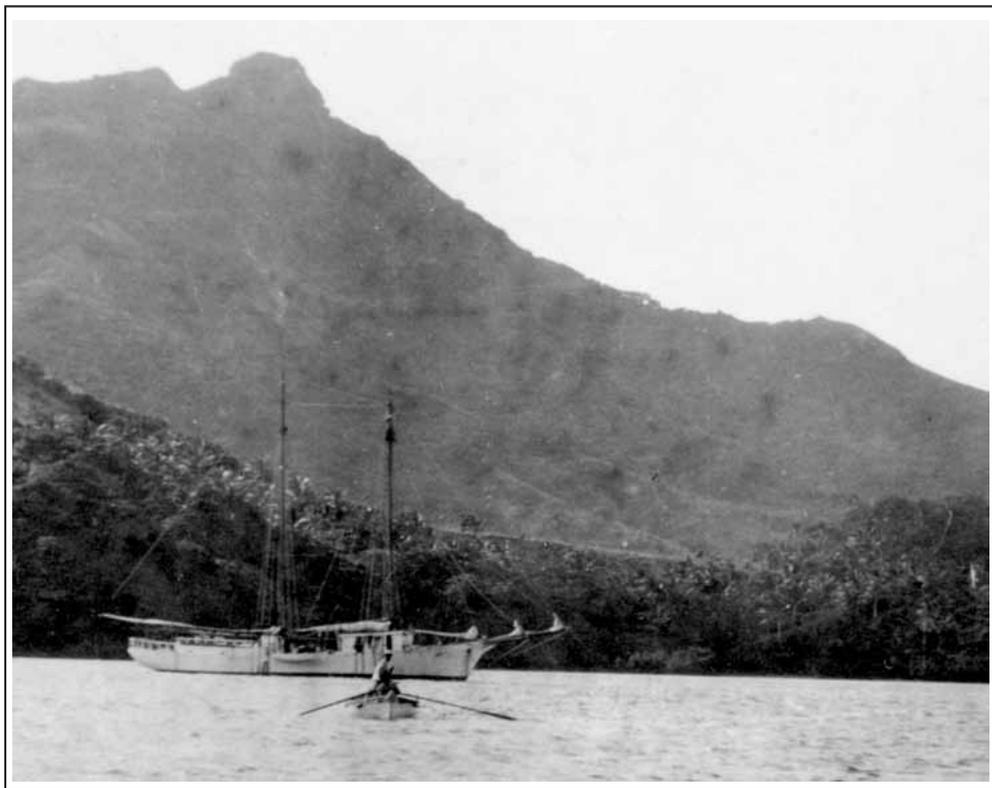


**Field Notes of E.H. Bryan, Jr.
on the Whitney South Seas Expedition
(February–November 1924)**

Compiled by
Neal L. Evenhuis



**Honolulu, Hawai'i
April 2007**

Cover photo: The Whitney Expedition's schooner *France* in Pago Pago Harbor, April 1924.

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**Pacific Biological Survey
Bishop Museum**

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Introduction

The following pages are devoted to the journals written by Bishop Museum curator Edwin Horace Bryan, Jr. (1898–1985) as he participated on one of the Whitney South Seas Expedition trips to the South Pacific. Bryan’s notes span most of the year 1924 (February through November). He traveled from Honolulu to Samoa to join the expedition, which used the 75-ton schooner *France*, which had been purchased in Tahiti in 1921 specifically for the Whitney Expeditions. From Pago Pago, the team visited islands throughout (then) American and Western Samoa, the northern Cooks, and on to Fiji where they spent most of the expedition in the Lau group—although Bryan also spent some time on Viti Levu and Ovalau while the boat was in repair and at the end of the trip.

While on the expedition, he climbed rugged peaks, slogged through swamps and marches, hiked across scorching hot atolls, trudged through sweltering hot mosquito-infested rainforests, all with his camera and collecting gear in tow; and eventually amassed an unparalleled collection of plants, insects, and other terrestrial animals. In addition, he wrote down detailed observations on the many specimens collected, the surrounding landscape; the weather conditions; as well as the geology, and even cultural traditions; took hundreds of photographs, and made sketches of most all the islands visited. He was curious about everything Pacific and made extensive lists of indigenous terms for plants and animals whenever he visited a new island group.

This work is a compilation of all of Bryan’s efforts during that 10-month trip in 1924 to islands that in some cases had not yet been “westernized” and others that contained vegetation and animals that had not yet been disturbed by urbanization, westernization, and/or agricultural use. It includes all of his daily journal entries as well as most of the photographs he took (which were all listed in his daily entries) and the many sketch maps of islands and other sketches he made.

The information herein derives from nine field books that Bryan used to produce a clean copy of his original scribbled notes and from the hundreds of black and white photographs he took; the latter that are contained in two large binders. All of this original material is currently housed in the Bishop Museum Archives (see Resources below for finding aid numbers).

Background to the Expedition

The Whitney South Seas Expedition actually was comprised of a number of expeditions to various

South Pacific islands from the years 1920 to 1939. They were supported through funding from financier and horse breeder, Harry Payne Whitney, and coordinated through the American Museum of Natural History. The first field leader was bird collector, Rollo Howard Beck (1870–1950) (see photo on p. 303) and the primary mission of the expedition was to collect birds throughout the Pacific. As a professional courtesy, the Whitney organizing committee made arrangements with Bishop Museum to not collect in Hawaii and exchanged specimens from Hawaii which went to the AMNH while a selection of specimens from the Whitney Expedition went to Bishop.

Then Bishop Museum director Herbert Gregory was on the advisory committee of the expedition and suggested that they take on an entomologist on one of their trips. The committee thought this a good idea and in 1924 the 25-year old Ed Bryan, at the time an Assistant in Entomology at Bishop Museum (in 1927 he acquired the lofty title of Curator of Collections), was chosen by Gregory to join the expedition in Samoa. He gave him specific instructions to “collect everything except birds”. The other members of the team would be doing that just fine, thank you. Bryan had already been on two previous expeditions (two of the four *Tanager* Expeditions) that were coordinated through the Bishop Museum (one to Johnston and Wake Islands; the other, to the Northwestern Hawaiian Islands). As such Bryan had garnered month’s worth of excellent field experience and was most suited for the job as well as being used to long sea voyages aboard various types of vessels.

Bryan gathered up the things he needed and boarded the S.S. *Ventura* on 11 February 1924, heading to Samoa where he would join the expedition members on the schooner *France*. For the next 10 months the expedition visited over 50 islands, and Bryan made detailed notes on everything he encountered. Additionally, Bryan was especially interested in geography and kept daily logs of the ship’s position, which would help future workers pinpoint exact locations on any particular day of the expedition.

Edwin Horace Bryan (1898–1985)

Bryan was born Edwin Horace Bryan III on 13 April 1898 in Philadelphia, Pennsylvania, but before he was a year old his father, a shoe dealer in Philadelphia, decided to move out to California to try out citrus farming in the Redlands area of Southern California. It was here that Ed Bryan grew up although he was sent north for his pre-teen years to attend St. Matthew’s Military Academy in the Bay Area town of Burlingame, California. After Ed’s grandfather died, Ed’s father abandoned the Jr. title and Ed took it on, one which he kept the remainder of his life, even after his father died.

After graduating from Redlands High School and getting an invitation from an uncle, his father thought it would be good for Ed to come out to Hawai‘i, go to college, and find a job. He arrived in Hawaii on 4 July 1916 and stayed with that uncle, who had just become head of the Mid-Pacific Institute. He entered the College of Hawaii (now the University of Hawaii) in 1916 and received his B.S. degree in general science in 1920. While enrolled, WWI saw Ed signed up as a trainer of soldiers via the U.S. Army Training Corps (forerunner of the ROTC). While at College, Ed worked in the library and assisted botanist and Asiatic explorer Joseph Rock. It was no doubt this association with Rock that helped him change his interest from sugar technology to general science.

At the request of entomologist Otto Swezey and through the good references of entomologist D.L. Crawford, on 1 July 1919, Bryan started a summer job as Assistant Entomologist assisting Swezey at Bishop Museum. Although his interest in entomology never abated, he took on whatever jobs were necessary at the Museum. In 1920 he assisted Museum director Herbert Gregory with the often complex task of organizing the first Pan-Pacific Science Congress in Honolulu. Bryan not only took on all sorts of jobs but did them well and with eagerness.

Gregory, noting the young man's energy, and appreciative of Bryan's enthusiasm, told him to go to back to the mainland where he attended Yale University for an additional year of study and obtained a Ph.B. in 1921. When returning to Bishop Museum in 1922, Bryan found that Gregory had signed him up to teach classes at Kamehameha Schools (at that time on the same campus as the Museum) in addition to his full-time work in the museum's entomology collection. Fortunately, all this work at the Museum and Kamehameha Schools counted as study time toward the M.S. degree he eventually received from the University of Hawaii in 1924 (while he was away on the Whitney Expedition). After he returned from the Whitney Expedition, Bryan continued his work in entomology at the Museum while also teaching courses at the University of Hawaii. Every few years thereafter, he would accompany other of the Museum's expeditions to the Pacific.

World War II took him away from museum work and he entered the military service, steadily moved up in rank from Captain to Major and finally Lt. Colonel. During these war years Bryan's extensive knowledge of the little-known Pacific Islands was instrumental to the U.S. Army and in some cases, battles were less bloody and losses were reduced because of this. He was awarded the bronze star for meritorious service. During that time he became well known for his map making abilities and produced an atlas of maps of the Pacific Islands that was an essential reference for his fellow servicemen and officers.

His service during the war changed Bryan's vision about his future and he began to focus more energy on obtaining as much information as possible on everything regarding Pacific Islands. He had a dream of creating a clearing-house of this information at the Bishop Museum. In 1960, his dream came true and the Pacific Science Information Center was formed with him at the head. This center and Bryan's affiliation with the Museum in that regard continued until his death in 1985.

Bryan was a polymath and his incredible knowledge spanned not only natural history but cultural, while he was especially interested in geology, geography, and astronomy. His publication record is extensive and includes articles in scientific and popular media on all of the subjects above. He is best remembered in Hawai'i for his newspaper columns on astronomy (the monthly "Star Charts") and those on natural history entitled "Hawaiian Nature Notes", the latter of which was compiled into a popular book.

Ed was a kind and generous man — always ready to assist anyone with a question. He had a quiet and humble personality that is evidenced in his Whitney Expedition field notes. On his birthday of 13 April, there is no mention whatsoever of it while on the Whitney Expedition. The notation for that day was simply "To church - Palm Sunday. Spent afternoon writing letters."

Ed had an eccentric side as well. After he passed away, when cleaning up his office, two small boxes were found in his desk. One was labeled "Pencils too short to sharpen" and the other "String too short to tie". Never ceasing to fuel the fire of *acquiring* any sort of information, that fervor extended to *keeping* everything as long as possible as well — even after its usefulness was futile. All he figured he needed to do to justify keeping it was label it as useless. His ball of rubber bands still exists and has been continually added to by former Bishop Museum Press (and now University of Hawaii Press) editor Keith Leber.

Explanation of the Bryan Journals

The entries below are taken verbatim from the field notes that Ed Bryan made during the Whitney South Seas Expedition in the year 1924. There are many misspellings and also inconsistencies in spelling (e.g., "papaia" and also "papaya" on the same page). All misspellings (including those in the figure captions) are kept as in the original handwritten version, which are found in nine field note books that contain his journals and sketches. A few places required additional words or letters for clar-

ification, these are placed in square brackets “[]”.

A typewritten copy was made of the field notes in the 1930s by a “W.P.A. worker” (E.H. Bryan, 1982 typewritten note with the typed copy) but was too faint for scanning. It was retyped by Steve Bunting and proofread via the original handwritten notes.

Bryan made pencil sketches of island maps as well as some island profiles and drawings of various objects. Most were drawn with a very light pencil onto the gridded paper of the field note books; a few were redrawn in full or in part in ink. Those in light pencil were often too faint to properly reproduce or to be distinguishable from the graph paper grid lines.

The photographs shown here are in most cases unretouched scans of the originals as only a few had negatives. As can be seen, Bryan’s proficiency with the camera and developing the film improved as the expedition wore on, but dramatic improvement is immediately seen after he received tips on developing film in the tropics from a local photographer in Pago Pago in April 1924.

Bryan mentions many plants by number in these journals. The numbered field notes pertaining to these plants are kept in the *Herbarium Pacificum* of the Bishop Museum.

Two maps are added here to assist in orienting the reader. A detailed map of the route of the Whitney Expedition through the Lau Group is presented in Map 2.

Acknowledgments

I thank the staff of the Bishop Museum Archives for allowing me access to these notes, sketches, and photographs; and to Steve Bunting for his diligence in re-typing the entire journal entries. Lu Eldredge kindly proofread the entire manuscript and helped ensure a high degree of accuracy in the transcription.

Resources

The following are the finding aid numbers in the Bishop Museum Archives related to the resources used in the compilation of these journals:

Handwritten field note books: MS SC Bryan Box 3.2–3.3 (nine 5" x 10" books)

Typescript of handwritten field notes: MS SC Bryan Box 5.2 (399 pp.)

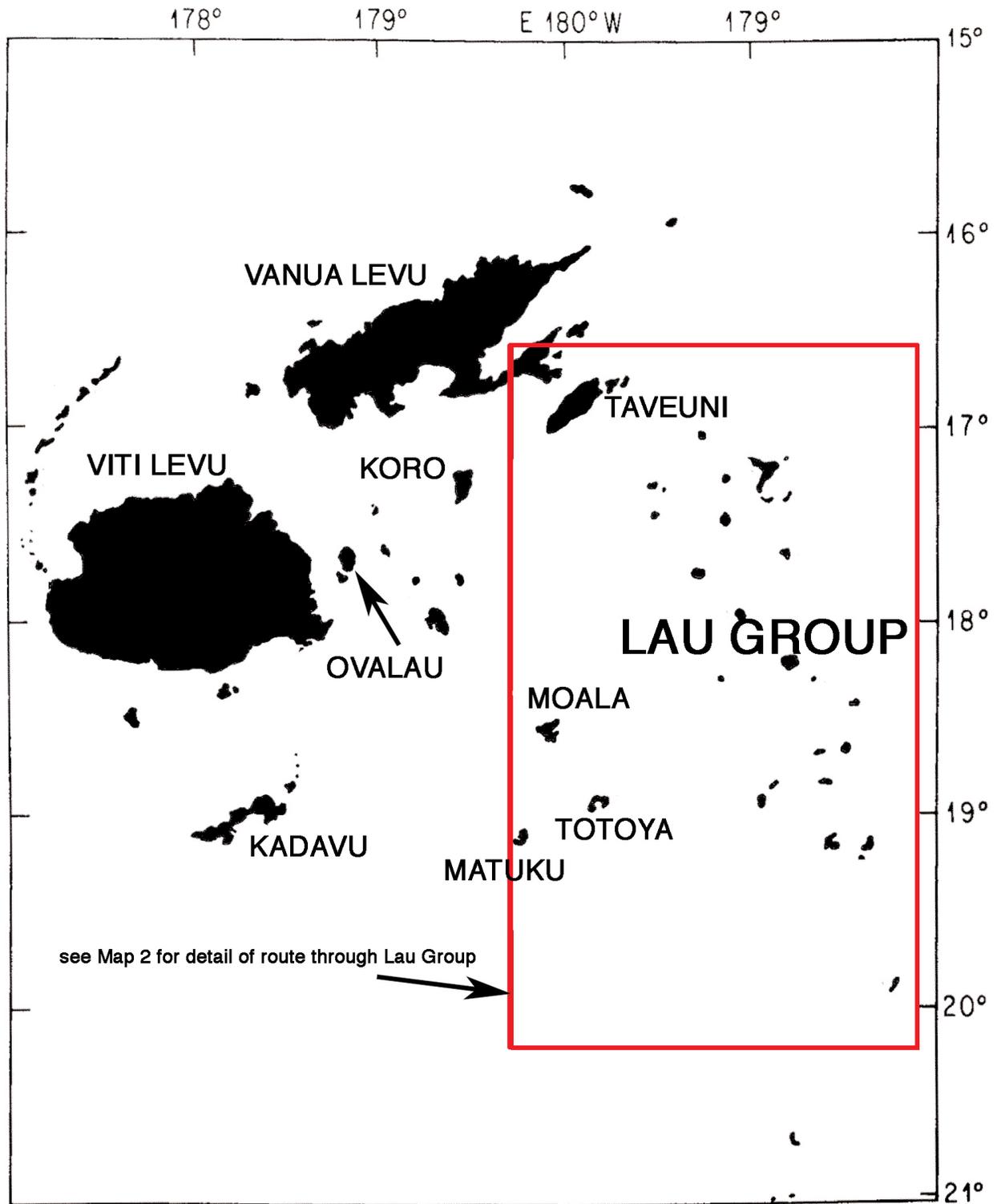
Itinerary of 1924 Expedition: MS SC Bryan Box 5.2 (3 pp.) [used here as Table of Contents]

Photographs (Rolls 48–79): Scanned images [SP11351–11627]; Original photos in Photo Album 44, parts 1-2 (BM11351–11627).

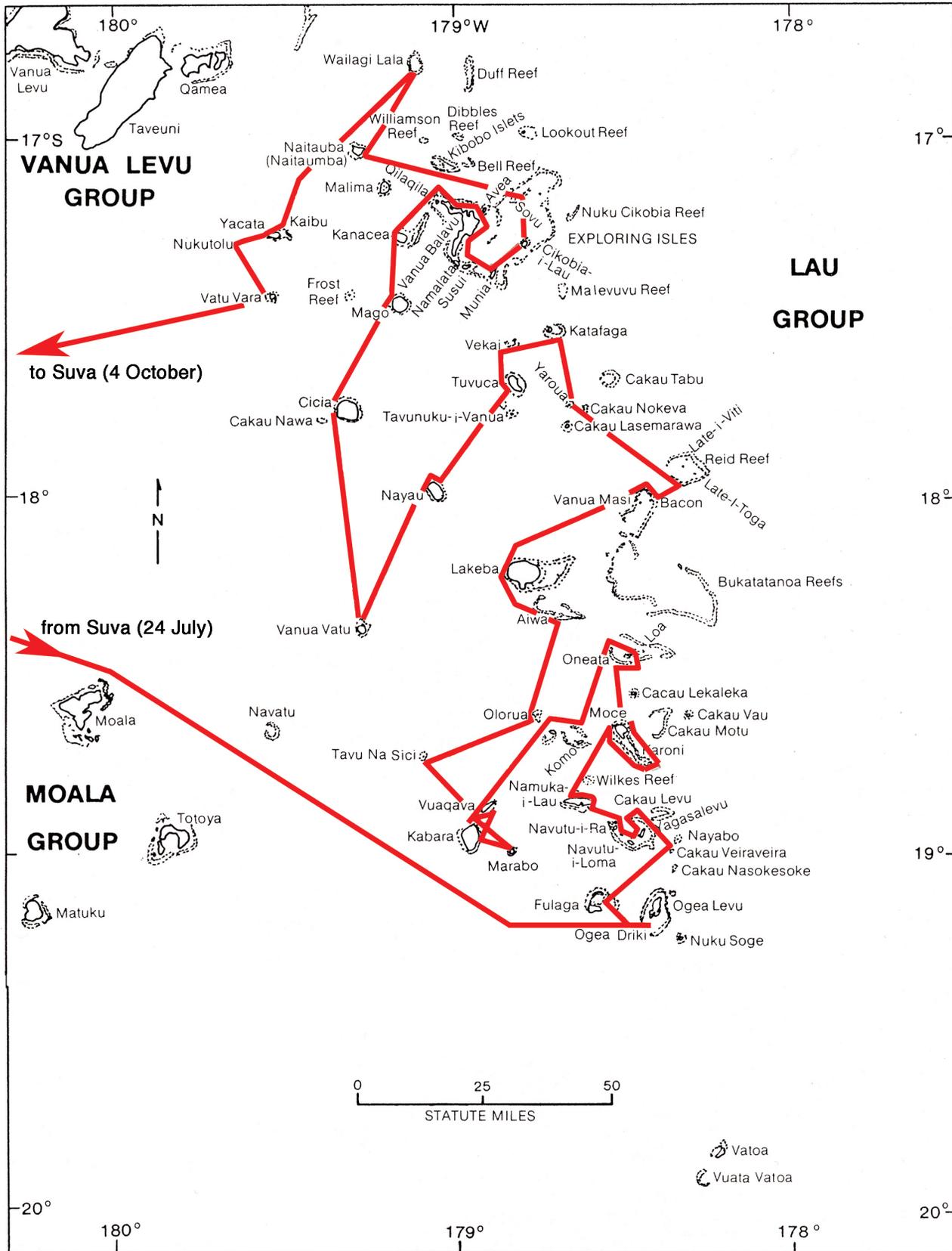
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Map 1. Map of Fiji Islands showing most of the main islands.



Map 2. Route of the Whitney Expedition in 1924 through the islands of the Lau Group. (Map modified from Mottler, L.S., 1986, *Pacific Island Names*, Bishop Museum Press, Honolulu.)

**Field Notes of E.H. Bryan, Jr.
on the Whitney South Seas Expedition
(February–November 1924)**

**Field Notes of E. H. Bryan Jr.
On the Whitney South Sea Bird Expedition,
to Samoa, Nassau, Pukapuka, Phoenix Is., Tokelau Is., and Fiji, 1924.**

Assigned to accompany Whitney South Sea Bird Expedition on Jan. 28th, 1924. Left Honolulu, Hawaii on S.S. "Ventura" on Monday, Feb. 11, 1924 at 4 p.m. arriving Pago Pago, Samoa, Monday Feb. 18, at 8 a.m. where I joined the party on Aux. Schooner "France."

Positions noted on trip south AT NOON:-

Date	Lat	Long.	Course	Distance
Feb. 13	11° 11' N.	161° 26' W.	S. 18° 42' W.	347.3 miles
" 14	5° 55' N.	163° 26' W.	S. 20° 42' W.	337.8 "
" 15	0° 39' N.	165° 15' W.	S. 19° 07' W.	334.4 "
" 16	4° 58' S.	167° 27' W.	S. 21° 30' W.	362.2 "
" 17	10° 31' S.	169° 05' W.	S. 16° 21' W.	647.0 "

Equator crossed Feb. 15 at about 3 P.M.

Notes of more or less scientific value made on trip south:-

1924.

Feb. 12. Sea very smooth, light breeze from S.E. Passed a school of small porpoises. No birds seen.

Feb. 13. Sea and wind the same. One or two birds - Shearwaters and an unknown whitish bird with dark markings at base of fantail (a petrel - "Madagascar chicken").

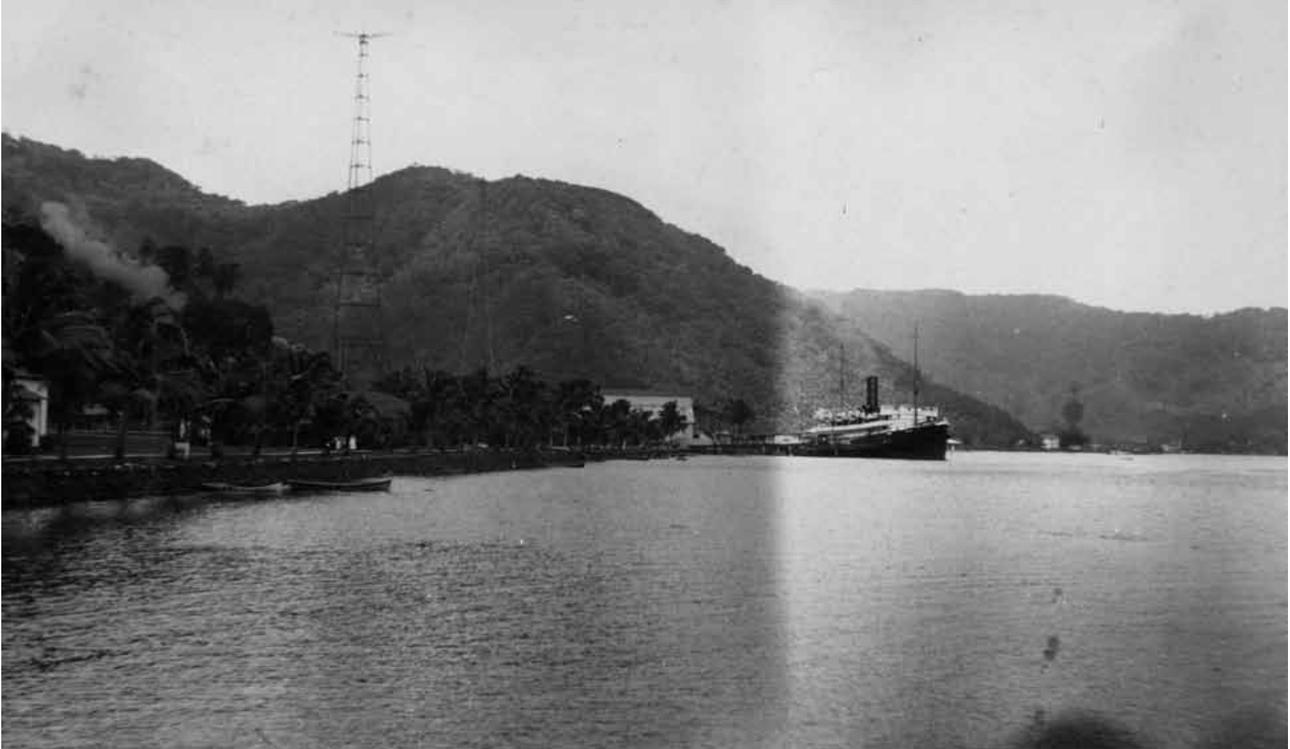
Feb. 14. Somewhat rougher, wind from S.S.E. Quite a number of birds seen including boobies, shearwaters, and white (lone) terns. These probably nest on Palmyra which is a little to the east.

Feb. 15. Crossed equator at 3 P.M. Weather clear and rather warm. Sea moderately smooth; wind from S by E to S.SE, light. Few birds. More porpoises.

Feb. 16. Clear, calm day. Wind light and from E. to S.E.

Feb. 18. Sighted Tutuila at daybreak and sailed along its south-east coast, one of the most luxuriant I have ever seen, with the morning sun lighting up the emerald green hills. The vegetation commences at the water's edge, with clumps of coconut palms, amidst which are small native huts. Behind are the beautifully wooded hills, with occasional patches of light green ferns and grass.

Pago Pago harbor at 7:30. A natural harbour, narrow, deep and, with its right angle turn and high surrounding hills, completely sheltered from all directions. After the usual visit from the doctor and customs officials, ashore and met Mr. Beck and Mr. and Mrs. José Correia, his assistant and wife. After getting gear aboard the "France," met Lieut. Ertz, delivering to him letters from G. P. Wilder and by him introduced to the Governor, Capt. Kellogg, to whom I delivered a letter and bottle of cane-



Roll 1:1. Looking up Pago Pago harbor from swimming pier, with “Ventura” at wharf.



Roll 1:2. Looking down (E.) harbor toward the “Rain Maker” from same spot.



Roll 1:3 Native houses at Fatu, on the Leone road.



Roll 1:4 Large native house at Fatu, on the Leone road.



Roll 1:5 Typical scene along Leone road, showing high trees and dense vegetation.

plated coconut leaves.

Returning to Pago Pago in a heavy rain-storm, I enjoyed a delightful evening and supper at the home of Gov. and Mrs. Kellogg, Major Colby being also present. Slept on board the "France."

Feb. 19, 1924.

Night calm, hot and stuffy in the schooner, with several showers, but a good breeze came up and it cleared off in the morning. A conference with Mr. Beck regarding our trip, learning from him that we were to visit the Danger islands, Phoenix Is. and Union Islands and return to Pago Pago about April 18th.

Then with Capt. Joe Steffany and Major Colby out along Leone Road again, visiting Faitogi, where the native girls sang, but we did not see the shark and turtle. We were treated to kawa by the native girls.

Returning to Nuuli we called on Chief Solei and some of his fine looking contemporaries, being again treated to kawa and native food – roast breadfruit, baked bananas, paeae (made of coconut milk)

borer parasite flies from Mr. Swezey. After lunch on board the "France" with Mr. and Mrs. Correia and Capt. E. A. Stenbeck, and after seeing the Ventura off at 1 P.M. was taken by Capt. Joe Steffany to Leone in his auto. Here we liberated the cane borer parasites.

The ride from Pago Pago to Leone is a wild, rough, but beautiful one, along the sea coast and then through the forest. The lowland vegetation is very luxuriant. Among the numerous trees, bushes, ferns and grass I could recognize many common to the lowlands and lower rain forest of Hawaii. Some of these are as follows, the name in parenthesis being the Samoan native name:– hibiscus, hau (fau), breadfruit (ulu), common purple verbena (vau), sugar cane (tolo), pineapple (fala) (those two only under cultivation), pandanus – a broad leaved species different from that in Hawaii, coconuts (niu), birds-nest fern (avoka), mango, canna, ginger, kamani, cocotree, silk-cotton tree, etc. apé (giant dry land taro) = (tanu).

Besides Leone, where I met Mr. Prichard, store owner, and his wife, being served milk and cake by the latter, we visited Nuuli, which Steffany said was the largest native village on the island. It consisted of two or three dozen oval sugar-cane thatched, substantial houses, the walls of which were movable and made of



Roll 1:6 Village of Vaitogi, Tutuila, looking N.E.



Roll 2:1 Bay at Vaitogi, where shark and turtles are supposed to appear. Captain Steffany, Major Colby and native women chanting, in foreground.



Roll 2:4 Lined up in front of tapa with kava bowl.



Roll 2:5 Roof construction, interior of Chief Solie's house, Nuuli .



Roll 2:6 Mauka part of village of Nuuli, looking toward Mafafou the highest peak on Tutuila; taken from in front of Chief Solei's house.



Roll 3:1 Kava ceremony at Chief Solei's, showing Temafa and two girls, the latter preparing the kava, the one passing the dirty dishwater-like liquid through a fiber strainer and the other shaking out the fiber strainer.



Roll 3:4 Schooner "France" of the Whitney Expedition, at the Customs House wharf, Pago Pago, Feb. 20.



Roll 3: 5 Schooner France at Customs House wharf, looking east toward Mt. Pioa from Post Office wharf.



Roll 3:6 Personnel of Whitney Expedition to Danger Is., Phoenix Group and Fakaofu. Mr. and Mrs. Correira, Captain Stebeck, and E.H Bryan, Jr. Feb 21



Roll 4:5 Typical beach barrier of littoral plants, Nassau I Scaevola, Tournefortia, Pandanus, and young coconut palms.

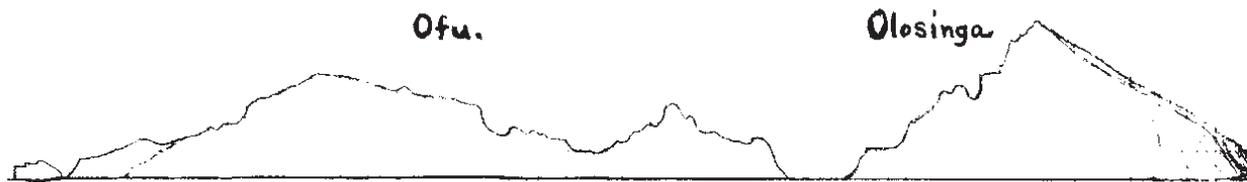
and fish. Steffany took pains to explain why I was collecting insects and taking pictures, why the Bishop Mus. was interested in the Samoans and how I had brought down some flies to kill the sugar cane borers.

Returned to Pago Pago and spent evening with Joe Steffany, seeing conditions under which he collected quantities of fine moths and night flying beetles on his veranda about 1/4 mile N.W. of Administration Bldg. With him called on Lieut. Ertz. Gave him (Steffany) four large cyanide bottles.

Feb. 20th.

Spent morning making a few minor purchases, arranging with photographer and Major Colby to have films taken, delivered to B. Mus., and writing letters. Met Mrs. Beck. Helped Capt. Stenbeck lay off course and check chronometer at 1: P.M. Finished roll photographing schooner and party. We cleared at 1:30, out of harbour under engine at 1:50 and steering E and ENE along south-eastern coast of Tutuila until 3: P.M. Sky partly cloudy, sea very smooth, sun hot on deck. Heavy downpour behind us over Pago Pago and vicinity moving W. toward Leone. Small island of Anuono on Starboard beam at 2:55. N. 30° E. true. East point Tutuila on port beam 3:10. Heavy swell, no waves, dead calm. Bar. 30.00" Stopped engine at 5: P.M. Found a stowaway on board.

Ofu and Olosinga from S. by W. at 6:30^{A.M.} - 8 or 9 miles distant



Tau from S W by W. from a spot about 8 or 9 mi. S. of Ofu. 7: A.M.



Feb. 21 (Thursday).

South-west of Manu'a Is. at daybreak. Engine started and we steered between Tau and Olosinga and Ofu. Sketched and photographed all three islands. Bar. at 7: A.M. 30.03", sky with light misty clouds, wind light, from NE by E.

MANU'A ISLANDS

The slopes of Ofu appear steep and deeply ravined from the south, with the morning sun shining across them, much resembling Koko Head. Nearby and nearly connected to the main mass of Ofu by a long, low, jagged peninsula lies Olosinga, shaped like Koko Crater, with a gentle slope toward the east and a jagged, steeper descent toward the west. It is about 5/8th the length of Ofu, viewed from

the south and over 1/3 higher.

About 5 1/2 miles to the eastward lies Tau, the largest of the three. It appears well wooded, with gentle slopes. Correia, who has been on the island says the soil is fertile, the woods are very luxuriant and that a moist, fertile flat area on top might be used for extensive agriculture. The island is moist with occasional ravines. Correia says landing is difficult because of absence of sheltered harbours and the heavy swells. We could see the smoke from the village of Tau on the W. end, which Correia said, numbered about 100 adults besides many children. The people are so very lazy that they do practically no cultivating and have not even cut trails into the highlands.

8:26 Position. Lat 14° 18', Long. 169° 36'.

Caught a small brown weevil on deck off Tau. It must have come aboard with the bunches of bananas or other fruit at Pago Pago. A few flies left on board and cockroaches. Saw a cockroach wasp parasite. Stopped engines at 11: A.M. Lat. observation at noon give Lat. 14° 03' S. Sea clam with almost no wind, what there was being from the N.E. Started engine at 1:30 — stopping at 4:40.

Strong wind from N by E at 6: P.M. with squalls and tropical showers on both sides, and a water-spout to S.W.

Friday Feb. 22. Steering NNE with brisk head wind.

8:13 A.M. position Lat. 13° 10' S., Long. 169° 00 1/2 W.

Noon " Lat. 12° 59' S., Long. 168° 57 W.

240 miles from Nassau, N. 69 E. Course made 85 mi. N. 25° E. in 24h. Slight squall at 1: P.M. Went over on other tack, steering ENE (Mag.) One of crew named Taupe from Rapa. Said he was the son of Huli and grandson of Hehe-a-Fara. Much delighted when I gave him a photograph of his grandfather, two aunts and cousins (B. Mus. No. 8396).

Saturday, Feb. 23rd.

7 A.M. steering ENE with good breeze from E. Occasional squalls. Bar. 30.04". Ran out pat. log at 7:30, reading 41.8 mi.

Position:-

8:10 A.M. Lat. S. 13° 17', Long. 168° 22 W.

Noon Lat. S. 13° 06', Long. 168° 09 W. Course made 54 mi. E. by S. To Nassau, 185 mi. N. 62° E. true.

(80 miles north of Rose I. according to chart).

4: P.M. Sky partly cloudy, light wind from NE. Steering NNE (Mag.)

Bar. 29.94". Log 69 mi. Sea smooth.

Sunday Feb. 24, 1924.

Wind light from ESE. Started engine, steering E by N. Sea calm. Sky partly cloudy, 8: A.M. Log 90.6. Bar. 30.02".

Position: 8:15 A.M. Lat. S. 12° 57'. Long. 167° 44 W.

Noon " S. 12° 53'. " 167° 25 W.

Course made N. 80° E. true, 48 miles.

To Nassau, 138 mi. N.E. Half way from Tau to Nassau

P.M. Dead calm, started engine 1: P.M. lowering sails.
 Sea glassy smooth with long undulating swells, sun hot despite hazy sky.
 Position 4 P.M. Lat. S. 12° 41', Long. 166° 58' W.
 110 mi. from Nassau. N. 60° E. true. N. 70° E. Mag.
 Shut off engine at 8: P.M.

Monday Feb. 25th. Calm. Started engine 7:30 A.M., steering ENE Mag.
 Position: 8:06 AM. Lat. 12° 42' S. Long. 166° 47 1/2 W.
 Noon " 12° 42' S. " 166° 27' W. (Made 70 mi. N. 51 E
 (Nassau 75 mi. N. 62 E

4: P.M. Lat. 12° 39' S. Long. 166° 02' W. Nassau 48 mi. N. 46° E.
 Stopped engines at 5:45.

Plankton surface dragging from 6:25 to 7:25 P.M. Log. 26.2 to 28.1.
 Position about 40 mi. S. 50° E of Nassau. Sky cloudy with tropical rain squalls threatening. Wind light from N.E. Quantities of Phosphorus on water and attached to bag when hauled up. Sample to be labeled #1. "Lat. 12° 08. Long 166° W. 40 mi. S 50° E Nassau"

Tuesday Feb. 26th.

Started engines about midnight. No sign of island at daybreak. Dead calm with occasional squalls. Bar. 30.07". Wind from ENE. Sighted island to N. at 10:15 A.M. from mast head. Visible from deck before noon. Met on leeward side of island by canoe containing 4 natives. I went ashore in the canoe followed by our boat, landed on S.W. side and warmly greeted by the manager, Fredrick L. McFall. The population of the island consists of 22 natives, 16 of them men, rest women and children. The nationalities include Ellis, Gilbert, Samoan, Tahitian and Hawaiian. McFall has Samoan wife and three children.

Back to schooner for our gear. In attempting to land at the charted "Landing" near N.W. point of island our boat capsized. The landing on the S.W. side was made twice without mishap.

Fish supper with manager and wife and put up in the house.

In evening witnessed an Ellice Island dance put on for our benefit.

ELLICE ISLAND DANCE (On Nassau I.)

The dancers all young men, although the two women present joined in the singing. They stood (in one dance sat) in one place or (rarely) moved majestically about, with swaying bodies, bent knees, and graceful movements of the hands, arms, hips, legs, body and shoulders. The swaying movements of the hips and bent knees remind one remotely of the hula, but there isn't that looseness of movement. Some of the movements and gestures suggested the pulling on ropes or paddles or wringing out something. A favorite position is with the arms crossed, the right hand slapping the left upper arm. The feet are often raised from the ground out the location is rarely shifted. There were from one to six dancers, moving in unison or the two end men or one leader going through different movements, while the others moved together — such as a steerer while the others paddled.

The accompaniment of the dance is a combined singing and thumping. The singing is done by all those present (except us spectators), both the dancers and the thumpers. Many of the chants are markedly modern. I recognized "Mele ana oe," "And now we are happy all the day," "Aloha oe" "Goodbye my dear," "It's a long way to Tipperary" etc., either the words or the tunes, although most of the songs sounded really "native." Mr. McFall suggested that they had gotten these from phonograph records, of which they are exceedingly fond. The songs may be in monotone unison or in good harmony or part

singing. Or the leader may sing to an accompaniment of the others in chorus. The time may be about the same throughout or may become gradually accelerated, until the dancers are moving with great speed.

The thumping is done by nearly all those seated. Four to six of them crowd about an empty kerosene box (wooden box), the others pounding on the mat covered floor. They strike in perfect unison, with the palm slightly arched and knuckles bent so that the cupped hand gives a curious resonance on the wood or mat. They hit with great force. It is strenuous work for both dancers and accompanists, but, though they drip with perspiration, they seem to enjoy it and, Mr. McFall informs me, would continue all night if he did not blow the whistle at 9:15 P.M., which commands silence and retirement to bed; he allows but two evenings of dancing a week.

A typical procedure is as follows: All are seated, resting and smoking. They are clad in lavalava and white undershirt (though many wear blue overalls in the daytime). Their heads, arms and legs are bare or hair and ears adorned with leaves or flowers. There is a general flow of conversation or more or less complete silence. A leader, not always the same one, utters a sharp command-like sound and repeats a few bars of a chant, striking the box with his hand. Then all join in and strike in unison. There is a good deal of repetition to the song, both words and tune. They may sing all the way thru without any dancing or one or more may rise at once and commence the dance, which apparently fits the song, as all make the same movements without any hesitation. When the chant is finished, (it lasts from two to five minutes), another may be commenced at once by the same or another leader, or a pause may follow, during which the dancers sit. The dancers may take part in the singing or not as they choose. As the evening wore on (and after Mrs. Correia withdrew) the white undershirts came off and the dripping dancers went on in their lava avas (pahreo) only. Some of the chants ended in a long subdued note, but a favorite ending, especially with the accelerated chants, was a shout which would have done credit to a football rooting section. — "Hale mae ae!" Screach! I recognized "Tipperary" by sound only, they tried to make sounds which corresponds to the English words, but they were merely similar sounds.

They stopped obediently, like well-trained children at 9:15, when the whistle blew and soon after all was still.

Feb. 27. (Wednesday).

After breakfast ran a sketch traverse around and through the island constructing a sketch map. The island is practically oval, about one mile east and west and slightly under half a mile north and south. It is surrounded by a broad flat reef, awash at low tide, which is 100 to 150 yards wide on the south, east and west sides, but comes in close to the sandy and conglomerate (of coral and sandstone) beach on the north side. The beach is sandy except on the N.W. arc, where it is made up of a north dipping sand and coral conglomerate, similar to that on the N. side of Johnston island and on Wake. The beach is high and steep toward the N.E. and S.E., up to 16'.

PLANT LIFE OF NASSAU

Except for the coconut trees the vegetation facing the beach might be that of Wake, and, I gathered from Correia and Hono, a bright Tahitian man, is typical of most low south Pacific islands. It consists of *Scaevola*, *Tournefortia*, *Pandanus*, and a tree called *Taufono*, with leaves and shape like Hawaiian *Kamani*, but with small fruits, green when immature, white when full sized and fibrous like a husked coconut when fallen to the ground, shaped like a tangerine orange and about 1 1/4 to 1 1/2 inches across and 1 inch thick. [A summary of the plants with their native names is given later.] The undergrowth includes a beach vine with lobed, sub-cordate leaves and a small bur, a *Boerhavia*-like low plant with red and green stem and purple or white flower (possibly 2 spp.), a *Lepidium*-like small

shrubby plant with linear-lanceolate leaves, some serrately-truncate at tip and white flowers on a bottle-brush-like stalk.

Inside this marginal fringe the dominant plant is the coconut palm which grows thickly over the greater part of the interior, except in several low swampy cross to be described later. Among these grow the large Buka trees, fully four to six feet in diameter, of soft wood, with an elongate sub-cordate leaf three to five inches broad and six to ten inches long. Some of these trees attain a height of 35 to 40 feet and are flattened off a short distance above the general level of the vegetation, as if truncated by the wind. About two species of grass are found, one in clumps, similar to bunch or wire grass and are generally scattered over the ground. A fern with a palmate frond, (found in Hawaii) grows about, at the bases of the coconuts and in the damper areas. Birds-nest ferns grow in crotches of other trees, especially in the Pandanus, of which there are two spp. The one with large edible fruits and the rough edged one. These fruits are eaten by the natives. There is a tall shrub or small tree, a fiber plant, called Roa, and a species of noni.

Some of the marshy-"kipukas" (my name) are planted to taro and bananas. With them, but more especially where they are absent one finds the following plants:- a hau-like tree, pandanus, noni, a common sedge, a buka-like tree with puffy red fruit and small white blossoms, tall grass (the same spp. Apparently as that elsewhere, but ranker) the Boerhavia-like plant (more luxuriant) and green scum on the dirty pools of open water, which is, however, fresh and used for drinking. On rotten logs and manure (from the pigs and three horses on the island) grow bracket fungi and small white toadstools. A very little Convolvulus-like vine was seen. A leafless parasitic vine [= Laurel dodder] grew about the bases of the coconuts and over other plants - resembling Vigna.

INSECT LIFE OF NASSAU.

The number of species of insects are not many, but of individuals there are quantities. A small brown fly and green Psilopus (Dolichopodids) abound on the leaves of plants. Everything is covered with ants, moderate size, black and reddish, and a small reddish-fuscous species; they are on all the plants, in rotten logs, under fallen coconuts, under rocks, among roots; in short, everywhere, and in great numbers. Spiders, the same spp. apparently as on Wake, have their webs abundantly from branch to branch. There are also one or two other spp. of spiders. Scale insects, small mealy-bugs, salmon-pink and white, are on leaves and roots. Red-brown dragonflies dart about the marshy pools, about which are found small nemocera flies. Tiny black (Borborid?) flies are attracted to manure. The day mosquitoes Aedes scutellaris are troublesome. Numerous leafhoppers in the grass and always on noni leaves, of two or more spp. The leaves of the Scaevola are abundantly mined and on them I caught a small black Agromyzid, a pale yellow crane-fly, and a small brown micro-lepidoptera; the larvae of any of the three night have caused them. The white moth with red and black spots, (the larvae of which were on Tournfortia on Wake) is present, but not abundant. There are a few smaller moths, but no butterflies. One or two spp. of cockroach, one being dug from rotten logs. The house fly (the narrow-fronted sp.) is not only abundant but a pest, being very "sticky" and hard to shake off.

Mr. McFall gave me a valuable sheet of Weather Data, covering the period of his residence as manager of Nassau. Copy as follows:-

NASSAU WEATHER. (F. L. McFall).

Rainfall.

“From June 18th 1921	to Dec. 31, 1921	216 points.
" Jan. 1, 1922	to June 30, 1922	318 "
" July 1, 1922	to Dec. 31, 1922	422 1/2 "
" Jan. 1, 1923	to June 30, 1923	180 1/2 "
" July 1, 1923	to Dec. 31, 1923	420 "
" Jan. 1, 1924	to Jan. 23, 1924 *	110 "

This is worked out from a standard sized kerosene tin at the rate of one-eighth in. 12 1/2 points.

*Rain gauge blown down on night of Jan. 23, 1924.

Prevailing winds from April to September S/E trades. From October to May from N/E to West—very rarely we have south or southwest winds.”

Mr. McFall also presented the Museum with a piece of heavy iron-colored stone, found under the edge of the reef on the N.E. side, where there is some little deposit caught in the reef. He would like very much to know its composition and possible origin.

Gathered up a small quantity of dirt from about the roots of the *Lepidium*-like plant, which contained land shells.

Also collected from under coral blocks and rocks containing land shells.

Hermit and land crabs abundant, especially the former, of which there are, according to Mr. McFall about 5 species:- red legged (as on Wake), white legged, purple legged, green legged, large and small—(some may be the young forms of one species). They are called “unga” by the Ellice boys.

Lobsters are abundant on the reef about the 1st quarter of the moon. And fish are common off the reef on the south side.

Mr. McFall called my attention to a single tree of *Pemphis ascidua* growing near the east end of the island. He said it had been washed up on the shore as a “little green ball,” and was planted by one of the native boys. It is now about 7 feet high and doing well. Correia says it is common on Suvarov I. to the E.S.E. (We found it common enough on Puka Puka, 45 miles to the NW by N.).

Mr. McFall presented the museum with a jar of Nassau sea shells, mostly cowries and several large cowries (*Cyprias*) and some land shells from the Tokelau Is.

February 28, 1924 (Thursday).

All over the island with an Ellice Island boy, Fakafo, collecting mere specimens, making further observations on the plants, including their native names, and taking pictures:-

Native Names of Nassau Island Plants. (Spelling phonetic).

<u>My Name</u>	Ellice Is. (From Falsofo)	Tahiti (From Hono)
1. Scaevola	gnasu	paketa = naupalce = gnasu
2. Tournfortia	tareumu (?)	tahomo = ngongo
3. Kamani-like tree	pua	taufono = kahala = pua
4. Puka tree	buka	puatea
5. Fiber plant	unga-unga	roa
6. Pandanus	fala	
8. Beach runner with bur	toritori	va lahilahe
9. Noni	nong nonou	
10. Hau-like tree	fou (used for sticks in house building)	
11. Birds-nest fern	laucatuf (?)	
12. Lepidium-like		runa (?)
13. Fern	maile	
14. Sedge	moku	
15. Boerhavia-like vine	ungaunga or gnunga	
16. Grass	makau ("kaekae for horses")	
17. Taro	tale	
18. Banana	futi	
19. Convolvulus-like vine	fui	
20. Leafless parasite (Vigna)	takimoi	
21. Low prostrate herb with with small ovate leaves	sounds like nuna = (ngunga?)	
22. Toodstools	tailinga	
23. Large dry-land taro	tamu	
24. Cultivated bean-like vine on a pole	ufi	
25. Large tree with puffy red fruit	puka-vai	
26. Tree resembling kou. Sap used as gum for snaring birds (common near the swamps).		kanava
27. Manioc (cultivated)	vateau or gnasu, (root eaten)	
28. Large tree	fatau	

Ellice Island Names for insects, animals, etc.

Hermit crabs	unga
Moths	pepe
Cockroach	mongamonga
Ants	lo (or glo) or leo
Flies	gnamu
(those on different plants called after the plant as gnamu-pua.)	
Spiders	levaleva
Lizards	mo (<u>not</u> mo'o)

Love bird (tern) akiaki

Small black mite and tiny red
mite caught under rock

No beetles seen on island except a
domestic green tenebrionid or domesticated
about camp

A large brown spider caught
in pandanus head.

The lizards, moderately large skinks, are very abundant, appearing the same sp. as on Johnson and Wake. There is also a gecko and a large black salamander-like lizard with scales like an alligator. Mr. McFall will collect and send.

Left south side Nassau about 6 P.M.
Spent evening developing two rolls of
films.

February 29, 1924 (Friday).

To eastward of Danger Island at 7 A.M. Three low, flat, coconut and tree covered islands connected by reefs; Puka Puka and Motu Koe appearing about twice N.S. dimension of M. Koe (east side) apart. Ran around N. side Puka Puka and landed in N.W. cone.

Sight at 8:34 with bearings on islands of N.W. 1/2 W. and S.S.W. gave Long. 165° 57' W. to 165° 58' W. Lat. taken as 10° 55' S.

Sight taken at 9:05 when in same Lat. as N. point Puka Puka gave Long. 165° 55' W. Lat. being 10° 53' S.

Roll 4:6 Fatau tree, one of two fully 40 feet high near the native camp, with my guide and a native boy, Fale, in front of the high trunk.





Roll 5:1 Gathering coconuts for copra. Large pile of shelled coconuts and laborers with their coconut-leaf baskets near west end of island looking S.W.



Roll 5:2 Low marsh-seep, in which are grown bananas; with hau, sedge, grass, etc.



Roll 5:3 Another “kipuka” showing the embankment by which the E-W “road” crosses, lined with young coconut palms; with hau and pandanus behind, sedge and grass in foreground.



Roll 5:5 A little enclosed patch of “tane” (dry-land tare) and a plant of “ufi” (on the pole). The small boy is sitting on the end of a fallen buka trunk fully 4 feet in dia.; in the background are coconut palms and a buka-vai tree. S.E.-Central part of island, looking west.



Roll 5:6 A non-typical, but inclusive picture of the marginal plant barrier showing coconut “hamani” =puapua, scaevola, pandanus, tournfortia, and beach runner.



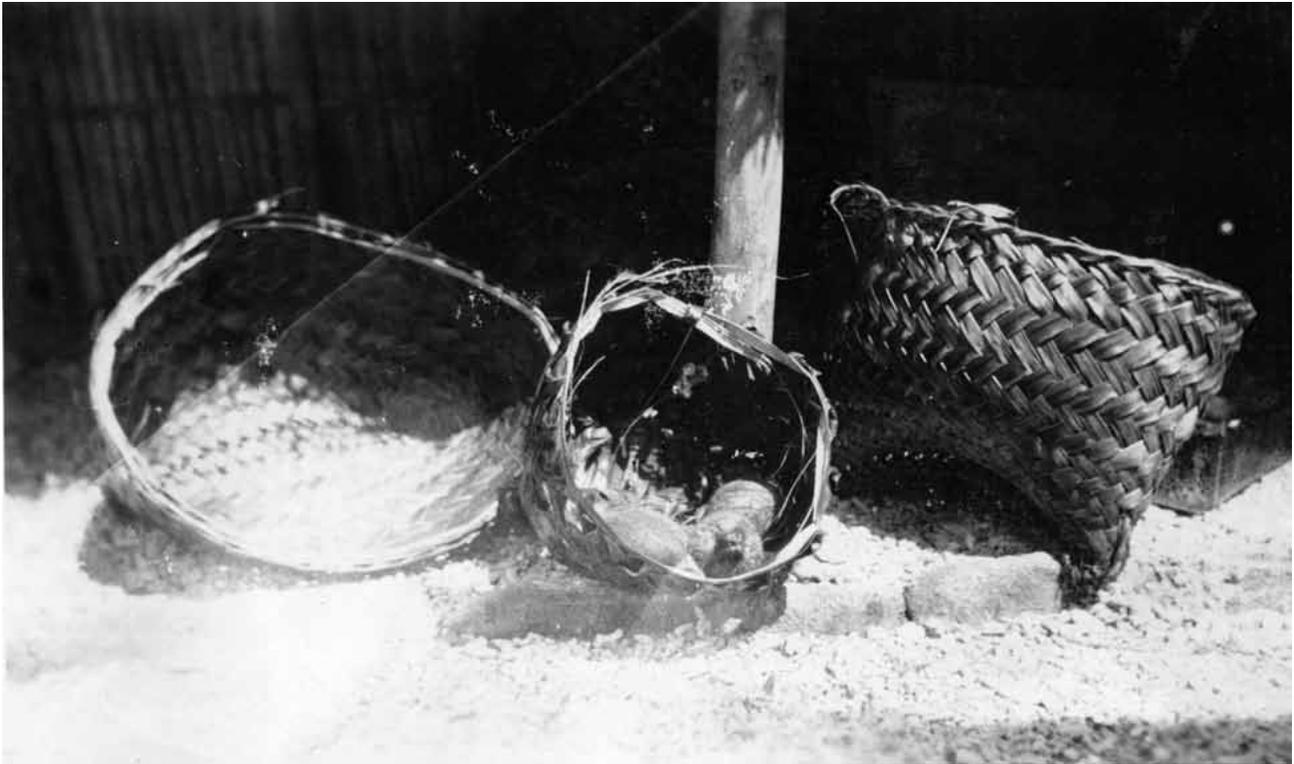
Roll 6:1 A “kepuka” filled with hau, pandanus, buka and banana tree in center between the coconuts.



Roll 6:2 Manager McFall, family and Mr. and Mrs. Correia in front of manager's house.



Roll 6:3 Nearly entire population of Nassau, (mostly Ellice boys) in front of one of the native houses.



Roll 6:4 Native baskets, the center one used to carry coconuts. They are made of coconut leaves.



Roll 6:5 Manager McFall's paopao and south shore of Nassau I.

Sights taken on ship in vicinity of Puka Puka while we were on shore:-

4 P.M. Feb. 29. Long. $165^{\circ} 50' + 165^{\circ} 48'$. Lat. taken as $10^{\circ} 54' S$.

A.M. Mar. 1 (S. $10^{\circ} 53'$) Long Assumed $165^{\circ} 45'$ by sight $165^{\circ} 54'$ 11 miles to W. by Chron.

A.M. " 2 (S. $10^{\circ} 51'$) " " $165^{\circ} 48'$ " " $166^{\circ} 01'$ 13 " " " " "

P.M. " 2 (S. $10^{\circ} 53'$) Long. " $165^{\circ} 48'$ " " $165^{\circ} 48' + 165^{\circ} 51'$ O.K. " "

A.M. " 3 (S. $10^{\circ} 52'$) " " $165^{\circ} 47'$ " " $166^{\circ} 00'$ 13 mi. to W. " "

P.M. " 3 (S. $10^{\circ} 53'$) " " $165^{\circ} 48'$ " " $165^{\circ} 48' + 165^{\circ} 51'$ O.K

Official conference with Missionary and finally with chief and assembled people in the meeting place, a corrugated iron roofed building with open sides. Some little trouble because Correia hadn't official permission to shoot birds in these islands. There was no question about my objects of collection, after I had convinced them that I was not a spy. The difficulty of explaining was increased by the fact that no one on the island spoke English with any fluency — only the Missionary Rev. Kare and one or two natives understanding it at all. We spoke to them through Hono in a mixture of Rarotongan and Tahitian.

The people are industrious looking and intelligent. The population is about 560 (200 men, 100 women and 260 children). They appear well fed and prosperous, most of the women being dressed in European clothes — a loose fitting dress of white or colored calico, with straw hats trimmed with ribbon or beads. (These are made of pandanus or coconut fiber and much resemble the Hawaiian products). The men wear blue overalls or cloth trousers and white undershirts; when dressed up, white or khaki coats and straw hats. Shoes are scarce. The lavalava is worn only by children and even they wear cloth trousers or skirts (girls) when dressed up.

The village, which stretches around the entire lagoon side of the island, along a deep bay, is neat, clean, substantial, well-built, many of the houses being made of coral lime — whitewashed. The walks are paved with gravel, lined with stones and a high culvert has been constructed across an arm of the lagoon which separates part of the village.

The water supply is good, there being two large lime cisterns with drains from the iron roof of the meeting house, besides the extensive seep holes and wells which give good water. They ship 60, 80, sometimes over 100 tons of copra a year. Other products are taro, bananas, a very few limes and some sickly looking sugar cane. There are no breadfruit trees. Pigs and chickens are raised in some numbers.

I spent the rest of the day exploring and collecting around Puka Puka in company with a troupe of little urchins, some stark naked, who supplied the native names. These I later verified from the older men.

DANGER ISLAND PLANTS. (With their Puka Puka Names).

1. Pemphis, a number of patches, especially at N.E. end of island. (gneagnea? - "neanea").
2. Pandanus, fairly abundant, at least 2 spp. (wala = fala).
3. Scaevola, abundant, leaves mined. (gnaeo).
4. Dodder (?) a leafless vine growing over Scaevola, etc. (Tahiti name kainoka) [According to Hono this is the vine with which "Hono" snared the giant with the long legs-in a favorite Tahitian legend].
5. The beach runner with the bur and yellow flower. (vavae).
6. Sedge - same as on Nassau (pulumu).
7. Taro (talo) extensive patches grown in mud (but not under water) behind church and running up toward N.E. corner of Puka Puka.

8. Mat grass with a small slender leaf and clover like blossoms, abundant, (vaeavaea).
9. Large tree with puffy red “apple”-like fruit (pukana).
10. Kamani-like tree. (tamanu = Tahitian puapua = tafano).
11. Large tree with coarse ovate leaves and small white flowers (vetau).
12. Boerhavia-like plant (same as Nassau) (grau).
13. Buka tree (Puka = puatea).
14. Tournfortia tree. (taihinu = ngongo (?))
15. Boerhavia-like plant with purple flowers (momoi)
16. Low shrubby herb with reddish panical (same as Nassau) (puluumu).
17. Small herb with chordate leaves (pohui).
18. Fern (same as Nassau) (maileae)
19. Bananas (wuti = maia).
20. Tall shrub with chordate leaves and axillary panicles of white flowers (fiber plant) (wau or vau)
21. Cultivated plant with a long lanceolate leaf, growing with taro (pulumu).
22. Giant taro (puláka).
23. Sugar cane (tou).
24. Gardenia-like tree with a white, trumpet-shaped sweet smelling flower, (tiale).
25. Lepidium-like plant, with bottle-brush white flowers  (gnau).
26. Birds-nest fern (lau kotava or kosawa).
27. Noni, with a large leaf and small fruit (I saw no ripe ones), abundant (nonu).
28. Milo tree (Tahitian milo - told me by Hono, I didn't see the plant).
29. Tou tree, the hau-like tree (akanava).

Insect, and Animal Names and Other Native Words.

Dragonflies - (pepe)

Flies (especially the abundant house fly (rango)

Larvae (caterpillar) of Tournfortia moth - white moth with pink and black spots (potipoti).

Blue butterfly with white spots (kawapule).

Small red brown butterfly (kitikilangi).

Brown spider (mangamanga).

Sow bugs (popolanga or popolunga).

Small green beetle (punupunu).

Ants - 3 to 6 spp. A large red sp., a moderately large black, ditto red, small fuscous, and the long antennaed “crazy ant”. (all called “leo”).

Small Tettigid grasshopper (kalewalewa).

Mosquitoes (*Aedes scutellaris*) (namu).

Large brown moth (like pemphis moth on Wake).

Same green *Psilopus* (Dolichopodid fly).

Hermit crabs. (unga) Land crabs, digging holes in ground (kaipia = manua taria).

Large red-orange land crab (pekakula) (it lives under rotting coconuts).

The lime ovens (hemupunga) in which coral rock is burned to make lime for house construction are nearly open pits.

Watched a small boy making fire with two sticks made of puapua tree. The under, flat piece with the groove in it is called "lakau". In this groove a short, pointed stick (äka) is rapidly rubbed back and forth, the fine dust from the scraping quickly smoking from the heat of friction.

In the shade of a coconut leaf thatched hut an old native was plating baskets (ola) the process being called eola. The fine weave baskets from split coconut leaf are "ola," the coarse woven ones, in which the whole leaf is used, being called "kete." A fan is called ili (in Tahiti Tai ili). Hats = pale, usually made of pandanus leaf (lau wale). A lavalava is called a paleu. A fine weave mat = panga (Tahiti pini), coarse mat = takapau, (of coconut leaf) tapakau = (Tahiti paua niu). If found the coconut maggot fly on a birds-nest fern (under which circumstances it would be called "lango patia").

Lizards are very abundant (called moko).

The western half of the island (Puka Puka) is much drier than the eastern, which is occupied by extensive seep-swamps, planted to taro and bananas, with occasional sickly stalks of sugar cane.

The paths, in some places, especially near the coral clinker beaches are paved with a single line of stones, like the Hawaiian "alanui."

Leafhoppers are abundant on grass and certain plants, such as moni, and Lipidium. The Scaevola, "Kamani" and vau had a species of brown beetle on them. Pemphis had the same long gray caterpillar on it that occurred on Wake. Small nemocera Diptera (Mycetophilid ?) on taro leaves.

Evening got some of the old men, including Joe (Makshiki man) talking stars:-

Puka Puka Star Names

Evening star (Venus)	"Tapau"
Pleiades (7 sisters)	"Mataliki"
Belt of Orion	"Talunga Maui"
Megellan's cloud	"Hea"
Milky way	"Mungo"
Sinius, Castor and Pollux	(all referred to as "Melemele")
Southern Cross	"Tau tolu"
Loo ("Sickle")	Wale a wetu
Stars (especially large ones)	wetu
Small stars	mata
Shooting stars	ka toto

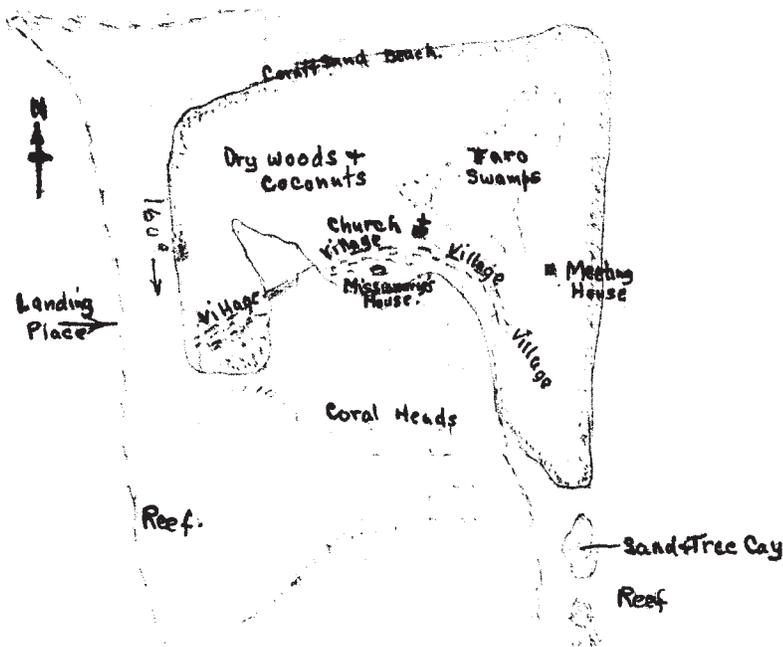
(Spent night in home of the missionary Rev. Kare).

Saturday, March 1, 1924.

After good breakfast provided in part by Rev. Kare, aboard schooner for additional supplies. Then in native canoe sailed south the length of the lagoon to Motu Katava.

Description of Lagoon-Danger Islands.

The three islands - Puka Puka, Katava and Koe - making up the Danger Is. are connected by broad reefs, which on the west and south are always awash. The atoll thus found is about 3 by 5 miles in extent, enclosing a triangular lagoon, narrow at the north and widening to about 3 miles E and W at the south. The north end of the lagoon, between the arms of Puka Puka, is shallow and filled with coral heads and reefs, which continue intermittently for about 1/2 mile, until south of opposite a sand cay being coconuts and pandanus. On the east a long arm of sand and coral crowns the reef for another 1/2 mile and intermittently beyond. South of this cay and area of coral heads is a stretch of nearly open water, fairly free from coral heads. The water is deep, up to 8 or 10 fathoms. One or two coral heads rise to near the surface within this area. The south end of the lagoon, near the two southern islands, is again blocked by coral heads and reefs.



Rough Sketch of
PUKA PUKA

The island is a little less than one mile across.

Dash line represents edge of reef.
Dots represent sand or bottom coral.

Trails run everywhere, only the main path across the culvert connecting village is shown.

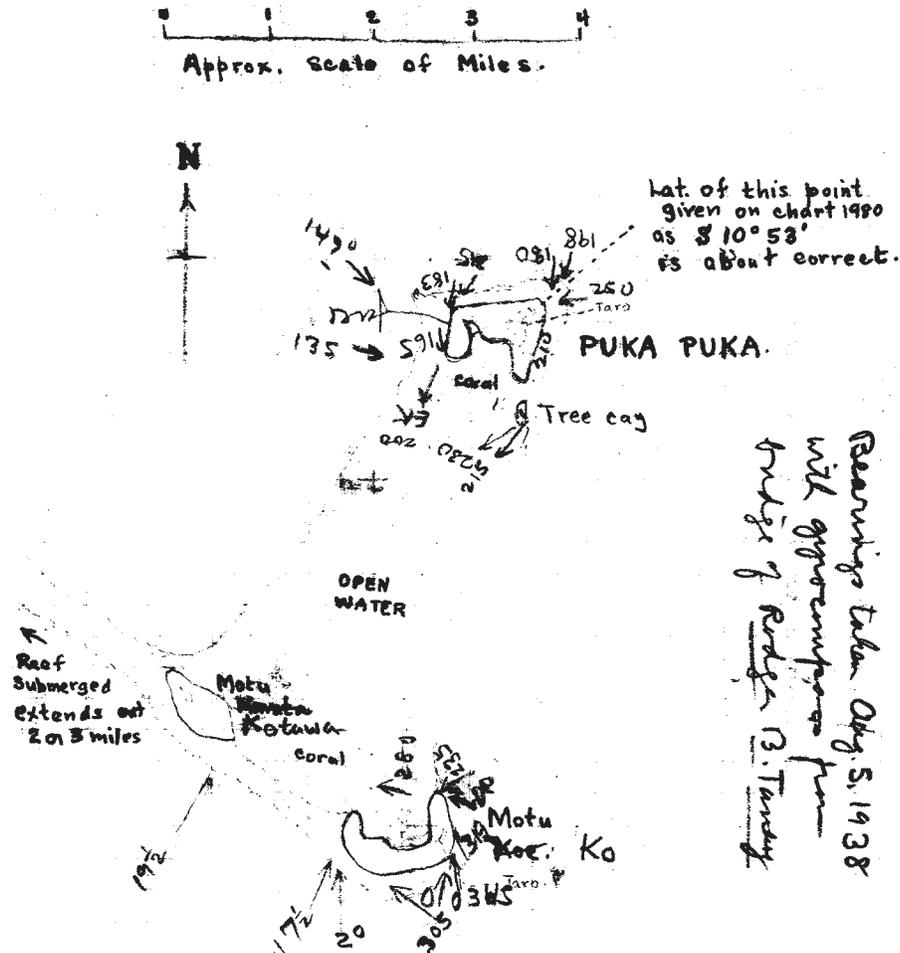
It will be noted that this sketch differs materially from that of Chart 1980. The general bearings and shape of islands are here correctly drawn. The distances could only be estimated.

Motu Katava is linear ovate in outline, a little less than a mile long N.W. and S.E. and about 1/2 mile wide, at widest place which is at about the middle, but W. of landing bay (lagoon side). The vegetation is very dense at the W. end, (the most luxuriant of that on any of the three islands) with tall Buka trees, dense undergrowth of small trees and shrubs and large birdsnest ferns. At the E. end the vegetation is the usual low, dry type, although there is a patch of conspicuous tall Buka trees a little E. of the middle.

Motu Katava is perhaps 3 to 4 miles S.S.W. of Puka Puka, the broad connecting reef being continually awash. Katava and Koe are less than 1 1/2 miles apart, the broad, flat connecting reef also being always awash.

The total height of the island including the vegetation, does not exceed 80 feet, the ground not rising over 40 feet and none of the trees being over 40 to 45 feet high, the highest growing in depressions.

ROUGH SKETCH MAP OF THE DANGER ISLANDS.

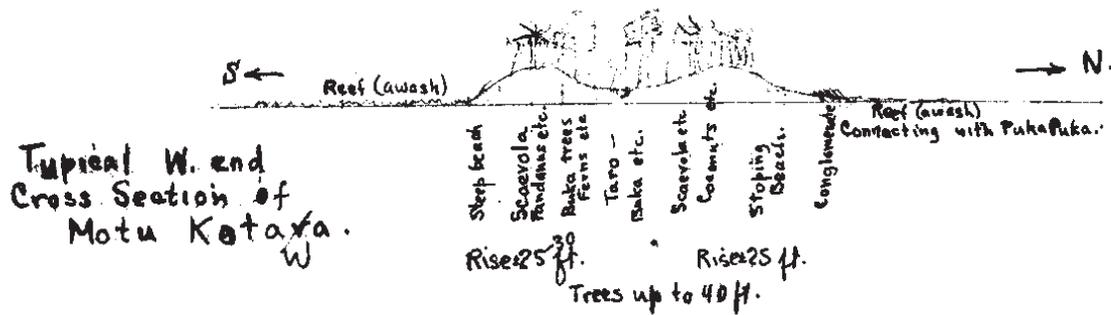


The heights on chart 1980 are much overestimated, Katava being the highest. Puka Puka next with less than 80 feet, and Koe the lowest, nowhere exceeding 60 to 65 feet. The slopes there given, especially of Koe indicate that the two southern islands were not visited when survey was made.

Fresh water is to be found on Katava, both about the huts, on the NE side, to which the inhabitants of Puka Puka move during copra gathering season, and in the seep holes in the center, where taro and bananas are grown.

The vegetation is about the same as on Puka Puka, no new plants being noted except a giant taro with a large candle-like flower enclosed in purple sheath, 10 to 12 feet high, leaves $2\frac{1}{2}$ by 4 feet, and a tree with thick, dark green ovate leaves and fig shaped orange fruit. The insects were much the same, with additions as follows:- Small yellow-brown centipedes, termites and purple scorpions under rotting bark and fallen dry coconuts; black and brown beetles, pale yellow cranefly, black Agromyzid fly, red-black spotted coccinellids, Odynerus-like wasp, all on Scaevola. Mites, sowbugs, oribatid mite.

On the N. side a bed of reef-sandstone conglomerate dips N. From the W. point a partly submerged reef extends far out to the west, with the surf breaking on it. The south side has a steep lump-coral beach and broad, flat reef. A cross section of the west end is as follows:-



The mosquitoes (*Aedes scutellaris*) are abundant in the low, central depression and bite villainously. There are numerous green-tinted lizards, scampering everywhere, and I caught a gecko under a hollow log at noon.

Some *Ipomoea* vine (not *pes-capri*) climbing over palms and trees.

As a convenience in gathering coconuts two paths have been cut the length of the island, one on each side of the central depression, with numerous intersecting cross paths at right angles.

Found at least three spp. of landshells under fallen leaves, sticks and dry coconuts.

Back to Puka Puka, having to paddle all the way against the wind which had shifted and prevented sailing. Supper of chicken and fish, cocked in imu. Watched old Puka Puka woman place the food in an imu:-

FILLING AN IMU

The coals and small hot stones, which had been in and under the fire were lifted and scraped away with a bent coconut mid-rib "forceps." In the resulting depression (perhaps three inches deep and 2 1/2 feet in diameter) were placed the parcels of food — taro, fish, etc. — wrapped in taro and coconut leaves; two rows of fine and a few odd ones around and on top. The hot rocks were then pushed back against the periphery and the whole was covered with sections of coconut husk, the outside up. Over these were spread deep gunny sacking.

Sunday March 2, 1924.

Attended three church services during the day:-

1. Special "family prayers" for us before breakfast. (Scriptures - Revelations 21:22 to 22:5).
2. Communion services at the large coral-lime church, in company with nearly the entire population, at about 10:30. (Sermon from I John 3:11).
3. Vesper services in the middle of the afternoon, conducted by the assistant minister, Rev. Kare sitting with us in the minister's pew, at left front of church.

Puka Puka Communion Services

The missionary was from Rarotonga, (London Missionary Society). He had been born in Puka Puka, sent to Rarotonga and Tahiti to school and assigned to a mission in New Guinea. There his wife had died of fever, and he had returned to Rarotonga and finally assigned to his native islands.

The Rarotonga Bible was used as well as a hymn book in that language. The order of service closely followed that of any protestant church:-

Order of Service

1. Announcements, both religious and secular, for the weak, in the course of which we were duly introduced and our mission made known.
2. Song, Hymn. 3. Prayer by an old man in the congregation. 4. Scripture reading.

5. Another hymn introduced and read by the clerk (?) sitting below the pulpit.
6. More scriptures. 7. Another prayer (absolutely unintelligible) muttered by an old man in the congregation. 8. Hymn. 9. Scriptures, with long explanation of different parts. 10. Hymn.
11. Baptism of two babies, carried by mother, but presented to minister by father.
12. About 1/3 to 3/8 of congregation here went out and the communion followed. 13 deacons took their place on front row.
13. Passage of Scripture. 14. Hymn. 15. Scripture. 16. Prayer. 17. Explanation of passing the "bread". 18. Passing of plates of finely cut taro. 19. Prayer by chief (who was one of the deacons). 20. Explanation of the "Cup". 21. Passing of the glass containers of coconut milk.
22. Prayer. 23. Dismissal.

(Being the first one in the first pew I was first to receive the communion, but apparently made no mistakes).

The first two pews (rough wood benches with single piece for back), were filled with young women. Behind these were several benches filled with men only and behind these a mixed congregation. The chief men sat along the sides of the church facing inward, our place in the minister's pew being the most forward of these on the S. side, at the ministers right. The pulpit was raised in front center, about 8 feet, and in front of it the communion table, behind which sat a drowsy clerk-like man.

The women were all dressed in white or colored calico loose fitting dresses, all wore hats of pandanus or coconut weave, decorated with ribbons, beads, seeds, etc.; a few wore cloth or lace hats. The men all wore white shirts and trousers, a few with white coats, one a khaki British uniform coat. Saw very few shoes.

The singing was, I suppose, typical. The men and women sang parts, the women, high pitched, squeaky, and nasal; the men deep and guttural. At the vesper service Rev. Kare told me the numbers of the hymns and I tried to follow them, but could not make out a word. The tunes were native.

Spent the time between and after church services in taking pictures about Puka Puka and collecting landshells, which are not abundant, but include about 3 or 4 spp.- one or two small brown, one flat yellow, and one elongate, conical, sharp light yellow green.

Evening-talk with Makohiki man named Joe, who has lived in Puka Puka 44 years and speaks fair English. He keeps the little store where calico and a and a few provisions (staples, "lolies", knives, etc.) may be had.



Roll 7:6 Looking south across the lagoon toward Katava, taken from the lanai of the missionary's house.



Roll 8:2 Village on bay of lagoon from S.W. arm Puka Puka. Looking E.



Roll 8:3 Causeway or embankment across arm of lagoon; gravel walk in foreground, missionaries house in background.



Roll 8:6 Henri Hopper, a half-cast, his 6 children and other children in front of his Home. (Taken by request).

Monday, March 3, 1924. Sailed down across lagoon to Motu Koe:-

Motu Koe lies about 1 1/2 miles S. 60° E. of Katava and about 4 miles S. and a little west of Puka Puka, (the west point of Koe is S. 15° E. of Puka Puka). It is connected with both these islands by broad flat reefs for the most part awash, but part of that toward Puka Puka, which forms the east wall of the lagoon is raised above the water in dry sand.

The island is broadly horse-shoe or crescent shaped (see sketch) slightly larger than Puka Puka, but not as thick. The arms point nearly north. From east to west it extends a little less than a mile, but is only 1200 to 1500 feet thick.

It is the flattest and least luxuriant in its vegetation; nowhere rising more than 60 or 65 feet to the tree tops. Fresh water is abundant, both in the shallow wells near the native houses, which line the lagoon, and in the seep holes toward the south-west central area. Probably less than two acres are under cultivation (taro and bananas), although coconut trees grow in some numbers among the other vegetation.

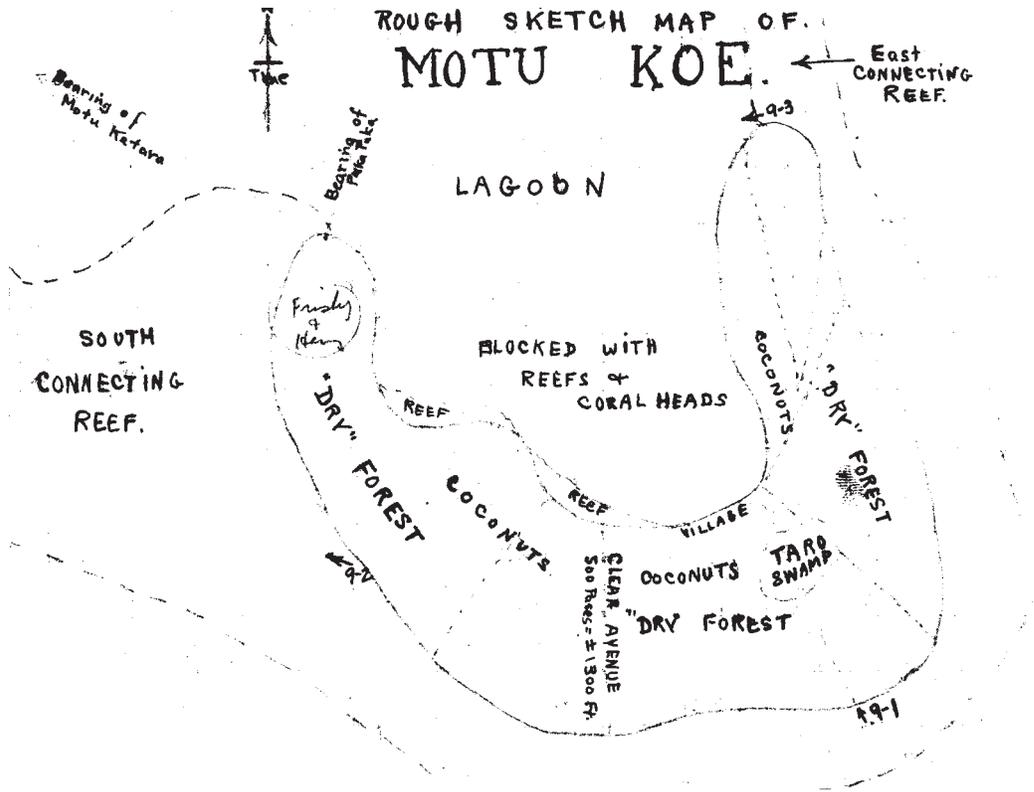
On the south side the reef is wide and flat, with a broad head of coral fragments, which at the S.E. end is higher above the edge of the reef than inland a few rods.

The vegetation is the same as in the drier portions of Puka Puka and Katava:- Scaevola, Pandanus, coconut palms, birds-nest fern, beach runner, ipomoea-like vine, grass, tamanu (Kamani-like tree), Tournfortia, Boerhaavia-like herbs, low shrubby herb with red painted panical, maile fern, tall fiber shrub or small tree (vau), lepidium-like shrub, noni, a few Buka trees and in the one low swampy area-bananas, taro and the sedge.

From the villages along the lagoon bay paths radiate out, some making clear cuts straight through to the ocean side, (which allowed me to pace the distance.

Numerous large purple-legged hermit crabs and a few very large red land crabs (abrosal shell, 3 1/2 – 4" in da.). Lizards abundant. .

About the same type of insect life as the other two islands. Flies sticky, following one about in



Roll 9:1 One of the avenues leading from Ocean beach toward lagoon, looking E. by N. from S.E. corner of island. Typical veg. and "alanui" of flat rocks.



Roll 9:5 The gifts and the assembled natives in front of the Missionary's house. The chief occupies a kerosene box in the right foreground.



Roll 9:6 Preparing to leave for the ship in the small boat, accompanied by the chief; with the missionary in a canoe accompanying us. Picture taken from a few yards out on the reef while the gifts were being put into the small boat from the canoe. Looking E. at about 5 P.M.

swarms-(the narrow-fronted sp.). Great numbers of the blue, white spotted butterfly, both male and female. Also a few small, red brown butterflies. At least four spp. of dragonflies. A large brown (common), large red (many), small brown (common), small red (common about taro patch), and one or two specimens of the very large green sided species of Hawaii. Two spp. of black wasp-one like *Odynerus* and a Sarcophagid fly on *Scaevola* besides small flies and a beetle.

Gathered a number of "tafono" fruits from the ground (the Kamani-like tree).

Back to Puka Puka and after eating (4 P.M.) received a present of taro, coconuts and 5 chickens, the gift of the Missionary, the chief, and the people, for our having taken communion with them on Sunday.

Stood out to sea, after making suitable presents to chief, missionary and congregation.
Log. 55. Fair wind from N.E. Pressed plants in evening.

Tuesday, March 4, 1924. Puka Puka bound for Phoenix I.

Squalls during night with rain.

8 A.M. Bar. 29.99". Log. 112. Wind from N to NNE. Sky overcast, sea rough.

Position. Noon. Lat. 10° 00' S. Long. 166° 20' W.

Squall in evening that ripped our jib to pieces and put holes in the main sail.

Wednesday, March 5, 1924. Sky overcast but sea calmer.

8 A.M. Bar. 30.01". Log. 80. Lat. 9° 23' S. Long.

Noon. Log 87. " 9° 19' S. " 167° 08' W.

65 mi. course. 318° true. Mag. NW 1/2 W

Developed 2 rolls films in evening.

Crew mending sail.

Thursday, March 6, 1924.

Near mutiny in crew. They came to terms when we threatened to put back to Pago Pago and actually turned the ship's head SW by W. for a few minutes.

9 A.M. position Lat. 8° 20' S. Long. 167° 48'. Sky clear, light wind from NNE.

Noon " " 8° 08' S. " 167° 53' W. Sea smooth. 90 mi. NW by N.

Friday, March 7, 1924. Partly cloudy, clear at noon. Fair wind from NNE.

