out in the stories and chants, where the lover always makes a careful toilet with oil before leaving the house.

TALO DISHES

The supply of talo varies from village to village and from household to household and is conditioned also by seasonal factors:

Ngake owns Motu Ko, and its extensive talo beds allow this village to draw on a large supply of talo. But because the reserve is distant from the village it is only during visits there to make copra that the villagers eat talo every day without stint. They bring back large baskets of talo on the return from the reserve. When this supply is exhausted, the village depends on the very limited number of talo beds on Wale, save on the occasion of large feasts when the women make special trips to the reserve to harvest talo. In general, then, Ngake does not have a large supply of talo and has to be as careful as Yato in its everyday use. Loto, on the other hand, has a regular and large supply of talo in the reserve of Uta on Wale on which it can draw constantly and extensively. This is a factor in the arrangement whereby members of households in other villages affiliate (*tau*) with Loto, so that some of this supply of talo is drawn upon by the other two villages. Yato village, with only small beds on Wale, has the least talo of the three villages. During their visits to Motu Kotawa the women fetch talo from Wale, making a constant drain on these beds throughout the year. Individual household differences within the three villages have resulted from vagaries of lineage and private ownership of the beds not communally owned.

At the present time talo is regularly harvested on Saturday in preparation for the weekly feast that follows early morning church on Sunday. A little talo is occasionally eaten as a special treat on Saturday evening with some of the fish caught that day. Left-overs from the Sabbath feast are eaten on Sunday night or Monday. On the remaining days of the week talo is rarely eaten. Exceptions to this are all holidays and special feasts. From Monday to Saturday, in the normal run of events, most households eat exclusively coconuts (drinking nuts and their flesh, *uto*, *takataka* nuts, *ipipi* and *mukomuko*) and fish. Pandanus fruit and an occasional banana or papaya are added to this diet.

No talo dish is reserved for special occasions; any dish is made when the spirit moves. *Mawu* and *olo* are made for large feasts oftener than are the other dishes. Each must have its proper food complement. In general, the *kinaki* for talo puddings is fish or pork. Special *kinaki* are mentioned for individual recipes. Informants characterize all the talo dishes, without exception, as sweet (*maile*), delicious (*vene*), and very good (*lelei lava*).

Talo corms are prepared for cooking by scraping (*tele*) the mud off on a scraping peg (*tukituki*) with a coconut-shell scraper (*kai*). The corms are not washed previous to further treatment. To wrap talo in leaves and make the food packet is termed *yawu*, sometimes given as *awi*. Talo preparations are:

1. *Lulu*. Whole corms are placed on a pile of *puapua* leaves (*warawa ki loto o te lau puapua*). The ends of the leaves are folded over the talo and the bundle tied with coconut leaves (fig. 6, a-b). The food packet (*lulu*) is baked in the *inu* for 1 or 2 hours.

2. *Loloi*. Whole corms or corms cut into small pieces, according to preference, are placed in banana leaves (*lau vaviti*). The package is placed on two crossed coconut leaflets, one of which is longer than the other. Two or three half coconut shells of coconut cream are poured over the corms. *Puaþua* leaves are laid on top and the banana leaves folded over all. The package is fastened as shown in figure 6, c-d and baked in the *imu*.
3. *Tata*. Baked *lulu* is placed in a wooden bowl and pounded with the *tuki* pounder until each corm is flattened. Each corm is then dipped, first on one side and then on the other, into *lolo* contained in a coconut shell. The corms are then placed side by side on a leaflet platter (*laulau*) and served.
4. *Ipu koti*. Large, well-shaped drinking nuts are opened at the eye (*mata*) end of the nut and the flesh removed. Each shell (*ipu*) is half filled with uncooked corms cut into small pieces, then filled with *lolo*. The opened end of the shell is covered with a half shell. The *ipu* are baked in the *imu* for about 2 hours. The pudding is served in the shells.
5. *Tete*. Corms are scraped into small slices with *tukituki* and *kai*. The slices are placed on banana and *puaþua* leaves, *lolo* poured on top, and the package bundled and fastened as for *loloi*. It is baked in the *imu*.
6. *Olo*. The *punapunga talakala* scraper is placed on a *puaþua* leaf. Corms are grated to a creamy mixture (*olo*) by vigorous rubbing against the stone. The *olo* is placed in a bowl and pounded with the *tuki*. Fresh water (*yua*) or coconut liquid is added, and *lolo* is stirred in with the *tuki*. A new coconut-leaf basket (*kete launuu*) is made and lined with *puaþua* leaves. Into this container the *olo* is scooped with a coconut cup. The two sides of the basket are brought together and tied at the two ends and at the middle with a single piece of coconut leaf. The leaf is passed through from side to side at one end and tied with an overhand knot; the free end of the leaf is passed to the middle, knotted again, and passed on to the far end, where it is knotted finally. *Olo* baked overnight is *olo wakanuu*; *olo* baked for a few hours only is *olo tao uke* (*olo*, baked to open). It has not such a crisp outer layer as *olo wakanuu*.
7. *Kanaka*. Uncooked *olo* is placed over a layer of *lolo* in a wrapping of banana leaves. The package is tied as for *loloi* and baked about 3 hours. Then the *lolo* is removed and placed in a bowl. *Lolo* is added and the *kanaka* is broken up with a stick (*lakau puaþua*) to work the brown crust on top into the pudding and the *lolo* into all. The food is scooped from the bowl with a coconut cup and served on a *laulau* platter lined with *puaþua* leaves.
8. *Maveu*. *Kanaka* is prepared up to the stage of placing in a bowl. *Lolo* in coconut cups covered with half shells is cooked on hot stones and coals and added to the *talo* in the following fashion. The open cup of *lolo* is placed beside the bowl. The *tuki* is dipped into the *lolo*; with a twist of the wrist the *lolo* is scooped out of the cup and transferred to the bowl, where it is rubbed over the outside of the pudding. This is then cut into small pieces with a sharp piece of coconut shell and placed on a *pulaka* leaf. The remaining *lolo* is poured into the bowl and the cut-up *talo* is dipped into *lolo* and placed on the leaves, and is then ready for serving as *niaveu*.
9. *Poke*. *Olo* is placed in a bowl, *lolo* is added, and the whole is stirred with long, circular, clockwise sweeps of the *tuki*, the left hand grasping the top of the *tuki*, the right hand below. The *poke* is placed on banana leaves, the packet tied as for *loloi*, and baked in the *imu* for about 3 hours.
10. *Ikoliko*. Uncooked *olo* is placed in shells. It is stirred with a small *puaþua* stick until soft. *Lolo* is stirred in, and the *ikoliko* is placed in baking shells and baked for 3 hours. The cover of each cup is then removed, the food stirred and served in the cups. This dish was the favorite food of the Pukapukan navigator and warrior, Te Nana, when he visited Yayake. Te Nana is reputed to have eaten 40 to 50 cups of *ikoliko* each day.

11. *Wawa tunu pakapaka*. Peeled corms are placed on heated oven stones (*imu na pu*, the oven that has been burned) and allowed to cook for an hour or more. They are served with *ipipi*.
12. *Wawa tukituki tunu*. *Wawa tunu pakapaka* is placed in a bowl, grated *yakaiti* nut flesh is added, and both are pounded until well mixed. *Lolo* is added to the mixture and the food is served in shells. The dish is considered very rich and is not often made.
13. *Pikopiko*. Very small, young *talo* cornlets (*pikopiko*) are peeled with the fingers. The cornlets and their petioles are broken into small pieces, placed in banana and *puaþua* leaves, covered with *lolo*, and baked.
14. *Pota ulukau*. The outer skin (*kili*) of *talo* petioles is stripped off. The petioles and young leaves are shredded into small pieces, wrapped in *puaþua* leaves, and baked. The food is then placed in a bowl, grated *ipipi* (*ota*) is sprinkled over it, and the whole pounded together. Coconut water is added and the food served in *ipu*.
15. *Pota ulukau puaka*. When available, layers of pork fat are alternated with layers of petioles and leaves, and the whole baked in leaves. Before serving, *lolo* is poured over the food to make a rich, flavorsome dish.
16. *Tingapula*. Young *talo* petioles are peeled, broken into small pieces, and placed on *puaþua* leaves. *Lolo* is added, the packet tied as for *loloi*, and baked.

Pulaka is considered less tasty than *talo* and is only eaten when the flavor of *talo* becomes tiresome or when *talo* supplies are low. Most of the dishes made from *talo* are also made with *pulaka*, excepting *pikopiko*, *poke*, and *pota ulukau*. The *talo* dish called *lulu* becomes *tao paku pulaka* when made with *pulaka*; otherwise the names are the same, for example, *loloi pulaka* and *maveu pulaka*.

Uncooked *talo* is buried in the ground near the cook house for preservation. It will keep thus without rotting for about three weeks. *Talo* brought from Motu Ko in large quantities is treated in this way. Cooked *talo* or fish, left over from one day to the next, is preserved by baking in a fresh oven. It is placed in the oven overnight or kept in a basket tied to the cook house rafters overnight and placed in the oven on the next day. Large *talo* puddings have been known to be kept for a week or more without the *lolo* in them curdling (*vi*), simply through being rebaked day after day, though after much rebaking the puddings get hard and lose flavor. The unusual thing about such preservation is that the puddings should remain so long un eaten. This occurred however after island fishing feasts. One family got a very large share of *talo* from the division and then had a very bad week for fish, catching practically none. Without fish for a food complement, they could not eat the pudding and so kept on preserving it in the hope that the men of the household would soon get fish.

For rebaking, *talo* puddings are either wrapped in *pulaka*, banana, or *puaþua* leaves (*vaʻovi ki te lau pulaka ma*), or tied up in coconut leaflets (*lakai ki te launuu*). The leaflet packet is preferred when a well-browned pudding is desired. Pairs of coconut leaflets are stripped from the midrib. One leaflet is twisted lengthwise round the packet, the second widthwise, and the packet fastened securely. To make them more pliable, the leaflet ends may be first heated over a fire.

OTHER PLANT FOODS

No origin myth is remembered for pandanus. Though it is not cultivated, pandanus grows abundantly. The keys (*pcnu*) may be eaten raw when ripe, with or without complement (*kinaki*). They may be sliced and baked (*wala tao*) and eaten with *ipiipi*. Grated raw and added to talo puddings (*olo wala* and *likoliko wala*) they give a sweet flavor. The juice of baked keys (*makano*) is used in the same way. The fruit is enjoyed by adults and children and provides an important flavoring and sweetening agent in the native diet. Children crack open the keys and chew the inner kernel. The woman in the moon, Yina, is said to be seen kneeling before a stone cracking open pandanus keys.

The banana was among the items fished up by Maui. Of the several varieties of banana (*wuti*) growing on the island today, *wuti pukapuka* is said to be old and indigenous. The trunk of the tree is called *pu wuti*. *Lito* is a small banana leaf; *lawwuti*, a large leaf, used extensively in cooking as a food wrapper; *laumatu*, the old, dried, and withered leaf; *kaw*, the leaf midrib; *kili*, the fruit peel; *kiko*, the flesh. Bananas are not abundant on the atoll and are not important in the daily diet. They grow in the talo beds and close to the houses. When available, they are much in favor as gifts. A household may get a small bunch of fruit from its trees once in five or six months. Bananas are ripened by hanging or by burying. A bunch (*ta*) of green fruit is cut and buried in a hole in the ground 2 feet deep and lined with coconut husks. The bananas are placed on a bed of husks and covered with coconut mats (*polapola*), then more husks, and finally with earth. After three nights the bananas are ripe and are eaten raw or cooked on hot stones. If a meal is made of bananas the correct complement is *ipiipi*.

Some sugar cane (*to*) is grown today on the talo bed embankments. It is owned by the villages and at infrequent intervals is divided among all village members. The cane is peeled with the teeth and chewed by children and adults with great delight. The cane is *pona*; the rings around the cane, *va*. The few papaya trees (*ninita*) and lime trees (*tipola*) are grown on Motu Kotawa and the fruits divided among all members of Yato village. One breadfruit tree on the atoll was planted by a man from Aitutaki. Its yield of fruit is negligible.

FLESH DIET

There were two staple flesh foods in former times, sea foods (fish, turtle, shellfish, crabs) and sea birds. (See pp. 27-31.)

No tapu against the eating of raw fish exists in Pukapuka, though visitors from Aitutaki have unsuccessfully tried to introduce the idea. Actually fish is not often eaten raw. A fishing crew occasionally eats some

of the catch raw to stave off pangs of hunger. *Kakai*, *pala*, and other big fish that are particularly tasty raw are usually caught on Saturday and must be saved and cooked for the Sunday feast. *Ava* (milk mullet), a small fish tasty when raw, is caught only by Yato village from its pond and is generally baked for village food divisions.

Large fish are split before cooking into four longitudinal quarters (*io*) by cutting along the longitudinal black blood canal and dividing each half into two. In the fore sections of the two bottom *io* is the choice part of the flesh called *pakoko* (fig. 7). It is fat and tasty and much preferred by pregnant women.

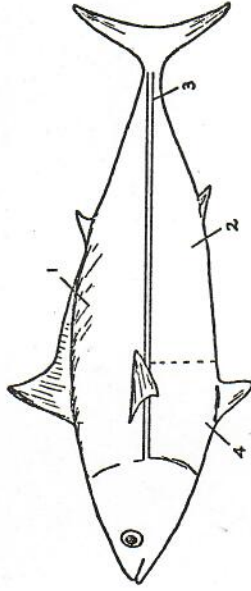


FIGURE 7.—Division of albacore fish: 1, upper sides, *io*; 2, bottom sides, *io atonga*; 3, dark-colored blood canal; 4, fat portion of flesh (*pakoko*) esteemed as special delicacy.

Small fish are not cleaned or scaled (*wolewole*) before cooking. Larger fish are roughly scaled by working the thumb along the skin from the tail to the head. Head, fins, and internal organs are not removed. Every part of a fish is eaten.

Only two methods are used for cooking fish: grilling (*tumu*) and oven-baking (*tao*). Fish to be eaten immediately are always grilled; fish to be eaten later in the day or on the next day are baked. For grilling large quantities of fish, a special fire is always built, even though another fire is already burning in the cook house. The grilling fire is built only of coconut shells (*ngaihu*) of the *yakali* or *uto* stage, which burn with a clear, fierce flame. The fish are laid on the glowing embers and turned from time to time until cooked. Small fish, particularly *kaloma*, are spitted on a coconut leaflet midrib, about 20 fish on each midrib, with all the heads facing one way and all the tails facing the other. They are grilled thus.

When there is a larger supply of fish on-hand than can be immediately eaten, fish is preserved by sun-drying (*wakala ki te la ke pakapaka*). Fish that has been dried for several days will last indefinitely. Large fish—*kakai*, *pala*, and *atiu*—are first split into the usual four sections and twice oven-baked. Each section is then cut into smaller pieces, placed on *laulau* food platters, and hung from house eaves to dry in the sun. During the flying-fish season when there is an abundance of fish, flying fish are partially grilled on hot stones and then sun-dried. They keep for a long time without spoiling.

Turtle flesh is grilled. The only correct complement for turtle in former days was a talo dish. It was tapu to eat coconut with turtle. A man named Yawenga broke this rule, so the story goes, and the next time he went turtle fishing he was caught by a male turtle, which sounded and drowned Yawenga and then took his body to the legendary land called Valu Wetuna. It is likely that this tapu against mixing turtle flesh and coconut is associated with the displeasure of the turtle when the woman Yina broke a coconut on his head. Turtle ova (*wava*) are eaten as well as the meat, fat, and carapace, raw or grilled. Probably turtle eggs were not eaten formerly but were left to hatch, an inference from informants' statements that it is only in recent times, since people have taken the eggs of the turtle from the nest, that turtles have been dying out.

Tritacna shellfish (*payua*) are eaten raw or mixed with coconut cream and baked in leaves in the oven. Persons especially fond of them collect large quantities which they preserve for future use or for periods of want by stringing them on coconut midrib fibers (*kalara*), 30 to 40 *payua* on each string. The string *payua* are baked for a day or overnight and then hung from house eaves to dry in the sun for about 10 days. Thereafter they are placed in baskets and stored until wanted.

Wild birds are not preserved in any way. They are grilled and eaten immediately after they are caught. A bird is plucked at the beach and the feathers allowed to drift anywhere. Head and claws are left attached to the body and the bird is not gutted or cleaned in any way. A length of green coconut midrib, thrust down the throat of the bird and into its stomach, is used to hold the bird over the flames and embers of a fire made of *ngai'pu* coconut shells until it is suitably grilled. All the bones are picked clean; the internal organs with the small fish and seaweed in the stomach bag and intestines are considered especially tasty morsels.

The pig (*puaka*) and the chicken (*moa*) were introduced after white contact. The pig, brought by early missionaries, is eaten today only at feast times or in food divisions to pay workers for services.

A pig is led down to the beach and allowed to wallow in the sea to clean its skin before it is killed by choking. A stout stick is placed across the throat of the animal lying on its back with its legs held or tied. Men stand on each end of the stick until the animal is dead. The dead beast is singed (*mumita*) with flaming coconut leaves and the skin scraped (*valwawatu*) with a coconut shell. It is washed (*palupalu*) again in the sea so that the skin is clean (*makitakita*). The animal is then placed on a bed of coconut leaves laid on the ground. The stomach is opened up, the internal organs (*ngakau*), heart and liver, are removed and washed in the sea. The blood is caught in coconut cups and baked in them (*tofo momoyo*, cooked blood). The intestines are grilled on hot stones; the liver and heart are wrapped in banana leaves and oven-baked. The whole pig is baked in an oven for 4 or 5 hours, according to the size of the animal, and then butchered and shared among the participants in the feast. The head (*ulu*), reserved for the chief, is cut off first; then in order the fore legs (*lima*), hind legs (*vae*), ribs (*ivi kayokayo*), back (*ua ivi*), and finally the hind quarter (*mulimuli*) are butchered. All these portions, together with the heart and liver, are again subdivided into the required number of smaller portions (*pona*). Save for the special portion for the chief, there is no reference in this division to rank or status.

Hens and roosters were introduced by a captain of a trading schooner whom the Pukapukans called Wuluwulu (Hairy-one) when he visited Pukapuka some time after the mission was well started in Samoa but before it was established in Pukapuka.

Chicken eggs play no important part in the diet today. It is probable that they were formerly left in the nests to hatch. At the present time eggs are used as gifts to visitors. We saw only one Pukapukan eating an egg, a child eating a hard-boiled egg. A great deal of trouble is taken over the raising of chickens, but at the present time they are rarely eaten. No household has enough chickens to have a chicken dinner very often. Only once, during the Christmas feasting, was a native family seen eating a chicken for a meal. A woman or a child chases the chicken to be killed, then hits the bird on the head until dead. Women or girls pluck the feathers, which are thrown into the sea. The body is singed, the head cut off, and the internal organs removed. The heart and liver are washed and baked on hot stones; the body is wrapped in banana leaves and baked in the oven. A live chicken, talo, and nuts are the usual gift feast sent to honor a friend. Only chickens found strangled in the trees or killed by the women's committee when found in the talo beds are regularly eaten by their owners.

The dog was unknown in Pukapuka. The native rat (*Mus exulans*) was caught with the rat trap (*vaka kiote*) when it became a pest in the talo beds but was never eaten. Rats were never hunted with weapons for sport.

Though many stories are told about cannibals, cannibalism was probably not practiced on Pukapuka. The use of human bone was tapu (*ya*), punishable by the goddess Taua (p. 309).

MEALS AND FOOD ETIQUETTE

No routine of set meals is followed. The nature and number of meals eaten by one household group on any one day depend entirely on the amount of food on hand and the program of work for the day:

If the men have been fishing early in the morning, the family has a meal of fish and *ipipi* some time before 9 o'clock. If there has been no fishing and if there is no leftover supply of fish or talo, a regular meal is not eaten; each individual makes a fresh coconut or *utu* nut do. The Pukapukan feels no need for food before he starts work in the morning and may work until 10 or 11 o'clock without refreshment. A child going to school in the morning takes with him a drinking nut to eat as he walks along the road. A regular meal may not be eaten by a household for a whole day, sometimes even for the best part of two days. Before the second day has passed, fish is procured by some male member of the household and grilled for a formal meal, usually in the evening, not infrequently at 9 or 10 o'clock at night after the torch fishing. It was not unusual for us to be awakened in the middle of the night by a returning fisherman bringing us fish on the supposition that we would get up and eat it immediately. Our practice of eating at regular hours was always a matter of discussion and comment.

The words *kai*, *taumamaya*, *yamuyamu*, *lanulamu* apply to eating, whether by an individual alone or by a group, whether of a single coconut or of an elaborate meal. There is no Pukapukan word for guest or host, nor is there any custom of entertaining friends or relatives for an occasional meal in the household. Special indebtedness is repaid by sending food gifts to the home of the friend.

Whether the meal is taken inside the cook house or outside on the open ground—as is usual for a meal on a fine evening—men, women, and children all sit on coconut-leaf (*takapani*) mats, with crossed legs tucked under them. They sit in rows opposite each other. The food platters (*lanlau*) are set (*wakawawara*) on *palapala* coconut mats in the middle. It is customary to rise and leave the group when satisfied (*yangia*). The food is taken from the center platters with the fingers in individual mouthfuls. Food etiquette is remarkable by its absence. There are no rules taught to the child on the correct way to eat food. There is no prescribed manner of chewing. Loud sucking, belching, gurgling, and loud smacking of the lips are all in good taste. The food may be packed into the mouth in any fashion. As it is divided into individual shares on the platters before being served, there is no opportunity for the quick eater to obtain more than his share of food.

Pukapukan food is invariably dry food that can be divided into separate shares without the aid of food containers other than the coconut platter and coconut shell. This sharing pattern leads to the grumbling of the *kaitangi*, the person who thinks he has been given less than his rightful share of food in the food division, whether of household or village feast. There are many references in the stories to trouble caused by people who were *kaitangi*. To a person who grumbles about his food, the classic reply is, "Wano koe aumai te kaitangi no Yele" (Go and get the food share that did not satisfy Yele), the implication being that even if the *kaitangi's* food shares were as large as Yele's in the story (1), he would still be dissatisfied. In another story, that of Watu-manava-nui, it is the dissatisfaction of Kumawawine that leads her to betray her own Yayake people to the Tongan warriors, with the result that all her people, including herself, were killed by the Tongans and Pukapukans. The person who grumbles over his share of nuts is told, "Wano koe ki te niu o Totoloa" (Go to the nut tree of Totoloa). This refers to the god Totoloa's magical tree from which a nut was picked, eaten, and then put together again and thrown into the tree, where it flourished as before.

SUMMARY OF ECONOMIC SYSTEM

Because old age does not bring with it fear of economic insecurity, there is no incentive to hoard wealth. Old people are cared for by children and relatives, and no one ever suffers from lack of food or shelter. The life of the lazy man might be materially easy, but he would suffer much through ridicule; there would be few whose pride could stand the blow of being allotted only a child's share of food. It is noteworthy that laziness never enters as a theme of stories.

The village of Ngake makes more copra than the other villages and each person in Ngake receives slightly more money from the proceeds of the semi-annual sale of copra than do the people of the other villages, but this does not mean that the increased wealth of Ngake villagers can be used to tyrannize over the other two villages. The money is spent on clothes or tobacco and increases personal prestige, not economic power.

The economic system is so well integrated with environment and social structure that it has stood firm under the impact of an alien culture when other aspects of Pukapukan society have been lost. Needs are well provided for, individual skill is appreciated, insecurity is absent, and the accumulation of wealth has for its end redistribution in the interests of increased prestige. Minor flaws in the system come from occasional inequalities in food distribution; these are temporary and never serious enough to disrupt the functioning of the major patterns, which draw their strength from the basic social structure.

MATERIAL CULTURE

HOUSES

HOUSE STYLES

A wide variety of house styles is found in Pukapuka today. In the permanent villages, the dwelling houses are either of coral lime roofed with pandanus thatch, or of a type introduced from Rarotonga by the missionaries, with slat walls reaching to the roof and often with a wide veranda. Along with these modern houses are found old style dwelling houses and cook houses. Small, square, slat-walled houses which stand close to each dwelling house in the permanent villages were evidently originally built under missionary impetus to serve as bath houses. Some of these bath houses are used for their assumed purpose, but the majority, after their novelty wore off, were converted into storehouses for fishing gear. Loto village at one time set up a row of wooden structures on coral lime foundations in the water a few feet from the lagoon beach. These serve as privies; many of them are in sad need of repair.

In the copra villages, most dwelling and cook houses are built in an old Pukapukan style. One house in particular, a watch house at the place Matala in Uta, has acquired undue prominence in the literature because of its age. Built about three generations ago at the time of first missionary contact, it is a well-authenticated example of one style of Pukapukan house building.

SIMPLE RIDGEPOST HOUSE

The *wale toinuku* (fig. 8, a) is a small, low house, usually erected on exposed outer beaches to serve as a cook house, sometimes as a sleep house. The framework consists of two ridgeposts (*pou tu*), which support a single ridgepole (*tau matua*). In one subtype, rafters (*wuti poto*) run from the ridgepole to the ground. In the other subtype, two wall posts (*pou*) on each side support wall plates (*kaukau matua*). Rafters run down from the ridgepole to rest on the wall plates. There are no thatch rafters; the thatch of coconut roof sheets is laid directly against the rafters, in such a manner that the midrib bases of the roof sheets function as thatch purlins. Lashings are of sennit or, as in a rough house examined, of dried *pulaka* stalks. Smaller houses of this type have one ridgepole only, but more substantial houses have a second ridgepole (*tau lua*), which is laid in the crossings of the rafters (fig. 8, a). The ridgepole roof sheet is securely fastened to the framework by pegs (*yuki*) that are pushed through the sheets and between the two ridgepoles.

A roof extension (*taumata*) is often added to the exposed end of these

houses. Two cook houses of the *toimuku* type each with a roof extension were observed on the outer beach of Uta:

Two wall posts on each side support a wall plate. Two grooved ridgeposts support the ridgepole. Nine rafters run from the ridgepole to the wall plate on each side of the house. Coconut roof sheets are laid directly on these rafters. The northeast, southeast, and southwest sides of these houses are open, the ends of the rafters on these sides being about 3 feet from the ground. At the northwest end of the houses, two low end posts, each about 18 inches high, support an end plate. End rafters run from the side rafters to these end plates. The thatching of the extension is continued to the ground by extra wide roof sheets that hang down from the end plate. This extension provides complete shelter against severe winds from the northwest. It also acts as a shelter for the ground oven and as a storage place for dry coconut shells and firewood.

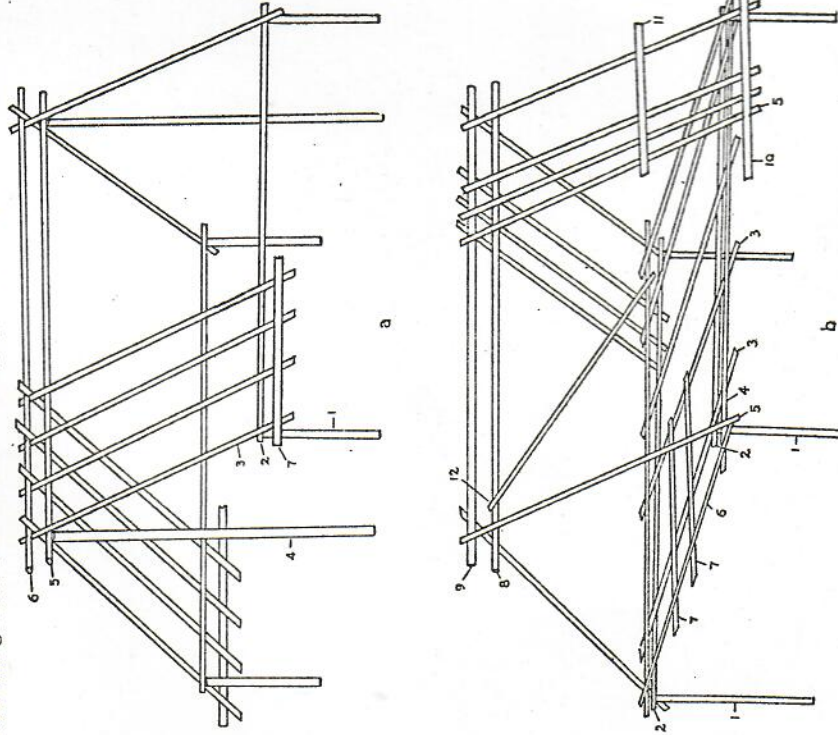


FIGURE 8.—Houses. *a*, framework for *wale toimuku* type house: 1, wall post (*poi*); 2, wall plate (*kaukau matua*); 3, rafter (*waii potu*); 4, ridgepost (*poi tu*); 5, ridgepole (*tau matua*); 6, thatch ridgepole (*tau lua*); 7, purlin (*takikiiti*). *b*, framework for *wakaqayamoia* type house: 1, wall post; 2, wall plate; 3, tiebeam (*oka*); 4, roof plate (*kaukau lua*); 5, rafter; 6, end purlin (end rafters not shown), braced by two supports (*yoka*); 8, main ridgepole; 9, thatch ridgepole; 10, side eaves purlin; 11, mid-way purlin (*talara*); 12, diagonal brace (*yoka*), running from roof plate to main ridgepole.

TIEBEAM HOUSE

The tiebeam house with paired side supporting posts, wall and roof plates is termed *wale wakaqayamoia* (fig. 8, *b*). Though similar to the Rakahangan and Samoan tiebeam houses (29, pp. 70-75; 27, pp. 15 ff.), the Pukapukan house customarily has no kingpost, its principal rafters cross below the ridgepole, and there is no set of wall posts other than the main series of paired wall posts which support the wall plates, tiebeams, and roof plates. For this reason I have retained the term "wall plate" for the longitudinal beam that rests on the wall posts, but this wall plate functions in the same manner as the tiebeam plate of the Samoan house. It is likely that the Pukapukan name for the type house, *wale wakaqayamoia*, is derived from its similarities to the Samoan house of this style.

This house type is used for dwelling and cook houses in both village and copra settlements. When the tiebeams are covered with a platform (*pa-panga*), on which coconuts at the *takataka* stage are stored, the house is termed *wale takataka*, a name sometimes given as the type name of the house. The *wale wakaqayamoia* is also constructed in the reserves as a watch house for the guards. On the outskirts of the villages rough structures of this type are used as shelters for disassembled canoe sections.