8 A.M. Bar. 29.99. Log. 60.5. Lat. 6° 45' S. Long. 168° 61' W.

Noon " 29.98. " 85. " 6° 22' S. " 169° 01' W.

Fresh breeze N.N.E. and N.E. Heavy sea.

Distance made 24th 122 mi. N. 30° W. True.

Distance to Phoenix I. 187 mi. NW 1/2 N. (mag.)

Wrote up note books all day and developed 2 rolls films.

Saturday, March 8, 1924. Clear. Moderate swell, light breeze from N.E.

8 A.M. Bar. 30.01. Log. 97.5. Lat. 4° 50' S. Long. 170° 26'.

Noon " " 117.5. " 4° 31' S. " 170° 35'.

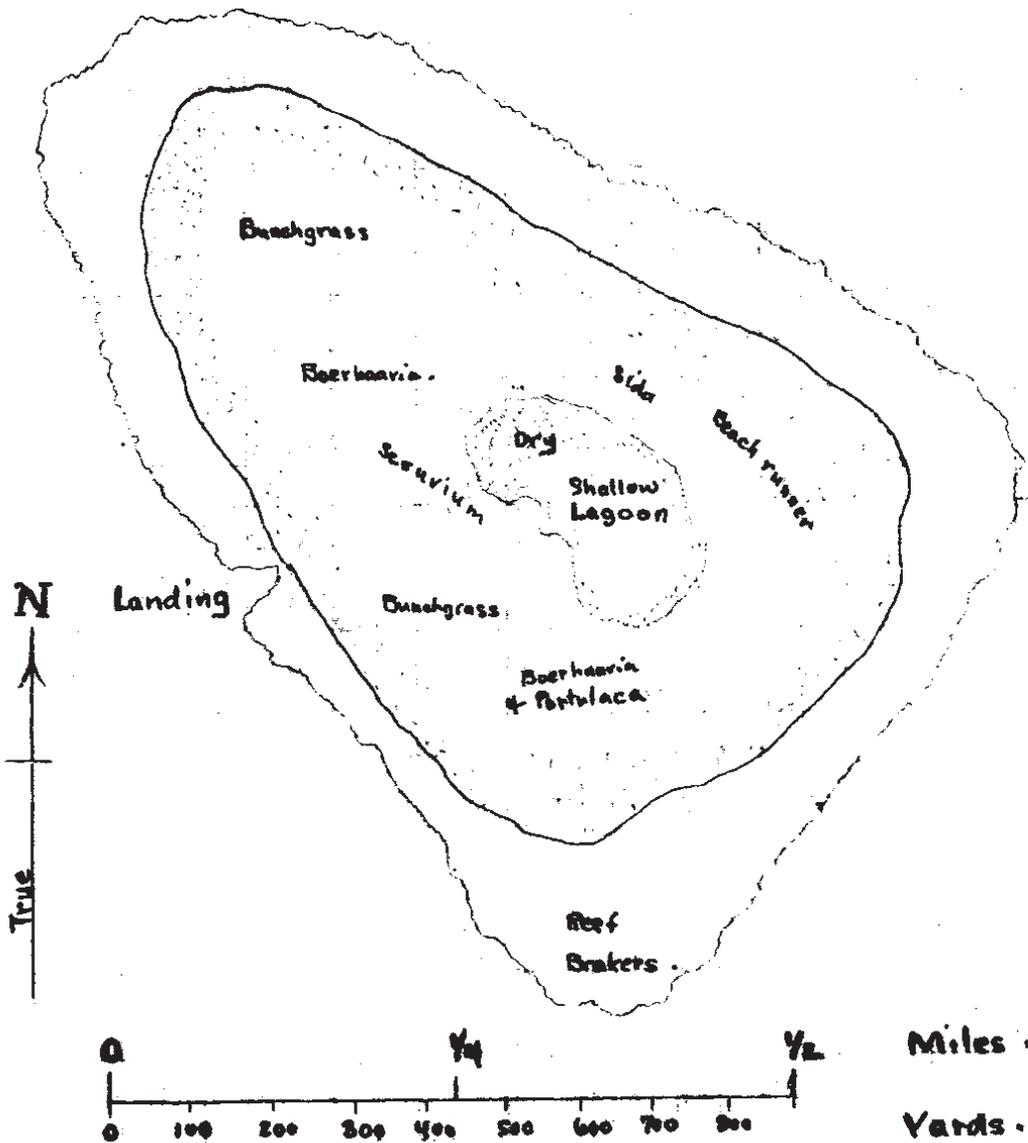
Heavy current setting to the westward. According to our A.M. sites we have been set 22 miles to the west of an dead reckoning position.

PHOENIX I.

(Enlarged from H. O. Chart 1211)

N. Point. Lat. $9^{\circ} 42' 28''$ S. Long. $170^{\circ} 42' 08''$ W.

About 18 feet high.



Position: 3:48 P.M. Bar. 29.96. Log. 133.5. Lat. 4° 16' S. Long. 170° 29' W.
Phoenix I. N.W. by N. 1/4 N. 35 mi. 153 mi. since yesterday noon.

Sunday, March 9, 1924.

Partly cloudy, Bar. 30.03. Light breeze from N.N.E. Looking for Phoenix I. 7:45 A.M. sight. Log 89. Lat. (by dead reckoning) 3° 45', Long. 171° 03'. 20 mi. to Leeward of Phoenix, the current having carried us 25 miles W. of dead reckoning position, despite allowance of 1 mi.

1 hr. current for 16 hrs.

5:30 A.M. Position: Lat 3° 49' S. Long. 171° 19' W

About ship on other tack, steering E. by N. against current and as close to wind as we could. Fine Sunday dinner included chicken and fritters.

Noon. Position Lat. 3°54' S. Long. 170° 55' W Bar. 29.96

3:30 P.M. " " 4°00' S " 170° 56' W. 22 mi. S.W. Phoenix. Log 17

Monday, March 10, 1924

7 A.M. Position Log. 88 Lat. (about) 3° 46' S. Long. (about) 170° 52' W. Between 12 & 15 miles S.W. Phoenix

8 A.M. " " 94 " 4. 09' S. Long. 170° 52' W.

Noon. " " 115 " 4° 06' S Long. 170° 47' W.

Phoenix 23 1/2 mi. N. (Mag.) Changed course to N.N.E. at 12:15 with engine. Log. 117. Capt. Stenbeck thinks the current sets south west, at least 2 knots. When we head N.N.W. we go W.; when S.S.E. we go south west (without engine). Sighted breakers of Phoenix at 2:30, dead ahead (True N.) Took Roll 10:1 from mast and rigging as we approached island. Ashore at about 3:45 P.M. The island is just as given on H.O. chart 1211, except that the reefs on the east side are not as wide as the area of breakers would indicate, being but slightly wider than that on W. side (perhaps 100 yards).

There is a good landing place, as indicated, on west side, the boat being able to go right up to the steep sandstone and coral beach.

The small lagoon is very shallow, not over a foot or so, with a large area of moist sand at its N. end. West side of lagoon fairly well covered with vegetation. East of lagoon for most part here broken coral, except at north end, which supports, bunch grass.

Plants:-

1. Bunch grass, (*Lepturus*) most abundant on north and west sides. (Plant Spec. 16)
2. *Portulaca lutea*)
3. *Boerhavia*) Covers large area of S.W. and South; with patches in N.
4. Beach runner with bur and yellow flower in dryer localities, on E. side, etc.

5. Stunted *Sida*, principally on West and South sides. -

6. *Sesuvia* around the lagoon, especially on N.W. end of it. (Plant spec. 19)

Took Roll 10:6 and 11:1-6 of the lagoon, Frigate birds and vegetation on island.

Animals:-

Rabbits, white yellow and brown ex-domestic, fairly abundant, but do not seem to have hurt the vegetation any.



Roll 11:1 Phoenix I. is low and flat, without trees or high bushes and with a small, shallow lagoon. The surface is a nesting place for great numbers of birds and several small rabbits.

Quantities of Sea Birds:-

Terns: - sooty, blue, gray, white (love-bird).

4 spp. Shearwaters. (According to Correia) Holes shared by rabbits.

Frigates with numbers of young, nesting on Sesuvium.

Boobies, Petrel, Curlew, etc.

Turtle remains (of which I took the skull) would indicate their presence on I.

No lizards, no rats (seen).

Insects:- Muscid fly, small black fly, small moth very abundant. Spiders (large like on Necker) and Dermestids under dead bird. Leaf hopper. "Monoplane" moth on Boerhavia, Ephydrid fly about lagoon, bugs, niero moths. No earwigs or butterflies. Took bunchgrass sweepings to look for land-shells, but no shells seen.

Shed and hut (marked on chart) long since gone. Tramway covered, but one pair iron wheels left. Back to ship at 6:00 P.M.

Log. 34.5 steering N.E. by N. for Canton I.

Phoenix is so low, reef so narrow, no trees, and so few breakers that it is practically invisible at night. Even with a crescent moon we could see nothing of it 1/2 hour after leaving, at 7 P.M.

March 11, 1924. Tuesday.

6 A.M. Log. 79.4 Enderbury Island being SSE, distant about 10 miles. Canton W.N.W. about 26 miles. Using sail and engine.

9 AM. Canton visible ahead from deck. Steering W by N, along S. and SE coasts. These are here covered with a growth of *Scaevola*, total height 25'-39'. Dropped anchor off entrance to lagoon in 9 fathoms water at 11:15A.M.

Ashore right after lunch.

Main entrance to lagoon has deep water well around Obs. point, but is blocked on the inside by coral heads. The point on the south side of the entrance (which I am calling Obs. Point, because the Obs. ppoint was situated on the east side of it) is about 250 yards wide. On the lagoon side and the iron reefs and resting remains of two or three shanks, now flat on the ground, and the broken iron iron tanks and a long iron cylinder, 50 feet long and 2 feet in diameter at one end, tapering to 14 inches at the other.

The vegetation on this point, which is typical of most of the other surface of the island (not trees) consists of:-

1. *Lepturus* bunch grass, usually much stunted; about 10" to 1 1/2' high.
2. *Portulaca lutea*, never very thick or high; usually small single plants.
3. *Boerhaavia*, in some places forming rather large masses, but prostrate.
4. Stunted *Sida*. Here not over 1 feet high, although elsewhere on the island it becomes 2' and even 3' high. (Plant Spec. 20)
5. Beach runner with yellow flower and bar; most abundant in dryer places where the other plants won't grow. (Plant Spec. 28)
6. *Sesuvium*-near the lagoon end in low seeps and dry water basins. (Plant Spec. 24)
7. *Ipomoea pes-capri* (with purple flower) (Plant Spec. 27) grown only at this spot, although another patch with white flowers (Plant Spec. 25) is to be found near the tramway.
8. Leafless green and orange dodder-lime vine, growing over the other shrubs and herbs. (Plant Spec. 26)

The ground underfoot is for the most part broken coral rocks with patches of sand.

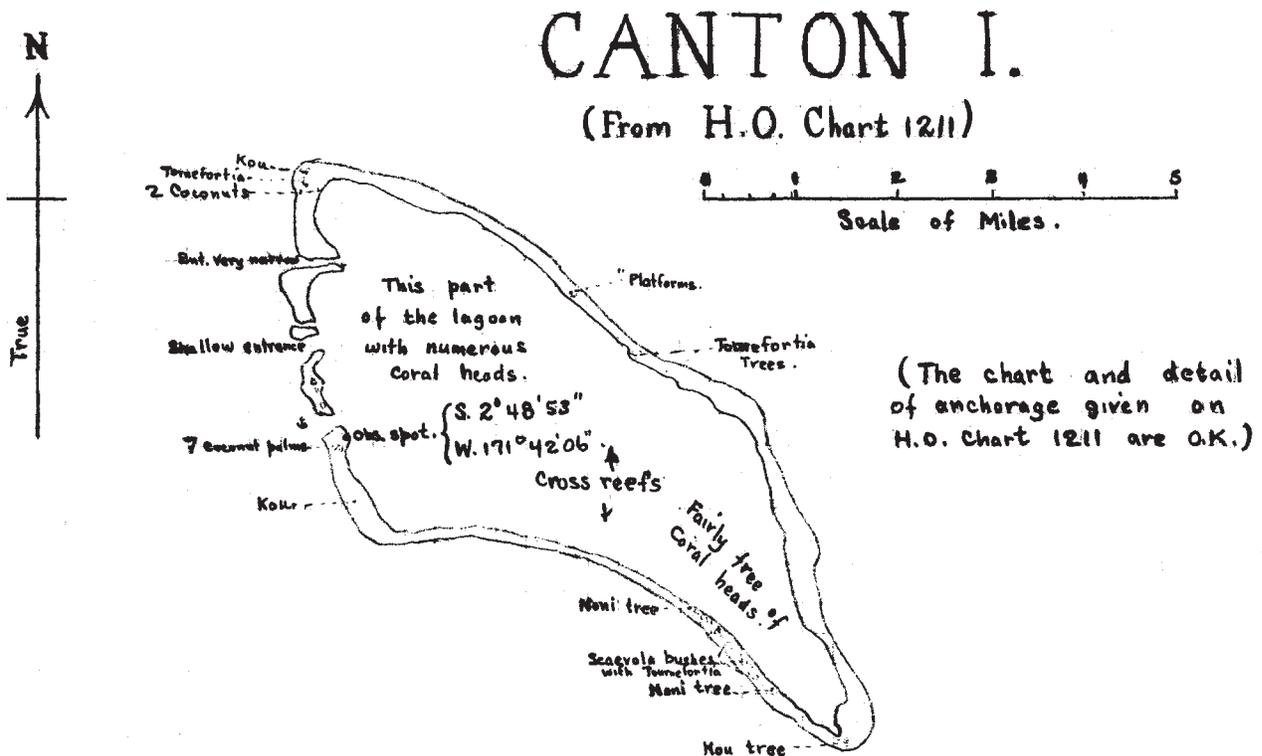
Six low coconut trees and a few young ones (apparently set out) grew about 300 yards south of lagoon entrance.

Hermit crabs are abundant but several small gray and gray-green lizards seen. A large red land crab and numerous rats also occur. Quite a little driftwood (here mostly remains of the shacks) is scattered about.

This entrance to the lagoon is about 80 yards wide at its narrowest point, and the incoming and outgoing tides race thru it with the swiftness of a swift stream (Pilot book says 6 knots an hour). Besides the far visible coconut palms, the entrance is further marked by three piles of rocks in the form of a V; one on the ocean side, one at the point and one on the entrance side. On the N.W. point lie the iron ribs and angles of a small vessel and nearly the remains of windless and rods. The reef at this point lies about 80 yards off shore. Opposite the entrance there are no waves — the soundings are given on H.O. Chart 1211. From this point all the rim of the island except the extreme S.E. end is visible.

Above and behind the steep ocean beach with its intermittent coral and sand lies a bolt of broken coral, here about 50 to 100 yards wide, behind which is a strip of vegetation sloping gently down to the lagoon beach.

Two coconut palms are visible to the N.W. end occasional trees and patches of shrubs along the rim.



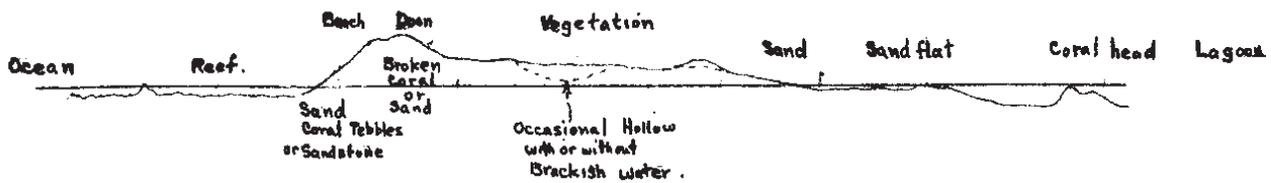
Frigate birds abundant and some boobies and terns. Beneath a dead frigate were the usual dermestid larvae and beetles. Saw specimens of a green muscid fly—possibly *Lucilia sericata*. Numerous hippoboscids flies about the frigates.

Remains of a wooden ship on lagoon beach about 1/4 mile south of entrance. Rowed SSE about 2 1/2 miles across the lagoon, which is badly blocked with coral heads, just awash, to where Hono had overturned a turtle on the ocean side. The island is here quite narrow, not over 60 or 70 yards wide, but with a wider reef, about 150 yards. Here there are scrub *Pemphis* bushes in addition to plants 1, 2, 3, 4, and 5 listed above. The turtle measured about 3 1/2 feet long and 30 inches wide. Hauled him over a low place to the lagoon. Back to the "France."

Wednesday, March 12, 1924.

Ashore at 7 A.M., landing on north side of entrance. Followed up the N.W. rim, accompanied by the boat in the lagoon. A series of small brackish ponds or sink holes, some dry, some only slightly brackish, although they rise and fall with the tide. Bordered with *Sesuvium*. Numerous ephydrid flies about the pools and small flies, black ants, and brown and gray leafhoppers on the *Sesuvium*. Some on *Boerhaavia* with addition small cream and brown moths. Usual hippoboscids flies on frigate birds.

Cross-section of Island Rim (at point 1/2 mile N. Lagoon Entrance)



Vegetation consists of Plants 1 to 6 inclusive (as listed above).

A small, only slightly brackish pool contained a green slime and a minute organism about 1/16 inch long. Took sample containing both. My attention was called to it by frigate birds sweeping down upon it and apparently drinking. Pool about 5' dia. with a patch of *Sesuvium* on W. side.

Some of the sand and coral fragments beginning to solidify into a conglomerate as in the lagoon at Wake.

The next entrance to the lagoon is 3/4 mile above the first (main) entrance. It is shallow but nearly 200 yards wide.

It is much like the S. entrance of Wake. Hono waded across, but we went around in the boat. Deep water with coral heads on lagoon side.

North of this about 100 yards is a second channel (the 3rd lagoon entrance) only knee deep and in places only 15 yards wide, which extends from ocean to lagoon. The rim here is between 200 and 350 yards wide.

To the north is a long level plane, covered with *Portulaca*, *Boerhaavia*, *Sida* and patches of bunch grass. It is occupied by frigate birds and boobies. There is rather a marked absence of rats and lizards here.

Sida is low and stunted, seldom over 2 feet high, but blossoms profusely. On it are small white microlepidoptera, a small green and orange caterpillar (probably of the small white moth), a red and fuscous ant, tiny black ant, and a *Reduviolus* bug.

Boerhaavia forms large mats and has plenty of white blossoms. On it are white micro, a green bug, a brown and gray leafhopper, both the ants, and a small black fly (*Agromyzid?*)

Bunchgrass, not so stunted as elsewhere: on it are a gray jumping spider, the leafhopper and *Reduviolus* bug, and the ants. In the roots are:- small cockroaches, sow-bugs, *Embiid*, *Pseudoscorpion*, centipede, and small spiders.

Just south of 4th lagoon entrance, a large patch of beach runner, *Boerhaavia* bushes and a single sprig of *Scaevola*, run up onto the coral ridge. A long point runs out (E.) into the lagoon. Here grows the tallest *Sida* bushes yet seen on the island, about 3 1/2 feet tall.

This fourth lagoon entrance is very long and winding, having two sharp turns in it. It is rather deep in spots, but on the average not over 20 yards wide. It is crossed by two reefs of coral.

On one side of the cross reef barrier is a deep pool, which was filled with fish waiting an opportunity to swim through a break in the barrier; some jumped over it. Points of land extended out delta-like in to both the lagoon and the ocean at this point, making the width over 1/4 mile. This channel must vary back and forth, for it has piled up coral rocks on one side and is cutting into the vegetated bank on the north.

The low herbs and shrubs continue north of this entrance, but we also have the beginning of a fringe of *Pemphis*, about 7-10 feet high along the edge of the lagoon. In it are boobie nests and on it



Roll 12:6 Looking S. from the N.W. point along W. beach showing the palm, the kou and Tournefortia and in the distance, the Obs. Point, coconuts and masts of the "France."

I found numerous yellow brown spiders, small white moths, white microlepidoptera, a black and red young bug, *Reduviolus* bugs and caterpillars.

Lizards are rather abundant now. The same or a similar hippoboscid fly occurs on boobies, especially young nesting birds.

Near the N.W. corner of the lagoon is a small coconut palm and opposite (W. of) it on the ocean side is another, taller one with a dozen or so nuts. Between them is a small slump of *Tournefortia*, about 18 feet high and 50 to 60 feet in diameter.

About the *Tournefortia* are the usual white moths with red and black spots small yellow and small black flies, white microlep. and spiders.

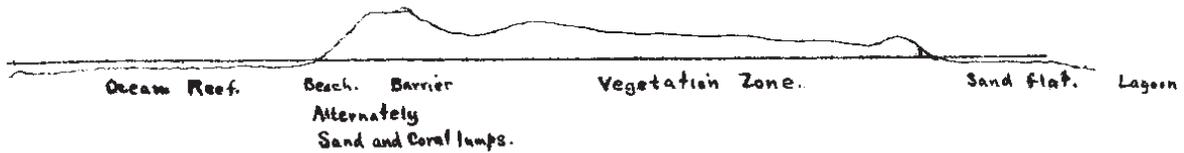
About 150 yards N of the ocean side coconut palm is a single low, stunted kou tree (*Cordia subcordata*) (Plant Spec. 21), with numerous orange blossoms and some fruit, about 10 or 12 feet high and 15 feet in diameter. On it were small yellow flies, small black pollinose fly, an ortalid-like fly with black markings on the wings, a small Sarcophagid fly, the ants, the micro-lep., the small white moth, and a large moth that I was unable to catch. (Caught some later). Saw the rat nearby.

About 200 yards beyond (N.) is the high, steep N.W. beach. The reef here and also both south end and east is quite wide (perhaps 1/8 mile), with the waves rolling in on the N.W. point along W. in great breakers.

Proceeded east and ESE along N. shore. The barrier of broken coral changes to sand dune, covered with beach runner and stunted bunch grass, with plants of *Boerhaavia*, *Sida*, etc. Past a pile or mast, the butt of which was sheathed for about 14 feet in sheet copper, lying on S. side of ridge. The beach is steep sandy, with a broad reef, (175 to 250 yards wide). The island rim is here 1/4 to 3/8 miles wide: made up of the beach, dune ridge, strip of broken coral and then the belt of veg. to the lagoon beach. There are occasional large logs and tree trunks on the beach ridge.

Some of the drift logs contain termites, the usual small black weevils (of the N. islands), silverfish, sowbugs, a small cricket, and the common gray and yellow mites. Ant nest under log contained winged females, medium sized red and fuscous and tiny fuscous workers.

Profile of Daland run, (N side). Width 300 to 400 yds.



Zig-zagged north rim as far east as two patches of *Tournefortia* trees, one of which also had a kou tree. Ocean beach lined with drift logs, some of considerable size. The sand dunes contain numbers of turtle "holes", indicating that turtles are very abundant at times. The beach barrier is alternately sand dune and coral lumps. In one place there is an underlying reef formation.

The flat is extremely xyrophytic, the beach runner and *Boerhaavia* vine being absolutely prostrate on the cracked sandy and lump coral ground, and the bunch grass stunted and brown. Some little black pumice.

On the lagoon side on a slightly elevated spot found as shown in



Roll 13:4 Two peculiar built up platforms of flat coral slabs, 6' x 7' and 10" high and 7' x 10' and over 1 ft. high at N.E. corner, 10' or 12' elevation, 30 yards from lagoon and each with what was formerly an upright slab in middle.

They were parallel to lagoon beach.

Numerous rat holes.

The leaves of the kou tree were badly eaten by a mottled, orange tinted caterpillar (took several both in alcohol and breeding can). Also caught spiders, yellow flies, black flies, Syrphus grandicornis and a large brown bug.

The Tournefortia trees had about them the usual white red and black spotted moths, green muscid flies, white micro-lep., small black flies and about the boobie nests hippoboscid flies similar to but smaller than those on frigates.

Caught a lizard in a boobie nest.

On the next point is a large patch of Tournefortia, trees about 150 feet in dia. and near it a very small patch of sickly looking Pemphis, about 1 1/2–2 feet high, used as nesting place by Frigate bird colony.

Back across lagoon to entrance. Noted a series of parallel reefs, extending across the lagoon from N by W to S by E. forming an effective barrier at low tide to even a flat bottom boat. The lagoon is also thickly beset with coral heads. There are large open spaces, however, which would permit landing in a hydroplane, if care were taken in choosing the spot. There are much fewer coral heads and reefs in the S.E. part.

March 13, 1924. (Thursday)

Correia laid up with sore eyes. Ashore at 7:15 with three sailors. Prepared a large scale sketch of lagoon and on it sketched the cross reefs and relative abundance of coral heads. It took us until nearly noon to beat back and forth down lagoon to where we left off yesterday, dodging coral heads and reefs.

Coral Heads and Reefs in Canton Lagoon (See larger Map.)

The coral heads are thick around main entrance to lagoon, except on south side near Obs. spot. Out in the lagoon they seem to run in more or less parallel strings from NNW to SSE, although there are numerous isolated heads. Between these are patches of deep, open water. The north-west end of the lagoon is blocked off by a nearly continuous line at right angles (that is E by N and W by S.). Beyond toward the middle of the lagoon they definitely take the form of nearly continuous, parallel reefs, about 4 or 5 in number, beyond which the scattered heads become fewer and fewer, until the S.E. end of the lagoon is comparatively free.

The heads themselves are usually flat on top or gently rounded, in many cases just awash. Some are topped by masses of forked, candelabra-like brown sharp tipped coral, which rises out of the water. The prevailing colors of the coral are yellow-brown, red-brown, blue and purple.

The third reef runs from a point a little W. of the 1st patch of Tournefortia trees on the N. to about 2/3 the distance from the S.W. corner of the lagoon to the middle of the south side where it bends toward the S.E.

Ashore at a point about 1/8 mile S.E. of where I was picked up yesterday. Here there is an interesting coral formation on the lagoon beach.

Saw a large ulua and several smaller fish including small sharks.

Several small groves of Tournefortia trees about this point, made up of trees 10 to 25 feet high; a nesting place for boobies. Took wood specimen (Marked (2)) (Plant Spec. 22). Caught another Syrphus fly (same sp.).

Grove directly N. of Point, about 250 yards from it and 150 from ocean beach in form of U. enclosing a luxuriant bed of Boerhaavia 20 x 100 feet, which was alive with small gray-brown leafhoppers, black ants, white micros, black flies, and small spiders. This grove is 75 yards in diam-

eter with usual moths and caterpillars, black ants and large brown bugs. Numerous nesting boobies and hippoboscids flies.

Small patch of *Sesuvium* yielded only small black flies and a few leafhoppers. It has a nearly white, five petal, star-shaped flower.

About 200 yards E of point (where we landed) is a stone wharf and remains of tram-way rails. Patch of kou trees, (a dozen stunted trees some 15 feet high) grown here, some of the trees growing over the tram-way rails, giving an idea of its period of disuse. Took wood sample (marked (1)) (Plant Spec. 21).



Roll 14:3 The bay containing stone wharf and kou patch, looking east.

The rails extended back (East) about 500 feet. Only remains are a roll of cable and two pair of wheels. Few mounds of guano near wharf.

Few small patches of *Ipomoea grandiflora* with white flowers. They are covered with black ants.

East of here is a patch of a dozen small *Scaevola* bushes, none higher than my head. On them:- small yellow fly, *Syrphus* fly, yellow moth (same sp (?) as on Necker), large brown moth (same as Wake (?), spiders, black ants, small white and brown moth.

The ocean side reef is here about 100–125 yards wide, beach steep coral lumps and sand; plenty of driftwood.

On lagoon side, about 1/4 mile ESE of kou patch, on next point, is a single stunted kou bush, 2 1/2 feet high and 5 feet in dia. On it – yellow flies and black ants.

Some little low, stunted *Pemphis*, mostly dead, along here; a roosting place for frigate birds, and harboring small *Reduviolus* bugs and spiders.

The island rim widens out, with a long sand beach on ocean side; slope toward lagoon covered with dead or stunted *Pemphis*, none over 4 or 5 feet high. Barrier ridge high here (Chart says 18 feet). Sandstone beach in places.



Roll 14:5 A single upright slab of coral rock and the xyrophytic flat, looking S.E.



Roll 15:2 Smaller sink hole between it and the S.E. dry arm of the lagoon, looking N.E.



Roll 15:3 Extreme S.E. bay of the lagoon, mostly damp sand, with a line of Pemphis on the opposite shore, 150–200 yards away, looking S.E.



Roll 15:4 Looking W.N.W. along the beach.

Long dry arm of lagoon runs up into this widened space.

Pemphis bushes larger, some 6 to 8 feet high with black flies, black ants, leaf hoppers, spiders and small white and brown moths.

Single large Tournefortia tree, with flies:- muscid, sarcophagid, spotted wing ortalid-like small yellow and small black, and moths:- white spotted red and black, yellow (as on Scaevola), white and gray.

S.E. of this tree the island rim is flat and xyrophytic. Beach sandy with narrow reef, (waves break about 100 yards out).

The S.E. beach is paved with sand-stone. Reef only about 75 yards wide. Lots of driftwood. Orange colored dodder on the brush.

Several patches of low Pemphis screen a moderately large brackish pond at the S.E. end of the lagoon, and another small pond S. of it.

Started up S. rim past kou trees, single noni (Plant Spec. 23) and large grove of Scaevola (to be described tomorrow) to the sail boat. This part of lagoon rather free of coral heads.

Sailed back length of lagoon, getting overtaken by nightfall and being hung up on several coral heads before reaching lagoon entrance and ship.

Friday, March 14, 1924.

Ashore at 7 A.M. landing on Obs. point, against a strong current coming out thru lagoon entrance. Went south and followed along entire south rim of the island to S.E. point, most of the way in a disagreeable drizzle of rain.

In early morning a number of oval, jelly-like organisms on lagoon beach, 3" x 8" or 10" long. Eaten by hermit crabs. Saw two small purple-gray eels. Medium size sand crabs with white backs, black sides, black stalked eyes, and one large and one small white claw.

Occasional brackish pools near lagoon and single stunted kou bush on arm south of coconut palms.

Island rim at W end of S. side very narrow, less than 100 yards in places, with 150 to 175 yard reef, steep sand and gravel beach and rocky ridge. Occ[asional] Pemphis bushes on lagoon side. Large lobster-like crayfish. Very little driftwood on ocean beach for first couple miles. Opposite 1st grove of Tournefortia trees reef about 150 yards wide, beach with a long even bay to S.E. point.

Usual vegetation, with patches of Pemphis bushes at intervals on lagoon side. Shearwater holes in sand. Embiid in bunchgrass roots with no land shells.

A little E. of S. of Stone Wharf and kou trees, and about S.W. of the lone Tournefortia tree begins a nearly continuous stand of Scaevola bushes, with occasional noni and Tournefortia trees. This extends to within about a mile of the S.E. point, a distance of about 1 1/2 miles. Most of the Scaevola bushes are between 7 and 10 feet high, a few higher, and they extend from the edge of the lagoon to near the ocean beach. The barrier ridge is not distinctly marked and the height of the rim is not over 10 to 12 feet.

The noni trees about 10–13 feet high, have on them yellow flies, moderate size red ants, yellow moths. The Scaevola yellow moths and spiders. (Everything wet from the rain and collecting of for present).

Beach low, wide, sand and lump coral, with a belt of conglomerate above water's edge.

Caught red coccinellid on Scaevola leaf. Small mite or cricket (?) in boobie nest. The Scaevola leaves are not mined, although some are eaten to transparency in spots. (I suspect the pale yellow crane-fly as the leaf miner, as the Agromyzid fly is present here).



Roll 16:2 An isolated noni plant at the S.E. end of the Scaevola, with Pemphis on the right and transition zone on left. Looking W. Note hermit crabs beneath tree.



Roll 16:3 S.E. end of the Scaevola patch, taken from spot 20 feet N. of (16:2) and looking W.N.W. Pemphis in foreground. Highest true is the lone Tournefortia.



Roll 16:4 A peculiar arm of the S.E. brackish pond (here dry), showing how the coral has been undermined and has fallen in; pond itself in distance. Looking E.S.E.

The boobies in the Scaevola patch have blue beaks and red feet. Those in the open have yellow bills and gray or yellow feet. On the other side of the lagoon I saw boobies with brown “wastecoats.”

Toward the SE. end of the patch the Scaevola became so thick had to take to the beach. It ends about a mile from the S.E. point, with a large *Tournefortia* tree near its end on the ocean side. Beyond is a transition zone of scattered Scaevola and patches of beach runner, *Boerhaavia* and *Portulaca*; gradually becoming the usual low vegetation, with low *Pemphis* along the lagoon side.

Numerous rats in open space between here and some *Pemphis* bushes to the S.E. Green caterpillar on *Pemphis*, but no cocoons among the leaves as on Wake. The *Pemphis* appears sickly. None in flower, and in places it is a bright orange color.

Opposite S.E. dry bay of lagoon is patch of sickly kou, on which were spiders, white and micro moths, and small black flies. More *Pemphis* along bank of lagoon arm.

S.E. point a long bend of beach, resting in places on conglomerate which dips N. Beach backed by broad stretch of bare coral stones. Reef 125–150 yards wide. Surf breaking heavily.

There are only a few dead *Pemphis* bushes near the beach at the point and the height is nearer 14 feet than 20 as given on the chart.

Behind the barrier ridge are several dry, shallow basins, and a single small stunted noni plant. On it were yellow flies and black flies and a small flat brown beetle.

While waiting for others to finish investigated fauna of bunch grass roots:- Tiny black ant, small brown roach, minute red mite, small brown beetle (found on noni) small brown mite (on cricket?), small brown leafhopper, sowbug, small brown spider, moderately large yellow-brown spider, pseudoscorpion, brown bird tick.

Back length of lagoon in sail boat, stopping at Obs. point, where I continued study of bunch grass root fauna near Coconut trees:- centipede, embiid, mite, spider, sowbug, leafhopper, ants. Caught rat while sweeping bunch grass. Swept Ipomoea patch (which has purple flower):- leafhopper, 2 spp. black flies, small thrip spider. Back to schooner.

Saturday, March 15, 1924.

Stormy night with wind from N. and N.W. Rain and heavy surf. Ashore at about 9 A.M. and spent morning breaking up lumps of coral, securing crabs, shrimps, brittlestars, worms, chaetopod, etc. and taking small samples of the different types of coral near shore.

Across to Obs. point and caught earwig, small brown tenebrionid beetles, dermestid beetle, silverfish, *Cutilla soror* roach, black ants, gray ants and mites on Coconut palm under leaf bases.

Back to schooner at 1 P.M. and spent afternoon on notes.

P.M. Sight. $2^{\circ} 49' S.$, $171^{\circ} 40' W.$ (Chron. 2 min East—should be $171^{\circ} 43' W.$)

Sunday, March 16, 1924.

Ashore in morning landing on N. side lagoon entrance. Spent morning sweeping bunchgrass (without adding anything but a winged Embyiid), and digging for Enteropneusta in the sand, while the others washed clothes. Back to schooner at noon and spent afternoon on board writing up notes. Developed films in forward hold.

Monday, March 17, 1924.

Ashore at 6:50, sailing across S. side of lagoon to line of Pemphis bushes after boobies etc. Walked back to Obs. point, collecting a few shells along ocean reef including a large clam shell, about 10" long in good condition — same kind as thrives abundantly in the lagoon. The reef is covered with a gray sandy ooze and is rather bare of interest.

Collected some black spotted orange coccinellid beetles on *Sida* attacking a small white (salmon



Roll 18:4 Correia [could actually be R.H. Beck — Ed.] holding shearwater at mouth of its hole, N. side of ridge.

color beneath) mealybug. Also saw one of the Syrphus grandicornis flies hovering near, and Reduviolus bugs, white micros, yellow flies, black ants and spiders.

Stopped to collect on the isolated, stunted kou tree,— only spiders, white micros, black ants, yellow flies, and the large mottled caterpillar. Boobie nests, and quantities of red-legged hermit crabs beneath. Caught another lizard on Obs. point.

Back to schooner at 10:30 A.M. and immediately started for Enderbury I.

March 18, 1924. (Tuesday)

Steering S.E. during the night with the current and set carrying us directly toward Birnie's I. Went over on other tack at midnight, starting the engine. No sign of land at 6 A.M. Position at 7:35 Lat. about 3° 12', Long, 171° 16'. 14 miles S.W. by W. of Enderbury.

Noon position Lat. S. 3° 12'. Long. 171° 02'W. - current = 171° 08'.

Enderbury sighted at 10:30. Ashore at 3 P.M., landing without mishap on W. coast opposite a large mound (probably of guano).

Vegetation:

1. Coconut palms, about 60, clump near N. point, one near south point and one E. of landing.
2. Kou trees, several clumps near S. coconut patch, one about hill of guano and a few isolated trees.
3. Tournefortia trees, large patch middle W. side, small patch S.E. side and a few isolated trees.
4. Noni tree—one tree on W. side at S.W. corner of dug up area.
5. Sesuvium meadows and patches about lagoon, south of it and in various low places.
6. Ipomoea vine (Plant Spec. 31) (with white flower), large patches in various parts of island.
7. Ipomoea pes-capri (with purple flowers), small patch near guano hill and landing.
8. Boerhaavia (Plant Spec. 32) } Covers most of the flat land not otherwise occupied.
9. Portulaca }
10. Lepturus (bunch grass) not very abundant, but small patches here and there.
11. Sida - stunted plants scattered among 8 and 9.
12. Beach runner, large patches at N. end and other patches along beach barrier.
13. Plant (No. 29) with red panicle (also found at Nassau and Puka Puka) not abundant, patches toward N.
14. Weed (No. 30) (common about Honolulu) small patches behind landing and among diggings.

Sea birds very abundant, especially terns, frigates, boobies.

Rats and lizards quite abundant.

Insects the same as found on Canton and Phoenix:-

Lep. Large brown and white moth on kou, with spotted, salmon and black caterpillars; white moth with red and black spots on Tournefortia, small gray moth, small brown and white moth; white micros.

Hym. Black ants, small black ants, red ants, pale yellow-brown ants.

Dipt. Large Sarcophagid, large green muscid, small yellow, small pollinose, small black, small Ephydrid about pools, small black along sea coast, small delicate gnat. No mosquitoes.

Hem. Leafhoppers in Boerhaavia, Sida, Sesuvium, Lepturus, Portulaca, Reduviolus like bug, mealy bug.

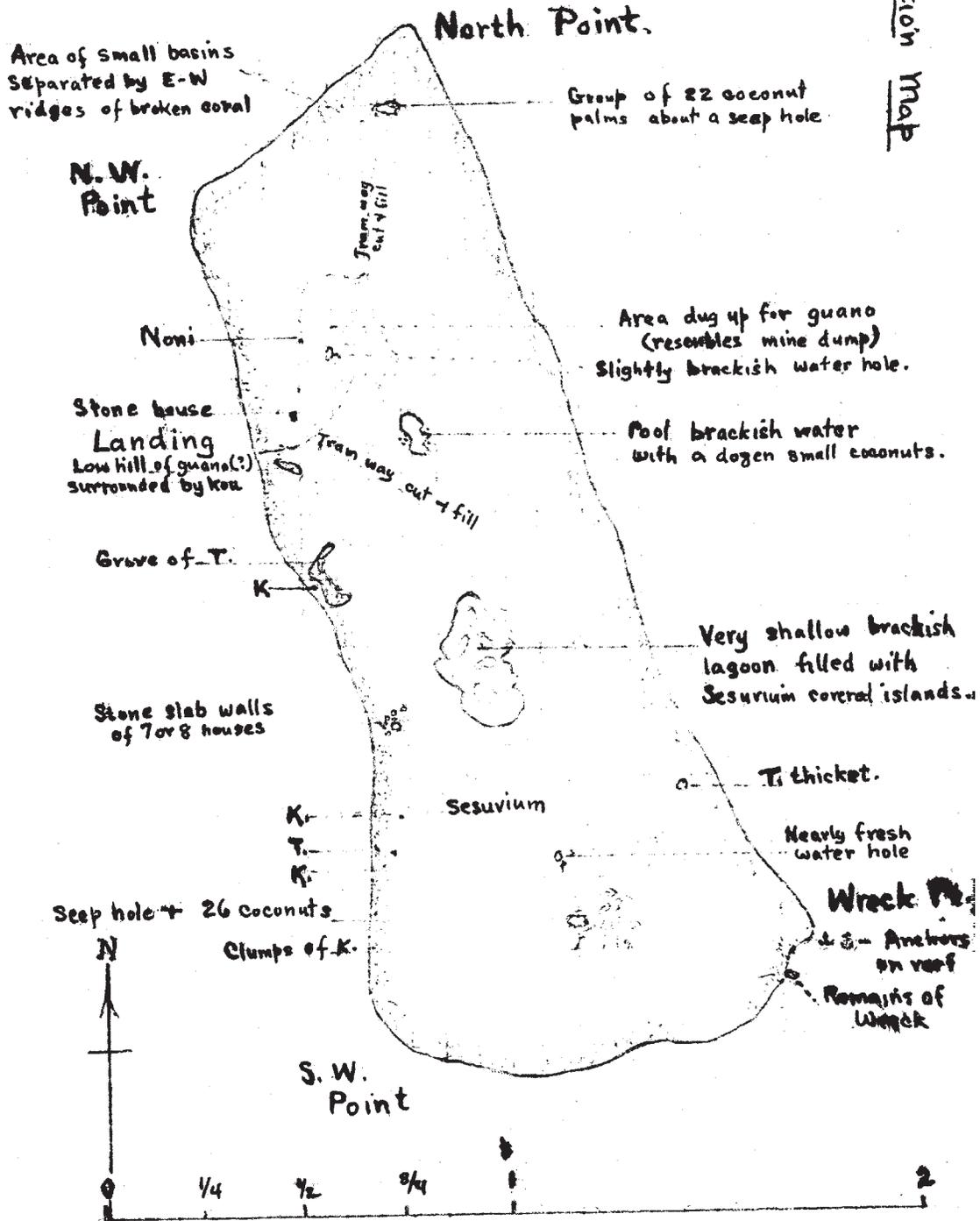
Coleo. Black spotted orange coccinellid; small black tenebrionid; dermestid; small flat Brown, spotted beetle. Proterhinus in bunch grass and one in Boerhaavia (not seen before on trip).

Embyiids, sowbugs, thrips, mites, small crickets (?) in bunchgrass roots.

ENDERBURY I.

(Enlarged from H.O. Chart 125).

Vegetation
map



Scale of Miles

T = Tournefortia trees
K = Kou trees

Narrative

Investigated hill of fine brown dust covered with prostrate herbs; (guano?). Directly east to small water hole with clump of 10 small coconut palms, none with eatable or drinkable nuts. North and north-west of this is area apparently dug over for guano, resembling a mine dump, with piles of coarse rocks and dirt, some here, some covered with flat herbs, among which I recognized a new one, (a common weed in Hawaii). Here was a small slightly brackish pool testing more of guano than salt, at which the birds drank; the water was warm and disagreeable, but could be drunk in an emergency. These pools and other low places surrounded by sesuvium patches; and entire area supporting a large colony of sooty terns, which had recently laid numerous eggs.

The entire N. end of the island is made up of shallow basins or troughs separated by E.-W. running ridge of rough coral rocks. In one of these basins surrounding a shallow, brackish seep hole, was a clump of 22 coconut palms, two of them as much as 40 feet high, with a number of huts and fallen trunks of other palms. Some were in bearing and I carried several nuts back to camp. At one end of the clump was a small water hole of slightly brackish water, at which the birds drank.

About 200 or 250 yards N. of this is the N. point of the island. Here the visible reef is but a dozen yards wide, but the surf breaks heavily 100 to 150 yards out, with heavy swells beyond. Only a few drift logs. Beach steep with coral rocks and sandstone slabs, behind which is a broad belt of broken coral and sandstone rocks, intergrading into the broken coral ridges.

Across this plane of rough coral are paved "alanui" or lines of flat sandstone and coral slabs, at convenient stepping distances, leading off in straight lines. Undoubtedly comparatively recent, because of good condition, having been probably built by the guano workers. The cuts and fills of the tram-ways which leads up toward the coconut patch are in such good shape that even the shovel marks are still visible; indicating absence of erosion.

Sea birds exceedingly abundant, great colonies of terns, frigates and boobies dotting the green plane. Rats and lizards also abundant.

Spent evening trying to collect moths from kou, ipomoea and Tournefortia by flashlight. Not abundant. Camped near landing, S. side of low hill.

March 19, 1924. (Wednesday).

Away from camp early and south to grove of Tournefortia trees:- usual white, red and black spotted moths, yellow flies, and spiders; and on Sida and Boerhaavia bushes nearby: white micros, red ants, black thrips, and small white and brown moths. Green muscid attracted to excrement. The Tournefortia patch is wedge-shaped, 200-250 yards long on east, 100-150 on west, and the N. arm, extending N.E about 200 yards. The S. end is opposite the N. end of the lagoon on W. side. There is a single small kou tree in front.

Between this grove and the lagoon (going S.E) is a patch of white flowered Ipomoea vine and some low bunch grass, harboring a large colony of sooty terns, so numerous as to form a black cloud when they rise. The margin of the lagoon and numerous low, flat sandy islands in it are covered with Sesuvium. The lagoon is small, and shallow, less than 1/2 mile long and 300-350 yards wide at the widest plane.

Opposite the S. end of the lagoon, on the W. side and about 400 yards south of the grove of trees are the ruined slab walls of seven small houses averaging 12 x 15 feet, the walls are nearly 6 feet high and a large double canal-like enclosure, 40 feet square with walls 4 feet high. On top of the front one, which is filled in solidly with rock, rests a small rusted iron cannon about 3 1/2 feet long, whose original bore was perhaps 2 1/2-3 inches, now much corroded. Two of the houses rest on a small paved (paepae-like) platform. The house in front is 60-75 yards from the beach, the others more.



Roll 19:1 The S.W. point, looking W. from barrier ridge. Some little driftwood near point.

About 400 yards south and 150 yards from the beach an isolated, stunted kou tree, much eaten by the large mottled caterpillar. on it are also black nuts, yellow-brown ants, white micros, black flies, gray flies, yellow flies (all small), and spiders. Also a nesting boobie.

150 yards S.S.W. another even smaller kou bush and opposite it on the low, broad, beach a lone *Tournefortia*, with nesting boobies. The beach is broad and low, composed of fine coral fragments, coarser at the top, with a zone of sandstone and conglomerate slabs. Numerous turtle holes. Reef very narrow perhaps 50 yards at a maximum, with a very small surf breaking on red-brown coral lumps. Not much drift wood. A boobie nest on the small kou bush yielded a jumping spider, dermestid, small flat brown beetle; and the leaves:- mottled caterpillars, black and yellow flies and white micros.

A short but rather heavy surf breaks in upon the S.W. point. The reef is about 30–40 yards wide with large jagged coral rocks sticking out of the water. A slab monument 6 feet high crowns the barren ridge.

Walked east to “Wreck point” across S. end of island. S. side with small sandstone slab and coral barrier ridge, 12–16 feet high, with steep slab, pebble, and sand beach. Tame curlew. Numerous sharks in shallow water above reef, which is about 100 feet wide and covered with numerous large, slippery, coral rocks. Drift logs scarce.

The waves break on “Wreck Point” about 200–250 yards out. There is a little lumber above the point on barrier ridge.

North along barrier ridge about 1/4 mile to a small clump of *Tournefortia* trees; the intervening stretch covered with *Sesuvium*, *Portulaca* and *Boerhaavia*.

The east beach runs north in a long gentle concave curve, with sandstone slabs and coral rocks

toward south, but sand beyond to the N. The reef is 75 to 100 yards wide with a moderate surf. Barrier ridge only 12– 14 feet high, covered with prostrate herbs to the edge of beach slope.

Fat caterpillar on *Ipomoea*, similar to one on kou.

The coconut palms at the S. end grow in small clump around the margin of a very shallow brackish pool, with small clumps of kou trees.

N.W. of the coconut grove is a long level plane of *Sesuvium*, stretching N. to the lagoon, with a small pool of nearly fresh water, at which the birds drink, as did I. It was warm but not brackish.

In sweeping bunch grass near houses, found some small gray-brown Proterhinids.

One of the common Hawaiian weeds grows about the guano diggings and near the landing (Plant Spec. 30). Also the red-flowered erect herb (Plant Spec. 29) which was common on Nassau and Puka Puka, but did not occur on Phoenix and Canton or on Johnson.

Took wood specimen (No. 3) of large *Boerhaavia* stem, 4" in dia. and found a single specimen of the Proterhinid beetle on it; also small salmon colored mealy-bug and spp. of ants.

Saw no landshells anywhere on Enderbury, neither under wood, stones, on plants or bunch grass roots. Fallen coconuts had on their under side thrips, oribatid mites, small mites (or crickets?) sow-bugs, ants etc., but no shells.

Dug quite a few termites and some reaches out of driftwood and timbers near the landing. *Ipomoea pes-capri* (with purple flower) patch near hill.

Back to schooner.



Roll 20:4 One of the clumps and part of the pool, looking W.



Roll 21:1 The stone house ruins, looking W. from east wall of large double house.



Roll 21:2 The patch of bunch grass on which I found *Proterhinus* beetles; stone house ruins in background, looking S.W..



Roll 21:6 The area N. of the hill, dug up for guano; with the noni tree at the left and the N. clump of coconut palms in the background. Looking N.N.E.



Roll 22:1 One of the “ancient stone ruins,” with bug net [center; on rock wall] for comparison.

Thursday, March 20, 1924.

8 A.M. Position 4° 03' S. 171° 17' W.

Noon " 4° 20' S. 171° 10' W.

Steering S.E. and because of current and set making S.

Sighted Sydney I. about 1 P.M. and anchored off flag pole at 4:30 P.M.

Best anchorage is between [hand drawn "up arrow"] beacon and flagpole about 250 yards off shore. Mr. Charles Jennings (half cast Samoan), manager for Capt. Allen and Samoan Shipping and Trading Co. came off to greet us with 3 of the 11 natives of his employ.

Friday, March 21, 1924. Sydney I.

Ashore about 6:30. Greeted by Mr. Jennings and shown a good trail lined with mat grass and raised in places above ground level, leading around island. Sydney I. about 2 miles in dia, nearly circular and with a lagoon in the center about 1 1/4 miles in diameter; leaving the ring of land on the average 3/8 of a mile wide. The west side is clear of brush and trees and supports a fairly heavy stand of coconut palms, which area is being added to, by clearing and burning the Scaevola, Noni and Tafono and setting out young palms.

Followed the good trail N and E, leaving it toward the N. side to enter the scrub beach thicket which begins and gradually occupies the entire width of the land from beach to lagoon. This scrub or dry forest consists of Scaevola, Noni, Tafono, Tournefortia with an undergrowth of Sida, Boerhaavia, Portulaca, bunchgrass and in places, especially on E side, Tribulus.

There are quantities of blue, white spotted butterflies, small red-brown butterflies, dragonflies, and blue-black (cock-roach-parasite) wasp. In the grass and herbs are red ants, black ants, yellow flies, leafhoppers, and slender brown bugs. Lizards fairly numerous.

This is 29 feet long, 15 feet wide and about 2 1/2 feet high, built of flat sandstone and conglomerate and coral slabs, with the inside completely filled with broken coral rocks. On each side are smaller platforms 18' x 12' x 1' high. the whole is surrounded thickly by Scaevola and is about 100 yards from the beach. They do not look ancient. Captain Stenbeck suggests that they, like the similar ones on Enderbury were built by the early guano diggers. True, some, (many) of the platforms are overgrown by large Scaevola bushes as are most of the "ala-nui"-like paths of coral slabs, which run here and there. But so too is the round the island built up trail at the S.E. side of the island where it has been unused for 6 or 8 years.

There are lots of these platforms along the N.W. side of the island. I having seen 8 or 10 in open spaces and there being goodness knows how many more in Scaevola thickets.

The north beach consists of a high, gradual slope of sand, 18 to 22 feet, topped by sandstone pebbles and broken coral. The reef is flat and from 50 to 60 yards wide, the edge rough with a moderate surf.

The tallest trees (Buka and Tafono) grow in the lower ground behind the beach barrier; some are 15 to 20 feet higher than eye level (30-40 feet high), but not higher than the coconut palms on the lagoon shore.

Patches of Tribulus, with greenish, fat caterpillars (probably of the red-brown butterfly), leafhoppers, small spiders, red, and pale brown ants.

Took wood specimen (No. 4) of Buka tree, and some leaves fully 14' long. Later found flowers. On it were delicate little white moths, long brown spiny legged grasshoppers, dolichopodid (Psilopus) flies, pale ants, black ants.

The round the island trail cuts across the N. and N.E. side of the lagoon, in places crossing arms and bays on raised dykes.



Roll 22:2 Tafono tree (No. 35) near first clump of house ruins, looking W.



Roll 23:4 The N.W. end of this pool looking N.E. (Will visit this area again). Across to lagoon and around S. side to copra camp and landing.

On the east is a dense thicket of trees — Buka, Kou and Tafono with some Tournefortia and Scaevola toward the lagoon, then a nearly unbroken mass of Scaevola to beach ridge where there are a few Tournefortia trees.

Followed south through “open” grove of Buka, Tafano, Kau and Scaevola and Tournefortia and then straight E for 200 yards through a very dense thicket of Scaevola to East beach. Here the sand beach is wide, rising about 14' in 40', crowned with Scaevola and Tournefortia. Reef about 60 yards wide, moderate surf, very little drift wood.

South to within about 1/2 mile of S.E. point and back to Scaevola to a large hook-shaped pond of nearly fresh water, surrounded by coconut palms.

Across to lagoon and around S. side to copra camp and landing.

Back to schooner at 4:50.

Summary of Plants of Sydney Island.

1. Coconut palms - solid stand W. side with untended patches about ponds on E and small patches in SW.
2. Noni tree (Morinda), a large constituent of “dry forest” N. side, elsewhere scattered.
3. Scaevola (most abundant plant on island) in “dry forest” and solid stands E. and S. sides.
4. Tournefortia abundant along beach and in “dry forest.”
5. Tafono tree (Plant Spec. No. 35). Abundant in “dry” and “Buka” forests.
6. Buka, abundant in low, more moist “Buka” forest toward lagoon from “Dry forest.”
7. Kou tree (Cordia). Principally in “Buka forest” East side.
8. Sida-higher and more luxuriant, abundant under shrub in “Buka forest.”
9. Boerhaavia - abundant mat herb.
10. Bunch grass - principally in Coconut patches and near fresh water pond.
11. Mat grass (Spec. No.) (same as 10)
12. Pandanus (only a few plants) NW. side in hollow.
13. Portulaca - not exceedingly abundant as on previous island, plants larger.
14. Tribulus (?) with blue and yellow flower and pinnate sinuate leaves. (No. 37) Patches in both “Dry and Buka forests”.
15. Ipomoea vine (white flowers) climbing over Scaevola etc., principally on SE side.
16. Ret panical, erect herb. (not abundant)
17. The Sedge, along S.W. side lagoon.
18. “Honolulu weed” same as on Enderbury. (Plant Spec. 30). Near camp & along trails.
19. Erect herb (Evidently an introduced weed) with purple flower and white "dany-lion" like seed dispersal, growing near copra camp and along trail.
20. Sesuvium, patches along lagoon and fresh water pond.
21. Talotalo, cultivated lily-like hedge } about copra camp
22. Cultivated pumpkin vine }
23. Beach runner

Summary of Insects. (Sydney Island)

1. Blue and white butterfly, very abundant, caterpillar is dark blue, spiny, on Scaevola.
2. Common yellow-brown dragonfly. (Same as Hawaii).
3. Small red dragon fly
4. " brown "
5. Very large blue "
6. Houseflies (narrow fronted) abundant and "sticky".
7. "Cockroach parasite" black wasps (abundant about herbs and grass).
8. Red ants.
9. Slender brown bug (previously called "Reduviolus bug")
10. White microlepidoptera
11. Small gray and white moth.
12. "Monoplane" moth on Boerhaavia
13. Black ants.
14. Black "crazy" ant with long antennae.
15. Small pale yellow-brown ant.
16. Leafhopper, abundant on Boerhaavia, Tribulus, Sida.
17. Small red-brown butterfly with spot. (Caterpillar possibly the gray-green one with three light stripes, on Tribulus etc.).
18. Yellow-green spider.
19. Green, "long-horn", spring forelegged grasshopper on Scaevola, etc.
20. Small shiny blue-green flies "dancing" in shade.
21. Small brown and white moth.
22. Small gray and white jumping spider.
23. Syrphus fly (possibly *S. grandicornis*).
24. Green Dolichopodid (*Psilopus*) fly on Buka leaves, etc.
25. Small green microhymenoptera.
26. Tournefortia moth (white with pink and black spots).
27. Delicate little white and light brown moth on Buka.
28. Small yellow brown flies (as on other islands).
29. Millipede on Buka log.
30. Brown bug on Sida, etc.
31. Large cricket.
32. Black spotted orange coccinellid.
33. White scale insect (mealybug).
34. Pale chironomid on coconut leaves.
35. Small green bugs, on Boerhaavia, Sida, Tribulus etc.

Saturday, March 22, 1924.

Too rough A.M. to land, so spent morning writing up notes.

Same in afternoon — changed blotters on plants. Developed 6 rolls films in evening.

Sunday March 23, 1924.

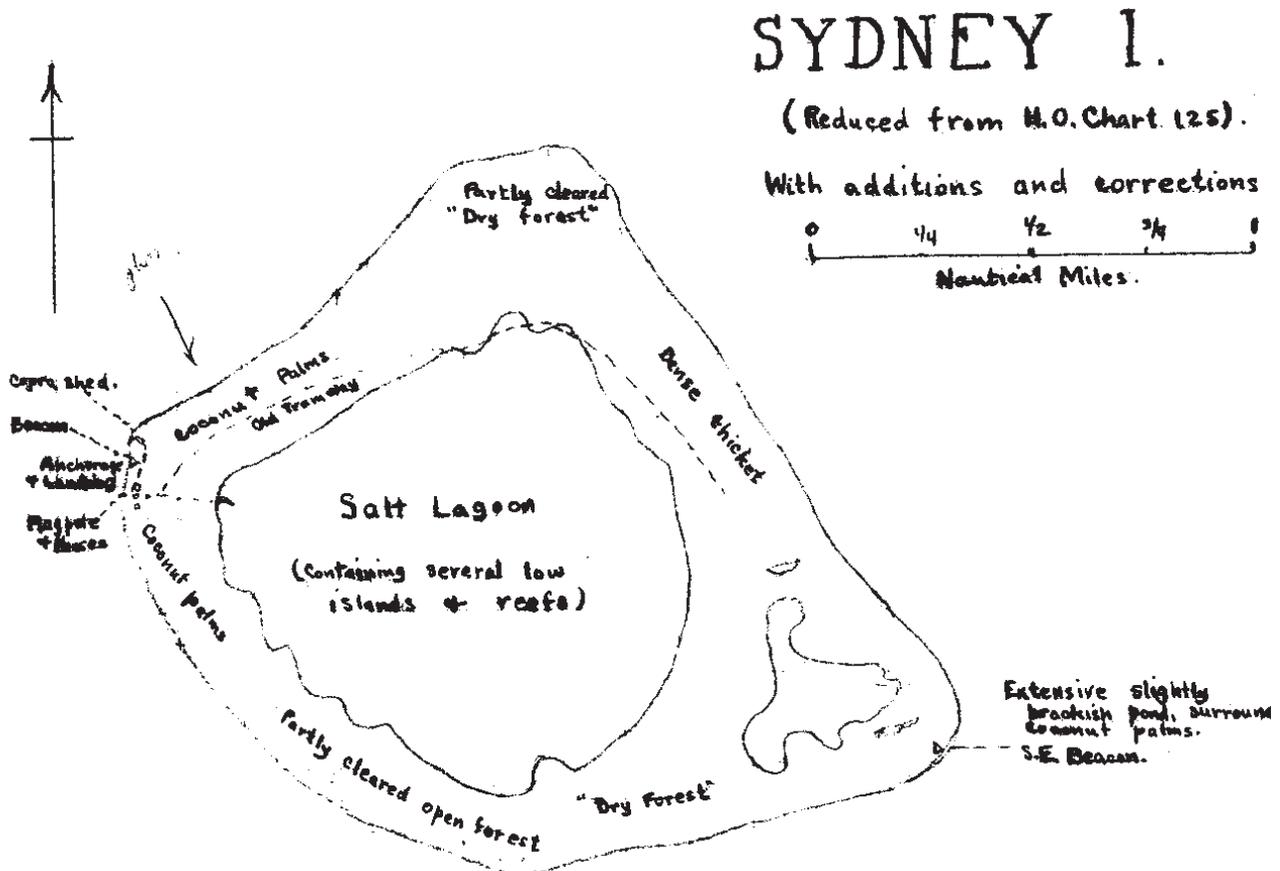
"Too rough" to land with ship's boat, but got natives to take me in to shore in their canoe, at a second day landing off N. copra shed:- dangerous except for canoes because of reef, which must be ridden over on the wave.

While waiting for a rain squall to pass visited the native cook-house and watched them prepare breakfast. In a large iron kettle they had a mixture of pumpkin, coconut and flavor called "panke"- (pancake or pumpkin, I'm not sure which). This they wrapped in 4 puapua leaves first moistened with coconut milk, (= tafono), with the stems out and tied with a coconut fiber.

Caught a cricket in cook house. There is considerable area of pumpkin vine about the copra camp and I took leaf and flower specimens.

South along W. side. Here the coconut palms continue but the stand is thinner, with considerable low brush (Scaevola, Noni, Sida, etc.) beneath. As one goes S. and E. the coconuts finally cease and one enters a low rather open forest which has been recently cut over, the brush being piled in parallel rows across the island rim, spaced 20 to 25 feet apart. This forest consists of Tournefortia, Noni, Kou and Buka with a fringe of Scaevola on each side, (the order gives = order of abundance).

The blue butterflies are very abundant (I caught 4 at one stroke of the net), as are also several species of moths. Dragonflies and leafhoppers also abundant. Numerous spiders with moths, butterflies, and dragonflies caught in web. Coccinellid attacking mealybug on Sida. Brown bugs on Sida. "Monoplane" moth and slender brown bugs on Boerhaavia. Large, fat caterpillar on Tribulus.





Roll 24:4 Another stone house ruin, 6' x 12', some of the slabs 3 feet high, all over one foot, filled inside by broken coral. Near S.E. point, looking S.E.

On the S.E. side is a fairly dense grove of *Tournefortia*, tafono and occasional buka, festooned in places with *Ipomoea* vine. Underfoot clear or with low sida; and the patch surrounded by thicket of *Scaevola*.

Wonderful surf on SE curve; beach high, steep, made up of sand and broken coral. Reef 80–100 yards wide, edge rough with heavy surf breaking. S.E. point marked by stone monument surmounted by [hand written “up arrow”] beacon.

Strip of broken coral crossed by several old ala-nuis and two modern trails, one of which I followed N. about 150 yards from beach to small brackish pool and arm of main pond is 50 yards beyond.

Caught male chironomid on coconut leaves.

North of point are the smaller seep holes, more or less brackish. on N. bank of last one, thickly surrounded by bushes found curious fire-place-like pile of stones - (flat sandstone slabs) the “chimney” part 7 feet high, the circular shell 4' across.

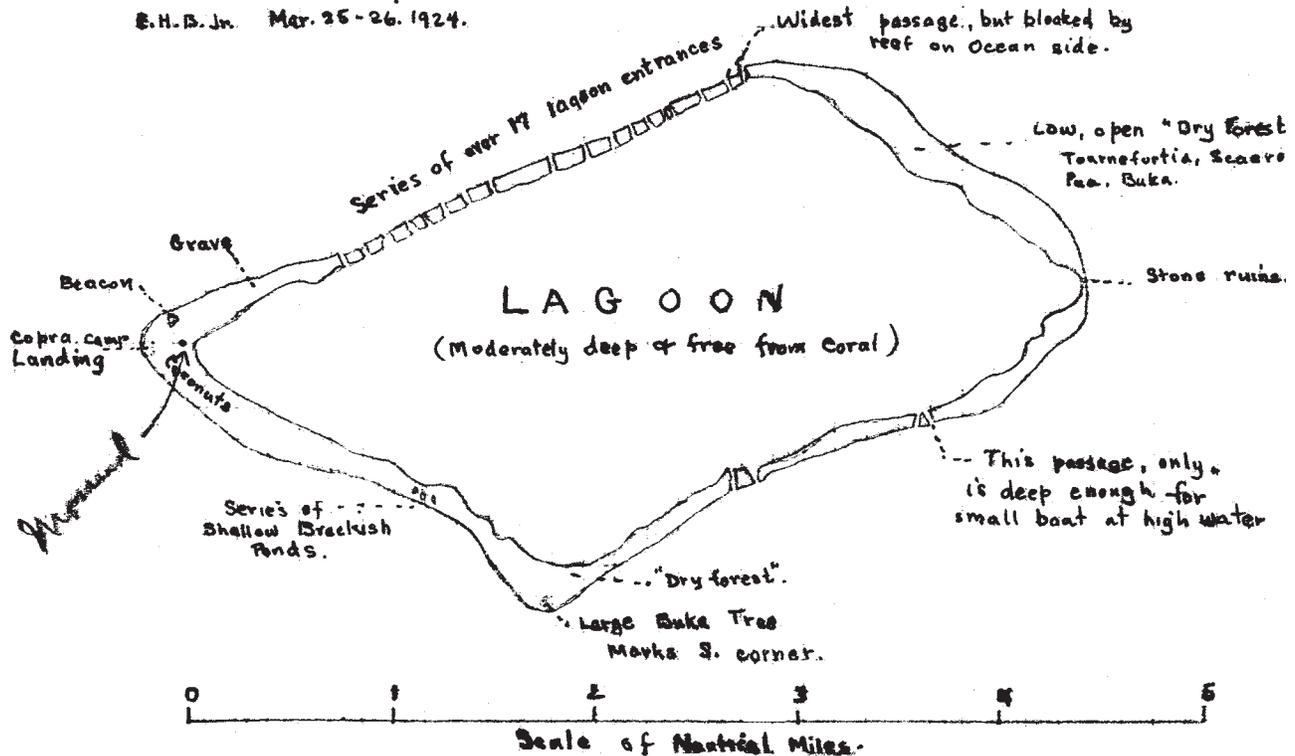
Road was [possibly] made by the guano diggers, for there are in places traces of old tram-trails and it is too carefully cut and filled to be for copra gatherers. It runs in straight lines and smooth curves from the camp on the W. side to the middle of the east side, near where the chart locates “ancient stone ruins”.

Collected wood specimens of *Scaevola* (No. 5), Noni (No. 6) and Tafono = pua (No. 7). Collected dirt from bunch grass roots in hope of finding land shells. Back to copra camp. Took plant specimens of Talo-talo and pumpkin vine.

HULL I.

(Revised Sketch Map).

E.H.B. Jr. Mar. 25-26, 1924.



Back to schooner in native canoe, through heavy surf. Off for Hull at 6:30 P.M.

Monday, March 24, 1924.

Sighted Hull Island at daybreak. Sailed along N.W. coast looking over the numerous entrances for one through which a boat could pass.

Just around the point is the landing, and copra camp and a small flagpole flying the British flag.

Enthusiastically greeted and shown anchorage by the manager for the Samoan shipping and Trading Co., Mr. Wiley Shafer. He and his wife and children (one girl, Carolina, with them; two girls Elizabeth and Virginia at Sister Frances school, Tutuila), have been on the island nearly three years, since October 30, 1921. He has 17 native men, mostly from Tokelau, and one woman. He ships about 75 tons of copra a year. He says fish are very abundant and turtle quite frequent.

Ashore and left gear at Mr. Shafer's house, (at which I stayed for five days). It is about 1/4 to 3/8 mile across to lagoon at this point. Very clean coconut grove of tall trees, planted, according to Mr. Shafer, by the Lever Brothers (Soap Co.) about 1902-3. They abandoned the project and it was taken over about 10 years ago by the Samoan Co. - Capt. Allen. Mr. Shafer is constantly clearing new land and setting out more coconut palms. The best way to do this, he says, is by cutting avenues through the low "dry forest" and not completely clearing the ground until the palms have gotten a good start.



Roll 26:4 One of the open spaces with brackish pools S.W. side.

Walked south along lagoon and S.W. side.

The island is distinctly less luxuriant than Sydney and the insect life far less abundant. Very few butterflies here and no dragonflies seen. Lizards, but not abundant. Land crabs, especially the large red-brown one with hairy legs and white claws, quite numerous. They dig holes, resembling rat holes, in the sand.

Reef 90–125 yards wide toward S. point with moderate surf.

Waterways lined with Pemphis and Scaevola. Between them are tall clumps of Buka, Tournefortia and Pua (Tafono).

As one rounds S. point going E, character of beach changes:- Conglomerate wall disappears, Beach becomes higher, of sandstone slabs, sand and coral, surmounted by broad area of gravel with “dry forest” of Tournefortia, Scaevola, Tafono = Pua and Buka. Reef widens out to about 150 yards.

Saw a rat among the outspread Buka roots. Seemed smaller and more fearless than other rats, sitting up on its haunches until I got close.

Periplaneta roaches (both American and Australasiae), sowbugs and black ants, gray spider, pseudoscorpion and 1 sp. of landshell in or on rotten buka logs.

South beach quite bare of driftwood, what there is being timbers or planks. Back to camp along lagoon beach.

Mr. Shafer informed me that he had dug up one skull, some bones and three worked stones in planting coconuts. He had also found old house ruins of stone, strange to both his Union and Ellice workmen. He also says that the two previous managers, Mr. French and Mr. Peterson, also dug up skulls.

The natives put on a Tokelau Siva for our benefit. It is very similar to that of Ellice Islands



Roll 26:6 First lagoon entrance on east side, going east. Looking N.N.W. from ocean side toward lagoon.

(Described under Nassau). They learned some from an Ellice Island woman, which may account for that. The accompaniment is the same box pounding and there is the same acceleration of time, fore-arm slapping, squatting, arm and leg movement etc. In addition there is some hand clapping and a few movements not noted at Nassau. They seem to enjoy it hugely, having the happiest of expressions on their faces. I got three of the favorite songs from them:-

“Talofa itaku malanga.
 Ne fano ke holona.
 Foi mae ina foi meia.
 Foi mae ina foi maia.”
 (Then six “hae” and “haé”)

“Talofa sina pate, sa agi le matagi.
 Sa lele ole loki, Talofa sina pate.”

“ (name of person) to alofa.
 Huhana tematagi e ku tipaea
 Kutipaea Hu hana tamatagi e.”

O fa tonuga maea sefa
 Ki nui poi o Takafo.
 Togo ia I low naefi } Repeat
 Sali ae le popo.

March 25, 1924. Tuesday

Coffee at 5 and off by 6:30 going N.E. around island clockwise.

Ground under the coconut trees to N.E. carpeted with a low fine leaved running herb and patches of soft grass, and the erect lavender flowered weed found in Sydney. The NW beach is 10'-12' high, part sand, part sandstone and coral pebbles, underlain by sandstone. Reef about 150 yards wide with moderate surf. Very little driftwood. "Dry forest" of *Scaevola*, *Tournefortia*, *Tafono* (Pua) and *Buka* - *No Kou* on island. Island rim flat, sloping slightly toward lagoon; about 1/8-1/4 mile wide and cut by many lagoon entrances; 17 with water and others dry.

Summary of Lagoon Entrances, N. Side.

No.	Approx. Distance From Previous One	Approx. Direction from Previous	Width Yards	Depth Feet (Medium tide)	Approx. length Yards	Remarks
1.	————	————	15 + 15	2-3	220	Double, esp. by low ridge.
2.	75 yds.	ENE	20	2-3	200	
3.	110-125"	"	8 to 10	2-3	200	Nearly blocked at lagoon end (dry one between)
4.	150 "	"	25 to 40	2-4	150	Bottom covered with coral.
5.	50 "	"	25 to 40	3-5	180	(Walked around on lagoon bar)
6.	50 "	"	10 to 25	2-4	200	Winding. Narrow reef end (dry passage between)
No.	Approx. Distance From Previous One	Approx. Direction from Previous	Width Yards	Depth Feet (Medium tide)	Approx. length Yards	Remarks
7.	100 yds	ENE	25 to 30	3-4	175-200	Shallow bar (two dry passages between)
8.	100 "	"	25 to 30	3-5	180	1 ft. water on bar
9.	250-300 "	"	40	3-5	220	Two 15 yard entrances ocean side
10.	125 "	"	8 to 50	3-5	200	Narrow ocean side, wide at lagoon (Two nearly dry between)
11.	200 "	NNE	60	3-8	250	Double with reef and small island between
12.	120 "	NE by N	30-40	3-4	200	
13.	40 "	" " "	narrow	2-4	250-300	Narrow and winding
14.	100 "	NE	60-70	2-5	250	Double throughout
15.	120 "	"	80	2-6	230	" and deep at bar
16.	150 "	ENE	nearly 100	3-8	220	Small boat might get in at high water
17.	60 "	E by N	30	2-3	150	

The narrow islets between lagoon entrances are low, sandy or covered with broken coral, with a low stand of *Tournefortia*, *Scaevola*, *Tafono* (= *Pua*) and occasional *Buka* trees. Underneath the ground is bare or carpeted with both *Boerhaavia* creepers, *Portulaca*, Red topped erect herb, *Sida*, etc.

Within the lagoon entrances grow several kinds of coral, in places completely covering the bottom and about these swim a half dozen different species of small fish, olive with brown stripes, black with olive band around the tail, bright blue, etc. Baby and larger sharks numerous.

Collected a few landshells beneath rotten *Buka* logs, in a damp spot beneath a large *Buka* tree.

Beginning at entrance 17 the rim turns east and later SE. High beach of white sand alternating with sandstone pebbles, underlain with coral sand conglomerate. Reef flat about 100–180 yards wide. Behind the beach rim of broken coral and sandstone pebbles lies an open low, “dry forest”. Lots of dead brush but very little drift wood. In one place the pebble beach rises steeply to a height of at least 20 feet. The rim continues narrow, about 1/4 mile.

Bird life much more plentiful here than in . half:- Terns, boobies, frigates, love birds, plover, and at times red-tailed tropic birds and shearwaters nest and breed here.

On *Sida*:- gray moth, leafhoppers, spiders, green *Psilopus* fly, small black flies, white micro moths.

On *Tafono* (= *Pua*): = brown psocid (same as on *Pemphis*), and the green leaf roller moth, green *Psilopus* fly.

Buka trees:- green *Psilopus* and yellow flies, black ants, spiders. Numerous little dry leaf nests of Sooty terns in the branches. Large *Thysanura*, and ants nests in rotten *Buka* log. Too dry for landshells.

Caught[t] black ants, bird ticks, sowbugs, pseudoscorpions and roaches under Mr. Shafer’s rest house, east side, while eating lunch of roast duck and raisin brown bread put up by Mrs. Shafer.

Three tumbled-down mound shaped shelters or dugouts, of sandstone slabs in the beach ridge, and one large house site, built of blocks of sandstone 10' x 18'.

The E. and SE reefs are quite wide 150 to 200 yards, with a moderately large surf breaking. The beach is medium high, of sand and sandstone pebbles, with sandstone slabs in places.

A little over a mile SE of the east point are a pair of narrow but deep lagoon entrances, meeting on the lagoon side, at an angle with a wedge shaped island between. They are about 10-15 yards wide and 300 or so yards long. At the NE end of the east entrance stands Mr. Shafer’s new rest house, containing a tank of water.

About 3/4 mile west by south to WSW. is another lagoon entrance, 20 yards wide and 150 yards long, with the one described and photographed yesterday (26:6 and 27:1) 1/8 mile beyond. This makes a total of four lagoon entrances on the S. side or 21 altogether which have water in them.

Back to Shafer’s house along the lagoon beach as yesterday. Spent a very comfortable night, enjoying their hospitality. Total distance around lagoon about 11 or 12 miles.

March 26, 1924. (Wednesday).

Walked down to lagoon with Mr. Shafer who showed me ruins of an old house site and an “artificial hill” of gravel containing turtle and bird bones (he said). Found one of the carved stones he had mentioned-an adze of shell, which he presented to the museum. Caught spider on ground and red ants eating copra

Mr. Shafer said that the coconuts between house and lagoon had been planted for the Levy Brothers Soap Co. by Ben Jennings about 1902–3. The tall patches toward east apparently antedated this, origin unknown to Shafer.

The prevailing winds, he says, are from the NE and N. with winds from the SE a few days each

year and occasional storms from the N.W. The rainfall principally in Jan. Feb. March and June. There is not enough rain however, to raise vegetables.

After breakfast down W and S.W. rim, collecting under Buka logs for landshells etc. White Buka moth, white micros, yellow flies, pale yellow-brown ant, black ant and *Psilopus* fly on Buka. Yellow and *Psilopus* flies thick on pua (= tafono), also occasional pale ants and spring-legged, large green grasshoppers.

It is Mr. Shafer's belief that the W. end of the atoll was swept by a tidal wave at some time previous, carrying coral rocks across the sandy rim. This is substantiated by the quantity of coral rocks, even large boulders on the S.E. rim, to be found clear across to the lagoon. He says there is good sand soil 3 to 4 feet down.

A few blue and white butterflies and smaller red-brown butterflies, but not nearly as plentiful as on Sydney. The same is true of the moth — only the *Tournefortia* moth being at all abundant, except the micros. The landshells (one or two spp.) are only to be found on the dampest rotten Buka logs and then only ones or twos. Dead specimens are to be found in bunch-grass roots and rich dirt in various places. Small red-brown earthworms in bunch grass roots and besides a small shiny oval black bug (*Hemiptera*). Several different types of grass on W. side. *Lepturus* (bunch grass), velvety leaf bunch grass, maineanea grass, a low grass with a tall bottle brush-like flowering stalk, a grass with a five-forked flower stalk, etc. some (so marked on the labels) introduced by Mr. Shafer.

Small brown Anthribid beetle on dry coconut flowers sheaths and stalks.

Thursday, March 27, 1924.

After breakfast, walked S. to S.W. point. Thousands of little crustacean isopods running in and out of land crab holes. Collected small black flies on dead bird on beach. Two small gecko lizards hiding in coconut flower sheaths on the ground. *Pemphis* moth, pupa cases among leaves (as on Wake) and long caterpillars. Large brown dragonfly (first seen on island). Some *Scaevola* leaves mined-cause unknown, as only small yellow flies, brown psocids and fuscous ants on it.

Green moth on pua (*Tafono*) the larvae of it rolling the edge of the leaves. *Sarcophagid* fly about crab holes.

At noon the native boys brought me several lizards both skunks and geckos, and the larvae of the click beetle which comes to lights at night. Another large beetle with yellow and black elytra and the small green copra beetle also come to lights at night, besides small moths.

In afternoon walked N.E. past the beacon to a "grave" or house site, about 6' x 8' built up 1' with sandstone slabs. Took pictures of it.

This part of the island has the most kinds and numbers of insects yet seen on the island. Numerous butterflies and moths; the Pua leaves badly rolled by a semi-transparent yellow-green caterpillar (of the green moth). Also caught a gray *Rhyncophora* beetle on Pua and more grasshoppers with spring forelegs.

Toward evening the *Sida* bushes on the edge of the dry forest were covered with the larvae of the blue and white butterfly:-about 2" long, blackish-gray, with red-brown spines.

The natives entertained us with another *Siva* in the evening.

Friday, March 26, 1924.

Spent morning and part of afternoon excavating "grave to a depth of about 4', but found no bones-(probably a house site?) found a few fossil landshells and took a sample of the white underlying sand.



Roll 29:1 The “Artificial mound” which Mr. Shafer says contains bird and turtle bones, looking N. from near lagoon. 50' in dia, and 7' high.



Roll 29:3 Mr. Wylie Shafer, wife, child and Tokelau workmen. (The woman behind the little girl is an Ellice Islander).



Roll 29:5 Mr. and Mrs. Shafer and Tokelau natives, Hull I.



Roll 30:1 Land crab holes and one of the inhabitants—a big red-brown hairy legged land crab with white claws. They make a hole like a ground rat and in places (damp sand especially) honey-comb the ground. They swarm out in the evening after dead birds and marine life and Mr. Shafer says they eat young coconuts and palm roots.

From [the people of Hull I.] I learned the following Tokelau names:-

Sida-akata	Portulaca = katuli
Boerhaavia = nuna	Bunch grass = mutia
Tournefortia = tausunu	Bean = natae
Buka = Puka vae	
Scaevola = gnasu	

On board schooner at about 4 P.M.

Along S.W. coast and away, steering S.E.

Sea calm, good light wind from N.E. to E.N.E.

Schooner rolled badly during the night.

Summary of the Plants on Hull Island.

1. Coconut - large grove W. end.
2. Bunch grass, (Lepturus).
3. Erect weed (found on Sydney) with “dandy-lion”-like tuft and lavender flowers.
4. Banana (only under cultivation and then do not do well-too dry.)
5. Beach runner with yellow flowers and burr.
6. Portulaca - erect, many stamened kind.
7. Boerhaavia - with white flowers and small leaves.
8. Boerhaavia-lavender flowers and coarse leaves.
9. Ipomoea vine (with white flowers).
10. Puapua (Tafono) tree.
11. Buka tree (some very tall, 50–60 feet).
12. Sida.
13. Red-topped erect herb (found on nearly all these islands).
14. Pemphis bushes (near salt water ponds and lagoon entrances).
15. Noni (only a few bushes seen). Mr. Shafer says it is good for rheumatism: the leaves heated or mashed up into a poultice.
16. Pandanus (only 2 plants on island).
17. Small leafed running herb.
18. Low grass with thick bottle-brush-like flowering stalk.
19. Velvety-leaved bunch grass. (Introduced by Shafer from Funafuti).
20. “Honolulu weed” - near camp.
21. Another grass with 5-forked inflorescence (introduced by Shafer).
22. Low erect herb, with very small flowers but red on floral leaves. (Introduced by Mr. Shafer from Funafuti and originally from New Caledonia).
23. Maeninia grass (introduced by Shafer from Funafuti).
24. One plant of Tribulus (promptly killed and burned by natives because of bur).
25. Pumpkin vine (Mogkini) cultivated.
26. Talotalo (lily-like plant with white flowers) same as on Sydney. (Cultivated).
27. Sesuvium.



Roll 30:3 House site or "grave" about 3/4 mile N.E. of camp under a large Buka tree. It is about 100–120 yards from the beach. First found by Mrs. Shafer about a year previous.



Roll 30:4 The landing, flagpole and schooner, looking west.



Roll 30:6 The entire native population of Hull. (Taken by request).



Roll 31:1 Ellice and Tokelau natives doing a Siva on Hull I.

Principal Insects of Hull Island.Coleoptera

1. Dermestes (about dead animal matter).
2. Anthribid beetle (in dry coconut flower sheaths).
3. Rhynchophora beetle (on puapua leaves).
4. Small black weevil (in driftwood).
5. Blue “copra” beetle (at light and in copra shed).
6. Large yellow-brown “long horn” beetle, some with black elater.
7. Small brown click beetle (in houses under mats and at lights).
- 7a. (Larvae only) of Coccinellid.

Diptera

8. Coconut fly (Ortalid).
 9. House fly (narrow-fronted male) very abundant and troublesome.
 10. Yellow Syrphus fly (about Sida and coconut blossoms).
 11. Small yellow fly (abundant).
 12. Small blue-green fly (hovering and on Pemphis) Also seen on Sydney.
 13. Green Psilopus fly (abundant on leaves in forest).
 14. Large green muscid fly (Lucilia sericata?).
 15. Small black fly (2 or 3 spp.?)
 16. Sarcophagid.
- (No mosquitoes nor craneflies)

Lepidoptera

17. Large blue, white spotted butterfly. (Large black, spring caterpillar).
18. Red brown butterfly (fat green caterpillar).
19. Green moth. (Larvae leaf mines in puapua leaves).
20. White and gray moth (with folded, flat wings).
21. Tournefortia white red and black spotted moth.
22. Large Pemphis brown and white moth.
23. Small light brown moth on Pemphis.
24. Portulaca brown and white moth.
25. Sida gray moth.
26. Large yellow moth (seen about Scaevola only) (?same as on Necker?).
27. Small white moth at light.
28. White micros (at light and about various plants and trees) (more than 1 sp?).
- 28a. “Monoplane” moth on Boerhaavia.

Hym.

29. Large fuscous ant (and small fuscous ant, same sp?).
30. Red ant.
31. Pale yellow-brown ant.

Hem.

32. Leafhoppers on Boerhaavia, Sida, Portulaca, etc. (spp?).

- 32a. Mealybug on *Sida* etc.
 33. Small, oval, black bug on bunchgrass roots.
 34. Small brown Psocid on *Pemphis* etc.

Orth.

35. *Periplaneta americana* (in rotten logs).
 36. " *australasiae* "
 37. *Cutelia soror* " and dirt).
 38. Small brown roach.
 39. Green grasshopper, long horned and front legs spiny.
 40. Large cricket-near or in camp.
 41. Small cricket, under stones, dead weed, etc.
 41a. Large brown dragonfly (rare).
 42. Spider on *Tournefortia* and *Pemphis*.
 43. Large brown ground spider.
 44. Pseudoscorpion (damp ground and rotten wood).
 45. Large centipede " .
 46. Millipede " .
 47. Crustacean isopods (sowbugs) about 2 spp.

Rats were formerly very abundant, but have been largely killed off by poison and cats.

Saturday, March 29, 1924.

At sea between Hull and the Tokelau Is.

8 A.M. Log. 95.5 Bar. 30.05 Lat. about 5° 42' S. Long. 171° 50'.

4 P.M. " 120. " " " 6° 04'S. " 171° 46'.

Light wind. Steering SE but making S by E.

Spend day putting away specimens and writing up notes.

Sunday, March 30, 1924.

8 A.M. Log. 59. Bar. 30.02

Becalmed most of afternoon and night.

Spent day typing first eight pages of "Preliminary Report" and writing up notes. Developed eight rolls of films in evening.

Heavy showers of rain and short windless squalls.

Monday March 31, 1924.

11 A.M. Log. 97 1/2. Bar. 29.98. Lat ? Long. ?

Noon " " " " Lat. 8° 04' S. Long. 171° 34' W.

Spent morning sorting over charts and arranging them in racks.

At noon the crew, who had gotten drunk on fermented coconut milk had a near mutiny. Cabin boy attacked Correia and Capt. Stenbeck, hitting me into the bargain, but was finally overpowered and order restored. Cook also disorderly.

Spent afternoon on notes and preliminary report.

Several squalls during night with wind from N.NW and N.E. and no wind.

Tuesday, April 1, 1924.

At sea between Hull and Fakaofu. Bar. 29.97, Log. 34 at 8 A.M.

Noon position S. 8° 48' 171° 17' W. Nearly becalmed in morning.

3:30 P.M. S. 8° 54' 171° 11' W.

Spent day writing up notes and bringing "Preliminary Report" up to date.

Wednesday, April 2, 1924.

Sighted Fakaofu at daybreak, lying to the S.W. and ran around NE and NW sides of the arrow-head-shaped atoll to the village which stands on one small islet on the SW. side, just south of the W. point. The small islets around the fringing reef appear exactly as indicated on H.O. Chart 126, (here reproduced with a list of the islets obtained from Chief Veneale and checked up as I visited the various portions of the atoll).

List of Islets Surrounding Fakaofu Lagoon. (From Chief Veneale).

See Map

- | | |
|--|---|
| 1. Fonu fata (Privately owned) | 25. Matakitu (n) ga (very small, used as salt works) |
| 2. Teafua (typical). | 26. Pagai (typical) |
| 3. Afua (Catholic cemetery) | 27. Teoki (typical) small, pigs |
| 4. Fakaofu (village with landing) | 28. Nukumasaga tele } close together |
| 5. Nukumatau (typical) | 29. " laituti } |
| 6. Patalinga (Protestant cemetery) | 30. Nukuseseke (typical) |
| 7. Nukumatini (caretaker for cemetery) | 31. Otafi (4 small) |
| 8. Papaloa (low with a few bushes) | 32. Fungalei (small, oval, sub-typical) |
| 9. Nukulakia (typical) | 33. Motuili - one mass close together. Niue on seaside Sub-typical |
| 9 1/2. Tawaafua (bare) | 34. Niue |
| 10. Fonua loa (luculent with large Taizala lake) | 35. Motuakea |
| 11. Sakea (4 typical islets) | 36. Motulua (typical) |
| 12. Motu (typical) | 37. Saketai " |
| 13. Sumatafa (n)ga (subluxurient, long) | 38. Kaivave " |
| 14. Otano (typical) quite small | 39. Ofuna |
| 15. Fafolaelo (typical) quite small | 40. Manumea |
| 16. Tokokimoa (typical) | 41. Olokalonga (typical) |
| 17. Toliakava (typical, property of magistrate) | 42. Palea tall Buka trees |
| 18. Motutulatula } small and separated only | 43. Fenuatapu (small) |
| 19. Patano } by narrow channel | 44. Matangi (large, long and luxuriant) |
| 20. Logotana (typical) | 45. Talapeka) small and separated by channel from the large islands on each side |
| 21. Tesungalu | 46. Avaono |
| 22. Rapa } very small and part of No. 21 | 47. Mulifonua (large, luxuriant) |
| 23. Falatutasi } | |
| 24. Vaiasa (typical) | |

Each of the little islets marked "typical" consists of a more or less circular, low mass of sand, gravel, coral and soil, rising perhaps 6 to 10 feet above the reef and covered (like a pincushion) with an open stand of tall coconut palms, some landing out over the beach. Below the coconut palms there

may be a fringe of *Scaevola* bushes and low *Tournefortia* trees, with perhaps a few *Pemphis* bushes. In the middle is a tuft (of greater or less extent) consisting of *Buka*, *Puapua* trees, *Pandanus* (called “fala”), occasionally *Kou*, *Ipomoea*. The underbrush consists of birdsnest, maile and brake ferns, and a very little purple flowered *Boerhaavia* and bunch and mat grass.

Met by a whole fleet of canoes, the natives swarming aboard and trying to sell us fiber and wooden knickknacks, strings of shells and articles of food – chickens, bananas, coconuts.

Ashore at the village (Fakaofu) and had a conference with the Magistrate and chiefs on the official lanai (see 37:1). The Magistrate, Seanoa, is a languid man of 45, with ordinary intelligence, and does not speak English. The chief, Veniale, is younger, about 37 or 8, of fine physique and personal appearance, well educated and speaks fair English.

After a long pow-wow over Correia’s killing birds, I had a quiet talk with the Magistrate and chief men; explaining the museum’s interest in the people of the south seas and the plant and animal life of the islands. As a concrete example I told them about Hehe, who had been kidnapped 60 years before, taken to Peru and returned as far as Rapa, where he had married and was still living. They were much impressed by the news, some remembering his disappearance, and by his pictures and the fact that his grandsons, Taeso, was mate of our schooner. They asked me to be present at a meeting of the old men, which they would call, and of which more later.

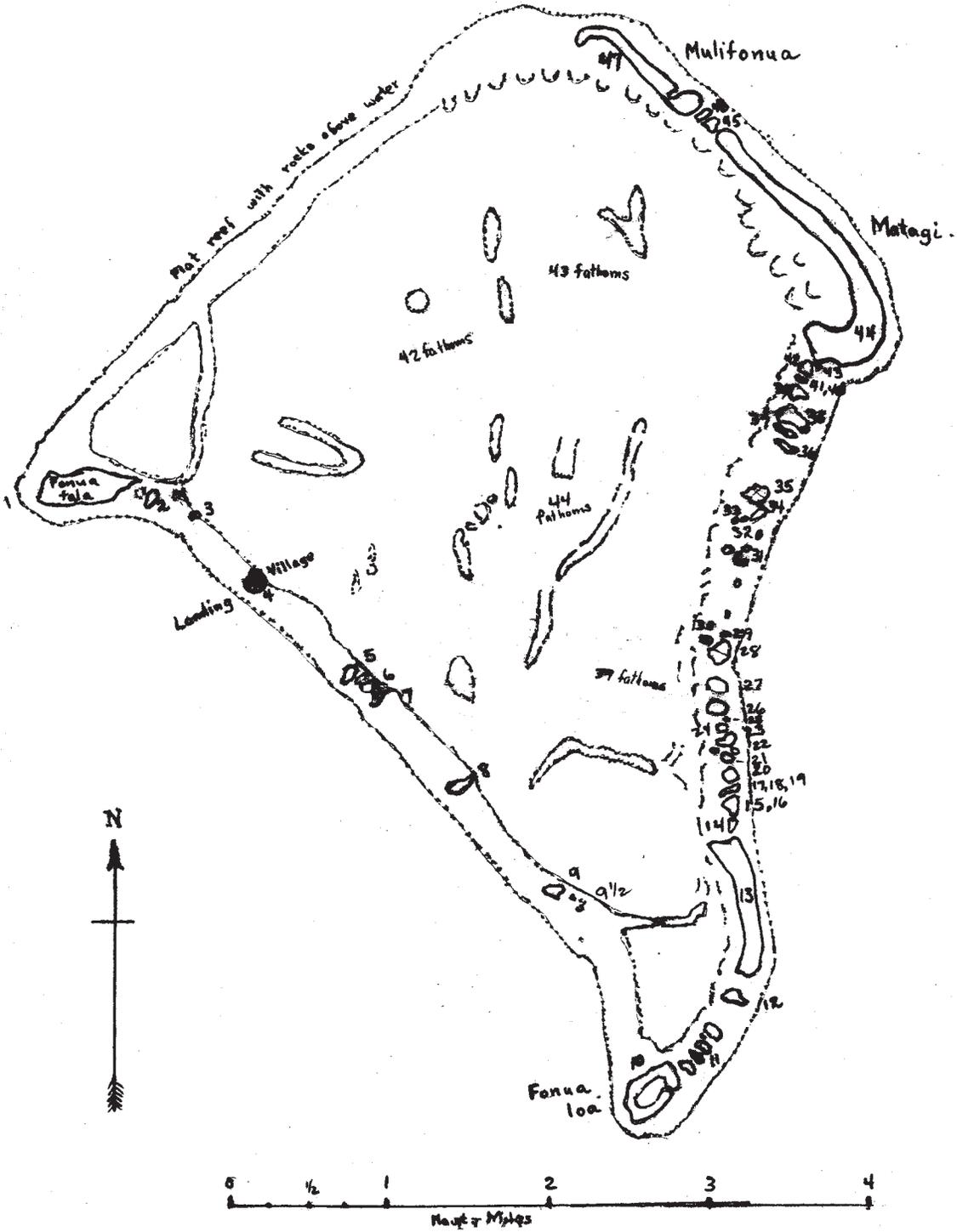
Fakaofu (islet) is not only the highest of those surrounding the lagoon, but is artificially banked up with stone walls, against high seas. Here the entire population of about 450 have their homes. Between the houses and stone lined gravel walks, the ground is thickly planted with bananas, noni, breadfruit, *Pandanus*, coconut palms, talotalo, *Pua* (a gardenia-like plant with a stiff ovate leaf and sweet scented, white flower), and *kou*. The houses appear clean, neat and substantial (although I heard that they were all blown down in a hurricane a few years ago).

Walked up the reef to Fonua fala. The reef is about 3/8 mile wide, flat on top and at low tide just awash. It was ebb tide and ankle deep. Near the island of Fakaofu there is a broad bead of erect sea weed - *vau* (see specimen), but beyond the reef is bare, except near the middle where there are flat and jagged rocks. Numerous sea slugs and large purple sea urchins (*vana*) in depressions and under the edges of rocks.

Fonua fala is one of the most luxuriantly covered of the islets, with the largest taro patches and extensive patches of bananas. The east end is largely covered by an open stand of coconuts with fringe of *Scaevola*, *Tournefortia*, *Fala* (*Pandanus*), *Puapua*, noni, and *Pemphis* and underfoot maile and brake ferns, bunch grass, mat grass, *tolo* (beach runner with yellow flower and burr), *Boerhaavia* and dodder. But as one goes W. it gradually becomes moister and denser with fewer coconuts and patches of *buka*, *kou* (= *kauoa*), *puka vaka*, *fau* (a fiber plant), and (*Tiale*) a gardenia-like plant with ovate leaves and sweet smelling flowers. The undergrowth adds birds-nest fern, sensitive plant (purple flowers), an herb legume with twice pinnate leaves, and such weeds as burr grass, nut grass, the “Honolulu weed”, the purple flowered, dandy-lion-like weed and a tall mint-like weed called [left blank]. A few small *Papaya* trees (called *ese*).

Among the insects, which are quite different from those of Hull and Sydney, although including some of the species found there, were caught:- a fuscous winged leafhopper on *tiale*, noni, etc., large and small *Drosophilid* flies, day mosquitoes (*Aedes scutellaris*), pale yellow ants on noni, long antennae gray moth, smaller *dolichopodid* fly on leaves, houseflies, dragonflies — small brown and small red (two sexes), and large brown and large red (two sexes of another sp.), red brown butterfly (as on Hull etc.), purple butterfly, *Tournefortia* moth and its caterpillars (larger and different appearing),

FAKAOFO ISLAND
(From H. O. Chart 126).



large brown leafhoppers on noni (and *Scaevola*), anthribid beetle (noni), black ants, fuscous ants, red ants, green long-horn grasshopper, large bluish fly, smaller fuscous winged fly. Large Sarcophagid fly on maile fern.

The banana patches are artificially built up with coconut husks to conserve moisture. The patches of pulaca and talo are artificially dug and contain a small shrub with linear-lanceolate leaves and yellow flowers (No. 59) and a grass (50). Here one finds the dragonflies common, with their larvae in the water and dry skins on the grass and taro stems. Also slender, delicate “darning needles” with blue and yellow-green bodies; small pale and light green chironomid flies, small black gnats, and black craneflies. Gray muscid flies (as on Tanager expedition) and house flies.

The W. end is luxuriant, moist, with dense patches of ferns underneath the trees; including large birds-nest ferns, called lau mea.

Reef of W. end about 50–60 yards wide, with only a moderate surf breaking. Beach of sandstone slabs and pebbles steep, but 10'-12' high. The luxurious vegetation comes right down to beach. Small sea shells (see bottle full) under rocks and coconut husks and debris on beach, called olava.

Bananas = fai, papaya = esi, nutgrass = muta, mosquitoes = namu, flies = lango. Black *Odynerus*-like wasp with yellow bands called tangi susu.

Arriving in Fakaofu at 3 P.M. photographed a wedding feast [Roll 32: 4,6].

Reviewed the military company, a group of 20 young men dressed in white lavalavas and six British army belts, leis of banana-leaves over their shoulders and of fala and puapua flowers about their heads. They drilled very well indeed with wooden guns, under the direction of Captain Uikilifi, who gave the commands in semi-English, even to progressive bayonet exercises and “silent” movements. The “band” consisted of a kerosene can beat by a young girl.

Back to the schooner for the night in order to press plants and put away specimens, although most of the “Bird Party” stayed ashore.

Thursday, April 3, 1924.

Changeable winds and squalls and the absence of the mate, who went ashore without permission, during the night made me late in getting ashore in the morning.

After considerable parlie, because of misunderstanding of village rules by those sleeping ashore, we got a canoe and paddled across the lagoon to Palea I., accompanied by Capt. Uikilifi and a policeman to see to our wants and also that we broke no more rules.

A few flat reefs and coral heads in lagoon, approx. as indicated on the chart. More near shore on E side, with very clear water and a beautiful coral formation – sheer walls, jagged and overhanging platforms, deep caves. Very few fish and no sharks visible.

Landed on Palea which supports a large clump of Buka trees, nesting place for frigate birds. Beneath a dense undergrowth of maile and birds-nests ferns, with numerous insects:- several spp. of brown and gray moths, spiders, large Sarcophagid, numerous day mosquitoes (*A. scutellaris*) and quantities of greenish-gray lizards. East and more open with coconuts, Pandanus, (fala) *Scaevola*, *Tournefortia*, Puapua, purple *Boerhaavia*, dodder, beach runner, *Ipomoea* vine. *Tournefortia* moths seem different, larger, and caterpillars not so light or hairy.

Across a 100 yard channel to Fenuatapu, which is small, and another narrow channel to Matangi. Here one enters a broad rather luxuriant area of open coconuts, and a narrow strip of native trees, those previously mentioned plus the small *Ficus* - mati a tall shrubby herb with little edible, puff-ball-like nodes, - nasevau, kou - called kanava, and Puka vaka, tall trees with sub cordate leaves and puffy fruit (food for pigeons) with a hard black seed. Fau (fiber plant). Lagoon lined with *Pemphis*.

Caught Coconut Ortalid fly, small brown cricket, fuscous winged Trypetid on fern, *Drosophilids*



Roll 32:1 West beach of Fonua fala, looking south. My three small guides on the coconut palm. Note how vegetation overhangs the beach.



Roll 32:4 Wedding feast, Fakaofu I. Tokelau Group.



Roll 32:6 The bride-Litia, groom-Kupa, best man, brides maid and minister and attendants. They presented the lau fola (Pandanus) hat.



Roll 34:6 Fakaofu is comprised of 48 small islets, situated along a triangular reef, which may be waded even at high tide. Looking NNE from sakea No. 4 toward Motu; my guides, the Magistrate and the captain of the military company, starting to wade across.

on Ficus, purple winged leafhoppers, crane flies. Saw large gray (Pemphis) moth. Blue, white spotted butterflies, large brown leafhoppers on Noni, small green dolichopodid fly, red ants and leaf mines on Scaevola. The puapua leaf roller is absent.

Quantities of small green tailed lizards, up to 6" long, and a larger dark drab lizard. Land and hermit crabs plentiful.

A few taro patches - obviously artificially dug. Undergrowth thick and many fallen and rotting coconut palms.

East reef about 50–60 yards wide, rough reddish coral, moderate surf, despite a perfectly smooth sea. Conglomerate and sand beach, narrow, steep, 10–14 feet high, with Scaevola and Tournefortia close down. Island very narrow in places, not over 150 yards.

Caught large longicorn beetle on Buka. Mosquitoes eat you up when you stop.

Across a shallow, partly dry channel, water 10 yards wide, and 100 yards further on another, wider one, the water flowing. A little further on another shallow channel. Multiforma essentially like Matagi, but drier and more open. To N.W. end and back across lagoon to Fakafo in the canoe.

Had long conference with chief, Magistrate and secretary. Obtained permission to sleep ashore and was assigned to an unoccupied house containing bed. Every comfort provided - good swim in lagoon and fresh water rinse in Magistrate's own wash house; mats provided by Magistrate and young coconuts to eat. Still one could not help feeling like a state prisoner. Policemen to wait on me, and after pressing plants and putting away insects before a large audience, a long conference with chief and Magistrate, who asked me all sorts of questions about myself, Hawaii, the government, the war, politics, inventions, etc. Policemen kept guard all night.

April 4, 1924, Friday.

Very curious place. People very polite and accommodating, giving me a plate of chicken, coconut pudding and bananas for breakfast; but watched, detained and hampered at every turn.

When bird shooters (Hono and Isadore) came ashore, was finally allowed to leave my house and we were rowed down the lagoon to Fonua loa in company with Uikilifi, a policeman and the Magistrate, who stayed close to us all day, and needless to say, prevented efficient collecting.

Nukumatau, nearly a mile S. of Fakafo, covered with Buka, fala, etc. surrounded by a fringe of tall coconuts. Separated by two narrow entrances and a sand islet from Patalinga, which is the Protestant cemetery, the graves apparently beneath the coconut palms. Nukumatini with the small huts of the cemetery caretakers, about 150 yards S.

Papaloa is a low sandspit with 3 coconut palms and a few bushes, mostly Pemphis (called ngangie).

Nukulakia has the typical fringe of coconuts and knot of native trees in the center. Beyond is a low sandspit called Tawaafua, with a half dozen coconut palms and a few Scaevola and Tournefortia.

A few sandspits south of this have names, but are bare of vegetation.

Trees on Fonua loa and Their Tokelau Names. (From Magistrate).

1. Scaevola - gnasu	marginal fringe
2. Tournefortia - tausunu	marginal fringe
3. Noni - nonu	fairly abundant
4. Tafono - puapua	fairly abundant
5. Coconut palms - niu	fairly abundant
6. Buka - Puka vai	" "
7. Kou - kanava	" "
8. Pandanus - fala	" "
9. Harnandia pullata - puka vata	occasional (tall tree with green fruit and cordate leaf. Need for making canoes)
10. Ficus - mati	"
11. Fiber plant - fau	"
12. Pemphis - gagie (ngangie)	marginal fringe

Principal undergrowth on Fonua loa: (names from Magistrate)

1. Maile fern - maile
2. Birds-nest fern - lau mea
3. "Puff-ball fruit-herb" - nasevau (little puffy fruits edible)
4. Boerhaavia (purpel flower - nuna
5. "Red-top herb" - atiati
6. Beach runner - totolo
7. Dodder over plants - fatae
8. Large dry-leaf taro - tamu
9. Ipomaea vine (white flowered) - fui
10. Papaya - esi
11. Bunch grass - makiku = (in samoan) mutea
12. Brake ferns - rata maile or maile kimoa

Tournefortia moths plentiful, their caterpillars called anufi - appear larger and different from those on the dryer islands to the north. Spiders plentiful, called kuma. Saw blue-white spotted and red-brown butterflies. Lizards are called pili, the large chameleon lizard is called moku. Land crabs - unga.

On the S. side, the reef is about 150 yards wide with a moderate surf. Sand beach with sandstone slabs.

In the center of the island is a large salt water lake called Taisala, connected on the E. Side by a narrow channel with the ocean.

N.W. side of the island called Teakena. The smaller S.E. side Tepuka.

Crossing a narrow channel NE, 30–40 yards wide with 10–15 yards of water one comes to four small typical islets called collectively Sakea. A channel of about 150 yards separates No. 4 from Motu.[see Roll 34: 6]

The little islets are all about alike, there being occasional little huts, used when gathering copra, and occasional dug taro patches with sickly looking pulaca and taro.



Roll 35:2 Peni'uto [center], his two daughters Monisi and Iala (a third, Sepornia, not in picture, lives in Fakaofu). Veneale (chief) and his wife Lesia, who is Monisi's daughter, in front of their house.

About 120 yard gap with 20 yards of knee deep water between Motu and the large islet of Saumatafanga. The S. end is comparatively dry and non-luxuriant, although composed of the moist forest trees and might be called a "dry-moist forest." Lagoon lined with Pemphis.

East reef about 60–70 yards wide, rough coral edge and moderate surf-sea perfectly smooth. Conglomerate and sand beach, backed by a continuous wall of *Scaevola*. Single portulaca plant called katulituli.

The brown longicorn beetle is called mongamonga.

Paid a visit to a very old man, nearly 100 years old, named Peni'uto, who lives with two of his three daughters in a neat little native house near the north end of Saumatafanga.

Veneale wrote out for me a list of the names of the islets on the east side, which is reproduced on p.[79 above] [62–63 of handwritten field notes].

Crossed several islands — all more or less alike. On some there are huts, taro patches, pig enclosures. Some are separated only by very narrow dry channels and really belong to same land mass. Toliakava belongs to the Magistrate.

It takes one day to boil down 90 buckets of water which yields about 20 to 25 pounds of salt. Salt is called masima. On Teoki encountered two men caring for pigs who had an adze with a typical old wood handle but a plane blade for a head. Tried Pandanus (fala) fruit, which they had, and found it very good tasting a little like a sweetish carrot - probably inanced by the color.

At Nukumasanga we took the boat, rowing up as far as Palea to complete the circuit of the lagoon.

Quite a ways from Nukuseseke to Otafi (which consists of 4 small islets) with only reef and sand-bars in between. Coral heads and rocks off shore in the lagoon.



Roll 35:3 Willi (who talks English fairly well), his sister Lano, and our party at Matakitoga, where Willi boils down sea water and makes salt for a living.



Roll 35:4 The boat, party, and Nukumasaga in the background.

Fungalei, about 200–250 yards N by E small, oval, typical. Motuili and Niue lie close together with Motuakea a part of the same mass, fairly large. Typical. Motuloa about 220 yards NNE.

Saketai separated from Motuloa by a 30 ± yard channel. Typical.

Kaivave by a similar channel, a little wider.

Ofuna and Manumea lie close together and separated from Olokalonga by a 100 yard channel. (Typical).

Close to the latter is Palea with its fine grove of tall Puka vai.

Rowed back across lagoon. Got things and aboard the schooner.

Made tracings of map of Fakafo for the Magistrate and chief Veniale.

Saturday, April 5, 1924.

Ashore at 6:45. Visited the Magistrate and presented him with the map.

Walked up along reef to Fonua fala, a distance of about 1 1/8 mile. It being 2/3 full tide the water was more than knee deep all the way but nowhere waist deep.

Walked length of island along one of the 3 well cleared paths, making a systematic study of the insects of the different plants.

Maile fern:- (also some on Brake fern):- small brown cricket, large and small fuscous ants, small gray flies, jumping spiders, large brown leafhopper, small fuscous leafhopper, gnats, small gray moth, brown moths greenish chironomid, small dark brown wasp, green dolichopodid fly, fuscous winged tryptid (or ortalid) fly, pale yellow ants, small pseudoscorpion.

Buka:- large brown longicorn beetle, yellow flies and green dolichop. fly.

Noni and kou: - large brown leafhopper, fuscous leafhopper, dolichopodid and drosophilid flies, yellow ants, fuscous ants.

Flying about:- Brown moths, dragonflies - 2 spp., mosquitoes, muscid flies.

Chased a large chameleon lizard (called moku) down a papaya (esi) tree.

Saw a small dark-red brown sphinx moth hanging to the under side of a kou branch, but failed to catch him.

Ran across three boys related to the owner of the island, who presented me with a bunch of bananas, shared my lunch and entertained me with a Siva.

On the way back I asked them the names of parts of the canoe and other common objects to get a sample of the Tokelau language.

Common Tokelau Words

Parts of the canoe:- Paddle - foi, bailer - tata, outrigger - ama, canoe proper - nafoa, sail - la, mast - tela, side of canoe - vaka, seat - foa, crosspieces to outrigger - kiato, and little uprights - tutuki, prop for the mast (which rests at an acute angle) - toku, guy rope - tuku, sheet - fafa, cord holding outrigger to canoe - kafa, loops of line holding sail to mast - fakafo.

Other Common Words

hat - pualo, husked coconut - sua, cemetery - te afua, fishing - sisi, coconut husk - pulu, sea - te tai, boy - tama, girl - te imi, coral - fatu, sand - neone, sea slug - loli, lagoon - ika, cloud - lagi, schooner - lualua, lavalava - kio, camera - ueata, shir - fofutino, house - fale, coral head - punga, take sail down - tulu tuku.



Roll 36:3 How the banana plants are enclosed in mulch, protected by covering of coconut husks to conserve moisture. Talotalo plants on left.



Roll 36:4 A typical large taro patch. The smaller arrow-head shaped variety is called tamupolaka.



Roll 37:2 The procession bringing us gifts for our having brought them tidings of Hehe after 60 years. (The first certain information they had received)

Back to the schooner at 5 P.M. in Mr. Uikilifio's canoe. He presented the Pandanus leaf basket and strings of shells.

Schooner left Fakaofu at 6 P.M. carrying away many presents and pigs, chickens, coconuts and bananas (bought); and leaving behind much good will and aloha for the Museum, thanks to the pictures and the information furnished by Mr. Stokes.

Protestants number 350, Catholics 80.

No landshells seen on entire atoll, although moist enough. Looked everywhere.

April 6, 1924, Sunday. At sea - Fakaofu to Samoa.

Calm during night and early morning. Good breeze from E by N all afternoon. Position:- 8 A.M. Bar. 30.00.

8 A.M. Log. 65.5. S. 9° 46' 171° 28' W.

Noon " S. 9° 58' 171° 18' W

2 P.M. " 90.0 S. 10° 11' 171° 00' W.

Took the day off, reading, resting and having hair cut.

Monday, April 7, 1924.

Squalls during the night, good breeze from ENE. Passed Swan's Island (not seen) 16 mi. to NE by E. at 7 A.M.

Position: 8 A.M. S 11° 08' 170° 53' W. Bar. 30.03

Noon S. 11° 14' 170° 50' W.



Roll 37:4 The old men who furnished the genealogical information.



Roll 37:5 Our party, the gifts and some of the chiefs.



Roll 39:1 Aunuu Island looking E.

Spent day typing off list of data for Photographs taken and looking over same.
Developed 7 rolls of films in the evening.

Tuesday, April 8, 1924

Steering S. in morning with moderate to light breeze from E by N.

Position 8 A.M. S. $12^{\circ} 37'$ $171^{\circ} 54'$ W. Bar. 30.03

Noon S. $12^{\circ} 45'$ $171^{\circ} 50'$ W.

Spent morning writing notes. Too rough in afternoon to sit in cabin. Heavy squalls in afternoon with rain. High head seas and strong wind from S. Steering E. under double reefed main sail. Much rolling and pitching. Rough night with squalls and lightning.

In late evening wind changed, coming from NE and we went over on other tack, steering S.E.

Wednesday, April 9, 1924.

Sea calmer with moderate or light wind from NE. Sky overcast. Steering SE by E.

Position:- 8 A.M. S. $13^{\circ} 01'$ $170^{\circ} 26'$ Bar. 30.03

Noon S. $13^{\circ} 22'$ $170^{\circ} 24'$

3 P.M. [left blank]

Spent day bringing notebook up to date.

Thursday, April 10, 1924.

Sighted Tutuila W. by S. at daybreak and Manu'a mag E. the former about 30 miles, the latter about 25 miles off. Squalls ended and sea calm with light breeze from NE. by N.



Roll 41:1 The two girls and Sister Frances, with the school in the background.

Took series of pictures as we sailed along S.E. coast of Tutuila
Along side custom house wharf at 1 P.M.

Called on Mr. Scholes, delivering letters and messages given me by Mr. Shafer on Hull Island.

Friday, April 11, 1924

Rowed across bay to Sisters' School with Sister Frances and box for Shafer's girls. Took pictures of them at request of Mr. Shafer, in return for his great kindness to us on Hull.

Returned to Naval Station and called on Gov. Kellogg loaning him my "Preliminary Report" and Field Notebooks 1 and 2, to look over. Being unable to obtain a chart of Tutuila, spent afternoon copying H.O. Chart 2924 on small squares of paper to fit note book. Also typed a letter to Mr. Beck for Capt. Stenbeck.

Saturday, April 12, 1924.

Obtained permission to go to Apia on U.S.S. "Ontario" and had passport vise'd by Judge Hall, Sec. of Internal Affairs.

Field trip up the hill behind (S. of) Naval Station, and back across ridge to Reservoir. Followed a very fair zig-zag trail up thru a little village and coconut grove and up the side of the ridge. Trail at first lined with verbena and weeds; then with canna and ferns; and finally through a thicket of herbs and trees strange to me. The insects were abundant from the start. They seemed much more numerous than in Hawaii, especially because zone begins immediately with the ascent and one enters the moist forest at 200'. Took a picture from beneath a large Kamani tree (called "futu").



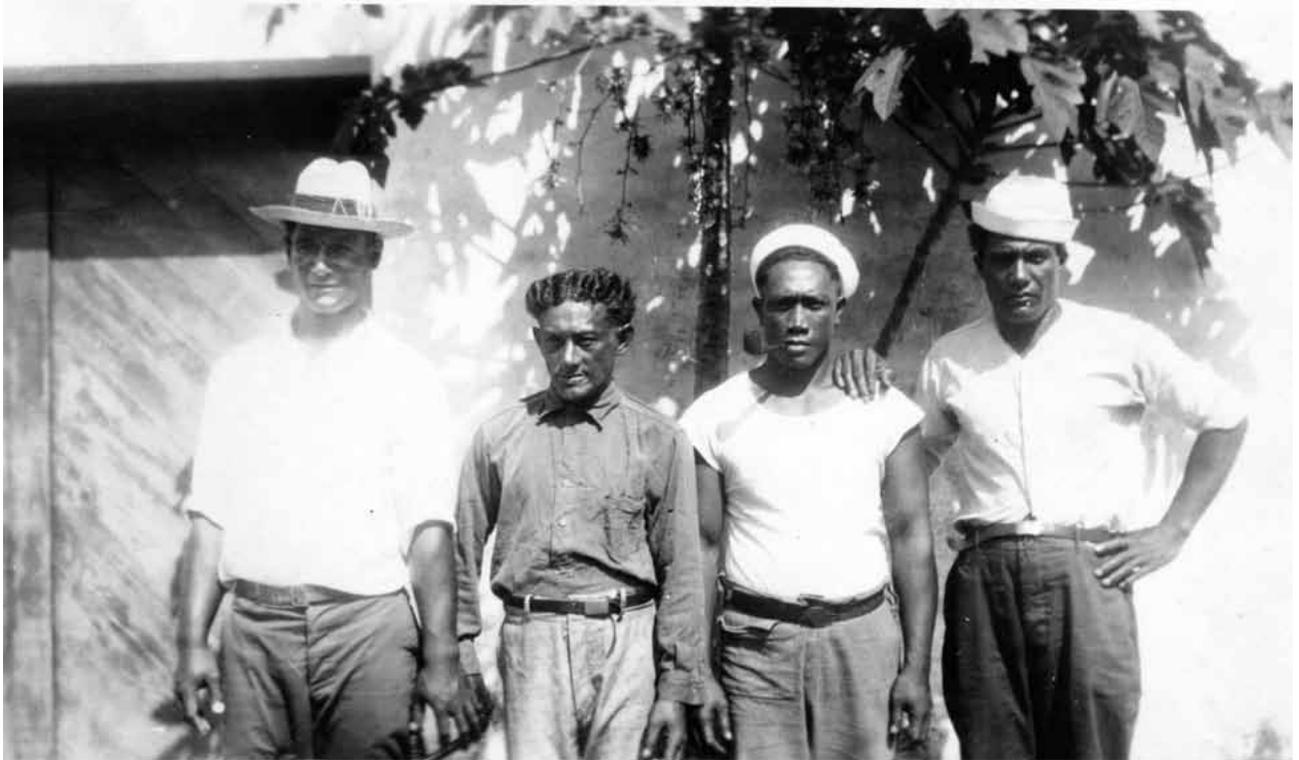
Roll 41:2 Pago Pago Naval Station looking down from elevation of about 300'.



Roll 41:3 Looking down the valley from top of intake dam.



Roll 41:5 Looking W. S.W. on Fagaalu from ditch, elevation about 700–800 feet. Slope of Matai on left.



Roll 41:6 Four members of crew, (taken by request). Left to right Willie (the stowaway), the cook, Mina, and Tao the mate (grandson of Hehe).

A little higher the ridge flattened out and one entered a region of grass, open forest and bananas. Here the Assassin bug was quite abundant on grass, having moderately strong flight and disagreeable odor. Followed cement flume along side of a very pretty valley, collecting insects so fast that I had no time to note the kinds. They were all taken from ferns and fleshy herbs. Also collected several plants and three bottles of landshells which are very abundant on the large fleshy herbs leaves and stems, on ferns and occasionally on trunks and stems.

Back down to schooner and pressed plants, obtaining Samoan names from old man, Vasai of Aua, who invited me to pay him a visit.

Sunday, April 13, 1924.

Washed off and sorted out negatives of which I wanted prints for Correia or persons taken, and took them to photographers.

To church - Palm Sunday. Spent afternoon writing letters. U.S.S. Ontario left for Apia at 10 P.M.

Monday, April 14, 1924.

Off N.E. coast of Upolu at daylight. Mountain range between 1800 and 3600 feet high and in general outline rather resembles mountains of Oahu or Kauai, semi-rugged, but thickly covered with arboreal vegetation as in Hawaii rainforest. Foa Mt. (3690) rises conspicuously by the side of a deep indentation, Fagoloa Bay, on the other side of which rises a long, flat-topped ridge, Malata Mt. 1900 ± feet in elevation. To the west an area of flat country runs back from Falifu Bay, with a row of peaks (2200'-2300') in background. Next to the W. rises the wedge-shaped Vaaifetu (3600') behind which is the rounded, cloud capped, backbone ridge, (3000' to 3600').

Along the shore rise a series of little pyramidal peaks (800' to 1300'), at the foot of one of which lies Apia. The vegetation comes well down, with a fringe of Coconuts along the shore.

Ashore and cashed \$10 at Bank of N.Z. on my letter of credit, receiving £-2-2-6. After locating whereabouts of Mr. Beck, walked up to Hospital and called on Dr. Buxton, who has charge of the investigation on Elephantiasis and is also collecting insects for the Imperial Bur. of Ent. Looked over his collections. Mr. Swezey reported no Carabid beetles, but Buxton has a large dark brown specimen with green metallic tinge, caught at Malalolelei, 2000'.

Dr. Buxton is specializing on the mosquitoes as the suspected carriers of Filaria causing Elephantiasis. Has so far six species, three of which are the same as our Hawaiian spp. He calls them A. pseudoscutellaris, A. fasciatus, and Culex fatigans.

Had dinner with Mr. Beck at Central Hotel. Got acquainted with Major C.A. Swindburne, Deputy Commissioner for the Gilbert and Ellice Colony, who is on his way to Funafuti. He expressed his willingness to collect anything the Museum might wish for from the Ellice Group. He strongly recommended the series of papers by Hedley, on Funafuti, pub. by the Sydney Museum, as being a very fine Fauna and Flora, as well as Ethnological study of the Ellice Islands. Recommended that Major Swindburne be sent apparatus and instructions for collecting Ethnological and Nat. Hist. Specimens and notes.

To Dr. Buxton's for tea and spent afternoon with him collecting up the slopes behind his house, going up to about 700 feet elevation. Dinner and evening with him. He would like any data we may have on Samoan insects and also spare catalogs of second hand books on scientific subjects and the addresses of good dealers.

Returned to U.S.S. Ontario for the night.



Roll 42:1 Apia Harbor, looking south.



Roll 42:3 Looking across Apia Harbor, "Adler" wreck, "U.S.S. Ontario" and "Dawn".



Roll 43:1 View of Nuuli village and S. slope from Fafiga Peak.



Roll 43:2 First raising of American flag on schooner "France."

Tuesday, April 15, 1924.

Left Apia at 2:15 carrying Major General Richardson, Administrator of western Samoa and party.

Just east of Fagoloa is another bay, flanked by fairly high ridges, the one at the right (W.) with a high waterfall. The island becomes gradually lower at the east, with two small, rounded peaks rising from the backbone and ending in four small islets. This portion of the island appears less luxuriant than further west. Arrived at Pago Pago at 3 P.M.

Mr. Beck came over with me on Ontario and we spent late afternoon discussing the "France's" trip and future plans. Later with him to a reception and dance at Governor Kellogg's in honor of Governor Richardson, Commissioner for Western Samoa.

April 16, 1924. Wednesday.

All day field trip to the summit of Fafiga (1541'). Walked around road to Matuu village and ascended steep ridge along an evergreen trail to near summit. Steep scramble to summit.

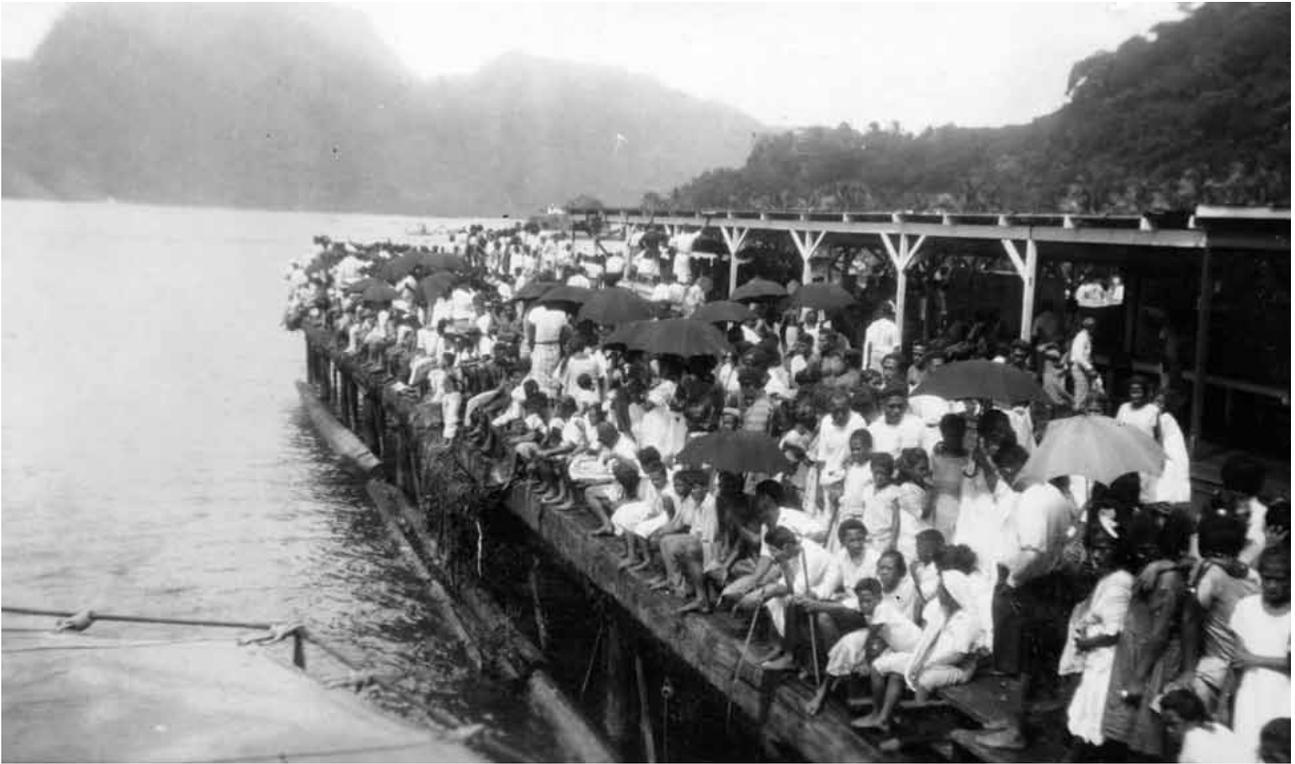
Collected a few insects and plant specimens on ascent, quite a number of landshells, which are everywhere abundant on leaves of the moist forest trees and fern fronds. Large spiders on banana and breadfruit leaves, and a translucent yellowish caterpillar inside banana bud. Large chordate leaves of a



Roll 43:3 Marine Barracks with crowd assembled to hear speeches.



Roll 43:6 Left to right Miss Richardson, Mrs. Kellogg, Capt. Kellog, and Maj. Gen. Richardson.



Roll 44:1 The crowd on the pier watching the races



Roll 44:2 The 24 hour boat race between the Tutuila villages.



Roll 44:4 The paopao (canoe) race.



Roll 44:6 The winning Siva team from Manu'a.



Roll 45:3 Pago Pago Harbor, looking nearly due E. from the top of a coconut palm near site of old observation station.

climbing vine much eaten by small gray and black caterpillars. Quantities of medium size yellow moths. Small brown termite makes large mud nests and runways on tree trunks. Black weevils of various sizes on leaves, some of which are badly eaten. Large native Anthomyid fly, large yellow brown fly and slender purple (wasp-like) flies abundant.

Many small to moderate size purple-legged hermit crabs, even well mauka (called mau and manga in Samoan).

The ridge formation is very similar to that on Oahu:- High steep forehill, topped by a steep knob; behind which the ridge drops down 50 to 100 feet, becoming a thin knife edge. This slopes gradually up to a second knob to fall off again, becoming progressively steeper until the summit is reached. The main difference is in the vegetation, the Tutuila ridges being well wooded right down to the beach.

It commenced raining soon after my arrival at the summit. On the return was only able to collect landshells.

Thursday, April 17, 1924.

Flag Raising Day — celebrating 24th Anniversary of U.S. in Eastern Samoa. Took Rolls 43:2 to 44:6 of the exercises and sports.

Friday, April 18, 1924

All day field trip to ridge W. of Pago Pago Harbor. Along road to Pago Pago village. Up Fagasa trail to summit and along ridge to the north as far as site of old observation station, where descended by a good zig-zag trail. Ridge averages 700–800 feet elevation and is covered by a good rainforest.

Dissected several banana blossoms in hopes of discovering insect which causes spread of fungus, which causes destruction of so many fruits. Intrablossom fauna as follows:-(in order of appearance as



Roll 45:4-5 Panorama of Pago Pago Harbor, looking S.W. from knob just W. of Afono Pass.

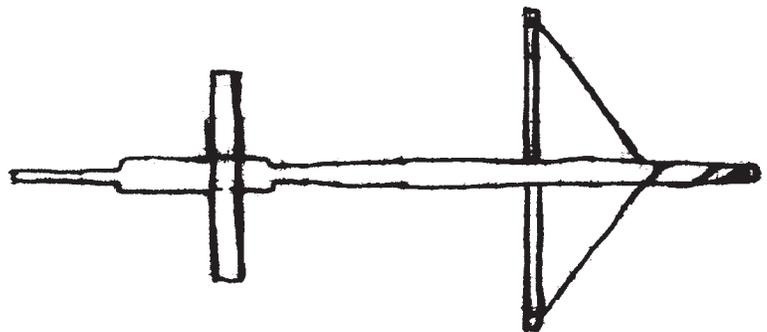
one penetrates the blossom):- earwigs - (dark fuscous kind with the yellow section on the antennae), large red ants, small ovate black beetle; flat, whitish larvae (possibly of the beetle), small thrip-like beetles, and small fuscous thrips (?)

Landshells (called sisi) are quite abundant even in the lowlands where they first occur on banana leaves. As one ascends there appears to be several spp. large and small, conic and flat.

Several showers during day made sweeping small specimens impossible. Caught a few large flies, etc.; and took a few plant specimens.

Saturday, April 19, 1924.

All day field trip to ridge North of Pago Pago Harbor. Rowed across bay to Atuu. Walked E. along road to Aua, where I called on Vasai, native who furnished names for plants April 12th. His house is of a semi-modern construction with wooden floor raised about 5 ft above ground. The walls are movable, made of plated coconut leaves and the roof is of sugar-cane leaf thatch, laid on a framework of split bamboo supported by tou (kou = *Cordia*) uprights. Floor covered by mats. Only object of interest in the house was a fire drill - laau. [see figure at right]



The little kava bowls, which are made to sell to the tourists, are like the larger ones, made of milo wood.

Followed Afono trail to summit and from there followed the summit ridge west to the Vatia trail, by which I descended to Leloalooa.

Saw large rat, on way up, gnawing the bark of a dead tree. The small lizards are not abundant, but the large black lizards are quite occasional. Took pictures from a little knob just west of the Afono pass.

The first half mile of the ridge is saw-tooth pali, where it is practically impossible to follow the skyline; but one can get around on a ledge on the N. side, about 25 to 100 feet below.

From Filitau to about 1/4 mile W. of Maavea the route followed a flat topped ridge, about 50 feet

wide and only rising and falling 20 to 50 feet in gradual undulations. This has an open stand of moss covered trees among which I recognized *Lobelia Ohia lehua* (*Metrosideros polymorpha?*). The undergrowth is thin with a few birds-nest and other ferns, monocotyledonous herbs and a *Freycinetia*-like vine. On the summit ridge the insects were fairly scarce, except spiders (whose webs stretched everywhere), large pale craneflies and the large yellow flies. The landshells here appear of but two spp.- both *Acotinella* [*Achatinella*]-like - one yellow brown, the other purple. The striped large ones and the smaller forms live at lower elevations. Very few of the plants were in fruit or flowers. Collected a couple and some wood specimens.

Easter Sunday, April 20, 1924.

Spent day packing up four boxes of specimens, to send to the Museum, and moving my trunks to the hold, as Mr. Beck is moving aboard and I am to change my quarters. In the afternoon the local photographer gave me some pointers on tropical developing, which I hope will improve the quality of my negatives.

Monday, April 21, 1924.

Steamer day: *Ventura* arrived at 7:30 A.M. Letter and box of plant blotters, paper and dozen rolls of film received. Spent day reading and answering mail. In late afternoon helped local photographer run off prints of a dozen or so negatives for Correia, Capt. Stenbeck and persons who entertained us on the the cruise.

Tuesday, April 22, 1924.

Governor returned my preliminary report which I had loaned him. Finished packing box IV and took all four to customs house for storage until return of "*Ventura*" to Honolulu. Spent day answering mail and attending to final minor details. Underway for Apia at 5:30 P.M. Engine running most of night.

Wednesday, April 23, 1924.

Cruised about Nuulua and Nuutele Islands - off east end of Upolu for for an hour in early morning to allow Mr. Beck to row in close and shoot specimens of birds. We did not land. Sailed along NW coast of Upolu, arriving at Apia at 3 P.M.

The two larger islets-Nuutele (478') and Nuulua (120') are well wooded; *Nannia* (120') less so; and Fanuatapa is comparatively barren, with a few coconut palms, *Pandanus*, hau and *Ipomoea*. Capt. Stenbeck says it had goats on it at one time. Dr. Buxton, who has explored three of the islets says that they do not differ materially in fauna and flora from Upolu, being but isolated bits of main island.

Ashore at Apia and called on Dr. Buxton having tea and dinner at his home. Had a little trouble about my alcohol, but obtained permission to use it in Western Samoa for specimens.

Thursday, April 24, 1924.

Errands in Apia. Made an official call on, and had a very enlightening talk with His Excellency Major General G.S. Richardson, Governor of Western Samoa. The Governor impressed me as a keen, broad minded student of nature and humanity, who is doing his very best to make the conditions of the natives as comfortable, safe and unaffected by the presence of the white man as possible. He defended his policy by pointing out how too sudden civilization and commercial exploitation has been the downfall of other island groups in Polynesia. He talked intelligently on Entomological subjects and questioned me concerning the control of such agricultural pests as the "Rhinoceros" beetle and

quarantine measures against the other pests. I cited the work done in Hawaii and advised the introduction of the Scoliid wasp from the Malay region to control the beetle. Bought maps of Upolu and Savaii at Survey Office.

In afternoon visited a cocoa plantation with Dr. Buxton and his assistant Mr. Hopkins, who were searching for breeding places for the day mosquitoes. Collected a few specimens, especially a few landshells in a taro patch and a large series of red-brown millipeds, under rotten log.

Tea with Mr. and Mrs. Hopkins. Borrowed a botany book and spent evening brushing up on Botanical Terms.

Friday, Apr. 25, 1924.

Anzac Day.

Ashore and watched parade at 9 A.M. Then took a field trip up to Vailema and collected up the slopes of Mt. Vaea to Stevenson's Grove. Thence N. down the ridge, through a low rainforest, collecting a few insects and several plants. Back to schooner and pressed plants. Supper and evening with Capt. Stenbeck at home of Mr. Paul Hoeflich, old resident and cordial manufacturer.

Saturday Apr. 26, 1924.

Up to Moaloalelei, elevation 2000' with Dr. Buxton and Mr. and Mrs. Hopkins, in a Ford, over a very bumpy road. Breakfast at the Rest House at which Mr. and Mrs. Beck have been and are stopping. Then W. and WSW along a rough muddy trail to Lake Lanuto'o. The trail winds thru a beautiful moist forest, with tall unfamiliar trees, including a very large Ficus and species of Lobeloids, and a thick undergrowth of ferns, shrubs and herbs, maintaining a level of about 2000 feet.

Collecting was poor because of the excessive moisture and intermittent showers. There were plenty of landshells, most small, and the few insects caught were quite different from those at lower elevations, especially the weevils, flies and leaf-hoppers. A large dark, oval leafhopper on Freycinetia. Several species of Orchids seen—one of which I took.

The lake occupies a large crater, about 1/2 mile long, at an elevation of 1900–2000 feet, with a rim 100–250 feet above surface of the water, and somewhat elevated above surrounding backbone ridge. The water is fresh, good tasting and contains goldfish.

On return trip missed trail, overtaken by darkness and forced to spend night in open, with a disagreeable cold rain falling and no food.

Sunday, April 27, 1924. After climbing a crater rim to get bearings, (the compass having been spoiled by the rain) we took a NNE direction to the trail and reached the rest house at 11 A.M.

Traced portions of a large scale map of the region and returned to Apia in early afternoon. Back to schooner and put many specimens.

Monday, April 28, 1924.

Spent day doing errands for self and ship. Bought a few necessary articles and borrowed a pocket compass for use on Savaii.

S.S. "Resolute" off harbor all day. We shipped the Tahiti crew back to Papeete by her. Spent evening writing up notebook to date.

Presented Governor Richardson with one of the three sets of Bishop Museum publications relating to Samoa and Tonga.

Tuesday, April 29, 1924.

Spent day on schooner and helping Capt. Stenbeck get together new crew. Heavy rain and uncertain time of departure prevented field trip.

Underway for Savaii at 5 P.M. carrying Mr. and Mrs. Beck, Mr. and Mrs. Correia, Miss Anne Kearns and two children — Frances and Monaca Flaherty (these three just passengers to Safune), and a new crew of Samoans, Fijians and Niue man, numbering 6; Capt. Stenbeck and myself.

Wednesday, April 30, 1924.

Off N.E. and Savaii at daybreak. This region remarkably like slopes of Mauna Loa (on small scale), with occasional cones and a broad field of fresh (1905–11) lava, running down slopes from a crater to sea.

Ran into Matauta Bay and called at Fagamelu on the Resident Commissioner Mr. G. Bigg-Wither, a very pleasant, well informed man. On to Safune where we anchored 9:30 A.M. On way out of Matauta Bay bumped a coral head without damage, (probably the spot marked two fathoms on the chart). Landed Mr. and Mrs. Beck and guests at 10. Mr. and Mrs. Correia and I went ashore at 12 and called on Flaherty, who is making moving pictures in this region, directly after dinner.

Beach with usual purple flowered Ipomoea pes-capri and grass. Village with coconut palms, bananas, breadfruit, oranges, mangos, and a few lowland trees including hau.

About two miles up a trail running S and SSE behind Safune, with native boy, Imu, as guide. From him obtained the following Samoan names of plants which we passed. Numbers refer to field numbers of plant specimens.

LOWLAND PLANTS

Fifi, large tree with mango-like leaf, and large brown fruit, latter used for oil.

Ulu, breadfruit, quite a few trees in lowlands.

Moli, orange the fruit apparently does not get yellow, but is ripe while green.

Guava - (native name same) abundant in lowlands.

Mago - mango, some of the trees having a diameter of 2 1/2 to 3 feet.

Maukefu - at least 2 spp. of *Sida* (113), also a small herb with a burr (114) and terminal lavender flowers, and a similar plant with yellow axillary flowers.

Ava Samoa - jointed stemmed herb with a rather large leaf.

Meso oe - tall tree with large pinnate leaves.

Vau fefe - the sensitive plant - Mimosa.

Lau kioke - an erect herb with small yellow flowers.

Lau ka - The “maile fern” specimens of which were taken from Fakaofu (?) or Puka Puka.

Ki - (Hawaiian Ti) Cordyline terminalis.

Fala - Pandanus (not abundant).

Fala Samoa - a wild or semi-cultivated Pineapple; occasional small fruit,.

Mamala - tree with thin chordate leaf, spike of small white flowers and small purple heart-shaped young fruit and large plum-shaped fruit. (specimen taken before).

Ufi lei - an Ipomoea-like vine.

Auke - Kibiscus (red flowered) (108).

fua sega - (95) a vine with racemose head of white flowers. Exceedingly abundant through lowlands and lower forest, climbing over trees and covering ground.

ava pui - monocotyledonous herb we call “ginger” in Hawaii.

- gmasa - coarse herb with large leaves, 6 ribbed fruit filled with rough seeds (shaped like orange seeds) and edible root.
- gogu - (noni) Morinda citrifolia (?) not abundant.
- fau - hau (Hibiscus tilliacens).
- vau fali - erect grass with short alternate leaves, raceme with short beards and reddish color. Also another kind of grass (111) much tasseled.
- lava - tall shrub with white milky latex, leaved in 3s, small compound raceme.
- lau gasese - large branching bipinnate fern
- masame - small tree resembling guava.
- koe - tall tree, large pinnate leaf, axillary-terminal raceme of small flowers.
- mauka - tall shrub with large pinnate leaves, raceme of small 5-locule pubescent fruits with blue-green seeds (eaten by pigeons).
- essi - papaya tree, planted about houses.
- foi - banana, quite abundant in lowlands.
- fi soa - shrub, sub-chordate leaves, 5-petalled, yellow-green flowers.
- maagugu - tree mango-like leaf, terminal compound raceme of berries.
- fuafua - (100) tall tree, hau-like leaves, lavender flowers and S-sided (loculed) capsules.
- nakai - tall shrub or tree with leaves in 3s.
- maki - tall shrub, large linear, alternate leaves.
- oleve - climbing vine with thick, subovate, pointed leaves, coarse stem.
- kamagu - tall, straight tree, with branches only toward toward top, used in making canoes.
- kuse - common Sedge, (specimens collected in Phoenix group).
- poalulu - tree with numerous thick leaves.
- lau mopa - bird's nest fern.
- lama samoa - the kukui, used for die in the process of tattooing (hakau),
- lau fau - banana-like plant, smaller trunk and larger leaf stalks, very abundant throughout lower rain-forest and lowlands.
- cocoa - tree which produces cocoa-bean; numerous small groves in lowland.
- mogau - tree with uneven lanceolate leaves and small crabapple-like fruits with 7 locules and hard yellow seeds.
- polo feu - the red pepper plant.
- Ifi - large tree with moderately large, coarse leaves.
- vaillema - (110) grass with bifed spike.
- lau gasese - tall sedge, (112) long narrow leaf.
- magioea - manist (?) edable root, 6-digitate leaf.
- filimoko - (97) tree with raceme of white flowers and small red berries. (Tutulia specimen)
- kapukoi - tall shrub or small tree with moderate size pinnate leaves.
- oa - tree with pointed, serrate leaves in 3s and comp. raceme of small yellow flowers.
- loa - (106) small trees with red-haired fruits containing red seeds, used in making red paint or dye.
- lau mamoi - (105) shrub with raceme of red flowers and purple green fruit.
- faga magu - canna or indian shot.
- Ua - shrubby herb, three lobed, serrate leaves, used in making kappa for lava lava.
- lau talotalo - lilacens, large leaved plants (spec. taken on Sydney).
- mutea - nutgrass (abundant near beach).
- fuifui - Ipomoea pes-capri (along beach, also in lowland).
- vavai - tree with 7-digitate leaf.

malila - cultivated herb with white or purple-red flowers (104).

fui - monocot, climbing vine (115), large fleshy leaves and white catkins.

avaava aiku - (116) erect shrub, noded leaves, red catkin, (very abundant undershrub in rainforest, found even at 3,000'.

Back to schooner with a number of plant specimens.

Thursday, May 1, 1924.

Ashore with Mr. Beck, Correia and sailor Joe Hicks, taking the trail used yesterday went inland 3 to 4 miles to a large cleared area planted to taro, bananas, sugarcane, etc., elev. 1275'±.

Collecting good; insects abundant; landshells commencing at 650 feet, on banana leaves, ki, and herbs. Usual dark leafhopper and small orange and fuscous bug on Taro. Butterflies abundant, Hypolemna bolina. A blue green and black sp. the "dead leaf"-dark brown sp., large Papilio "swallowtail", and many moths. Syrphid flies and long brown bugs in grass.

Several small thatched huts in taro patch. Trail continues on up ridge into a moist rain forest, containing quite a number of species of trees, all covered with fua sega vine (36), which also carpets the open spaces and other vines and creepers of various sorts. One of the most striking trees was a widely spreading, umbrella-like, with very large peltate ovate leaves. There was also a very tall tree (possibly a Ficus) with a tall trunk, often large and much twisted, and a "crop" of leaves and branches at summit only.

Friday May 2, 1924.

Ashore with blankets, provisions, plant blotters, aneroid etc. Up to hut in taro patch visited yesterday where established a solitary camp. Obtained following elevations on Aneroid:-

Spot where paopao was being made, about middle of lowlands	375 feet
Fork in trail where beginning of steeper ascent	450 "
Lower end of taro patches	200 "
"House" used as "base"	1275 "

Up thru the taro patches and headed S.E. at 1500 feet.

Cicada on banana leaf dead and being eaten by pale yellow, fuscous headed ants. Moth fauna large; saw several swallowtail (Papilio) butterflies. Leafhopper fauna large, several species including some with large membranous wings. Numerous Dolichopodid flies, one with basal 3/4 of wing infuscated. Stratiomyid flies-Large dark metallic green dragonfly. Black and blue-black wasps; large yellow-brown vespids, Sarcophagid flies. Swarms of yellow moths at about 1600' elevation. Larvae, pupae and adult of semi-transparent winged black, gray and white butterflies, caterpillars and pupae being on the chordate, serrate leaved climbing vine with racemes of white flowers (Fuasega-95). [Note:- A separate, detailed, systematic list of the plants and insects found on Savaii is being kept, under the title "Summary of the Plants and Insects of Savaii." Only a general summary and special notes will be given here hereafter.]

My route hit the ridge at an elevation of 1825' from which the schooner here N 3° W. Turned S. up a gently rising ridge. Large metallic green Buprestid. Caught large brown Dixiid. Long brown lizard sunning itself on top of prostrate vines, which thickly carpet the open spaces.

Struck yesterday's trail and followed it up (S.) to elevation of 2400'. General direction of trail SE. to SSE. Passed a little seep hole of good water, elevation 2200'. Dug some fig wasps out of fruit of Plant Spec. 123. Saw small rat - dark gray above, lighter beneath.

Returned to hut; pressed plants and put away insects. Mosquitoes exceedingly bad directly after sunset, continually until daybreak.

Saturday, May 3, 1924.

Got a fairly early start after a most uncomfortable night despite net, but had to take refuge in last little banana thicket hut because of heavy shower of rain.

Saw a large brick-red bodied moth with red-brown wings — as large as a sphinx and hairy. Caught a large moth at water hole. Specimens of ear fungus at 2400', with small black beetles and mites on them. This lower rain forest is thickly carpeted with the fua sega vine (95) which covers all the bare ground and most of the lower parts of the trees. The vine continues on up to about 2500' elevation.

The forest at 2900 feet is quite different. Much more dense, no open spaces; no bananas or lau fau. The trees are moss covered with large leafed monocot. vine (fui - 115) and ieie (*Freycinettia* - called pauono). Tall tree ferns, wine palms, lobelias, tall monocot. grass-like plant with rough, ribbed lanceolate leaves and apical compound racemes of small berries (125). Undergrowth chiefly ferns, lily-like monocots and orchids, avaava aiku (116), small trees, shrubs and herbs. Two compositae - apparently weeds, continue, especially along trail, but also elsewhere.

Trail rises to max. elev. of 2950' and then drops gradually around the W. shoulder of a high hill to the S. by E. coming out upon a ravine running from E.N.E. to W.S.W. 25 feet wide, 5 to 15 feet deep, Elev. 2890.

Ate lunch here, there being water in pools (not running), attempted to pick up the trail on the S. side, without success, and returned to camp.

Sunday, May 4, 1924.

The little thatched hut which I use as a base is in the midst of an extensive taro patch, situated on a bench on the NNW slope of a ridge running from the high hill mentioned yesterday to Safotu. Nearby are two varieties of sugar cane, mango trees, breadfruit trees, semi-wild pineapples, papaya trees, pumpkin vine, and bananas. The taro has the usual black leafhoppers, and an orange and fuscous small bug. A large brown *Dacus* (?) Trypetid fly attacks the papayas. There is also a large yellow-brown beetle on the pumpkin vine. A small dark Anthribid beetle is to be found on the papaya trunks and quantities of yellow-brown *Drosophilid* flies about the decaying fruit which has been bird or rat eaten. The thatch of the house is full of *Odynerus* and blue black wasps. Two species of gray muscids are abundant and troublesome, one being *Musca vacina* (the "narrow fronted *domesticus*") and the other the common Pacific species found on Nihoa, Laysan, Wake, etc. with broad bands on the abdomen.

Up the trail to a point where it turns SE up the ridge. Then across country, keeping on E course by compass, thru the thickets and vine covered open spaces, and coming out at the 1905 crater. Up a gradual slope to 1850 and then practically level. The thick vine and (last half mile) breast high young tree ferns, made walking difficult and tiring.

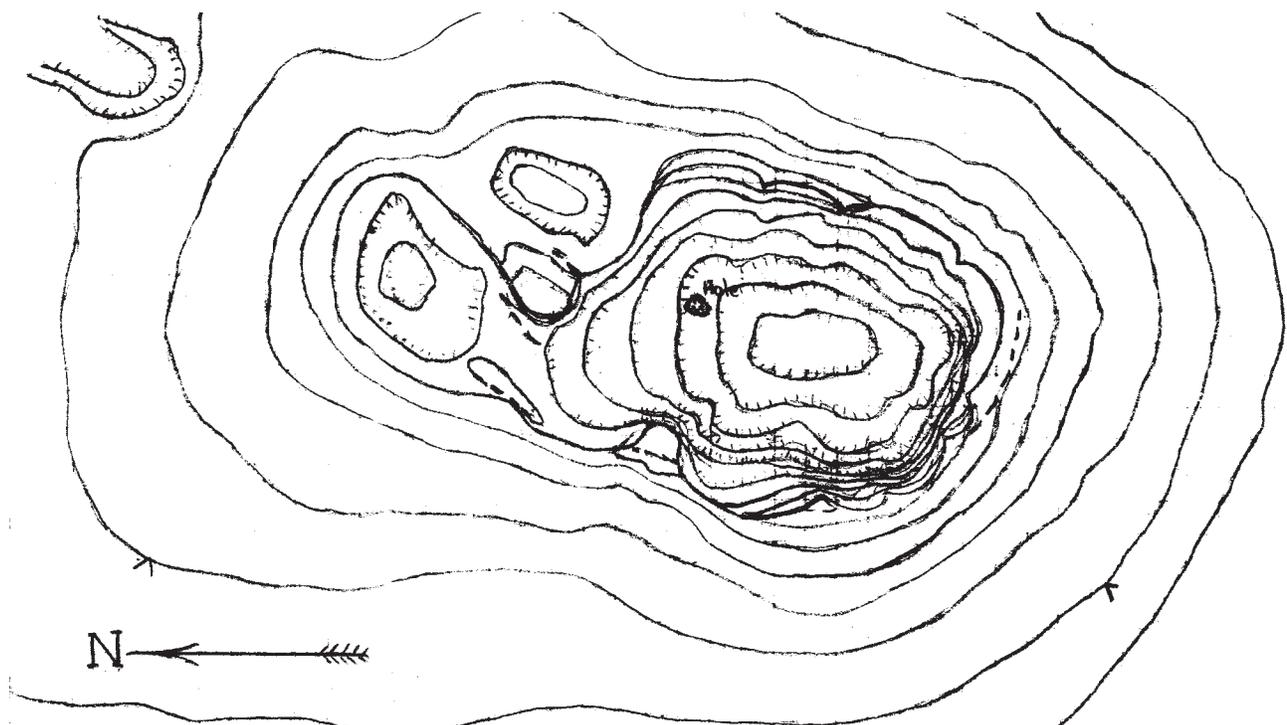
As one approached the lava flow, down the last slope, the trees become fewer, with many of them dead, very little undergrowth excepting young tree ferns and the everpresent vine, and underfoot the crunch of cinders beneath the vine. The edge of the lava is fairly well defined, but the vine runs out over it for 25 yards or so.

The lava is very brittle, much of it smooth but with large areas especially further down (N. and NE) on the flow of rough aa and ridges of broken slag. It gives one the auditory and touch sensation of walking on popcorn balls, but such balls mixed with ground glass and razor blades from the havoc wrought on ones shoes and skin. Even the smooth crust is brittle and one is continually breaking thru.

The lava seems to have been first invaded by a moss (No. 126), after the lichen stage of which traces remain only in bare spots and volcanic bombs. Onto the foothold prepared by the moss have spread several species of ferns, grasses and herbs and an occasional small tree (none over 4 or 5 feet

high) as enumerated below:- Ferns- 133, 134, 135. Two Lycopoda -small "rats foot" 132 and a larger and more erect species 131. An orchid-like herb with lavender flowers and 6 ribbed capsules in racemes on a long flower stalk (127), a plume grass (129), quite abundant. Lavender thistle (121). A jointed "bull-rush" like herb and one with fleshy ovate leaves (see specimens taken) were frequent, but not in fruit or flower. Among the stunted trees are: 126, 130, 136, and the "rose bud" tree with linear lanceolate leaves (spec. taken on Tutuila - No. turned in).

The elevation of the highest point of the rim, on the W. side, is 2040', rising about 190 to 220 feet above base on W. side. The mouth of the crater is about 130 by 200 yards, with the walls sloping steeply in palis and steep talus slopes to the bottom 150 or more feet below. The lowest place is toward the south side with a series of terraces toward the north, each about 25 to 50 feet high to the top of the rim, elevation 1940'. On one of these terraces is a large round hole discolored by sulphur. The N. side is the lowest, south next, east next and west highest. The edge of the rim overhangs in places, with wide cracks suggestive of imminent caving in. Walked around to low N. side and worked down to a lower shelf 1900' elevation. The bottom is perhaps 80-100 feet below. The walls on the inside are clothed with moss, grass and ferns, except on the cinder slides and steep drops. On the N. side are two small craters, separated from the main pit by low thin walls. About 150 to 200 yards N.E. by E. is a deep crack leading from the direction of the main flow).



Sketch of Crater of 1905-11 - "Matavanu"

Contours + Depression Contours only to indicate relative s
Scale about 100 yds. to the inch. - - - - Cracks.

Back to camp, travelling W. by compass at the lower level and reaching the trail at 1650 feet. Down to tank at lower end of taro patch for water. The cicadas start chirping at about sundown. They sound like a jump-spark wireless, with the cadence of the automatic telephone when the line is busy. The mosquitoes arrive in thousands at about the same time and a few minutes later the sphinx and other large moths begin to fly past.

Monday, May 5, 1924.

Stayed near shelter because of intermittent showers and collected about taro patches, and on food plants until party arrived, 10 to 11 A.M.

Two varieties of sugarcane are grown by the natives, primarily for thatch, although the stalks are chewed with relish; as follows:-

1. Smaller stalk, 3 to 3 1/2 cm. dia., joints 12–14 cm. long. Height (without tassel) 9 feet ±; color plum purple-brown with touch of green (approximately color of “red”-tan shoes); darker and a trifle more reddish near nodes, and with 1/2 cm. white band at upper end of internode. Buds alternate, nodes rather greenish with purple dots.
2. Larger variety:- Up to 5 cm. diam., joints shorter, average less than 7 or 8 cm. but some 10 cm. long; deep purple color, with 1 cm. white “pubescent” band on upper edge of internode.

Scorpion, ants, roaches, black beetle in rotten logs. Light yellow leafhopper on bread fruit leaves (also other plants). Lemon yellow and brown long conic landshell abundant under every rotten stick at 1300'. Larger and smaller flat spp. also occur. Large dark brown wingless roach under damp rotten logs. Also millipedes, leaches, red mites and orobatid mites.

Narrow fronted house fly a great pest - persistent, “sticky,” and abundant. they are much more a nuisance than the comparatively scarce day mosquito (*Aedes pseudoscutellaris*). A number of small black fleas in native hut.

Mr. & Mrs. Correira and Mr. & Mrs. Beck and three sailors carrying provisions and supplies arrived between 10 and 11.

Down to Safune after lunch, carrying down plant press and other specimens, in order to get more supplies for two weeks stay. Swept ferns and trail-side plants all the way down, collecting a number of moths and small specimens.

Stopped in at Nelson's store and had interesting talk on semi-scientific and pseudo-ethnological subjects with the agent, Mr. David. He showed me a “genealogy of Safune” [see p.117] and told me much concerning the island and people, based on 30 years residence. He is a brother-in-law of Mr. Nelson, who, according to David, is quite an authority on Samoan lore.

On board schooner; pressed plants, put away specimens, cleaned up cyanide bottles, etc.

Tuesday, May 6, 1924.

Spent morning mending shoes, trousers, insect net, and getting together bottles, blotters and supplies for stay in mts. Wrote Dr. Ball as there was a trading schooner in port bound for Apia. Traced small map of Savaii.

Ashore at 1:30 and hiked up to taro patch hut, carrying 75 pounds of supplies. Aneroid read 1275'.

Wed. May 7, 1924.

Split up some dead wood obtaining bottle full of termites and beetle larvae. Made series of observations with compass to determine approx. location of base camp:-

Cape Puaa	263° Mag.
Mauga point	262° "
Nualogo point	268° "
Sosina	321° "
“France”	347° "
Fagamalo (?)	7° "
Top 1750 flow	226° "
Depression on Mt. side	197° "

Carried tent, blankets and provisions over to ravine (2850') and made camp — Mr. & Mr[s]. Beck and myself. The rocky ravine is not a stream bed, as it does not run either up or down, but consists of a series of pools and depressions. Mr. Beck and I agreed that it was either a broken in lava tube or a volcanic fault. It is about 25' wide and from 3 to 12 feet deep. Water accumulates in the deeper hollows.

Thursday, May 8, 1924. Cut a trail to the WSW and SW up to an elevation of about 4000', thru a very wet forest. Sometimes following rocky stream beds; sometimes pig trails, but most of the time cutting our own trail. Collecting very poor, (1) because of time consumed in cutting trail, (2) because of extreme dampness and occasional showers, (3) because very few insects. Lots of nemocera Diptera, espec. Psychodidae on the grass. Water striders and 4 spp. dragonflies about pools in stream beds. Bird collecting also poor.

The ground slopes up gradually from the 3000' eastern plateau to a high 5000' Western plateau. The highest peaks are located on top of this high plateau, culminating in Mauga sili-sili which is estimated to be from 5400 to 6094 feet elevation.

Friday, May 9, 1924.

Rained very hard during the night, soaking our camp, nearly drowning us out, and filling the pools in the ravine full. Caught a few water striders, hydrophyllid beetles and water walking flies on these pools.

Walked up to the peak just east of the pass thru which the trail comes and about N. of camp. By climbing to top of a tree was able to see most of eastern plateau and to check up most of the craters given on the small chart made by Wilkes. East point of Palauli Bay lay just to the west of the summit of Falolua peak. This peak (which I had climbed) is the rim of a large crater, the center of which sinks precipitously several hundred feet. The interior is well wooded. Followed the rim around to NE side. From here the 1905 crater lies NE (True), just below. As the summit of this latter was 2000', would estimate height of rim at 3500'.

Back to camp, packed up and returned over trail to taro patch camp. Collected two elongate, long snouted and brown slender weevils on log, and saw two greenish Cicindelids and a large Metallic Asilid fly on same log. Caught large bronze rhyneophora and a number of flies, leafhoppers and microhymenoptera.

Mr. Beck caught gecko.

Saturday, May 10, 1924. Cold night. After breakfast rigged tent to catch rainwater. Caught large gecko in hollow dead log; also termites, all cast[e]s. Rain came!! and forced to spend most of morning in hut. Started writing up “Fauna and Flora of Savaii” notebook. Split up more dead wood for fire, getting termites, large red ants, and beetle larvae. Cleared off in evening.



Roll 46:5 Tree No. 141 (lau pata) and typical bit of lower forest and vine covered ground, 1700'.

Sunday, May 11, 1924.

Collecting all day in rain N.E. of taro patch camp, 700' to 1200'. Down trail toward Safune about 1/2 to 3/4 mi. Then up to a steep rise to the right; due east and back to camp up the ridge.

Collected slowly, carefully noting all species in large notebook. Quite a variety of specimens. Beautiful sunset. Mosquitoes bad again.

Mon. May 12, 1924.

Late start because of showers. Put in time on notebooks.

Spent day collecting region to NW of taro patch. Down trail toward Safune to junction (450'). Took other trail, running S.W.; not much used being overgrown with grass, "ginger," weeds and even fallen trees. General direction S or S by W. Past small groves of bananas and cocoa trees. Hau badly eaten by a translucent green leafrolling caterpillar. Number of large mud termite nests on coconut and other trunks. Trail finally leads to another native clearing, much overgrown with weeds, containing a good water tank, several small huts and patches of taro, bananas, sugar cane, etc. Ship bore Mag. N. from here. Trail continues up ridge but soon loses itself in thicket. Returned to camp across lots, E by N compass, thru hau thickets, thick woods, and finally open "lower forest" and vine covered open spaces.

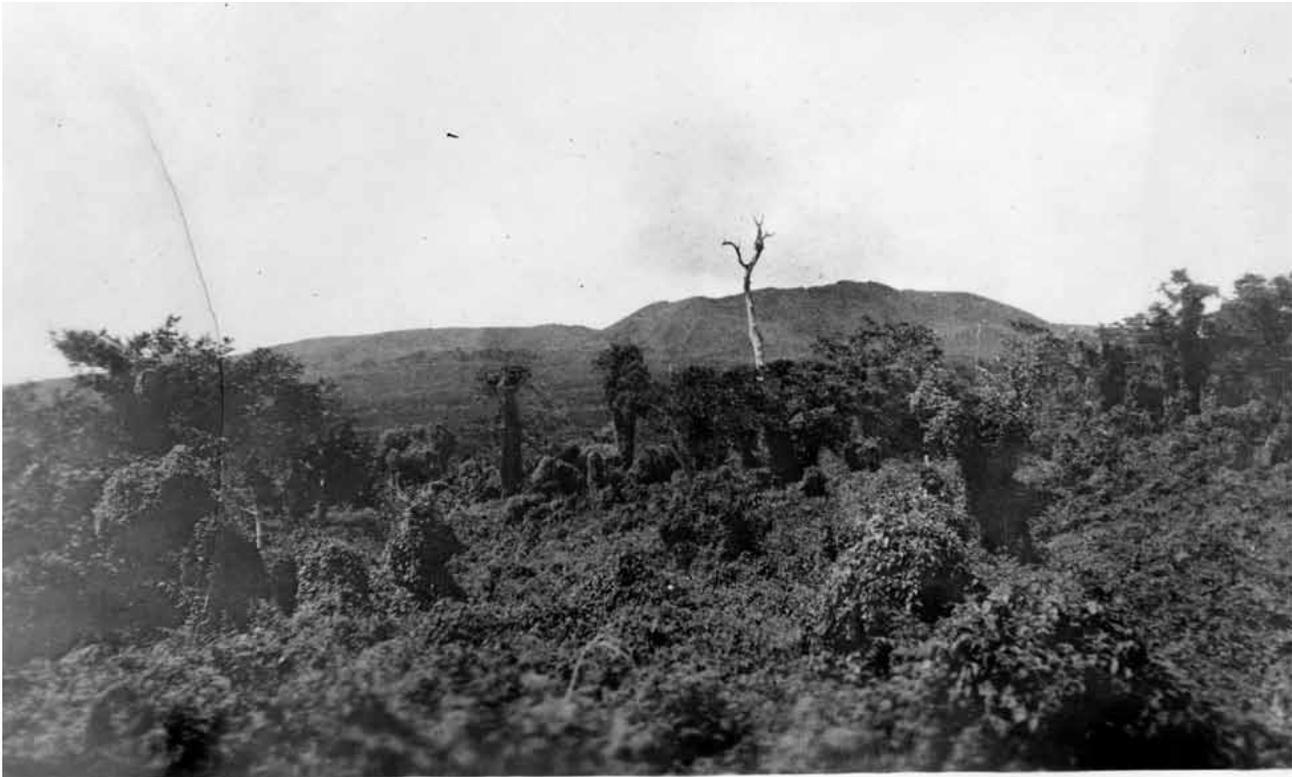
Tuesday, May 13, 1924.

All day field trip to 1905 crater (Chart Page [112]). Up trail to 1400' and due E, coming out to NW. on lava flow just S. of where it falls over the bench.

Climbed crater and walked around rim to highest point, which is on SW side. Caught several *Lycaenid* "blue" butterflies on very lip of crater.

Walked around the south side of the crater and slid down a long talis slope on west wall. Slid fully 200 feet amid cinders and small lava clinkers, to bottom. One place on south wall about 50 feet below rim had a small jet of steam issuing from it, apparently from a series of cracks in the wall.

The entire interior (except the talis slopes and slides) is covered thickly with moss and ferns, the latter even growing in places on the talis. The deepest spot in the crater is toward the feet of the south wall at the bottom of the talis slope I slid down. The air is cool, a good breeze being focused into the



Roll 46:6 The 1905 crater looking S.E. across area of stunted vegetation.

crater. Cold water drops in places, from the sides, especially on the W. wall, giving rise to luxuriant pockets of ferns, grass and weeds. The insect life is not abundant: a number of gnats and small flies, microlepidoptera, ants, small white leafhoppers, spiders, etc.

Lava is brick red and purple black (slag). Distinct smell of sulphur about N. end, where is situated the hole. This is about 18 to 20 feet in diameter and 25 feet deep, and seems to be a caved in portion of a lava tube. Climbed down into it. The walls drip water and are coated with a thick deposit of sulphur. Collected a sample of the crystal flakes.

Walked down to place where lava "falls" some 200' or more over a low "bench." The lava in this direction is mostly rough aa and the walking is very difficult. Back to camp over the same trail followed (made) in the morning.

May 14, 1924. Wednesday.

Packed up. Collected about camp (1275'), catching several wasps, and another swallowtail butterfly feeding on hibiscus bushes.

Down to Safune. Stopped in at store and copied the typewritten sheet called "Genealogy of Safune" which was compiled by Mr. O. F. Nelson.

Called on Flahertys and met Major Hawkins, a very pleasant ex-war officer interested in photography and natural history.

Letter from Gov. Richardson thanking me for the Bishop Museum publications which I presented to him and stating that they would be placed in a local museum soon to be established at Mulinu'u.

On board schooner and put away specimens and pressed plants.



Roll 47:1 Looking N. by E. into crater from highest point, on S.W. side.

“GENEALOGY OF SAFUNE”

[Compiled by O.F. Nelson]

“Lealali took to wife one Malelega Savaii, daughter of Seve of Safotu, and had issue Tupaiilelei, etc. Tuitoga, King of Toga, took to wife daughter of Tuifiti and had issue Laufafa-i-Toga, girl.

“Laufafa-i-Toga came to Samoa on hearing of the wonderful men Tupauulelei, but on arrival in Samoa she found Tupauulelei was not as handsome as he was reported to be; so she accepted the hand of his brother, Tupainatuna.

“When Laufafa-i-Toga was with child she asked her husband to take her back to Toga for her confinement. On the way to Toga they struck a gale and the boat passed Toga and ultimately landed in Fiji, and when the child was born, the boy was named Vassiliifiti, the boat overreached her destination to Fiji.