In the typical house of this style, two wall posts on either side, grooved at the upper end, support wall plates which rest unlashed in the grooves. Four tiebeams (*oka*) rest on these wall plates and project 18 inches beyond the wall plates to which they are lashed. Resting against the outer ends of each tiebeam are thin poles which serve as supports for the coconut-leaf wall sheets (*takapani*). Roof plates (*kaukau lua*) are placed longitudinally on top of, and at the outer extremities of, the tiebeams. Twelve rafters (*waii potu*) run from roof plate to ridgepole on either side of the house. They are lashed to both roof plate and ridgepole and cross above the ridgepole to support the thatch ridgepole (*tau lua*). An eaves purlin (*takikiiti*) and a second purlin (*talara*) midway between roof plate and ridgepole are lashed to the inside of the rafters on each side of the house. The roof plate seems to function here as a third purlin, and some informants gave *talara* as the name for both purlin and roof plate. On the two outer tiebeams at each end of the house are lashed, longitudinally, thin split sections of pandanus wood. These form end platforms for the storage of mats and household goods. They project beyond the outer tiebeam at each end to support an end purlin (*talara tala lewai*). The end rafters are lashed to this purlin and to an end eaves purlin. On one side of the roof framework, a diagonal strut (*yoka*) runs on the inside of the rafters from the ridgepole at the point where the first rafter joins the ridgepole, down to the roof plate at the point where the tenth rafter joins the ridgepole. The strut is lashed to ridgepole, intermediate rafters, and roof plate. On the opposite side of the house, the strut runs from the ridgepole at the tenth rafter to the roof plate at the first rafter. In other houses of the *wakaqayamoia* type, two braces are used on each side. The braces run diagonally from the roof plate in the center upward to each end of the ridgepole. The type house has no other ridgepole support than rafters and struts, but in one house observed, a rough kingpost ran from the second tiebeam in from the end and supported a ridgepole. The kingpost, also called *yoka*, was of rough wood, undressed, and obviously a novel addition to the roof framework. It was lashed neither to tiebeam nor ridgepole.

Each gable end of the type house is made by running eight end rafters (*waii potu*

tala levu) from the end caves purlin (which is itself lashed at each end to the side eaves purlins) to the end side rafters. Four end rafters run to the left side rafter, four to the right side rafter. The end rafters are of varying length depending on their distance from the highest point of the ridgepole. Another end purlin, midway between eaves purlin and ridgepole supports the end rafters on the inside. A variation may sometimes be introduced into the gable end of both the *wakayamao* and the *wale atua* house types, by using for the end purlin a piece of timber that has a slight, natural curve in the horizontal plane. The end rafters would be made of suitable length to retain the natural curve of the purlin. In small houses of the *wakayamao* type, where the end purlin was of small diameter, it was sometimes bent into an artificial curve through binding the two ends of the purlin to the ends of the two outermost side principal rafters and through graduating the length of the end rafters in such a way that when lashed to the purlin, they thrust it out in a slight horizontal curve. There are no side or end thatch rafters on the type house. The coconut roof sheets are fastened directly to the principal rafters, the midribs of the sheets functioning as thatch rafters.

Lashing

The lashing used for all parts of the house framework is of one pattern only, that of alternating curves, termed *yimu wakawivi*. The lashing corresponds to the curved pattern lashing described by Buck (29, p. 72, fig. 5)

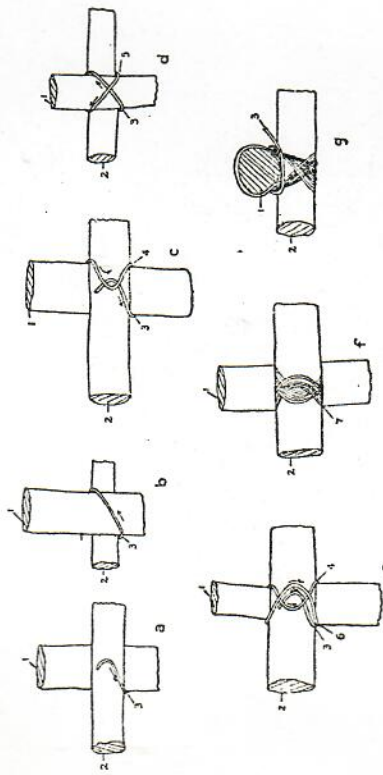


FIGURE 9.—Alternating curves lashing, used for principal parts of house framework; lashing shown for fastening together tiebeam (1) and wall plate (2). *a*, view from above: sennit braid laid on wall plate and held with thumb; free end makes reverse turn on under side of wall plate (3). *b*, view from below: free end makes transverse turn across tiebeam. *c*, view from above: sennit braid (4) brought across commencement end, thumb holds crossing cords in place while braid makes curved turn across and down at wall plate (4). *d*, view from below: braid (5) makes transverse turn across and up tiebeam to curve around wall plate. *e*, view from above: braid (6) curves to right across second curve (4) and locks preceding two curves in place; thumb then removed and rough sennit does not slip. *f*, view from above: repetition of two curved turns successively applied on outer side of previous turns produces pattern (7); number of lashings varies according to elements, average number being 5 curves on either side, 10 in all. *g*, side view: crossings of turns and half of one design; braid (3) makes number of horizontal circumferential turns around lashing turns between two wooden elements; end of braid fixed by half hitches around last loops. (Diagram adapted from Buck, 29, fig. 5, p. 72.)

for a type Rakahangan house, save that the Pukapukan commencement differs slightly from the Rakahangan technique. The Pukapukan lashing is shown in figure 9. This lashing is extremely common in Pukapuka on both houses and canoes, and is the only lashing used when it is necessary to fasten together securely two crossing elements.

Thatching

All houses in former days were thatched (*ato*) with coconut roof sheets (*poia laumiu*). The method of plaiting the double coconut sheet is that described by Buck (26, pp. 7-11, figs. 6-10) for Aitutaki. Before being made into roof sheets the coconut leaf midribs are soaked in salt water for a few hours to free them of insects. The roof sheets are attached to the rafters by a continuous two-ply twisted sennit cord (*uka*); the method of passing the cord through the sheets from the inside of the house and back from the outside is that described for Aitutaki (26, pp. 19-21, figs. 23-25). A special thatching needle (*yuki*) is used in Pukapuka, however, to facilitate this work. Two methods are distinguished by which the sheets may be applied to the rafters:

In one method (*ato yinaki lau*), the sheet midribs are all of the same length. They are applied in courses running from eaves to ridgepole, the midribs about one inch apart, contiguous courses overlapping. In the second method (*ato tele*) some roof sheets are made with short, some with long, midribs. Long midribs (*ui poia*) alternate in each course with short midribs (*pu poia*) and the sections running from eaves to ridgepole are not defined as in the *ato yinaki lau* method. The *ato tele* method of applying the sheets is more laborious than the *ato yinaki* method, but a well-thatched roof of this type is more nearly waterproof and lasts up to 10 years, whereas an *ato yinaki* roof, though more easily and quickly applied, rarely lasts longer than four to five years.

In thatching a roof section, a long doubled sheet (*poia waraiti*) is placed on the rafters commences. Short sheets alternate with long sheets. As the thatching advances up the side of the roof, a worker lifts up the roof sheets to those who are lashing from the inside by skewering them with a lifting pole (*tuku poia*), which has the customary shoulder point. In both methods of thatching it is arranged that the last sheet to be applied to the sides is a long one. On top of this and overlapping the ridgepole break (*ati*) between the thatchings of the two sides is placed another sheet (*poia ati*), covered by still another sheet (*poia tauhoto*). Over all is placed a coconut ridging mat (*takapau tauhoto*), made of two split half leaves and one whole leaf as described for Aitutaki (26, pp. 24-28, figs. 28-34). The gable ends are thatched in the same manner, starting from the double sheet at the eaves and working up to the ridgepole. The sheets are shortened as the thatching comes close to the ridgepole. At the top a small space is usually left for ventilation, and at the sides the edges of end sheets are often wedged in between the sheets that form the side thatching. Some leave the overhanging sheets at the eaves ragged and irregular, but others carefully trim the eaves edge of the sheets in an even line (*kotikoti te tuluwatu wale*).

When heavy winds are expected, the thatching of coconut-leaf sheets is reinforced by knotting together the tip ends of two coconut midribs, which are then slung over the roof thatching in such a way that one midrib falls

on one side of the roof, the other midrib on the other side. Where the roof is low, leaflets at the butt end of each midrib are carried under the eaves and tied to a thatch rafter. Where the roof is high, the weight of the midribs is sufficient to hold down the roof securely. A number of these double midrib slings are placed at intervals along the roof for added protection.

House thatching with pandanus leaves was introduced into Pukapuka by missionaries from Rarotonga. The method in use conforms in every particular to the Aitutaki method (26, pp. 11-24):

Pandanus leaves are collected in the reserves, and straightened (*voe lauwala* or *vaivalo lauwala*) by passing them around an upright stick (*lakau voe lauwala*). The leaves are then fastened in bundles (*pohei lauwala*) by placing the tip end of each leaf over the butt end and tying the ends of a number of leaves together. The leaves are bent over and sewn to strips of wood split from the aerial roots of the pandanus. A sewing needle (*tui*) is used to split the longitudinal grain of the pandanus leaves so that the coconut leaf midribs (*tiainiu*) may be inserted to keep the leaves in position on the wooden strip. The completed roof sheet is termed *poia lauwala*.

Framework Construction

Pandanus wood is used almost exclusively in the framework of the *wakayamo* type house. Formerly the wall posts were buried about 12 inches in the ground, but in a modern house of this type, four ground posts are supported on low, grooved coral stones and the wall posts are fitted to these ground posts by mortise and tenon joints. In the modern house the tendency is also to fit together tiebeams, wall and roof plates with mortise and tenon joints, but in the old house this would have required much labor with shell adzes. Hence only the tops of the wall posts were grooved (*wakauu pou*) to receive the wall plates, the heads of the rafters chipped out (*wakatala*) to fit against the ridgepole, and roof plates grooved (*wakakamu*) to fit against the tiebeams. If it is necessary to leave a house framework unthatched for several days all the principal posts are wrapped with coconut-leaf mats (*akapau*), and rafters are covered with a few coconut midribs, to protect the timbers from rotting or warping in sun or rain.

Wall Mats

In old houses of the *wakayamo* type, walls are made with coconut-leaf mats (*takapau*). Mats are made long enough to overlap two wall poles, the depth of plaiting for each mat being about 12 inches. In a typical house, four mats form a set between each pair of wall poles. The mats are supported at their upper, midrib edges by two or three semit cords spaced equidistantly between the two edges. The method of support is the same as the Samoan method (27, pp. 73-74, fig. 79). The mats operate on a Vene-

rian blind system and are raised and lowered according to the direction of the prevailing wind. The overlap of the mat screens against the wall poles prevents their being blown inward by the wind.

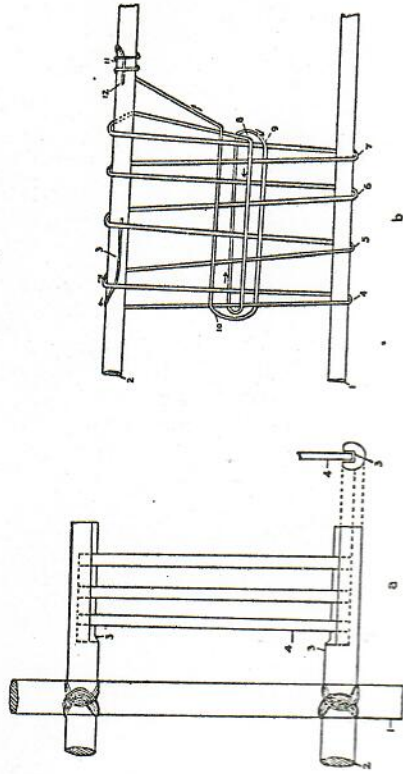


FIGURE 10.—Details of house construction. *a*, making of house wall (*waiwai*): 1, wall post; 2, horizontal wall logs; 3, point at which slotting of inner surfaces of wall logs commences; 4, thin rails fitting at each end into slotted wall logs. *b*, suspended loop lashing (*vinu vakamau*), bracing first and second ridgepoles (*tau matau, tau lue*), also bracing third and fourth ridgepoles (*tautalu* and *nii momoti*) in model *vaale atua* house: 1, main ridgepole; 2, second ridgepole; 3, buried commencement end of semit braid laid on ridgepole; 4, four figure-of-eight turns (4, 5, 6, 7) made around both ridgepoles; free end (8) passes in one circumferential turn round four figure-of-eight turns; free end then passes (9) through lower loop of figure-of-eight and back through upper loop (10); lashing finishes with overhand knot made on one cord of outer loop or else free end passes up to second ridgepole where it makes two or more turns (11) and finishes buried underneath two turns (12) and pulled tight.

Wooden Walls

Low walls (*waiwai*) are sometimes added to dwelling and cook houses of the *wakayamo* type by the following method, said to be old:

Two pandanus logs about 6 inches in diameter are run between the wall posts, one log at ground level, the other about 30 inches from the ground. A rough slot is hollowed out about 3 inches deep and 2 inches wide on the inner surfaces of the two logs. A series of *puhia* poles, about 3 feet long and 1½ inches in diameter, is inserted vertically between the two logs, the upper and lower end of each pole resting in the slots. This wall, which resembles a close-set railing fence (fig. 10, *a*), incloses the house on three sides, leaving one end open for a door. On the outside of this low wall and between the top of the wall and the roof eaves (if the eaves are high), *takapau* mats are hung for extra protection. Cook houses rarely add the extra mat protection unless they are in exposed situations. The method of adding a wall to a house by inserting horizontal slats between uprights and tying the slats together by a continuous cord of semit is modern and introduced from Rarotonga.

House Platform

Most dwelling houses and a few cook houses are built on a platform of coral rubble (*paepae*), several feet larger than the ground area of the house. The rubble is contained by a curbing of coral stones 8 to 10 inches high. Some houses are built on a secondary or upper platform of rubble limited by a coral or log curbing, which forms the house floor and extends about 12 inches beyond the walls of the house. Most houses in the copra settlements are built on a single low platform, gravel inside the house being retained by log curbings.

Variations on Type House

Variations on the type house are found in the copra settlements.

One house on the back beach of Uta conforms in all particulars to the *wakayamao* style, save that the ridgepole is supported by two ridgeposts, which stand on the inner side of the end tiebeams. This house combines features from the *wakayamao* type and the *wale atua* type. Most houses on exposed beaches are permanently covered on three sides with *takapai* mats or *pola* roof sheets fastened to wall poles. Only the leeward side of the house is left open between the ground and low caves. In exposed situations, cook houses and dwelling houses of the *wakayamao* type are provided with roof extensions (*tannata*) to cover ovens or to provide a roomy wind break. The rafters on the exposed side of the house are extended to about 18 inches or 2 feet from the ground and supported on subsidiary wall posts and a subsidiary wall plate. The extension is thatched, and permanent *takapai* mats are fastened to the outside of the subsidiary wall posts.

A small typical *wakayamao* house, used as a sleep house in Yato village, measured 15 feet 8 inches long, 11 feet 7 inches wide; the eaves were 4 feet 6 inches from the ground; and the ridgepole was 9 feet 7 inches from the ground.