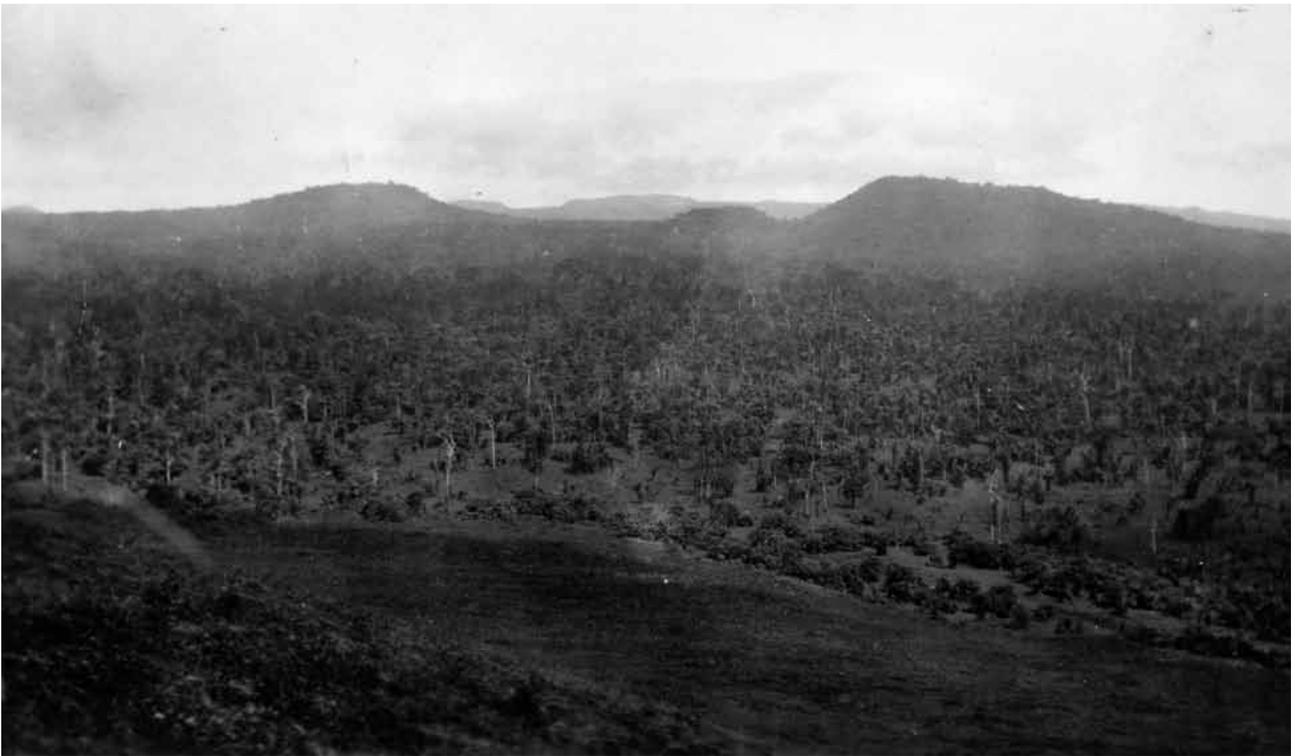
“When she was with child again, Tupainatuna requested her to go to Samoa with him. She gave birth to a girl just as they sighted Samoa, hence the name of the girl, Samoauafotu. They landed in Tupainatuna’s grandfather’s place and called the name Safotu, named after the little child. The girl’s name was shortened to Fotu and she lived in Safotu with her great grandfather and her parents. Her brother Vaasiliifiti took up his residence in Taoa, so as to be near his sister. Vaasiliifiti took to wife two women of

Upolu named Feenaga and Feata. Both women had a son on the arrival of whom Vaasiliifiti went back to Savaii with his two wives and two sons. On the way down they found the kernel of a breadfruit, which in Samoa is called Fune; so one of the women - Feata - named her son after this Fune. In the progress of their journey they caught a stingaree, with the skin of which they made a sail for their boat, hence the name of the other son, Laifai, which means “a sail made from the skin a stingaree.”

“The village of Taoa became Safune after Fune the founder, and Laifai’s connections with the other districts of Savaii, founding most of the villages in Savaii, hence the name Salafai, being the official name of Savaii among the natives. Fune waxed strong and conquered the whole of Savaii, on completion of which he established seats of government in each of the districts. These seats are now the principal Fale-Safunes in Vaisala, Sili, and Vaiafai, which with the original Safune-i-Taao, make the four Fale Safune.



Roll 47:2 Looking S.W. from same spot toward central high plateau of Savaii. The high peak on the right is the large crater visited May 9.



Roll 47:3 Looking down on the hole from a ledge, 40'-50' above it.



Roll 47:5 Looking N.N.E. across mouth of small crater and main position of the lava flow, toward the sea.

“The claim by Vaifai that they are the original Safune will have to be proved by some connection with the founders. The fact that Safotu on the N. coast of Savaii retains the original name and three miles away is the original village of Safune founded by Fotu’s nephew is sufficient proof that Safune-i-Taooa is where Fune lived in the original seat of his government of Savaii.

“Fune courted a girl Sunalaua of Falelima and the girl loved Fune. Tagalooa-Lagi the spiritual king of Samoa, also wanted Sunalaua and begged Fune to retire and give the girl up to him, in return for which he would confer upon Fune his title and rights of Tagalog-Lagi. This is the origin of the Tagalooa title now in dispute by the Fale Safune, so if Safune-i-Taooa was the original home of Fune, it has the first say in the title of Tagalooa.”

Thursday, May 15, 1924. Ashore 7:30.

Field trip across lava flow of 1750 to Aopo. Took road W. along beach from Safune. Noted two apparent varieties of breadfruit growing about the villages: one with deeply serrated leaves and nearly spherical fruit; the other with about 2 or 3 “teeth” near tip on each side, leaving basal part entire, and with long-ovate fruit. Road follows beach as far as Sasina, being lined with leguminous plants (No. 143) and roadside weeds, with a stretch of marsh, filled with sedge. Then it heads inland, running W by S to W.S.W. and soon becomes only a trail. Passes thru coconut plantations and small patches of cocoa and bananas. Then thru the lower forest - consisting principally of fuafua, noni, kukui, wild oranges and the usual lowland plants.

Letui consists of a dozen native houses, lime church and one frame house.

A short distance beyond Letui the ground becomes decidedly rougher with numerous lava rocks and boulders. Then one merges upon the old lava flow, and finds an entirely different type of growth.



Roll 47:6 The little native hut we occupied in the taro patch. (for 12 days).

The tall overhanging trees cease abruptly and their place is taken by a low, open scrub about 12 to 15 feet high. The following plants were noted, the numbers referring to plant field numbers.

Fuafua (100), *Morinda citrifolia* (noni = nogu), 139, filimoku (97), 140, 142, Mamala (specimen from Tutuila with chordate leaf and spike of small white flowers), the leguminous shrub or small tree seen in the lowlands (143), another leguminous shrub (145), 144, 146, 147, 148, 149, 150, Osmanthus, the “rose-bud” tree collected on Tutuila, Kou (*Cordia subcordata*); lavender flowered, small arrow-head shaped leaved morning glory (151), epiphytic plant 137, a clinging vine with large potato shaped fruit, Pandanus.

Beneath is a more or less thick undergrowth of breast-high ferns (152) ki (*Cordyline terminalis*), “maile” fern (lau ka), sida, mau kofu (167), fua sega vine (95), dodder-like orange leafless parasite, and numerous weeds and grasses (all the kinds noted in Savaii), including a prostrate matt grass.

The ground rises and falls in gentle undulations. Underfoot are broken lava rocks of all sizes and in places south surfaced areas with radiating cracks.

Mr. Stahlin, trader in Salailua, tells me that when he first crossed this flow, about 15 years ago, that it was about waist high with vegetation, and that one could see from the upper slopes to the sea without an interruption. Some eight years ago he again had occasion to cross the flow and noted that the plants had grown and were as high as his head. He further commented upon the fact that there seems to be a distinct difference between the plants on the lava field and those in adjacent old regions. This last I can account for. The plants and trees are a mixture of lowland and rainforest species, the undergrowth being lowland, because of the xyrophytic conditions; the trees both lowland and rainforest. In the rainforest as also in the lowlands, the trees are tall and one seldom sees them in fruit and flower. Here on the flow the trees are stunted or young and the inflorescence and fruit which are high out of sight in the forest are displayed a few feet above one’s head. It is a botanist’s paradise, for one need not exert oneself in reaching the fruit and flowers.



Roll 48:1 An open place on the lava field, looking S. toward Mauga silisili and the main mountain mass. In the foreground are the low scrub of the flow and the higher forest of kipuka which surrounds Aopo. Note lava stream on face of mountain.

There are several notable kipukas or small forested areas left by the flow: one about 1/2 mile in from E. side on trail; another, moist and luxuriant, one a mile further on trail and then the large one a couple miles in diameter, in which is situated the village of Aopo. It is interesting to note how the soil character controls the vegetation and it in time controls the moisture and climate. The flow surface is hot, dry, xyrophytic. The moment one steps within the arched trees of a kipuka the atmosphere becomes cool and moist, the rocks underfoot mossy and wet, the undergrowth luxuriant and the trees tall and moss hung.

Aopo is a small but clean little village of a dozen houses. Water is caught on a galvanized iron roof and stored in a tank.

I had lunch with a native family, exchanging my can of beans for a large well cooked tarp and a couple hardtack for a refreshing coconut.

Back to Safune picking up the plant specimens marked on way over. Aboard schooner and spent entire evening pressing plant specimens. Underway at 7:30, sailing W.

Insects not abundant on lava flow, but species found closely associated to vegetation, with addition of certain xyrophytic living forms.

Friday, May 16, 1924

Off Felialupe Bay at daybreak. We were going to stop; but harbor too rough with heavy swell. S.E. along S.W. coast. Heavy surf piles in on Auto (Oouto) point with spouting horns sending jets of water and spray as high to twice as high as the 40-50' cliff face. Anasta hill (490') is a tree covered isolated mass, rising gradually on the W. from Auto (Oouto) point, steeply on S.W. and running in a ridge S.E. to a small knob N.E. of Alelai Point. The people of Neiatsu just beyond this point are reputed to be the best singers of all Samoa. The people of all this region on the W. end of Savaii are said

to use the purest form of the Samoan language now spoken; many places having discarded the t for k and the ng for n.

Spent morning putting away specimens, cutting more cotton for cigar box insect storage and plotting peaks on field copy of N.Z. (also N.G.) map of Savaii from U.S. Hyd. Chart 2921.

Anchored at Salailua at 9:30. Ashore by 10:30. Took trail leading up to taro patches and spring, elevation 1100'. It runs NE to NNE thru quite a little area of coconut, cocoa and bananas. The region seems quite a lot moister than N. side, which agrees with statements of residents.

Saw a number of blue-green and black and the russet-brown butterflies hovering about a composite weed, lau taetoti (No. 153).

Up thru an extensive native taro patch. When the natives asked me where I was going I gave them the Hawaiian word "puna" which turned out to be the same in Samoan - "puga." Above the taro patches one enters a fairly luxuriant rainforest with tree ferns, moss festooned trees and Freycinetia instead of "fua sega" vine. It is as luxuriant at 1000' as on N. slope at 2500'. Occasional open spaces with vines and grass, but not dominated by the white flowered fua sega.

The spring is a large stream of cold water (about 150 to 200 miners inches) coming out of the side of a hill, probably from a lava tube or other subterranean channel. It runs a few rods and disappears again.

Fell in with some natives gathering oranges from a tree near the spring and obtained the following native plant names:-

mami - large shrub (No. 154) with large sessile brown fruits.

uunu - tall lobelia like arborescent plants with white flowered "drumsticks" and large acuminate leaves.

pauono - Freycinetia ("ieie") vine.

pisupo - generic name for large fern.

lau pata - the large leaved, spreading tree (No. 141).

fue - vine with chordate leaves and white trumpet-shaped flower.

moa - small prostrate herb on ground, with violet-shaped leaves, orange berry and white star-shaped flower (No. 117).

mamala - tree with the thin chordate leaves, spike of white flowers and small heart-shaped fruit which grows into plum-shaped drupes. (Specimen taken in Tutuila).

leaoa - the huge banyan, Ficus — with prop roots covering an area 25' in dia.

ago - (in Toga - agoago) the herb with the red "drumstick", squashy stalked fruit and grass or lily-like leaves. (Common in Hawaii) called "ginger."

vi - large tree, green fruit, small lanceolate leaf.

Landshells are called akiai.

Back to Salailua. Met Mr. Jenson and wife, part white, trader, who have their two little girls in St. Andrews Priory - Honolulu. Also Mr. Ross white trader.

Returned to schooner, put away specimens, pressed plants and wrote up notes.

Saturday, May 17, 1924.

Sailors caught a huge shark 10 or 12 feet long, said to be the largest ever caught about Salailua. Had them save me the jaws for the Museum. All day strenuous field trip to high central plateau following trail which leads across to Aopo, nearly to summit.

Ashore at 7 A.M. W. along beach road past large castle-like residence occupied by Methodist Missionary. Road turns inland there being villages both on bench and beach 100 feet below.



Roll 48:3 Looking S.W. by S. down thru the native gardens in which are grown taro, bananas, sugar cane, pineapples, and a few coconuts, palms and cocoa trees.

Trail turns off just beyond (W. of) Foailuga church, running in general NNE.

Noted an interesting example of mimicry — small gray green moth flattened against mossy bark of a tree. Took the moth specimen.

Trail passes up thru a large taro patch, most extensive yet seen. From here “France” bears S.S.W. 1/2 W. Elevation about 900'-1000'.

Saw large swallow tail butterfly.

Above the gardens the trail traversed a vine covered open space, past another large Ficus banyan and entered the rainforest at about 1200'±. Here the climbing begins, up thru a damp forest where the moths disappear and numerous crickets - light brown and large and small dark fuscous, and quite a variety of small hym. and dipt. appear. Came out at about 2,000-2500', at a little clearing of banana trees containing a small leaky, banana thatched hut. Added more leaves to the roof and left my knapsack there while I hurried on to the summit, about 4500'-5000'. The trail was good all the way and continued on across summit high plateau. On return hurt my ankle and broke my shoe and had to limp back about 6 miles to Salailua.

In village - saw boys playing a native game. Five rows of five or six boys. A coconut is passed back in each row, both hands being employed to pass it over the head to the boy behind. The last boy runs to the head of the line with the nut etc.

They also play soccer extensively.

Late getting aboard. Feet sore, but a good days collecting of high elev. stuff.

Sunday, May 18, 1924.

Spent day aboard Schooner; mending clothes, scraping sharks jaws, writing up notes; copying some of the place-name and island data from MSS list prepared for Beck by W.S. Richmond etc.

Looked over Mr. Beck's pictures and picked out a few the Museum would like to have prints of. Read a MS. article on South Pacific by man interested in birds eyes, loaned Mr. Beck by Consul Roberts of Apia.

Finding that it would not be possible to ascend the high peaks, because of lack of time made the following rough observations with extant on heights of some of the principal peaks. The results do not check up very closely with the heights as given on the chart. It may be due to an error in method or because the positions given on the chart are not very accurate:-

$$\text{Formula} \\ \underline{h = d \tan \theta}$$

Peak	L. of Elev	Dist. Miles	Comp. Elev.	Given Elev.
Mauga silisili	8° 16'	8.3	6336'	6094'
Mt. Teelegi	7° 07'	9.0	5933'	5904'
Mt. Siope	7° 38'	8.3	5860'	5904'
Small group of peaks nearly due west of Salarlua Bay	6° 45' (average)	5.7	3520'	—
Summit reached yesterday	7° 48'	7.0	5068'	—

(See p. [126] for more elevations).

There seems to be some little discussion about the heights of the peaks. They vary in elevation from 5000 to 6000 feet for a maximum. The trouble is they are not accurately located and no one has tried other than the angle method apparently.

Mauga silisili is undoubtedly the highest. It is called "Papafu" locally (about Salailua).

Monday, May 19, 1924.

Ankles badly infected and walking painful. Ashore at 7 A.M. and up trail to spring. Collected very little on way up because of wet foliage. Elevation of spring 1100', distance about 3 miles.

Brown crickets with narrow white abdominal bands common. Small black flies and red-brown *Drosophila* flies abundant.

Collected quite a number of plants on return trip, mostly ferns.

Called on Mr. Stahlin, trader and representative of Nelson, and obtained permission to explore caves on his property. They are lava tubes.

Caught 4 brown butterflies of a number hovering about a *Tournefortia* tree on the beach, the first seen on Savaii.

Snakes called gata. "Darning needles"- Odonata - semu. Dragonflies - mataga.

Tuesday, May 20, 1924.

Spent early morning doctering ankles. Ashore with Mr. Beck at about 9:30 equipped to explore the lava tube caves. They consist of a network of lava tubes opening by several low entrances upon the face of the cliff which forms the beach referred to before. At the point where the tube emerges, the cliff is about 60 feet high and 150 yards from the beach. Crawled and walked about three branches, catching 21 bats (pe'a) and a young swift.

In afternoon walked down past Siutu in direction of Lataitai a mile or so. Then NE across country thru a moist lower forest to another trail which followed back to Siutu.

Had tea and a most enlightening conversation with a trader, Mr. Davidson, who leases the Latai district, raises copra and carries on a successful trading business with 2 stores.

Bought a small, slender, olive brown snake, caught by a native in the foothills near Salailua, paying 2 shillings.

Spent evening pressing plants, putting bats and snake in alcohol and formalin, and putting away insects.

May 21, 1924. Wednesday.

Ashore with blanket, mosq. net, equipment and three days provisions. Up Aopo trail from Foailuga to hut in banana patch. Caught among other specimens a large brown longicorn. Mr. Beck had come up here yesterday. Spent most of middle part of day in hut out of the rain. Collected on up trail in afternoon. Two large *Ac[h]atinella* landshells on Orange tree in banana patch at about 2200'. [Met] Mr. Beck and returned to hut. Mosquitoes not bad, but rats after our provisions.

Very good collecting at this elevation.

Thursday, May 22, 1924.

Put away yesterday's insects. Mr. Beck found pseudoscorpion. Up trail taking right hand fork, which climbs a little, but follows on and on to the ENE to NE by N. on about a contour. Collected several landshells. Black and white bracket fungus on large fallen tree trunk 5' in diam. Several spp. wasps and small flies. Small water hole with Hydrophilid beetles. Caught large green dragonfly. Dug several things from partly rotten bank of large tree:- centipedes, termites, sowbugs, tree cricket and moderately large slender fuscous Carabid.

On up trail about half a mile more, total of 3 1/2 or 4 miles from camp. Trail continued on E to NE at about same level, so returned. Large black red and white spotted caterpillar, light yellow-green below and fully 3" long, on leaves of tree No. 170.

Collected quite a number of ear and bracket fungi, on return, on logs, trees, etc. Back to banana patch hut.

Friday, May 23, 1924.

Helped Mr. Beck pack up. Put away large quantity of specimens collected yesterday. Collected about camp. Up to the orange tree and tried to find cause of decay on oranges, which sets in in certain spots before the fruit drops to the ground. Opened up several fruit in various stages of decay, finding two small translucent, dark headed maggots in one, directly under the "puncture." This "puncture" seems to be the point of entrance for the fungus rot, and appears to be caused by a fly. Have observed a blue, fuscous banded winged Trypetid or Ortalid about the woods, but not on the orange trees. Collected all the insects seen coming to the tree as follows:-

Brown nitidulid beetle, blue Lamparidae, green dolichopodid fly, brown drosophilids, slender black and gray Tachinid, blue slender abdomened Syrphid, dark green wasp, brown ichenumonid.

Correia and sailor came up. Started the sailor down with the camp outfit and Mr. Beck's bag and followed slowly collecting all the way. Carved up bark of rotten log - finding:- centipedes, worms, elongate, slender, black shortwinged beetle and its larvae, other larvae, sowbugs. Also scared up t[w]o crickets which got away.

Collected two lizards and bought another snake for 1 shilling.

Got back to Salailua just in time to see the finish of a "hookilau," which is called "faiva" in Samoan. The net consisted of long laines twined with coconut leaves. The fish were driven in as the net decreased in size - about 50' by 30' oval. Instead of drawing them up on the beach, the fish were driven into a large mat, weighted with stones. The sides were held out of the water and when the stones were removed the mat came to the surface with the fish. Catch exceedingly poor, consisting of two moderately large fish, a dozen small ones, two garpike and a few minnows.

The boys have a throwstick game called kia. The round slender sticks 2 1/2 to 3 1/2 feet long are thrown underhanded by means of a cord about 2 1/2' long, with a knot in the end.

Procured a common lowland large cosmopolitan centipede from a boy as a record from Savaii. They occur abundantly in lumber, trash and old houses.

On the schooner and worked until 11 P.M. pressing plants and putting away specimens.

There seems to be at least six species of lizards on Savaii:-

- (1). The small "pili"- olive green, brown striped; one sex with green tail same on Phoenix Is. etc
- (2). A larger, lighter olive gray green. Unstriped.
- (3). The large "mo'o" - a dark olive brown above, lighter beneath.
- (4). The very large black sp. found up coconut palms etc.
- (5). Small gecko.
- (6). Large chameleon gecko (?)

The snakes are brownish to olive green.

Underway at 7:30, around W. and Savaii to Safune.

Saturday, May 24, 1924.

Arrived Safune about 9 A.M. Spent early forenoon cleaning out locker, putting specimens in hold and doctoring ankle, which is rather badly infected. Spent rest of morning and afternoon writing up notes.

Made a series of sextant observations on elevations of higher peaks from ship. Ships bearings were:-

Point to W. -	W. by S.	<u>Magnetic</u>
Entrance to Safune lagoon	S. by E. 1/4 S.	<u>Magnetic</u>
1905 crater	S.E. by S.	Magnetic
Point to E.	N.E. 1/2 N.	"

(See page [122] for other sights).

Peak	Angles	Distance	Calc. h.	Known h.
1905 Crater (summit)	4° 24'	6.0 mi.	2438	2050
Crater climbed May 9	5° 27 1/2'	6.5 "	3280	—
Mauga Silisili	5° 56'	(8.6 mi.	4719)	
		(9.6 "	5268)	6000±
		(10.6 "	5817)	
Top of ridge S. by E.	5° 43'	8.6	4541	
Crater at head of white flow	5° 20'	(8.0	3943)	
(Parasite?)		(9.0	4435)	5400
		(10.0	4929)	

Left Safune about 6 P.M. Spent evening writing up notes. Found the shark's tooth had dropped from jaws. Preserved all teeth remaining and discarded jaws.

Sunday, May 25, 1924.

Heavy squalls during the night nearly carried our foremast away. Beating all day against strong headwind with engine going. Arrived Apia 6:15 P.M. 24 hrs. from Safune. Capt., Mr. & Mrs. Beck, and most of the crew ashore. Wrote letters.

Monday, May 26, 1924

Ashore at 8:15. Took two rolls films to be developed. Up to Apia Hospital and had legs treated and bandaged. Talked over Savaii insects with Dr. Buxton and Mr. Hopkins, the latter identifying the butterflies collected. Called at Survey Office and made suggestions for correcting N.Z. man of Savaii.

Field trip in afternoon with Dr. Buxton and Mr. Hopkins up road toward Malalololei. Spent most of time collecting eggs, larvae, pupae and adults of the semi-transparent brownish-black and white winged butterfly, *Acraea andromache*, from its host plant a passion flower vine (181). I collected the same behind Safune, May 2nd. To hospital to press specimens of the vine and fix the leaves in Carnoy's solution. (Acetic acid 10 cc., Absolute alcohol 60 cc. chloroform 30 cc.)

Dinner with Dr. & Mrs. Buxton, spending the evening looking over his books and journals. Buxton has written a lot on Palestine, Deserts and their relationship to faunas, etc. Returned to schooner at 10 P.M.

Tuesday, May 27, 1924.

Finished letters to Dr. Ball, etc. Ashore at 8 A.M. Called in at Survey Office to show them U.S. Hyd. Off. Maps of Upolu & Savaii, which they had not previously seen. Up to Apia Hospital for dressing and treatment on legs. Called in at office of Agricultural Department and was entertained and shown collections by Mr. L. Lewis, Mr. Richie being out.

Found the following identified insect species in cabinets:-

Odynerus bizonatis Bois.
Evania impressa Sdolott.
Taniseus [?] *samoansis* Kohl. (Ichneumonid).
Pison perplexum Sn.
Lithargus albofasciatum Sichel.
Rhynchuin rufipes F.
Polyzosteria nitida Brunn. (Black wingless roach).
Periplaneta americana (common large brown roach).
Levuana iridesens (coconut moth in Fiji - not in Samoa).
Stenodontes insularis (very large, brown, longicorn).
Graeffea cocophaga (small phasmid).
Polistes hebraeus (the Vespid).
Menohammus fuscata Montr. *argutus* Pasc. (Det. K.M. Heller)
Cresium noculatiolle Blamb.
Oxycetonia verricolor Fab.
Adoretus vestitus Boh.
Priochimus fremicollei Li Guth. (the elongate, black, shortwinged beetle).
Acicnemis foreicallis M. (small gray weevil)
Xylothrips religiosus Bsd. (Boustrichid)
Trogosita maurita Mead. (flat brown beetle).
Necrobia rufipes Fah.
Aphodius lividus Al.
Ceresuin unicolor Fab.
Pyrrhocoris optera

Then looked over herbarium of plant specimens, numbering about 120 sheets in fairly poor condition. Most were identified and bore the native names.

<u>Identified Plants</u> in Herbarium	(Native name)
Cerbeia lactoria	(lava)
Cauna indica	(fanamanu)
Abrus praecatorius “Paternoster pea”	(matamatamoso)
Hibiscus rosa sinensis	(aute)
Garcinia mangostana “Mangosteen”	
Fuesina	
Parinarium laurinum	(ifiifi)
Ficus tinctoria	(matifonua)
Comelina sp.	(ma’ untoga)
Portulaca quadrifolia L.	(ufiatuli or tamale)
Kleinhaffia hospita	(fuafua)
Acolypha insulana var.	(pupuiono)
Alyxia bracteolora	(kamaile)
Flacourtia ruckam	(filimoto)
Mimosa pudica L.	(la’u aufefe)
Pteris sp.	(vactuanui)
_____	(la’ aumagoso) “Poison”
Poinciana regia “Flamboyant”	—
Humulus — “Fuesaina”?	— (climbing vine)
Tamarindus indica	—
Psidium guayava “Guava”	(kuava)
Abizzia sp.?	
Morinda citrifolia	(nonu)
Canauga odorata	(mosoai)
Cucurbita lagenaria	(fagufagu)
Lonicera xylosternium “Woodbine”	(teiula)
_____ [tree from Tonga]	(mapa)
Arum esculentum L.	(talo pulepule)
Bougainvillia speciosa	—
Albizzia abipulata	—
Amorphophallus campanulatus	(teve) “Poison”
Bixa arellana “Orleans tree	(loa) [with hairy capsule]
Parinarium insularum	(seapapalagi)
Calophyllum inophyllum	(fetau)
Ipomoea pescapri	(fuefue or fuesaga)
Casuarina equisetifolia	—
Cordyline terminalis	(Ti or ti fanua)
Passiflora sp.	(pasio) [Caterpillar]
Piper methisticum	(‘ava)
Eugenia malaccensis	(nonufiafia)
Erythrina indica L.	(‘alo’alo or gatea)
Mangifera indica	(mango)

<i>Croton tiglium</i> (?)	—	
<i>Fragraea berteriana</i> (?)	(puafua)	
<i>Cerbera lactania</i>	(leva)	
<i>Schizostachyum glaucifolium</i>	(ofe)	[bamboo]
<i>Cyprus</i> sp.	(lauselesele)	
<i>Aleurites moluccana</i> L.	(lama)	
<i>Portulaca</i> sp.	(tamale papalagi)	
<i>Sida rhombifolia</i> L.	(tea pua'a)	
<i>Hibiscus tiliaceus</i>	(fau)	
<i>Acrosticium areum</i>	(la'au sa'uto)	
<i>Capsicum annuum</i>	(polo)	
<i>Coix lacerina</i> [Jobe's tears]	(sanasana)	
<i>Arum esculentum</i> L.	(talo)	
<i>Barringtonia samoensis</i>	(falaga)	
<i>Manihot utilissima</i>	(masoā)	manxihot
<i>Rhynchospora aurea</i>	(utu'utu)	
<i>Urticaria endernalis</i> Munro.	(ogōgo mūmū)	red nettle
<i>Urticaria endernalis</i> Munro.	(ogōgo)	white nettle
<i>Loranthus insularum</i>	(tapuna)	
<i>Ceiba pentandea</i> or <i>Eriodendron anfractuosum</i>	(vavae)	“Kapok”
<i>Commelina nudiflora</i>	(na'u utoga)	
<i>Pontideria rotundifolia</i>	(lili)	“Beautiful pest”
<i>Caladium bicolor</i>	—	
<i>Calocasia indica</i>	(ta'a nūi) or 'ami?	
<i>Terminalia cappata</i> L.	(talic)	
<i>Rhizophora mucronata</i> L.	(togo)	mangrove
<i>Gymnogramme tortarica</i>	(lau āutā)	
“Esclapia”	(vaolele)	
<i>Urena lobata</i>	(mautofu)	
<i>Datura suavealens</i>	(tagamuni)	[vine on 1750 flow with purple flowers]
<i>Bruchiotus feddei</i>	(Olasina)	
<i>Adenathera excelsa</i>	(toi)	
<i>Myristica hypargyrea</i>	(atone)	“wild nutmeg”
<i>Bischofia trifoliata</i>	(‘o'a)	

Copied the following from a list by S.H. Forsew, Manager of Vaitele Plantation, describing a collection of Samoan woods:-

1. Talie - (*Terminalia cattapa*) here and there along coast; slow growing, but reaches great size. Smaller talus grown inland in the bush. Fruit almond-like and palatable.
2. Teak - Not indigenous to Samoa. Used for cart poles.
3. Tava - Large slow growing forest tree, up to 12' in girth, edible, almond-like kernel.
4. Poumuli - (*Phalera*) Used in house building.
5. Oa - (*Bischofia trifoliata*-fam. *Euphorbiaceae*) Slow growing, reddish dye from bark
6. Tamanu - (*Calophyllum spectolile*) *Guttiferae*. Slow growing, large, 6' girth, common, used for canoes, paddles

7. Ulu - Breadfruit. (*Artocarpus incica*, Noraceae). 9 different var. in Samoa. Edible fruit. Canoe wood. Roots used for medicine.
8. Atone - (*Myristica hypargyreia*, Myristiceae). Wild nutmeg. Common small tree used for carrying sticks, posts etc.
9. Mamala - (*Dysoxylon albiaceum*, Meliaceae). Large common.
10. Mamalava - Tall, common, used for oars, paddles.
11. Tilimoto - (*Eugenia* sp. Myrtaceae). Slow growing, small, hardwood, common, cherry-like fruit.
12. Fau - (*Hibiscus tiliacens*, Malvaceae), hard, fenceposts, because of bent shapes, boat keels and ox yokes.
13. Moscoi - (*Cananga odorata*) Annonaceae. Tall, straight, 50-60'. Ylang ylang oil, scent oil for coconut oil
14. Fuafua - (*Kleinhavia hospital*, Stenulaceae). Common, good size but large trees often hollow.
15. Milo - (*Thespesia populnea*) Indian tulip tree. Small, lowland or beaches.
16. Pipi - (*Hernandia morhrehoutiana*). Quick growing
17. Matimao - (*Ficus tinctoria*) Artocarpoideae. Quick growing, 30', contains coloring matter.
18. Niu - (*Cocos nucifera*) Coconut palm.
19. Tavia - (*Rhus taitensis*). Large forest tree, not common.
20. Aloalo - (*Premna taitensis*) Verbenaceae. Highlands only, hard.
21. Sausage. Very common hardwood, large tree.
22. Malili - Spreading, common, hardwood.
23. Lagaali - (*Aglaia edulus*, Meliaceae). Small tree, fragrant, flower used in scenting coconut oil.
24. Laufia - Quick growing, medium size.
25. Fagaia - Small, Quick growing, soft wood, bark used to be made into cloth.
26. Laupata-(*Macaranga herveyana*, Euphorbiaceae). Quick growing, large leaves, 30'-40', fairly hard wood, common in high lands.
27. Falaga-(*Barringtonia roseosa*, Myrtaceae). Large, slow growing, bears profusion of Fuchsia-like flowers which drop off. Common.
28. Afa - Good girth, low, slow growing, hard wood.
29. Gasu - Large, slow growth.
30. Ola or Olapito - (*Psychotria*) Small, slow growing, hard wood.
31. Naito - Red wood, slow growth, growing on W. Upolu and "Papa."
32. Ifilele (*Azelia biuga*). 60', quick growing, used in making kava bowls.
33. Taputoi - (*Spiraenthemus samoanse*) Canoniaceae. Slow growing, medium size.
34. Lama - Candle nut [*Kukui*] (*Aleuritis moluccano*). Fast growing 20'.
35. Olasina - (*Ploctronea* sp. Ruhraicae) Fair size, slow growth, hard, strong.

In afternoon collected among mangrove swamps to W. of Apia and visited the Apia Observatory, which is located at the end of the peninsula just W. of the city. Was most courteously entertained and shown about by the Assistant Director and Seismologist, Mr. C.J. Westland, the director Mr. Thompson, being away. In addition to regular meteorological work on temperature, rainfall, wind etc. the observatory is carrying on a very large program of Seismological and Magnetic observation, and high elevation balloon experiments. I was shown accurate battery of clocks and chronometers which furnish time for Western Samoa; the 2" transit; vertical and horizontal seismographs, magnetic instruments and theodolite, and a Turtfer variometer; and an apparatus for measuring air-earth induction.

Again called at Survey Office to get loaned maps. Aboard schooner. Pressed plant specimens. Wrote letters.



Roll 48: 5 Dr. Buxton and Mr. Hopkins in their laboratory.

Wed. May 28, 1924.

Final trip to hospital. Iodoform, Bismuth, Parafine dressing. Cost of three visits, treatments, bandaging, etc. 6 shillings (50¢ a visit).

Said goodbye to Dr. Buxton and Mr. Hopkins.

Returned to schooner, leaving two containers for Rhinoceros beetles and grubs (to be forwarded to Museum), with Mr. Lewis at Agricultural Department, on way.

Wrote final note to Dr. Ball. Underway at 5 P.M.

Thursday, May 29, 1924

Off Apolema I. at daylight, using the engine to pass thru the straight, because of light and uncertain wind.

Captain made observations at known spot south of the channel to correct chronometer and find sextant error.

Spent morning writing up notes to date and afternoon typing photograph data and drafting outline for "Preliminary Report on Samoa." Calm most of day. Good breeze with squalls in late afternoon. Variable winds and calm during the night.

Friday, May 30, 1924.

Bar. 8 A.M. 30.15.

Light breeze from N.N.W. Sea smooth, Savaii still in sight. Spent day making first draft and final copy of "Preliminary Report on Samoa." P.M. breeze changed to strong head wind. Forced to steer south. Squalls in late afternoon.

Noon position:- Lat. S. 14° 17'. Long. 172° 54' W. Log. 25. Bar. 30.06.

Saturday, May 31, 1924

Breeze from S.S.E. steady, sea fairly calm. Steering SW by W. Spent day writing first draft of popular article - "Impressions of Samoa." Sorted over plants and removed dry one from press. Listed specimens from Samoa to be sent to Museum.

Noon position: Lat. S. 14° 38'. Long. 173° 42' W. Log. 75. Bar. 30.06.

June 1, 1924. Sunday.

At Sea, en route Apia to Suva. Steering SW by W. before a light N.N.E. breeze. Spent morning reading and writing letters.

Noon position S. 15° 05', 175° 00' W. Throw overboard a H.O. "bottle paper" in sealed bottle, correctly made out except longitude, which, due to an error in calculation, was 30 miles too far east.

Spent afternoon plotting route of expedition, Pago Pago to date, on large British Admiralty Chart of Pacific.

At 3 P.M. lookout reported the three peaks of Niuafoou I. about 30 miles to S. by W. 3:30 P.M. sight gave S. 15° 07', 175° 09' W

Dredged for Plankton in evening. 6:15 to 7:45 P.M., log reading 59.5 to 61.0. Position about S. 15° 09', 175° 11' W. Lots of phosphorescence on surface. Noted especially in sample dredged small red transparent arthropod (?) 1 cm. long; spherical colorless transparent organisms, 3 to 5 mm. in diameter; Bluish thread-like organism; transparent, elongate, colorless spindle 1 1/2 cm. long. more or less pointed at ends.

Monday, June 2, 1924

Rained in early morning, which cleared off. Light variable wind with tropical showers. Spent morning wrapping up specimens and packing two boxes in hold.

Noon position: S. 15° 25', 175° 55' W.

Spent afternoon copying more island data from Richmond's MS on South Pacific Islands, prepared for Mr. Beck:- Line Island, Cook Islands, and those between.

Lost plankton drag overboard when dragging in evening

Niuafoou I., to which we approached within, about 15 miles this morning, is a huge volcanic cone 3 1/2 by 3 miles, rising steeply from the sea to a height of 588 feet. The entire interior of the crater is filled by a large lake, with hot springs, small cones and other signs of volcanism. George, the mate, who has been there several times, tells me that the shores are rocky, precipitous, with neither anchorage or good landing places.

The population number about 1200 to 1300 and although there is only rainwater to drink and for irrigation, bananas, taro and other native crops are extensively grown. There are three stores and other signs of prosperity. The island is visited frequently by cutters, schooners and small craft from Tonga, to which group it belongs.

There are numerous craters about the island, some of which were active in 1912 and before. A series of very severe eruptions occurred in 1853, 1856 and 1887.

We did not land, not having permission from Tonga to collect birds.

Tuesday, June 3, 1924.

Usual shower at about 4 A.M. Very calm. Ran engine most of the day to maintain headway. Curious colored cloud affect about sun in morning, at about 8 A.M. Spent morning copying more extracts from Richardson's MS and reading.

Noon position S. $15^{\circ} 58'$. $177^{\circ} 15'$ W. Bar. high, 30.11.

Clear and rather hot in afternoon. Read, looked over Quaritch catalogue of scientific books, and typed page of "Impressions of Samoa."

Calm, to light breeze from ENE or variable during night.

Wednesday, June 4, 1924.

Heavy shower between 4 and 5 A.M. accompanied by sharp squall. Smooth during morning with light breeze. Spent morning comparing Polynesian and Fijian dialects as tabulated in British Pacific Islands Pilot II, [a very similar table appears in our H.O. Pacific Isl. Pilot].

Noon position S. $16^{\circ} 11'$, $175^{\circ} 27'$ W. 230 miles from Suva, 48 from light.

Spent afternoon typing Capt. Stenbeck's poem on "Jaws" and more "Impressions of Samoa." Good breeze sprang up from NNE sending us along at 4 to 5 knots. Sighted Wailangilala light at 6:40, 2-3 points off port bow. Light about 18 miles SSW. at 8 P.M. and abeam at 10:

Good breeze continued all night.

Thursday, June 5, 1924. Strong wind sending us along at over 7 knots thru the Koro Sea. Squalls and cloud all around. All hands double reefed mainsail and foresail. Sighted Koro Island thru mist about 10 miles to N.W. at 9:15 A.M. Made 81 miles since 10 P.M. last night; 94 miles to Suva, at 9:45 A.M. Spent morning trying to copy from Richmond MS. So rough had to stop. Looked over Fiji charts.

Made fine headway thru Koro Sea, passing between Mbatiki I. and the lighthouse at 2 P.M. Calmer in afternoon and was able to copy Tuamotu place names from Richmond MS. Sighted Nasilai Reef light at 7 P.M. Good breeze continued although sea has gone down.

Friday, June 6, 1924. Omitted and discarded because we are west of the 180^{th} meridian.

Saturday, June 7, 1924.

Anchored Suva Harbor 1:30 A.M. Bottle of concentrated formaline which spilled on my legs during yesterdays rough sea set going the old infection.

After visit from Doctor, ashore, where Mr. Beck (who had come down on the Tofua with Mrs. Beck) waited to greet us. Up town to find Mr. Simmonds, government entomologist. Unable to locate him, but very nicely entertained by Mr. J. Probert, health inspector, who carried me all around town in his sidecar-Harley-Davidson, looking for Simmonds and finally took me for a spin in the country, out toward Rewa. The roads are very good. The lowland is for the most part grassland with scattered clumps of trees. We rode down past the Carnegie library, Government Bldgs, Fiji Museum, botanic gardens, and race course, around the coast line for a few miles and then back over the hills to Suva.

Visited the Carnegie Library, where I obtained a borrowing permit by depositing 10 shillings. Borrowed Darwin's "Voyage Around the World" and Sir John Lubbock's "Origin and Metamorphosis of Insects" to read over Sunday. Also found a copy of Seeman's "Flora Vitiensis" in Reference Department. A very fair library.

Returned to "France" for lunch. Watched five good games of Rugby in afternoon. They play on a large well kept grass field, owned by the city and rented to the clubs. Two of the games were between white teams with fast, fair teamwork. The other three were by native Fijian teams, equally fast, but without the teamwork. Plenty of noise from the Fijian sidelines.

To dinner with Mr. & Mrs. Beck at the Pier Hotel, where they are staying. To the library in the evening. Back to "France."

Sunday, June 8, 1924.

Quiet day. The "France" tied up to the end of the government pier after the departure of the government yacht "Pioneer." Spent the day reading and talking with some of the numerous visitors, including Mr. Hunt, postage stamp enthusiast, who offered advice and assistance. Evening to Anglican Church - broadminded address by the Bishop.

Monday, June 9, 1924. Holiday, celebrating King George's birthday (June 3).

Field trip, alone, around edge of Suva Bay to N. and W. Along a very good road, built up, with mangrove thickets on one, and in some places on both sides. Derth of insect specimens. Caught Sarcophagid on Mangrove. These are covered by lots of striped or mottled gray and brown snails - (more sea than land shells,) although they much resemble the latter.

In places there was an abrupt rise on bluff on the right, covered with the familiar Lantana and the "fua saga" vine of Samoa which is here called "mile-a-minute" and identified as *Mikania scandens*. Saw large monkey-pod (?) trees and another pinnate leaved dark green leguminous tree (No. 197), with thin flat, light green pods; "Koa haole" (of Hawaii) [*Leucaena glauca* Benth.] "Kamani" [*Barringtonia speciosa* Linn.]; and bamboo.

There seems to be two species of mangroves. One, the kind collected at Apia, with large pinkish flowers, here has a larger "projectile" and grows to a height of 30 to 40 feet. It is probably *Rhizophora mucronata* Lam. Called "Dogo" and having a blood red sap used by the natives to dye their hair. (No. 195). The other, which is the more common, is lower, but with large prop roots. The flowers have 4 thickened, yellow-green sepals, and 4 white hairy petals; the "projectile" like fruit comes out from a brown based portion in a curve and reaches a mature length of 8 to 12 inches, (No. 196), probably *Bruguiera Rheedii* Blume. Another tree common in the mangrove swamps (No. 198) has a near umbel of bright red torch-shaped flowers and little vase shaped fruit.

The principal roadside weeds are:-Verbena (same as Hawaii) sensitive plant [*Mimosa pudica* Linn.] various spp. of grasses, ferns, lantana, and a coarse, Solanum-like shrub [No. 191]. Also saw bananas, sugar cane, "ki" [*Cordyline terminalis*], hibiscus, breadfruit, coconut, tree ferns, and a *Dracaena*, (ki-like-plant) with green and red-purple, variegated leaves.

Walking along the road encountered "hau" trees [*Cordia subcordia*], tall plume grass (No. 190); and the low shrub with a 4-petaled yellow flower, linear lanceolate leaves, same as collected at Puka Puka and Fakaofu.

Occasional small patches of taro. Large morning glory vine with blue and white flowers; vine with large heart-shaped leaves; beautiful red flowering cannas [*Canna indica*]; *Ipomoea pes-capri*, with lavender-purplish flowers; large shrub *Cassia* with yellow flowers, (frequent in Hawaii lowlands); Pandanus; mango; tall, large linear leaved, liliaceous herb with large crimson spike (a ginger ?); orange; guava; erect herb resembling cassava, with five to seven digitate leaves (also in Samoa); pineapple; Cacao; red pepper; large tree with thick ovate leaves and reniform, flat pods about 6 x 2 1/2 inches; triangular stemmed rush (?) with tassle; rugose, hirsute leaved shrub, "Kosters curse", [*Clidemia hirta*] (No. 187), with white flowers and small, hairy indigo-blue fruit.

Insects along here included:- large orange Vespid [*Polistes hebales*] large green Dolichopodidae; huge grasshoppers; day mosquitoes (*Aedes pseudoscutellaris*); small brown and white butterfly with black spots.

Further on:- tree with moderately large, leathery leaves, compound raceme of small white flowers, and ovate green to gray-brown fruit. Very small leafed, low herb with terminal spikes of minute white flowers (No. 184); herbaceous shrub with 3 lobed subcordate leaves, pink to old rose flowers and small, 5-locular capsules, (No. 194); mile fern; small tree with alternate leaves in one plane, axillary, compressed spikes, 4-5" long, and jointed stem, probably a Piper (No. 186); papaya trees; small slender herb with pairs of opposite, small linear lanceolate leaves, and axillary sessile heads of very small white flowers.

Passed the quarry (about 5 miles from Suva), opposite of which are two luxuriantly green islands. The enclosed bay is what is known as the Suva "Hurricane Harbor." On the right of the road, which is here under construction, is a bluff, with ki, tree ferns and several interesting looking spp. of trees and shrubs. Walked a few hundred yards further to the end of the road, at which point a much overgrown, muddy path begins. Here saw a shrub with dense, compound raceme of star-shaped white flowers, with five slender petals and slender, conical, truncated fruit (No. 185). Took specimens of small hermit crab on damp bank. Stag-horn fern; prostrate legume-resembling very small clover, with small purple flower (shaped like a canoe with sloping sail), and small brown pod, white pubescent on stem, leaf and sepals (No. 183).

Collected several small Hymenoptera on a yellow flowered composite (No. 188), including bees, Polistes, black and yellow wasp.

Returned to ship, picking up specimens of the plants noted on way out which were in fruit and flower. Also noted a leguminous vine on mangroves with a large lima-bean-like pod; and another large leaved vine with bright pink blossoms.

While pressing the plants had the pleasure of meeting Mr. A.E. Ward, Artist, who gave me some interesting information about the plants and other subjects:-

No. 187 he identified as Köster's Curse and told me the following anecdote about how it got its name: "It was introduced as a garden plant by a Mr. Parr. It later escaped and became a great pest because of its ability to spread rapidly. Someone asked the son of Mr. Köster, a neighbor of Parr's who it was who had introduced the plant. Young Köster replied "Parr." Thinking he had said "pa", the misinformation became fixed that Köster had introduced it and despite Koster's efforts to correct the mistake it has been known as "Köster's Curse.""

Upon seeing a specimen of Hibiscus tiliacius, Mr. Ward said that a factory was started to make wood pulp from the soft wood, but was later abandoned. The fiber of this plant (which in Viti is called "Vau") is most useful, being 6 to 7 feet in length and very strong.

Mr. Ward (and everyone else) calls the island of Kadavu the "collectors paradise."

Tuesday, June 10, 1924.

Called on Mr. Probert, medical inspector, who took me up to Department of Agriculture and introduced me to Mr. H. S. Simmonds, Government Entomologist. He placed his office, desk, books, notes and the Department collection of insects at my disposal for the length of my stay in Fiji. Introduced to the Chief of the Department of Agriculture, Mr. A. Despeissis, a very pleasant Frenchman. He gave me a life history box of the coconut moth - Levuana iridescens.

Spent morning at Entomologist's office and returned after lunch. Their collection is by no means complete. Many of Jepson's specimens have gone bad before ravages of dermestids, psocids and mold. Simmonds has gotten together a few thousand specimens, many of which have been identified by the British Museum. These he has arranged in two cabinets and a number of glass topped boxes.

Each species is numbered and a register supplies the name and locality data, together with notes on economic importance. Two small boxes are specially arranged with economic insects of coconuts and cotton.

To tea with Mr. Simmonds, meeting Mrs. Simmonds. In addition to being a very competent entomologist, Simmonds is an amateur horticulturist and an artist of some ability. His paintings of South African plants and Fijian insects are really very good.

Stopped in at Y.M.C.A. Very fair equipment. Well frequented by sailors and others. Was told that the membership was very small (20 or so) and that the institution was rather at low ebb.

Wednesday, June 11, 1924.

Spent whole day at Department of Agriculture. Mr. Simmonds away on a field trip, but made use of his desk, books and notes and went thru the Coleoptera and half the Hymenoptera of the collection, writing out a check list of the species-the name, number (for reference) and a few notes of description and on economic importance.

Called on the Government printer, Mr. Sebastian Bach and purchased a copy of Hazelwood's Fijian Dictionary for 7/6 (regular store price is 10/-). He presented me with copies of two pamphlets about Fiji, some maps etc. and promised copies of other available publications.

To Carnegie library and made notes on Fijian plants from Seeman's Flora Vitiensis. Caught a few specimens - including Adoretus beetle and some Tipulidae on lighted shop window, while waiting for library to open.

Thursday, June 12, 1924.

Up to colonial Hospital to have ankles dressed. Hospital is a fine, large airy, concrete building on a hill just west of the city. It was opened by Gov. Cecil Rodwell, 1923 and dedicated "to the memory of the sons of Fiji who fell in the great war." It appears to be well equipped with a large staff of capable nurses and assistants. Dr. P. Harper, the resident physician is a very competent doctor.

Took films to be developed and got bill of lading for three boxes of natural history specimens (collected on Savaii).

In afternoon visited the Fiji Museum, housed in a small building near the Botanic Gardens and just S.W. of the Governor's Residence. The museum has only Ethnological specimens and curios, - such as coins, bank notes, old papers, and more recent relics of the great war. The collections of clubs, tapa beaters, wooden pillows etc. are extensive. The arrangement is not well thought out, there being a strange mixture of ancient Fiji artifices and modern war relics side by side. The only natural history specimens seem to be a few jars of snakes, fish and amphibian and a few sea shells.

Mr. George Wright, the curator, was most pleasant, showing me about. He spoke pleasantly of having met Stokes, Handy and others from the Bishop Museum who had been to the Fiji Museum in times past. He has been a resident of Fiji for nearly 50 years and is well informed on Fiji and its people. The only support of the Museum, except occasional donations, is a government grant of £350.

Spent rest of afternoon at library.

Evening attended a meeting at Y.M.C.A. which discussed whether the institution should continue to exist or not. The general opinion was that it was a great asset to Suva, but no one had any very definite plan for its perpetuation. The people of Suva, as a whole, to which there are a few notable exceptions, seem to lack the energy and enthusiasm of a corresponding American citizenship. Among the exceptions were Mr. Salmon, the Y.M.C.A. temporary Secretary and Mr. G.F. Grahame, the Mayor



Roll 48:6 The Colonial Hospital, Suva, taken from the Waimanu Road, looking S.W.

of Suva, who was chairman of the meeting. The latter walked back to the “France” with me after the meeting and gave me considerable information concerning the affairs of Suva and Fiji in general.

Friday, June 13, 1924.

Finished up letters and “Impressions of Samoa”. Spent morning at Department of Agriculture working over their collection. Returned in the afternoon after lunch. Makura arrived from Sydney at 2:45 and left at 8:30 taking three boxes of specimens, reports and letter to Honolulu. Late afternoon at Library. Evening writing notes.

Saturday, June 14, 1924.

After visit to hospital, called on Mr. Campbell, Plant Pathologist. He is newly appointed and lacks equipment and literature to handle the large job of combatting the numerous fungus and plant diseases of Fiji.

Cashed \$25. on letter of credit receiving £ 5-10-6.

Called on government printer, Mr. Sebastian Bach, who gave me a file of Agricultural Bulletins, a Fiji “Blue Book” for 1922 and some other publications, to be transmitted to the Museum if they lacked them.

Worked at Entomology room of Dept. of Agric, for rest of afternoon. Read Jepson’s “Report on Economic Entomology, 1911”, which is out of print and rare, there being but one or two copies in Fiji. Copied out notes and list of the principal insects mentioned.

Interviewed by Mr. McCreadie, assistant editor of the Times, and Herald.

Mr. Correia gave me a large tick which he found on his leg after a day in the woods.

Spent evening at Carnegie library, getting familiar with Fijian plants from Seeman's "Flora Vitiensis."

(Summary of Jepson's report copied elsewhere).

Sunday, June 15, 1924.

Finished reading Jepson's report in morning. Collected a few plant specimens and some insects by roadside on way back from hospital. Coccinellidae and grass hopper. Wrote Dr. Buxton. Typed descriptions of two Fiji mosquitoes, one of which (Aedes pseudoscutellaris Theobald) may occur in Hawaii, from Jepson's report.

To tea and spent evening at home of Mr. Bach, Government printer.

Monday, June 16, 1924.

Up to Colonial hospital. Met Mr. A.M. Lea, who had just returned from a field trip, (at Mr. Campbell's office). He is entomologist at the South Australian Museum, Adelaide. He is employed for a year by the Fiji government to find a parasite which will combat the Levuana iridescens, which is a pest on coconuts. I found him a very kindly man of about 55. Spent whole morning with him talking over Fiji and Australian insects. He has caught several species of weevil much resembling our Rhyncogonus and at least one species of Proterhinus in Fiji.

Mr. Lea is very anxious to get the Helms collection for the South Australian Museum. I agreed with him that they would be of more value in Australia than Hawaii, and also that the large collection of Hawaiian species of Blackburn, now in the S. Aust. Museum, would be of more value in Hawaii. Perhaps an exchange could be arranged, both parties keeping a few representative specimens for comparison.

Spent afternoon at Dept. of Agric. working over & listing the Hemiptera. Evening at Library.

Tuesday, June 17, 1924.

Rainy day. To Hospital. Spent day at Dept. of Agriculture working thru the Hemiptera and Orthoptera. Mr. Simmonds gave me a few duplicate specimens.

Called on Mr. Lea in his office on way back to "France". He loaned me a list of the identified Coleoptera in Mr. Vietch's collection. Spent evening making a copy of the list. (Copied elsewhere).

Met Mr. & Mrs. Roberts (plumber) and Mr. Vine (lawyer).

Rainy evening.

Wednesday, June 18, 1924.

To hospital. Returned list of Coleoptera to Mr. Lea. Spent day at Dept. of Agric. identifying some of the diptera. Tea with Mr. Simmonds. Evening at the library.

Thursday, June 19, 1924.

To Hospital. Spent day at Dept. of Agric. listing diptera and part of the Lepidoptera.

Gave a lecture on "Hawaii" at Y.M.C.A. in evening. Introduced by Mr. Poole, prominent labor leader and member of New Zealand Parliament. Very appreciative audience of 30 or so.

Friday, June 20, 1924.

Niagara arrived in early A.M. from Honolulu. Field trip with Mr. A.M. Lea to Colo-i-Suva (pronounced Thōlō-ē-Suva) on the new cross-island road, about 7 to 8 miles from Suva to north. There is a native village here, but we arranged to stay in a small frame house owned by Mr. Mewton.

The house is situated in the rainforest near the top of the ridge overlooking the Waimanu River, a tributary of the Rewa, which can be seen in the distance. Far away to the N.E. rises the island of Ovalau.

Got started from Suva at 11:45, and reaching the house at 1: Most of the lowland is open grass country with occasional scattered trees and some introduced guava and other shrubs. About 6 miles north of Suva one enters the rainforest. The trees range in height from 30 to 50 feet, dense in places and with a thick undergrowth and boggy holes or seeps. Conspicuous among the trees is a tall Casuarina (not "ironwood"). The road has been cut thru the forest, traversing a ridge and crossing a divide having an elevation of about 760 feet. A short distance beyond the summit is Colo-i-Suva. Near here Hindus and native Fijians have made small clearings in which bananas & taro will be planted. Spent the afternoon collecting among these, sweeping the dead twigs and looking under fallen logs. The beetle fauna was extensive and decidedly different anything I was used to in Hawaii. One has to use a different method of collecting to obtain the best results. Found Mr. Lea's method of beating into a white umbrella very effective in obtaining small specimens.

In evening had very good success collecting moths and beetles at light on Mewton's front lanai. Also numbers of craneflies, and other insects attracted by the brilliant light of a pressure benzene lantern.

Saturday, June 21, 1924.

Spent morning collecting along ridge west of Mewton's house. Very good collecting with sweep net. Mr. Lea obtained a fine series of small beetles, on which he is an authority, by "whacking" dead twigs into his umbrella. Took a few photographs for Mr. Lea, after lunch.

Collected down the road toward Suva, on wood piles and scrub. Also took a few plant specimens. Our two wheeled cart picked us up and took us back to Suva. Reached ship 6:30 P.M.

Spent evening pressing plants, putting away specimens and reading mail received by Niagara.

Sunday, June 22, 1924.

Rained hard all day. Up to Hospital. Spent rest of day answering correspondence and figuring out expense account to date.

Monday, June 23, 1924.

Not only a holiday - Prince of Wales birthday -, but a steady downpour of rain all day. Stayed aboard schooner on the slip and answered rest of correspondence.

Tuesday, June 24, 1924.

Still cloudy, but only occasional showers. To hospital, post office and Lea's office. Spent day at Department of Agriculture finishing up Lepidoptera, Odonata and lower orders.

Paid transportation and board for field trip - £1-0-0. to Mr. Mewton. Tea and evening at home of Mr. S. Bach, government printer.



Roll 49:1 Sprouting hau and cassia fenceposts in Mewton's yard.



Roll 49:3 Mr. Lea with collecting equipment in front of Mewton's house, Colo-i-Suva.



Roll 49:5 One of the open clearings in the forest where trees have been recently felled. This is what Mr. Lea, (who is looking for small beetles in his umbrella) calls “Bonza collecting.” It’s O.K. for beetles.

furnished me with a sample of the insect mounting gum which he uses with good success to glue specimens to points, ‘Formula:-

1 beaker ground gum Arabic	}	Mix wet. The latter requires plenty of water. Add little carbolic acid
1/4 " " Fragoanth		

Upon return to ship found that Correia had caught a fine Lampyridae dark purple-blue with yellow-white abdomen. The specimen was in full “glow”, from two small areas on next to last abdominal segment. The most interesting fact noticed in connection with the insect was that the light did not cease immediately upon the death of the insect. Correia said the light illuminated clearly an area the size of his hand, when first caught. The insect died after a few seconds in the cyanide bottle, but the light remained quite bright for fully five minutes, becoming gradually fainter, but still visible in dark after 15 minutes.

Wednesday, June 25, 1924.

To hospital for last treatment. Paid bill of £1, being ten visits at 2/-. Returned to Schooner, attended to a few small jobs and collected specimens nearby Mangrove swamp. [Finished] up roll during sunny moment.

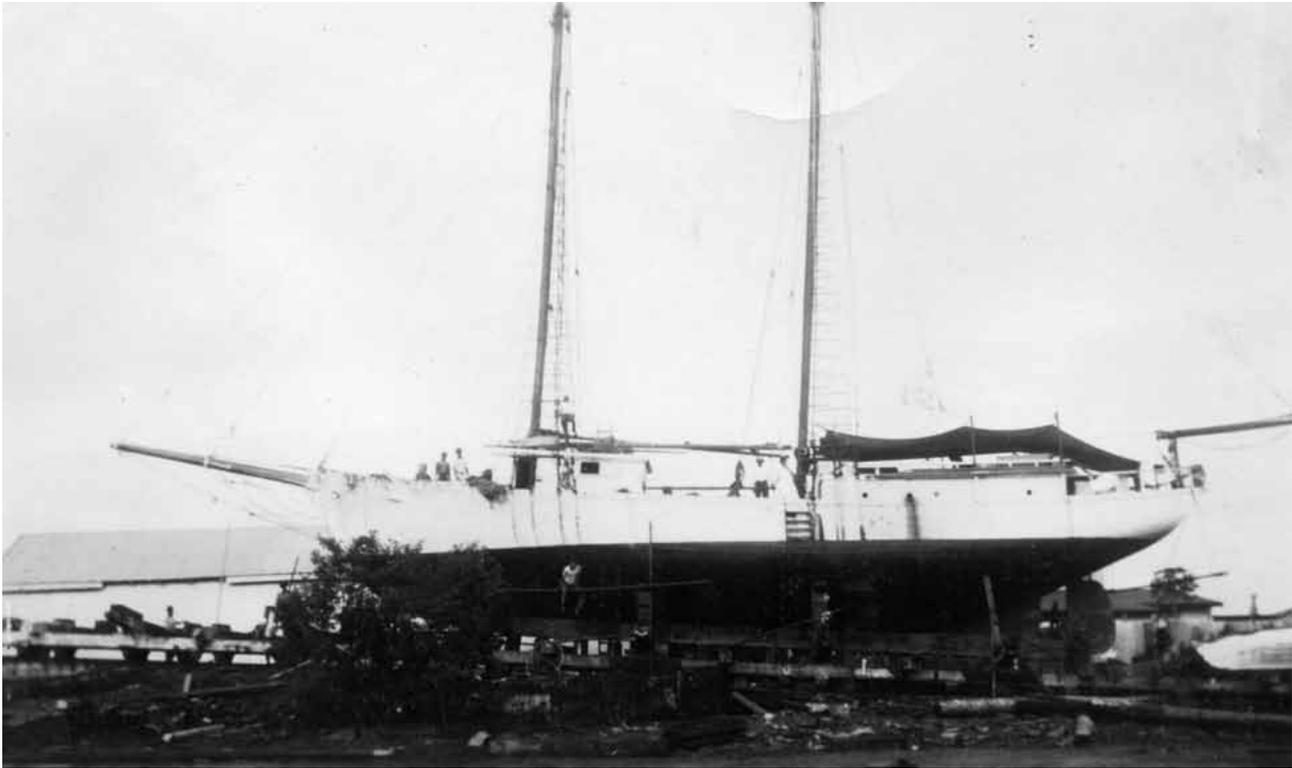
Afternoon and evening at the library. Rained heavily all afternoon.

Thursday, June 26, 1924.

Packed box of plants and other specimens collected in Fiji to send Museum by the Niagara. Got bill of lading and customs declaration. Package of Museum Field Notebooks received. Spent rest of morning at library.

Afternoon field trip around Suva Bay to Quarry with Mr. Lea. Collected eggs and pupae of Levuana iridesens from small coconut palms.

Heavy rain prevented extensive collecting. Returned to Lea’s office. Mr. Lea



Roll 49:6 The "France" on the slip, Suva.

When in good solution pour into porcelain dish and allow to dry. Best preserved in dry state. When required add a little water.

Borrowed a copy of Strassburger's Textbook of Botany from Mr. Campbell, plant pathologist, to take along on trip.

Spent evening copying my field notes into this book from my daily journal.

Friday, June 27, 1924.

Clear, sunny morning; cleaned up my part of the "France" and put specimens and clothing out to dry.

Up to Library until noon.

Afternoon field trip with Mr. Lea, Mr. Despeissis, Supt. of Agriculture, and Mr. C. Phillips, principal of Queen Victoria School for Fijian chief's sons, to a bat cave near Kalabu village. Took road toward Waimanu as far as a stone crusher. Followed up small stream along ditch trail to village of Kalabu, which is situated on a hill of soapstone, containing intrusions of blue stone which Mr. Despeissis called "Dyarite." To the west of the village the hill falls off precipitously into a large river bed. A tributary of this river running in from the east has cut a large arched cave thru the heart of the hill, under the village. The cave is 30 to 40 feet high and 15 to 25 feet wide. The river running thru, nearly fills the floor of the cave in places. We made our way well in, to a point at which a small cave enters thru the roof. Here a number of swifts and bats were flying and beneath on the flat soapstone rocks was a deposit of guano (sample taken), made up very largely of beetle bodies. Small microlepidoptera were hovering about and a number of spiders clung to the walls. Took a sample of soapstone, containing fossil shells, at the mouth of the cave. Collected a number of plants on the way back to the car. On return trip Mr. Lea had a native boy climb an old dead tree on which grew a beautiful cluster of orchids with bright yellow flowers. He presented specimens of it to the Museum (No. 219). Back to schooner and spent whole evening pressing plants and putting away specimens.

Saturday, June 28, 1924.

To Department of Agriculture and gave Mr. Despeissis the identification of one of the plants collected yesterday, Urena lobata. This is called Moutofu in Samoa, is a common weed in the tropics and threatens to become a pest in the cultivated area of Fiji.

Left with Mr. Lea for Colo-i-Suva at about 9:30. Stopped on way at office of Mr. Edwards, road overseer, to see some fossil sharks teeth and other specimens dug up in the road quarries. One of the teeth measured 4 x 4 1/2 inches. Also stopped at several clearings and woodpiles on way up, to collect. Reached Mewton's at 12.

In afternoon collected in piece of woods just S.W. of the house, finding a number of interesting insects and a few plants. Pressed the plants. After supper collected at light on Mewton's front lanai, catching a gecko and a number of moths, beetles and flies. Rather windy and damp which prevented collecting being as good as on previous trip.

Sunday, June 29, 1924.

Spent morning collecting in glade south of Mewton's house. Very fair collecting on farms, shrubs and small trees. In afternoon collected in clearing near the road. (See picture 49:5). Got a quantity of small beetles and some good Diptera. Large red-brown landshells under rotten log.

Evening collecting moths and beetles at light. Only fair success because of cold damp wind. Caught quite a number of specimens, however, including a beautiful Agaristidae.

Monday, June 30, 1924.

Collected in clearing and along road toward Suva.

Reached Suva at 1 P.M.

Pressed plants. Dentist appointment at 2:, with Dr. L.B. Hart D.D.S. graduate of Pennsylvania. Spent rest of morning at library.

Mr. W. Staite, a log truck driver, whom we met on the road near Colo-i-Suva, brought me down a large milliped an inch in diameter and six or eight inches long, which he caught under a pile of logs near the 6-mile post; Colo-i-Suva road.

Tuesday, July 1, 1924.

Packed up box of specimens and carried it to warehouse. Errands in town and goodbye to Dept. Agr. staff. Dentist at 10. Library in early afternoon. Met Mr. MacNamara, Mr. Lea's assistant on the Levuana job, who gave me a letter of introduction to Mr. H. H. Steinmetz of Munia in the Lau Group, and told me particulars concerning a cave containing a large number of skeletons on the island of Cikobia near Vanua Mbalavu.

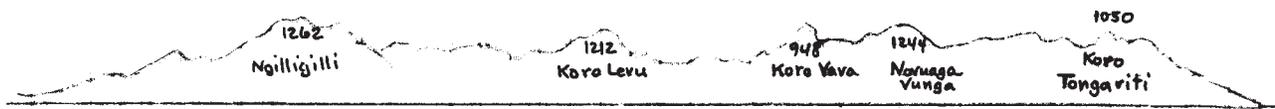
France cleared at 5 P.M. running out of the harbor and heading SSE before a very light breeze.

Wednesday, July 2, 1924.

Opposite Bega in morning. Near calm. Light N by E breeze at 7 A.M. Kadavu in sight to SSE at 9. 11 A.M. steering SE by E with North Astrolabe Reef light house visible due S.

Thursday, July 3, 1924.

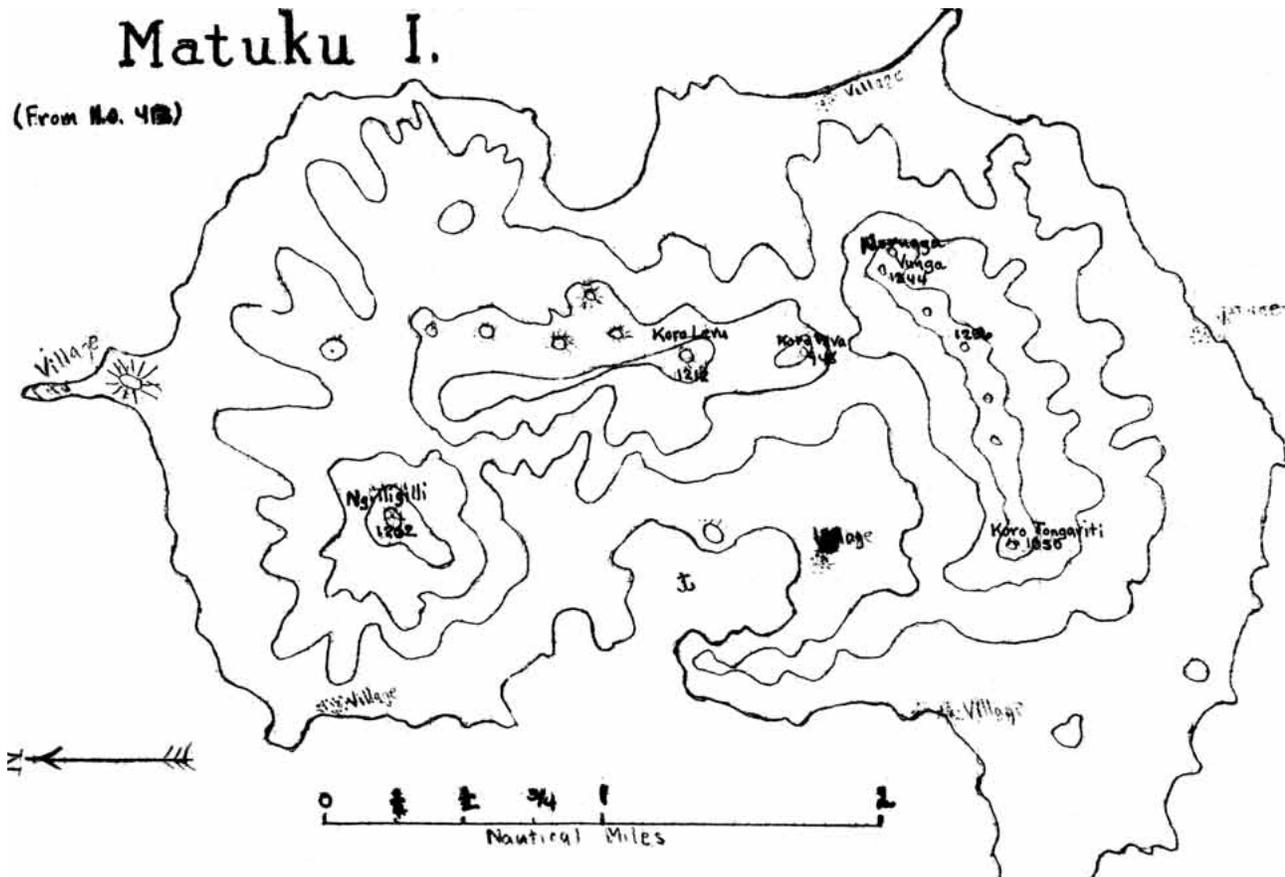
Started engine in early morning and Matuku island in sight at daylight due east. Sea glassy smooth, near calm.



Profile of Matuku, looking east at 7: A.M.

Rowed around to NW side and landed at cluster of frame buildings occupied by some white planters. The "Bula" [= buli] was away on another island.

Ascended the N. slope of Ngilligilli (1262) as far as the native vegetation. Stopped by shower of rain. Worked around head of a valley to ridge running west, descended the valley to S. of this ridge.



There seem to be three zones of vegetation:-

- (1) The Littoral fringe of trees or cultivated area. This is variable in character. For the most part it is made up of coconut groves and mangrove swamps, the former on the stretch stretches, the latter on the bays. But surrounding the main harbor and in other places is a well developed low forest, made up of quite a number of trees and shrubs besides the characteristic hau, noni, kamani, pandanus, etc. In the cultivated areas one finds oranges mangos and coconuts.
- (2.) The forehill grass area. Here bunch grass and plume grass dominate together with a number of weeds including Sida, Bidens, thistle, and several stunted shrubs-225, 226, 227, 228, etc. some of which become small trees under more favorable circumstances.

(3) The larger valleys and the upper slopes bear a native forest of trees and slopes. Ngilligilli is the highest peak, 1262 feet elev. Its summit is rocky and bare; while those of most of the other high peaks are wooded, as are their upper slopes.

The forehill grass harbors a quantity of large grasshoppers of the *Conocephalus* group, as well as smaller long-antennaed species and several crickets. There are also a number of species of moths - small brown, large dark brown and an agaristid. Yellow and brownish-white butterfly.

Numerous outcrops of reddish, grayish and brown basaltic rock on hillside. Took samples from small ravine.

In working down a small wooded valley, besides the specimens taken (230, 231, 232, etc.) noted kukui, ti, ava-ava-aiku (*Piper*), maile fern, red peppers, etc.

Collected two large spiders, called tukutuku.

Returned to schooner via a good path along beach

Friday, July 4, 1924. Very heavy wind during the night, continued in the morning as occasional gusts accompanied by showers. Ashore at 7:30, landing to S.E of an anchorage at the foot of a hill marked "276 feet" on the map. Walked south along the shore. So many plants in fruit and flower, new to me, that I had my knapsack full by 11: and returned to the sea shore to press them.

Much of the bay is lined with mangroves, both the species collected near Suva (195 & 196) being present. Behind the mangroves lies a belt of trees and shrubs, most of which were new to me and many of which I succeeded in getting as specimens. Of these I knew there were:- kukui, hau, noni, Piper (ava-ava-aiku), puapua, papaya, and kamani (*Barringtonia speciosa*).

Too wet to collect many insects. Saw seven large species including the swallowtail and other butterflies.

Collected as far as the end of the luxuriant vegetation, about half way to the villiage of Karomaci.

Ashore again at 2 P.M. Caught a series of small crabs on the mud flat just seaward of the mangrove swamp. Caught number of *Halobates*, driven up the small streams by the heavy wind.

Followed a trail directly mauka, into a valley which leads up on the west side of Koro Levu. Past taro patches, bananas, papaya trees, coconuts, etc. Saw a peculiar shaped fern like this: -

It was flat on top, about 2-3 feet across and 2-3 feet high.

Scrambled up the slope to the edge of the native vegetation, catching a number of leaf hoppers, beetles, small wasps, flies, etc. by sweeping the bushes and ferns. Collected specimens of ti which looked different from *Cordyline terminalis*, having purple and white flowers and berries red when ripe. Also collected an erect shrub with spicy leaves and stem.

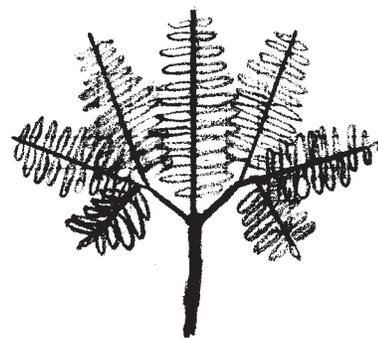
Back to schooner. Correia gave me a specimen of epiphytic plant, resembling mistletoe.

Wind strong again in the evening, accompanied by showers.

Saturday, July 5, 1924.

Damp drizzly morning with high wind blowing. To the summit of Koro Levu (1212').

Ashore at 7:30 and took trail leading east from N.E. corner of harbor. This good trail crosses the



Fern common in lowlands

island thru a pass just north of Koro Levu. Red flowering canna. Milkweed common, but no Monarch butterflies seen. Passed a few *Polistes* wasp nests in the underbrush. Collected a number of beetles and microhymenoptera by "whacking" the yellow flowered composite (Plant 228). Brown and metallic green scutellerid bug on tree 263. Fern 263 largely replaces the grass on the upper forehills and ridge summit, although the plume grass continues to the very top.

Fine view from ridge summit. The greater portion of the eastern slope is grass-land, the trees being confined to pockets in the valley and clumps on the upper slopes. Coconut palms and lowland plants in the valleys and mangrove and littoral trees along the beach. The cross island trail follows down a ridge to the south side of the bay. The village of Galligarue to the SE has at least a white red-roofed church. Comparatively little cultivation except patches of taro in the valley bottoms.

Left the trail and worked along ridge, which is narrow and steep in places and thickly covered with shrubs and trees, to the summit (1212'). Small flat landshells rather abundant on leaves, also found one larger white shell, and picked up a few dead ones off the ground. The summit of Koro Levu has the plume grass, yellow composite, ferns, weeds, and trees on lower elevations.

Collected a quantity of small Diptera, wasps, bees, leafhoppers, and small beetles by sweeping grass, ferns, shrubs and the yellow composite on the way down.

Mrs. Correia had collected a number of earwigs and roaches on board the schooner.

Sunday, July 6, 1924.

Ngilligilli (1262) and north-east end of the island.

Ashore at about 8:45, landing on N. end of harbor. Over a small hill to the valley in which the village of Lomati is situated according to the chart (H.O. 413). The village has long since disappeared, there being no signs of houses among the coconut palms which fill the lower part. The reason for moving the village about a mile further north is probably the filling up of the bay with mangrove trees and mud. There are, however, numerous orange, mango, breadfruit trees and banana plants. Caught a large, all yellow-brown coccinellid on orange leaf, and a small nitidulid beetle in one of the over-ripe oranges. These oranges are the sour kind, tasting and smelling like lemons, even though bright orange in color. There are also trees bearing large yellow shaddocks, 4 1/2 to 6 inches in diameter and a skin over 3/4 inch thick.

Up the valley NNE toward the peak. Saw the large olive-brown moth with orange, blank spotted hind wing.

Up the slopes of the north mountain mass. Much of the undergrowth in the native forest is made up of Piper (called in Samoa ava-ava-aiku), red pepper, ferns and ti. Bird nest fern occasional. Saw a ti plant with all white blossoms, - most have at least half the corolla purple in color. Numerous large woody climbers, 4 to 5 cm. in diameter. Caught three brown crickets ♂, ♀, & young, in leaf nest, made like a leaf roller caterpillar's, of a folded leaf held in place by a white web.

The plume grass and accompanying weeds has invaded every unoccupied space and is crowding the native vegetation off the ridges into the valleys. The lowland plants have been pushed down and the upper forest up.

Climbed to the summit having to work around to the NE side to get up the last 100 feet. Found a Cycad plant on the ridge just below the summit. It is entirely surrounded by grass. Caught a Brenthid beetle on the leaves.

Both the islands to the east (Moala and Totoya) visible. The village called Tokalou on the chart is out on the east end of the point on the north (instead of the south) side of the small hill. A Euphorbia-like plant with small white flowers, small leaves and milky latex common on NE slopes. Collected small brown beetle and green leafhopper on it (but no Proterhinus).



Roll 50:6 The Cycad, looking W.

Descended NE slopes and returned to schooner via east side and central pass. There is a good trail around the island and over the pass, but it goes up and down all the way, preferring to climb over the ridges instead of going around them. Saw a quantity of bronze-white moths hovering around the dry blossoms of tree 248. *Scaevola* bushes occasional on the beach. Also saw koa haole (*Lucaena glauca*). Traveled most of the pass in the dusk, reaching ship about 7 P.M.

Monday, July 7, 1924.

South mountain mass and S.W. end of Matuku.

Ashore at 7:30, going S. along bay and entered valley to S.W. of Koro Vava. Legume with cyl. brown pods (281) had a black and white banded caterpillar with brown sides, on the leaves and small ones in one of the pods.

One of the dominant trees of the valley (), has a tall straight trunk, rosettes of acuminate leaves, some up to a foot in length, green plum-shaped, apple-scented fruit and white flowers with many purple tipped stamens. More brown crickets with leaf roller-like nests in the leaves of shrubs and trees. The male of the large dark brown white-spotted butterfly (of which I caught several) has a pair of bright yellow plumes, which can be pushed in and out on the end of the abdomen. These emit a strong spicy or musty odor.

Followed the beautiful little valley up to near its head, where the little stream divides into several branches. Underfoot the ground is carpeted with ferns and dry brown leaves. Overhead a nearly continuous canopy of foliage makes a pleasant dusk, with the bright morning rays peeping thru from over the high hills to my left. Caught a number of small moths, micro-hymenoptera, flies, a large crane-fly, brown crickets among the leaves, and several spiders. Saw familiar breadfruit trees and numerous coconut palms.

The trail I was following led me out of the valley onto a ridge where a small clearing had been made for cultivation. Saw a tree of No. 266 with its leaves mottled yellow and pale beneath. Seemed sickly although fruiting. Took specimen. Caught several Lycaenid blue butterflies in a grassy pocket.

Stripped the bark off a dead tree and got black and small gray-brown roaches, 2 beetles, larvae (grubs), and a large gecko. The pale brown, globose spider rolls up leaves as does the cricket to make its nest. Got a number of fig wasps, both ♂ & ♀ from the fruit of tree 282. Same small, violet shaped leaved creeper with white flowers and orange fruit, as found abundant in Samoa.

Some of the woody lianas on the slopes have trunks 8 to 10 cm. in diameter. Landshells not so abundant as on Koro Levu, but got several small specimens (All same sp.) and one large live and several dead. Saw another cycad. (Mr. Correia says he has seen them also.) Large red-legged hermit crab on shrub at 900'. Numerous large and small "fish tailed" palms. Cordyline (ti plant) with large red violet leaves seen here and elsewhere at higher elevations and (apparently planted in lowlands).

Crossed over summit of ridge and down the south side to some taro patches, from whence a trail led to the beach. Came out at a village and followed the "round-the-island" path west and N.W. back to the harbor. Noted several familiar beach plants:- *Tournefortia*, "buka vai" (with peltate large leaves) collected on Puka Puka etc.), Scaevola, hau, Leucaena glauca. Passed to villages and planter's house.

Tuesday, July 8, 1924.

Ashore at 7 A.M. and back to the valley behind Karomaci village visited yesterday. Collected the same caterpillar on the same legume plant. It may be the larva of a "leopard" moth with black spotted orange wings, several of which I saw nearby. Caught a longicorn beetle on the plant.

Followed the valley to its head, where the steep ridge begins, collected quantities of spiders and craneflies. On way back swept the ferns and shrubs catching a quantity of leafhoppers, small flies, wasps, weevils etc.

A number of fish tailed palms in the village, some of them having trunks 20 to 25 cm. in diameter-larger even than the average coconut palms, and rising to a height of 15 to 18 meters. Fruit a orange nut, shaped like an acorn. Collected a small specimen.

Beautiful large dragonfly with green and yellow striped thorax and bright red abdomen and fuscus tipped wings, about a pool. Unable to catch a specimen. Caught several large water striders from surface of the pool.

Passed the village of Karomaci and around on the S.W. side of the bay. Took a few pictures from various places along the peninsula.

The mountain mass is I-shaped, a mountain at each end, connected by a longitudinal range. The panorama shows one side (the west) of the mass.

Returned to ship from this point, pressed plants, put away specimens and traced chart of Moala Island from H.O. No. 119.

Wednesday, July 9, 1924.

Up anchor at daylight and out of the harbor before a strong breeze. Made 9 knots an hour between Matuku and Moala, anchoring off Maloku at about 11:45.

Moala is a considerably larger island than Matuku, being triangular in shape, 8 miles on a side and with at least two peaks over 1500 feet high. The mountains rise more abruptly from the sea (at least on the north side) than on Matuka. They seem to be more extensively forested as seen from the ship. The forest appears less thick and luxuriant, however, and much of the forehills is covered with grass.

Ashore at 1:30, landing on west side of bay, in mouth of little creek edged with mangroves. The



Roll 51:6 The valley just collected in, behind Karomaci village, looking east with Koro Vava on the left.

village marked on the chart is around the corner on the sea, west of the bay, their taro, sweet potatoes, and banana patches being in the valley. The streams are quite large.

Up the valley on the west side. Frequent showers made collecting poor, although insect life quite abundant. Lots of moths and butterflies, large syrphid flies. Caught a series of brown weevils and one sex of which has a spine on the forsum. They were in cop. on the stump of tree 297. Collected beetles, centipeds and earthworms under bark. Scale on leaves of tree 301. Landshells (small) abundant even in the lowland, but only dead large ones seen.