Storage Houses

Houses of the *wakayamao* type used as storage houses (*wale takataka*) for nuts, fishing gear, or old canoe sections are often built far enough from the village to be safe from fire, but near enough to be easily visited. The floor of a *wale takataka* is used either as a place for lumber storage, or as a workshop for craft activities. According to the number of nut trees a man owns and the number of nuts he has to store, he possesses one or more *wale takataka*. Four houses was the usual number for an average family in former times, before copra was made.

Storage Platform

Nuts at the *takataka* stage are stored on a platform laid on the tiebeams and occupying the whole area marked out by the tiebeams. The lengths of wood forming the platform and the rafters are laid very close together to prevent the intrusion of thieves. Legitimate entry to the platform is made through one or two gates or hatch-

ways built into the center of the platform. Formerly the bottom hatch (*pu lua*) was level with the platform and lashed to it by complicated knots supposed to be known only to the owner of the house. When in use, the fastenings were untied and the hatch placed on the ground. The top hatch (*pu tai*), about 12 inches directly over the first hatch, was lashed horizontally to the top ends of thin vertical poles, which were lashed at the bottom to the platform supports. The two hatches and the vertical supporting poles thus formed a sort of box resting on the platform. On visiting his *wale takataka*, the owner took with him a block of wood which he placed on the ground under the hatch. He mounted this block to unfasten the first hatch, inside of which he usually kept a length of rope. One end of this he fastened to the platform and then, by the help of the hanging rope, scrambled up to open the second hatch. On leaving, he securely fastened the hatches, re-tied the knots, placed his piece of rope on the platform, and carried off his block of wood. After white contact a short ladder, something like a truncated grocer's ladder, came into general use to reach the platform hatches. This was called *tula*, a name probably derived from the word "stool". It was kept in the owner's sleep house when not otherwise needed. I saw no *wale takataka* house with two hatches in the storage platform. The above description is based on informant's account of old time practice. Many houses today, however, have the single hatch, which as often as not is fastened with hinges and padlock to the platform.

RIDGEPOLE, WALL PLATE HOUSE

The type *wale atua* house is a bilateral wall plate house with two or more ridgeposts supporting the ridgepole (fig. 11). The type house was used in former days principally as a god house (*wale atua*), but the massive construction style made the same type of house ideal for a meeting or watch house. Smaller houses of this type were occasionally used as sleep houses. There are available for study today the watch house at Matala, erected 75 years ago (described as type), a sleep house on the outer beach of Uta, and a model *wale atua* house (C8086)⁷. Brief mention of certain features of the framework of the watch house has already been made by Macgregor (20p.43).

The watch house was originally constructed with six wall posts. A seventh post has been added at a later date to give added strength. The wall posts of *puapua* wood are sunk about an arm's length in the ground. Each post is round in cross section, save at the top where it is adzed roughly rectangular. The top of each post is grooved to receive the wall plates of pandanus wood, which are laid in the grooves, unlashd (fig. 11). Five tiebeams are placed transversely across the wall plates, one tiebeam at each end, and the other three equi-spaced along the length of the house. The end of each tiebeam is grooved to fit securely over the wall plate to which it is lashed. The buried in the ground are flush with the wall plates. Two ridgeposts of *puapua* wood, pole of pandanus wood which rests in the grooves and is unlashd. Each ridgepost rises from the ground on the inner side of the second tiebeam from each end; about 2 inches separate ridgepost and tiebeam. Running between wall plate and ridgepole on either side of the house are six principal rafters of pandanus wood. Each rafter is round in cross section but is grooved at each end to fit against ridgepole and wall plate, to which it is lashed. Each rafter at its lower end projects about 9 inches beyond the wall plate. The under surface at the end of the rafter is flattened that the square surface of the eaves purlin may fit more closely to it before lashing (fig. 11, c).

⁷ Unless otherwise stated, all collection numbers refer to specimens in Bernice P. Bishop Museum.

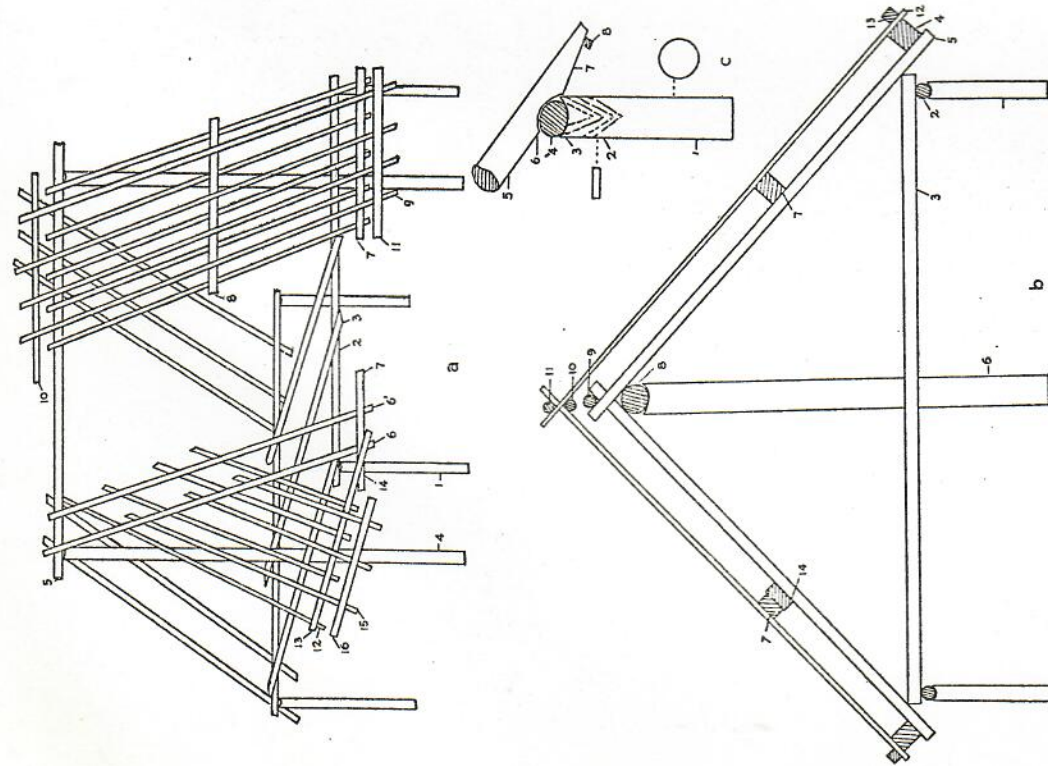


FIGURE 11.—Ridgepole (*wale atua*) house. *a*, general features of frame construction: 1, wall post, supporting wall plate (2) on which rest tiebeams (3); ridgepost (4) passes upward on inner side of end tiebeam to support main ridgepole (5); principal rafters (6, 6') cross above ridgepole, and are lashed at lower end to wall plate and at upper end to ridgepole; eaves purlin (7) and midway purlin (8) lashed to principal rafters; thatch rafters (9) pass over purlins (7, 8) and support at top second ridgepole (10); another eaves purlin (11) lashed to lower end of thatch rafters; end principal rafters (12) pass to ridgepole and second side principal rafter (6') on each side of roof; end rafter eaves purlin (13) lies on bottom of end principal rafters, and is joined at side to side rafter eaves purlin (7) at point (14); end thatch rafters (15) pass over end purlin (13), and up to first side principal rafter (6) on each side; end eaves purlin (16) joins bottoms of end thatch rafters (15). *b*, end view: 1, wall post; 2, wall plate; 3, tiebeam; 4, rafter eaves purlin (*takihikihi*); 5, rafter; 6, ridgepost; 7, midway purlin, on left side widened by chock (*neinei*) (14); 8, main ridgepole; 9, second (rafter) ridgepole (*tauhua*); 10, third (rafter) ridgepole (*tautolu*); 11, fourth ridgepole (*nui monohi*); 12, thatch rafter (*kayo*); 13, thatch rafter eaves batten. *c*, detail of wall post and rafter: 1, wall post, round cross section, adzed at top to produce rectangular cross section 2; head of wall post grooved (*wakatu pou*) (3) to receive wall plate (4); principal rafter (5) grooved on inner side (*wakakamu*) at 6 to fit over wall plate; lower side of rafter flattened (*pa*) so that eaves purlin (8) will fit closely.

On each side of the house 25 thatch rafters (*kayo*) of *puapua* wood are lashed to the eave and midway purlins. At the top, each pair of thatch rafters crosses above the ridgepole to support a thatch ridgepole to which each rafter is lashed. At the bottom, the thatch rafters are lashed to a thatch purlin which passes longitudinally on top of the series of rafters.

Each gable end is formed first by three principal end rafters of *wakanawa* wood which are lashed to the end tiebeam. The two outermost end rafters run between the end tiebeam and the two outermost side rafters, being lashed to these about two-thirds of the distance from the lower ends of the side rafters. The middle end rafter runs from the end tiebeam to the main ridgepole and is lashed to it at a point 3 feet from the end of the ridgepole and on the inside of the first two principal end rafters. To the bottom ends of these end rafters is lashed an end eaves purlin. The nine end thatch rafters are lashed at the lower end to an end eaves purlin, and at their upper end to the second side thatch rafters. Thus the gable ends of the house incline obliquely inward so that the main roof projects beyond the gable end for a distance of about 2½ feet.

The lashings of this house are of two kinds. The lashing of thatch rafters to eave and midway purlins and to thatch ridgepole, and of the end thatch rafters to the side thatch rafters is by a continuous cord of three-ply braided semit, ⅜ inch thick, which takes two transverse turns around the two crossing elements, then makes a single circumferential turn around the transverse turns between the two elements, and passes to the next crossing elements. All other lashing is the typical Pukapukan alternating curves pattern lashing with three-ply braided semit, ⅜ to ¼ inch thick.

The thatching of this house is with coconut roof sheets, the method being that described for the *wale wakanawa* house.

The floor is covered with coral gravel which is retained by lengths of timber laid on the ground on the inside of the wall posts.

Principal measurements of this *wale atua* type watch house are: length, 34 feet; width, 14 feet; height of wall posts from the ground, 4 feet 10 inches; height of eaves from the ground, 3 feet 10 inches; height of ridgepost, 10 feet 2 inches; diameter of ridgepost, 5 to 6 inches; diameter of wall posts, 9 inches; diameter of tiebeams, 6 inches; diameter of principal rafters, 4 inches.

Variations

The construction of the sleep house on the outer beach of Uta and that of the model house in Bishop Museum are identical with the basic structure of the watch house first described, except for the following variations:

Sleep house. This house has four ridgeposts, grooved to hold the ridgepole. There are four wall posts on either side of the house, grooved to receive the wall plate. Four tiebeams are placed on these wall plates, their ends flush with the wall plates. Rafters cross above ridgepole to take thatch ridgepole, and are flush at their lower ends with the wall plates. There are no purlins or thatch rafters, roof sheets of coconut being fastened directly to the rafters. Along the windward side and west end of the house, there are subsidiary wall posts, each 2 feet apart, which are lashed at their upper end to the wall plate or end plate. The thatching from the roof or end is continued to the ground on these sides, the coconut roof sheets being applied directly to the subsidiary wall posts to form a permanent wall. At the east end of the house, the end rafters run out at an angle of 60 degrees from the side rafters, and are supported at their lower end by six low end posts, each 20 inches high, and an end wall plate. The east end thatching continues to the ground, and the end thatching is tied directly to the end wall posts. The whole of the south (leeward) side of the house is permanently open. This house is 24 feet long and 10 feet wide; the ridgepost is 6 feet high, and the eaves on the south side are 3 feet from the ground. The house is low, strong, and compact, well

adapted to withstand the fierce gales from the northwest that strike this exposed beach with full force.

Model house combining features from both the *wale wakayama* and the *wale atua* types. This house has five wall posts on either side, two wall plates, and six tiebeams, which project beyond the end of the wall plates and support two roof plates. There are four ridgepoles, one on the inside of each of the end tiebeams and one on the outer sides of the third and fourth tiebeams. Eight principal rafters on each side run from the roof plates and cross above the main ridgepole to support a rafter ridgepole (*tau tua*). There are two purlins on either side, an eaves purlin and a midway purlin. The midway purlin on one side is narrower than that on the other side. In order to keep the thatch rafters on both sides equidistant from the principal rafters, the narrower purlin is given additional width by chocks (*neinei*) inserted between purlin and rafters. Thatch rafters run on the outside of the purlins. At the top, they support on the under side a third ridgepole (or a thatch rafter ridgepole), *taitohi*, which is separated from the rafter ridgepole by chocks (*neinei*) but is lashed to the thatch rafters. On top of the crossed thatch rafters is laid a fourth ridgepole (or thatch ridgepole), *nii momohi* (fig. 11, b). At the bottom, the thatch rafters support a thatch eaves purlin.

At each gable end, end wall plates (or additional tiebeams) are lashed at each end to the ends of the side wall plates. The principal end rafters are fastened at the top to the second side rafters, all save the center end rafter which is fastened to the main ridgepole between the second and third side rafters. At their lower ends, the end rafters are lashed to the end wall plate, but project downward and beyond this to support an end eaves purlin, which is itself fastened at each end to the side eaves purlins. The end wall plates are braced by two struts (*yoka*) which are lashed to the two outer tiebeams and project far enough to be lashed to the end wall plates. The end thatch rafters run on the outside of the end eaves purlins to the first rafter on either side. On the bottom outside of the end thatch rafters is lashed a thatch rafter eaves purlin, which is itself joined at each end to the side thatch rafter eaves purlins. The ridgepole is further strengthened by two diagonal braces (*yoka*), each brace running from the middle of the third tiebeam (counting from each end) to the main ridgepole, and lashed to both tiebeam and ridgepole.

The lashings of this house conform to Pukapukan pattern. The central principal rafters and the diagonal braces, which both lie against the main ridgepole obliquely, are lashed to the ridgepole by four transverse turns which are themselves tightened by three circumferential turns (*yimu wakapoka*). The first and second ridgepoles and again the third and fourth ridgepoles are braced against each other by five transverse turns of semit which are made taut by three or four circumferential turns, thus forming a suspended loop lashing (*yimu wakamau*; fig. 10, b).

The variations in this model *wale atua* type house bring it close in type to the *wakayama* house, the only distinction being the use of ridgepoles in the model and the heavier construction of the roof framework. It was suggested by informants that the reason for projecting the tiebeams beyond the level of the wall plates, and then adding —of necessity—roof plates to support the principal rafters, is to protect wall posts of pandanus from exposure to the weather. By projecting the tiebeams a sufficient distance (from 12 to 18 inches), low eaves would give ample protection to the wall posts, especially if thin poles are run between the ends of the tiebeams and the ground to support wall sheets. If these poles rot, they can be replaced easily, but it is difficult to replace main wall posts without pulling down and rebuilding the roof framework.

HOUSE FURNISHINGS

Furnishings of the Pukapukan house are of the simplest kind. People sleep on coconut leaf and pandanus sleeping mats laid on the coral pebble floor or on wooden platforms. When not in use, mats are rolled (*taputu*)

and kept on rough platforms made by laying longitudinal members across the tiebeams of the house. Plaited pandanus satchels (*tuluma*, p. 134) for valued fishhooks and larger satchels of the same type for malos and other items of dress were also kept on the tiebeam platforms.