Mr. Beck collected 33 bugs with red and gray abdomen and fuscous wings, on young coconut palm. He said there were thousands on it.

Mr. Correia gave me Hippoboscid fly ex pigeon.

Rise and fall of tide extensive. At low tide one can walk across on the seaside of the mangrove swamp on fairly dry mud. At high tide we rowed across this area with plenty of water under the keel.

Thursday, July 10, 1924.

Ashore at 7:30, landing on point at east side of the bay. Up the middle ridge of the valley, a broad, fairly gradual rise with a few steep slopes, rising to a high plateau, elevation 1000 to 1300 feet, with a few peaks 1500 or over.

The most abundant creatures seen on the slope were large, dark red-brown millipeds, up to 1/2" diameter and 3" long. Common under damp fallen leaves. Caught a flat, black Lucanid beetle in a rotten stick, and what seemed to be its larva.

Although wooded to the bottom and merging with the lowland forests, the trees are small and open for the most part, making walking fairly easy except for the tangle of stout vines about knee or waist high. The lower slopes in places are covered with boulders and rocks, from around which the soil has apparently been washed away, as the surface larger roots are in places quite visible between them. Saw a woody climber with trunk fully 14 cm. in diameter.



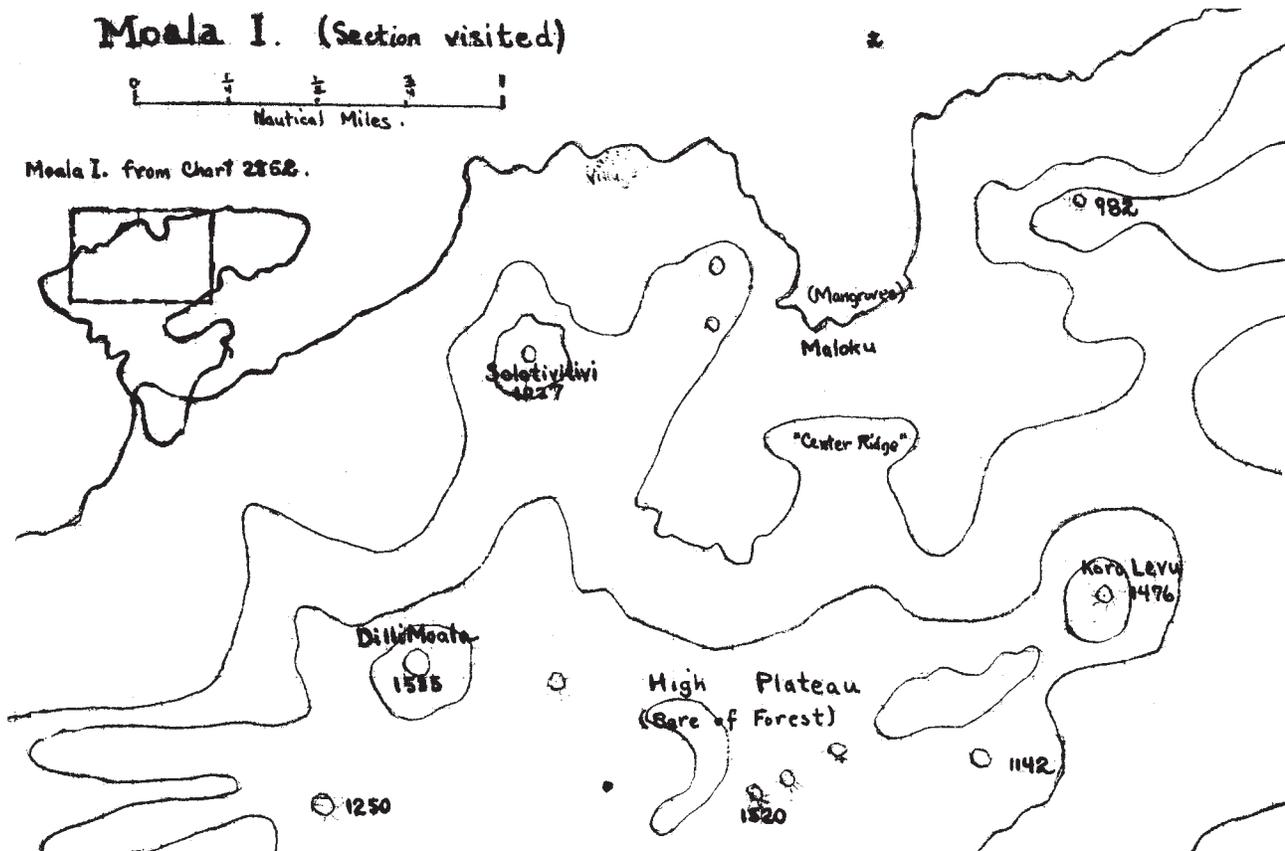
Roll 52:2 to 6 Panorama of Matuku from N. point of peninsula looking across Matuku Harbor. On extreme left is Ngilligilli (1262') and on extreme right Koro Tongaviti (1050').

Caught a small microlepidoptera just color of bark it was on.

My climb up the slope substantiates observations made from ship that the hills are more extensively but less thickly covered with trees. Especially on the upper ridges the trees are nearly all small, few exceeding 15 cm. in diameter and most of them 4 to 8. The undergrowth is open, composed for the most part of small (young) trees together with low ferns, a few grasses, and vines. Note many trees common both to the slopes and to the lowlands and much the same as those on Matuku. Apparently 1000 to 1200 feet does not make any great difference in the general vegetation.

At intervals up the ridge are small terraces or depressions like "trenches", but doubtless due to erosion. Some of the terraces have piles of stones which look almost artificial.

Freycinetia vine only above 800 or 900 feet elev. and even there only in patches and not thick. Small red-brown weevils on leaves. Found *Polistes* nest at about 900'. Small landshells, which are to be found even in the lowlands are quite abundant on leaves and even trunks of trees at 800 to 900'. Very few large shells seen, although the dead ones are numerous on the ground. Caught a large spider and a beautiful striated greenish weevle. First nearly full grown large landshell on *Freycinetia* at about 1000 feet.



Followed E. along flat topped ridge rather thickly covered with small trees, with fern 306 fairly abundant underfoot and on the trunks of the trees toward their bases. Moss 307 on the tree trunks; birds nest and tree ferns; and the Lycopodium collected on Matuku. Came out on quite a treeless area—a high plateau, covered with low grass (very little plume grass), knee high ferns and scattered shrubs, stunted trees and wind swept Casuarinas (ironwoods). Among the grass one occasionally met Lycopodium of the robust and “rat-tail” kinds; purple orchids (as collected at Colo-i-Suva etc.), the “Rose bud”: shrub; Sida, yellow composite, and several common weeds. Metrosideros polymorpha and the stunted trees.

The green, striated weevil is rather abundant on some of the low scrubs, especially # 308.

Descended via east valley finding several waterfalls and quite a volume of water even high up.

Large caterpillar on shrub at about 900'.

Collected in lowlands between showers. Got specimens of two woody climbers. The one with the large pod is the one with the huge trunk which reaches a diameter, in some cases, of 14 cm. The other has the pods, twigs and stems covered with thorns and is most disagreeable to encounter.

Joe Hicks (sailor) handed me a large green walking stick which he had collected on a fau tree. He said he also saw a snake.

Mr. Beck contributed a large cricket, a papilio butterfly and some flat landshells.

Very heavy wind, which has been blowing for several days, caused the schooner to drag her anchors about 250 feet nearly landing us upon a coral head.

Friday, July 11, 1924.

Ashore at 8 A.M. East about 1/2 mile along sea beach shelf, below a low cliff of black lava rock, which juts out into the sea. Passed a small cone where grew a quantity of beach trees, many of them in flower. Recognizing kou, hau, kamani, (*Barringtonia speciosa*), noni, puapua, several species collected on Matuku or here and a few new ones, which will collect later.

Up a ridge to an elevation of about 950 feet. Forest quite open and going, though steep, is good. Collecting very poor at lower elevations. Collected a large pale yellow landshell with darker spots, a green weevil and two large spiders (in their nests), all on one small bush. The larger spider had a partly eaten cricket with him in the nest, which consisted of a folded leaf. Saved the leaf nest of the smaller spider.

Passed quite a little patch of small, slender trunked tree ferns (No. 312) 6 to 15 feet tall and about 5 to 6 cm. in diameter. Small patch of erect Lycopodium (313) growing with Freycinetia.

Collected three large landshells from the leaves of tree No. 314, showing that they are present on the ridges, although high up in the trees. Also caught a large female cricket in same tree.

Large green and a large brown leafhopper on fern fronds.

Came out on top of the ridge upon a treeless, fern covered area of 5 or so acres, with a few stunted shrubs and wind blown Casuarinas. From this spot (elevation about 900') one can look across the valley to similar bare spots, especially the domes of Solotivitivi (1027') and Dilli Moala (1535'), about 1 3/4 and 2 1/4 miles distant in an air line. The greater part of the visible ridges is forested; only patches being bare.

Collected a moderately small weevil, reddish brown in color, on leaves of # 315 and adjacent plants.

Followed back along ridge wall of valley, part way along a fair cut trail (probably made by pig hunters). Dipped down 100 or 200 feet on a saddle which separates the valley of Maloku from one running ESE to Vounuka on the SE side, to rise again into another bare, fern covered area, with scat-

tered ironwoods. On the right the valley of Maloku drops abruptly. On the left the other valley stretches away, with an undulating wooded range of hills behind it and forming its north wall.

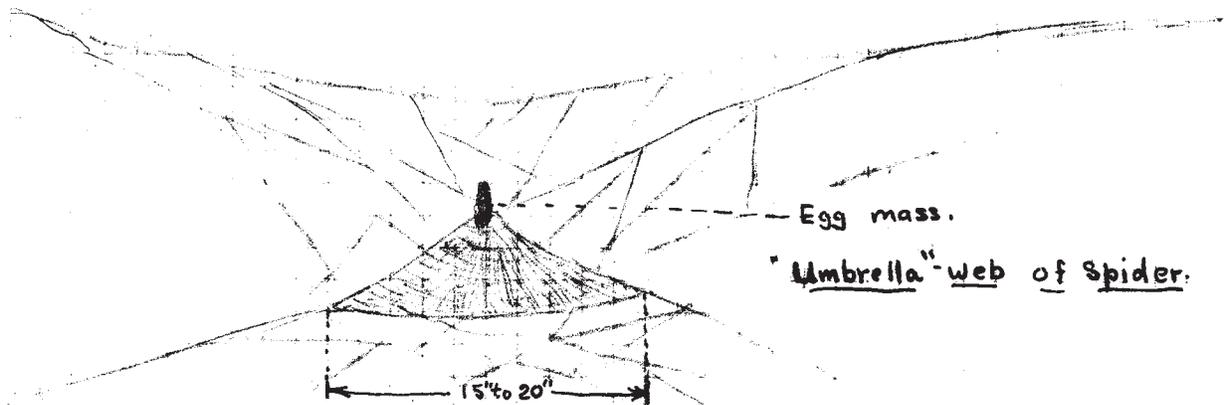
Besides three or four spp. of ferns, the open areas support a flora of low grass, stunted yellow-flowered composites, with small aeneous bees on the flowers, stunted plants of the "rose bud" shrub, Lycopodium, a small violet-shaped leafed running herb, lavender orchids, a few stray patches of plume grass, Bidens, and two or three spp. of common weeds. Under one number (316) collected a sample of each of the principal weeds for identification.

Saw a specimen of the shrub with the whirl or purple berries on a fleshy torus (collected on Savaii). Over summit of Koro Levu (1476').

Finally reached the bare high plateau behind the crater ridge (visited yesterday). In the middle in a small marsh, the source of one of the streams, filled with larger ferns, plume grass and Pandanus. The latter also grow along the depressions. This undulating plateau looks as if it might be the butt of an old volcanic cone. This is further emphasized by the quantities of lava rocks, resembling iron in weight and appearance. Another small depression filled with water (from the frequent rains) had wiry grass growing in it.

Descended middle of "center ridge", finding it rather steep in spots. Passed several small patches of bamboo.

Throughout the lowlands and lower slopes are many spiders webs with an umbrella shape. The main part is a flattened cone, apex up, made of interwoven web of about the mesh of mosquito net, the strands being finer. This is suspended from the surrounding vegetation by the elaborate system of threads and guys.



Beneath the cone is another elaborate system of strands which are used for runways as well as guys. The egg mass is situated at the apex of the cone, and the spider usually hangs back downward on the inside of the cone, near the apex. The spider is dark greenish black, the dorsum of the abdomen red-brown with white markings and the legs black. The body is often $\frac{3}{4}$ " long, with legs as much as $1\frac{1}{2}$ " long.

Taro, banana and awa patches on lower end of the slope. Followed trail around to east side of bay and back to schooner.

Saturday, July 12, 1924.

Ashore at 7:30, landing on sand bank running out from west side of bay. Around point and west along sea beach to ridge beyond village.



Roll 53:2 Looking up the ridge toward Solotivitivi, showing fern and plume grass open cover.



Roll 53:3 The N.W. coast of Moala from slope near summit of Solotivitivi (1027').



Roll 53:5 Dilli Moala (1535'), looking S.W. from summit of Solotivivi. Note the extent of the bare areas.



Roll 53:6 Looking S.S.E. toward high central plateau (visited yesterday) from same spot. Note the grass and fern covered areas.

Stripped bark from dead, fallen tree, getting a quantity of beetles (of several different spp.), small brown bugs, earwigs, grubs, centipedes, mites, ticks, etc.

On up ridge thru sweet potato patches, and open grass and fern covered slope, along a fair trail. This is the first ridge, going west, which is not forested.

The most abundant insect on the grass slope was a small aeneous bee, flying in large numbers about the ferns and stunted shrubs.

Passed thru a little wooded tract, and open space containing taro, bananas and young coconut palms (to which the trail led). Hypolimnas bolina butterfly quite abundant here. Came out again on the fern and grass covered slope, which is covered with large lava rocks, boulders of various sizes up to 6 or 8 feet in diameter. Dark reddish gray to slate in color (Took sample). Climbed to summit of Solutiviti.

Back (S.) along ridge. Struck a path and followed it W.S.W. toward Dilli Moala. Crossed several streams, large even at this elevation. One tasted strongly of iron.

Insect life on ridge poor. A few landshells on the trees. Very few trees in fruit or flower and a general sameness throughout. Collected a few specimens of ear fungus from a rotten log. Came out on bare area just S.E. of Dilli Moala and leading up to it. It resembles a great open park with its scattered shrubs and ironwoods. Climbed to the summit.

A lot of lava rocks, scattered about the fern & grass covered areas, which look and feel like solid iron. (Sample). Quite abundant in outcrops and probably much more beneath. Small dark brown Tettigid grasshopper among the ferns.

The S.E. slopes of Dilli Moala are covered with large basaltic boulders. Crossed to high plateau.

Stunted Scaevola bushes abundant on high plateau. Collected both red brown and gray weevils, and the aeneous bee on the leaves and white "half" flowers.

Descended west side of "Center Ridge." Saw a wild duck over taro patches at foot.

Correia brought some Hypolimnas bolina caterpillars and pupas, which he had collected in W. valley. Also a specimen of wild raspberry (330), which, according to Seeman, is Rubus tiliaceus Smith.

Sunday, July 13, 1924.

Ashore at 7:45 landing on W. side of bay. Followed up stream bed in floor of right hand valley, catching quite a number of butterflies, moths, small flies, leafhoppers, etc.

Collected several yellow-green landshells, a large green leafhopper, and a rotund black Scarabaeid beetle on Ficus tree #331. Tree #332 is a host plant for hundreds of large Hypolimnas bolina caterpillars, the cocoons hanging in this and adjacent trees. Some of the trees of this species were badly eaten, the caterpillars preferring it to other trees.

Noticed regarding the tree with the round flat "cheese"-like fruit that the fruit when ripe breaks up into six red seeds, which hang to the ovary, forming a wheel-shaped disk.

Several good sized pools in the stream (which is as large as any of the streams on Oahu at a corresponding elevation), in which were small dark gray fish up to 10 inches in length.

The large landshells—apparently only one species—are quite abundant at about 300 to 400 feet elevation, in the valley bottom on the leaves and even trunks of trees and shrubs. They prefer the larger leaved trees such as Ficus # 331 and # 299.

Passed a little grove of 6 to 8 meter tree ferns. Ascended the stream bed until began to encounter waterfalls and then returned over the same route.

The cicadas make a racket in the trees even in the middle of the day.

Saw a kamani (Barringtonia speciosa) tree - which is usually only on the beach - fully 1/2 mile up the valley. Collected a peculiar epiphytic plant with a long green pod (?) on it.

Large and small gray to olive green lizards very abundant in the lowlands, about piles of coconut husks, on rocks and in the trail-apparently making a living off the small insects.

Collected a number of plants along the sea beach.

Developed four rolls of films in the evening with better success than any attempts on the Phoenix trip. The partial failure there was due to not leaving them in the "Hypo" long enough.

Monday, July 14, 1924.

Ashore at 7 A.M. Ascended west side of "center ridge" to high bare plateau. Convolvulus vine with pale lavender petals and dark plum colored center (340) rather abundant in clearings in the lowland.

Caught half a bottle of the spike-back snout beetle and two large longicorns on a small (live) tree at about 500' elevation where they were congregated in numbers on the bark.

Collected several plants on the high plateau including blossoms from a huge Lehua (Metrosideros polymorpha) tree with a trunk fully three feet in diameter and 50 feet high. It was a pretty sight with the branches loaded with scarlet blossoms. The lowest limbs were 20 feet above the ground and 8 or 10 inches in diameter.

Picked up a rock specimen on the bare flat which much resembles solid iron in weight and appearance. The stream which has its origin in this flat tastes strongly of iron and has a thick layer of rusty brown sediment on its sides and bottom, as well as on all the roots and brush in the stream. "Iron"-like rock is very abundant on the highlands.

Saw a large, aeneous, robust syrphid fly (one in Suva collection).

Descended east side of "center ridge". Passed a patch of "lau fau"-the banana-like leaf, at about 800'.

Caught a black and white banded snake on the beach rocks. Also a small slaty-gray lizard which just matches the rocks on which it runs.

Returned to schooner at 3 P.M. Underway at 5:15 P.M.

Correia brought in a small cicada.

Very rough night. Boat rolled and pitched so violently that the table and loose objects were thrown about the floor.

Tuesday, July 15, 1924.

Anchored off isthmus, W. side Totoya Id. At 8:45.

Ashore at 9:15. Crossed the coconut covered isthmus on a very good trail, a distance of about 1/4 mile. Turned north, up the bay beach.

Totoya island is shaped like a huge horseshoe, with the arms pointing south, enclosing a large deep bay. The two ends of the horseshoe are connected by the fringing reef. The peaks on the west side do not rise higher than 900 feet and the highest elevation on the east arm is 1184 feet. The greater part of the island is bare of trees; only the beach, lower valleys, and the slopes of the higher peaks are forested. The two southern ends of the horseshoe are the most luxuriantly vegetated. The remainder of the island is covered with the familiar plume grass, low grass and ferns.

The sandy beaches, separated by rocky lava bluffs, are fringed with the usual littoral trees: hau, Scaevola, Tournefortia, Barringtonia, kou (Cordia), Hernandia peltata, and several trees, shrubs and vines collected on Matuku and Moala. Conspicuous among the trees is a large Legume with brilliant

scarlet petals, # 349. I collected specimens of this in Matuku, not in flower, and saw one tree of it in Moala. Collected several other leguminous plants. Saw another leguminous vine with purplish-pink flowers (already collected).

Insects and lizards fairly abundant in the moist tree covered pockets. Especially numerous are the little, large winged fuscous leafhoppers; and small moths in the grass. A great many weeds. Hypolimnas bolina fairly abundant, more so than other butterflies.

Swarms of natives, mostly children, out on the reefs at low tide.

Crossed the ridge at the next saddle north of the isthmus, by a very faint trail, descending into a valley filled with coconut palms. The entire ridge here is covered with plume grass, weeds and clumps of Pandanus, here and there. Grasshoppers very abundant, especially the large robust species. Yellow flowered composite (previously collected,) and the sedge, common especially on the lower slopes, together with small ferns, Sida and numerous weeds.

Two or three species of moderately large moths - one dark gray, the other light brown with darker markings, common in the grass. Polistes wasps abundant and noisy. Several fairly large spiders - both the "umbrella-web" species and the long yellow and fuscous banded legged species with the creamy green abdomen very common.

Back to the schooner along the sea beach. Encountered the same trees here as found on the Moala sea beach. The vine with white flowers and a brown "onion skin" capsule containing a fuzzy dark brown egg-shaped seed 3/8" x 1/2", common on trees and shrubs.

Saw a species of butterfly having whitish wings edged with dark brown. Also a small yellow and brown species.

The beaches are covered with dark slaty gray rocks and the bold cliffs are of the same material.

Brown crickets abundant among the leaves of trees. Saw no Tournefortia moths. This tree is visited frequently by the large dark brown butterfly with small white spots on the wings. Also spiny legged green grasshoppers present. Swallowtail butterflies not very abundant, but present. A large green bug common on "hau." in places. Also a yellow backed one, which is probably the other sex.

Woody climber with thorns present in some quantity on the beach.

Wednesday, July 16, 1924.

Ashore at 7 A.M. Across isthmus and followed a good trail south along the summit of the ridge. First rise entirely covered with grass above the zone of beach trees which extends up 100 feet or so. Burr grass by the side. A low legume with yellow flowers and brown pods (collected on Matuku) common in places. Ferns, yellow composite common. Trees 351 and 357 common along the summit ridge before one encounters the main forest zone. Also the tree with the speckled brown capsules and white floral leaf.

Caught a number of large, yellow and black *Scolia* (?) wasps along shady summit path.

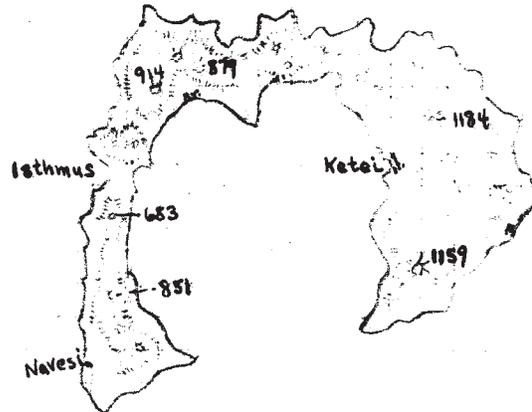
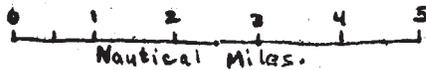
Climbed to top of 688' hill, from which a fine view of the entire island was obtained. The peak is wooded, but the plants are for the most part of a lowland nature, even hau and the scarlet flowered legume growing on or near the summit.

The ridge to the south is bare and grass covered again for a stretch. Saw specimens of the tree with small green berries in 4's. Saw one of the "umbrella-webbed" spiders sucking the juices from a spring-legged grasshopper. Usual underbrush in wooded sections made up of Piper (ava-ava-aiku), red pepper, and ti. There are several species of ferns underfoot - including "Maile" and birdsnest. Many of the ti plants are tall with woody stems, frequently branched. All were in fruit having a small number of large grass or red berries. The red fruit contain small black seeds. Large bean woody

TOTOYA I.

{See H.O. Chart 412}.

(Enlarged from H.O. Chart 2852).



climber. Saw many of the trees collected on the other two islands. The tree with the terminal compound raceme of small white flowers and green, elliptical soft capsules and alternate compound leaf present. The tree with the sweet smelling pink and white sticky flowers has a fleshy, ovate green fruit 1 1/4" x 3/4".

Trail descended abruptly to the west beach, part way by the side of a trickle of water, one of the few streams seen on the island. Along a broad sandy beach.



Roll 54:4 The 851 foot hill, looking S.S.E. from same spot; beach and slope vegetation in foreground.



Roll 54:6 Looking N.N.E along east side of west arm of island, the reefs being plainly visible at low tide, from elevation of about 500'.

Day mosquitoes (*A. pseudoscutellaris*)? Abundant and troublesome.

Back along same route.

Saw a small reddish orange and black Vanessa (?) butterfly. Large and small green tailed, olive-brown, striped lizards. Common. A yellow thistle with white seed plumes in places.

Back to top of 683 foot hill and took some pictures.

Saw an all white butterfly, about the size of *Peris rapae*.

Down to the beach and caught a number of the large spiders, common in the lowlands on the coconut palms and other trees.

The two small landshells collected on the summit ridge on leaves were all I saw on Totoya.

There seems to be a good deal of communication between the small islands. Saw two cutters come in yesterday and one arrive and one leave today. The principal village seems to be Ketei on the middle of the opposite (E) side of the lagoon. It has white buildings with red roofs.

In lifting the anchor in getting underway the chain broke and we lost both anchor and 30 fathoms of chain overboard. Forced to return to Suva for another anchor and chain.

Thursday, July 17, 1924.

At sea, tacking against a head wind in the triangle formed by Matuku, Moala and Totoya.

Spent morning packing five boxes specimens to send north from Suva, writing up notebook to date and a letter to Gregory. Afternoon checking Veitch's list of Fiji coleopteran (obtained from Mr. Lea) against my list of the identified species in the collection of the Dept of Agriculture at Suva, and making additions and corrections to the latter.

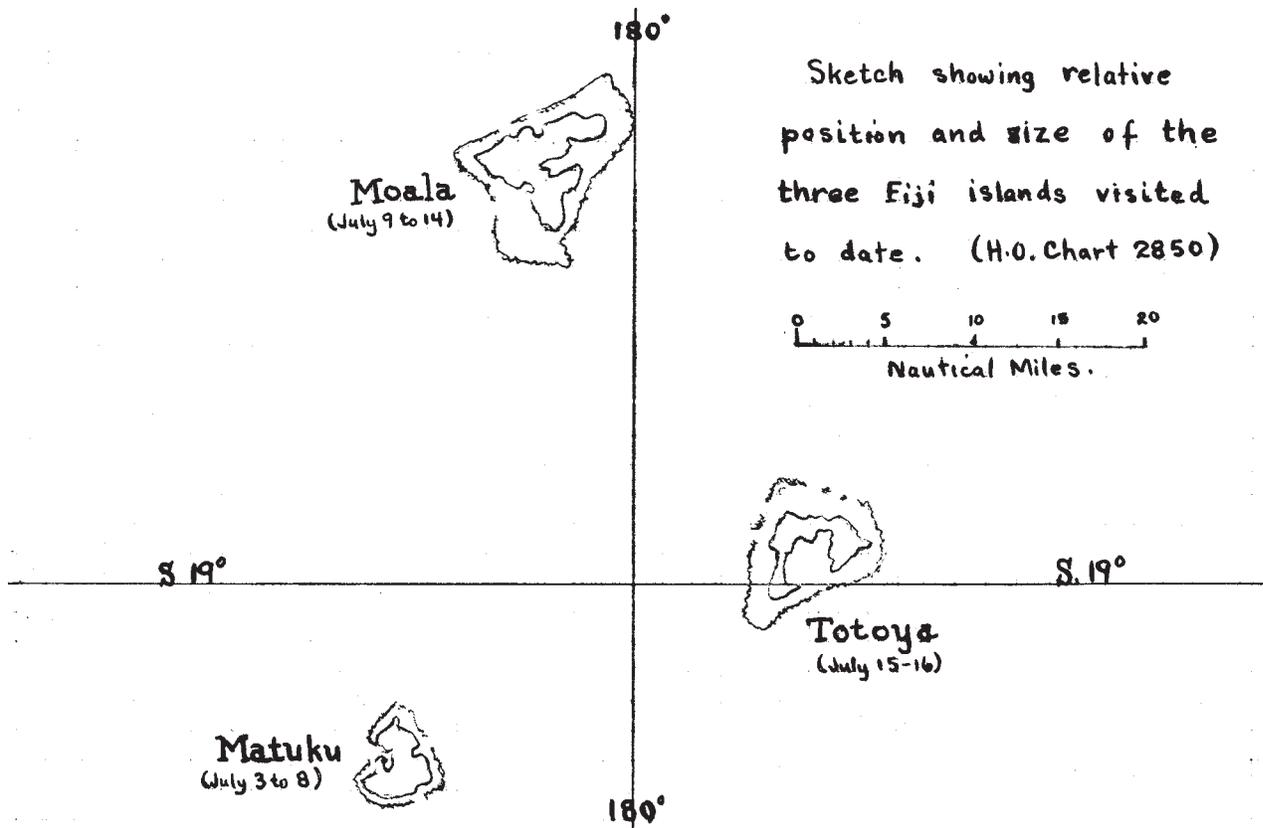
Spent evening writing out Photograph data.



Roll 55:4 S.W. end of Totoya (E. side) from same spot.



Roll 55:5 Looking down on the isthmus from about 400' elevation. Here stands one of the largest groves of coconuts on the island. It is flanked by fine sand beaches.



Friday, July 18, 1924.

Spent day reading and writing some popular notes on the three islands of Fiji visited. Ship tack- ing against head wind south of Nagau.

Removed last plants from dryer and finished packing box 5. Enough left over for box 6.

Saturday, July 19, 1924.

Arrived Suva at 8 A.M. Ashore and got bill of lading and customs declarations for six boxes to Honolulu. Bought some acid Hypo fixing powder. Mr. Campbell gave me a pint of Ethel Alcohol. At his office met Mr. H. Collard, who is working on the "Bunchy top" disease of Bananas. He has been sent out by the Queensland Dept. of Agriculture which is about to establish a Banana Experiment Station, to study banana diseases in Fiji and other localities. I told him what I could concerning banana diseases and pests in Hawaii and referred him to Dr. Lyon of the H.S.P.A.

Packed the sixth box of Natural History Specimens for the museum. Received my mail:- \$50.00 from the Bishop Estate and letters from Gregory and Ball.

In afternoon field trip - visit to diseased Banana plantations with Mr. Collard, Mr. Campbell and Mr. Wyke, journalist.

By auto to end of Colo-i-Suva Road, stopping on way to tramp thru a plantation and viewing sev- eral others from the road. Found plants infested with beetle borer, obtaining specimens. Also learned how to distinguish the typical "bunchy top" disease and other fungus attacks on banana plants, includ- ing Sigatoka disease.

On plants affected with "bunchy top" the interior leaves instead of becoming larger than the lower leaves are very small and give a stunted appearance to the plant. The center rots entirely away. The

leaves have a distinct snap when broken and the blades crackle when crumpled. The mid-rib often has a dark green streak on the under side and dark lines radiate out from the mid-rib across the blade parallel to the ridges or corrugations. The interior of the trunk is frequently bluish toward the rest of line incomplete.

Several other types of fungus attacks were noted, some of them new to the two plant pathologists. "Scab" on the fruit itself was comparatively rare, this being controlled by dusting the early blossoms with a mixture of 1/2 Pyrethrum and 1/2 wood ashes mixed together and blown on the plant.

Collected a few specimens from bananas besides the beetle borers; some beetles and a gecko under the bark of a dead tree; and a few landshells on banana leaves.

Mr. Collard asked me to be on the lookout for banana diseases upon my return to the Lau Group.

Sunday, July 20, 1924.

All day field trip along Suva Water Supply Ditch Trail in foothills to north and north-northwest of Suva.

Early start, walking 2 miles N & NNW along bay road to large concrete bridge over the Tamavua river. Turned to right and followed up the valley to the east bank of the river. First along a road past the slaughter house and Animal Quarantine Station. Then along a very muddy track as far as two small native villages. Finally along a very fair trail - following the pipe lines.

Saw a Monarch butterfly, one of the first seen in Fiji. They are apparently rare at this season of the year.

The valley floor has the usual lowland vegetation:- Kösters curse, "mile-a-minute vine, lantana, Solanaceae, verbena, sensitive plant, grasses and ferns and several weeds. Here and there patches of small shrubs and an occasional tree or tree fern. A great deal of the hill slopes and higher ground is under cultivation, planted to taro, bananas, awa, yams and occasional sticks of sugar cane. Many of the larger patches are operated by Chinese, who raise a few vegetables.

Insects scarce in lowlands. A few tiger beetles (Cicandellidae) in the trail; honey bees on the sensitive plant flowers; black shining submetallic round "stink" bugs on the shrubs; numerous small brown ants; a few small moths and occ. skippers and small brown & yellow butterflies. A few day mosquitoes about me.

The valley broadens out and divides into two, the larger branch going to the right, taking the large stream with it, still navigable for motor-boats, even here. The pipe lines (3 in number) and trail cross on a small bridge and continue to the N. and NNW. with the forest covered hills just ahead.

Passed a good sized patch of fairly large banana plants. The leaves seem badly colored with fungus, but saw no "bunchy top."

Soil changes from brown-cinereous soapstone and stream carried sediments to a distinct red-brown heavy clay as the trail leaves the valley bottom and ascends a ridge. The vegetation also changes to the beginnings of rainforest - scattered shrubs and trees, tree-ferns more numerous and much staghorn fern undergrowth-although the Köster's curse continues.

Near the top of the ridge the pipes pass thru a short tunnel while the trail goes over the top. Went thru the tunnel, finding that the red clay continues for some depth - all the way thru the tunnel - becoming quite moist and very slippery at a depth of 50 feet or so.

Caught a moderately large gecko in a v[a]lve box.

Down other side of ridge into a pretty wooded valley. Trail forks - as does the valley and stream and pipe lines. Followed right hand fork which goes approx. N by W. The slopes of the valley are covered by a fairly luxurious forest. In the bottom a little stream roars over rapids and waterfalls. Saw several new and interesting trees, herbs and ferns. Soil again loses its red color and becomes grayish to slate-brown.

The general types of forest, the coolness and pleasant dampness, the trail, cut in the side of the valley, and most everything except the quantities of Köster's curse, remind one of the ditch trails on Maui.

The trail rises steeply up a bluff and is assisted by wood or log steps and a wire cable. Up to this point the trail could be traversed on horseback.

A number of brown, white spotted butterflies about the blossoms of tree # 364. Also honey bees, attracted by the fragrant odor.

Finally reached the intake dam. Just above the dam is a self-recording stream gauge sheltered by a small shed. Caught several craneflies and other nemocera in the shed.

A number of very large-leaved Pandanus plants grow in the valley bottoms. The trunks are three to ten feet long, up to 10 or 11 inches in diameter and topped by a large rosette of long, narrow, parallel-sided, obtusely pointed leaves, some of which reach a length of 8 or even 10 feet. They are without spines, but sharp-edged.

Returned over same route, collecting the plants located on way out.

Collected a few insects on return trip.

Developed three rolls of film in evening. Typed document for Capt. Stenbeck regarding the loosing of anchor.

Monday, July 21, 1924.

Suva, Fiji. Spent day doing errands in town and getting bill of lading for the six boxes of specimens signed. Delivered the boxes to warehouse for storage until Makura leaves, Aug. 8. Cashed \$50.00 draft.

Presented with a map of the Fiji group by the Dept. of Agriculture and the Government Printer. Purchased one of the new handbooks on Fiji just off the press.

Rainy afternoon and evening.



Roll 56:5 Intake dam and valley just below it. Looking S.S.E.

Tuesday, July 22, 1924.

Rain continuing. Mr. Beck informed me that we would not sail until late afternoon so made another excursion up the Suva Pipe Line trail. Despite occasional drizzles and deep mud underfoot went up trail traversed Sunday. Caught an unusual looking millipede with long gray and red spines on the margins of the segments dorsally, crawling along trail in valley bottom, Elev. 25 feet.

This time took left hand fork of trail and pipe lines. It runs west a short distance and then turns north to NNW paralleling the other branch, in the next valley.

Noticed the same soft moss on the banks which collected on the stream banks on the high Moala plateau.

Caught a slender red, black and white bug, caught in spider web.

Two of the pipe lines have their intake at a small dam and the third in another small dam a few hundred yards further on.

A great deal of anthrocyan in the new growth. Many of the young leaves of both ferns and several shrubs and trees are bright red-brown in color.

From this upper dam a small trail runs east over the ridge thru a very pretty small forest to the head of the trail, coming out at the upper dam.

Followed the E. fork back, collecting several plant specimens and a few insects. Reached Schooner at 4 P.M. only to find that hour of departure had been postponed again - indefinitely.

This region would repay other visits, especially as several small tracks lead up the ridge.

Finished up Plant Field Notebook 4 and wrapped it up to be posted to the Museum.

Wednesday, July 23, 1924.

Visited Botanical Gardens in morning. They have a beautiful situation on the slope behind the waterfront, about $\frac{3}{4}$ mile south of business district. The lawn and grounds are well kept, but the gardens are poor from a scientific standpoint. The plants run largely to palms, with a few large trees - several of them Ficus, and tall, spectacular Araucaria trees. Although supposedly labeled, I saw but one label in the entire grounds - on a calabash tree, a native of the west Indies. In fact but few of the plants appear to be natives of Fiji. It seems to me that a much more valuable, and for the visitor - interesting botanical garden could be built up with less effort, if it included more of the native Fijian plants. A small scale representation of the forests, with the plants well labeled would be of great interest to the botanically interested tourists, as well as instructive to the residents.

There are two memorial or gift monuments and a small pavillion containing a clock, situated in the grounds.

Also looked over Mr. Barker's collection of books on Polynesia and Australasia. He has a very fine lot, including many of the early voyages and older books. In some instances several copies of each, such as Cook's voyages, Ellice's Polynesian Researches, etc. Nothing much on Hawaii. Mr. Barker is editor of the Fiji Times and Herald.

Received note from Browne & Joske, agents for Colonial Sugar Refining Co., stating that Mr. F.C.T. Lord, manager of Nausori Mill had heard of the Whitney Exped. thru the H. S. P. A. and wished to do anything he could to help us. Called on Capt. Joske and phoned Mr. Lord from his office. Also wrote him a note of thanks.

Schooner left at 4:45 P.M. Out of the harbor and S.E. with a light breeze from the E.N.E.

The crew caught a snake in the harbor, while we were still along side the dock. It later partly regurgitated an eel or small fish which it had eaten.

Thursday, July 24, 1924.

At sea all day, NE of Astrolabe tacking against a head wind in early morning, and S. of Ngau in afternoon, after the wind had shifted. Head sea made the trip rough and in the late afternoon a heavy blow necessitated reefing both sails. Spent day reading. Rough night.

Friday, July 25, 1924.

Wind lighter in morning. Daylight found us to S.E. of Moala. Wrote out some notes regarding Tanager insects, which I had formulated. Spent morning reading in cabin because of rain. Late afternoon we passed south of Kambara. Coccinellid found on deck. It probably was blown aboard as we passed Totoya, the wind having been from that direction.

In the evening, while drawing charts of Ongea and Fulanga the large kerosene lamp rocked over on me, showering me with the broken fragments of the chimney and globe and nearly causing a small fire.

Saturday, July 26, 1924.

Skinned a rat caught on board "France" before breakfast, also preserving the skull and stomach.

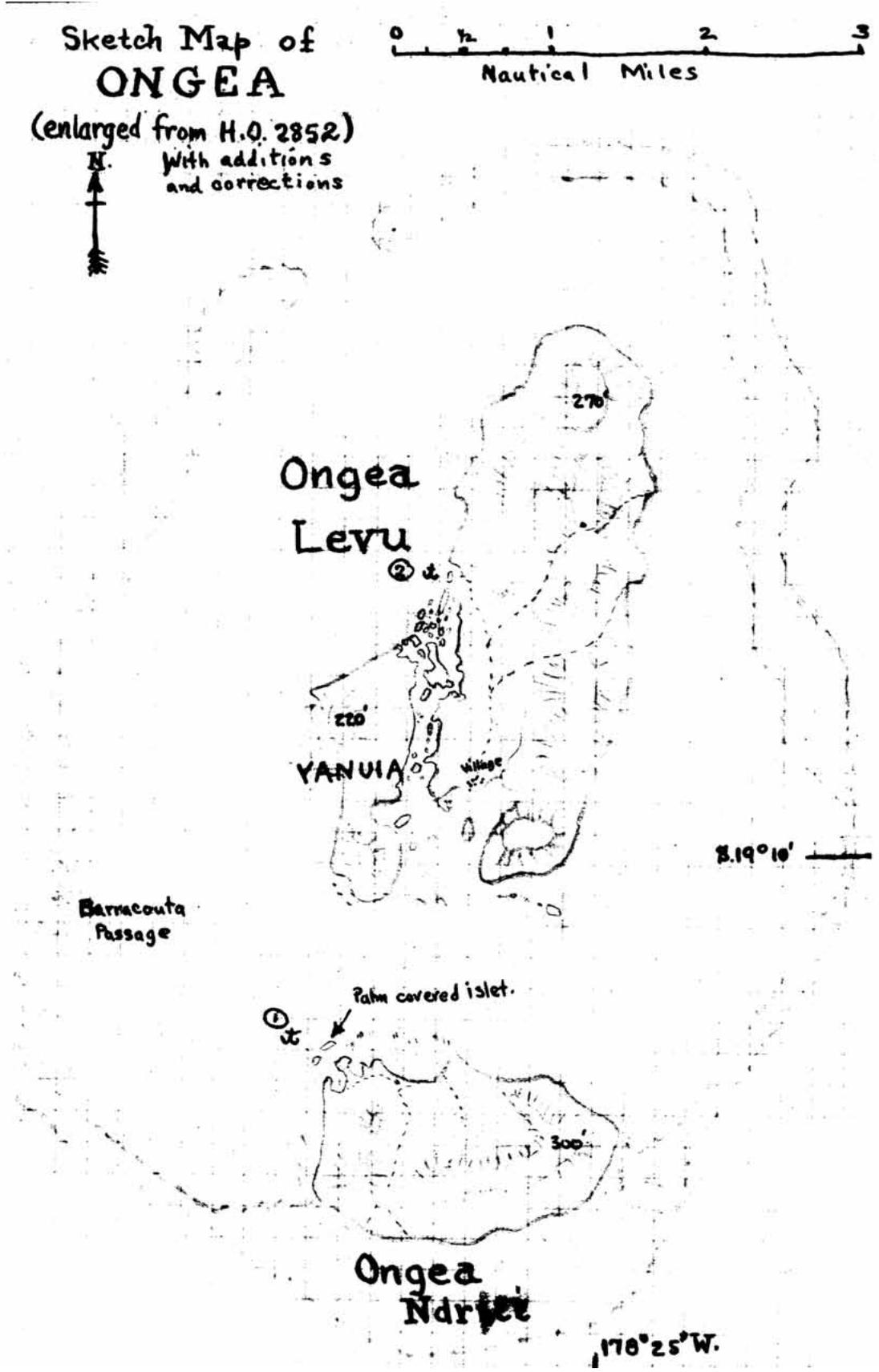
To south of Fulanga and S.W. of Ongea in morning. Anchored off N.W. point of Ongea ndrite, ESE of Barraconta passage, by which we entered the lagoon.

From the ship all the southern islands:- Kambara, Wangava, Marambo, Fulanga and both Ongea appear flat, with but few prominent elevations. Much of the coast line rises sharply from the waters edge, which is undercut by the waves. These cliffs rise only to a height of 10 to 60 feet, but compared with the height of the islands (200' to 400') they are large. They are broken (especially on the S. and E sides of Fulanga by sand beaches flanked with Mangrove and behind them coconuts and the usual beach trees and shrubs.

The entire rocky shore and all the small islets have this undercut line. Some of the smaller islets have only a slender neck and truly resemble toadstools.



Roll 57:1 Fulanga island, looking N.W. from the ship





Roll 57:3 Small islets off the N.W. side of Ongea ndrite showing the mushroom outline given them by the undercutting at the water level.



Roll 57:4 One of the larger of the small islets its steep slope covered with native palm. (*Veitchia* sp?)

We landed in a nearly enclosed bay at the N.W. corner of the island, on the undercut shelf between mangrove thickets. Behind this is quite a clearing containing coconuts, maniot plants, taro, sweet potatoes, yams, etc. No one lives on Ongea ndriti, but several good sized areas are cultivated by natives from Ongea levu, the village being a scant two miles away.

Followed a very fair trail across to a sandy beach on the south side of the island. The interior is undulating (at the W. end), and extremely rough in places. The coral limestone, of which the island is composed (see samples) weathers unevenly, leaving jagged rocks and deep holes. The latter are often covered with herbs and vines, making progress, off the trails, arduous if not dangerous. The interior is densely covered with scrub-No. 382 being the dominant undergrowth. There are also scattered large trees, up to 3 feet or more in diameter. The straight trunks without lateral branches make their crests inaccessible. There seem to be three or four species of the largest types. The largest has a dark red heart, (judging by the cut stumps it is the sp. from which kava bowls are cut – called vesi (Afzelia bijuga)).

The beaches and rough limestone cliffs are lined with the usual littoral plants – among them *Tournefortia*, *Pemphis*, hau, *Pandanus*, *Scaevola*, tree legumes, the one with the red flowers (*Totoya*), the one with the ovate leathery leaves with obscure veins (*Totoya*) and # 404; and several others collected.

The yellow flowered composite (*Matuku*) prominent among the open coconut groves, and cultivated paths, to other with a number of introduced weeds. Many of the same trees, shrubs and vines as on Motuku, Moala and *Totoya*. Saw the beach runner with yellow flowers and burrs.

Back to N.W side collecting a few plant specimens.

The insect life is not abundant. There are a few beetles under bark and on dead twigs; small flies, leafhoppers and wasps on foliage; and numbers of butterflies.

Landshells are fairly abundant on the leaves of small trees and shrubs but they are all small and not many spp.

On way back to schooner I looked on one of the rocky “mushroom” shaped islets and collected specimens of the palm which covers its slopes. Access was difficult owing to the steep slopes. The natives call the palms niu sawa which corresponds to Veitchia joannis H.Wend. in the list. They look very much like our Hawaiian Pritchardias but have very small seeds, reddish when ripe.

In pressing the palm caught dome green scutallistid [scutellarid] bugs on the immature seeds. Pigeon fly got on the dog from the skinning room.

Sunday, July 27, 1924.

Spent most of the day on the small palm covered islet visited yesterday afternoon. It is good collecting because the vegetation is concentrated and also stunted which makes it readily accessible.

The entire islet rises steeply from the sea for 15 to 40 feet. This cliff face is undercut to a height of 5 to 10 feet. The highest point is about 80 feet elev. The surface is entirely of rough cut coral limestone, with a minimum of soil. Despite the roughness and lack of soil it is well covered with vegetation on top – besides the palms there are *Scaevola*, *Pemphis* *Pandanus*, hau, buka (?) # 387, an epiphytic orchid - # 396, a tree with fleshy green fruit enclosing 4 to 5 shiny dark brown seeds (called kalaka by the natives) (398) a large shrub or small tree with moderate large 5 ribbed fruit (399). *Ficus*, tree with 4 berries together (collected before), tree with white flowers and small red capsules (collected before) *Boerhaavia*-like herb (390), and quite a number collected here for the first time (Nos. 390 to 403).

The insects are all concentrated. Butterflies (4 or 5 spp.) fairly abundant; large creamcolored leafhoppers, on palms, *pandanus*, and shrubs; white scale on stems of several shrubs; a few bugs; a



Roll 57:5 Close up of the palms on the N.W. side of the islet and of the undercutting.



Roll 57:6 A toadstool islet at the entrance of a small bay.

longicorn beetle in Pandanus heads, etc.

Collected a very few landshells from leaves.

Small geckos in Pandanus heads. Several small green tailed lizards on the rocks.

Large red-brown land crab, in crevice, with long lobster-like antennae.

Took a specimen of the water worn limestone which was typical of much of the surface of the islet and also of the rougher localities on the main island.

Watched two Fijian canoes in action, before a stiff breeze. The natives seem to be good sailors. To reverse the direction a native picks up the point of the mast and sail (which consists of a triangular mat, one side of which is tied to a spar) and carries it to the opposite end of the canoe. They were able to stop from full speed (6 or 7 knots) within about 25 feet and within a few seconds to have gained headway in the opposite directions.

Upon return to Schooner at 4 P.M. Mr. Beck gave me a specimen of crystalline rock which he had found in large deposits on the limestone cliffs. Testing it with Ammonia molybdate and concentrated nitric acid showed presence of phosphate, but the violent liberation of carbon dioxide proved it to be limestone. The ordinary limestone gave the same reactions.

Monday, July 28, 1924.

Ashore at 7:30 visiting the level interior and high eastern end.

Scattered along the limestone cliffs and undercut shelf are patches of dark red-brown (See Samples). Here and there is a small deposits of the white crystalline rock (sample from Mr. Beck).

Collected some large red-brown ants from under the bark of a large dead tree.

East along a fair trail which leads to the next sand beach, collecting a few small landshells from the dew covered leaves.

Stripped bark from a fallen tree getting centipeds, wood-lice, caterpillars, grubs and fly pupae, and larvae, pupae, and adults of several beetles, including a moderately large brown Elaterid and a slender fuscus staphylinid.

Walked along beach shelf (it being low tide) to next sand beach. From here a good trail leads inland to a large central clearing planted to coconuts, cassavas (Manioc), bananas, papayas, pumpkin vine, etc. but much overgrown with weeds, especially Bidens. Coconut leaves were much eaten along edges as if by Phasmidae, and also much spotted with fungus. Took a few typical bad ones for the Fiji Dept. of Agric. who asked me to be on the lookout for crop pests. This cleared area is quite large, with new sections being added to it. The surrounding country is level with a good soil, the best on the island.

The trail leads SE beyond the clearing, but only two places from which timber has been cut. Some of the large trees and cut stumps are over 3 feet in diameter, the largest with dark red-brown hearts. The ground becomes undulating again with rough hummocks of limestone rock and sheer depressions or sinks.

In at least two places large trees had been felled against these limestone hummocks. These were burned, converting the rock into lime (see sample).

Caught some of the rotund purple "jumping" beetles under dead bark of one of the large trees. The bark is fully 2 cm. thick and red-brown in color.

Came to the line of hills which fringe the east end south-east end of the island. Climbed the highest. From the top of a large banyan which crowned its summit a good view was obtained. The circular reef containing the Nukusonge Rocks was plainly visible to the eastward, about four miles away.

Walked west and north west across very rough country, full of pot holes and jagged ridges, com-



Roll 58:1 A family of Fijians (over from Ongea levu) with their cooking fire and ti covered lean-to on the beach, S. side.

ing out on the cross-island trail traversed Saturday.

Collected a few beach plants while waiting for the boat. Also caught some grasshoppers, leafhoppers etc., sweeping beach grass at the N.W. end.

Mr. Beck donated a yellow, brown and white butterfly, a cockroach, and a scorpion which he had caught.

Tuesday, July 29, 1924.

Ashore at 7:30, spending the day in the west end of the island.

Worked S. and W. around the N.W. bay, collecting land shells from damp leaves. Collected a small red hermit crab which had a piece of coconut for its shell.

The vegetation is very uniform in the interior, # 382 being the dominant undergrowth. Some yellow-brown cylindrical mushrooms as previously collected. Several of the trees are the same as collected on Matuku, Moala and Totoya, including both the trees with large pinnate leaves, composed of opposite good sized pinna.

Got scratched up trying to get up the face of a limestone cliff to a small cave. The cliff was very crumbly and gave away under me. Nothing in the cave when I got to it.

Collected a specimen of coral limestone from beach cliff showing all three of the dominant shades – gray, brown and white crystalline. It also had a fossil shell in it.

Collected quite a number of beach trees along arm of the small bay.

Returned to schooner early as we were shifting anchorage to north end of bay on west side of Ongea levu.

Chief of the village on Ongea Levu aboard, acting as pilot. He gave me a snake, which he says are numerous on O. levu.



Roll 58:2 Palms growing on overhanging cliffs of this small islet.

“mustard.”

At the village bought a small pandanus mat for a shilling and a piece of tapa 3/. There were no stone implements. After diligent enquiring thru an interpreter I was shown a modern circular grindstone and then a metal adze. They had apparently long ago lost their stone utensils.

Purchased three sticks of black ebony (?) wood (for 2 shillings) which they call “kaukauloa,” on condition that they would show me the tree so I could get leaves and fruit or flowers if any. The wood is highly prized because of its heavy weight and hardness.

Saw a “flying fox” bat over the shore.

Pigeon fly and bronze bug from Mr. Beck.

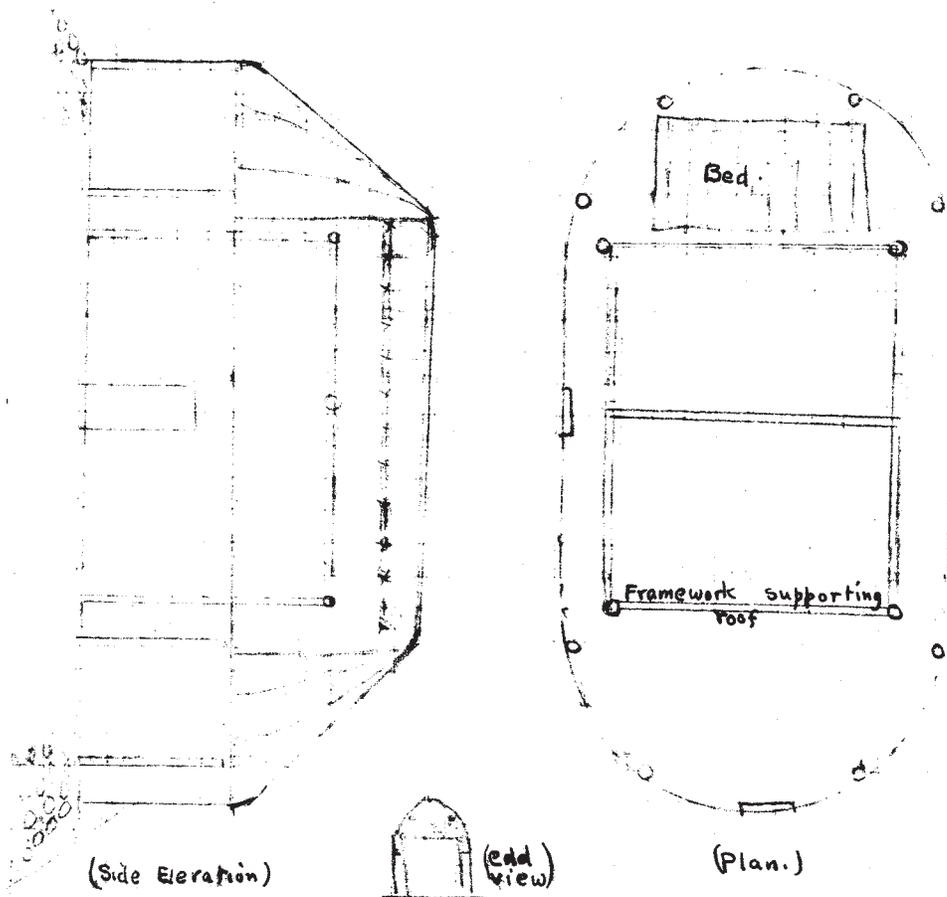
Wednesday, July 30, 1924.

Ashore at 7:30 and across a good trail to the village, which is situated at the head of a deep bay on the south side. The interior of the island included a large flat area, the portions of which, not under cultivation or cleared for coconuts, are luxuriantly covered with scrub and larger trees, some of large size. Think one of the large species is buka.

The butterflies and landshells (small ones on leaves of shrubs) are abundant. Collected a number of both. The trail is lined with red pepper bushes and Piper insectifugum (?) called Wagawa here and in Samoa awa-awa-aiku, both of which were scarce on Ongea ndriti. # 382 continues to be an abundant under-shrub.

Caught a series of blue bugs with red and white spots, yellow brown beneath, on the seedy-looking lettuce plants which I was told were

The houses are ovate elliptical of very simple construction. A rectangular frame on four posts supports the slant roof, which is straight and not curved like the two ends. The side walls are about 5 1/2 feet high, covered by overlapping braded coconut leaves, tied to a light framework of coconut wood.



The posts are of vesi. The roof is thatched with pandanus leaves on light framework of coconut trunk "scantlings." At one end is a bed, made of light framework over which are spread several of the large pandanus mats. The red and orange fringes hang at different levels on the side, making the entire side of the bed a series of colored bands.

Followed trail north and east across to sand beach about half way up east coast. Did not cross stream marked on chart.

Small grasshoppers are called gnaka. Collected a number of beetles and large fly larvae under bark of fallen tree.

Walked north along undercut shelf (it being low tide) about 1 1/2 to 2 miles to another sandy beach near the NE end of the island. Caught a large noctuid (?), a species which I noticed before in the rough rock face of the beach shelf.

On some rocky islets off this sand beach are several ironwood trees-called Cau [Thau] or Caukuro [Thaukuro] (Casuarina nodiflora) [or it might have been equisetifolia - neither flowers or fruit].

Met an old native who put me on a good trail leading back thru the rough interior to the cultivated flats behind the village. In the little valley behind this sand beach he cultivates manioc, bananas, breadfruit, large and small taro, and dries the coconuts to copra.

Collected a specimen of cotton,- apparently not cultivated, on the edge of one of the clearings (# 421).

Mr. Correia had a white moths for me.

Bird skimmers collected a pigeon fly and a number of small Hippoboscidae, the latter's host not known for certain.

Thursday, July 31, 1924.

Central and north-east end of island.

Ashore at 7 A.M. Down trail toward village and out on a fork leading well out toward NE end of the island.

Collected quite a few landshells and some insects. Occasionally one sees a shrub with its leaves serpentine with mines. Collected few species of ferns (# 423 + 424) growing epiphytically from a collar-like bracket high up on the trunk of a straight tree. The tree had been felled, but the ferns were still growing. The bracket, which encircled the tree, seemed to be composed of a third kind of fern, although it was growing from the same rhizoids as # 424. These perched ferns are comparatively common on the east side of the island. Caught a green tailed, olive-brown lizard, a large gray spider and a small roach by "whacking" the dry brackets.

Passed three partly finished and apparently abandoned canoes, one of which was large and practically finished. These trails are wide cut especially for bringing out canoes which are made up in the N.E. and N.W. forest and carried the length of the island to the village. Found the chips of a score of cuttings.

Collected a number of moderately small black weevils, a centipede, scorpion and some flat greenish-gray shells under loose bark of prostrate dead trees.

Fuscous yellow syrphid and dark aeneous bee on flowers of plant # 427.

Collected some small shiny black wasps dancing in the sunshine.

The trail and its two branches ended in felled logs. Returned over same route. Caught some Ephydrid flies and Halobates bugs on beach while waiting for small boat.

Friday, August 1, 1924.

South and South-east end of island.

Ashore at 7:15. Down trail to village, catching butterflies and collecting small landshells along the trail.

An intelligent native, "William Goodtime," showed me a kaukauloa tree from the dead heartwood of which the hard black "ebony" canes and clubs are made. It was neither in fruit nor flower, the period being mid-summer - Jan., Feb. and March, but collected leaves and wood specimens. Caught a black Lucanid beetle in the trunk.

Returned to village, which is called Naiculaga. About 78 to 80 people live here and "farm" both Ongea levu and Ongea ndriti. The village is situated on a flat toward the north east end of the bay which runs up between the two southern arms. Had thought that the ridge to the south-west was part of Ongea levu, but found that it was a separate island called Yanuia, separated from O. levu by a shallow channel.

After much talk about Matau vatu (stone adzes) was able to locate one and purchase it for a shilling. William said they were occasionally dug up in cultivating sweet potatoes and yams or manioc.

Watching natives making kava bowls and wooden combs. For the former they used a number of plane blades and gauges fastened to old fashioned wooden handles. One was made from a hatchet,

fastened sidewise instead of vertically. For the latter (comb) making the tools were strictly modern: saw, plane and even a small square.

Crossed head of east arm of bay by village (the entire arm being dry at half tide), and went SSE along S.E. arm. This is rocky with occasional small sand beaches, covered with coconut palms and beach vegetation.

Collected a robust, shiny fuscous Scarabaeid on the common beach legume; also some narrow waisted fuscous bugs and a small white and brown spider.

Several good sized trees of noni (*Morinda citrifolia*) near the beach. Many of the forerst trees grow on the rocky slopes behind the beaches, but saw no new ones in fruit or flower.

Small shiny round black stink bug common on beach shrubs.

Considerable of the *Chirodendron*-like shrub with yellow flowers and brown pompoms (collected on rocky islet off O. ndriti).

Saw some of the thorny trunked leguminous trees with bright red flowers. Although I collected it on Totoya, took another specimen (# 434).

Saw a huge dilo tree (*Callophyllum inophyllum*), the trunk of which must have measured 8 or 10 feet in diameter. The spreading dome was easily 60 feet across. It was growing on the sand beach, not 25 feet from the water, on S.E. end of the island.

Caught several yellow and brown butterflies about the shrubs on this beach. From the point, just S.W. of the beach, a line of small palm covered islets runs out E.S.E. to a fairly large islet, about 250 yards long and 90 feet high.

This angle of the island must be subject to strong winds, as the rocks above the undercut shelf for several feet are covered only by creeping *Boerhaavia* and stunted shrubs. Behind this is a zone of windswept palms, *Pandanus*, and stunted shrubs and trees.

Walked north along east beach, partly along small trails, partly on undercut shelf. Passed several small sand beaches. The little pools on the shelf contain numbers of small olive gray brittle-stars. Small greenish or purple crabs are abundant.

Struck in from beach, directly west. Traversed a small zone of "bad-lands" about 250 yards wide. This consists of alternate steep, very rough limestone ridges (or rather hummocks, as they do not lead anywhere) and deep pot holes, up to 50 feet in diameter, with steep sides and filled with brush and debris.

Then passed some less steep hummocks where the smooth bare rocks, under the dense shade of the forest trees were covered with landshells, often half a dozen on a small rock. Collected a generous sample.

Over to the village and watched part of the process of extracting coconut oil from pulp, the squeezing of the dirty, rancid smelling oil from the brown pulp into a white enamel wash basin.

Up trail a ways to NNW. Then cut cross country again directly W. After traversing another zone of "bad lands" came out on small bay, at extreme S. end of the large islet filled bay to S.S.E. of anchorage. Worked up along undercut shelf in water up to my knees. The rising tide forced me up on a rock to wait until the boat came in to pick me up.

Mr. Beck brought some beans and leaves of the 3-leafed beach leguminous vine # 403.



Roll 58:4 Looking south along E. face of Ongea levu, a palm in foreground.

Saturday, August 2, 1924.

Extreme N. and NE end of the island.

Ashore at 7 A.M. taking first branch of trail running north. Collected some insects, landshells and another plant.

Scorpion, roach and earthworm under bark of fallen log.

Slender cream-yellow leaf miner in leaves of small tree. Took specimens of larvae and leaves.

Caught a moderate size red-brown and cinerous spider eating from one of the robust fuscous Scarabaeid beetles.

Came to end of trail in some canoe cuttings. Cut across due east and hit head of another trail, following it S.S.W. This proved to be a branch of the trail followed Thursday. Again struck out due east toward the east shore. More "bad-lands". No wonder the natives prefer to carry their canoes the length of the island to the village, rather than across this kind of ground to the east or west coasts. The hummocks lead nowhere and one must be continually climbing up and down the walls of the pot-holes, the bottoms of which are filled with brush and jagged limestone. It took a long time and much energy to reach the east coast and then I couldn't get down the steep 80 foot cliff.

The spot at which I came out was about 1/4 mile north of the small sand beach visited July 30. Could see the whole of the east reef and Thakau Teteika—a small circular reef to the NE from here. Took a picture from this spot. [58:4 above]

Made my way along the top of the cliff. Descended on ledge to undercut shelf, down to sand beach with Casuarina trees and SW across island on the trail followed Wednesday.

Sunday, August 3, 1924.

Explored the channel between Ongea Levu and Yanuia. There being no indication of this channel on the chart, took special pains to sketch its passages and bays. (See following page.)

Took the small boat and rowed down east side of the small islets, clear thru the channel and down toward S.W. end of the bay. Stepped at several sand beaches on return.



Roll 58:6 Native canoe off entrance to one of the numerous small bays, with usual sand beach and clump of coconut palms.



Roll 59:1 A section of the passage at ebb tide.

Much the same type of vegetation all along. Kou, hau, mangroves, Pandanus, noni, Chaenopodium-like shrub, yellow flowered composite, ti, running beach grass, etc. on the beaches and forest trees on the slopes behind. Collected a specimen of the fragrant white-flowered Gardenia-like tree, in both fruit and flower. (Previously collected, but not the fruit). # 440.

Picked up a fine specimen of Nautilus shell on sand beach.

The tide rises and falls about five feet, which makes a lot of difference in the waterways. The passage entirely dries at low tide. Had to tie the boat up to a "mushroom" islet and explore on foot. Was able to walk all about the islets, past which I had rowed, on dry sand.

Waited for tide to come in and rowed back to ship.

Developed two rolls films in evening.

Saw a hydroid [actually a sea cucumber; see at right] about 5 1/2 feet long and 1" to 1 1/2" in diameter. Brown to dark brown in color and covered over with round bead-like protuberances in rows.

It withdrew its tentacles and contracted the anterior half of its body when disturbed. It was scooping up sand into its mouth with its tentacles in about 8 inches of water.

Monday, August 4, 1924.

Spent early part of morning packing up accumulation of specimens and cutting more cotton for insect packing.

At 10:45 up anchor and shifted berth to Fulanga. Made a quick trip across, reaching NE side by 12:40. Lay off the mouth of the passage until a native canoe came out and a large Tongan skipper piloted us in.

Inside is a splendid landlocked harbor about 2 by 3 miles with the main island to the south and west and small islets to the north end east. The inside also contains quite a number of very small "mushroom"-like islets in addition to several moderately large ones, covered with scrub and palms.

But the difficulty is getting in. The passage (said to be 60 yards wide at the narrowest place) seems to be scarcely 60 feet wide with a strong current running out thru it. Just inside the passage are several coral heads, to avoid which one must steer close up to a small islet on the left. On the inside, however, the water is fairly deep 6 to 10 fathoms or more and free from coral heads.

Anchored on south side, in small bay from which the trail crosses the island, at 2:40 P.M.

Ashore and crossed to village, via a good trail which rises to elevation of 60 to 80 feet. The trail is bordered with the poinsettia-like herb collected in Hull I., which is an immigrant from New Caledonia or the Solomons. (# 441). This herb has brilliant red floral leaves, the rest of the foliage being dark green.

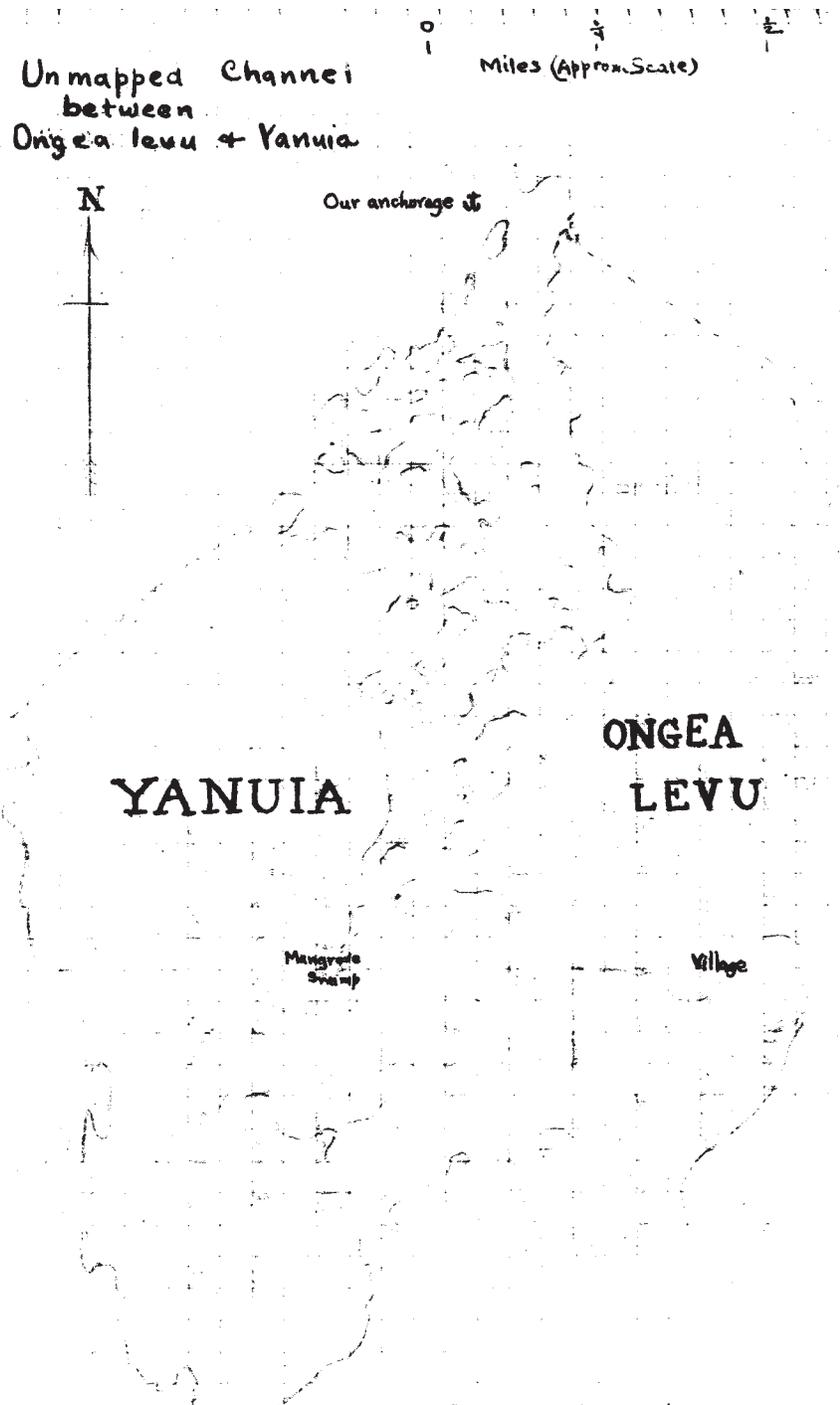
Saw the orange and brown butterfly here which was unsuccessful in capturing in Ongea levu.

Stopped at a village, Monotheke. They had neither old fish hooks nor nets of native make, but was able to purchase one good and two chipped stone adzes for 6^d, 6^d and 3^d respectively.

Continued on along beach to another village Munerah. Collected specimens of the large spider with cream-colored abdomen and long fuscous and red brown legs. Native name tukutuku.

There is also a small grasshopper called vondri.



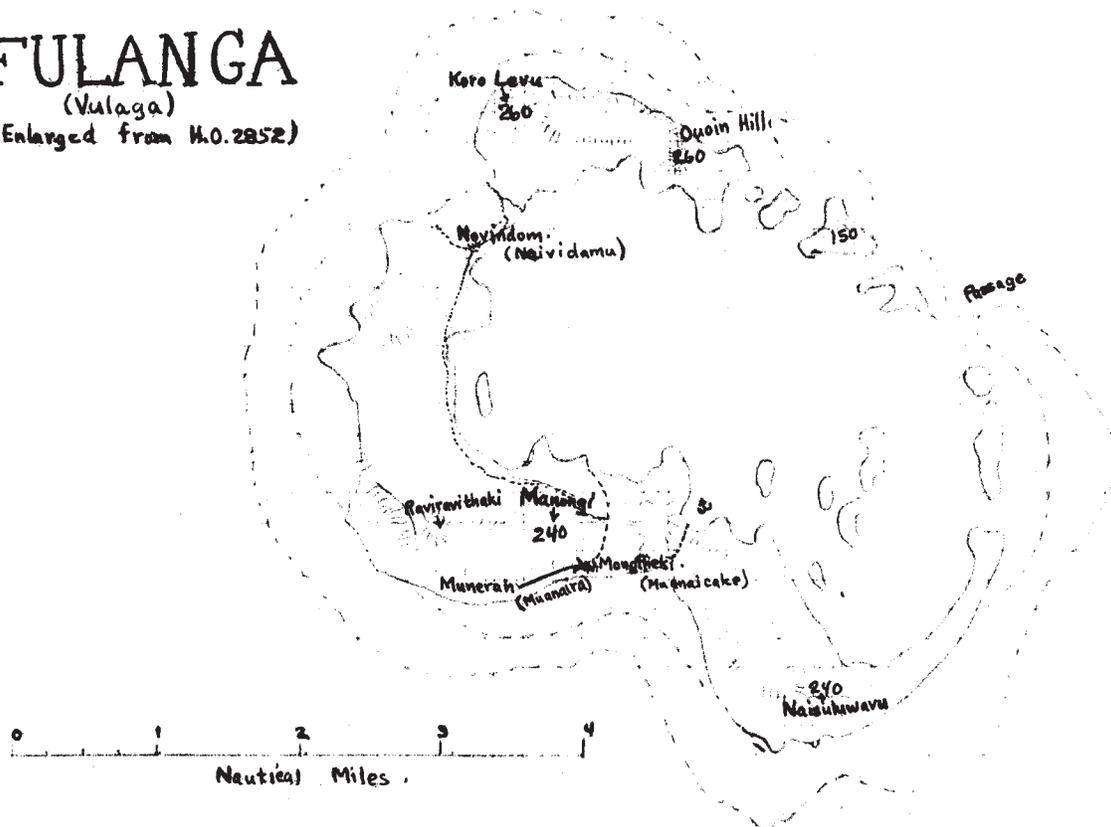


The spider lily-like plant collected on Ongea ndriti is called *viavia* (*Crinum asiaticum*), and the fragment white flowered tree (440) with round green fruit is called rewa or vasa (*Corbara odollam*). Two other common trees associated with the coconut and breadfruit in the lowlands between the villages are *ivi* (*Inocarpus edulus*) and dawa (*Pometia pinnata*). They look very much alike and both have mango-like leaves. Quite a number of *Tournefortia* trees along beach. Caught a *Tournefortia* moth (with red and black dots on white wing), the first one caught in Fiji.

Correia gave me a robust spider with light gray abdomen and short black legs, which he said had a nest made of leaves on which it was sitting like a bird.

FULANGA

(Vulaga)
(Enlarged from H.O. 2852)



Discovered a kava bowl and large wooden "pig" bowl half buried in sand on beach. Dug them out and brought them on board only to find that they had been purposely buried to season the wood and give it a black color. Had to return them.

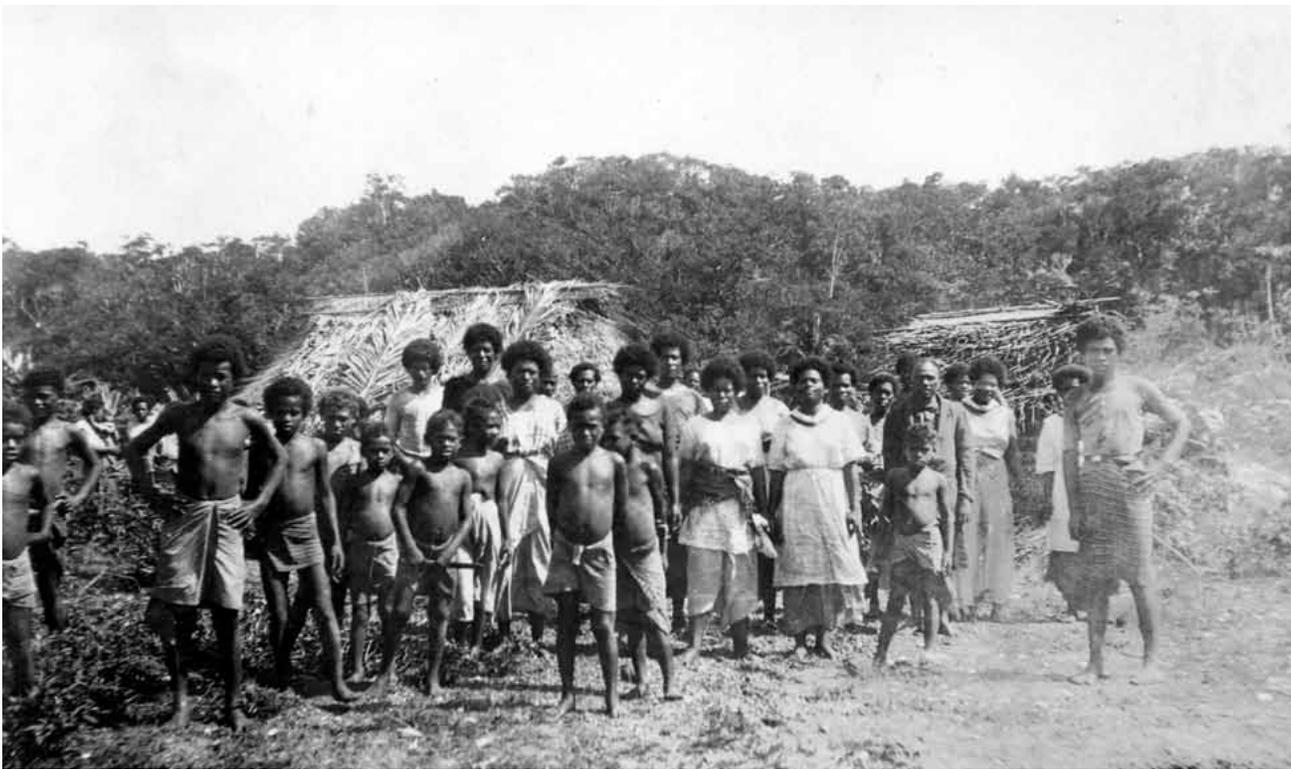
Tuesday, August, 5, 1924.

South-west and western portions of Fulanga.

Ashore at 6:40. Over pass and west along trail to Munerah. Then along sand beach and undercut shelf around S.W. point. This S.W. point is a steep cliff gray limestone, streaked with red-brown and white, and rising abruptly from the sea to a height of 50 or 60 feet. The "uplift" or "upheaval" spoken of in the pilot book may perhaps apply to this, but more likely applies to the higher cliff of limestone, containing caves, behind the village of Munethaki. That also has patches of red-brown (some almost pink) limestone. The west side is again a sand and coral pebble beach, underlain by limestone and coral. Behind the beach is the usual thicket of littoral vegetation:- *Scaevola*, *Tournefortia*, beach legume (= tangeos) (with ovate leaves) pandanus, tree with orange berry, tree with small hard brown berries in saucer-like rosette of leaves; # 442 (which I perhaps collected before); "puapua" = *buabua* (*Guttarda speciosa*), of Samoa and elsewhere; # 399 and 398; Legume with large flat brown pods and small sub-elliptical leaves (# 426); hau; coconut palms; # 443; # 444 with fibrous brown fruits, in pairs, and milky on the tree; pemphis; dilo (*Calophyllum inophyllis*); etc.

Good sized ridge (about 200 feet high) along part of west arm, thickly covered with trees.

Small clump of *Casuarina* (Cau) on the beach. *Boerhaavia* herbs; prostrate running grass; three leaved leguminous vine (called *voasae*); *Chaenopodium*-like shrub; all under Coconut grove on beach. Also the shrub (climbing over rocks on beach at Moala) with small 4 locule green to brown capsules, grows here as a low shrub.



Roll 59:3 Some of the inhabitants of Novindom [Naivindamu] in front of one of the houses.

Blue-bottle flies on dead fish. Large long legged spider frequent on its sticky orange web. Small brown dragonfly (the common Pacific sp.) here; not noticed on Ongea. Leafhoppers, grasshoppers, small bugs, small flies & wasps, etc. in grass. One small leafhopper had a red parasite on right "shoulder." Winged Ant-lion in grass.

Over short but steep trail to village of Novindom [Naivindamu] which is situated on lagoon side. Given a cordial reception by inhabitants.

Returned to Minerah village over a very good trail along the lagoon and over the ridge. The lagoon is lined for the most part with mangrove swamp, with lowland forest running up the rocky slopes behind. A trail also connects Munerah with lagoon beach. Here a number of native canoes are moored.

From them (the native women), learned the names of several of my plants:- the yellow composite is called kulululu, the common "maile fern" is vatsivatsi, the common tree with dull red capsules = matadra (Missiessya corymbulosa), # 442, sevua; # 443 waiwai; # 444 vavaoa; # 445 tangalito.

Stopped in at chief's house at Munerah. Purchased from him a domodomo or top piece of canoe mast, for 2 shillings. It is carved from vasi wood (Afzelia bijuga), and the shell which surmounts it is a white cowrie - buli, fastened to the wood with coconut husk sinnet - magimagi.

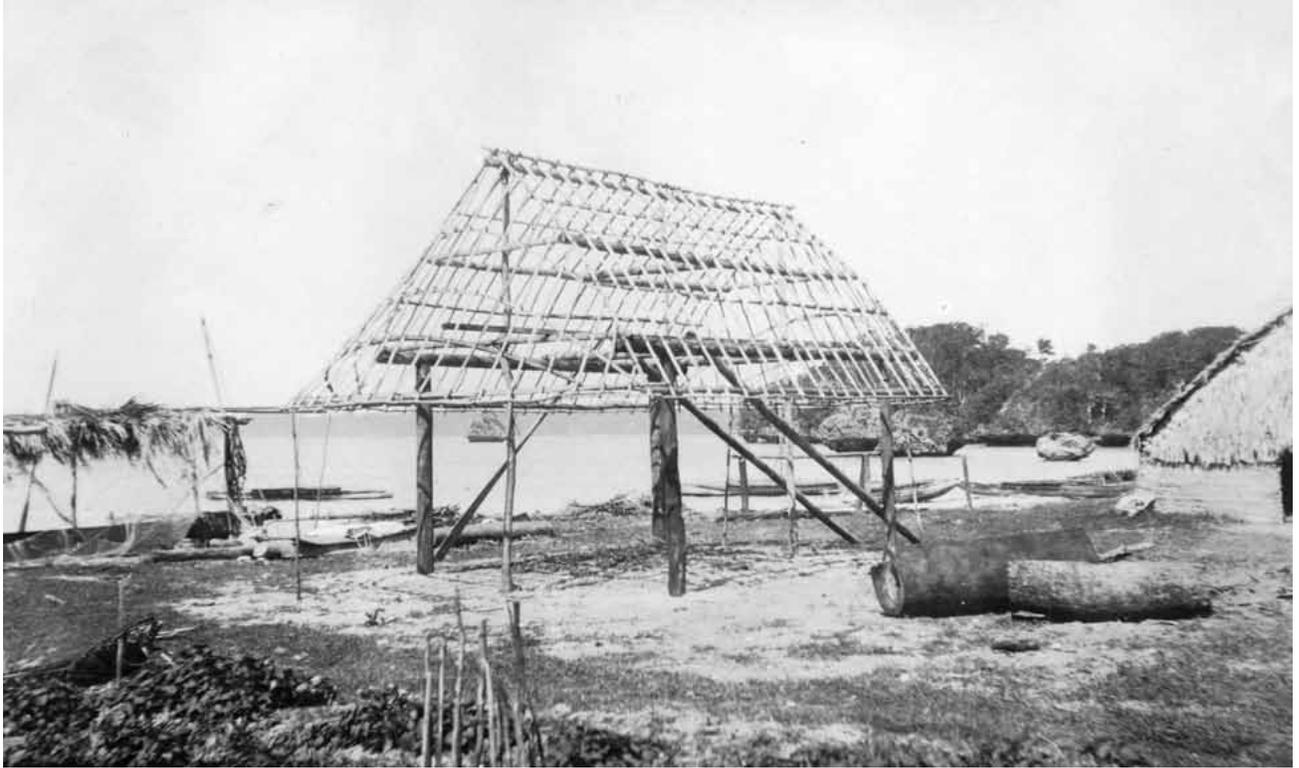
Was also able to obtain his Malumu (war club). He said it was old and it looked it. Made of Cau (Casuarina) wood. Gave him 2 shillings for it.