Plaited pandanus pillows (*ulunga laukawa*, p. 134) and wooden headrests (*ulunga lakau*; fig. 12, d) were in occasional use. Most people, however, did not go to the trouble of making a special pillow but used for this purpose any suitable block of wood. Soft driftwood was favorite material, a piece of cork of suitable size and thickness being most prized. Today, the usual headrest is a block of wood inserted into a European pillowcase and packed tight with a thin layer of kapok. This pillow combines a desired hardness with the prestige value of using a European object.

Wooden back rests (*teke*; fig. 12, c) were occasionally made in former times. Made of *wakanava* wood, they were used for resting in a reclining position inside or outside the house.

Insect switches (*uene*) are in great demand when mosquitoes (*naniu*) become vicious:

These switches are quickly made by superimposing three sections from the tip end of coconut leaf midribs, each section carrying 10 to 20 leaflets. These are bound together by several transverse turns of fiber from the coconut leaf midrib or by passing two leaflets from the bottom midrib around the several midribs in opposite directions and tying the ends together with overhand knots. The switch is discarded when the leaflets become dry.

Brooms (*velevele*) made from leaflet midribs are in common use to sweep up rubbish from the floor of dwelling or cook houses.

A short broom (*velevele tuaniu*, C8193) is made of midribs (*tua*) stripped from coconut leaflets and dried in the sun. These are caught about 1 inch from the proximal end in a three-ply braid of pandanus material (*lito*) about $\frac{1}{2}$ inch wide. The projecting midrib ends are bent over and braided with one of the *lito* plies as a single ply. The braiding is continued for about 25 inches; for this length, about 170 midribs are required. When all the midribs have been added, the braiding is continued for about 6 inches and fastened with an overhand knot (*wakapona*). Starting with the commencement end, the braiding is rolled (*tupetupe*) on itself to form a convenient bundle of midribs. The free end of the braid is wound around the butt ends (*mutimuti*) of the midribs and fastened with an overhand knot. The distal ends of the midribs are trimmed off to make bristles about 2 feet long.

A large broom (*velevele wolo*) for sweeping the ground outside the houses is made from hard coconut midribs that have dried on the leaflets. The midribs are gathered together in the hand and spaced evenly around the end of a long handle, generally a length of *ngangie* wood about 4 feet long. The butt ends of the midribs are fastened to the handle with transverse turns of semit, commencement and finishing ends being buried underneath the turns.

Lighting inside the dwelling house is usually provided by burning a few dry coconut shells on the floor. Today kerosene lanterns are fairly common,

especially for evening prayers and for all-night vigils over a corpse. Out-of-doors light, on dark nights of the moon, is provided by small coconut-shell fires. When dry shells are plentiful a number of half shells are strung together on a strip of pandanus material (*lito*) about 2 to 3 feet long by passing one end of the pandanus strip through the soft eyehole of the half shell. Two parallel rows of these shells are placed on the ground and a few dry shells rested on top of the two rows. The shells are lit at the windward end with a *tamine* torch and burn with a fierce flame. Such a firelight torch of dry coconut shells is termed *lama ngaiipu*.

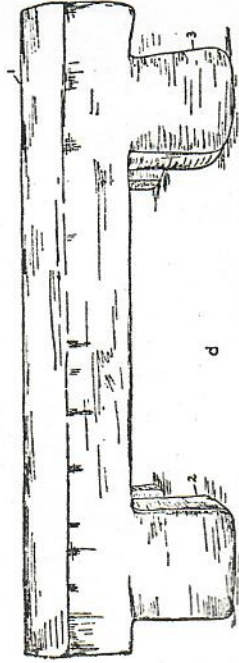
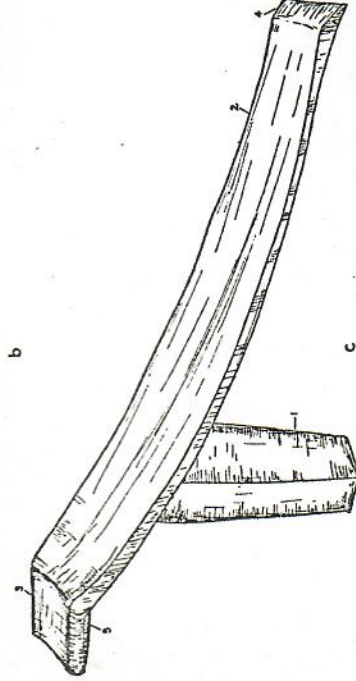


FIGURE 12.—Household implements. *a*, scraper (*vahi'vahi*) (C8127) for removing flesh in making coconut water container; handle of *ngangie* wood (1) 13½ inches long, 1 inch thick at proximal end, and ¾ inch thick at distal end; under surface of handle slightly concave longitudinally; distal end of handle inserted into carefully chipped hole

in scraping shell (*vahi'vahi*, *Nerita polita*) a little to left of apical whorl; four lashing turns of fine three-ply sennit braid (3) pass from handle through shell (2) where commencement end is buried, lashing continues with 16 transverse turns around distal end of handle (4); finishing of lashing buried beneath last turns; at proximal end a thin cord (7) of twisted *rao* fiber is attached so that the scraper may be hung up; two notches (5, 6) cut in handle; the two plies of *rao* cord lapped about notch (5) and fastened with figure-of-eight turns of fine, two-ply twisted sennit which pass around handle and between two notches; free end of sennit seized (8) around *rao* cord and finishing end buried. *b*, coconut stand grater (*huat*) (C8106): clam-shell grater (1) mounted on wooden stand (2) cut from solid block of *vetani* wood; horizontal base 1 foot 10½ inches long, 4½ inches wide at proximal end, and 2 inches thick; two triangular notches cut into proximal end said to be old form of ornament; oblique arm (3) 7 inches long, 3 inches wide, and 2 inches thick; angle (4) at which arm leaves horizontal base obtuse, under side (5) shaped and rounded off slightly; distal end of oblique arm (6) slotted for depth of 2 inches and concave so that convex outer surface of shell grater fits securely against arm; a piece of cork (7) fitted against inner concave surface of shell grater; lashing of three-ply braided sennit (8) applied over cork and around arm; lashing consists of 24 turns with buried commencement, and under normal conditions finishing end would also be buried, but in this grater free end is not cut off flush with transverse turns but is knotted and left free (9) so that grater may be hung up by free end. *c*, back rest (*teke*) cut from solid block of *wakanara* wood (C8161): 1, four-sided stand 8¾ inches high at back and 5¾ inches high at front, sides about 2½ inches wide; 2, main backrest, surface of which has slight transverse and longitudinal concavity, 2 feet 3½ inches long, 9½ inches wide, and ¾ inch thick at edges; continued by horizontal extension rest (3) 4 inches long, ¾ inch thick at sides; 4, end resting on ground has bevel 1½ inches wide; 5, under surfaces of horizontal extension (3) shaped obliquely, coming together in short mesial longitudinal ridge 1¾ inches high. *d*, wooden headrest (*utunga takau*) (C8184); roughly cut from single block of *huapua* wood: 1, pillow section 1 foot 7 inches long, 5 inches wide, and 2¼ inches thick; 2, four legs, each 2½ inches high, 3¼ inches wide, and 2 inches thick; 3, slight flare at base of right front leg due to unskilled workmanship and not to design.

Furnishings of Pukapukan houses today include little that is modern. Occasionally one sees a European chair. Most houses have wooden chests or suitcases in which clothes are kept. European mosquito nets are in common use, and several houses proudly display antique sewing machines. Beyond these few articles and bundles of mats, the house interiors are generally quite bare.

FOOD UTENSILS

To harvest and husk coconuts, the climbing bandage (p. 146), husking stick, and carrying pole are used. The husking stick (*koyo*, C8049) of *ngangie* wood is driven into the ground for two thirds of its length. Informants were sure that the short stick was the only type used formerly, the worker kneeling or squatting on the ground to husk. Today, a much longer stick is generally used, the husker standing and bending over the stick. The carrying pole (*amio*) is a convenient length of coconut leaf midrib on which a nick is made at each end. Pairs of nuts are slung over the pole, the

fiber joining end pairs resting in these nicks. The carrying pole is discarded when the worker returns to the village. Shaped, permanent carrying poles are never used.

A spatula-shaped implement (*kalokalo taunaya*, C8036) of *ngangie* wood is used to scrape out the soft flesh of the drinking nut. One end has a sharp point used for opening the nut by piercing the soft eye. The other end is broad and is used for scraping out the flesh after the liquid has been drunk. The implement is a combination of scraper and spoon.

A hand grater (*kalokalo ui mata*, C8091) is used for grating the flesh of the coconut to make the coconut food called *niu kalokalo*. The blade is the *uyoloto* section of a pearl shell. The nacreous inner surface of the shell forms the front surface (*alotalo*) of the blade, the black outer surface forms the back (*tua*) of the blade. The teeth of the serrated edge of the blade are termed *mata*. The blade is fixed to the handle of *ngangie* wood by 17 transverse turns of three-ply sennit, with buried commencement and finishing ends.

A stand grater (*tuai*) is used to grate the flesh of the mature coconut to make coconut cream. No shell graters (fig. 12, *b*) are in use on the atoll today, but the stand-grater principle is retained in the use of a toothed metal grater attached to a wooden arm which is fastened to a box. To use the shell grater, the worker sat on the horizontal base. Holding the half coconut with both hands, she worked the flesh against the grater teeth with a downward rotary movement. The gratings fell onto a coconut mat on which the grater rested.

A coconut cream wringer (*tawangā*) is made from the husks of the coconut at the *niu mata* stage after burial in beach sand to macerate the inter-fibrous material. The husks are beaten with a stick to remove the decayed parts, washed in water, and are ready for use when dry.

Food packages for transporting talo pudding or fish are made by placing the food on the platter called *laulau ara loloi* and then folding back the two tails (*vakapona*) of its finishing edge over the food; the tails are pushed through the plaiting just below the midrib commencement edge, their free ends tied in a reef knot to make a compact package.

Water containers (*awawongi*; fig. 13, *a*) are made from especially large coconut shells. The husk is removed and the shell opened at the soft eye. The liquid is poured off and the shell filled with salt water. When the flesh has rotted, it is removed through the soft hole with a special scraper called *valuyi* or *valu awawongi* (fig. 12, *a*). A handle of sennit is tied to the netting on either side and the containers hung in pairs (*awawai*) to the rafters of the cook house. No containers were seen in use, their place being taken by buckets or empty cans.

Various implements are used in the harvesting and preparation of talo. The worker in the talo gardens formerly sliced the petioles from the corms with a cutting implement (*taku*, C8096, C8097) made from the backbone of the turtle. This knife was also in general use as a cutting implement as was a knife (*pala*, C8145) made of the jawbone and attached teeth of the *pala* fish (*kawvae pala*). No spade was used for replanting talo; if the ground was hard it was first loosened with a short, straight digging stick (*koyo*).

Talo is prepared for cooking by scraping the dirt from the corm. A scraping peg (*tukituki tete wawa*, C8083) is made from a section of coconut midrib (*palelara*) about 17 inches long. The proximal end of the peg is rested on the ground and the distal end placed against a half coconut shell or piece of wood of suitable height 6 inches from the distal point. The worker holds the proximal end of the peg tight by resting her left knee on it. She holds the corm with the left hand at the distal point of the peg and scrapes (*tete*) the corm downward and toward the body with a scraper (*kai*). The *kai* (C8084) is the bottom portion of a small, discarded dry coconut shell. Part of the outer edge circumference is cut away to form a short cutting edge.

After the scraping, the talo may be sliced (*tele*) into sections with the *kai* scraper, cooked whole, or grated on a stone grater (*wawu ola wawa*). A typical grater (C8053) is a block of coral (*punga talatala*) with a rough surface. The block weighs 8 pounds, is 1½ inches long, averages 6½ inches wide, and is 3 inches thick. The worker sits before the stone and rubs the corms under pressure up and down the surface of the stone.

An oven spreader used for spreading (*tolo*) the hot stones of the oven is a section of the butt end of a coconut midrib (*palelara*). Oven tongs (*pingoi* or *mangoi*, C8191) are made of a piece of coconut midrib, 18 inches or more long. The leaflets are trimmed from the side edges and the midrib doubled so that the outer fibers snap while the inner ones remain to form a sort of hinge. The tongs are green when first made but dry quickly and become brown. Tongs are in constant use for shifting the hot stones of the native oven.

Cooked talo is pounded and mixed with coconut cream in a wooden bowl (*kumete*). A small bowl is shown in figure 13, *e*. A common type pounder (*tuki*) of *ngangie* wood is shown in figure 13, *b*. Pounders in use become polished with oil. Those seen in use ranged from 1 foot 5 inches to 1 foot 7 inches long, with ¾ inches diameter of pounding base. A cone-shaped proximal end is common, but a few pounders have a terminal knob. A larger wooden stirrer (*yenu*) also of *ngangie*, is shown in figure 13, *c*. Other bowls in use were examined in the field. They may be briefly described to

show variations on the type elliptical bowl. All bowls were carved from a solid block of wood. Large bowls used to prepare the talo foods for feasts are named after their makers.

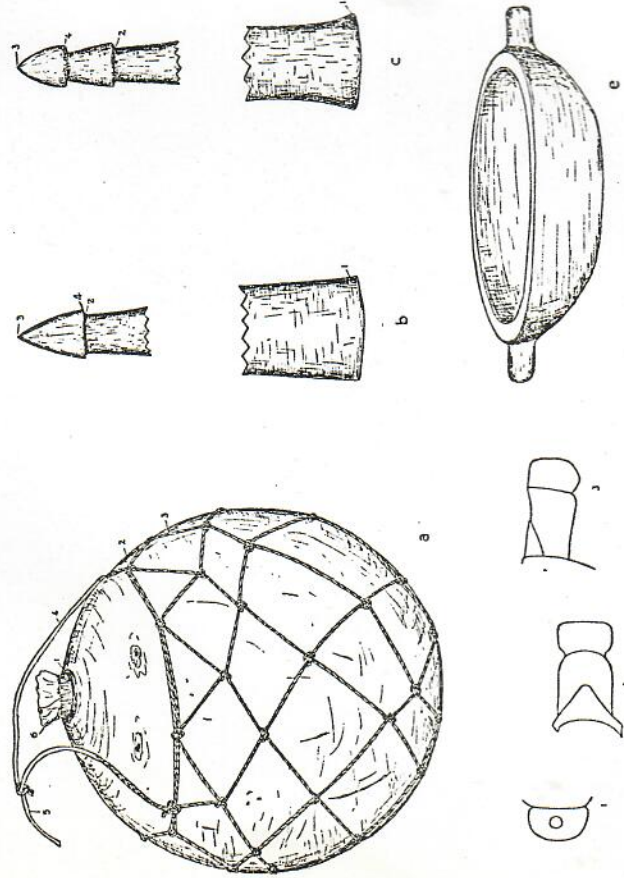


FIGURE 13.—Household equipment. *a*, coconut water container (*waruwangi*) (C8052): soft eye (1) of large coconut (2) opened and enlarged; net (3) of two-ply twisted semit cord encloses shell; handle (4) made by knotting three-ply braided cord to top of netting on either side and knotting another cord (5) to first one; 6, cork (*momono*) a strip of dry pandanus leaf rolled into cone shape and stuffed with more pandanus leaves. *b*, talo pounder (*tuki*) of *ngangie* wood (C8050): weight 4 pounds, length 1 foot 10 inches, diameter of base (1) $3\frac{1}{4}$ inches, diameter of neck (2) $1\frac{1}{4}$ inches; distance from point of proximal end (3) to neck, $2\frac{1}{4}$ inches; diameter of base (4) of cone-shaped proximal end $1\frac{1}{2}$ inches; pounding base (1) flares slightly and is slightly convex; surface of pounder smooth. *c*, talo mixer (*yui*) of *ngangie* wood (C8051): weight $3\frac{3}{4}$ pounds, length 2 feet 4 inches, diameter of base (1) 3 inches, diameter of neck (2) 1 inch; length of first cone of proximal end from point (3) to base (4), $1\frac{1}{2}$ inches; length from base of first cone (4) to base (2) of second truncated cone $1\frac{1}{2}$ inches; distal end of mixer flares out and pounding surface is slightly convex. *d*, variant lugs of wooden bowls: 1, top view of left lug, 2 inches broad, 1 inch wide, and $1\frac{1}{4}$ inches deep at bowl rim; hole, $\frac{1}{2}$ inch in diameter, runs through lug, by which bowl is suspended; 2, 3, top and side views of right lug of same bowl; lug, $1\frac{1}{4}$ inches wide and $1\frac{1}{2}$ inches thick, carved in conventional phallic symbol 3 inches long. *e*, small food bowl (*kamele*) of *puapia* wood (C8139): greatest diameter $1\frac{1}{4}$ inches, least diameter 13 inches; thickness of sides at rim ranges from $\frac{3}{4}$ inch to 1 inch; depth of bowl $4\frac{1}{2}$ inches; lugs plain, 2 inches long and 1 inch in diameter; bottom flat.