Purchased another stone adze for 6 pence. It is of light brown stone - called vatu beia or bia (pronounced embeia).

The shrub with the white floral leaves and yellow flowers collected on Matuku is here and called vobo (vombo).

On board schooner. Bought a vokai or large green "Chamelean" lizard for 2 shillings.

Mr. Beck brought in a specimen of Mulumulu tree, (the milo of Polynesia) - Thespesia populuea. Pressed it, although collected a specimen on Moala.



Roll 59:4 Unthatched house frame at Novindom [Naivindamu].



Roll 59:5 Typical Fijian canoe and group of native fisherwomen.

Wednesday, August 6, 1924.

Central and Western portion of Fulanga.

Ashore at 7 A.M. Along trail past Monethaki, and Munerah, and over pass and trail to Novindom [Naivindamu].

Collected a few landshells and quite a number of insects along the trail and in the open patches. Aedes pseudoscutellaris (?) (I think) is present, but not numerous. A number of beetles and weevils from dead leaves, especially some black ones from the dry leaves of milo. The soft brown cricket makes a nest by folding leaves, holding the edges in semicircle with white web. Shrub leaves “rolled” by a yellow and green caterpillar.

Red pepper and wagawa (Piper) present along the trail; also the “Pittosperum” collected on Ongea ndriti (# 383).

Went on beyond Novindome [Naivindamu] as far as trail went, which was to the narrow isthmus and across to the ocean side.

Collected kaukauloa tree with moderate size yellow fruit. Small trypetid fly at fruit. (# 448).

Back along cultivated areas under coconut grove between isthmus and village. Caught some quite large grasshoppers, pumpkin bugs, etc. Returned to Novindom [Naivindamu].

Back over trail to Munerah and Monethaki, collecting several beetles in dry leaves, wasps on shrubs and flies, butterflies, leafhoppers, grasshoppers, etc. Also another plant # 449. The red-flowered legume (collected on Ongea levu, # 434) is called drala and is Erythrina indica.

Noticed (but could not catch) the large common brown dragonfly.

Returned to schooner after trying in vain to find the old man who had made me an old style fish-hook.



Roll 59:6 Weaving coconut leaf thatch for house shown in 59:4.



Roll 60:1 Old woman slicing off the spines from pandanus leaves with a piece of shell, and a typical young mother. I wanted to get the baby swung on her back by the the cloth over her soulder, but she turned just as I snapped.

smaller cream colored species were abundant.

Insects consisted of red ants and black ants; a small pale yellowish fly, a slender black Nemocera fly, a robust Sarcophagid; the common brown and white moth, on Portulaca, etc., a small white moth, a bright colored micro.; a pale brown cricket on the buka leaves; the larvae of a beetle, possibly a Tenebrionid, under a dead Frigate bird; a very small brown mite under rocks; a purplish sowbug, and brown to gray spiders very abundant on buka trees and a large brown spider occasional about coral rocks.

Thursday, August 7, 1924.

Early morning trip over to Monethaki village to collect some wooden fish hooks or mete which an old man made for me after the ancient pattern. Gave him a shilling for six.

Under way at 9 A.M. and outside the narrow entrance of the lagoon by 9:20, for Naiabo I. 15 miles to the N.E and directly east of the Yangasa Cluster. Spent part of morning sketching a canoe model which Mr. Beck had bought, with additions and generalizations after sketches made on beach of full sized canoe.

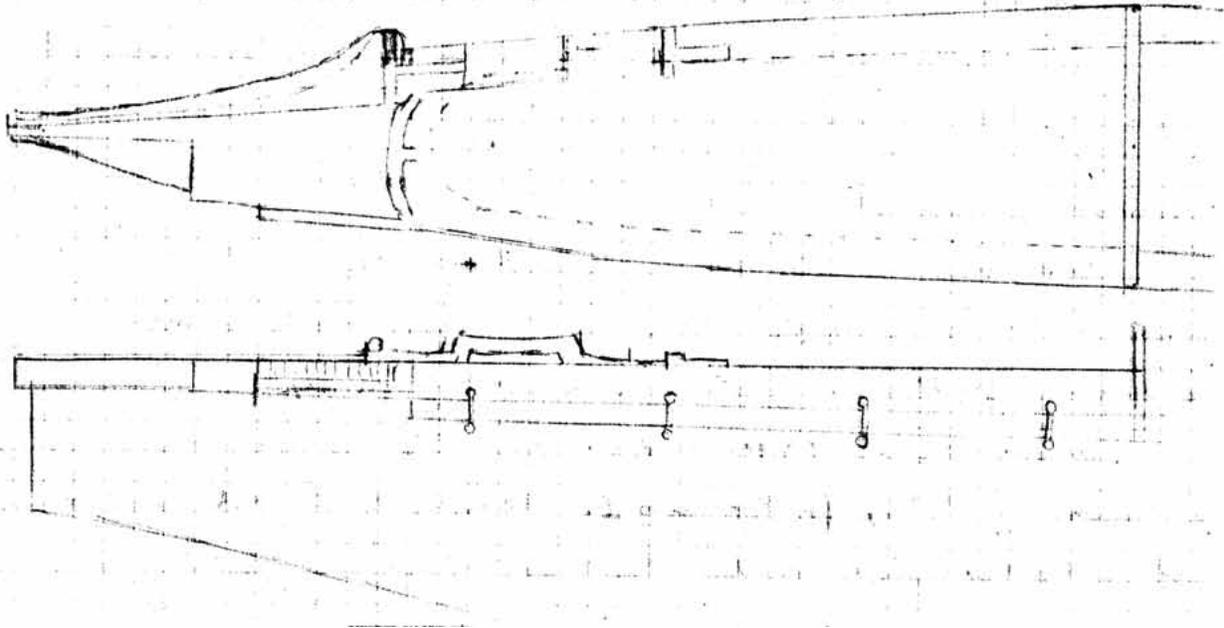
Wrapped up alcoholic specimens.

Ashore on Naiabo island at 1:30 P.M.

Naiabo islet is ovate in shape, about 150 by 250 feet and 25 to 30 feet high to the tree tops. It is of limestone, with a sand and broken coral beach on the east and north. Off the north point there is a very narrow winding passage thru the surrounding reef which makes the islet accessible to rowboats at moderate or high tide. The west and south beaches are of coral rock, with patches of Portulaca, Sesuvium (?), and Boerhaavia. The center of the islet is occupied by an open "forest" of stunted buka trees, 8 to 15 feet high and abruptly truncated on top by the wind. In these trees is a rookery of boobies and perhaps terns.

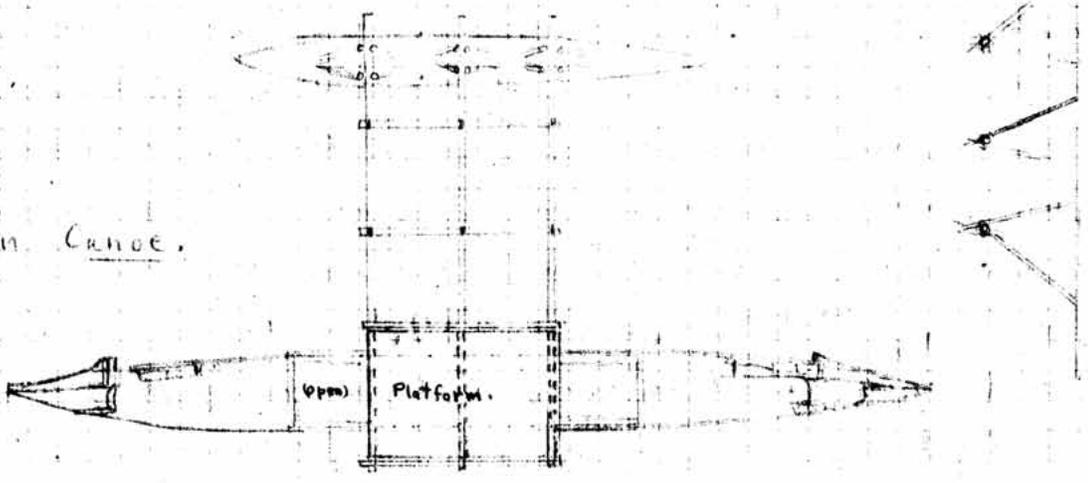
Caught a number (10) of geckos in a hollow "buka" tree and several small greenish-olive-brown lizards under rocks on the beach. Hermit crabs, both the large red-legged and a

Typical Fijian Canoe
Detail of Bow.



Bow.

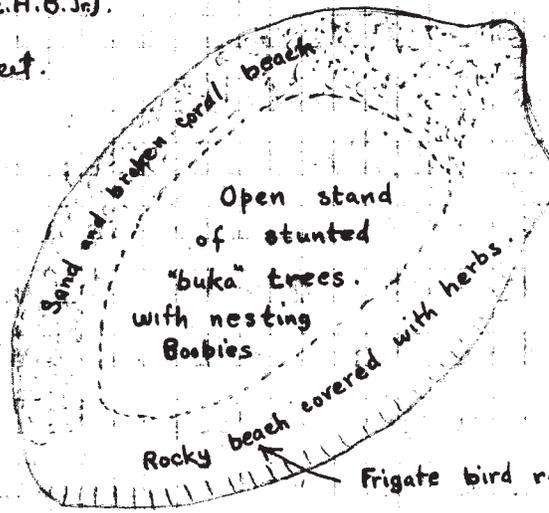
Fijian Canoe.



NAIABO I.

(Sketch Map by E.H.B. Jr.)

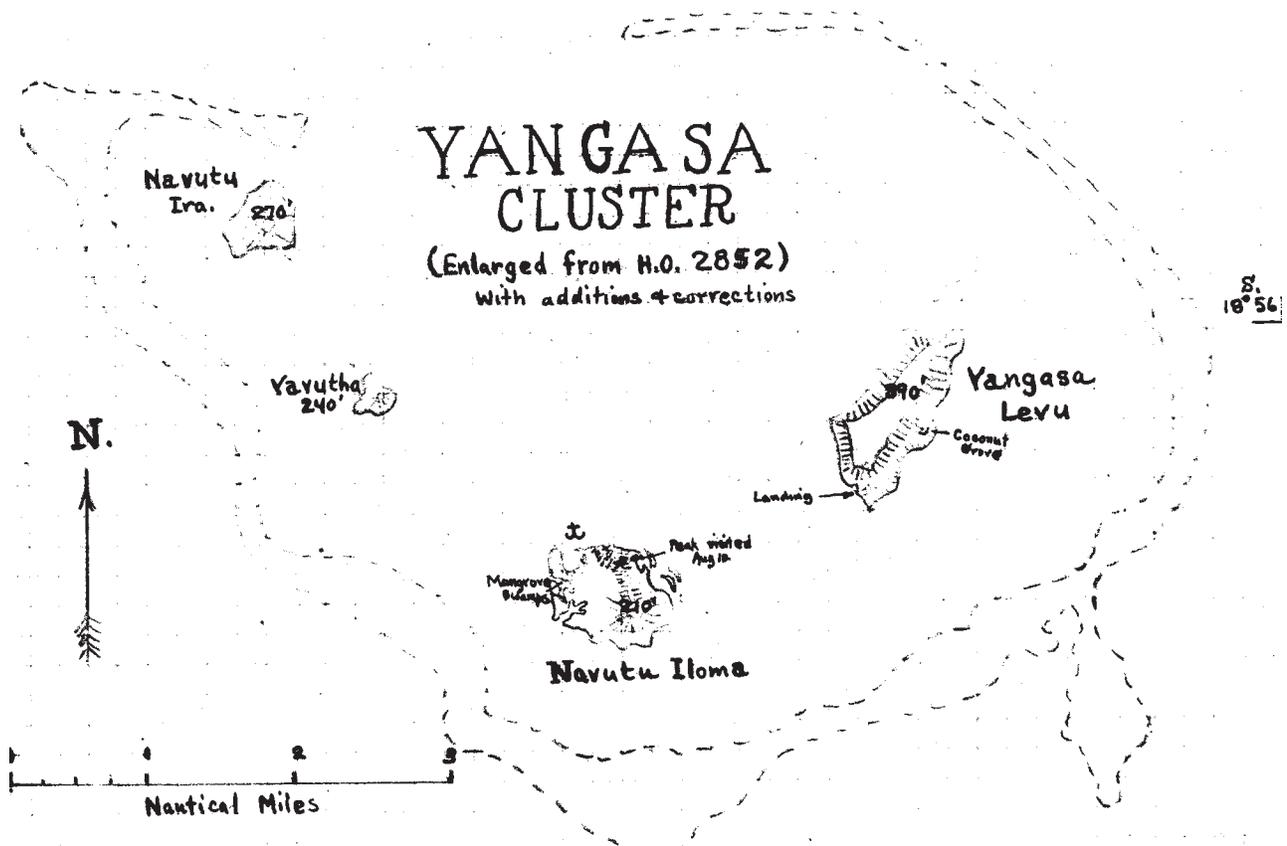
25 to 30 feet.



Returned to the schooner at 3:30. Sun came out for a minute and I took:-



Roll 60:2 Naiabo islet from W.N.W.



Using the engine we were able to anchor off the N.W. bay of Navutu Iloma island in the Yangasa Cluster before sundown (at about 5:30 P.M.)

This cluster of four islands within a nearly closed reef is inhabited, but is "farmed" by the people of Mothe Island which lies about 17 miles to the north.

Friday, August 8, 1924.

Navuto iloma, southwest and west end.

Ashore at 7 A.M., landing on a sand beach just within the NW bay. The point extending N to westward is rocky and covered with Casuarina. This tree is more abundant here than anywhere so far (since Moala) growing both on the rocky beaches and on the summit ridges, especially where windswept.

The west and south western portions of the island are very rough, with deep bays running in from the west and south, the arms of which are choked with mangrove thickets. The sharp narrow ridges between the arms, as well as higher localities consist of typical "bedland" formation, with deep pot holes, jagged rock cliffs and thick scrub. Crossed near the west side and returned across west central portion to the middle one of the three northern points. The roughness of the country can be estimated by the fact that it took me from 7:15 A.M. to 3 P.M. to go about one mile; and that I lost nearly all the hobnails from the soles of my shoes and quite a bit of my shirt.

Collected specimens of a tree with moderate small spherical green to yellow green fruit and exceedingly fragrant white flowers; probably the same as "puapua" collected in Samoa etc. (# 454).

Saw a gray and light brown owl. It came out from a shallow cave on S.W. side.

Caught very few insects in the interior. But obtained quite a number of specimens sweeping grass and shrubs on the sand beach, west side of middle N. point, including a Pipunculus fly.

Collected a few landshells, most of them of the flat olive green species, on tree trunks.

Mr. Beck caught several snakes.

Saturday, August 9, 1924.

Sailed and rowed across with Mr. Beck to Yangasa levu. Landed in small cave near S.W. point, near a small patch of coconut palms. Across a nearly level area, smooth underfoot to foot of the central plateau cliff, which we ascended at S.E. point.

The island is shaped like this:-

The central plateau is flat and undulating on top, elevation about 350 to 390 feet, with steep cliff sides, around. On the west these descend to the waters edge, but on the east, north and south there is a



Profile of Yangasa levu from W.

nearly level shelf of greater or less width-up to 200 to 300 yards between the foot of the talis slope and the sea, into which it drops in a 20 to 60 foot cliff.

The top of the plateau is covered with very thick scrub. It is furthermore crisscrossed with fissures and holes which make walking extremely difficult, even dangerous. The sides are forested to the top of the talis slope, but the upper 100 feet, especially in the W. side is bare of trees for the most part, being covered with low shrub or quite bare rock.

Descended to the E. shelf, near the center of which is a grove of tall coconut palms. Collected a number of small landshells, a few craneflies and a couple of plants. The shelf is covered with trees, many of them large and some reaching a diameter of 3 or even 4 feet. Ficus trees were plentiful, both the tall, large leaved fig and the large banyan, with its hollow, intertwined trunk, which had formed about that of a large tree. Caught a large gray snake on S.W. side.

About 1 P.M. sailed across to one of three small crescent shaped islets off the E. end of Navutu iloma. Landing on a small sand beach, spent a few minutes collecting in the lowland scrub.

Then across to a sand beach on the main island, near the N.E. point, where I collected another plant specimen and a number of insects sweeping grass and shrubs.

Sailed back to the schooner at 4:45 P.M.

Sunday, August 10, 1924.

North East end of Navutu iloma.

Spent early part of morning on board schooner, wrapping up specimens and puncturing snake and lizard, killed in formalin tank.

Ashore at 9:30, landing on east side of N.W. bay.

Collected insect specimens, sweeping the beach grass and shrubs.

Followed a trail E. into the woods behind the beach. This north central portion of the island is flat and comparatively level, with a moderately open stand of trees; quite in contrast to the extremely rough S.W. portion visited Friday.

Caught a snake, coiled up in a branch of dead leaves. They are torpid, apparently because it is mid-winter and "cold".

Collected in plant # 464 what I think are the flowers of #383. This much resembles Pittosporum of Hawaii, native name "tubekalo". Previously collected only in fruit.

Saw several trees of # 460 in blossom, along west side of N.E. ridge.

Climbed this N.E. ridge at a point above the sand beach and bay on the N.E. side (visited yesterday). Good view of Yangasa levu.



Roll 60:3. The N.W. bay, looking west from beach at east side.

From this spot one gets a fine view of the surrounding islands, Mothe to north, Komo to the NNW, Namuka ilau to the N.W. beyond Yuvutha and Navutu ira; Kambara, Mangava and Marambo to the west. Fulanga to the south and the two Ongea islands to the S.E. One can also see a good deal of the reef surrounding this Yangasa Cluster, and the small reefs to the east, including that surrounding Naiabo.

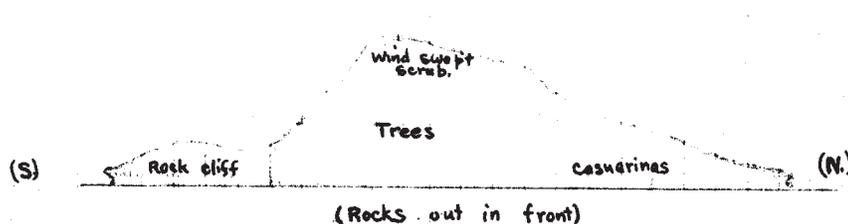
The head of the bay containing the sand beach below, is black with a huge school of minnows which are being constantly chased by a number of large gray fish, smaller olive yellow fish and long slender garfish.

Descended the west side at a different point than where I had come up. Caught a second snake coiled up in a hollow. Worked back to the N.W. bay. There caught a number of specimens on beach grass. Returned to schooner at 4:30. Developed 2 rolls films in evening.

Monday, August 11, 1924.

Navutu ira and Yuvutha islands.

Left schooner at 6:40, sailing N.N.W. past Yuvutha (240') to Navutu ira (270').



Yuvutha from the east.



Roll 60:4. Yangasa Levu looking N.E. from summit of N.E. ridge of Navutu iloma, elevation about 150 feet.



Roll 60:5. The bay and sand beach on N.E. side of Navutu iloma and part of the small crescent shaped islets off this side, from the same spot, N.E. ridge. (This fits on to 60:4).



Roll 60:6. Looking S.W., diagonally across Navutu iloma toward S.W. point, from peak on N.E. ridge



Roll 61:1. Looking N.W. along N.E. ridge, with N.W. bay of Navutu iloma at left and Yuotha and part of Navutu ira on the right, from high peak on N.E. ridge.

Yuvutha is a small circular island, sloping up rapidly from the rocky beach, the undercut shelf extending clear around. Above this 8 to 15 feet bluff is a line of beach trees with numerous *Causarina*, especially on the N.E. and N. Behind these is the usual lowland forest reaching to near the summit, which is crowned with a low windswept scrub on the east side.

A long narrow reef connects the two islands. On this are a number of thin, narrow rocks, sculptured into fantastic shapes, with "windows" thru. There are several rocks on the west side, but the east side of the reef shelves off into the deep water of the lagoon.

Landed on a sand beach toward the S.W. point. Here was a small clump of coconut palms. On the beach was a shelter made of palm leaves, and signs of fairly recent copra cutting, within a month.

Climbed the steep, wooded S.E. slope to the top, which is rounded, covered thickly with stunted trees and scrub, and very rough underfoot. From here a good view was had of the surrounding islands and the reef connecting this island with Yuvutha. Caught a large specimen of the fuscous and yellow spider. I had previously considered it a sand beach and lowland species, but finding a large specimen quite at home at 250' elevation, shows it to have a general range throughout these islands. It had feasted on two good sized longicorn beetles, the remains of which—quite past recognition—hung in its web. The fruit of the ficus tree with moderately large, asymmetric leaves, is red-purple (plum color), when ripe, quite soft, tasteless and quite without sign of wasps inside, although it attracts the medium large red ant.

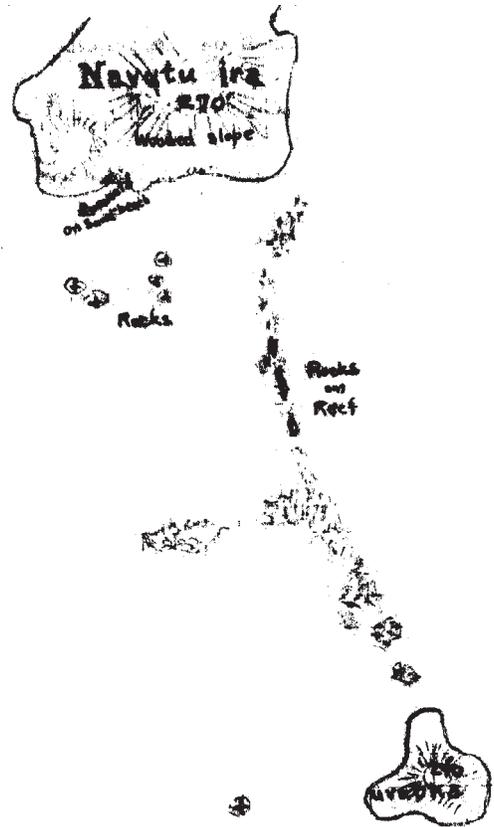
Descended again to the beach, collecting quite a few small landshells and seeing absolutely none of the large flat greenish species, which was so common on Yangasa Levu and Nevitu ilama.

Found a turtle shell (in bad condition) on the beach. It had a little putrid meat adhering within which contained some maggots of the bluebottle fly and a number of elliptical, black beetles. These appear to take the place of *Dermestes cadaverous* and *D. vulpinus*, the scavenger beetles of further north, none of which I have seen in Fiji.

About 11 A.M. rowed and sailed back to Yuvutha, against a strong wind. Landed on W. side. Ashore for about 20 minutes while Mr. Beck unsuccessfully looked for ground domes. Spent the time sweeping the bushes in the west lowlands for insects and landshells. Obtained some very small brown shells from a branch of dry leaves, the first of this size I have seen alive in Lau.

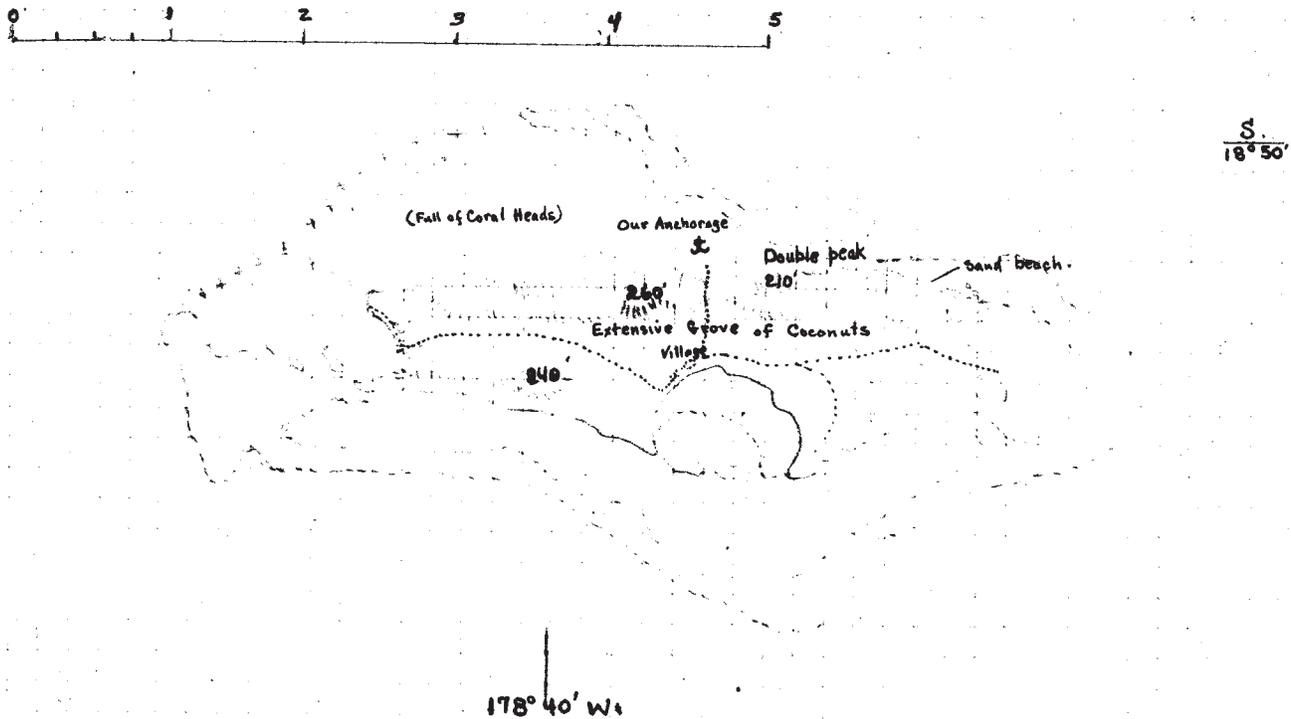
Rowed back toward Navutu iloma and picked up by the schooner at 1:45. We proceeded out of the lagoon for Namuka ilau, sailing around its NE point and inside toe reef toward the N.W. point. Anchored at 4:50 about midway between the "Double peak" (210') and the highest peak (260'), just off a grove of coconut palms. From here a trail leads over the ridge to the village, situated on the south side. The landing place is only a break in the steep undercut sea wall.

The north face of Namuka i-lau rises abruptly from the water to a height of 150' to 260', with numerous bare pali faces. I noticed several caves, both at the waters edge and higher up on the cliff. There is a sand beach at the N.E. end, but the rest of the N. face is fronted by a continuous undercut shelf. The reef protects the eastern two-thirds of the north side and extends entirely around the south side.



NAMUKA -ILAU

(Enlarged from H.O. Chart 2852)



Spent the evening in enlarging maps of several of the islands in this neighborhood from the U.S. H.O. Chart 2852.

Tuesday, August 12, 1924.

Namuka-i-lau, central and western portions.

Ashore at 7 A.M. Crossed ridge on a broad well cleared trail to the village, which is situated at the head of a deep bay, south side. The village is a large and prosperous looking one, with numerous roofs of galvanized iron, a few shacks of wood and a wooden church-school house in addition to the Pandanus and coconut thatched native houses. There is a Chinese store.

Met the chief of the village and made the usual enquiries for stone implements and fish gear, without success.

Followed a very good trail clear to the west end of the island. The central portion south of the northern ridge and west of the deep bay is flat, with one of the most extensive groves of coconuts yet see in Lau. The grove is more than half a mile wide and fully a mile long. The west end of the island is undulating and smooth underfoot, with a very typical lowland forest. Saw no new trees in fruit or flower.

Collected a lot of landshells both in the central flat and western forest, they being very abundant on the leaves of shrubs and small trees. Beneath the coconut groves they were mainly on the leaves of *Piper insectifugum*(?) which with the red pepper and shrub # 382 makes up the bulk of the undergrowth. Also collected quite a number of insect specimens, especially on dry leaves, under bark and sweeping the shrubs.

The trail ends at the middle of the west end bay, in a sand beach, flanked by a small coconut grove. A small wooded islet lies partly across the bay, off the S.W. point. The bay is shallow with numerous coral heads and patches of reef.

Walked along the undercut shelf (it being low tide) to the N.W. point of the island. Caught a black and white banded water snake among the rocks. Caught one of the brown and gray Noctuid moths which hide in crevices under the overhanging roof of the beach ledge here as elsewhere in the group so far.

Collected a variety of specimens - yellow-Brown coccinellids, psyllids (?) small flies, etc. from the leaves of a mile tree badly infected with scale and aphids.

Caught some Lycinids, a white moth, and some Sarcophagids on the grass covered sand beach while eating lunch.

Returned over the same trail, collecting more insects and landshells.

A small marsh, W. by S. from the village, is filled with tree ferns (# 471). Nearer the bay is quite a little patch of Sisal-like plant (# 472), which I found in flower.

Returned to the Schooner about 3:45 as it was commencing to rain. Pressed plants etc.

Mr. Beck brought a small crumpled specimen of orchid, which I pressed, but did not give a plant number.

Wednesday, August 13, 1924.

Namuka-i-Lau, east end and Ethnological data at village.

Ashore at 6:45. Across ridge to bay on S. side and followed trail east thru an extensive grove of coconuts. Collected an Astelia-like plant (# 473) with white flowers and blue fruit, growing abundantly with Piper, etc. under the Coconut palms.

Insects cut in force. Quantities of butterflies and moths:- Hypolemnas bolina, ♂s, blue & white ♀ and (rare) yellow ♀; Euploea; Vanessa cardui; a large yellow brown sp.; Lycaemidae ("blues"); and at least three spp. of "skippers." A large gray moth; large brown moth; large orange; moderate size white moth, smaller black; small white; and several micros.

Noticed process just prior to mating of two ♂ + ♀ H. bolina butterflies. Following a fluttering chase in the air, the ♀ lights on a leaf or twig. The ♂ lights close by and stealthily approaches the ♀, which usually flutters away once or twice to adjacent limbs. At last the ♀ allows the ♂ to approach. It does so keeping the wings vibrating and apparently touching the abdomen of the ♀ lightly with its antennae.

Caught an ant-lion in grass.

The east end of the island, beyond the coconut covered flat is undulating, with the usual lowland forest. Good sized areas of the latter have been cleared and planted to bananas, papays, manioc and sweet potatoes. The extreme east end is quite rough underfoot with a dense wood; quite moist.

Collected some landshells on bare rock, in the rough hollows and crevices. Also found a number of small brown shells on leaves. They also occur in some numbers under dry fallen leaves & twigs. Also collected a few of "Dr. Cook's Special Brand", 1000 per cubic centimeter, minute red brown shells under dead leaves and moist twigs on the ground.

Came out on S.E. coast near east end of island, in a small bay flanked by coconut grove. Some good sized trees of Casuarina and Pemphis toward the E. point on the rocky bluff, and the usual beach flora. The east point is deeply undercut, up to 25 or 30 feet in places, with a 40' or 50' cliff above. In one place the wall has broken down leaving a great heap of huge limestone boulders.

Just around the E. point on the N. side and several small islets, close in. In the fairly shallow channel between the beach and the islets a characteristic marine growth has developed:- live coral; green, moss-like sea-weed; green backed crabs with red-brown legs; bright blue star-fish; greenish Arthropods, about 4 inches long and intermediate between a cray fish and a "sowbug". Brilliant little blue fish scoot in and out of holes.

A sand beach begins just west of the point on the north side and stretches westward for about 1/2 mile. There is one cove containing coconut palms.

Walked the length of the beach and crossed the high ridge to the S. side, just east of the Double

peak, without seeing any tree or plant in fruit or flower not previously collected.

The landshells are abundant here, on rocks, dead leaves and live leaves and trunks. Only small or very small sp. however.

Descended back into the central flat. The large grasshopper is fairly numerous in the lowlands. Collected quite a number of insects. Over to the village.

Watched several women making bark cloth ("Tapa"). It is made from the sapwood of a small tree or tall, slender shrub, growing to a height of 3 or 4 m., called Masi (*Broussonetia papyrifera*) the paper mulberry plant, from which tapa is made all over the Pacific. The sticks of this wood are about 1 to 2 cm. in diameter and about 2 m. long. The bark and sapwood is loosened at one end from the heartwood with the teeth and stripped off, the stick being held with the teeth in successive places as the hands strip off the exterior. It is then rolled up, bark outside. The next step consists in cutting across the bark about 4 or 5 inches from the larger end, with a knife. The bark is from here pulled off from the sapwood, leaving a strip about 3 to 4 cm. wide and 2 m. ± long, (quite often not over 1 m. long with the smaller stems.

This (the sapwood) is next rolled up and placed in water. In a short time it becomes soft and is pounded out flat on a "dundua" or board. This varies in width from 12 to 16 inches, up to 7 feet in length and T-shaped in cross section, thru the support, of which there are two, one toward each end; rather rounded on top. Made of buabua (*Guettarda speciosa*).

The beaters are called "ike" and are from 12 to 15 inches long with four faces and a handle made of cau (*Casuarina*) wood. One of the faces is always without grooves. The others vary in the number and arrangement of the grooves from two to six or seven. The usual numbers are 3, 4 & 5 and occasionally 6. Purchased two representative beaters for 2/-.

The process of beating is called samusamu. The bark quickly flattens out, but must be repeatedly moistened. Several thicknesses are pounded at once after they have become somewhat flattened out. The final produce is about 30 inches wide (as made here) and of various lengths. These of course can be joined together in the beating making sheets of almost any size.

There is practically no carving of kowa (yagona) bowls here, and no extensive canoe making. The men do carve out "lali" or native drums; several finished and partly finished ones being scattered about the village. They typically are shaped thus:

It is made of vasi (*Afzelia bijuga*) wood, hollowed out within, with the upright and pieces about 8 to 10 inches in from the ends of the log. They are 5 or 6 feet long and about 2 ? feet high. When beaten with one of the short, heavy clubs it can be heard for several miles.

Each of the islands in this part of the group is noted for some special achievement or form of work.

Ongea for its mats and large tapas.

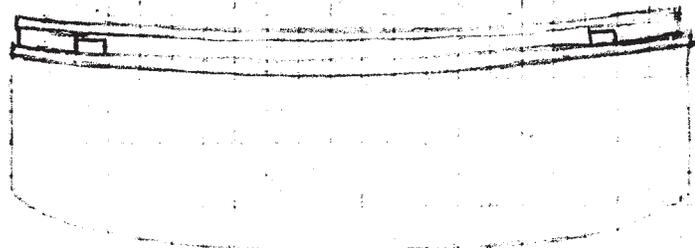
Fulanga for its canoe making.

The uninhabited Yangase islands for their ruggedness and snakes.

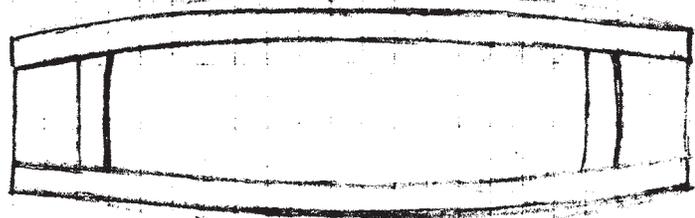
Namuka for its tapas and extensive coconut groves.

Kambara for its Yagona bowls and carving

(So they say-I did not find it so).



Lali or Native drum



Top view of Lali.

Thursday, August 14, 1924. Mothe N.W.

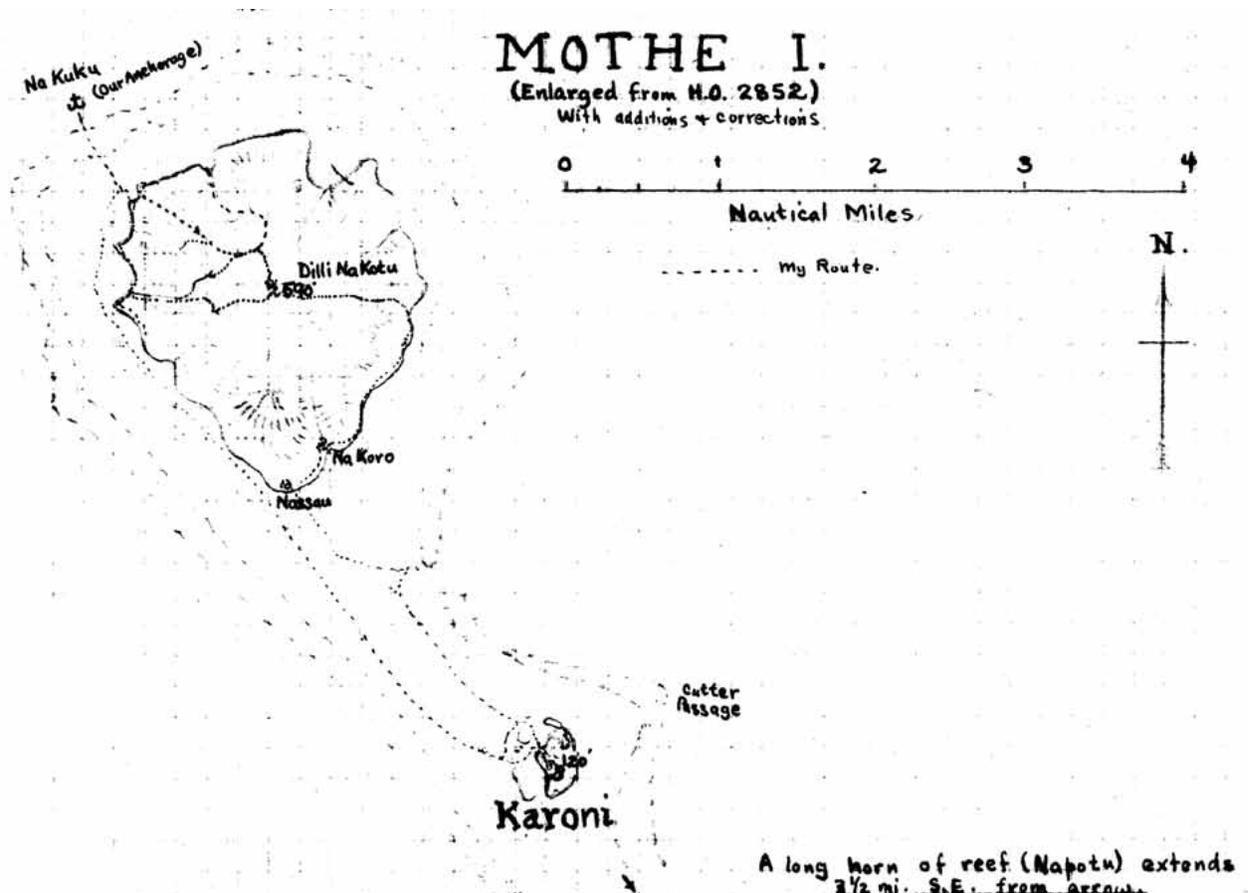
Up anchor at 7 A.M. and under way from Namuka-i-Lau to Mothe.

Spent early forenoon wrapping up alcoholic specimens and getting out fresh supply of bottles.

Mothe is a volcanic island nearly circular in outline with numerous valleys radiating out from a central peak. Quite a contrast to the densely wooded, low limestone islands, it is for the most part covered with grass; having a strip of coconut palms and beach trees along the edge and in the lower valleys and a small knot of trees on the summit of the central peak. The crests of the higher, radiating ridges are lightly fringed with Casuarina trees, and the beach vegetation in places has crept up the forehills.

Anchored off the N.W. side at 9:50 A.M. Ashore by 10:15 having to drag the boat over the reef, it being less than half tide.

There are several small fish walls along the beach, one near the place of landing on N.W. side being 150 feet or so in diameter and about $2 \pm$ feet high; and made of black lava rocks.



Ascended the face of one of the forehills, thru a native garden planted to manoc, sweet potatoes, malo, bananas, papayas, and coconut palms. On each side was a small thicket of the usual littoral trees. Numerous butterflies and moths of the common species found on nearly all the islands. The ridges and slopes are covered principally by a knee high narrow leafed grass, green to brown in color; the familiar plume grass, which fortunately is low (up to 3 feet) except in hollows; two species of ferns, both previously collected, one the coarse, wiry fern with narrow pinnules, and various stunted shrubs and weeds. Among the latter noted the shrub with the 3-locule winged capsule and the orange

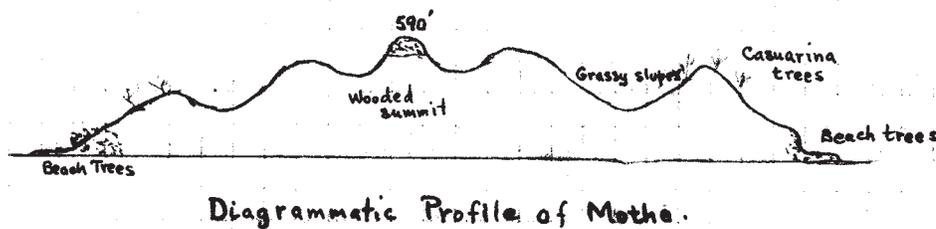
flowered species with white floral leaves. Also a shrub resembling *Boerhaavia*, with white flowers; bidens, yellow flowered composite, lavender orchid, and numerous common weeds. Ironwood (*Casuarina*) trees and the ever present *Pandanus* scattered here and there. *Sida*, morning glory, etc., and yellow leafless parasitic vine.

Craneflies, grasshoppers, brown crickets, and numerous moths in the grass. Also small ortolid (?) flies, microwasps etc.

Collected an orange bracket fungus, common on fallen pandanus trunks.

The ridges are well eroded and the soil disintegrated and weathered. One sees occasional outcrops of dark reddish, brown or gray lava, but for the most part it is dark rich soil. Nearly all the numerous ridges, which radiate out spoke-like from the central peak, rise in a series of one to several humps before reaching the central peak, the summit of which is covered with a cap of trees.

The coconut groves are more extensive in the southern and eastern valleys.



From the higher knoles on the ridges a splendid view may be had of the surrounding islands, all those to south already visited. Komo and Olorua to the north. The reefs to the east and north east-Thakakau motu, Thakau vau and Thakau lekaleka also show up clearly as blue-green water with a white edge.

Finally reaching the high central peak was disappointed to find that the cap of trees consisted of beach and lowland species:- *Erythrina indica*, kukui, milo, *Ficus*, etc., with noni, *Piper* and "maile" ferns beneath. Cool and moist beneath the shading trees, white moths plentiful, also mosquitoes which are very troublesome. Red-legged hermit crabs. Small landshells under and on dead leaves on the ground.

Coconut palms, shaddock tree, canna, milk weed, etc. on upper slopes. Several clearings where planting was underway.

From a high bare hump on the south side a fine view was had of the small limestone island of Karoni and the long sweeping curve of Napotu, a horn-shaped arm of the reef and lagoon. Five valleys radiate to the south; each containing cultivated spots and having groves of coconut palms toward their mouths. They contain a fringe of trees along the stream bed, which is running toward the head, but dries further down. Many of the cleared, cultivated areas have been allowed to lie fallow and have on them, like the rest of the lowland, a great abundance and variety of weeds.

Descended into a west running valley and returned to the boat along the beach, where there is a trail.

Butterflies and moths numerous and mosquitoes very abundant in the valleys. The weeds have on them their usual bugs and beetles; and the large grasshoppers is abundant on the plume grass.

Friday, August 15, 1924. Mothe and Karoni.

Ashore at 7 A.M. Rowed with the sail south along the west side of Mothe and across to Karoni, a small limestone island to the south of Mothe, 120 feet high, crescent shaped, with several small rocky islets to west, which complete the oval.



Roll 61:2 Fijian canoe under sail, off Karoni, with some of the outlying rocks in the background.



Roll 61:3 Mothe and northern rocks of Karoni from summit peak. Note the cutter sailing toward the passage which is at an angle of the reef, nearly due east of the north end of Karomi.



Roll 61:4 The west face of Karoni main peak, looking E.S.E.

Ashore and climbed to summit of highest peak, which rises abruptly 120 feet from N.W. side. The lower slope is covered with trees, but the upper faces is nearly bare.

Explored the middle western and N.E. portions of Karoni, which consists very largely of “badlands” and deep bays, the arms of which are filled with mangroves.

Sailed back to Mothe, close to the east reef, and landed at Nassau village, situated on extreme south point. Walked N. along east beach, beneath fringing groves of coconuts. A broad beach reef extends out from shore all along SE side.

Small village, called Na Karo, in small bay about 1/2 mile NE of the main village, consists of about a score of huts.

Caught a banded water snake well up on the lava rocks. They are called “dakalaci” or “dadakulaci” by the natives.

Ascended one of the numerous valleys (one which runs nearly due east,) and up onto the ridge near its head.

Up to the central peak and from there followed in the opposite direction the route of yesterday.

Dropped down into west running valley and out to beach, where the boat was waiting.

Obtained the names of the peak, the villages and the anchorage from a crowd of natives about the boat, who were returning home from repairing the fish walls, preparatory to a day (Saturday) of fishing.

Saturday, August 16, 1924. Mothe and Oneata

Ashore at 6:30. Up ridge behind landing place, catching moths, flies, craneflies, wasps, leafhoppers, grasshoppers and spiders in the grass. Jumping beetles under bark, also centipede.



Roll 61:5 Small boy spearing fish on the beach, Mothe I.

Took small sample of lava rock from outcrop on high ridge, elevation about 450 feet.

Dropped down valley which runs out to N.N.W. Large reddish brown dragonfly about nearby pool of fresh water. Some curious large cray fish-like Arthropods in the pool. Caught a number of *Drosophilid* flies about rotten noni.

Followed beach around to landing and returned to schooner at 11 A.M.

Underway for Oneata island at 11:15. Off west end of the island at 1:45.

The island looks lower, less rugged, and the west end much less wooded than other limestone islands visited so far. A sand beach extends around the west end and interruptedly along north shore.

Entered "Transit Passage" at 2:05. Around S.W. point of island, having to keep well off (half way between reef and shore) because of shallow water near the point.

Wangori village occupies the lowland behind a sand beach in the first bay on the S.W. end. Off the village at 3 P.M. and ashore by 3:30.

The village is a fairly large one with about 250 inhabitants. The water supply comes from a spring just west of the village, situated on the upper slope of a sandstone hill, bare of trees except for scattered *Casuarinas* and a

few other stunted. It is piped down to a faucet in the center of the village. This western elevation is about 100 or 120 feet high, and for the most part covered with grass, sugar cane, pandanus, noni, rewati, *Casuarinas* the shrub with yellow flowers and white floral leaves, and a variety of weeds.

Much of this region is covered with rich brown soil, but there are numerous outcrops of light gray sandstone (see samples), showing that the rock is close beneath.

From the top of this western elevation, the greater part of the island is visible. The western portion is undulating with a ridge on the north, with extensive garden patches, groves of coconut palms, small clumps of trees, and a few bare areas like the elevation underfoot.

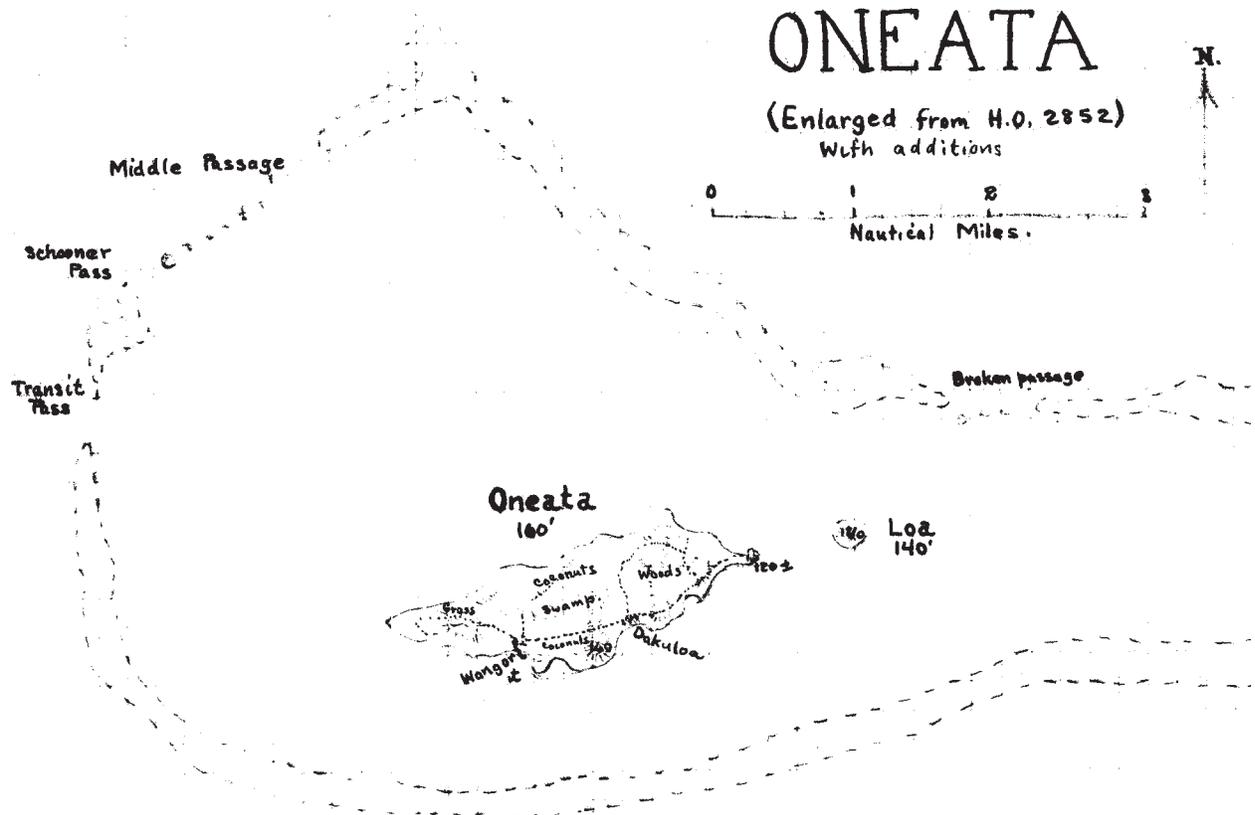
The middle of the central flat is occupied by a marsh, with groves of coconuts on each side and



Roll 61:6 Looking east down a typical valley, containing grass and weeds, garden potatoes, coconut palms, and reef off its mouth.



Roll 62:1 The summit peak of Mothe, called Na Kotu, looking E. by S.



small tree covered areas. The far east end appears more wooded and elevated. Elevations to N.E. and S.E., and one due east nearly in line with the small islet of Loa, which overtops it.

Descended the gentle slope to the west end. Grass hoppers very abundant, and dragonflies plentiful.

Peculiar stunted ti plants, about 2 feet high, with large bunches of red fruit.

Around the south-west beach to the village. The sand is underlain with slab sandstone which crops out in places, there being quite a bed off the village.

This must be a much wetter island than those to the south as there are numerous small streams even in this comparatively dry portion of the island, running to the beach. Several large *Calophyllum inophyllum* trees on the beach. Also trees of *Santalum yasi* and ivi (*Inocarpus edulus*) about the village.

Returned to the schooner at 5:30.

Sunday, August 17, 1924.

All hands ashore at 8 A.M. to attend church.

As we were an hour ahead of time walked across the N side of island, collecting a number of dragonflies of various colors-blue, red-brown, green, and brown, as well as small ones breeding in the central marsh.

Returned to village as the drums announced the hour for morning worship.

The church building is a large wood structure, higher on the slope than the rest of the village,- the most pretentious church seen thus far in Lau. A pew on each side of the pulpit is used by the chief and old men. The rest of the congregation sit on the floor in front of the pulpit. Upon entering, each person kneels, bends forward and says a short prayer. The children, in imitation of their elders flop on all fours, bump their foreheads on the floor and call it enough.

The chanting begins as soon as two or three have arrived, punctuated with a few words. As soon as the flock has gathered the main service begins, the minister announcing a hymn-the numbers of which are listed on the wall. The Fijian song book is called "Ai Vala Ni Sera ni Lotu Weselele e Viti. Singing very good, in parts, the men and women singing phrases following each other as well as together. It is accompanied by the beating of a triangle.

The prayer was long and bombastic, the congregation saying an enthusiastic Amen! at the end. This was followed by another hymn, scriptures, hymn, sermon, and baptism of five babies. In the latter the father and mother seated themselves in front of the pulpit, the mother holding the child, and remaining seated during the service.

Order among the numerous children was maintained by an old native with a switch, which he used several times on the backs of the restless children.

Most of the women wore loose "mother-hubbard"-like or smocks of white, black or colored material. A few, in mourning for dead relatives were in black with old, worn, mats tied about their waists. The little girls had on nice fitting hand made dresses of various colors. Many of them have the first half of their heads close clipped, while the hind half bears a tuft or tangle from 2 to 8 inches long. The men and older boys wore white or colored shirts (a few undershirts) and black or white lavalavas. There were about 100 present, the men and women sitting on opposite sides of the church.

Following the service we had refreshments at the chief's house:- 3 kinds of sweet potatoes ("white," "red", and "pumpkin") baked fish, a spinach-like dish resembling luau, with grated coconut, and a hot, highly seasoned sauce of coconut milk and fish broth.

Walked about 3/4 mile or so east to the other village, called Dakuloa, also situated on the south side of the island. It is smaller and less pretentious than Wangori.

There were several interesting plants about the village, Pritchardia pacifica, apparently planted; a small banyan-baka, (Ficus oblique), ivi (Inocarpus edulus). Makosai (Canaga odorata).

Returned to Wangori and collected on north side again. Got two more large brown longicorns whacking dead leaves on a tree. Collected a very pungent shrubby herb called Tamoli; the juice used medicinally for sores and bruises; # 485. Also # 486, "yasi" (Santalum yasi).

Returned to Schooner at 4:30.

Monday, August 18, 1924. East end Oneata.

Ashore at 6:45 and walked east to Dakuloa along main highway. To the north stretches the long, narrow marsh, 100 to 200 yards wide and occupying the entire central area between the two villages. To the north of this is a ridge of higher ground. The trail crosses two knobs with a coconut filled valley between. The eastern one of these ridges culminates in a steep limestone peak facing the sea, which is 160 feet high, the highest elevation on the island, covered with lowland trees.

All the bare, grass covered knobs are underlain with sandstone. The lava slopes similarly support only grass and weeds. Only the limestone lowlying islands are forested. Wonder if sandstone and basalt are not more porous, allowing the moisture to sink to the water table, while the limestone, being more impervious holds the moisture, allowing a more luxurious vegetation. Further, the limestone islands have no springs and very few streams, while these abound on both volcanic and sandstone islands.

The vegetation on the sandstone "bare knobs" consists principally of Pandanus, Casuarina, stunted "rewa", small shrubs of the tree with yellow flowers and white floral leaves, guava bushes, stunted moni and ti, grass, weeds, and occasional planted trees such as orange, mango and coconut.

Followed a fair trail eastward beyond Dakuloa to the east end of the island. Beyond the village the country is underlain with limestone and is moister, rougher and covered with a more luxuriant vege-

tation. There are two ridges trending NNE and S.S.W. separated by a small valley filled with coconut palms and cleared garden patches. The eastern ridge is nearly bare of trees, and has either been cleared for the gardens or is too dry. Beyond this ridge a narrow neck of low land runs out to a steep conical peak about $120 \pm$ feet high. Sand beach along part of the south side back by the usual beach trees. Toward the east end of the south side and on all the north side the beach is edged with a flat topped wall of conglomerate-dark gray volcanic (?) rocks and limestone cemented together with sandstone. (See samples).

The small islet, Loa, is about $\frac{3}{4}$ mile to the W.N.W. It is a small truncated cone-shaped islet, the south slope steep and bare of trees, except a few Casuarinas, a small knot of beach trees on the north side and a sand beach covered with coconut palms on N.W. Patches of reef between it and the east point of Oneata.

The green spiny-legged grasshopper on the leaves of *Scaevola* and *Tournefortia*.

Collected some pods of *Erythina indica*. The dry pods were full of small pale ants with fuscous heads, large fuscous ants, flat shiny black stink bugs and weevils.

Ate one of the large shaddocks. They are coarse and dry but the pinkish pulp has a good flavor, resembling that of a sweet grapefruit. Caught a Trypetid fly on the leaves, and sample of the many *Drosophilids* about the rotting fruit on the ground. One tree was about $2 \frac{1}{2}$ to 3 feet in diameter and 30 or 40 feet high.

Saw some coconuts which were by actual measurement over 40 cm. long and 22 to 25 cm. broad. These large husks do not contain the largest nuts, however. Some of the smaller coconuts contain nuts 15 cm. in diameter.

Along the N.E. side and across the forested area to near Dakuloa. There is a general sameness about the trees, the most of the interior lowland forest being made up of half a dozen species. Landshells not plentiful, but collected a few on leaves on the shrubs and trees.

Returned to Wangori in time to watch the preparation of Vakalolo, the Fijian pudding. Manioc, taro (dalo) and bananas (vudi) which have been cooked in the native oven Lovo, are pounded up together in a wooden trough with the butts of coconut leaves, a little water being added so that the final consistency is about that of bread dough. The lolo or sweetening is mixed in with the hands, the pudding being broken up into small balls, about a tablespoon-full each and rolled in the syrup. This mixing and dividing with the hands is called Kala vakalolo. The chief himself wrote out the recipe for making lolo; it is as follows:

“(Na Lolo) A niu kei, suka qai Riri” which means The lolo. Coconut (milk) with sugar, then boil on the fire. The small balls and a generous supply of syrup are tied up in banana leaves, in which form they are sewed.

Present at the division of a feast given by an old part Tongan native man because of the death of his brother, a month or so previous. The brother had died in Lakemba. The old man had given a feast there, and now upon his return to Oneata was giving another feast. Cans of beef, cooked sweet potatoes and Nakalolo (pudding) were carefully divided into ten piles for distribution among the families of Wangori, and the pig was cut up.

Meanwhile Yaqona was prepared. The root was bought at the store in dried form, coming from Suva, about 3 pints of the dry lumps being turned over to the mixer. It was next pounded up in a wooden cylinder with a heavy stick. Placed in bowl and water added. Strained with a “mop” of coconut fiber.

I sat in state between the buli or chief of the village and the old Tongan, who was master of ceremonies. On the other side of the chief was the matani vanua or magistrate. We sat on a mat a little above the rest of the people who were clustered about the bowl (on both sides and behind, not in front).

The yaqona is always mixed by a young man or girl, in this case by one of the young “bucks.” It was served in a coconut shell cup by the daughter of the man giving the feast, a girl of about 18, with good features and jet black hair, in contrast to the reddish hair (caused by lime?) of most of the girls. When a “cup” was ready for serving one of the young men near the mixer sang out something; the matani vanua would call the name of the person to receive the “cup”, which person would clap his hands, so that the passer could locate him. When the chief drank all clapped.

Bought a stone chisel for 6 pence and a broken one of similar shape for 3 pence. Also bought a large native wood pillow-“kali,” for 4 shillings and a smaller one for 3 shillings. Both made of *vesi* (*Afzelia bijuga*) wood.

On board Schooner and returned at 8:30 P.M. to see a

Fijian Dance

Preceding the dance the chief men of the village and our party were furnished more (kava) yaqona. We sat on the mat covered floor of one of the large houses.

First came the men, five “dancers” and the “orchestra”. The latter were armed with a small wooden drum and bamboo beaters of various lengths. The dancers were bare to the waist, black lavalavas, handkerchiefs about necks, leaves on the arms, and black about the eyes. Their shoulders glistened with coconut oil. The singing was nearly entirely monotone, accompanied by the tapping on the drum and the thumping of the bamboo cylinders on the mat floor. The dancers sat crosslegged, at first with their backs to the audience. The first part of the dance consisted of singing only. Then this was accompanied by movements of the head, arms, shoulders, fingers, feet, and trunk, all in unison and remaining crosslegged. As the dance progressed they turned sideways, with the left side to the audience and finally faced us. The movements were graceful and “snappy.” More and more movements were added until after half a dozen songs they were making complicated combinations, beautifully executed in unison. For a small village the dance was splendidly executed.

Then came the girls. The men dancers retired, the “orchestra” remaining. These girls were eight in number beautifully “dolled up” with head dresses of roses, ferns, yasi blossoms, colored fiber ribbons, and necklaces of strung flowers, peppers, fruits, etc. Their backs were bare to the waist; black lavalavas; breasts covered with wreaths, flowers and colored cloths. The singing was in harmony with the men; some in monotone with a two or three note range at the end or a beautiful half note slur; some as a regular tune. They too, began with their backs to the audience, turning sideways and finally full face as the dance progressed. Their cheeks were decorated with red or black splotches. Most of the songs were “introduced” by an alto (leader?) singing a few phrases, after which both men and girls joined in in harmony.

We stayed until 11:30, but the dance continued until daylight, the girls giving one song and the boys of our crew giving one in return. The natural inclination toward duck dancing and practice from childhood up, makes nearly every native an adept. Although made up of Niui, Samoan, Fiji and Tonga boys the crew did fully as well as the natives on shore, but a distinctly different kind of dancing - standing and every one for themselves.

Presented with one of the fiber “leis.”

Tuesday, August 19, 1924.

North and east end of Oneata.

Ashore at 7:30 to Wangai, crossed to north side of island and zigzagged back and forth thru coconut groves and wooded patches between beach and swamp to east end of island.

Caught a number of insects, sweeping the grass, weeds and shrubs.

Except that there are more kukui trees here than I have noticed on previous Lau islands, the woods are made up of the same lowland trees as elsewhere.

Quite a number of low stone walls separate the coconut groves and cleared cultivated areas on the N.E. side.

Collected two climbing vines not previously noticed.

Came out near east end of island on the trail from Dakuloa followed yesterday and followed it to the village.

Watched some small boys sailing toy "ships" on the beach. These are made from a section of coconut husk, with sails of pieces of coconut leaf (pinna), pinned to a stiff slender fiber (fern stem?) mast; several sails and masts to each boat. They have a long rudder of coconut mid rib and are counterbalanced against the wind with small bits of coral.

Near the village, under the high hill is a cave containing a pool of slightly brackish water, in which the natives bathe.

Walked around undercut rock shelf to a sandy beach, just east of Wangori, and thru a coconut grove to the village.

Two graves on the main highway, one of them the late chief's, are built up with slabs just as were the "stone ruins" on Sydney, Hull, etc. of the Phoenix group. They are about 10 x 15 feet and 6 x 10 feet covered with pieces of tapa (called samusamu), shells, bottles, and patterns of stones.

Saw a small boy in the village walking on "stilts" [see at right] made of half a coconut and a fiber of vau (Hau) bark. They place the cork between the big toe and next toe with the ball of the foot on the nut and walk as do children in America on tin cans.

In the evening the chief and most of the young people came aboard the schooner with presents and gave us another dance on deck.

The presents I received consisted of a bottle of coconut oil and another dance ornament (Furnished herewith.)



Wednesday, August 20, 1924.

Komo I.

Up anchor at 6 A.M. and underway for Komo with the sunrise. Anchored off N.W. end of Komo at 9:40 and ashore by 10 A.M.

The north face of Komo rises abruptly from the sea in an E.-W. ridge averaging 150' to 200' high, the summit being 270'. The south slope is more gradual, with a flat of greater or less extent, up to 1/4 mile wide, next the sea. The island is volcanic in origin and is underlain by basalt similar to that of Mothe, there being numerous outcrops, especially on the points.

Walked around south beach to the village which is located toward the S.E. end. It is of moderate size, and appears the worse for some recent blow, which has leveled several of the houses. Population perhaps 150 to 200.

Bought a hand fish net from an old woman who had just come in from catching fish with it. The cotton part of the net was "papalagi," but the shell weights and general arrangement was distinctly native. Paid 2/-.

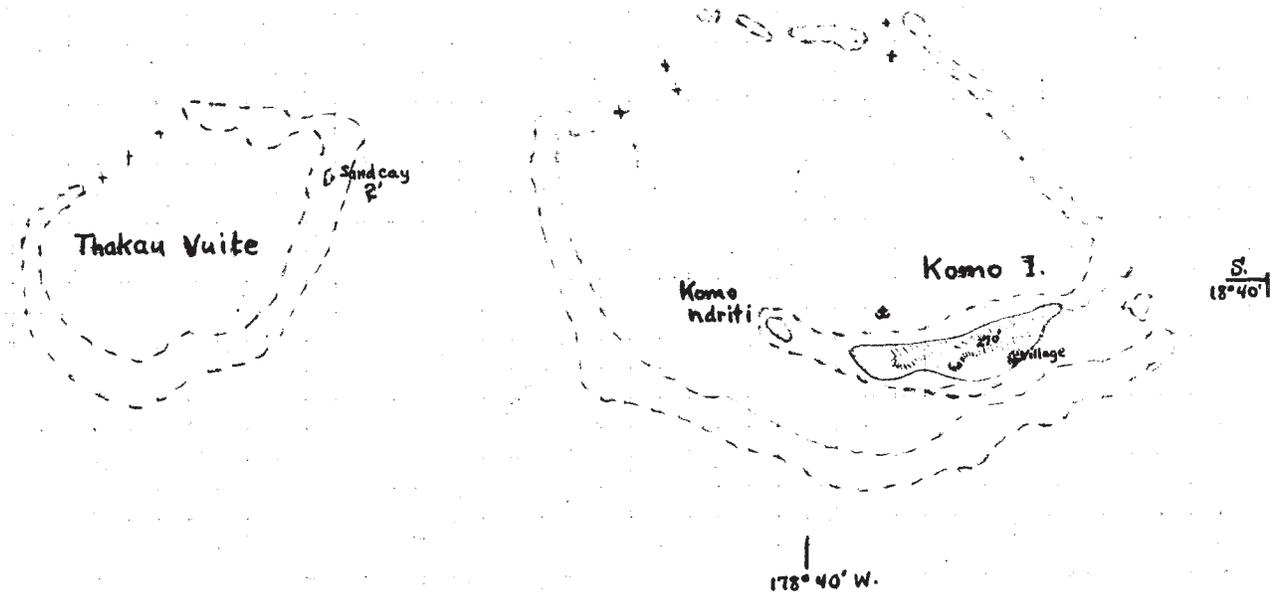
Saw an old man making a fish basket trap, and persuaded him to make me a sample one. They are woven from the Leguminous beach vine with leaves in threes and appink flower. (Specimens collected on Ongea, etc. # 403). It is called Wan ndravundravu and the basket is called kawa.

The S. beach is lined with coconut palms and the usual beach trees. N. and E. of the village are extensive native gardens. Collected several butterflies, moths, crickets, etc. in this area.

KOMO I.

(Enlarged from H.O. 2852).

0 1 2 3
Nautical Miles.



Up a trail which leads over the north ridge from the village to the north shore. The ridge is covered for the most part with grass and stunted scrub and weeds. There is also considerable Casuarina, Pandanus and a few coconut palms. The scrub includes ti, noni, rewa, the plant with yellow flowers and white floral leaves and several other stunted lowland trees and shrubs. Here and there are small garden paths.

Grasshoppers large and small are abundant. Butterflies fairly numerous- *H. bolina*, with both yellow and white spotted ♀s; *Vanessa*, the black white spotted sp., brown sp., *Monarch*, and *Lycaenidae*. Mr. Beck caught a large orange and red brown centipede under a log and gave it to me in the field. Other insects scarce on the ridge, but of some variety in the lowlands.

Collected a number of small brown shells on the dry leaves on an *Inocarpus edulus* tree, about 150 yards inland.

Returned to village and got my fish basket. Watched the men of the village preparing a feast to celebrate a wedding shortly to take place.

They were peeling manioc roots, cutting up pumpkin and putting it into coconut baskets and making up small parcels (of coconut leaves) of sweet potatoes. A hot fire was blazing in the lovo depression, where stones were heating. A bowl of grated coconut stood finished, ready to be cooked with sugar and made into lolo.

While I was watching the cooking process the natives found two small walking sticks for me.

The burning sticks were finally raked out of the lovo and the coconut-leaf baskets of food piled up over the hot stones, covered with breadfruit leaves and heaped over with dirt, until the pile was fully 8 feet in diameter and about four feet high.

Returned to our landing place collecting two plants on the way-one the common *dilo* (*Calophyllum inophyllum*) seen here in flower for the first time.

Mr. Beck had been on the small limestone island of Komo ndriti, half a mile to the W.N.W. and about 300 yards in diameter, and brought back a prostrate rock vine, with white flowers (# 494).

A cutter in port.

Thursday, August 21, 1924.

Komo I.

A strong south east gale prevented our departure for Olorua.

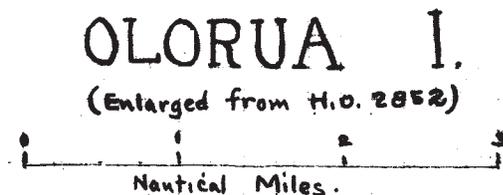
Packed three boxes of natural history specimens, collected during the past two weeks.

Ashore at 8:30, landing with difficulty against the strong wind. Collected around the south side of the island, catching several butterflies, moths, and flies. Collected quite a number of small landshells, of at least three species, and some small gray weevils and a tenebrionid beetle under the dry fallen leaves of a dilo (*Calophyllum inophyllum*) tree, on the ground, just off the beach.

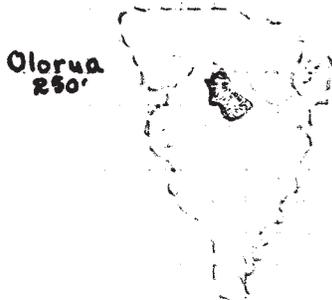
Took refuge from a squall of rain in a little hut half full of sweet potatoes. Forced to return to the Schooner at 2:30 P.M. by the rain. Collected the flowers of the beach leguminous tree #475 with elliptical acute nearly veinless leaves - small yellow pompons.

Found a wooden bowl - used by natives for mixing food.

Spent late afternoon putting away specimens, and wrapping up accumulation of alcoholic bottles.



Profile from E. by S.



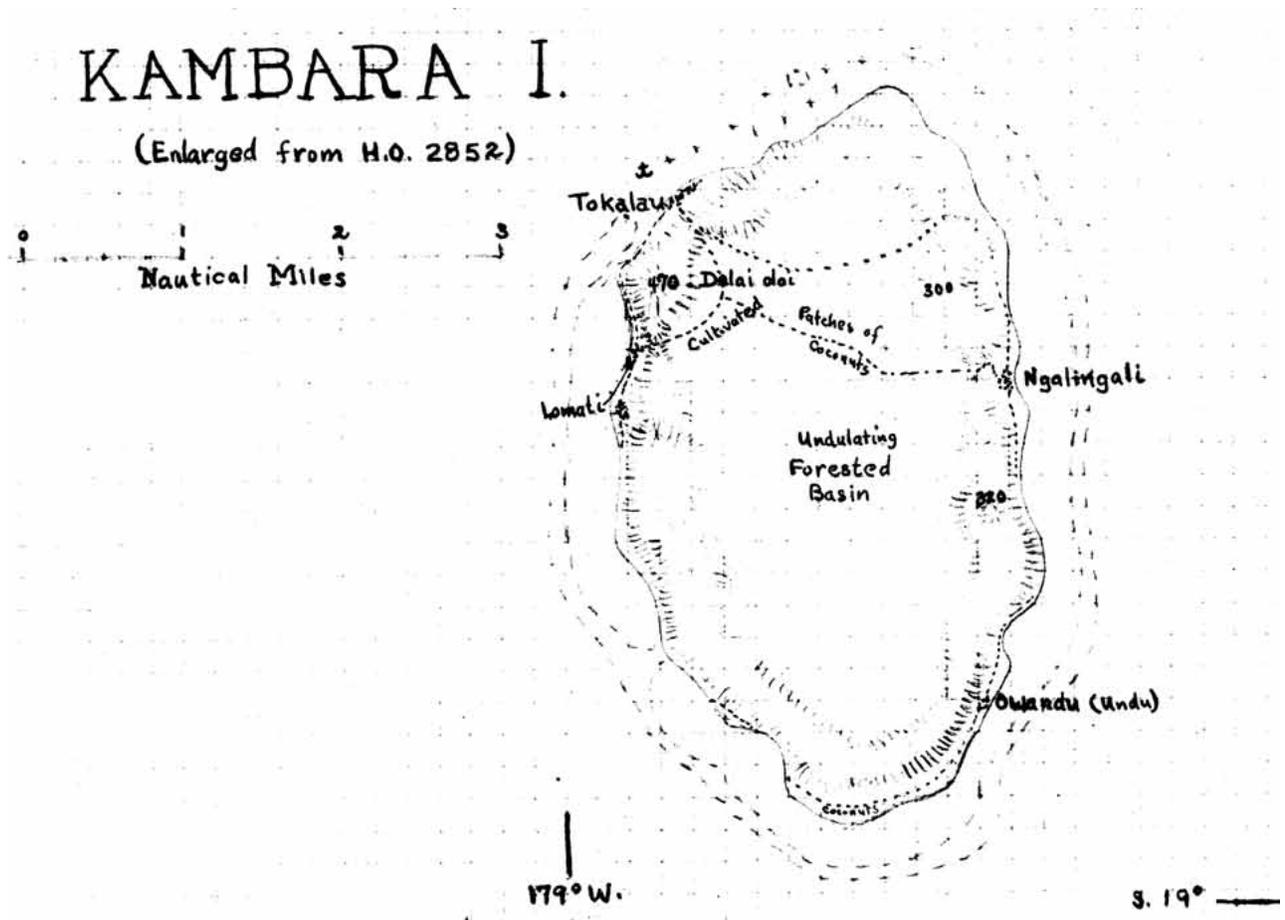
Heavy swell from ENE and steady downpour of rain made it impractical to land on this small peripitous island.

Friday, August 22, 1924.

Heavy wind somewhat moderated, but a steady drizzle of rain continued with occasional squalls. Up anchor at 9 A.M. and proceeded to Kambara. Did not stop at Olorua because of rain and heavy swell. Sketched profile thru the mist as we passed to the S.E. Rough trip down to Kambara, where we anchored off the village of Tokalau, on the N.W. point at 2 P.M. Rain continued so did not go ashore.

Spent early morning commencing a preliminary report on the "Lau Group," which I continued in the late afternoon.

Heavy squall from the N.W. compelled us to put to sea for the night. Rough night; wind, swell, and rain.



Saturday, August 23, 1924. Kambara

Stood in to Tokalay village and landed at 7:30. Climbed the ridge which rises steeply along the north side of the island, by a trail just east of Delai eloi (470'), the highest peak on the island. Descended into the basin beyond. To the west and S.W. are extensive cultivated areas or gardens, stretching clear to the palm covered slope above the west shore. To the east and south is forest with scattered clumps of coconut palms:-undulating ground with large trees and dense undergrowth.

Crossed the garden area to Lomati village, which is located just S.W. of the high hill (Delai elio). It consists of 15 or so native thatched huts, a frame house, a small but substantial frame church and a galvanized iron shed for catching water, which is stored in a cement tank.

What with the nights rain and occasional showers, the forest was too wet for good collecting, so hiked down the west beach toward the S. end of the island. Near the village of Lomati the beach is broad, sandy and underlain by a bed of sandstone, slabs of which crop out, and backed by a steep cliff ridge, covered with lowland trees and scrub. The cliff rises 50 to 100 feet sheer in some places. Saw one or two small caves in the face. The limestone, of which it is composed varies from dark gray, frequently with a bluish tinge, to light cinerous or brown with a pink or purplish tinge. But in places there are deposits of dark red-brown limestone resembling bits of putty in a crack.

The gray-white butterfly with black markings and the white "ournefortia moth" with red and black dots are both common among the beach trees. The slope is covered with lowland and beach trees and shrubs-about all the different species collected in Lau to date, but nothing new in fruit or flower.

Further south the beach becomes narrower, in places reduced to just the undercut shelf. This allows walking at low tide.

Small gray Asilid (?) fly here on the sand beaches much resembles in size, color and actions the sp. caught on the lagoon beach of Wake.

A trail cuts across the S.W. point, thru a grove of coconuts on a level area, leaving a limestone mass on the right toward the sea. On the left towers the high, rough, wooded cliff. There are several small isolated limestone rocks just off the broad steep sand beach near here. The sand is underlain by a coarse sandstone. (See sample taken).

The yellow composite and a tall climbing coarse grass common, the latter (not yet collected) occurs on nearly all the wooded islands. It attains a height of 6 to 8 meters in places, climbing to the tree tops.

Met a crowd of girls and women about to start fishing in S.W. bay. From here a trail cuts across the south end flat which is covered with coconut palms and littoral trees and shrubs running near the base of the cliff. The ridge is lower, but no less perpendicular here. The trail is covered with a green algal growth. (See sample taken.)

Just before entering Ondu village saw an old man binding the stems of the plume grass on the outside of his house (set apart from village), with coconut sennet.

Ondu is a clean little village of about 15 native huts, a frame building and a small frame church. On the galvanized iron roof of the latter water is caught and stored in a cement tank.

Welcomed by the usual array of girls and children. One girl was thrumming an improvised "jews harp" made from a section of coconut leaflet and a mid rib fiber. The two were so held in the month that the fiber could be thumped against the leaf, producing a rattling sound.

The ridge rises steeply behind the village to about 200 feet elevation, and there is apparently no trail up it.

The coconut grove covered flat to S and SSW. of Ondu is about 300 to 400 yards wide. That north of the village is less wide, only 200 to 250 yards. This rapidly narrows to just the sand beach with outcrops of slab sand stone, and finally to a narrow rocky shelf. One can traverse this "good sea path" with comfort only at low tide. I traveled it at less than half tide and experienced several waves above my knees.

Ngalingali is situated on a widening of the shelf (200 to 300 yards wide) a little north of the middle of the east side. It consists of 35 or so native houses, one or two of corrugated iron, and a frame church, from the roof of which rain water is led to a cement tank.

Bought an old worn basket for 1 shilling and a canoe baler for 2/.

From Ngalingali a trail leads up over the ridge and across the wooded basin to the garden areas at the N.W. end of the island. Followed it, securing a number of specimens of small landshells, which are quite abundant on the leaves of shrubs and trunks of trees and on the bare rock faces.

Saw a patch of "wet-land" taro, growing in water in one of the depressions. Caught a "leaf-like-insect", the first one I had ever seen alive. Didn't see it until I had it in the net, having swung at a leafhopper which was sitting on its leaf-like wing

Descended to Takalau village and returned to Schooner 5:15.

Mr. Beck caught a brown longicorn beetle which came to light in the hold, where he was skinning birds.

Sunday, August 24, 1924.

N.W. Kambara.

Ashore at 9 A.M. and attended church at Tokalau village. Very few present, many of the people of the village having gone to Komo to attend a wedding. The service was essentially like that at Oneata (except the baptism.)

Walked around to Lomati village on the beach.

Climbed the west face of Delai olio. On the N.W. end of Kambara the reef sweeps in to the beach, as if the north end of the island, including the high peak, had been a later addition. The reef off the N. end is not continuous, but consists of broken up, but closely set coral heads.



Roll 62:2 Cemetery at Tokalau, Kambara. I took this view because of the superficial similarity between these walled up graves and those on Sydney and Hull islands.



Roll 62:3 Interior of the church, Lomati. This is the neatest and most attractive church seen to date in Lau. The windows are of purple and orange glass; the rafters are hung with cloth banners. Two or three swinging lamps. Roof thatched, but walls of board.



Roll 62:4 Typical source of water supply on these limestone, springless islands, Lomati. Cement tank, with galvanized iron roof and gutters to catch the water. Ascended the plateau wall by the trail up from Lomati.



Roll 62:5 Looking N. across the native gardens toward Delai olio (470').



Roll 62:6 The reef at the N.W. end of Kambara, showing how it runs to shore, while the line off the N. end is continued by coral heads. Taken from near the summit of Delai olio, elevation about 400 feet, looking west.



Roll 63:3 Looking N.E. down on the village of Takalau and the N. ridge wall (face) of Kambara, from upper slope of Delai olio (elevation about 400'); the "France" at the left, Wangava Island at the right.

Climbed to the summit. Think that the Delai olio mass, which is elevated 250 to 350 feet above the limestone plateau, is of volcanic origin, and that it was elevated quite some time subsequent to the elevation of the rest of the island. This idea would be greatly strengthened if the samples of rock taken from the summit are positively basalt, as I believe them to be. Time element shown by the course of the reef (shown in 62:6).

Descended the east by south slope. The lower slopes up to about the 350 feet level are strewn with limestone boulders. The brake in the limestone wall at the foot of the slope of Delai oloi is quite pronounced, being the only gentle incline, except at the corresponding spot on the SW slope, (of Delai oloi) which I noticed in the rim. Delai oloi is nearly in a line with Komo and Mothe to the N.E.

Followed a trail leading S.E. into the woods. Collected some beetles from the dry leaves and fruit of a fallen tree. Also some small beetles, etc. (in alcohol) from beneath the bark of a fallen log.

Collected a plant specimen (# 500), which in falling knocked down a branch of # 501, which the natives call "selavu". It looks very much like kaukauloa to me.

Collected quite a number of small landshells.

Returned to Tokalau over same trail. On board at 5 P.M.

Developed two rolls of films in the evening with very good success, using the Australian Hypo (good in 90° water).

Monday, August 25, 1924.

Kambara, N.E. side.

Ashore at 7 A.M. landing at Takalau. Over ridge to plateau and followed same trail into woods as taken for a short distance yesterday afternoon. It runs E. by S.E., and finally N.E. coming out on cliff north of Ngalingali.

Insect collecting good and landshells plentiful. Also found a few new plants, including a strange looking cordyline with large branching stem, long, comparatively narrow leaves and large branches of large red fruit (# 507).

Collected a gray spider on the bark of tree # 510, which it exactly resembles. This tree has fruit in shape, size, and color resembling a plum, but smelling and tasting like a pear. Collected green and nearly ripe fruit as well as foliage specimens.

Collected some of the minute brown landshells from the fallen leaves which make up a thick humus mat under the forest, at the top of the cliff where the trail descends to the beach.

Collected a specimen of ivi (*Inocarpus edulus*) and a mistletoe growing parasitically upon it (# 513, 514). Took the wood specimen at the juncture between the two plants. It shows very nicely the smothering effect of the parasite and its means of attachment.

Returned to Tokalau village and looked over the cutter which a native is building on the beach. It is 50 to 60 feet long, 18 feet on the beam. All the ribs, braces and angle pieces have been laboriously hewn from the native trees, only the side planks being of machine cut lumber. This is the first large boat which the British Government has allowed a native to build. Most of the wood is dilo (*Calophyllum inophyllum*) pronounced "gilo" in Lau. It is being finished by three islands, Kambara, Namuka and Komo. The work has taken two years to date, the long time being due to lack of funds. It appears about half completed, and but one man is working on it.

Capt. Stenbeck pointed out several technical defects in the construction, but overlooking these it seems a very creditable piece of work. The native said they hoped to put an engine in it, and was aboard looking over the "France" for hints on interior construction.

Tuesday, August 26, 1924. Marambo.

Up anchor at 6 A.M. and under way for Marambo, passing along west side of Kambara and around south end.

Ashore at 9:15, entering by a good boat passage on the north side and landing on a broad sand beach, which borders the north and north-west sides. On the north there is in addition to the usual groves of coconuts and lowland trees a dense fringe of *Acacia laurifolia*, and another leguminous shrub (# 517).