BOWL NAME	LONGEST DIAMETER	SHORTEST DIAMETER	DEPTH	REMARKS
—(1)	22"	15½"	7"	No lugs. Right lug plain, bored with hole to facilitate hanging. Left lug conventional phallic symbol. (See fig.13,d). Each lug 9" long and carved into realistic phallus. Bowl holds 1000 talo corms. Two food mixers accompanying this bowl are of ngangie wood, each 23½" long and 2½" diameter at pounding base.
—(2)	17"	11"	4"	
Pilato	6' 7"	2'	12¼"	Lugs plain, 11½" long and 3" diameter in cross section. Bottom shaped like a turtle back (<i>tua wunu</i>) and propped with stones when in use. Holds 400 corms.
Palemaimua	4' 2"	1' 9"	12"	Lugs plain, 11" long, 4" by 2" in cross section. Turtle-backed. Holds 1000 corms.
Elia	6' 4"	1' 3"	10¾"	Lugs plain, 11" long, 4" by 2" in cross section. Turtle-backed. Holds 1000 corms.

Large coconut shells in which to cook talo are set aside whenever they are available. The cook always tells a person about to open a large coconut to crack it with care and put aside the shell when he has drunk the liquid and scooped out the flesh. Shells are thrown away after being used once as cooking utensils.

PLAITING

Plaited articles of coconut leaf or pandanus material are still in common use in Pukapuka. Among these articles are plaited roof sheets and wall screens, floor and sleeping mats, and articles used for transporting, storing, and serving foods. Formerly plaited articles were used also for everyday and ceremonial dress.

In the following brief description of Pukapukan plaited articles, the terminology used is that established by Buck (27, pp. 164-168).

PANDANUS MATERIAL

Pandanus trees are not cultivated to provide material for mat making. Plaiting material prepared from the leaves (*lau*) of the *zeala* variety is termed *lito*, and from the *yulu* variety, *lauwitu*.

The method of preparing *lito* material is as follows:

A woman collects green pandanus leaves from trees in the reserves and brings them back to the village. While the fire she has made of dry coconut midribs and butts is burning, she takes each leaf and slices off (today with a knife, formerly with a sharp

shell), the longitudinal ridge (*tua i'ei*) on its back (*koa yiyi te tua o te lito*). The back of the leaf is termed *tua*, the front, *aloalo* or *vakevake*. When the fire has burned down to red embers, the worker passes the leaves in bundles of about 10 back and forward over the embers for about 1½ minutes or until the leaves are thoroughly warm (*koa lala te lito ki luga o te a'avi*). Some women heat the leaves over the embers before stripping off the back ridge. She next cuts off the narrow ends of the leaves so that the width of each leaf is fairly uniform throughout.

The next process is bleaching (*wakamumu te lito*). The leaves are spread on the ground in the sun, gathered in at sundown each day, and spread again the next day, for several days.

Next the leaf is made smooth (*yoyalo te lito ki te ngaipuu*). The worker takes the butt of the leaf in her left hand, the rest of the leaf in the right hand in which she holds a dry half coconut shell. She presses the outer surface of the shell against the leaf surface and draws the leaf through her right hand. This smooths the leaf, which has become curled and twisted in bleaching.

She strips off the spikes of the leaf (*yiyi te mata tala*) by biting a commencement with her teeth at the butt of the leaf, then inserting the thumb nail in the slit, and running it longitudinally down each side of the leaf. She smooths the leaf (*yapini te lito*) a second time by winding it round the fingers of the left hand, back (*tua*) side inward, at the same time stretching the leaf until it is as smooth and wide as possible.

The final process is making the leaves into bundles (*po'at*) by winding one leaf on top of another until a flat, round bundle about 12 inches in diameter results. The completed bundle is fastened with a strip of pandanus and the material is now ready for plaiting.

Like *lito*, *lauwiltu* leaves are first heated over the fire and bleached in the sun. The process then is as follows:

The spikes are trimmed off (*yiyi loa na mata tala*). Next, each leaf is split transversely and longitudinally. The two leaf strips are soaked in the sea. Each leaf in a bundle of leaves is tied with a single overhand knot to a coconut midrib which is pushed into the sea bottom of shallow water so that the leaves are covered at low tide. After soaking for two to three weeks, both front and back strips of the leaf provide a stiff material (*laukie*) used for mats; the *tua* strips of the leaf, soaked for four weeks or longer, give a soft, flexible material (*kite wete*) used for plaiting malos. When removed from the sea, the leaves are washed in fresh water (*wakamungalo i te yua*). They are then dried in the shade (*haye loa tatau ke pakapaka i loto o te wale*), and smoothed (*yapini*) by winding around the hand. The leaves are bleached a second time in the sun (*haye loa wakala ke munuka*) and rolled into large bundles (*po'at*).

A third preparation of pandanus leaves, termed *lauwala pakapaka*, is easily prepared to provide a strong material for some designs. Dry pandanus leaves are collected from the ground beneath the trees, the spines are removed, and the leaves smoothed and rolled into bundles.

MATS

The technical processes in the plaiting of Pukapukan mats correspond exactly to the Samoan technique for plaiting *papa* and *fala* mats (27, pp. 214-221). Plaiting elements are either single (*luga tai*) as in plaiting thick materials or material where a soft finish is desired, or double (*luga lua*) treated singly as in plaiting thin material (*lito*) which is to be sturdy and long-wear-

ing. In plaiting with a single element, the finished surface has the back of the leaf uppermost. In plaiting with double elements, the two single elements are placed together with the back surfaces (*tua*) outward; when the mat is finished, the back of the leaf shows on both sides.

The free single or double element commencement is known as *kauinga pakapuka* to distinguish it from the double butt commencement for single element plaiting (27, p. 217), which is termed *kauinga pa wenua* (foreign commencement). Informants believed that the double butt commencement commonly used today in hat making and satchel plaiting was introduced from Samoa or from the lower Cook Islands after white contact.

The finishing technique follows the Samoan method (27, pp. 218-220, figs. 116-118). It is impossible to fold in the last dextrals when the right hand top corner is reached, so the worker takes a thin strip of coconut midrib about 6 inches long, points it at one end and makes a longitudinal transverse slit in the other end. The free end of the dextral is inserted in the slit and the midrib is passed back underneath the check strokes, drawing the dextral after it. Both the process and the needle are called *yulu*. The dextral is then cut off flush with the dextrals that have been folded back along the finished edge.

Technical terms employed in Pukapukan plaiting are:

Langa, wai: to plait.

Tawenu: pandanus element.

Tawenu patapata: a wide element.

Tawenu liliki: a narrow element.

Langa tai: to plait with single elements.

Tawenu lua: to plait with double elements.

Tawenu ki lunga, tawenu ki lalo: the element above, the element below, in double element plaiting.

Tawenu: to add elements when working elements have run short and must be lengthened to continue the plaiting.

Kauinga: the commencement corner of the plaiting.

Wakamulinga: the bottom right corner.

Ikikinga: the top right corner where the finishing process (*ikiiki*) commences.

Wakamulinga no te ikikinga: the top right, or finishing corner.

Tautawa: the right or left edge of the plaiting.

Ala: the working shed.

Tonga: the term used to describe the number of elements making up the working shed. The shed is made of 5 to 20 elements according to the thickness of the elements and the skill of the worker. One asks: "Ewea to tonga?" ("How many in your shed?"). The reply is: "E laulau toku tonga" ("My shed is composed of 20 elements").

Lolotonu: the completed part of the plaiting to the left and below the working edge. Kopi: to fold an element in making the edge.

Nape, napepape: a plaiting stroke or series of strokes. To plait in check was given as *tawenu nape takitai*, or *tapani tai*; to plait in twilled twos, *tawenu nape takilua* or *tapani lua*.

Loa, lapalapa: length, breadth of plaiting surface.

Lito makakaka: brittle plaiting material, easily snapped with slight strain.

Panga punipuni: closely plaited mat.

Panga taipupu: uneven rough plaiting.

Panga matalatala: loosely plaited mat.

Yiyinu: even, straight plaiting secured through uniform tension.

In the commencement stages of plaiting, the worker uses her toes to keep elements steady until she has established a firm working edge. The finished portion of large mats is folded under as the work progresses or else kept flat under heavy stone weights (*evatu maunga*) so that the working edge may be brought within reach of the hands. Some workers prefer to lay fine plaiting on a smooth board (*papa* or *palepale*). Straight edges, either right or left, are difficult to produce, and a woman's reputation as a plaiter is based on her ability to make them. Of the good plaiter, it is said that she has skilled hands (*lima pateka*), busy hands (*lima tateka*), or quick hands (*lima tovilu*). These terms are used in chants by the man who wishes to comment on the plaiting skill of his mistress.

The plaiting of large mats is an arduous task. By continuous work a woman can plait a mat 6 feet by 4 feet in about 30 hours.

Design is obtained by using alternate elements of lito pandanus and *lau-wilu pakapaka* pandanus, or by the use of overlaid or through and through elements of red dyed pandanus. The Pukapukan plaiter makes little use of contrasting check and twilled plaiting to make pleasing designs in pandanus work, save in the building-up of a few blocked geometrical designs. The method of preparing red dye and of dyeing (*puni ke kukula*) material for designs is as follows:

The worker scrapes from the roots of the *nonu* plant the dirt, rootlets, and dark brown outer bark. She places a coconut-leaf mat (*laralava*) on the ground, covers it with *puapua* leaves, and scrapes the roots a second time to remove the dark yellow bark, which falls onto the leaves. Hot ashes from a fire of coconut butts are added to the bark scrapings and the whole well mixed together with the hands. The mixture is placed in a wringer (*lavanga*) of coconut husk fiber and the liquid wrung out into a wooden bowl. The wrung-out bark mixture (*ola*) is placed aside. Strips of *laukie* pandanus are now passed through the liquid, then rolled on the hand and placed back into the liquid. *Puka* leaves are packed on top of the rolls of pandanus and the wrung-out bark is placed on the leaves. The whole is set aside for 24 hours. The bowl is then opened, each roll of material is passed through the hands to smooth the dye on the strip, and placed back in the bowl. Sea water is poured on the wrung-out bark material which is pressed (*lomi*) and mixed with the water. It is then wrung out for a second time and the rolls resteepled for a second 24 hours. The rolls are finally removed from the dye, smoothed with the hands, placed unrolled on a coconut leaf mat (*folapola*) and allowed to dry in the shade. When dry, the material is ready for use.

Old Pukapukan designs (*kave*) are shown in figure 14. A group of old women recognized only these designs as definitely old. The Pukapukan worker, however, shows great skill in adapting or inventing new designs. A sampler of designs (C8208) contains 32. The names of some of the newer

designs indicate the extent to which the environment furnishes ideas for design: *yiku ika*, fish tail; *uka*, two-ply twisted sennit; *lauinu*, coconut leaf; *mangamanga*, spider; *puyipuyi*, tobacco pipe; *polotiko*, house veranda; *karvatau*, sennit anchor line; *mato puta*, spotted malo.

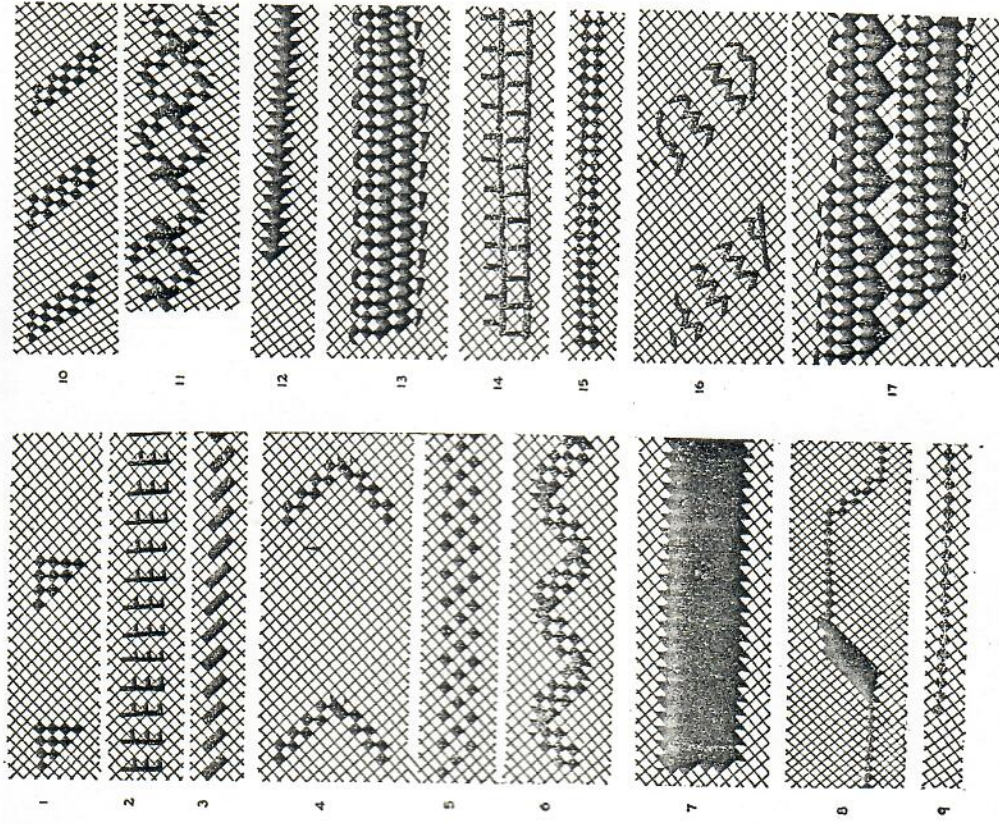


FIGURE 14.—Old Pukapukan pandanus mat designs. Native terminology with available translations: 1, *matalata*, pandanus leaf spines; 2, *te lau wenua wakaravike*; 3, *alaunga*; 4, *kauana*, shark-skin implement for working pearl shell; 5, *koyi tulla*, flash of lightning; 6, *matuakalou*, variety of sea cucumber; 7, *koyi maana*, rainbow stripe; 8, *vae kave*; 9, *moamoa*, a small blue cigaret-shaped coral growth; 10, *lavutu*, banana leaf; 11, *patioiole*, diamond-shaped; 12, *molokan*, centipede; 13, *manuia*, rainbow; 14, *tokerevelangi*, stone resting platform; 15, *kavamalo*, five-ply braided sennit malo; 16, *ulikaana*, a bundle of *kauana* implements; 17, *langi pini*.

Sleeping and floor mats are made of all three pandanus materials in various sizes for children and adults. The name of the material is added to the general name for a mat (*panga*) to distinguish the various types. Pukapukan mats in Bishop Museum are:

NAME	SPECIMEN NUMBER	MATERIAL	SIZE	WEFTS TO INCH	USE
Panga laupua	C8070	lauwili	3'5" square	6	Crawling mat for child
Panga lauwiilu ava	C8071	lauwili	1'11" X 1'6"	5	Mat on which newborn infant is laid
Epaepa	C8074	lauwili	5' X 6'6"	5	Durable under-mat for sleeping
Panga lito	C8114	lito	5'3" X 4'7"	5	Floor mat
Panga lito	C8122	lito	5'8" X 3'7"	5	Floor mat
Panga lauwala pakapaka	C8123	lauwala pakapaka	4'10" X 4'	3	Coarse foundation mat placed under epaepa
Panga karoni (mixed) lauwiilu	C8166	lauwili and lito	5'1" X 3'3"	6	Durable sleeping mat
Panga kie wete	C8121	kie wete	5'4" X 4'	6	Soft mat used to cover body when sleeping

All the above mats have the exposed sinistral finish described by Buck (27, fig. 118, *a*), except the last which presents two interesting variations in the fundamental plaiting technique:

It is made of single elements to obtain a soft surface, but in order to bind the edges securely, the Samoan fine mat technique of a five-weft braid finish is used in defining the lower border. The commencement edge on the reverse side of the mat follows the method described by Buck (27, fig. 161) and the continuation is the turned back fringe described by Buck (27, fig. 162 right). In the Pukapukan mat the dropped sinistrals are cut off flush with the lower border. The upper, finishing edge follows the Samoan method (27, figs. 163, 164) with the exceptions that the Pukapukan mat has a five-weft braid finish; the fringe ends produced by the projecting sinistrals and dextrals are cut off flush with the border; the right upper corner is not braided into a tail but the last three working dextrals are roughly interlocked by carrying the third working dextral from the end over the corner of the mat and pushing it under one sinistral, then with a forward turn, pushing it under two dextrals and cutting the ends off flush with the edge. The last two working dextrals from the end are turned back at the edge and pushed underneath the third dextral where it passes to the other side of the mat.

All the mats have overlaid or through and through designs of the customary red-dyed pandanus material. Most of the designs are old but several are obviously modern, for example the turtle (*wonu*) and the house side (*tataruale*) designs. The mats are more heavily laden with design than is usual because the plaiters felt that many designs were appropriate for what they knew would be museum pieces.

The use of plaited mat material for canoe sails is mentioned on page 181. Informants stated that formerly four light mats were sewn together (*tui*) with strips of pandanus and a fish bone needle to make a sort of rough mosquito net (*ana*).

Malos made of soft pandanus *kie* material (*malo kie*) were formerly worn by the men for dress occasions. They were worn with the malo of sennit (*malo kawa*) for wrestling contests and fighting (pl. 3, *c*). Three malos in the Bernice P. Bishop Museum collection are:

Malo 3501. 11 feet 5 inches long, 6½ inches wide, fringe on upper and lower edges 1¼ inches deep. Wefts 12 to the inch. *Paiokiole* pattern. The technique follows the Samoan fine mat style with a lower border commencement of a three-weft braid, the dextral and sinistral elements functioning as fringe (pl. 4, *B*). The top border is a three-weft braid finish, the dextrals and sinistrals again forming a fringe. The working dextrals on the right upper corner are secured with two overhand knots and are not braided. (Sec 27, figs. 161, 163, 164.)

Malo B3662. 14 feet 4 inches long, 7 inches wide, upper and lower fringe 1½ inches deep. Wefts 12 to the inch. *Paiokiole* pattern. The technique varies slightly from the previous malo in that the three-weft braid fixations are worked on the reverse side, so that the garment was probably turned during plaiting. This is further evidenced by the fact that the knotted tail finish is formed on the right lower corner. Not only the lower and upper edges, but the right side as well, have the braid fixation and fringes. It is possible that the left side was plaited in a similar fashion, making the similarity to the Samoan fine mat clear, but the left side is now undefined and ragged, perhaps eaten away by rats.

Malo C8069. 6 feet 8 inches long, 10½ inches wide, upper and lower fringes about ½ inch deep. Wefts 8 to the inch. *Paiokiole* pattern. This malo (pl. 4, *C*) was made as a sampler which explains its shortness. The material is soft and pliable, but the modern workmanship is rough compared with the two old malos just described; these malos are no longer made in Pukapuka today and thus the women are not very skilled at the work. The top and bottom edges are fixed by a five-weft braid, the left and right edges are given the customary mat turn. The right upper corner finishing dextrals are knotted.

The design material in all three malos is not overlaid but forms plaiting elements. A fourth malo examined in the field corresponded in all particulars to the first two malos:

It was 12 feet 7 inches long and 8 inches wide and had the *paiokiole* design. An informant stated that this malo was one of several made by his mother and given him when he attained sociological adulthood (*wakatane*) about 50 years ago. He suggested that formerly some malos were made 5 fathoms or more long, especially those that might be needed for fighting. I neglected to verify this statement, but if true it means that a malo of such length wound round the waist would have formed valuable defensive equipment against spear thrusts.

Edge-Partington (8, 2d ser., pl. 38, no. 4) figures a typical Pukapukan malo in the British Museum, 8 feet long, 10 inches wide, and with the usual *paiokiole* design.

SATCHELS, BELTS, PILLOWS

Satchels of pandanus are used today in Pukapuka to carry to church on Sunday a Bible and note paper with which the sermon is followed and text noted down. The making of these satchels has been introduced from the lower Cook Islands, and the craft conforms in all particulars to satchel techniques described for Manihiki and Aitutaki (29, pp. 127-131; 26, pp. 190-202). Coiled baskets are sometimes made, but the technique has been recently introduced from Samoa by the wife of the resident agent.

A two-cornered pandanus double, or envelope, satchel called *tulumā* is thought by informants to be old. Small *tulumā* such as the one described below were used for storing fishhooks and pearl-shell ornaments. They were known as *pa tulumā*, and a specially valuable pearl-shell hook was known as *mulu tulumā*, (the precious object) after the bottom of the *tulumā* receptacle. Larger *tulumā* were made for the storage of pandanus and sennit malos. The *pa tulumā* (C8120) is made of *laureala pakapaka* and *lito* materials:

The inner satchel is $9\frac{1}{4}$ inches long, $7\frac{1}{2}$ inches deep and 1 inch wide. The outer satchel is $9\frac{1}{2}$ inches long, $6\frac{1}{4}$ inches deep and $1\frac{1}{2}$ inches wide. The plaiting is coarse, wefts being 3 to the inch. The plaiting is in check, with double elements, alternate sets of elements being dried pandanus and *lito*. The basket is plaited like a strip of mat, the ends brought together and the free marginal wefts plaited to make a cuff plaited in sections to the required depth. The sides are brought together to compress the bottom opening longitudinally; the bottom is closed by check plaiting. The free ends of the finishing wefts are pushed (*yutu*) under three or more elements in the plaiting on the outside of the satchel, pulled tight, and the exposed ends cut off flush with crossing elements. The rim is finished with a level edge by the downward turn of the rim elements.

Abdominal belt supports worn by women after confinement are made of plaited pandanus:

Belt C8072 (*pale manara*) is 1 foot 11 inches long, 4 inches wide. Strings by which the belt is fastened at the back range from $8\frac{1}{2}$ to $10\frac{1}{2}$ inches long. Wefts 6 to the inch. Plaiting is by the simple mat technique in double element check, with *laureala pakapaka* and *lito* used as crossing elements to form a small diamond-shaped design. When the belt length is finished, material for the strings is pushed through under seven to nine crossing elements at each corner. Four strings are thus attached to each corner and braided into a four-ply braid, finished off with a single overhand knot.

Belt C8073 (*pale tata*) is 2 feet long, 3 inches wide. Strings range from 8 to $13\frac{1}{2}$ inches long. Wefts 4 to the inch. Plaiting is with double element check of *laureala pakapaka* and *lito*, forming a simple diamond design. Three string elements are pushed under crossing elements at each corner and braided into a three-ply braid, finished with a single overhand knot. Both belts are shorter than they would be if intended for use by Pukapukan women.

Informant stated that formerly a pillow or headrest (*ulunga laukawa*) was made from plaited pandanus material. As described, the pillow was apparently cylindrical in shape, 12 inches long and 6 inches in diameter at

either end. A hollow cylinder was made and stuffed with banana leaves (*lau routu*) or coconut husk fiber (*lau karua*). The technique by which this pillow was made has been forgotten, for no woman professed herself able to make the article. Yielding to my suggestion that someone experiment, two pillows were made, but neither conforms to informants' description.

Pillow C8182 has a four-cornered cover $13\frac{1}{2}$ inches long, 6 inches wide and $2\frac{1}{2}$ inches thick. It is plaited in single element check of *lito* material. Wefts 3 to the inch. The technique is that of ordinary mat plaiting, plaited in the modern way around a wooden block. The oblong cover is stuffed with coconut fiber and closed by passing finishing wefts under adjacent plaited elements.

Pillow C8183 is also four-cornered, 11 inches long, 5 inches deep, and $2\frac{1}{2}$ inches thick. It is plaited in single element check of mixed *laureala pakapaka* and *lito*. Wefts 2 to the inch. The cover is stuffed with banana leaves.

Hats of European style are made of pandanus materials or prepared coconut fiber. They are of the Panama type, either plain or decorated by change of plaiting stroke or by overlaid strips of red-dyed materials. They are worn as protection against sun and as part of the church-going costume. No head covering or eyeshade of pandanus or coconut leaf was made in former times.

COCONUT-LEAF ARTICLES

MATS AND SHEETS

The technique of making the Pukapukan coconut roof sheets, roof ridding sheets, and wall screens follows exactly the Samoan technique (27, pp. 169, 174, 176; cf. 26, pp. 7, 24).

Pukapukan coconut leaf mats in Bernice P. Bishop Museum are described in the list given on page 136.

BASKETS

Plaited coconut baskets (generic name, *ota*) are made with two different commencements—the twisted, two-strip commencement (29, p. 107, fig. 25) and the Pukapukan turned-back, two-strip commencement.

In the twisted two-strip commencement, the leaflets of each strip, following their natural direction, are twisted over the leaflets immediately in front. Two strips carrying leaflets are placed together, the sinistral-bearing strip above the other strip. To make the plaiting close and neat, one or more extra leaflets are added as extra wefts by placing the butt end between two midrib strips forming the commencement. This is the two-strip commencement with extra wefts which corresponds to the Tongarevan technique (28, pp. 127-133, figs. 14-17). The plaiting of the body of the baskets is in twill. At the bottom are a few rows of check, the size of the basket being made smaller by superimposing two alternate dextrals or two alternate sinistrals and plaiting the two elements as a single element. The baskets are finished with a braid.

NAME	NUMBER	COMMENCEMENT	Body or Mat	FINISHING	Use	
Takapua	C807	whole midrib (see 29, p. 105, fig. 22)	13 rows twilled two's	three-ply braid with free tail tucked under crossing welts	floor mat or rough wall screen	
Takapua	C805	two strip (see 29, p. 106, fig. 24)	extra welts added to make close; plaited for feet with alternate rows of twill and check, followed by 8 rows of check	three-ply braid, with free end tucked under crossing welts	floor mat or rough wall screen	
Takapua Iua	C806	in check with single closed leaflet welts (see 27, p. 210, fig. 111)	13 rows of check	turned back two strip (fig. 15, a), continuous upper strip containing 11 natural dextrals, lower strip containing 15 dextrals of which first 2 from left function as dextrals, 3-13 turned back to form sinistrals	turned back two strip (fig. 15, b), lower strip containing 15 natural dextrals, of which 1 and 2 act as dextrals; 3, 4, 5, turned back to engage dextrals of first superimposed upper strip of 3 dextrals; 7 and 9 form sinistrals engaging 8 and 10; 11, 12, 13 form sinistrals engaging second up- per section of 3 dextrals; 14 a dextral, 15 a sinistrals	same as for polapola ika
Wakatapu	C806	turned back two strip (fig. 15, a), continuous upper strip containing 11 natural dextrals, lower strip containing 15 dextrals of which first 2 from left function as dextrals, 3-13 turned back to form sinistrals	13 rows of check	three-ply braid, free tail fastened with knot	platter for storage or transport of food	
Polapola	C8150	turned back two strip (fig. 15, b), lower strip containing 15 natural dextrals, of which 1 and 2 act as dextrals; 3, 4, 5, turned back to engage dextrals of first superimposed upper strip of 3 dextrals; 7 and 9 form sinistrals engaging 8 and 10; 11, 12, 13 form sinistrals engaging second up- per section of 3 dextrals; 14 a dextral, 15 a sinistrals	8 rows of check	three-ply braid, with free end tucked under crossing welts	container for fish	
Polapola	C8077	same as for polapola ika	12 rows of check	braided tail	placed on ground to hold talo corns when preparing for cooking	

Baskets made with the Pukapukan turned-back, two-strip commencement (fig. 15, a, b, c) are called generically *kete*. They are used for transporting talo corns, coconuts, crabs, and the like. Small baskets with one or two points are sometimes used to hold talo pudding (*olo*), but they are generally used as shellfish and crabbing baskets. The plaiting technique is the same as for the Manihiki *pite* pointed receptacles (29, p. 117, fig. 33).