The northern half of the island is raised to a flat topped ridge, according to the map, 160 feet high, (I should call it more-perhaps 200'), which has a summit depression within. Between this hill and the beach wall, which rises from 30 to 60 feet behind the beach, on the north-east and north-west sides are narrow valley-like depressions, which have a fairly level floor and in places supports groves of coconut palms instead of the usual dense wood. South of the hill these widen out into an area of undulating bad-lands, enclosed on all sides by rough walls of limestone rising 50 to 80 feet, which either front the sea or a sand beach of greater or less width.

On the NW beach beneath a coconut grove are four partly delapidated huts, occupied by the people of Kambara when they come to gather copra. Found one of them occupied by a native and two boys, who had been forced to land here en route from Komo to Fulanga when the rudder of their canoe broke. Having no knife they were unable to repair the damage and proceed, but had been living here for some days with only coconuts for food. We gave them a cane knife, which will enable them to repair the canoe and go on to Fulanga.

Worked around to the south side of the northern hill and ascended to the summit. Very rough going like that on Kangasa levu. Both the lower slopes and the summit depression are thickly covered with trees. Collected a ficus which had larger leaves than before seen; also a solanum-like shrub. Found a pigeon nesting with a partly grown chick, just beginning to get its feathers.

Crossed some close ruining bad-lands to the large coconut grove near the S. point, west side. It also contains bananas and breadfruit trees.

Around the W. beach to the N. side and returned to schooner at 3 P.M. as it was commencing to rain.

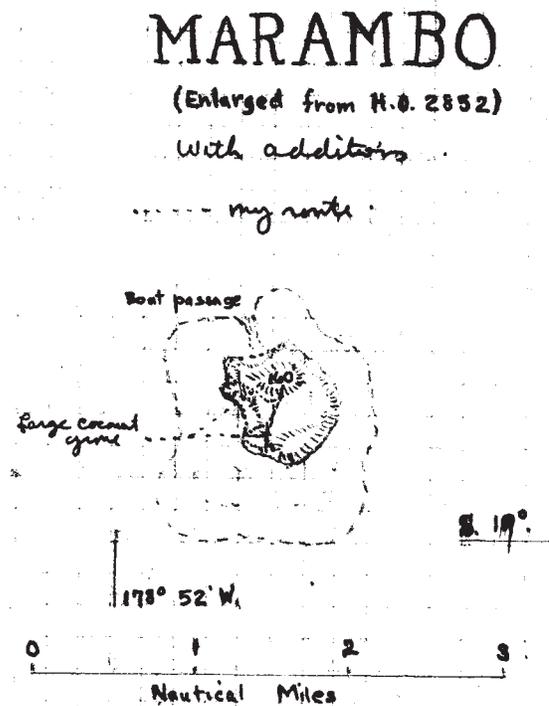
Underway at once for Kambara and anchored again off Takalau village. No anchorage at Marambo.

Wednesday, August 27, 1924.

Wangava.

Up anchor at 6 A.M. and across the four miles to Wangava. Ashore by 7:15 landing on a small sand beach on the N.W. side, where the cliff is somewhat lower than elsewhere. The entire sea face of the island on all sides is a steep cliff, ranging in height from 150 to 550 feet. There are but few sand beaches, the largest of which is at the west end. The cliff face is densely wooded except on the steeper portions and summit which is covered with scrub in places.

Ascended the ridge and dropped a few feet onto a high rough undulating plateau, densely covered with trees. As one walks out on it the ground becomes smoother and slopes gently toward the center.



Here is situated a large lake, much larger than indicated on H. O. Chart 2852, for it fills the greater part of the north-eastern interior of the island. The water is slightly brackish, but unfit for drinking. It is bordered with mangroves in places, and is without a beach, the marginal limestone being even undercut. Around the lake are several small clumps of coconut palms with a large grove at the east end. The entire basin is hemmed in by the marginal ridge which is continuous without a break.

Explored the west end of the lake, which is bordered with bad-lands of the worst type here. Came upon a clump of coconuts with fresh copra cuttings and after a search found a faint trail which lead away to the westward. Followed it west, W.S.W. and even S.W. for a stretch, past several small groves of coconut palms and a few orange trees. This portion of the island is a fairly smooth heavily wooded undulating high plateau, at least 150' elevation at the west side, sloping gradually down to the lake. The trail lead to the long sandy beach near the west end of the island.

WANGAVA I.

(Enlarged from H.O. 2852)
with additions.

0 1 2 3
Nautical Miles.

..... my route.

Our anchorage

Brackish Lake

Wooded
undulating
Plateau

Grove of Coconuts

18° 52' S.

178° 56' W.

The rough limestone rocks have on them in places numerous gray, yellowish and purplish landshells. There are great numbers of red-brown to purplish crabs with light colored claws; also red-legged hermit crabs.

Collected some white scale insects on a small tree stem.

Collected a few small landshells on moist fallen leaves-several different (at least 4) species. Also a very few small landshells on the leaves of shrubs and trunks of small trees. Caught a gray Asilid fly (similar to those on the beach) on a leaf well in the interior.

Walked N.E. to the end of the sand beach which is just beneath the 290' peak on the ridge. There are three or four small tumbled-down huts here in the coconut grove which backs the sand beach. The

narrow fronted house fly is abundant along the beach. From the end of the beach took to the cliff face back to the landing place. There are two Cycad plants growing here. Caught a greenish leafhopper and a small Coccinellid beetle on them. Caught a brown beetle and a small brown weevil on coconut.

Returned to the schooner at about 3:30 P.M. We remained anchored here for the night, the wind being from the S.E. although there was little shelter on the other three sides.

Thursday, August 28, 1924. Tavunasithi and Olorua.

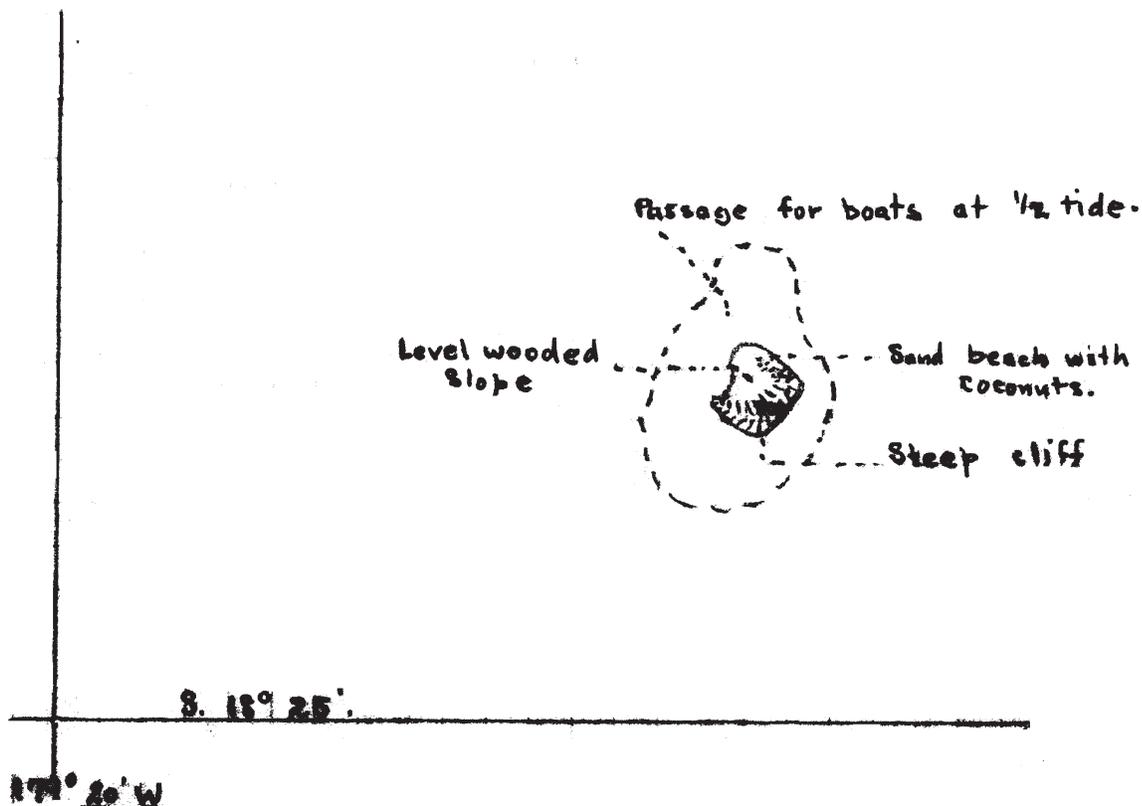
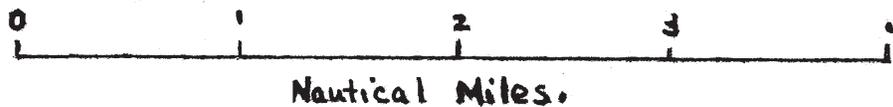
Underway at daybreak for Tuvunasithi island which we reached at 7:30.

The island is nearly circular, except for a shallow bay on the west side. To the east and south the island is edged with a steep ridge, rising to about 200 feet elevation near its middle in a knife edge. The ridge is precipitous on the sea side, rounded toward the center, which is occupied by a nearly level wooded flat, which slopes gradually up toward the ridge.

To the north-east and part way along the east side the beach is sandy and backed by a fringe of coconut palms.

TAVUNASITHI I.

(Enlarged from H.O. 2852, with additions)





Roll 63:4. Olorua from the N.W. with Komo beyond.

The “boat passage” on the north side is usable only when the tide is at least half full. The passage only admits small boats to a sandy basin, between which and the beach there is another reef.

The north beach has rather more pemphis on it than is usual in these parts. Otherwise the vegetation is of the usual beach type, with *Acacia*, *Scaevola*, *Dolo*, *Pandanus*, etc., and large bushes of the light pubescent shrub with yellow flowers and brown, hairy catkins.

On the north-west point and along the west bay the beach is of slab sandstone with only small patches of sand. The N.W. point is dominated by pemphis which is absent along the west side.

Large piles of coconut husks indicates recent copra cutting.

Inside the dense fringe of beach trees is a rough flat with birds-nest ferns and the usual lowland trees.

A narrow rocky point runs out 100 feet or so at the south end of the west bay and then the coast turns sharply east. The south to south-east portion of the ridge begins at this point, inclining upward and rising steeply from the water. Its face is covered with scrub with areas of bare rock. The highest portion of the ridge is on the east side, where a narrow knife edge rises precipitously from both sides, being separated from the main ridge by a deep chasm.

The reef extends practically in to shore, with small sandy pools, but few of them very deep.

No great variety to the trees on the central flat. *Pandanus* abundant, and about half a dozen familiar species making up the bulk of the dense forest. *Kukui* trees rather noticeable on south side.

Landshells not very abundant, perhaps too dry. Found a few under dead fallen leaves, and some on the green leaves of shrubs and tree trunks.

Insect collecting poor, first because they were not very abundant, and second because one had to spend so much time watching out for the next step on this bad-land limestone.

Found a small hut on the north beach.

Returned to the schooner at 11:45 and underway immediately for Olorua, which we reached at 2:30. [Chart on Page 45].

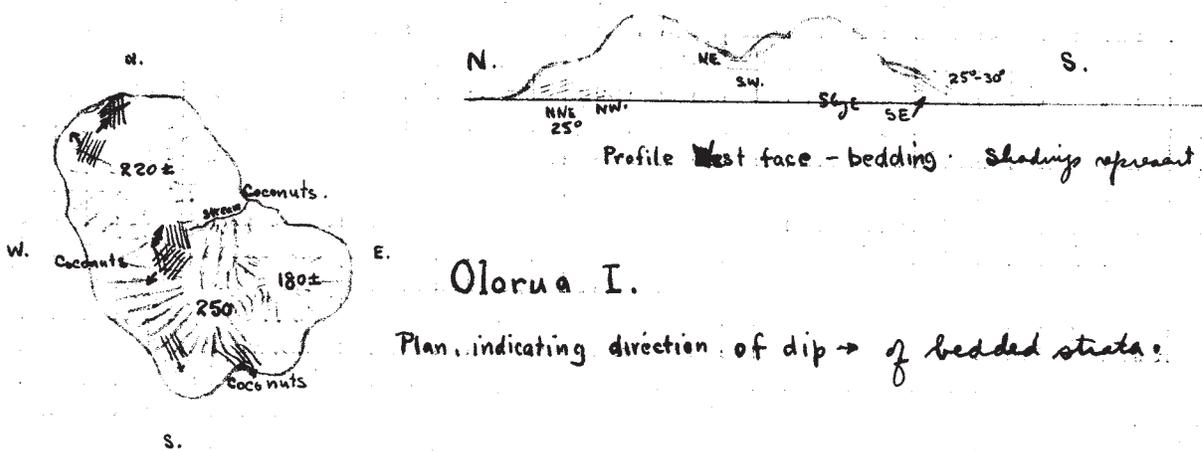
Olorua is of volcanic origin, rising steeply from the water to a height of 250 feet in three humps, which form a triangle. On the south side of the northern peak is a conspicuous clump of Casuarina trees, standing up against the skyline. Other clumps of this species dot the sides, especially the west side. The east, north and south slopes are rounded and wooded with scrub and fair sized trees. The NW and SW ends drop precipitously to the narrow beach. Each side of the central low dip is occupied by groves of tall coconut palms.

Landed at 3 P.M. on the N. end; the ship anchoring about a quarter or third of a mile off the land here in 12 fathoms, a hundred yards or so off the reef.

Most of the N. and east beach is made up of volcanic boulders and pebbles of various sizes up to 2 feet. The slopes vegetation includes Casuarina, puapua Hernandia peltata, Pandanus rewa milo, and other lowland trees. These form an open, park-like stand with volcanic pebbles and patches of dry grass (# 519 and 520) beneath.

A small stream trickles down the slope of the low place thru the coconut grove. The ironwood trees on this slope attain a larger size than any I have seen in Lau, being up to 2" in diameter and 20" high.

Found a very interesting bedding of a sandstone-like material olive brown to dark brown layers. The layers of the N.W. face south peak dip slightly to the south west. On the S.W. face it dips to the S.E. at an angle of 25° or 30°. Between are various intermediate inclinations. On the N.W. face of the N. peak it dips to the N.N.E. at an angle of about 20° or 25°. The following sketch map attempts to indicate this:



The strata consists of the following:-

- | | |
|--|-----------------|
| Brown, fine grain sand, about 1/2 inch in thickness | } Predominating |
| Cineros " " " " " " " " | |
| Olive coarse " " up to 1 or 2 inches " | Several such |
| Small lava pebbles inbedded in coarse sand, up to 3 or four inches thick | Occasional |



Roll 63:5. Outcrop of bedded strata on low divide between the two west hills, which dips very slightly toward the N.E., looking south.

This bedded material is overlaid by coarse tuff (?) [much the same type of material that Punchbowl is composed of]. thru the latter are dykes of lava, especially at the north end. The bedding is only visible on the west side, the more gentle, wooded east slopes being covered with partially disintegrated lava and tuff (?) and loose hard pebbles of the former on the surface.

The west side has a sand beach along the central portion.

Patch of low plume grass (# 521) in a small pocket off the beach. Abundant anthrocyan in young growth of several species of trees. Caught some small beetles and a spider “whacking” it.

Small beach on north side with patch of *Ipomoea pes-capri* which has taken on an erect habit of growth from the running undergrowth stems-up to 1 1/2 or 2 feet high. Purplish flowers and brown, spherical capsules which split both ways at right angles across top exposing small brown hairy seeds.

Caught a small brown Hippoboseid fly on a Kingfisher.

Mr. Beck gave me a large greenish Hippoboseid which he thinks came off a pigeon he was skinning.

Friday, August 29, 1924.

Olorua & Aiwa.

Ashore at 6:45, taking camera to photograph the bedding formation. Walked entirely around the island to pick out best spot. Small cave or clef in rock on N.W. side in a bed of pink, purple and yellow coarse sandstone (?). (Took sample). Low cliff of gray and red-brown lava at S.E. point with bed of consolidated tuff (?).

Swarms of small red-brown ants under dry bark of fallen *Casuarina* trunks; also collected a silver fish and a small brown beetle. Demolished a partly rotten log and secured the larvae, pupa and adult

of a moderate sized Lucanid beetle. Also caught a *Cutilia sora* roach and saw one of the large black wingless species.

A mosquito, either *Aedes scutellaris* or *A. pseudoscutellaris* present and active.

Collected a few specimens in Ipomoea patch and along beach, returning to Schooner at 10 A.M. Underway immediately for Aiwa.

These two small limestone islands lie close together in nearly a straight line, within a much extended reef. The western is slightly the larger and higher, being 210 feet high and 1800 by 600 yards. The eastern island is slipper shaped, 200 feet high and 1600 by 600 yards. The north face of both islands and to a slightly less degree the south face also, is a sheer limestone cliff, with numerous caves, both at sea level and higher up the face. Some of these caverns are of considerable size.

Anchored off the middle of the W. island at 3:30 and ashore by 4 P.M., landing on a sand beach in a small bay, at the east end of the western island. A sunken reef with a "mushroom" rock on it connects the two islands and is awash at low tide. From the beach a good trail leads first to a small grove of coconut palms and then into the woods.

The entire central portion of the island, quite in contrast to the rough forbidding sides, is a flat, nearly level, smooth plateau, in places higher than the enclosing walls, and covered with a moderately open stand of the usual lowland trees. They are for the most part of considerable size, some of the strangling banyans attaining a height of 50 to 60 feet and a diameter between the external "props" of 25 or more feet. In places there is quite a tangle of vines, but open "avenues" extend thru the thickets making trails unnecessary. Here and there there is a deep sink or pot hole (like those on Ewa Coral Plane), with sheer walls, 20 to 30 feet deep and of various sizes, some with caverns extending back from the sides, and with large trees growing on the level bottoms.



Roll 63:6. Bedded strata at S.W. point which dips to S. by E. perhaps 5° or 10°, looking east. (Took a large sample here which shows several layers).



Roll 64:2. Aiwa islands, looking S. by W. (Showing principally the eastern island).

Walked west a little more than half the length of the island near the north side; then across the island to the top of the south face, which is less precipitous here; and diagonally back to the landing beach.

Saw a brown rat.

Landshells not plentiful, perhaps too dry. A very few on rock faces and one here and there on leaves.

Too late in the day for good insect collecting. Caught a few small moths and some small spiders, flies, etc. Mr. Beck found a large brown coreid bug, (*Mictis profanus* var. *crux* Dallas).

Saw a Cordyline with leaves not only at apex, but also in a double spiral down the stem which was a branch of a good sized trunk, 8 to 10 cm. in dia. and over 4 m. high.

Collected a couple specimens of a lowland tree, also collected on Komo, because it was covered with a good set of fragrant blossoms.

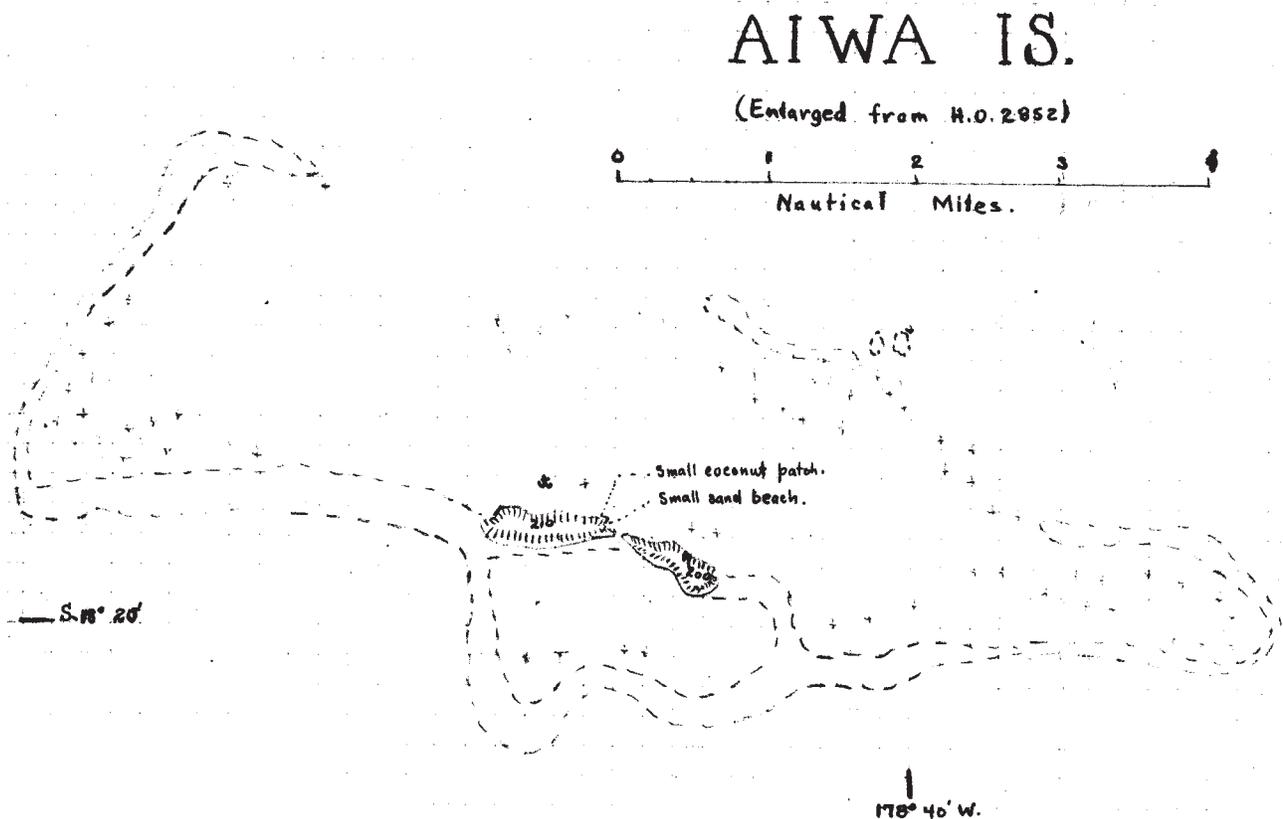
Returned to the schooner at 6 P.M.

Saturday, August 30, 1924. Aiwa (Eastern Island).

Ashore on eastern of two Aiwa islands at 6:45, landing on a ledge near waters edge (N. side) and ascending to the summit of the ridge, over very rough limestone. Like on the western island the sides are precipitous limestone cliffs, especially the central portion.

Saw a herd of wild goats on the rough cliff summit.

The interior of the island is an undulating basin, somewhat depressed below the level of the surrounding ridge walls. It is filled with trees. The western end is narrow and composed of the two marginal ridges, which come together, leaving no level interior. The eastern end is even more open and parklike than the interior of the western island, the ground being carpeted with fallen leaves, and the



trees having a very open stand, so that walking is good in any direction. Near the middle is an area where the trees become smaller and even more scattered, with quite a large patch of plume grass, bunch grass, Pandanus and ferns. Between this and the rough western end are areas of thicker growths tangles of vines & shrubs, a milo thicket, etc. with open avenues. On the north-west side found a small cane with signs of a camp fire and sleeping place.

Collected a number of scorpions under the rotten bark of a fallen tree. They are brown when small, but become greenish when full grown. The tail is small like that of a whip-scorpion. They are slow moving, rather sluggish creatures, making little effort to escape, quite in contrast to the small brown roaches which live under the same bark and are extremely quick in their movements.

A few orange trees at east end, but no coconut palms.

Tried to catch a large (10 to 12 inch), olive-green backed lizard but they are too quick to be caught by hand. Finally knocked one off the trunk of a tree and captured it.

Climbed one of the rough rocky peaks of the marginal ridge on the S.E. side. From here one gets a fine view of the undulations of the S. reef, with Oneata, Mothe, Komo, and Olorua on the horizon. Plenty of goat manure and tracks along these rough cliffs. Numerous small, more or less dry patches of bunch grass on the sides of the cliff and in small pockets. This is probably used by the goats as food. Resembles # 520.

A few butterflies about the grassy patches on the cliffs; the white one with black or yellow markings, the black species with white spots and *H. bolina*. Collected one of the latter.

No specimens of the large white, yellow and fuscous spider which spins the orange web. Have not seen it on the last four islands. It was on Kambara, Mothe, Oneata and Komo and before.

Small aeneous bee on the flowers of tree # 526.

Crossed to N. side and climbed the highest pinnacle, 200'. From here an excellent view of the whole island may be had. Could also plainly see Lakemba and another island (Tevutha?) beyond it,

to the N.W. The goats frequent these high peaks, their trails and deposits being everywhere. Scared up the herd again. They are nearly all white with black markings on the head and neck.

Collected a birds nest for Mr. Beck, containing two eggs. While waiting for Mr. Beck to photograph a dove's nest, demolished a rotten log and obtained a bottle full of termites, both soldiers and workers.

Returned to the schooner at 4:40.

Sunday, August 31, 1924. Aiwa (W.)

Ashore at about 9:15, landing on the sand beach at west end of the western island.

Explored a large limestone cave toward west end. The caves run out and downward from a broken-in central pit, about 20 feet deep and 25 or 30 feet in diameter. The walls and ceiling drip, and are festooned with cinerous, purple and crystal white stalagmites. One of the caves runs down nearly to sea level, (will take a light tomorrow and explore it more fully). Took specimens of stalagmite.

Collected along south half of the island to west end and back on the north side.

Small spider feeding on two bluebottle flies caught in web.

Brown ants on fallen log.

Small brown landshells on new leaves of a scandend shrub. Also a very few small landshells on twigs and leaves.

There are also goats on the western island toward S.W. end.

Caught a young walking stick (Phasmid) on a large green leaf.

Returned to Schooner at 3:30.

Drew enlarged outline maps of Lakemba and the two reefs to the northeast of it, in which there are small islets.

Monday, September 1, 1924. Aiwa (W. Island)

Ashore at 6:30 returning to West island, which is better collecting.

Further explored the limestone cave, going to the ends of all the ramifications. Saw and heard a few small bats, such as I caught in the cave on Savaii, but the roof was too high to catch these.

One of the arms slopes down practically to sea level and at its bottom is a large pool of brackish water. The natives visit the upper part of the cave, as there was the remains of a fire near the entrance.

Many of the trees are festooned with the codate leafed climbing vine with large white flowers and spherical brown capsules. Collected the fragrant white flowers of the small tree on rocky slopes which has 4 ribs and contains a bright orange pulp in which are inbedded numerous small cream colored seeds. Several fruit were broken open and the contents partly gone as if eaten by birds. (# 399 and 529).

Collected about the eastern end of the island, obtaining a very few landshells and quite a number of small insects principally by beating the leaves of shrubs and small trees. Saw a large skipper, the same species, (I think) as captured on some of the other islands.

Very few large or conspicuous insects on the Aiwa islands, except some butterflies and moths, which were seen principally in the grass or about the weeds near the sand beach and coconut clump. Saw practically no new plants on this island.

The large olive-green lizards are quite abundant but hard to catch. Mr. Beck shot several and also one of the very large green lizards. The small green tailed skink (called "pili" by the Samoans) is abundant. Also one occasionally scares out a gecko (called molo or moko) from its hiding place in a hollow tree, under bulging bark or beneath a log.

Along the trail between the sand beach and the clump of coconuts and spreading out along the extreme east end of the island is an area of introduced weeds and grass, especially the yellow flowered composite. Among them (and seen no where else on the island) is the pepper (*Capsicum frutescens*) which forms with Piper the dominant forest undergrowth on some of the other islands. I had considered it indigenous, but this tends to show that it has been introduced during the period of man's presence, as it seems to be only where he has been, which may also be true of the Piper. The latter is not present on either of the Aiwa islands.

With the introduced weeds one also finds who introduced insects, such as Syrphus sp., the small greenish Stratiomyid, small gray or light brown slender bugs, Lycaenid butterflies, the Monarch butterfly, various grasshoppers, etc., species always to be found in lowland, woody localities. This illustrates how even the occasional visits of natives will bring about the introduction of foreign flora and fauna.

While waiting on the sand beach for the rowboat walked along the undercut limestone shelf and caught a few more of the greenish craneflies which frequent the rock face here. Also caught a small dark green lizard here on the rocks, which were nearly the same color.

Hicks (sailor) caught a very large purplish crab [photo above], the kind which in Tahiti and the Tuamotus climbs the coconut palms and drops the nuts. It measures about 18 or 20 inches across the leg spread.

Underway at 3 P.M. for Lakemba, where we anchored off the west end of the island at 5 P.M.

September 2, 1924. Tuesday Lakemba, (walking entirely around island).

Ashore at 6:45, landing at the Berns Philp Store and ranch, where we were greeted by Mr. Steward, the manager. He showed us the entrance to one of the numerous limestone caves on the ranch, which he said was frequented by great numbers of small bats.

This lowland district is covered with extensive groves of coconuts beneath which is a more or less open undergrowth of guava, Piper, canna, weeds, ferns and higher up on the slopes, plume grass.

The island is encircled by a very fair "main road"-a good horse and foot trail. Followed this around



Roll 64:6. The cook holding it up by the legs.

The zone of coconuts continues but toward the S.E. point it becomes narrowed and pushed inland by a marginal mangrove swamp. The trail runs inland mounting a plume grass covered slope and descending into a broad valley. Came upon a small area of sisal and collected some fruit to complete # 472 (collected at Namuka-i-Lau).

Shortly after leaving Waitambu passed a native tying lengths of a slender rope-like liana together. He said it was walai (Entada scandens) and that he was going to use it for a fish net support. A small patch of wild pineapples on trail side.

Saw a gray tomcat (Wild?)

In places the trail was very muddy. This is supposed to be a dry region and this the dry season of the year, but Mr. Steward tells us that they have had most unusual and unprecedented rainfall.

Nukumuku consists of a score of native huts, two or three frame shacks and a small church, located on a deep, mangrove bordered bay at the southeast end. Just before reaching the village passed the mouth of a small but deep valley, up which I could see the rough, bold outline of a peak (Kendi Kendi?). Just north of the village the brown plume grass covered hills have been burned off in places.

At the east end of the trail is well inland, between 1/4 and 1/2 mile from the beach; the space between being occupied by lowland trees and mangrove thickets.

The area immediately south of Yandrana is all broken up into small hills and undulating ridges. The trail turns N.W. across the edges of these.

Yandrana is a fairly large village situated on the banks of a good size stream-somewhat inland, the coast being fringed with mangroves. A high narrow ridge runs inland from behind the village.

From here to Vakano the trail is inland, with a very extensive grove of coconut palms on each side. This zone of coconuts, in fact continues almost uninterruptedly around the entire margin of the island. Volcano is a moderate size village, fronting a broad mud flat which extends from shore to reef and is dry below ? tide. The village has a Chinese store. The natives should be well off, judging by the extent of the coconut palms loaded with nuts, which surround the village.

The mud flat continues nearly the entire length of the north side. The beach is steep, but the flat is low and sandy with a broad zone of coconut palms.

Nassangulau is located on the first stream west of Vakano. It is quite a good size village with two stores, one Chinese and the other owned by a white trader and presided over by a Fijian. The village seemed more industrious than the others, the tap tap of samusamu (tapa) beating resounding from every quarter of the village.

Quite a long sandy stretch from here to the base of Mt. Goodenough, where the trail turns abruptly south. This peak rises very abruptly on both sides with a terrace about half way up. The lower platform is much larger than the upper, rising in a high cliff from just behind the beach. The rocks at the base are limestone. Judging by the luxuriant covering of trees, the whole may be upraised limestone. The beach at the north-west point is of salb-sandstone and sand. The trees are of the lowland forest type. Saw some very large specimens of Hernandia peltata.

South along a sand beach and extensive coconut zone off the mouth of a valley. Then up the side of a limestone bench which rises in a rough cliff from the sea. This is the cliff which is full of caves and on the other (S.) end of which Mr. Steward's house is located.

Large patch of bamboo along bank of small stream. Field of milkweed with several species of butterflies:- the Monarch, the black species with white spots, small yellow sp. and another species which I have not previously collected, fairly small, and patterned intermediately between the Monarch and a Vanessa. It feeds both on milkweed blossoms and on the purple Verbena flowers.

On board the schooner at 5 P.M.

Wednesday, September 3, 1924.

Lakemba - interior.

Ashore at 6:45 and up the west slope of Lakemba. Followed a well beaten trail part of the way, which led to some gardens well up one of the west flowing streams. The slope is covered toward the bottom with an open scrub, with scattered Casuarinas and Pandanus. Above the region frequented by cattle there are also ferns:- the knee deep wing sp. and low staghorn. Higher up found occasional small trees of Metrosideros polymorpha in flower.

The stream beds in the valleys are bordered with lowland trees well up toward the heads of the valleys. Many of them have small cultivated areas containing taro, bananas, yams, papayas, pineapples, sugarcane, kava, noni, ti and coconut palms.

Continued on up the slope to a high plateau on which are located a number of hills, cut off from each other by the deeply eroded valley heads. The slope of this plateau is covered with Casuarina, Pandanus, knee deep ferns, saw grass (# 533), lavender flowered orchids and scattered scrub, with areas of plume grass in places. The scrub is made up of the following:-the narrow leafed species with triangular winged capsules; a species with dense compound umbles (?) of small white flowers and a sub-spiny olive green capsule; "rosebud" shrub with the pink and white flowers and red brown spherical capsules and acute 3 nerved leaves the shrub with yellow flowers and white floral leaves; # 532, and here and there lehua.

The soil underfoot is red brown; outcrops have tints of yellow and purple. Toward summits more and more bare areas with water eroded holes.

Small brown moth with wavy fuscous lines across wings about Casuarinas. Large grasshoppers common. Small Cicindelidae. Small fuscous bug and black wasp with red brown legs and swollen hind tarsae, in shrub with triangular winged capsules.

Saw a few stunted tree ferns toward top.

A very fair trail crosses the island from south to north; running up the ridge behind the school at Tumbou and branching near the top of the north high ridge, one branch running down the west side of a valley to Nasangalau, and the other traversing the ridge a short distance and descending to Vakano.

The four central peaks are of about the same height, 680 to 720 feet. These are nearly in a straight line from NW to SE, and the fourth is an elongated ridge to the eastward. The middle one of the three, Mt. Goodenough is a shade higher (720' according to the Pilot book) but Kendi Kendi has a knot of trees and coconut palms on its summit (690'), which makes it look higher. Climbed to the top of all but the eastern of these peaks. To the S.E. the slopes are covered with dense plume grass, those to the west have ferns etc.

A good trail leads from the summit of Kendi Kendi to an area of gardens at its south foot. From here there is a well tread trail down the valley to Tumbou village. The upper slopes of Kendi Kendi, above the plume grass, are covered with lowland trees, scrub, and weeds, with a couple dozen coconut palms.

Caught a few beetles in dead leaves near this summit.

Water is piped down the valley to Tumbou.

In the village found a group of 13 women dying (tapa)-samusamu. The strips of tapa were pasted together with a native starch made from mamico root. These strips were laid over a semi-cylindrical form covered with a fish net on which the raised designs, worked out in fiber (fern stems) and tapa were fastened. The dye-called kasa, brown in color and made from the bark of the Lauci (Alurites moluccana), is applied with bits of cloth in the form of a swab. When rubbed with a back and forth horizontal movement the high places only take the dye (along the design). Eleven of the women were doing the work, one was bossing the job and one was mixing kava for the others.

Crowd of boys of various ages playing association football in an open space-“village green”.

Stopped in at the Morris, Hedstrom Ltd. (this branch is called “Lau Traders”) store which is also the west office.

Called on the chief of the island to see two fine canoe models which he had. Both were beautifully finished, but too large and too expensive to tempt me.

Learned that the goats in Aiwa had been put there by the chief who “owned” the island, recently deceased.

Stopped a moment at the Hospital which is located just across the creek from the rest of the village on E. side.

Collected along road toward Wathiwathi, catching a swallowtail butterfly. The plume grass is called nasau. Collected a specimen of vutukana (*Barringtonia edulus*) in fruit and flower.

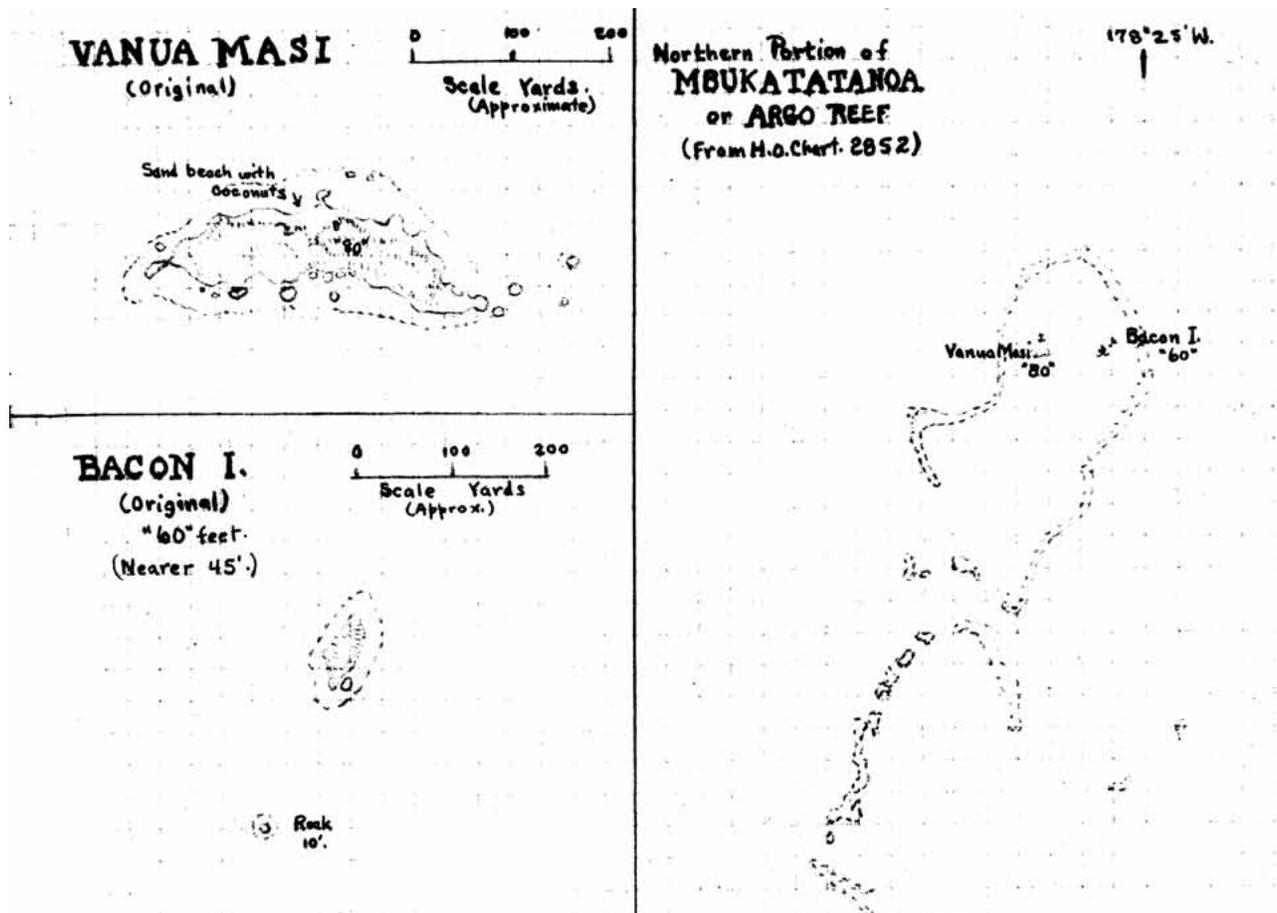
Returned along road thru village and around the S.W. end along the beach. The beach is here underlain by, or composed of, slab sandstone, except for a short stretch of undercut limestone shelf.

Aboard at 5:30.

Thursday, September 4, 1924. Bat Cave Lakemba. Vanua Masi.

Ashore at 6:45 and visited bat cave near Mr. Steward’s house. The cave is in the west end limestone ridge and goes down 40 feet or so with a width at the bottom of 25 feet and length of 60. Succeeded in catching about a dozen of the small reddish-brown to fuscous bats. Sample of guano.

Returned to Mr. Steward’s store. No is the supervisor and manager in this district for BurnsPhilp (South Sea) Ltd. and has a wholesale store here near his home, from which he supplies the four retail





Roll 65:1. Vanua Masi from N.E.

stores. Made a few minor purchases and also bought from him a kumete or yaqana bowl, small and not only well finished, but representative, for 2/6.

Learned from Mr. Steward that the Lakemba school is a "provincial" one maintained entirely by the government. Some 50 or 60 boys are in attendance, Mr. C. J. Haskell, head master.

Returned to the schooner at 9:15 and underway at 9:30 for Argo (Mbukatatanoa) reef. Anchored off the north side of Vanua Masi at 1:45, ashore by 2. Saw a turtle on way to beach.

Vanua Masi is a small, rough limestone island, not over 400 yards long and between 60 and 100 yards wide. According to the Pilot book and chart it is 80 feet high, although it hardly seems that much. There is a sand beach underlain and backed by slab sandstone on the northern side west of the middle. Behind it is a small clump of coconut palms, banana plants, papaya trees and listed below, scrub and grass and weeds. The trees include buka, puapua, Scaevola, Tournefortia, Pandanus, Milo, Noni, the tree with the small orange fruit (eaten by pigeons), tree with zigzag spike of small white (strawberry-like) fruit; asymmetric large leaved Ficus, yellow flowered leguminous shrub with narrow, flat green pods. Other plants included the white flowered Ipomoea, another vine (not in flower); "maile" ferns, # 537, which is the dominant plant on the island covering much of the limestone face as a lowvine as well as growing as a shrub on the sand beach, Portulaca, Sesuvium and two or three weeds; grasses etc.

Walked around the island making the accompanying sketch map, while Mr. Beck was photographing nesting birds in interior. The west end is much carved by the waves. South side presents a high shear wall which has broken down in places leaving a lot of large boulders on the otherwise flat reef. There are several small pockets of sand, but the rest of the beach is undercut shelf. There are several isolated rocks off east end, two on the fringing reef and two beyond.

Watched a large brown speckled eel catch one of the mottled green backed crabs and, after squeezing it to death, bite off the legs and split open the shell cleaning out the interior. Saw several small

fish swimming about pools in the reef platform, one was black with yellow bands on its sides. Another was dark green with blotches of red almost constituting longitudinal stripes. Picked up two live brown and white cowries in a shallow pool. They had a dark fuscous margins.

Small red brown ants abundant everywhere. A cream and light brown moth common about the trees. Hemispherical, showy black bugs, pale yellow flies, a small brown bug, small black flies and spiders on Ipomoea vine. A few mosquitoes. Green Dolichopodid flies numerous; also a few Sarcophagids. Hippoboscids on both frigates and young boobies which nest abundantly in the trees and among the rocks.

Caught a snake, too large to preserve in formalin so skinned it in the evening.

Friday, September 5, 1924. Vanua Masi and Bacon Islands.

Ashore on Vanua Masi with Mr. Beck at 6:45.

Collected around sand beach and adjacent slopes; under rocks, under fallen coconuts, and on the plants.

Centipedes, sowbugs, ants and small crickets under rocks. These same and two spp. small weevils under coconuts. The usual small black weevil on driftwood. Landshells under both. The small red-dish-brown crickets are more or less closely associated with the red brown ants. Leafhoppers on the shrubs, particularly # 537. Also found a number of dark olive green caterpillars with bands of small yellow spots on # 537. It is probably the larve of the white butterfly with black markings which is numerous. Found a fairly large red-brown jumping spider which had just caught a fly (Synthesomyia nudiseta); took it away from him. Saw one or two more flies of this species about.

Small greenish white hermit crabs numerous. Collected a few.

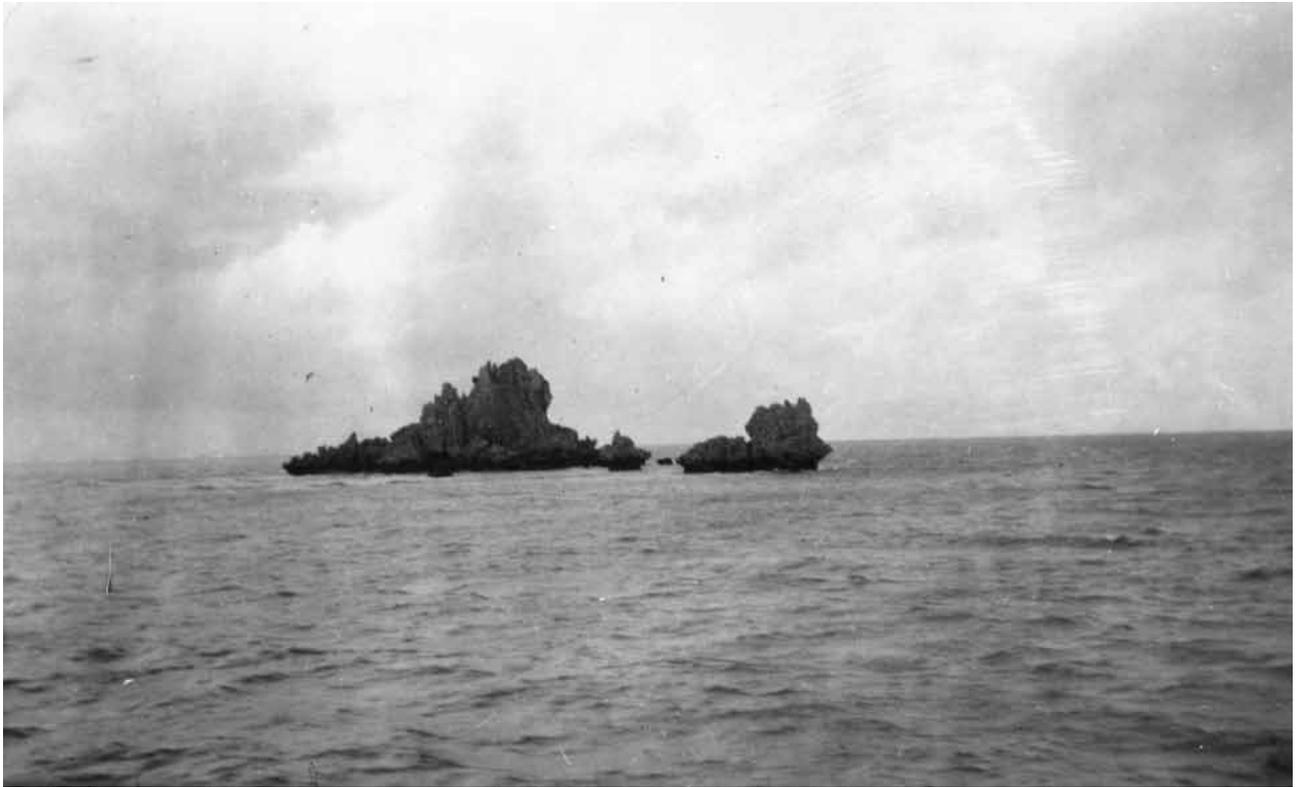
Found fig wasps in the ripe figs of the few large leaved Picus trees.

Small lizards numerous. Several banded snakes in crevices.

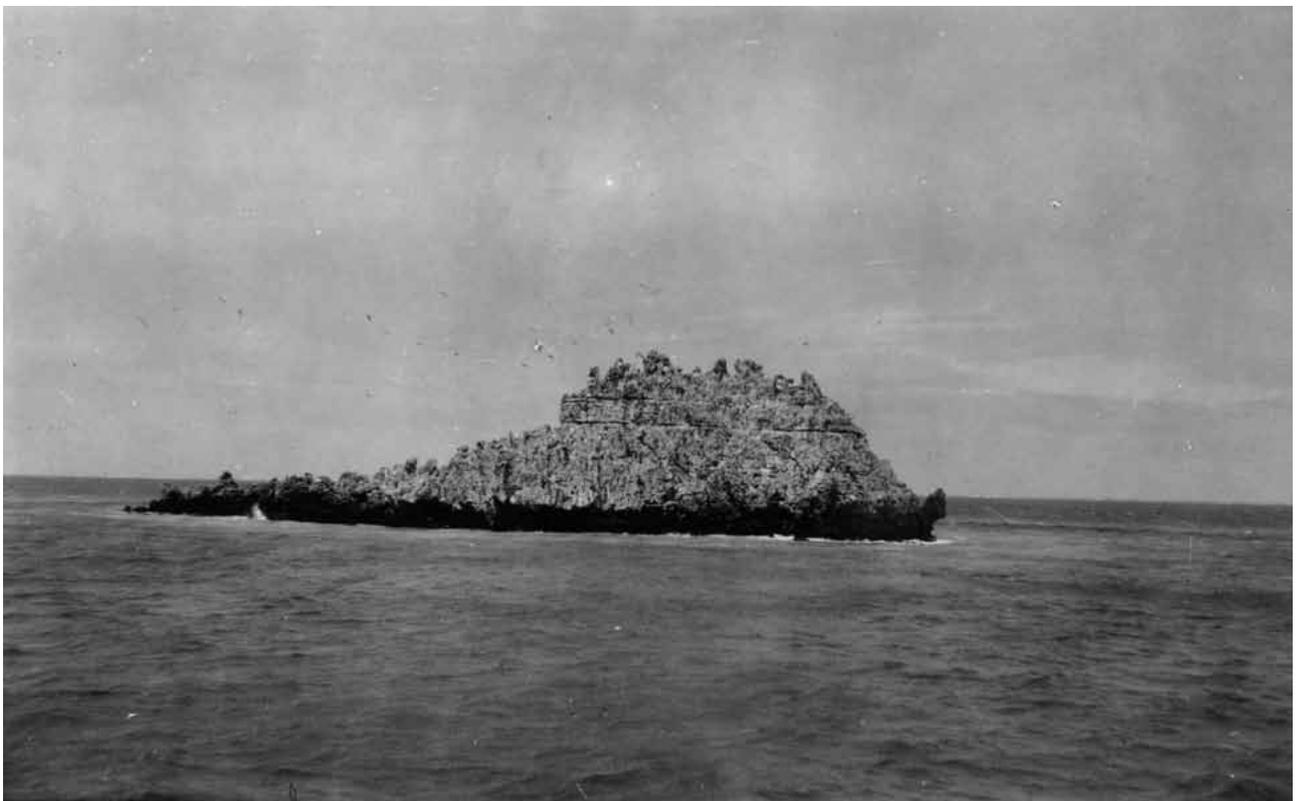
Returned to ship at 11 A.M. and underway for Bacon Island which lies about 2 miles to the east by north.



Roll 65:2. West face of Bacon Island, looking east.



Roll 65:3. Lati Viti looking N. by S.



Roll 65:4. Latei Tonga looking E.S.E.

Landed at about 12:45, on the point, west side which is the only piece of the face which is not precipitous. Even this rises 10 to 15 feet steeply from the water.

Bacon Island is about 80 or 90 yards long, W. and E. and less than 40 or 50 yards wide, tapering at both ends. It is composed of extremely rough and jagged limestone. The pilot books and chart give the height as 60 feet, but it is scarcely more than 45' or 50'.

Between the knife edges on its sides are small pockets of dirt richly impregnated with bird guano. In these grew little patches of sesuvium (near the edge), Portulaca-both yellow and white blossoms (# 539) a purple stemmed creeping herb resembling Portulaca but with thinner leaves; bunch grass; and a weed shrub (# 538) which is the dominant plant. Plants and rocks are "whitewashed" with bird dung. Numerous nesting boobies and a few terns.

Large number of banded black and cream water snakes of all sizes. Small lizards.

Insects few as to species, but large number of individuals:-leafhoppers, small yellow flies, slightly larger black (Agromyzid?) flies, greenish crane fly on Sesuvium, Portulaca and # 538. These and in addition a Psyllid and a green leafhopper on bunch grass. Saw a Sarcophagid fly and a red coccinellid.

One or two small patches of "maile" fern in crevices.

Saw a large turtle on way over to 10 foot rock about 150 yards to SSE. Returned to schooner at 2:15.

Spent afternoon putting away specimens and preparing another tin cracker box to hold insects. The first tin box holds those from July 26 to September 5, inclusive.

Saturday, September 6, 1924.

Latei Viti and Latei Tonga.

Underway at daybreak for Reid Reef. Anchored off NW side of Latei Viti at 10 A.M.

Latei Viti is a small rocky islet of jagged limestone, nearly triangular in shape, about 50 or 60 yards on a side, and about 60 feet high. On the southwest side are a few isolated rocks, one of them about 50 feet in diameter and 25 or 30 feet high. The south and west sides rise precipitously from the water while the north and east slope less steeply and have pockets of soil (highly impregnated with guano) in which grow small patches of Portulaca and Boerhaavia, the only species of plants on the island. Some of the north terraces are of fair size, - five to six feet wide and 15 to 40 feet long. We landed on a small sand pocket on the north west side.

Animals:-Small dark green lizards and banded black and pale greenish-white water snakes, both fairly numerous.

Small black Agromyzid fly the dominant insect, frequenting both Portulaca and Boerhaavia plants. Small fuscous ants and small Phorid flies under dead bird. Hippoboscids about boobies and their nests.

Returned to schooner at 12:40 and proceeded to Latei Tonga where we anchored to W.N.W. (of S. point) at 1:30.

Latei Tonga is very similar in formation to Latei Viti, being of jagged limestone, sub-elliptical in shape about 60 yards long by 30 or 35 yards wide at the widest part, and 50 feet high at S.W. end. The north end is low and rather flat with fair size patches of Portulaca, Sesuvium, mat grass and Boerhaavia. In fact small patches of these four plants are to be found in nearly every part of the island, even in pockets on the S.W. cliff face. The Sesuvium grows near the edge while the Portulaca and Boerhaavia is plentiful higher up.

Both boobies and terns nesting, with four eggs to half grown chicks.

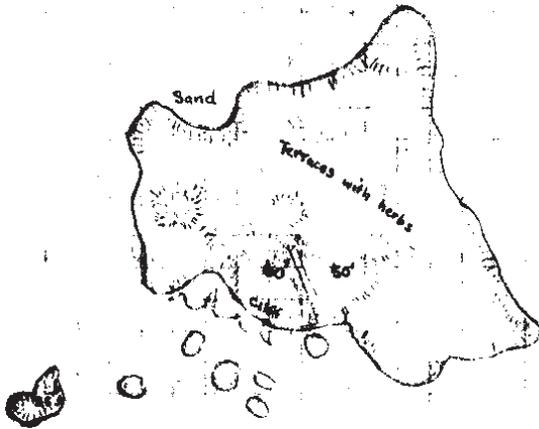
Water snakes, lizards and red legged hermit crabs.

Ants, Dermestes vulpinus (?) and a small black beetle under dead boobie.

LATEI VITI

(Original Sketch)

0 10 20 30 40 50
Approx. Scale of Yards.



LATEI TONGA

(Original Sketch).

0 10 20 30 40 50
Approx. Scale of Yards.



Black Agromyzid fly and small fuscous leafhopper about Portulaca, Boerhaavia and Sesuvium. Also a green crane fly about the rocks and Sesuvium.

Fuscous and red brown ants, pale mites and two species of weevils, one gray and one smaller and browner about Portulaca roots.

Small brown and white and smaller yellowish gray microleptopteras on rock faces. Boobie hippoboscid.

Picked up a few Cowries in pools and under ledges on the reef which surrounds the islet. This also had the mottled green back crab, blue starfish, and other sea ferns on it.

Returned to the schooner at 4:45 and remained anchored for night.

Sunday, September 7, 1924.

Anchored all day off Latei Tonga. Spent the day enlarging outline sketch maps of the next four or five islands and writing several pages of preliminary report.

Somewhat overcast during day with shower in evening.

Monday, September 8, 1924.

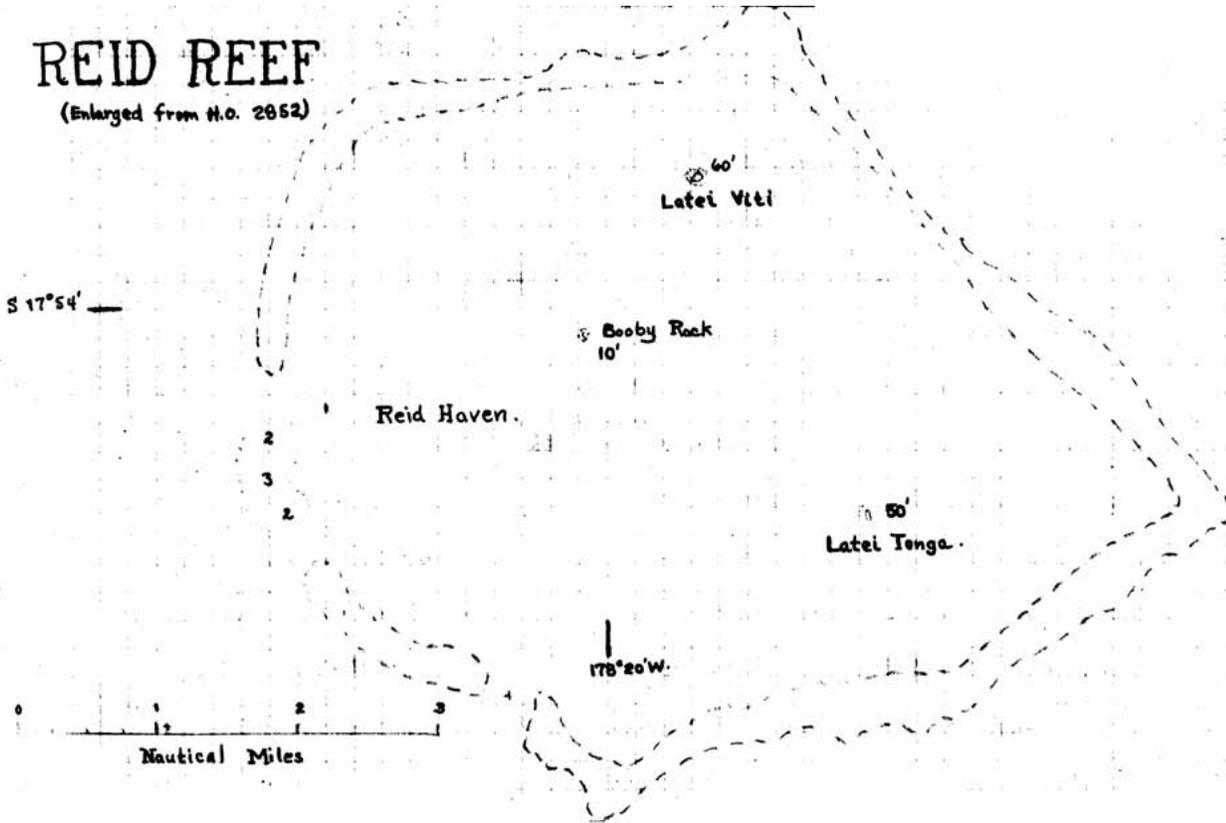
Underway at 5:30 A.M. for Yaroua Island.

Spent early morning computing and typing off a tide table for the Lau islands for the balance of September and October.

Off Yaroua at 9:30. Ran along east side, and around north end looking for suitable landing place. Landing would be possible at high tide on the N.W. point, but the tide being low and the wind from the N.W., we did not stop.

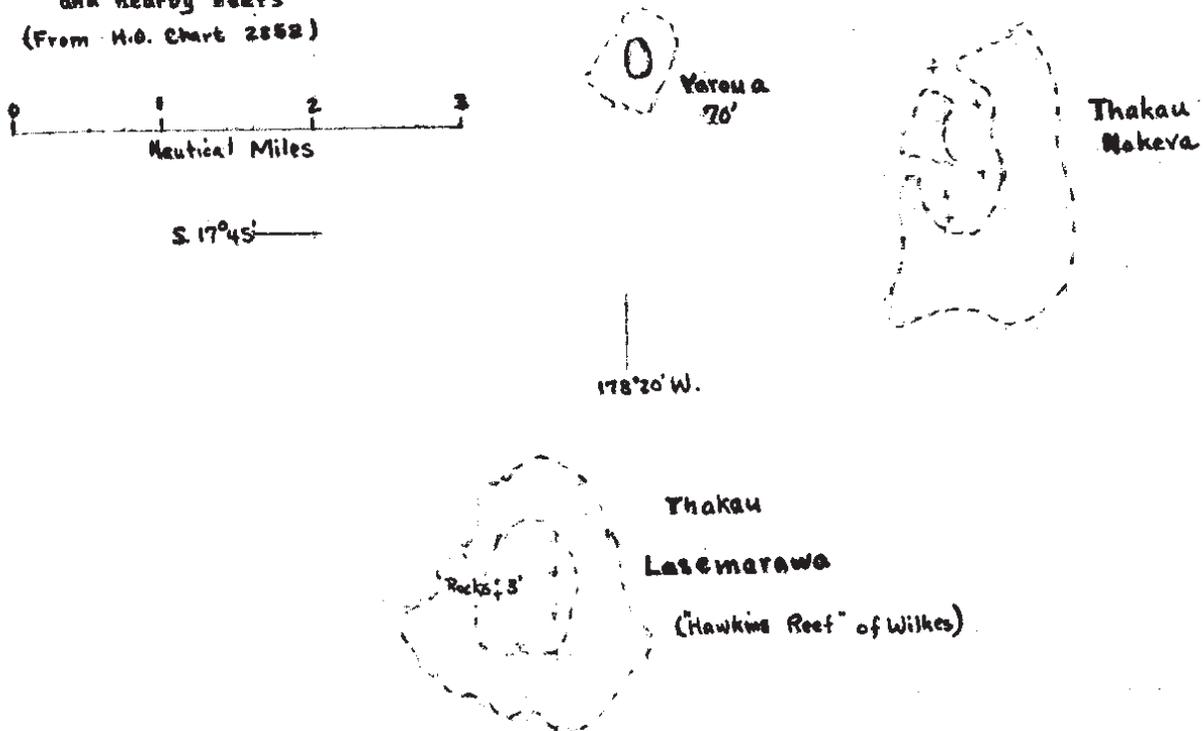
REID REEF

(Enlarged from H.O. 2852)



YAROUA I

and nearby Reefs
(From H.O. Chart 2852)

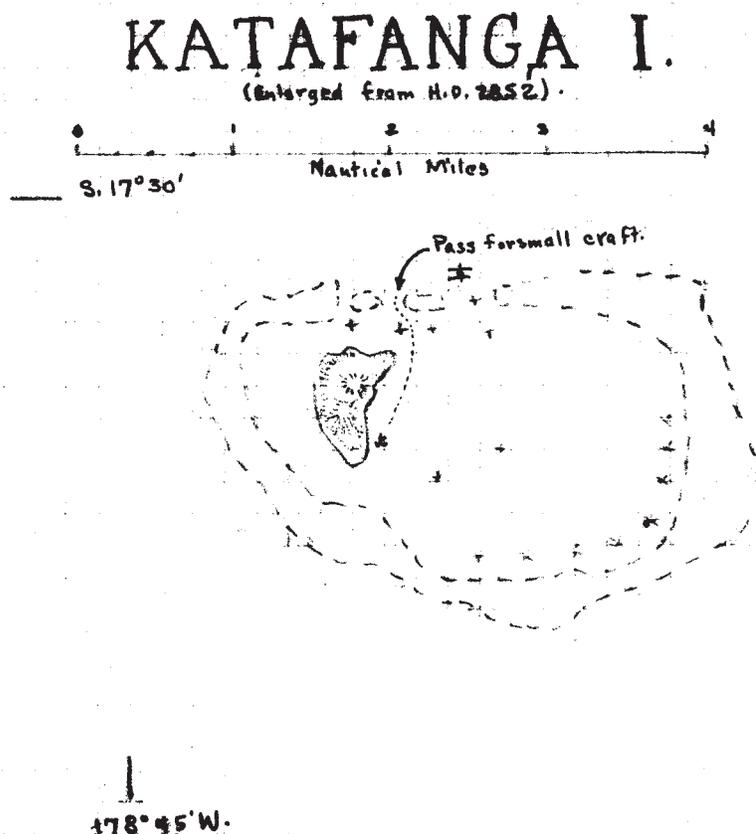


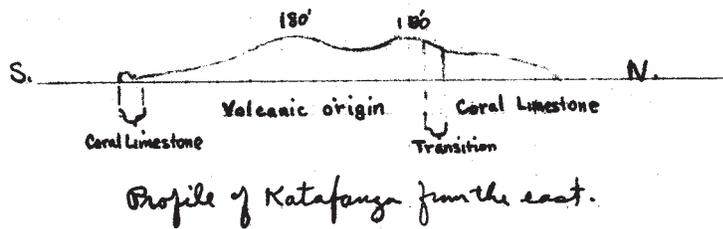
Yaroua is about 500 yards N and S and 300 east and west. It is surrounded by a broad, steeply sloping sand beach. The interior is thickly covered with coconut palms and beach trees, the total height being about 70 feet. It is smoothly ovate in outline, surrounded by a fringing reef which lies from 200 to 400 yards off shore. This makes its total length about $\frac{3}{4}$ mile and width of about $\frac{1}{2}$ mile.

On the N.W. point are a few native houses which were occupied; a few natives being seen on the beach and nearby. No canoes on the beach.

Continued our course to Katafanga. We entered the lagoon not by the break in the reef indicated on the chart (# 2852) as being the entrance for small craft, but by the next break west which is directly north of the N.E. point of the island, as indicated on my sketch. Anchored off S.E. point at 12:30 P.M.

The island is partly volcanic and partly of elevated limestone. The southern $\frac{2}{3}$ is of volcanic origin, thickly covered with coconut palms, beneath which is grass, weeds, and scattered scrub (very little of the latter). In this portion there are two rounded hills each about 180 feet high. Just north of the summit of the second hill a transition area begins in which the smooth grassy slopes has limestone boulders of various sizes up to 25 or 30 feet in diameter scattered thru it. The larger of these support a stand of lowland trees. To the north stretches a section of typical limestone "badlands" with dense forest and scattered patches of coconut palms. A sand beach, underlain or supplanted by slab sandstone on the east, surrounds the volcanic portion while the northern beach is rough limestone undercut ledge.





Ashore at 12:45 and met the owner of the island, Mr. T. O. U. Stockwell. He took it up as a free hold land and has a large acreage of coconuts producing about 70 tons of copra a year. He and his Tongan wife and little girl occupy a very comfortable wooden house. The six workman have a house a few hundred feet nearer the S.E. end.

The coconut palms looked healthy except for some of the leaves which were badly infected with what Mr. Stockwell called "leaf miners." They were also badly eaten by the walking stick (Phasnid).

Mr. Stockwell said that some little damage had been done to the palms by a violent hurricane of March 15, 1923. He also said that he had known hurricanes in Lau as late as April 13.

The mosquitoes were very troublesome. The wind, however, was light and from the N.W. blowing them over from the moist N. end. Mr. Stockwell said that they were not generally so bad.

Both the shiny black and the dull fuscous stink bugs very abundant. The latter being in clusters on the papaya leaf stalks (petioles).

In the grassy area the large grasshopper very abundant.

Spent most of afternoon exploring the north limestone end. Insects were very abundant and a number of landshells (all small) seen. Several species of butterflies, one of two species not previously seen in Lau. The large gray noctuid moth with pink hind wings marked with black fairly common, but unable to catch one.

Scared up a wild (?) chicken patterned like a jungle fowl. Mr. Stockwell lets them run wild, occasionally adding a rooster.

Came out on N.W. sand beach which extends to within 200 yards of the N.W. point. The north end is all undercut shelf with a few small patches of beach.

Came upon a small one of the large red-brown "coconut" crabs.

Recrossed the limestone area by another trail and traversed the length of the well kept coconut groves and cultivated areas to the south point, where there is another small area of limestone.

Had a welcome bath in a real bathtub and excellent supper and evening with Mr. Stockwell. He had only just returned from America, and had stopped at the Bishop Museum when in Honolulu on his way south in August. He says that we are the first non-official callers since the visit of Von Luckner in the German raider.

Tuesday, September 9, 1924.

Ashore at 6:30 and further collected in the N. limestone area. When the tide became low walked around the north undercut shelf and beach.

Collected a few small landshells on the leaves of shrubs and trunks of small trees. The plane greenish gray shells on rock faces.

Reddish-brown, purplish and cream white land crabs and red legged hermit crabs very abundant in limestone areas.

Along the north face the white butterfly with black (and brown) and yellowish marking very abundant. Its caterpillars feed on plant # 537.



Roll 66:1. A cluster of the black, white spotted butterflies about a Tournefortia blossom.



Roll 65:6. The transition between limestone and volcanic portions of the Island at the beach, looking west

Saw a flock of 21 “flying foxes”, (large fruit bats).

Tournefortia blossoms with swarms of the black & white spotted butterflies about them.

Down the west side of the abrupt transition between the limestone and volcanic portions. Waded out on the reef.

The limestone area characterized by an abrupt, rough, wooded cliff, with a rough limestone beach or undercut shelf.

The volcanic slope is more gentle, without trees, covered with coconut palms, grass and woods or with bare areas, and sand beach.

Took a sample from a rocky outcrop in the volcanic area.

Saw a light gray skink, rare, while the greenish one is common. Caught large longicorn Coleoptera in dead leaves.

Returned to Mr. Stockwell’s house for lunch.

Mr. Stockwell said Prof. Mann of Harvard had collected insects in Lau, at Lakemba in 1817.

On board at 12:30 and underway for Vekai. Ashore at 2:05, having to row over a mile and landing on the rough precipitous west face at 2:45.

The west face is a sheer drop up to 50 feet high except toward south end, where we landed. It is about

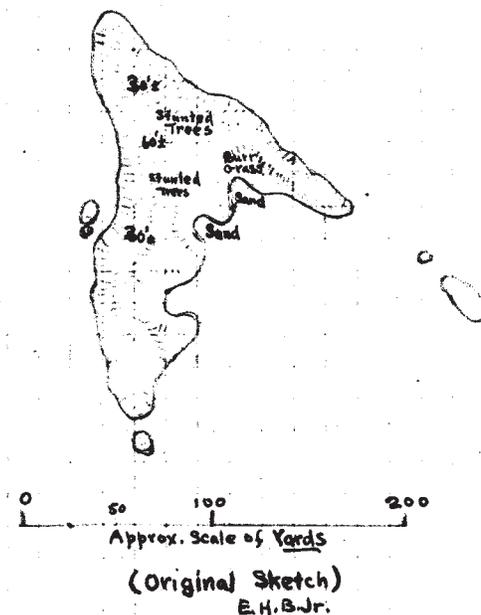
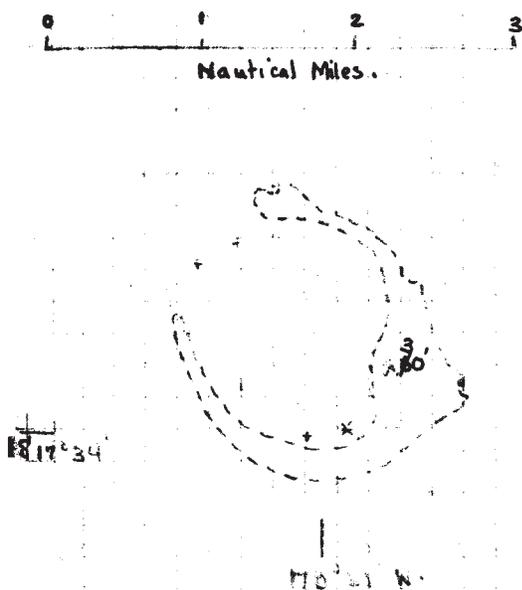
200 to 220 yards long with a small rock near its middle and another at the S. end. The east side has an arm extending S.E. from the N. end with two rocks off the S.E. end. The east side of the main arm is scalloped into three small bays, two of which have small sand beaches. The slope is gradual and running up from each of the bays is a narrow depression. These and the adjoining slopes are choked with stunted trees, *Tournefortia* (1), *Hernandia peltata* (dominant), the beach tree with small orange fruit, eaten by pigeons, and a tree with leaves like those of an orange, neither in fruit or flower. None of them are more than 8 feet tall and most less than 6. Other vegetation included:- the white flowered *Ipomoea* growing over the trees and rocks; the purple spiked shrub (# 538); beach legume with leaves in 3s and pink flowers; *Portulaca*; and a large patch of burr grass at head of N. cone.



Roll 66:2. Mr. and Mrs. Stockwell and child on front steps

VEKAI I.

(Enlarged from H.O. 2852)



As we spent but 25 minutes on the island had time but to sweep a few of the plants for insects. Among the more conspicuous noted: the white butterfly with black & yellow markings; small yellow flies (very abundant); small black flies; small green dolichopodid flies; small fuscous ants; a grayish leafhoppers; a small gray beetle (weevil) etc.

This island is especially interesting because it forms a transition between the nearly bare rocks like Latei Viti, Latei Tonga, and Bacon Island and the small islets like Vanua Masi on which trees have become well established, dirt and sand accumulated and coconut palms taken root. Wish I could have been on it longer. Saw no lizards or snakes, but the former or both may occur. The surface was rough and the trees formed such a dense shrub-like covering that one could neither get about readily nor see far on the surface.

Returned to the schooner after another mile pull in a choppy sea at 4 P.M.

Down along the west side of Tuvuthá, which lies directly south of Vekai, about 5 1/2 miles distant and anchored at 5:30 in the curve of the reef near the S. end, in 13 fathoms.

Tuvuthá is the highest elevated coral limestone island I have yet seen in Lau. The mountains rise rather steeply, in places in sheer cliffs up to 800 feet. There are three such masses. The peak at the north is the highest and most conspicuous, with an elevation reported to be 800 feet. Near the middle of the west side is a high ridge nearly as high (50 to 100 feet lower) but of greater bulk. Just south of this there is a pass. The south end again is high, about the same elevation as the central part (700 to 750 feet), but of even greater mass. The slopes of the southern peak, and to a less conspicuous degree the other two, rise in terrace-like steps. Along the beach front a low ridge 100 to 150 feet high rises steeply from the undercut shelf. There are a few small sand beaches along this side, backed by little patches of coconut palms. The slopes, except the bare cliffs, are heavily wooded and look rough and jagged.

The village is situated on one of the larger sand beaches about 2/3 of the way down the west side. Behind it is quite a patch of coconuts and an even larger grove is located on the south end which is lower than the rest of the ridge.

There is deep water close up to the west reef. A small passage about a mile above the village admits row boats at all tides. Boats can pass over the reef opposite the anchorage in smooth weather and half tide or more.

Wed., Sept. 10, 1924. Tuvutha Interior

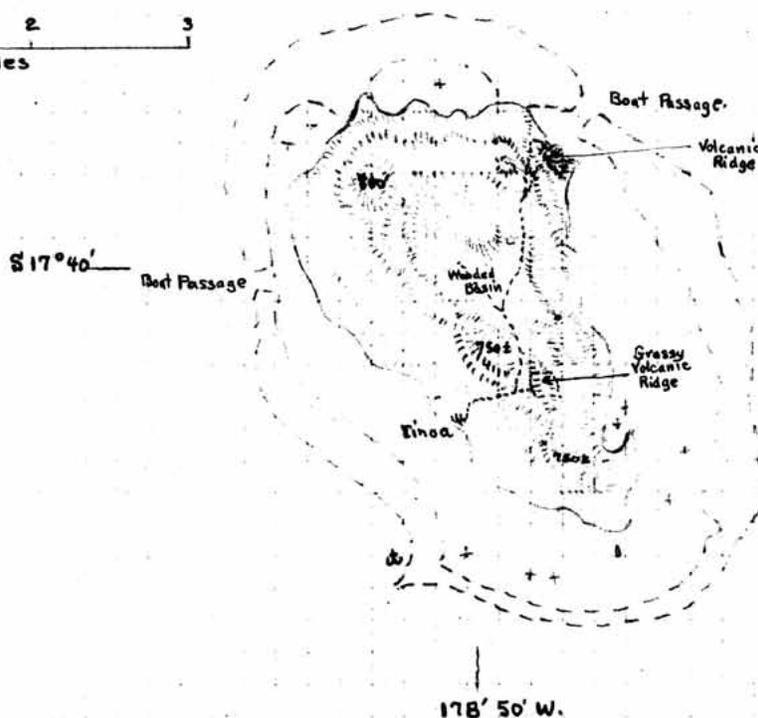
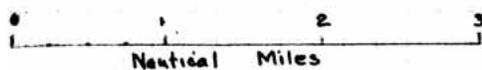
Ashore at 6:40, crossing the reef opposite (E. of) the anchorage, where there is water enough in smooth weather to allow small boats above half tide. Noted that the islet off the south point must be very thin as the rising sun shone thru it in three places. Landed at the village.

Tinoa village is the only one on this large island. It consists of about 18 native huts facing a small sand beach which is slowly being eroded away. The population is 60. Met the chief and the missionary, neither of whom, nor anyone else, could speak English.

A trail, the only one on the island, the Chief informed us, leads up the steep limestone face behind the village, over one or two small palis and into the interior thru a pass just south of the center west side peak. Several small groves of coconuts and much timber along the way. The slopes covered by luxuriant forests, huge lehua (*Metrosideros polymorpha*) trees in full blossom being conspicuous. Small landshells very abundant on the leaves of shrubs and small trees along the way. Insect collecting the best for some time. Caught several of the large blue-green Rhyncogonoid weevils and quantities of the gray ones on leaves. Leafhoppers, wasps, flies, moths, butterflies, grasshoppers etc. abundant. Saw two of the large gray and pink noctuids.

TUVUTHA I.

(Enlarged from H.O. 2852).



The interior was a great surprise. The high limestone ridges, which surround the island on all sides, are just a shell which enclose two large basins, separated by a low ridge at about the middle. The northern area is typical wooded basin with numerous clumps of coconut palms and some little area which has been cleared for cultivation. The southern basin, however, is mostly filled by a high ridge of volcanic origin, covered with the typical growth of grass, ferns, weeds, Pandanus, Causarina, scattered scrub, lavender orchids, etc. as if a portion of Lakemba or Mothe had been dropped down in the basin. The ridge, judging by the surrounding limestone ridges, rises to about 500 feet elevation or a little less. From its summit one can see over the low places in the limestone enclosing wall, but the 750 feet peaks rise well above it. A narrow zone of coconuts, bananas, papayas and cultivated patches containing taro, sweet potatoes, manioc etc. fringes this ridge.

Judging by the number of coconut palms and the area suitable for cultivation the island should be able to support a population 10 times what it has.

Near the S.W. end of the volcanic ridge found a house site on top of the ridge, lined with stones, 25 x 20 feet. Near it are a number of breadfruit trees in a small coconut grove.

Lowest places in enclosing ridge is at S.E. end.

Coconut leaves badly eaten by phasnids and attacked by the same "leaf miner" (?) as those on Katafanga.

Small patch of low bamboo on E. side volcanic ridge. Also much plume grass, which is scarce on west side.

Milk weed and monarch butterflies in east side hollow.

Found a small white dipterous maggot in papaya.

A faint trail runs NNE into the northern basin, the main trail entering from the S.W thru a small pass

Extensive groves of coconuts. Found some women drying copra. The main trail divides, one branch running to some cultivated areas at the south foot of the N.W. peak, the other to the N.E. end of the island.

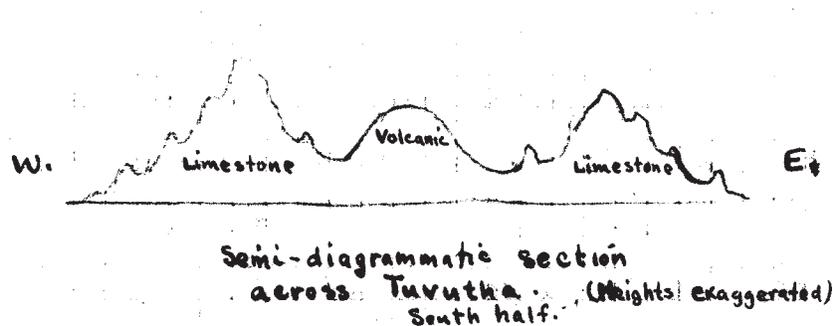
Cordyline terminalis with a mass of fragrant lavender to purple flowers (also some with bunches of green and red berries). Black bees abundant about the flowers. Numerous small Vanessa butterflies in a sweet potato patch. Several recent clearings in which caught some small and two moderately large beetles by whacking the dead leaves.

Climbed to summit of a small peak just south of the sharp conical peak at the NE corner. From here quite a bit of the north forested basin could be seen. The pilot book speaks of there being lakes in the interior, but saw no sign of any and the natives know of none. The basin (where not cleared for cultivation or in coconut palms) is densely wooded, some of the trees reaching considerable size.

The black bees also numerous about Lehua blossoms, these trees being numerous and brilliant with red blossoms.

Native called # 544 "sanga vuturou", but wasn't sure of it.

Returned to the pass above the village and collected along the depressions behind one of the terrace-like cliffs, on the west side, which was valley-like and filled with coconut palms and scrub.



Collected several long-winged white leafhoppers speckled with brown, on banana leaves.

Found some children on the cliff gathering brown roots about the size and shape of large sweet potatoes. They grow wild and are called kau kava.

Landshells are called vivili.

Returned to village and collected a few house flies. They are of the narrow fronted male variety. Also found two small blackish brown beetles in debris or sand.

Mr. Beck furnished a pigeon fly, a baby walking stick, and a flat brown landshell from the island and a Bostrichid beetle from the hold.

Thursday, Sept. 11, 1924.
Tuvutha, N.E End.

Ashore at 6:45. Near the village a stream of fresh water issues from a small cave in the limestone ridge, flowing into two little pools, the first used for drinking and the second for bathing.

Up the steep ridge trail to north basin.

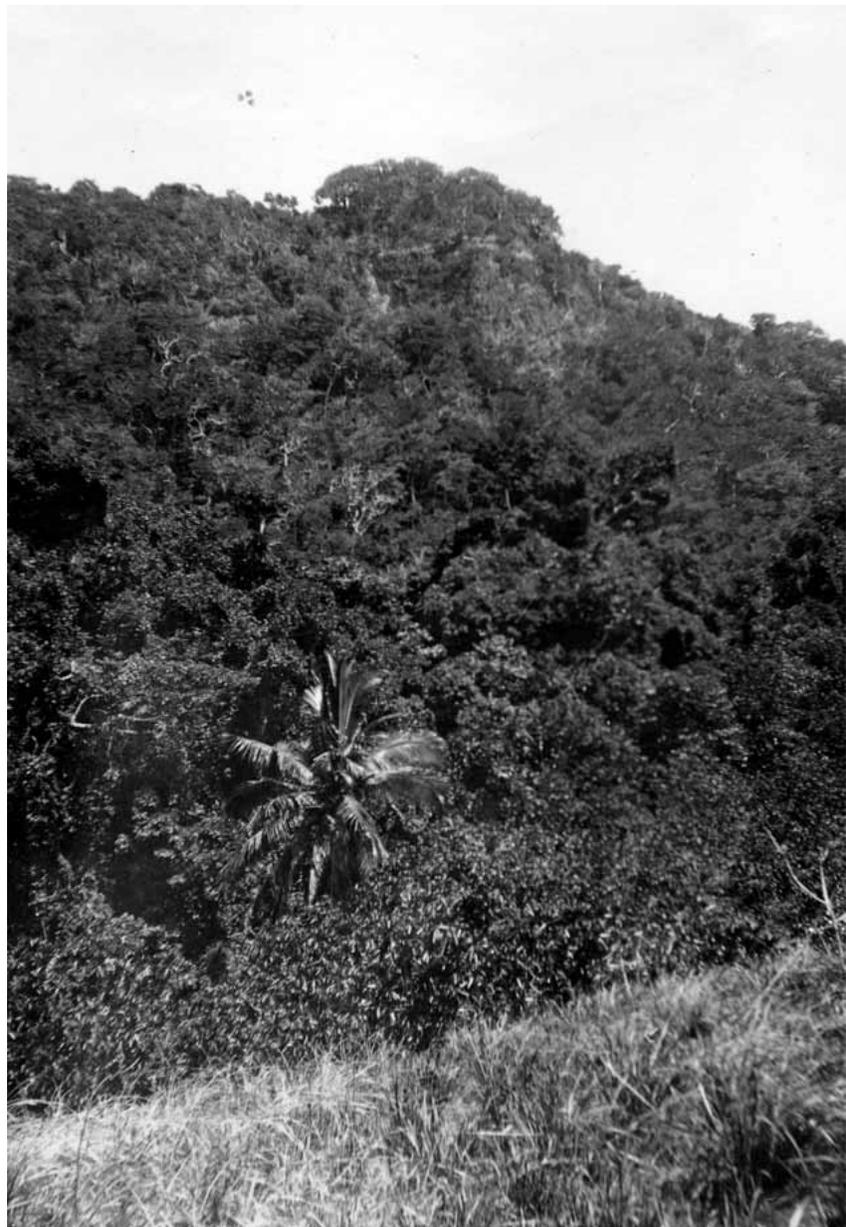
Caught male and female walking sticks (Phasmids), the small male hanging, characteristically, to the back of the larger female. Both have small pinkish wings.