Pukapukan baskets in Bernice P. Bishop Museum are described in the list (pp. 138-139):

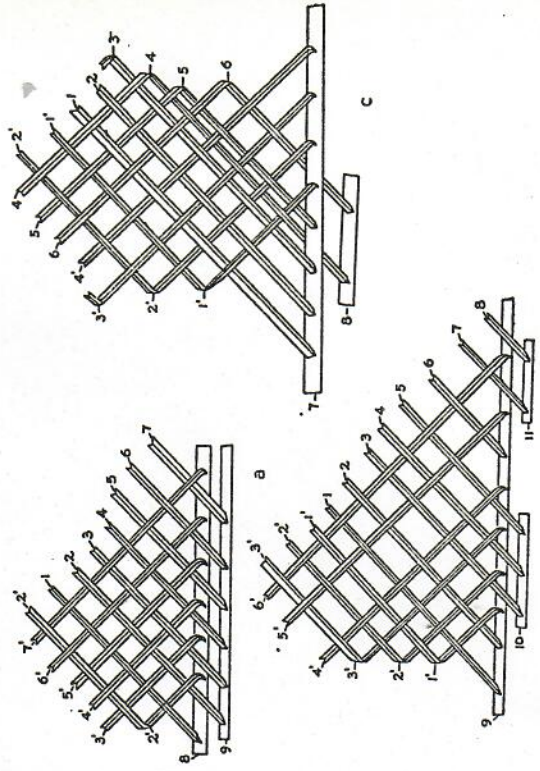


FIGURE 15.—Coconut-leaf mat. a, turned-back two-strip commencement: midrib strip (8) with leaflets naturally directed toward right; leaving out first leaflet (1), remaining leaflets on strip turn back to function as sinistrals (2', 3', 4', 5', 6', 7'); sinistrals engage with naturally inclined leaflets of second strip (9) which function as natural dextrals (2, 3, 4, 5, 6, 7). b, discontinuous two-strip commencement: lower continuous leaflet strip (9) carries leaflets naturally directed toward right; leaving out dextral leaflets 1 and 2, leaflets 1', 2', 3', 4' are turned back to function as sinistrals, engaging with naturally inclined dextral leaflets (3, 4, 5) carried by second strip (10); leaflet 6, of first strip (9) keeps its natural direction and acts as a dextral; the next two leaflets of this strip (5', 6') bend back to act as sinistrals engaging previous dextrals; leaflets (7, 8) of third strip (11) act as natural dextrals and will engage with turned-back sinistrals of first strip; course of plaiting continued by additional strips and turning back of naturally inclined leaflets to left to act as sinistrals. c, variation of turned-back two-strip commencement: midrib strip (7) carries eight leaflets naturally inclined to right; to establish stroke four leaflets (1, 2, 3, 5) function as natural dextrals; they engage in plaiting stroke remaining four leaflets on strip which are bent back to act as sinistrals (1', 2', 3', 4'); additional strip (8), carrying two natural dextrals (4, 6), placed under first strip (7), and two extra dextrals engage with turned-back sinistrals of first, or upper strip (7); when stroke has been established, edges are formed by giving a half turn to sinistrals at left edge so that free sinistrals are converted back into functioning dextrals; for right edge, free dextrals given a half turn to left and continue to function as sinistrals in plaiting.

A small receptacle or container of coconut leaf is sometimes made to transport young birds from the reserve islets to Wale. The containers function also as bird cages.

Receptacle C8144 (*puhu manu*) is made from a length of coconut midrib, 14 inches long and carrying 19 leaflets, cut from the tip end of a coconut leaf. The plaiter works with the midrib base uppermost, and starting from either end plaits the leaflets in a close check to form a cone 20 inches long, base diameter 4 inches (fig. 16). The base is finished with a three-ply braid, and the two free ends of the braid are knotted together. When a bird is placed inside the cone, the base is fastened together by interlacing a leaflet from side to side through and under the base braiding. If the receptacle is used to transport flowers or plants from the islets, the cone-shaped container is plaited round the objects.

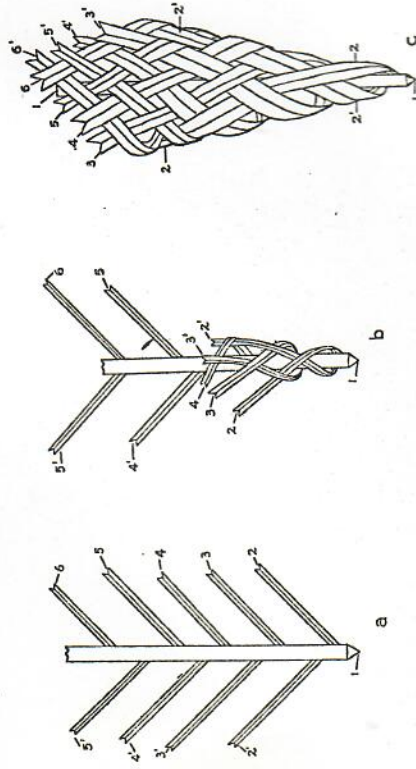


FIGURE 16.—Commencement of cone-shaped receptacle (*puhu manu*). *a*, section of midrib (1), carrying nine leaflets (2, 3, 4, 5, 6, 2', 3', 4', 5'); broad base of midrib uppermost. *b*, commencement of plaiting: leaflet 2' carries across from left to right and engages leaflets 2, 3, 4, 5, 6; leaflet 3' carries to right and engages leaflets 2, 3, 4; process continues, alternately bending left side leaflets to right, right side leaflets to left, plaiting leaflets in check. *c*, result after several plaiting strokes: leaflet 2' has engaged leaflets 2, 3, 4, 5, 6 and has passed around under cone; similarly, leaflet 2 has engaged leaflets 2', 3', 4', 5' and passed to other side of cone; other leaflets, those from left side functioning as dextrals, those from right side as sinistrals, plaited together in open leaf check; only six leaflets on each side figured, but process continued with all leaflets on midrib base; when cone is large enough, free ends of leaflets braided in three-ply braid, and two ends of braid knotted together, forming fixation edge for mouth of receptacle.

Platters (*lauiau*) on which food is served are characterized by a natural concavity formed by the dull side of the coconut leaflets when plaited or folded together. All pudding platters for the talo dish called *olo* have the braided finishing edge; all fish platters have the overhand knot finish; all platters for the talo dish called *loloi* have the non-braided, double-knot finish. All platters are approximately 18 inches wide and 9 to 12 inches deep.

Platter C8081, *lauiau ava olo*, is used for serving the talo pudding (*olo*). The platter has the Pukapukan turned-back, two-strip commencement. It is plaited in open

leaf check for 6 rows. The dextrals are gathered together and braided in three-ply, and fastened with a knot; the sinistrals are similarly treated.

Platter C8082 (*lauiau ava ika*) is a platter for serving fish. It has a single-strip commencement in which four leaflets from the left function as dextrals and four leaflets on the right are turned back to function as sinistrals. Two leaflets carried on one strip are added to make the plaiting closer. The plait is in check for a depth of 12 inches when dextrals and sinistrals are gathered together on one side and tied in a double overhand knot with the gathered wefts from the other side.

Platter C8080 (*lauiau ava loloi*) is a platter for serving the dish called *loloi*. It has the turned-back, two-strip commencement, and the body of the platter is plaited in open leaf check for a depth of 12 inches. In finishing the edge, all the dextrals are carried across to the right side and knotted. Similarly, the sinistrals are all carried across to the left side and knotted.

MALO

Formerly the everyday dress of the Pukapukan man was the coconut-leaf malo (*malo launuu*), made by ordinary plaiting technique. It was worn during working hours and thrown away when soiled. The following malo is typical:

Malo C8165 (*malo launuu*) is made from a strip of midrib $13\frac{1}{2}$ inches long, carrying 10 leaflets (pl. 3, B). Each of the six leaflets in the middle of the strip is split into four lengths longitudinally. These 24 elements are plaited in a close check to a depth of $10\frac{1}{2}$ inches, width 7 inches. What is really a small coconut sheet is narrowed by plaiting two elements as one for five rows and then four elements as one for one row, the ends being gathered together and braided in a four-ply tail of which each ply is composed of four elements. The tail is $12\frac{1}{2}$ inches long and finished with an overhand knot. The sheet material has a natural concavity on the dull side of the leaflets. The two end leaflets on either end of the commencement strip are each split into two longitudinally and braided in a four-ply tail, finished with an overhand knot, 24 inches long on one side, 20 inches long on the other. The commencement strip is chewed with the teeth and softened before wearing.

FANS

Both coconut leaf and pandanus fans (*ili*) are made by the women and used on all occasions by men and women. (See pl. 3, A.) A square fan made of pandanus is similar to a type of Samoan fan figured by Buck (27, p. 633, and pl. L.V, B, 4), but the style is said to be old in Pukapuka:

This fan (C8170), *ili lauvala kanoni ma te lito*, is plaited in check with wefts of *lauvala* (*lauvala paka*) (pl. 3, A, 1). It is 7 inches square and mounted on a handle of *puapua* wood 14 inches long and $\frac{3}{4}$ inch wide. The commencement of the plaiting is by the ordinary pandanus mat technique. The left edge and the bottom edge are plaited to a depth corresponding to half the size of the completed fan. At the working edge a shed is made the width of the fan. A long strip of *lito* material, the width of the handle, is laid in this shed, passing underneath and back over the last element of the shed. The handle, which has been whittled down to half its thickness, is laid in the shed on top of the *lito*. The strip of *lito* is brought back and laid on top of the handle, the free ends of the *lito* strip projecting beyond the proximal end of the handle. Plaiting continues beyond the handle which is thus gripped by the crossing wefts, as alternate elements forming the shed are laid down and taken up. The fan is then turned so that the previous left edge is at the bottom of the plaiting and the handle projects to the left.

The new functioning left edge of the fan is now plaited and the top edge finished off with the customary mat finishing technique (*ikiikina*), the projecting sinistrals being cut off flush with the top. The dextrals are pushed underneath crossing wefts and cut off close to the right edge of the fan. The free ends of the *lito* strip are tied round the handle with a double overhand knot to prevent the fan from coming off the handle when in use.

Coconut-leaf fans of characteristic Polynesian shape, base of triangle at the top, apex at the bottom, are made either with midribs to which the leaflets are attached or else with leaflets stripped from the midrib.

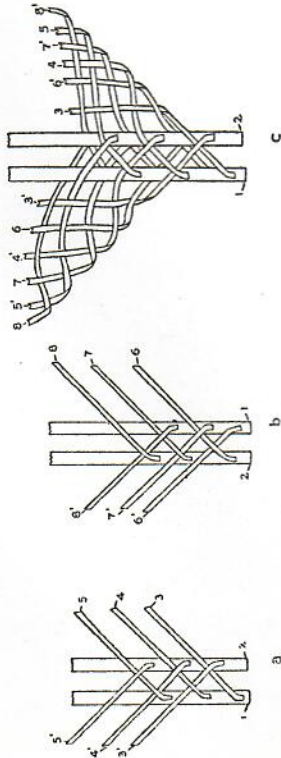


FIGURE 17.—Commencement of coconut-leaf fan (*ili yukuyuku*). *a*, midrib strips (1, 2) shown with only three upper leaflets on each to avoid confusion: leaflet 3 carried across to opposite side, opposing leaflet 3' being carried across to its opposite side on top of leaflet 3; leaflet 4 carried across, and right leaflet 4' similarly carried across, passing on top of leaflet 4; similarly with leaflets 5, 5'; each leaflet crosses alternately until all are crossed. *b*, under leaflets of midrib cross as in *a*: midribs turned over so that left midrib (1) is to right and right midrib (2) is to left; each leaflet crosses alternately from either side as in *a*; leaflet 6, which is under leaflet corresponding to leaflet 6', corresponding to leaflet 3'. *c*, establishment of plaiting stroke: leaflet 3 from midrib 1 carried across and given forward half turn to engage with leaflet 6' which has come across from underneath and is itself given a forward half turn to engage with leaflet 4 from midrib 1; similarly with leaflets 7, 8 and leaflet 5: on other side, leaflet 3' engages with leaflet 6, leaflets 4', 5' with leaflets 7, 8 from opposite side; plaiting continued by carrying across all leaflets on either midrib to opposite side and plaiting in closed leaf check; when body of plaiting is large enough, top edge finishes with ordinary pandanus-mat finishing technique.

Fan C8174 (*ili yukuyuku*) is made from two pieces of midrib cut from the tip end of the coconut leaf (pl. 3, A.3). Each midrib is 13 inches long. The left midrib has 9 leaflets on one side, 8 on the other; the right midrib has 9 leaflets on one side, 7 on the other. In the finished fan, the butt ends of the midribs form the handle. Commencement and establishment of plaiting stroke are shown in figure 17. The fan is plaited in closed leaf check. At the top, each closed leaf is split into two and the finishing edge is plaited with five rows of check. Commencing with the top left corner, the edge is finished with the common mat technique (*ikiikina*), the projecting sinistrals cut off; the free ends of the dextrals are cut off on the line where each weft was previously split into two. The fan is neat and compact, the *ikiikina* finishing technique providing a strong, slightly curved finishing edge. This fan is 16½ inches long, 15½ inches wide across the top.

The same technique is employed with individual leaflets. The required number of leaflets, depending on the size of the fan, are stripped from the tip of the midrib and

divided into two bundles with the tips of the leaflets lying in the same direction. The butt ends of the two bundles are laid together and roughly fastened with a leaflet. Commencing about 4 inches from the proximal ends of the butt leaf bundles, leaflet 1 from the left bundle is passed to the right, leaflet 1 from the right bundle is passed to the left over leaflet 1 of the left bundle. This process is continued until all the leaflets have been crossed over. The leaflets are then plaited in closed leaf check and the finishing edge made with the *ikiikina* technique. The two bundles containing the butt ends of the leaves are bound together with transverse turns of semit, the completed lashing having buried commencement and finishing ends (pl. 3, A.2). The technique is the same as that of the midrib-handle fan shown in figure 17 save that the handle is composed of the butt ends of the leaflets bound together.

Fan C8189 (*ili yae-yae*) is a smaller fan made by the same technique. It commences with check plaiting, goes on to twilled twos, twilled threes, and finishes with rows of check. The fan is 13½ inches long, 6 inches wide at the top, which is straight instead of curved as with the other two fans. The handle is bound with nine turns of common string.

CORDAGE

Various materials are used as cords. Readily obtainable materials that serve a need of the moment are coconut leaflets and strips of fiber from the coconut midrib or from dried *pulaka* stalks. These are used without preparation and discarded when no longer necessary. More permanent cordage is made from the husks of the coconut and from bark of the *wao* tree. *Wao*⁸ fiber is used for fishlines where quality is more important than quantity; coconut fiber is used for every variety of cord where strength and quantity are desired. Human hair is occasionally used to make short cords by which valuable ornaments (*yana*) are hung from the neck.

Wao fiber is prepared for the finer fishlines as follows:

Bark is peeled (*wowole*) by a man from a small branch or sapling (*yuti*) of the *wao* tree and rolled up into a bundle (*po'ka*). A woman proceeds with the task. She puts the bark in a wooden bowl and covers it with fresh water. Then she places a strip of bark on a flat surface, a special board or the blade of a canoe paddle, with the inner surface of the bark lying downward on the board, and scrapes (*zaitu*) away the green outer bark with a shell until only the white inner bark is left. When all the strips of bark have been scraped, they are braided together at the ends by the man or woman to make a bundle of strips termed *titi wao*. This *titi* is hung in the sun for about two weeks to bleach. At the end of this time, each strip is rubbed with a half coconut shell until it is soft and pliable. Each strip is then shredded (*waywayi*) into narrow widths (*yako*) which are ready to be made into fishline.

Appliances used in *wao* bark preparation are:

Scraping board C8047 (*papa zaitu wao*) is a board of *puapia* wood, 26 inches long, 4 inches wide, and 1½ inches thick. The scraping surface has a slight transverse convexity.

Shell scraper C8046 (*hoti*) is a highly polished and smoothed black-lipped pearl shell; greatest length 3¾ inches, greatest width 3¼ inches, thickness at the hinge ¾ inch, thickness at the lip 1/16 inch.

Hank of fiber C8132 (*titi wao*) is a semi-bleached hank of prepared *wao* bark from which line may be made. Thirty-one strips of bark ranging in length from 3 feet to 6

⁸The tree is *wao*; fiber prepared from its bark, *wao*.