Ate the kernel of a *Barringtonia edulus* fruit, finding it very palatable, flavor much resembling that of a chestnut.

Small landshells very abundant; among them a single specimen of a different type, on a leaf, conic and about 1/4" high.

The heavy set fuscous leafhopper, which is brown beneath, hangs at rest on a leaf with wings outspread like those of a moth in flight. Wingless black stinking roach and greenish jumping beetle under bark of a fallen tree. Slender gray and brown millipeds and red ants under bark of another dead tree.

Saw a moderately small gray jumping spider eating (or sucking) one of the moderate size cream and gold moths.



Roll 66:3. Looking west from the top of the volcanic ridge across wooded depress on and low ridge to limestone cliff. The grass in the foreground is not quite typical as it has recently been burned off.

Crossed the north basin to N.E. end on the trail and continued on it down the steep face of the limestone ridge to the N.E. beach. Here is situated another grassy volcanic ridge, about 1/4 or 3/8 mile long, 200 yards wide and 150 to 200 feet high. It lies along the beach and is separated from the limestone ridge by a depression and low ridge. Several small patches of coconuts, cultivated plots, and breadfruit trees near by. Small sand beach opposite the boat passage thru the reef.

The ridge is covered with a small grove of Casuarina trees and the usual grass, weeds, ferns, Pandanus, and scrub, -principally low rewa. Collected a rock sample from outcrop.

Numerous beetles of various species on the trunk and dry leaves of a fallen breadfruit tree. Large bluish Stratiomyid flies also about the trunk.

Caught some small brown and white moths at rest on the tips of their wings on a milo leaf. The wings were folded back along body and the body and legs were high in the air.

This bay with its groves of coconuts etc., looks like an old village site (although the natives say there has been no village there.) In the midst of the cultivated patches are two small native huts, one in good condition and partly filled with yams.

While eating lunch near the beach, a canoe landed there containing a man and two boys.

Landshells were in the lowland on milo leaves etc. and even found them on coconut palms.

Returned over the same trail, up the cliff and across N. basin. Met Mr. Beck here. He had found a cave containing some bone fragments. The only pieces worth saving was a lower jaw.

Caught another ♂ and ♀ Phasmid. Mr. Beck also caught a ♀

The low running herb with white flowers, orange fruit and violet-like leaf locally common here.

The lakes (at least 2) mentioned in the Pilot book are not in the interior but on the east side lower down, according to the natives.

Friday, September 12, 1924.

Naiiau.

Underway from Tuvutha anchorage at 2:30 A.M. Reached N.W. corner of Naiiau at 6:30, where we landed 6:45.

The island is sub-ovate in outline 2 by 3 1/4 miles. The slopes rise steeply, in many parts precipitously, to a height of 500 to 580 feet. They are heavily wooded and somewhat resemble those of Tuvutha except that the terracing is less pronounced. The shore alternates between sand beach and limestone cliff with undercut shelf, the latter being chiefly at the points. The reef is close in for much of its length, especially on the west side where it is practically fringing. Small boats can pass around the N.E. and S. sides at half tide.

Followed the coast around the N.E. point. Passed a sandy beach bay cut off on both sides by rocky points and ridges which is used for pig raising. Several fat, large sows with litters.

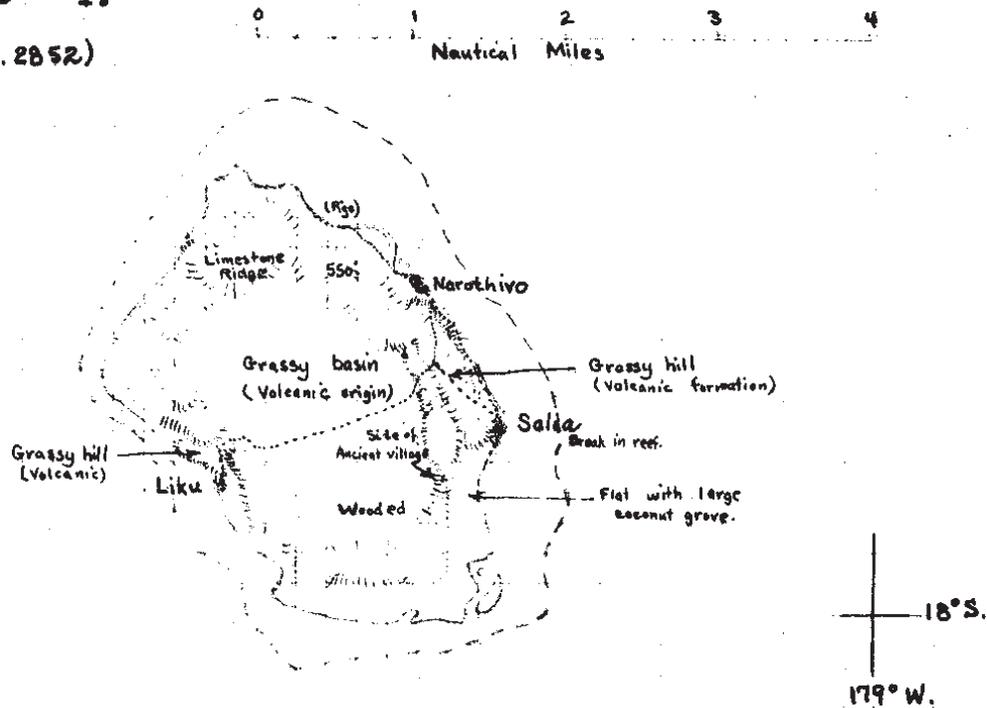
The village of Narothivo is situated on the N.E. side. It consists of about a dozen native houses, with perhaps 50 inhabitants. From here a good trail leads along the beach to Salia, and another mounts a high grass and scrub covered ridge of volcanic origin, which lies between shore and indented limestone ridge, to the interior.

Proceeded to Salia village at the most eastern point, opposite a small break in the reef. This is a larger and more prosperous working village, with about 25 or 30 houses, over 100 inhabitants and two Chinese stores. From here a trail ascends the volcanic ridge and joins that from Narothivo to the interior.

The limestone ridges enclose a large central basin which is unique in being nearly flat and covered with grass, scrub and numbers of Pandanus plants. It is undoubtedly of volcanic material. There is no water inside. A good trail leads across the basin up the opposite (W.) slope, thru a gap and down another volcanic grass covered slope to the village of Liku, which is located on the beach near the

NAIAU I.

(Enlarged from H.O. 2852)



middle of the S.W. side. The village has about 20 native houses and a population of about 60. The inside of the enclosing shell of limestone, like its outside, is heavily wooded. Here and there on the transitional zone between the grassy basin and the limestone slope are small groves of coconut palms and cultivated patches of yams, sweet potatoes, manioc, bananas, etc.

The collecting in the grassy basin was fair, but on the limestone slopes it was excellent. Here, for the first time in Lau, I found large landshells. Butterflies numerous including the swallowtail and Monarch. The large greenish weevil and several other beetles numerous. Leafhoppers, grasshoppers, wasps, bees and flies in great number and variety. Both the large dark olive gray and larger fuscous and yellow spiders present.

The natives report numbers of snakes, both gray and black, but saw none of either. Small greenish lizards plentiful.

Landing is so bad on the rough fringing reef at Liku that the natives have to carry all their copra etc. across the central basin to Salia.

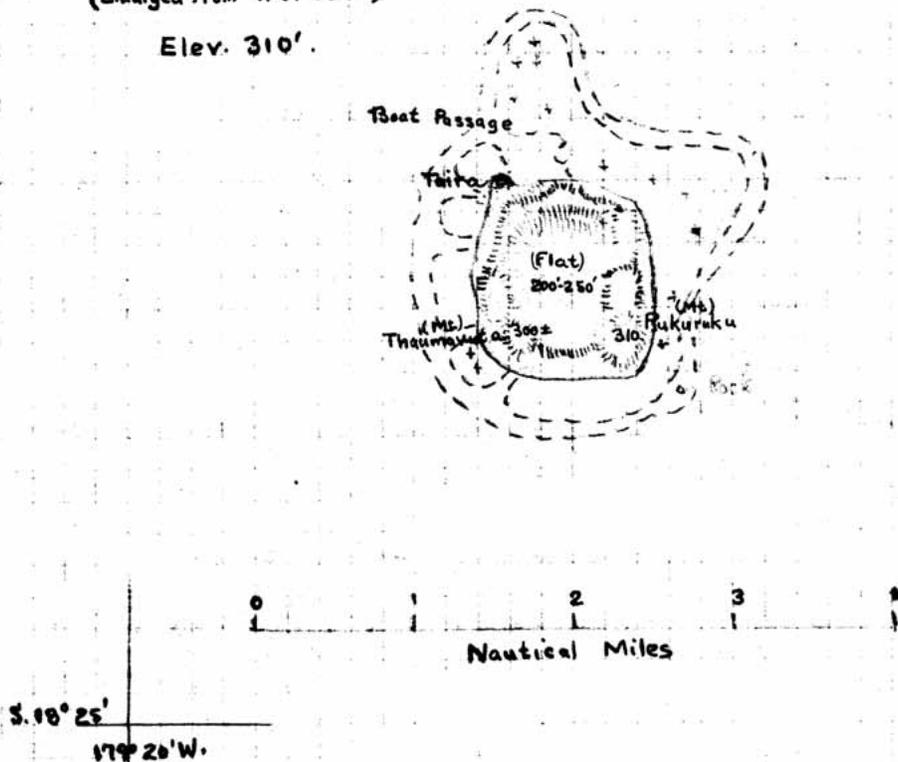
Made the acquaintance of a very intelligent part Tongan boy, who speaks fair English and has had much experience in trading in Lau. Hearing that two white men (Mr. Beck and myself) had gone up into the bush he followed us and gave us much valuable help and information. His name is William Wainginggolo [he spells it Wainigolo] and his home is in Lomaloma.

William took me up a steep trail to Naireirei ("the lookout") where, at the time of the former wars between the Viti people of Lau and the Tongan invaders, there was an ancient village (now called Koro Matua "(olden village)"). He pointed out the high pinnacle on which a man always sat on guard, ready to blow a warning conch at the approach of danger. The village site is on the edge of a 300 or 400 foot cliff which overlooks the S.E. flat covered with coconut palms. The site is a small scale reproduction of the "pali".

VANUA VATU

(Enlarged from H.O. 2852)

Elev. 310'.



The following are the present degrees of native authority according to William:-

- Turanga ni Koro - chief of the village
- Buli ni tikina - chief of the island
- Koko tui - high chief of the provance.

Took refuge from a heavy squall of rain in a small hut half full of large yams. Although it rained hard and the roof was only made of plated coconut leaves, not a drop came through.

Returned to the schooner down the trail from the basin to Narothisvo and back around the N.E. point to the sand beach landing.

Saturday, Sept. 13, 1924.

Vanua Vatu.

Landed at Vanua Vatu, after a rough night at sea, at 6:45. The village, called Taira, is a large one, situated on a sand beach on the N.E. corner. It has a population of about 300. The houses are nicely laid out in rows with breadfruit trees and flowering plants, such as Hibiscus, Plumeria viavia (*Crinum asiaticum*), etc. between. On the slope behind the village is quite a grove of coconut palms.

A passage thru the outer reef admits small boats into a small lagoon, but a second reef has to be crossed in order to reach the village. This may be readily done at high water, but the reef dries at low tide.

The chief and the missionary were holding morning prayers in the thatched church when we arrived. The former lives in a frame house which was formerly a store. The latter looks the part.

After the customary formalities we ascended the grassy slope to the interior flat, which is surrounded by low limestone hills. These rise not over 100 feet above the central plateau which is covered with grass, scrub, weeds, Pandanus, ferns, etc. Around the grassy area is a transitional zone which, while still covered by ferns and grass supports small trees and numerous groves of coconuts.

The forests on the limestone slopes are not as thick as usual, but the slopes are quite up to form in roughness of surface.

Large areas have been cleared and the little pockets of soil between the rough limestone rocks are planted to yams, sweet potatoes, taro, bananas, papayas, etc.

The highest elevation is at the N.W. corner of the plateau, 310 feet, the hill being called Rukuruku by the natives. A more prominent hill at the S.W. corner is nearly as high and named Thaumavuta.

Insects fairly plentiful, especially the gray weevil which is very abundant, especially on the yellow flowered composite. The greenish are absent. Large fuscous and yellow spiders suck the body juices from unfortunate grasshoppers and moths which become entangled in its sticky orange colored web. Saw one large grasshopper which had just been entangled being attacked by the spider. It takes a firm hold with its mandibles across the labium. Butterflies of several spp. numerous.

Lizards abundant, both the olive and brown striped skenk and an all light gray-green sp., the latter less abundant.

The natives report snakes as abundant, both black and gray species. Good country for them but saw none.

Small area of low tuft grass at S.W. end with light brown leafhoppers, black bugs, pale slender brown bugs, pictured winged flies, etc. The white butterfly with black and yellow markings plentiful in this locality.

Few mosquitoes, probably scarce because of the absence of water. Only one or two little water holes on the plateau. Houseflies are plentiful and sticky.

Interior of Naiiau like this only depressed in the form of a huge basin with much higher limestone enclosing wall. The volcanic ridge in the south basin at Tuvutha also has this type of vegetation with the addition of Plume grass and staghorn fern.

Most of the central flat is covered with red-brown dirt in pockets between great numbers of limestone rocks, but there are also many small outcrops and rocks of a brownish rock like the samples.

Numbers of black bees and a large swarm of small whitish moths about the fragrant reddish purple flowers of # 553.

Found out from a well informed native that plant specimens # 399 = 529 is bua *Fragraea berteriana*. Also got names for the four plants collected on the island.

534, Wa tuva = (*Derris uliginosa*) is a leguminos vine with small, white flowers, growing on the limestone cliffs near the sea. Its stout stems are used in weaving fish baskets and it is also used as a fish poison, just how I didn't learn.

The wind being from the S.E. the schooner was able to anchor close up to the reef off the boat passage on the N.W. side. A ledge of 9 fathoms rapidly sank to 20 and ended in an abrupt drop to 100 fathoms, no bottom. Anchor continually dragging down the slope.

Sunday, September 14, 1924.

At Sea.

Underway at 9:45 for Thithia. Spent morning repairing shoes and equipment and reading.

Off the S.W. end of Thithia at 2:30. Anchored off village at N.W. end at 3: P.M. in 9 fathoms. Good landing place.

The island is mixed volcanic limestone. The interior hills which rise to an elevation of 540 feet are volcanic in origin, covered with the characteristic grass, scrub, Pandanus and Casuarina. At the S.end are a chain of precipitous limestone hills covered with lowland forest, which stand behind the beach, cut in front of the slope. They are fronted by a sand beach, and close in reef which is nearly fringing in places and just awash at half tide. The west side is low with lowland trees and groves of



Roll 66:4. Looking across a portion of interior flat, Vanua Vatu, showing the grass, fern, scrub and Pandanus vegetation.



Roll 66:5. Looking N.E. across part of the village of Taira.



Roll 66:6. Curious carved stone head surmounting one of the rocks in the wall surrounding the church, and carved wooden steps by which one mounts the wall. (I shifted the latter about 20 feet to get it in the picture with the idol).



Roll 67:1. Limestone wooded cliff and grassy slope to south of and behind village of Tarukua, looking S.S.E. from anchorage.

coconuts for a width of 1/4 to 1/2 mile, behind which rises the grassy slope. This is cut by small valleylike Lakemba. The ridge behind the two southern valleys on the west side is faced with lowland forest and may be underlain by limestone. Sandy beach. Sand flat to edge of reef.

Developed two rolls films in evening with very good results.

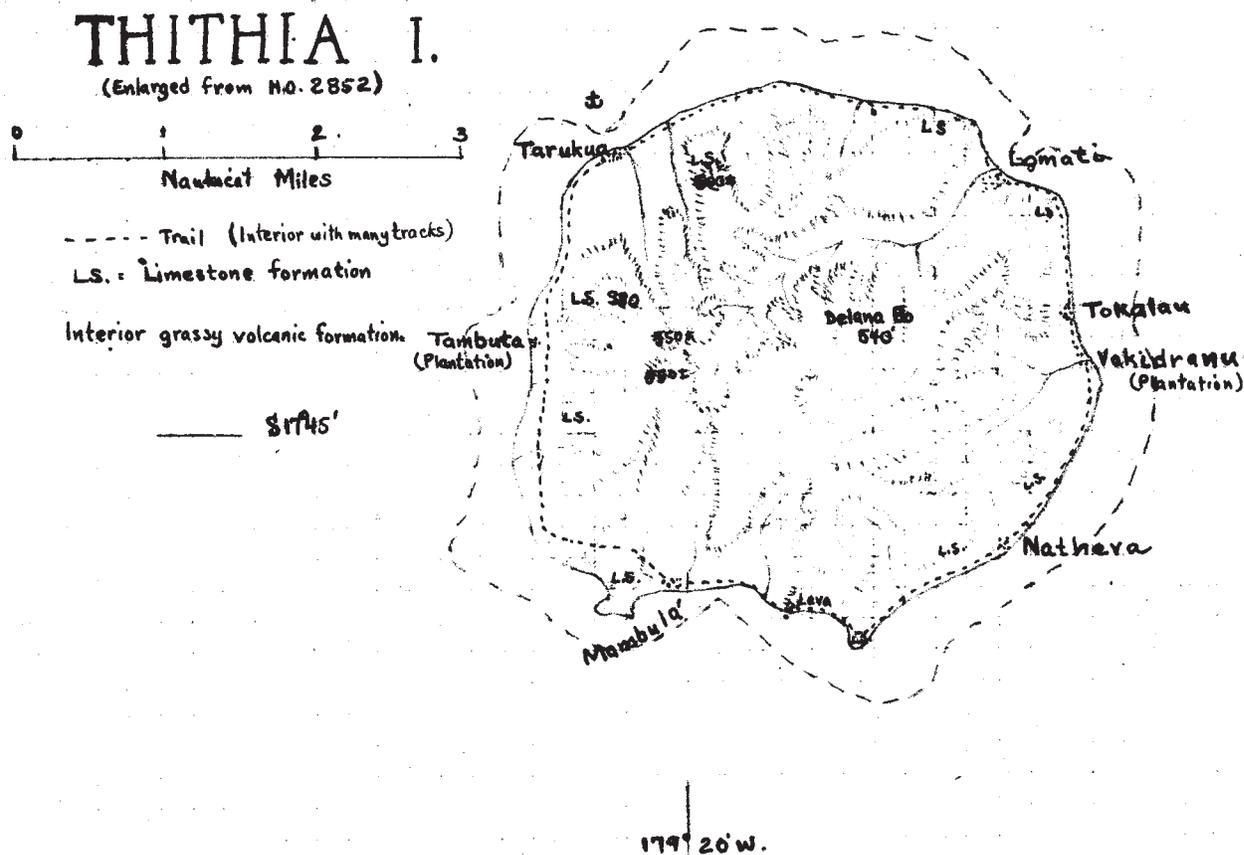
Monday, Sept. 15, 1924.

Thithia. (Around the island)

Ashore at 6:45, landing at Tarukua. The village is moderately small, situated at the N.W. corner of the island. It is however, the shipping point for copra for the rest of the island (except with very calm weather when Lomati may be shipped from), and several galvanized iron copra sheds front the beach. There is a Chinese store. The Buli of the island also lives here.

Walked S. along a good trail down the west side. A high ridge of limestone formation rises from behind a moderately narrow beach flat covered with coconut palms and lowland trees. Tambuta is a well kept plantation belonging to the Borron Estate. Tall Bryophyllum plants in lowland field. Large fuscous cranefly in road. Also numerous cicindellids in road and not a few mosquitoes. Numerous breadfruit trees among coconut groves in lowland. Several small valleys, each containing a streamlet, run into the sloping "nasau" - plume-grass covered forehills.

About the plantation area the track is a road with many wheel marks-cart used to haul out copra. Saw a small herd of steers-used to draw the cart. An introduced, large black and white bird from India among the coconuts.





Roll 67:2. Mambula bay and mushroom rock off lava point, looking west. Beyond is the S.W. limestone ridge.

On the way fell in with a large, imposing native, who proved to be the island chief of police on his monthly round inspecting the villages. He had been in France in the army and was well informed. Though he spoke no English, managed to obtain some little information about plant names, etc.: Numerous ivi (*Inocarpus edulus*) trees toward south end, along stream. The native name for the yellow-flowered cucumber vine (collected at Oneata) is wa vusovuso. Dralakaka or Mulokaka (*Vitex trifolia*) also in lowland along streams. The shrub with yellow flowers and white floral leaves is vobo (pronounced vombo). Large dawa trees. Large pod leguminous vine = wa thimbi se valai.

At the south west end there is another large ridge of upraised limestone, covered with trees. The trail cuts in behind this, crosses the lower spurs of a grassy ridge and rises over a wooded neck connecting the southern ridge with the grassy hills to the north, descending into a broad coconut filled valley flat.

The village of Mambula is located on the edge of a long curved sand beach fronting this valley flat. It is a fairly large village with 130 people. Just west of it a limestone point with lowland forest sticks out to the south. There is a small Chinese store. Landing here is possible when the wind is from the north, but with the usual south or east wind the copra must be shipped from Tarakua. Here met the taranga ni Koro (chief of village) and a native who speaks excellent English.

East of this Hambula flat the grassy-and beyond limestone-hills rise sharply from the sea, pushing the sea, pushing the trail onto a sand and rock beach. The former has a tufa and lava point with a mushroom shaped rock off its face.

Beach with quite a growth of trees- *Hernandia peltata*, *Barringtonia speciosa*, *Hibiscus tiliaceus*, *Callophyllum inophyllum*, *Scaevola*, *Tournefortia*, *Acacia laurifolia*, etc. Coconuts behind and above.

Natheva is a smaller village nestling at the foot off a steep limestone cliff, covered with stunted scrub or bare of vegetation. Only some small boys and a little native with hair full of cobwebs around. Even the Chinese store was shut. Everybody either very busy or very sleepy.

Another well cleared coconut plantation, Vakandrano, is located beneath the shadow of a towering cliff of limestone, between Natheva and Tokalau end extending up into the valley. It too belongs to the Borron estate. Here found the manager of both these plantations, Mr. E. J. Broadman, an Englishman born in Auckland. He lives four months on one plantation while the copra is being cut by the Indian laborers and the next four on the other. Plenty of milk, cream, butter, fruits, vegetables and meat, fresh from the plantation. Had dinner with him and a pleasant conversation.

Yellow butterflies and aenous bees about the large yellow flowers of plant 558.

Tokalau village is located a little way north of the plantation at the foot of the next limestone cliff. There are 18 native houses fronting a sand beach and mud flat. The high limestone cliff continues to overhang the sand beach from here to Lomati.

Lomati village includes several shacks as well as native houses, a Chinese store and the residence of Mr. C.B. Crabbe, on both banks of a large stream between high limestone walls facing the sea. Mr. Crabbe has charge of a plantation and also is postmaster for the island and runs a small store - for his own workmen - he says. Pleasant conversation with him learning much about the island. Moths are numerous at lights at night. He has seen at least two kinds of snakes, possibly three. The highest (?) peak - Elev. 540' is called Delana Bo.

Just beyond Lomati along the E. beach the limestone cliff rises abruptly from the sea, but a small sand beach remains dry at half tide. Followed the shore back to Tarukua in a heavy rain.

Mr. Beck turned over two black Lucanid beetles and three of its Larvae which he found in a coconut stump.

Several caves on the island, some with bats and one with a deposit of phosphate - according to report.

Tuesday, September 16, 1924.

Central & West Thithia.

Ashore at 6:30. East along beach; up second small valley east, along stream; up grassy slope to ridge top, which I followed south to two small peaks, the highest on the island.

This central grassy area is rather poor in plants and insects. The plants include the usual "plume grass"-called "Nasau" by the natives and "reed" by the whites; a low, narrow leaved grass; wiry open frond ferns; staghorn fern reaching to about the knee; two small low ferns; open scrub in places, consisting of stunted rewa and the usual 3 or 4 shrubs and stunted plants enumerated before under "Lakemba;" here and there a Pandanus and Casuarina; local patches of the beautiful pale lavender field orchid. The insects include the large grasshopper; one or two small grasshoppers; occasional stray butterflies, mainly Monarch and Vanessa; a few small and medium size moths; red ants, smaller fuscous ants, and stray wasps; small flies-the small pictured winged sp. and a small nemocera; small leafhoppers and slender brown grass bugs; mites; and tiny spiders.

Both the N.W. peaks are as high or higher than the one to the S.E. which has an elevation of 540 feet according to the chart; could see the horizon level with the top from the northern of the two and a shade less from the other. Should say $550 \pm$ for the elev.

The Tambuta Plantation fence comes up to the south-western of the two peaks. The natives have to keep a firebreak between the plume grass country and the fence, as they are responsible if the fence is damaged by their fires. Considerable areas of the grass land are burned off now and them for cultivation. Followed the fence line (on the firebreak) down to the lowland and returned to Tarukua to keep an appointment with Mr. Brodman. While waiting for him looked around the village.

Tarukua has a population of about 95. It is a rambling village, but clean. The buli of the island resides here with his Tongan wife. Here also is located the Thithia Provincial Hospital, on a small hill to the west of the village, in charge of a native Fijian doctor, graduate of the Suva training school.

The chief's house is decorated with white cowrie shells and the ridge pole has on one end a manikin astride its scallops, and on the other a carved fish.

Watched the native women mending their nets and preparing for an excursion after fish. They go in a body, about eight or ten, each armed with a net of some kind, a closely woven basket and a bite of lunch wrapped up in a coconut leaf. The

majority of the nets were of good size, up to eight by ten feet, or larger, mounted on the light poles at the sides, the bottom weighted and the top with hau wood floats. Some were smaller of similar style and a few were without sticks-more of the throw net type.

To Tambuta Plantation with Mr. Brodnam. He is something of an amateur botanist and showed me with pride his vegetable and flower gardens, in which he was growing with much success, but with some combating of insect and fungus pests,-truck vegetables of various sorts, several species of Hibiscus, roses, fruit trees, flowering and fruit vines and shrubs, etc.

After lunching with him we walked up thru the plantation where he pointed out and named several of the native and cultivated trees. He has a large acreage of coconuts and quite a number of orange trees of the kind called moli ni taiti, ("the orange from Tahiti"). Several trees of an ohia ai (*Eugenia malaccensis*) called by the natives "havika;" they were heavy with fruit, palatable even before turning pink. A small leguminous shrub either Cassia obtusifolia or *C. occidentalis*, with yellow flowers and slender cylindrical pod is called Kau mothe, because the leaves "go to sleep" or fold up at night. The large leaved aroid (*alocasia indica* ?) called ape in Hawaii is here called via, with various variety names depending on section of country and mode of growth. Vutu wai (*Barringtonia rasimosa*) is plentiful. The kernels are poisonous (more or less) and used to stupefy fish. They are pounded or grated up and placed in the water; the fish soon become stupefied and come to the surface. The weed of the wiriwiri tree (*Gyrocarpus jacquirie*) is exceedingly light when dry and is used for making canoe outriggers. The small black fruit of the doi (*Alphitonia excelsa*) tree is eaten by pigeons.

Returned to the landing place after gathering a few plant specimens, at 5 P.M.

Mr. Beck brought in six small brown weevils which he found on lemons, and one large white land-shell, found on a shrub in one of the gulches.

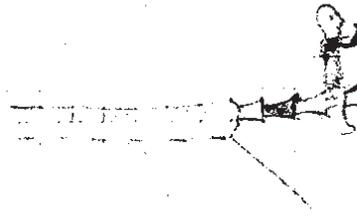
Wednesday, September 17, 1924. Mango, S. & W.

Underway from Thithia at 2 A.M., arriving off Mango at 6 A.M. and anchoring at the N.W. end at 6:30.

The island is composed of volcanic grass land, surrounded by steep limestone ridges of various heights, interrupted by grassy ridges running down to the beach. Most of the shore (at least on the west side) is edged with sand or conglomerate, but north-east of the landing place is rocky undercut cliff.

Every available part of the island suitable for raising coconuts is covered with palms. They run clear to the summit of some of the grassy hills and well up on others.

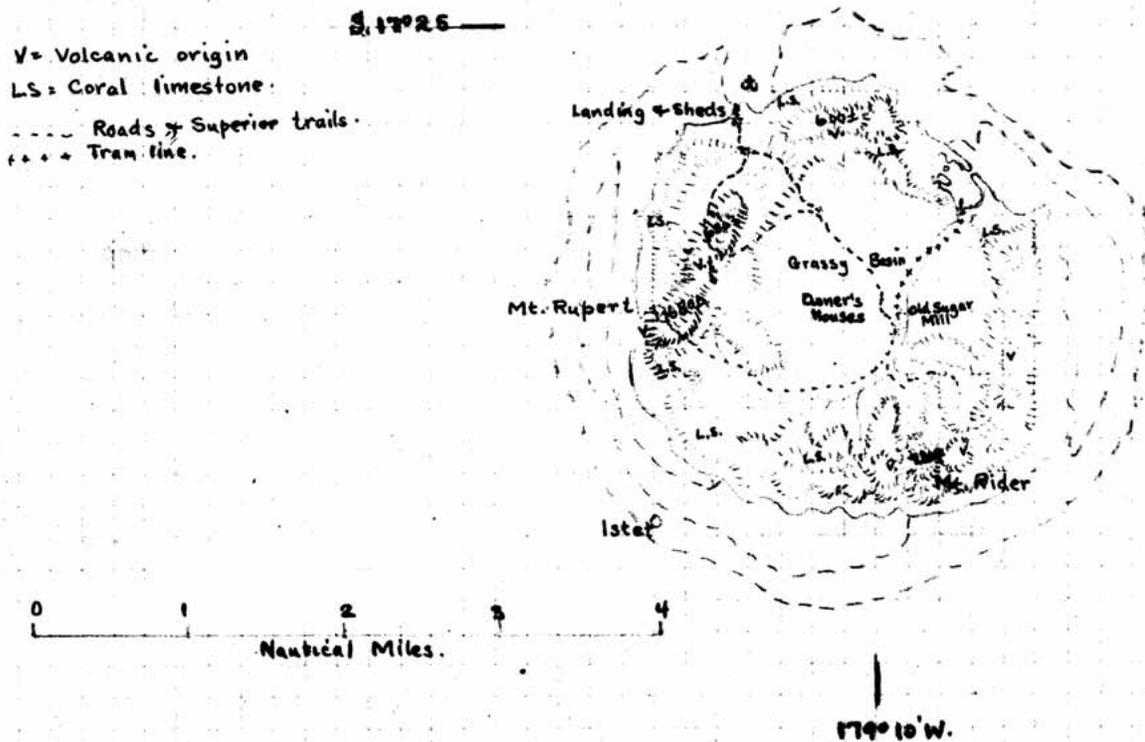
The anchorage and landing place is located at the N.W. corner of the island. Here there is a short stone pier with a small tramway leading up to copra storage and drying sheds. The latter is similar to those used in Tahiti with falt tray-cars which can be run out on rails into the sun or pushed back under a galvanized iron shed in case of rain. They run out both sides in two decks. The decks, chickens and



middle cone, body and arms red, the rest white.

MANGO I.

(Enlarged from H.O. 2852)



minah birds are allowed to run over the copra and pick up insects.

Crossed a high broad ridge on a good road to the owner's house and Indian workmen's compound. Here met Mr. James Borron Jr., the son of the owner, a vary pleasant and polished young man and the bookkeeper, Mr. J. Menzies, also young and agreeable.

Learned from them that the island was used for raising cotton about the time of our civil war. That this crop was abandoned and the entire interior basin planted to sugar cane and a mill erected. Sugar did well and as much as 300 tons a year were produced but the small producers were finally driven out of business by the larger company in Suva. This crop also having been abandoned the island was purchased by Mr. James Borron and planted to coconuts. At present about 500 tons of copra is produced annually. In addition about 700 head of fine cattle are pastured on the grassy hills.

Mr. Menzies had collected a few moths at light and among them were the large orange brown sphinx and a large orange yellow noctuid (?) with black markings on the underwing, not collected by me in Lau.

Crossed the central basin to the south side and climbed the south grass covered ridge. The highest peak (which Mr. Borron says is about 730 feet high) is a grassy knob at about the middle of the south side. From its summit a splendid view of the central basin and surrounding ridges may be had. The basin is of volcanic material, grassy and a continuous sea of coconut palms. Along the stream, on the slopes of a small ridge at the feet of the south ridge and on a few small knobs rising from the floor of there is rather dense forest. The south ridge, of which the peak is a part, runs east and west in a chain of rounded grassy peaks. It ends to the east on the south side of a small bay, but continues around the south-west side as a lower limestone ridge. On the west it rises again in two high grassy



Roll 67:3. Looking N.E. across basin toward eastern gap and bay from S. peak.



Roll 67:4. Looking north across basin toward grassy beach from same spot.

peaks or rounder ridges, about 600 to 680 feet elevation, the slopes of which are thickly covered by coconut palms. To the east of these is a broad flat or plateau, covered with green grass and with two small lakes on its surface. It is across this that the road from the landing runs. Along the north side of the basin is another high grassy ridge 680 ± feet high with scrub, coconuts and casuarinas ending in the east in a wooded limestone ridge.

The stream which drains the basin has its origin in the two high ridges at the west side. It enters the sea thru the gap at the east side, emptying into a small, nearly enclosed bay. The manager's house, native compound and old abandoned sugar mill are near the stream at about the center of the basin. Another Workman's house is situated near the western ridges.

The grassy slopes of the south peak are underlain by a coarse gray sandstone (?) [see samples] in which are fragments of a red brown material and also by beds of red-brown tuff (?). The hills are roamed by horses, cattle and flocks of large turkeys.

Worked west along the south ridge. Numbers of small lemon trees growing with casuarinas, guava, Pandanus and scrub. Cattle keep the grass short so that walking on the ridges is good. Quantities of young coconut palms set out, even throughout the limestone district.

Struck a pocket in the limestone ridge, in which the leaves of shrubs and trees were covered by landshells of various species, including the large brownish-white, the flat dark brown and various shades of the small kind. Large greenish shells on the bare limestone rock. A very few smaller ones under damp sticks on the ground. No minute landshells seen.

Patches of milk weed and numerous Monarch butterflies as well as the smaller orange and black sp. and *H. bolina*. Saw a few swallowtail butterflies. Large red ants common.

Followed the south and south-west limestone ridges and pockets around to the high west peaks where I descended the long grassy, coconut covered slope to the sand beach and followed it north to the landing.

North of this grassy slope the wall is of steep limestone, well wooded. Above and behind this shell, the volcanic plateau is covered with coconut palms. A shoot leads down the limestone face to carry copra bags to the beach.

A few small limestone rocks of the S.W and W. shore on the reef. Covered with casuarina, shrubs, vines, etc. There are numerous volcanic rocks and a ledge of lava off the N.W. point.

Thursday, September 18, 1924. Mango-East & North.

Ashore at 6:30 and across ridge via road and trail to central grassy coconut covered basin. Small pond near native compound and owners houses covered with Lemna; collected specimens. Numerous large Mango trees along the road and tracks in basin.

Followed a narrow gauge tram line which leads from the old sugar mill to a shed and wharf in the small bay at the east side. Saw some bushes of klu (*Acacia freycinetia*) for the first time since leaving Honolulu—at least the first time in Fiji. There used to be a residence near the bay in the sugar or cotton days and here quite a number of date palms and other imported trees are located.

The east bay is a remarkable one. The bay is between 1/2 and 5/8 mile long by 1/4 wide with a shallow entrance only about 60 feet wide. Mr. Menzies informs me that the current thru this entrance attains a velocity at flood of seven knots, and is about 1/2 hour later than the tide outside. The entire rim is of wooded limestone, the stream disappearing thru it. There are several small ponds of fresh water near the bay, some covered with lemna, some only temporary with the trees (not mangrove) growing in and about them. This east side is quite moist with luxuriant growth—ferns, shrubs, moss, etc.; and landshells on both rock faces and shrub leaves. Small brown conical shells on rocks in addition to the flat green ones. Waterstriders on the fresh pools. Small dragonflies as well as the larger

brown, and green species. Saw some of the large gray and pink noctuid. Large brown spider on leaves. One fern abundant which I collected previously. It has a stalk about 1 to 1 1/2 meters high with a whirl of radiating fronds-palmate, one simple and two branching, total of 9. Moss on coconut palm sheltered three or four flat brown landshells.

North of the bay is a small flat enclosed by high limestone cliffs on two sides and with bay and sea on other two; covered with brush and young coconuts.

Caught some tiny Mycetophilid flies about a leaf badly infected with galls. Took sample latter. Collected another specimen of # 553 in the limestone forest, with flat green pods.

Worked west along base of limestone ridge, and climbed the high coconut covered north volcanic hill. Number of trees of *Casuarina equisetifolia* (native name Nokonoko) on the east slope besides the usual scrub, grass, ferns, and Pandanus. Soil is dark brick red above purplish-red sandstone (?). To the east the limestone country is luxuriantly and densely wooded, the trees covered with vines and lianas. Many of the depressions, however, are planted to young coconuts. To the north the grassy slopes stretch to the sea, the lower part densely covered with coconut palms.

Caught a very pretty dark green sphinx moth with transparent wings. Caught a moderate size cinerous spider with legs banded yellow and black, not seen before. It was oscillating back and forth on its web as do the "daddy-long-leg" spiders, and craneflies.

Traversing the length of this north highland to the N.W. bay and collected on the west side, north of the high west hills. This is limestone country with a series of pockets-each with coconut palms. Ti, which has not been common on Mango, is here in fruit and flower. Watched a red-legged hermit crab climb laboriously up the stem of one, with apparently no special object in view, as when it reached the rosette of leaves it simply climbed from leaf to leaf aimlessly.

Found a second liana. The twisted trunk at its maximum was by actual measurement 49 inches in circumference, or 15 1/2 inches in diameter. Caught a black and yellow Buprestid on a broken tree stem. The figs of *Ficus* # 570 badly infected with small white beetle grubs. Collected some for breeding and preserved a number.

Some of the streams disappear down subterranean channels in the transition zone between volcanic and limestone formation.

Call on board in evening from Mr. James Borrón Jr., & Mr. Menzies. They said there were several large limestone caves on the island, some with bats. Also Manganese deposits. Ancient fortified city on one of the hills. Normal rainfall 60 inches, but so far this year there had been 90 inches.

Mr. Beck brought in a red millipede and several small beetles from a rotten log. Correia furnished two walkingsticks and a millipede. Mrs. Correia two small Hippoboscid beetles from a Kingfisher.

Sept. 19, 1924. Friday.

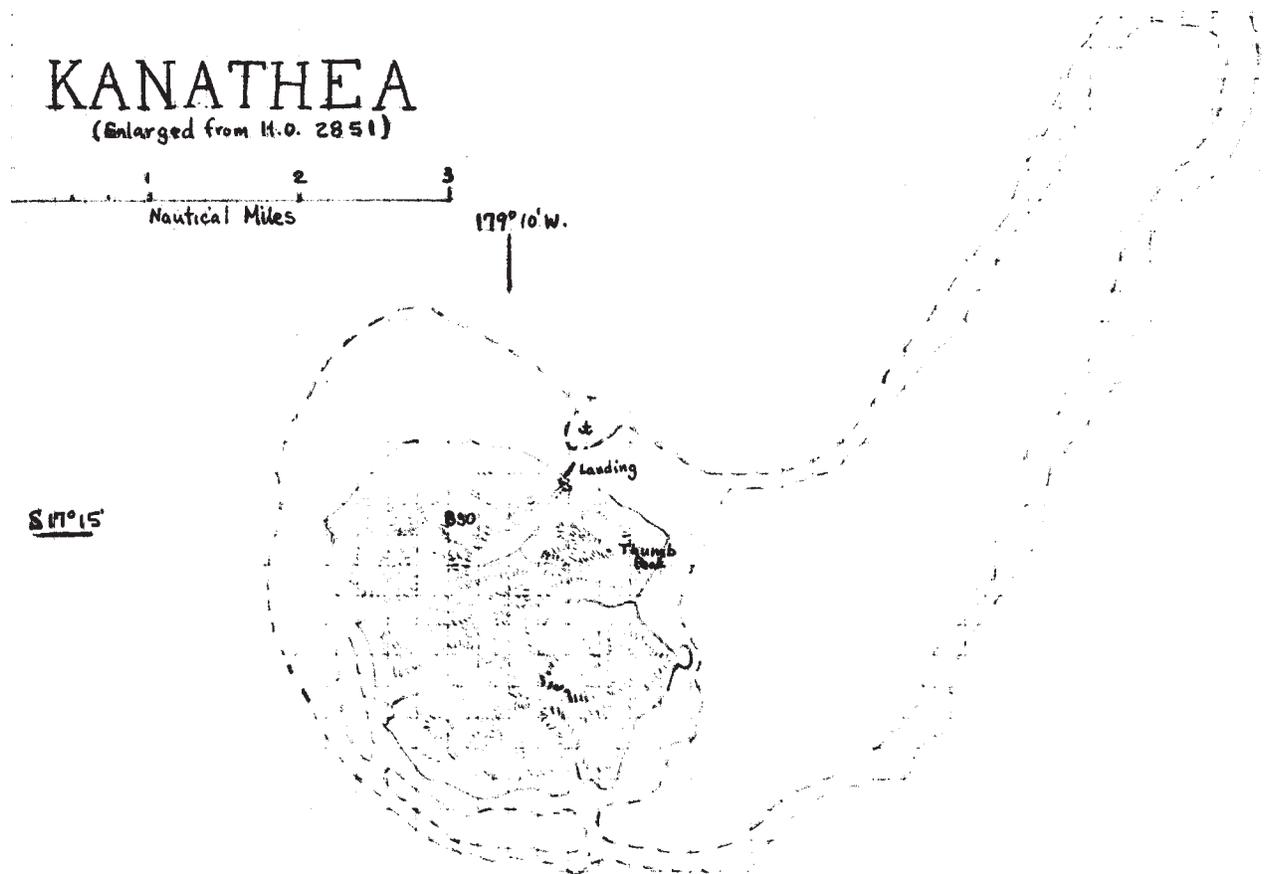
Kanatheia I.

Underway from Mango at 4 P.M. Off Kanatheia at 6: A.M.

The island is of volcanic material, without the usual limestone cliffs, sloping up rather gradually from the beach, which is sand backed by a narrow flat. The highest peak is 830 feet, the center one of three forming a triangle at the N.W. end. The beach and lower slopes are covered with coconut palms, which run up the valleys. Above the coconut zone is grass, scrub and knots of some little extent of lowland open forest, especially capping the peaks and on the slopes of some of the valleys.

Opposite a deep indentation in the reef on the north side, a long wharf has been constructed which reached to deeper water off the mud flat and reef. Here on the beach are located copra drying and storing sheds, native houses and the manager's residence, on both sides of a small stream.

Although the manager, W. A. Smith, could not let our party shoot birds, he was quite willing to have us look over the island and himself pointed out the trails. He said the island was producing over



600 tons of copra, which he hoped would increase to 800 when the young trees came into bearing. He also had 700 head of cattle on the island, raising them for the Suva trade. Previous to the coconut groves, both cotton and sugar were successively raised.

A few "rain trees" (# 574) in valleys. Abundance of guava, which is considered a bad pest. Other weeds including Cassia (*kau mothe*) valuable because of its nitrogen fixing bacteria. Beautiful streams of clear water in every valley.

The summits of most of the high hills and some of the slopes are covered with an open forest of the familiar lowland trees. Slopes are fairly steep in places with outcrops of volcanic rock and beds of pebbles (sample).

Outcrops on the N.E slope of the S.W. peak—volcanic rock containing crystals of olivene (see sample).

South side has three partly wooded ridges separated by two valleys. Portions are grassy with coconut palms. At their heads the valleys are separated by low gap ridges from the eastern and western valleys. These lower ridges are covered with grass and Pandanus, but there is no *nasau*, "plume grass."

Several heavy showers made collecting poor. But even allowing for the dampness, insects not abundant. A few grasshoppers, butterflies, stray wasps and on *Cassia occidentalis* (*kau mothe*) some small moths, dolichopodid flies, sarcophagids, and a few small wasps.

This is the first island in Lau which has had sharp rocky wooded hills of volcanic material. There is no limestone, but a few sheer cliffs are of basalt.

Swallowtail butterfly present. Found a dead adoretus beetle in a spider web. Caught one of the moderately large lizards—purplish gray above and light yellow green below. Have seen this species on



Roll 67: 5 and 6. Panorama from S.W. peak. The highest peak (830) is at the left, the “thumb” in the center background, and the S.E. peak on the right. The peak in the center foreground is at the center of the island.

several of the islands about coconut leaves. Caught a pair of *Hypolemnas bolina* butterflies in cap. The female “carries” the male.

An auto truck is used for carrying copra out of the larger valleys.

Climbed the grassy south slope to the “thumb” a 60 foot shaft of lava rock at the summit of a 500± foot peak. Sample of the basaltic material from its summit.

Found termites-all casts-in a small rotten stump near the “thumb.”

Cap of open forest on ridge and higher peak behind the “Thumb.”

Collected “X-bugs” (*Mictis profanus* var. *crux* Dallas) on plant # 572.

Over gap and down north valley to pier. To protect his coconuts from possible pest introduction, Mr. Smith prohibits the bringing in of coconuts or baskets made of coconut leaves. He has the following sign posted on the wharf:-

Na mate ni niu.

Moni kila sa tabu sara ni sobu mai e na vanua oqo no kato
so basikete e tali e na drau ni niu se so tale ga na drau
ni kau e so.

Supper and pleasant evening with Mr. Smith and Mr. Charles Hathaway of Naitamba.

Saturday, Sept. 20, 1924.

N. end Vanua Mbalavu.

Underway at 6:30 A.M. from Kanathea; thru Ngillangilla passage and anchored in a deep bay on the north end of Vanua Moalavu, just west of Blackswan point, at 7:45.

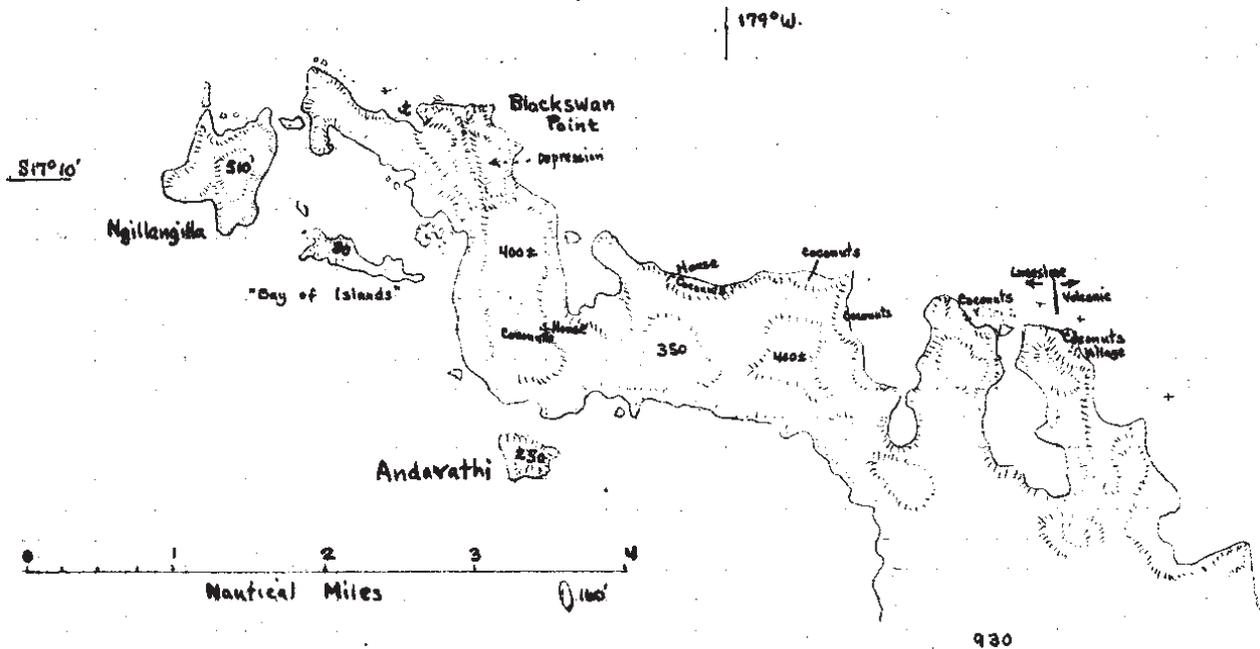
Both Ngillangilla island (510') and this peninsula are of rough elevated limestone, rising abruptly from the undercut shelf. The open forest which covers the rough slopes is far from “impenetrable,” and the slopes themselves are not as rough as those of the Yangasa islets, having pockets and hill sides of occasional slight smoothness.

We landed at 8 A.M. in a small mangrove choaked arm of the bay. Traversed a mile or so of the familiar lowland forest finding one or two new plants and quite a number of cycads. Most of these latter were one to three meters high but two had from 5 to 7 trunks growing out of old butts, 20 cm. in dia. and up to 6 or 7 m. high. Several female trees with fruit. Had previously collected foliage at Matuku so took fruit and section of stump.

Wild goat manure on cliffs and Correia found large pair of horns which he presented to the museum.

VANUA MBALAVU

(Northern Portion)
(Outline enlarged from H.O. 2851)



Both the large yellow and fuscous spider and the smaller dark fuscous ("umbrella" web) spider present. Saw one of the large noctuids with gray forewings and pink and black hind wings.

Cushion moss on rhizoids of ferns and moist limestone rocks appeared the same as that on Moala high plateau. (Specimen).

The bay on the south is dotted with islets—rocky and wooded, of various sizes. One is about a mile long and 80 feet high. Another is horseshoe shaped and deeply cut by small bays. The rest are small rocks.

Collected flowers of several (3) plants previously collected.

Saw a great quantity of small beetles, brown with metallic blue elytra, in the air and on the leaves of a small tree, which they had nearly defoliated. Caught several brown and orange butterflies.

Saw Chua trees in flower.

Several large "flying fox" bats.

Mr. Beck brought in a green katydid and a white orchid. The latter grows and looks like the common field orchid, but the flowers are pure white instead of lavender.

Sunday, Sept. 21, 1924.

Spent the morning packing 3 boxes of specimens, making 7 new cyanide bottles and a new insect net, and rowing down to Ngillangilla island to map in the point and passage.

Underway at 12:30 for Avea, where we anchored at 1:45. Sketched in the hills of the big island (Vanua Mbalava) as we sailed by, and completed the outline of the Exploring group in the afternoon.

The limestone slopes continue as far east as the east side of the eastern deep inlet. Beyond here to the S.E. the hills are grassy, of volcanic origin with some forest on the upper slopes and along the beach. The small sandy bays of the limestone district, of which there are several support small groups of coconuts and there are also small patches even on top of the limestone plateau.

Visited in evening by most of the younger men and two girls from the village, about two dozen in number.

Monday, Sept. 22, 1924. Avea.

Ashore at 6:45 landing at the village, which is also called Avea. It is located on the S.W. end of the island and consists of about 15 native huts and three frame houses besides the church.

Made for the wooded central plateau, the lower slopes having been cleared for cultivation or coconut palms.

Collected a few landshells on the slope, and caught another of the moderate size yellow and fuscous spiders oscillating on its web. A small grove of coconut palms on the plateau explained why a good trail leads up the steep rocky slope.

The plateau is about 1/4 mile wide and 3/4 miles long, rising to a peak at the south (called Sa(n)gawela(n)gi about 500' elevation) and tapering to a knife edge on the north. It occupies the central portion of the island. There are a few small patches of bananas and areas which have been cleared for cultivation in the past, but the greater portion is covered with a moderately open stand of the usual lowland forest. Remains of an ancient stone wall would indicate that a village had once stood on part of the plateau, possibly in the early war days.

The highest point on the island, (Mt.) Salia (600'), is located toward the north end of the plateau about the middle of the island. It is a small abrupt pinnacle of limestone, wooded on the less precipitous W. slope and crowned by a few old gnarled, wind-blown casuarinas, of large girth, but small height. From its summit a good view may be had of the plateau and most of the island.

Found at least three kinds of landshells including the large brownish white species on the plateau. But also found the same three kinds clear down to within 50 feet of the sand beach, in several different types of environment; indicating that their presence does not depend on altitude.

One of the large red-brown "coconut crabs" under a rock. Red legged hermit crabs abundant.

A pool of brackish water on the east side, in which were growing several trees. Their bases spread out into proproots much like those of mangroves. It looked, from the water levels on the rock walls and tree bases, as if the water rose and fell, but certainly not from the tide, as it was several feet above sea level with a low limestone ridge, a flat with coconuts and a sand beach in between.

The east side of the plateau drops down in a steep wall to a rough flat with woods and coconut groves. In the middle of the east side is a sand beach. To the N.E this changes to limestone cliff and undercut shelf. To the S.E a hill of volcanic origin terminates the flat. This has a grassy top with cultivated patches and coconut groves. The sea face is a steep, in places a precipitous basalt cliff. (Sample of the rock). The rest of the island is coral limestone. On the S.E. there is another small sand flat with coconuts and cultivation-bananas, taro, papayas, manioc, breadfruit, backed by the high limestone ridge and running up gradually onto the volcanic hill.

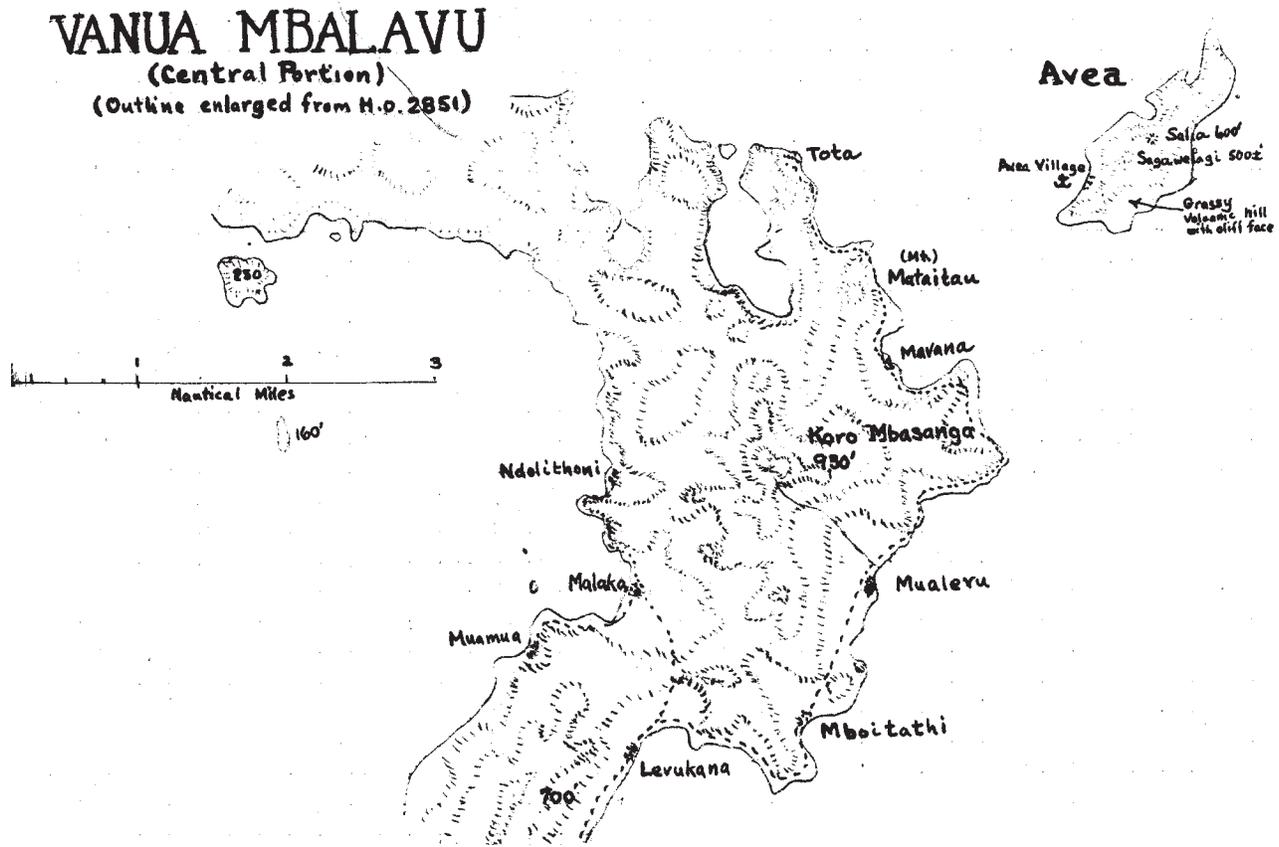
Large black earwigs in rotten papaya. Good insect collecting on the grassy ridge:-butterflies, moths, wasps, flies, leafhoppers, and grasshoppers.

Small fresh water pools at foot of cliff further south. On them were large water striders and nearby small dragonflies. Taro grew in the surrounding moist soil. Good trail leads over south point to village. South end rough limestone with undercut shelf.

Obtained the names of peaks, islands and villages from the natives while waiting for the boat. On board at 4:30.

Mr. Beck brought the conspicuous red fruit of the plant with purple buds and long red-purple stamens, previously collected.

Caught a kingfisher Hippoboscid in evening in my hair.



Tuesday, Sept. 23, 1924.

Vanua Mbalava, Central.

Up anchor at 5:30 and across narrow strait to Mavana village, which nestles at the foot of Mt. Moasanga, 930 feet high. Anchored in the bay at 6:15 and ashore at 6:45.

The village is a small one, but boasts a very superior cement church.

Over the ridge to the west of the village, following a well trod trail to a large cultivated area in a valley running well up into the mountain mass. The gardens are planted to yams, sweet potatoes, manioc, bananas, papayas, etc. and there are several small groves of coconuts, even well up on the summit of the peak. Plenty of butterflies, moths, grasshoppers, wasps and even an ant lion here, but a heavy shower put a temporary end to collecting.

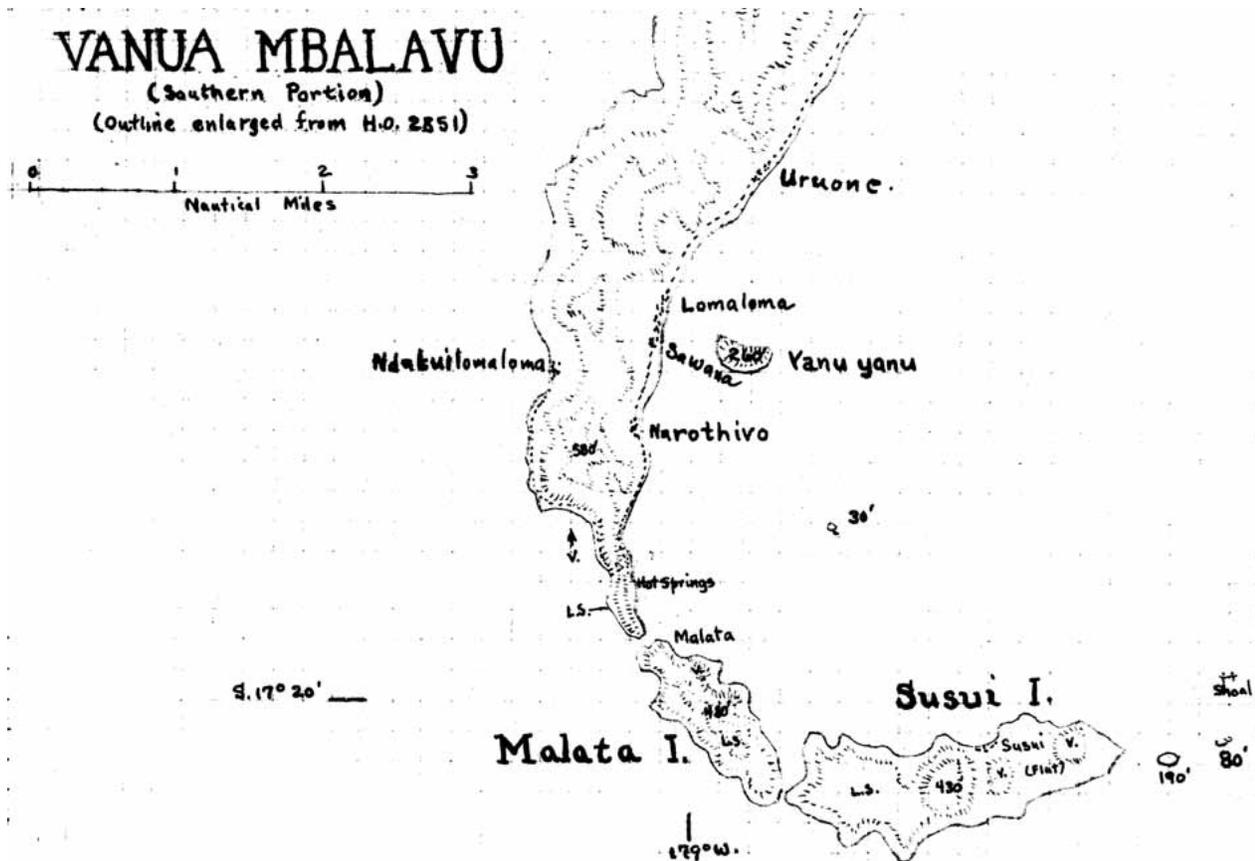
A high ridge running north from the main peak is underlain by coral bedded sandstone. Took a sample from an outcrop which was nearly horizontal, dipping slightly to the N.E. on the northeast side of the ridge. Another outcrop had a more pronounced dip, of about 5° , to the N.E. The slopes were covered with a moderately thick stand of the familiar lowland trees, with ferns and piper underneath.

On the upper slopes of the main peak the forest became really luxurious with large tree ferns, some 7 to 8 meters high, with large trunks and wide spread fronds.

The summit rounded and rocky with open forest. Just east of the summit there was an outcrop of limestone. Several small clumps of coconuts near summit.

Large red ants in dead limb. A few landshells.

Worked S.E. along backbone ridge, which slopes down from the summit to a grassy ridge. This transition zone is densely covered with brush and small trees. Reached a spot from which could be seen both the limestone area running away to the N.W. and the grassy ridge stretching to the south. The area behind the two long (deep) bays on the north coast is all broken up into hollows and hummocks and densely forested. To the south between this mass and the 700 foot hill there is a low gap



with a deep bay on each side, each containing groves of coconuts. The entire ridge to the south is grassy with a few caps and beach fringe of trees, until one reaches the south end, which is again wooded, probably limestone.

Tree # 585 is abundant in the transition zone between the grassland and forest cap.

Caught one of the large red-brown jumping spiders holding a long legged orange colored spider in its jaws. Saw a swallowtail.

A large stream (for this group) runs down the valley to the S.E. toward Mualevu village. Followed a fair trail down the valley past several small clumps of coconuts and small cleared cultivated areas. Water for the village is piped down from a small dam in the stream. Further down stream the stream is divided by a wall of loose rocks into an area planted to taro.

Mualevu village is a large one with 185 inhabitants and a progressive Chinese store, but with a very dilapidated church, quite in contrast to that at Mavana. The people appear industrious; the tapping of samusamu (making tapa) being heard from every part of the village.

Followed an excellent track north along the shore to Mavana partly along the beach and partly thru the coconut groves.

Quantity of volcanic rocks off the east point and a fish pond wall constructed there of them.

Saw a barn owl asleep in the middle of the trail. Fortunately for him and my insect net he awoke on my approach.

Wednesday, Sept. 24, 1924.

Lomaloma & S. end Vanua Mbalavu.

Up anchor at 5:30 and underway for Lomaloma. Anchored there at 7:05. The hills toward the southern end of Vanua Mbalava are grassy with summit caps and the valleys lined with trees.

Lomaloma harbor is well sheltered. It lies directly west of the rounded, coconut covered islet,



Roll 68:2 and 3. Panorama of Lomaloma and islands to S.E. from the ridge N.W. of the town. District Commissioners house in the foreground. Yamu Yamu islet in center. Islands in background, left to right: Munia, Susui, Malata, and south end of Vanua Mbalavu.

Yanu Yanu. To the north are two patches of coral, to the south another and a long coral point runs west from the west point of the islet; forming a very complete breakwater around a small basin with deep water right up to the beach.

Lomaloma village has seen better days. At one time it was the business center for the copra trade of Fiji. This was about 30 to 40 years ago. At that time there were seven hotels on the beach, a wharf, numbers of white people and a constant string of large sailing vessels coming and going. Today except for being the headquarters of the resident commissioner it does not amount to much. There is one small store of the Lau Traders Ltd. The village is really two villages. The northern one is Lomaloma - the Fijian village. The southern one-a continuation of the other has a separate buli (chief) and distinct population - all Tongans; even the name is different, Sawana. Behind the town the grassy ridges rise on three sides.

The government offices are toward the north end of the village with the resident commissioner's house on a small hill behind. Mr. K. J. Allardyne, the Resident Commissioner, was out of town, but his clerk, a well educated Tongan was in the office. Dropped in to see what general information I could get on Lau. Found that they had taken a census last year (1923), but that there was no copy on file. A tremendous amount of paper work passes thru the clerk's hands. He has to handle the marriage certificates, death and birth records, legal proceedings, and taxes for the whole of Lau.

Ascended the slope back of the village. It is covered with the usual grass, ferns, scrub, lycopodium, Pandanus, casuarinas, lavender field orchid, etc., as other grassy slopes. There are large areas of plume grass. Dropped down into a pocket containing a few trees, much grass, ferns, and vines covering everything. Some small breadfruit trees and young coconut palms, and a cleared cultivated area.

Climbed to the summit, up a steep slope with bare basalt outcrops. From here a very good view could be had of the southern part of Vanua Mbalavu and the southern islands of the "Exploring" group. Filled in another portion of my sketch map.

Down a fair trail leading from a clump of coconut palms near the summit down the valley to the village. Collected a number of insect specimens.

On board schooner for the camera.

Collected specimens of dog tick from a dog at the Lau Traders store.

Walked south along road past Narothivo, nearly to south end of the island. The people in these parts have come into too close touch with civilization to pick up good ethnological specimens at a low



Roll 68:1 Lomaloma District Hospital



Roll 68:4 Copra drying rack and typical small native hut nestling beneath coconut palms and a *Hernandia paltata* tree.



Roll 68:5 Typical bit of the “main road” which runs along the east side of the island connecting up the other villages with Lavalava. It is lined with groves of coconuts.

figure. Offered an old woman 2/ for a mat, but she said it was worth a pound. At the mention of “Matau vatu” (stone implements) they shook their heads and said “sigavau”- no more-in the olden days, etc.

The south end of Vanua Mbalavu tapers off into a wooded limestone ridge with a sand beach on the east. A very narrow channel separates it from Malata, which is a continuation of the limestone ridge, 420 feet high, with a grassy, volcanic hill covered with coconuts at the north end. It, in turn, is separated from Susui by a narrow channel. The latter is limestone with a central plateau (430') and a long low flat to the east densely covered with coconut palms, ending in some low hills with numerous casuarinas, which look of volcanic material.

After my return to Lomaloma (when it was too late to go back) heard that at the south end of Vanua Mbalavu, within ? mile of the place I had gone to, there are some hot springs-where the water “boiled up out of the sand” so hot you could “cook food in it” and that near by was a large pool of “warm water to bathe in.”

Thursday, Sept. 25, 1924.

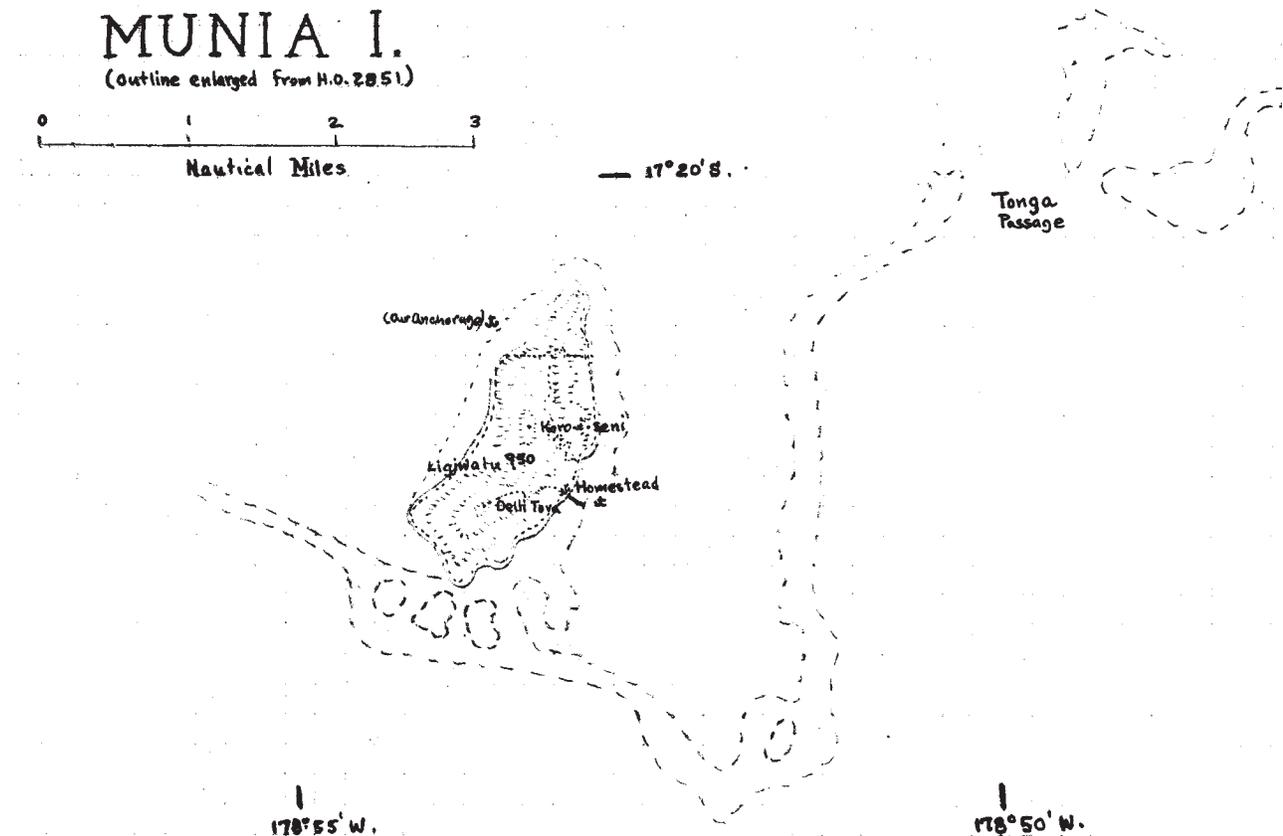
Munia.

Up anchor at 5:45 from Lomaloma and underway for Munia where we anchored off the N.W. side at 6:50.

Did not stop at Malata and Susui which lie to the S.E. of Vanua Mbalavu. Malata appears to be mainly of elevated limestone, with a central ridge reading an elevation of 420 feet.

There is a volcanic hill at the N.E end covered with grass, scrub and coconut palms and other portions of the east side may also be of the same material.

Susui is somewhat larger and lies nearly at right angles to the main N-S. axis of Vanua Mbalavu. The highest portion of the island is a transverse limestone ridge, 430' a little west of the center. The lower land to the west is limestone. To the east is a long grassy flat, thickly covered with coconut palms and with one large and several smaller rounded volcanic hills covered



with grass, coconuts and large clumps of casuarinas. The coconuts and grass land runs well up the east slope of the central elevation. Off the east point of Susui lie two small islets, the larger one (190') with a small grove of coconuts, and the smaller (80') rising more abruptly with rocky slopes and covered by casuarinas. About a quarter of a mile north of the smaller islet is a patch of shoal water.

Taken as a whole Vanua Mbalavu and its three closely adjacent islets form a large slender S. (backwards) or perhaps better a large figure 2. The central portion is predominately volcanic, while the tapering extremities are largely coral limestone.

Munai is an elongate volcanic island about 2 1/2 by 7/8 miles with a central ridge which rises to 950 feet elevation. Most of the lower slopes have been cleared and planted to coconut palms. The upper slopes, which are in places precipitous, still retain a cover of native forest. A fringing reef nearly surrounds the island and it is connected with the main barrier reef, which surrounds the entire "Exploring Group," at its south end.

Ashore at 7 A.M. and met Mr. H.H. Steinmetz, the owner. He is a most interesting man. Despite his name he is thoroughly British. Very well informed despite 45 years isolation in Fiji, he having come to the group from England in March 1879. He is, in contrast to most people in this climate energy and system personified. He is noted for having a place for everything and everything in its place. With him to his neat and comfortable homestead, and deciding that I could learn more from the man than from the island, which is essentially like the others in flora, fauna and general topography, spent most of the day with him.

Watched him take his 9 A.M. metrological observations, barometer, wind, rainfall and temperature. He has these recorded twice a day, in one form or another for nearly forty years a most valuable record. He turns his data over to the Department of Agriculture at Suva, who publish it with their own.



Roll 68:6 Row of native palms, (# 586) in front of the government buildings, Lomaloma. These were obviously planted, but are none the less native palms.

He showed me several publications dealing with Fiji in general and Lau in particular among which are:-

W.G. Foye, Geological Observatory in Fiji, Proc. Am. Acad. Arts and Sciences, Vol. 54, No. 1. Sept. 1918.

E. C. Andrews. Notes on the limestones and general geology of the Fiji Islands with special reference to the Lau Group, based upon surveys made by Alexander Agassiz. Mus. Comp. Zoöl. XXXVIII-1.

And Mr Agassiz's own book, a copy of which he did not have.

Dr. Mann collected insects, but no publication seen.

The island was very badly hit by a hurricane in March, 1923. He told me of the damage done and showed photographs of the wreckage. The coconuts are only just recovering. His account of it was published in 1923, as part of a "Report of Hurricane Season 1922-1923" by the Government Printer, Suva, M. P. 3220/23 a consular paper laid on the table.

He showed me a large scale survey map of the island scale 16 inches to the mile, and presented the museum with several photographs which he or his daughters had taken of Munia.

In discussing the distribution of weeds in Lau, he said that he has to wage a constant war on them. He has stamped out Lantana, and one plant of "mile-a-minute" which he found. Despite its nitrogen adding value the "kau mothe"-*Cassia occidentalis* is a pest in coconut fields for it grows so high and thick it hides the fallen nuts and hinders gathering them. Lantana is said to be on Thithia, and klu on several islands. He thinks that many of the weeds found entrance during the 70's when the islands were devoted to cotton raising.

He finds a tree called mbotho (boco) an excellent hard wood for fence posts. A small tree (# 588) called "tambua ni kalavo" or "Sua-ni-bu" has a white sap which might be used to make rubber. The

natives use the mashed leaves as poultice, and the bark as a tonic.

Mr. Steinmetz took up Munia as free hold property in 1898 and has made an attractive and paying plantation of it. Prior to the hurricane he was cutting 200 or more tons of copra a year and might get that much again in a year or so.

He came aboard the "France" with his daughter Lily in the afternoon.

Mr. Beck collected a large Brenthid or Scolydid (?). Mrs. Correia secured another couple of Kingfisher Hippoboscid flies.

Friday, Sept. 26, 1924.

Underway at 6 A.M. from Munia for Thikombia. Anchored off north side opposite two small sand beaches at 7:20 A.M. in 13 fath[oms].

Ashore and around the north east, east and south sides to the village, walking partly on the beach and in places climbing over rough spurs. The island is an interesting one geologically. The north face is entirely of high elevated coral limestone, precipitous in places and reaching a height of fully 500 feet. This ridge with one diagonally across the middle and hill on the west, all of coral limestone, enclose an undulating plateau of volcanic material which averages about 80 to 100 feet lower than the summit peak near the middle

of the diagonal ridge (550'). The eastern half of the island consists of small spurs of volcanic material - conglomerate made up of lumps of lava cemented together with coarse sand, radiating out from a central wooded hill or rather covered ridge. This ridge is separated from the diagonal limestone ridge by a low gap connecting the heads of two deep valleys. Noted one dyke about 4 or 5 feet wide on the extreme south east point, running into the face in a south by west direction. Noted that the conglomerate on this S.E. point dipped E.S.E. about 15° or 20°. The N.E. beach is sand with a rocky north point. The west beach is partly undercut shelf, and toward the S.W. point another sand beach. The south and east beaches alternate between sand with sandstone (outcrops) beneath, and black lava boulders. In places there is also some limestone. The east side is lower than the west.



Roll 69:1 Mr. E. H. Steinmetz and daughter Lily on deck of France.

THIKOMBIA "I" LAU.

(Outline enlarged from H.O. 2851)

0 1 2 3 4
Nautical Miles.



177° 20' —
Tonga
Passage
176° 50' W.

The volcanic portions, true to form, are covered with scrub, grass, pandanus, and on the east spurs considerable casuarina. The limestone portions and upper slopes of the western ridge are well covered with forest. The two valleys on the south and east and the pockets between the small spires contain groves of coconuts. The interior has extensive areas planted to yams, manioc, bananas and also a few coconut palms.

The village, on west end of south side is on a small sand beach. It is small and rather run down in appearance; there being between 12 and 15 native huts and a cement water tank. Noticed a woman carefully scraping the sand from some small pockets on sandstone beach, at low tide, thru which water was bubbling up.

The buli, a very fair type of fijian, after serving us with a breakfast of manioc, fish soup and boiled minnows, agreed to show us the famous "cave of bones," concerning which MacNamara, the coconut inspector, had told me in Suva. He guided us up a trail behind the village across the central plateau and up onto the limestone ridge on the N.W. It is not a cave, but an arched-over depression, wide open on the west side, partially open on the N.E. and lacking part of the roof, which is a slanting limestone slab. The interior space is about 10 by 18 feet and 8 to 2 feet high, with a dirt and leaf mold floor, which is well strewn with bones. There were exposed and buried shallowly in the loose dirt about 50 skulls in all stages of completeness and the long bones, ribs, etc. of perhaps that many skeletons. Many of the bones were in an excellent state of preservation even though exposed to air and rain. Sorted thru the entire heap and removed 26 skulls and jaws (not together) and a few long and other bones. Six of the skulls am turning over to Mr. Beck. Six more are for Mr. A.M. Lea of the South Australian Museum, thru whom I learned of the cave. The rest, long bones and fragments of pottery are for the Bishop Museum.



Roll 69:2 General view of the "cave" from the west side.



Roll 69:3 Close up of the remaining skulls and piles of long bones. (These I piled up in sorting thru the material).



Roll 69:4 The buli and his son, the future Buli with typical plateau vegetation being burned off.

Carried all those down the cliff to the ship and returned in the afternoon to the plateau with the camera.

[Regarding Figure 69: 3]: The large stick in the foreground is a “club” with which NcNamara said these victims were dispatched. A native told me however that the skeletons had been buried and were of Fijins of the “olden time” who lived in the nearby village on the plateau. My own observations leave not too great faith in either story. The skulls do not appear to be very old—they could scarcely have lasted 50 years in their present environment. And while a few bore the fractured skull mark of having been hit on the head—the majority—from children to aged, toothless, men and women were in good condition. The entire mass was so jumbled about that no complete skeletons could be collected with certainty and even the jaws and skulls are only approximately matched up.

Mr. Beck caught a brown bug and large red ant. Collected several “kutu” (head lice) from a native’s hair.

Mrs. Correia turned over a scorpion some of the sailors had caught on shore.

Very few mosquitoes but house flies very abundant and troublesome.

Hicks, the engineer, who also shoots birds, did not return to the schooner in the evening. He was found (lost) by some natives and brought back at 10 P.M.

Saturday, September 27, 1924.

Sovu.

Underway at 6 A.M. for Sovu Islands where we anchored on the north side of the middle islet at 7:45. Ashore on small islet at 8.

These islets are three in number, of rough coral limestone. The larger is on the west, with steep sides and covered with forest. It is entirely surrounded with undercut beach shell. It is about $\frac{3}{8}$ mile long and 100 to 200 yards wide, reaching an elevation toward the east end of 230'. It much resembles



Roll 69:5 Looking east from the highest volcanic part of the central plateau toward the east limestone ridge.

the Yangasa islets in vegetation and roughness. The middle islet is subcircular, with gentle slopes, about 200 yards in diameter and 60 feet or so high. There is a small sand beach on the N.W. and another on the S.E. The slopes are wooded and there are a number of coconut palms. It is composed of rough elevated coral limestone, but less rough than the larger islet. The smaller islet and the easternmost is elliptical in outline, about 125 to 150 yards long, 40 to 50 wide and 60 to 75 feet high. Small patch of sand on N. W. side. Its rough coral limestone slopes are covered with scrub-stunted lowland trees of several kinds, vines such as ipomoea and boerhaavia, familiar herbs-portulaca, etc., the low purple spiked shrub found on the Reid reef islets, "maile" fern, etc. The most interesting plant is the native palm (possibly *Pritchardia thurstoni* ?). A grove of between 200 and 300 covers the slopes and summit. There are also a few of these palms on the larger islet. Collected several specimens. In general appearance this islet resembles the small palm covered islet off Ongea ndriti.

Insects include the white butterfly marked with black, *H. bolina*, small hymenoptera, quantities of small yellow flies, a small brown moth, fuscous ants (2 or more spp.). On the palms there were long antennied anthribids, a black Tenebraaid, and the metallic blue "jumping" beetle.

Did not have an opportunity to visit the middle islet, but returned to the schooner at 11:30. Up anchor and across the north side of large islet, where we anchored at 12:10. Ashore at 12:45 on the large islet.

Interior very rough beneath the thick growth of trees, herbs and vines. Collected ants ex dead stick and termites from their large brown, globular nest. Saw large coconut crabs. There are a few native palms on the lower slope here. Driven back to schooner at 3 P.M. by heavy downpour of rain. Spent most of afternoon in cabin writing. Shower of rain and squalls of wind in evening.

Mr. Beck furnished 2 more Kingfisher Hippoboscids.



Roll 69:6 Sovu islets from the S.E.

Sunday, Sept. 28, 1924.

Occasional heavy showers and strong puffs from the east.

Found that the figs (# 570) which I placed in a vial in Mango, September 18, had bred out small weevils from the small white grubs.

Drew outline maps of the next two islands and packed up the bones secured on Thikombia-i-Lau.

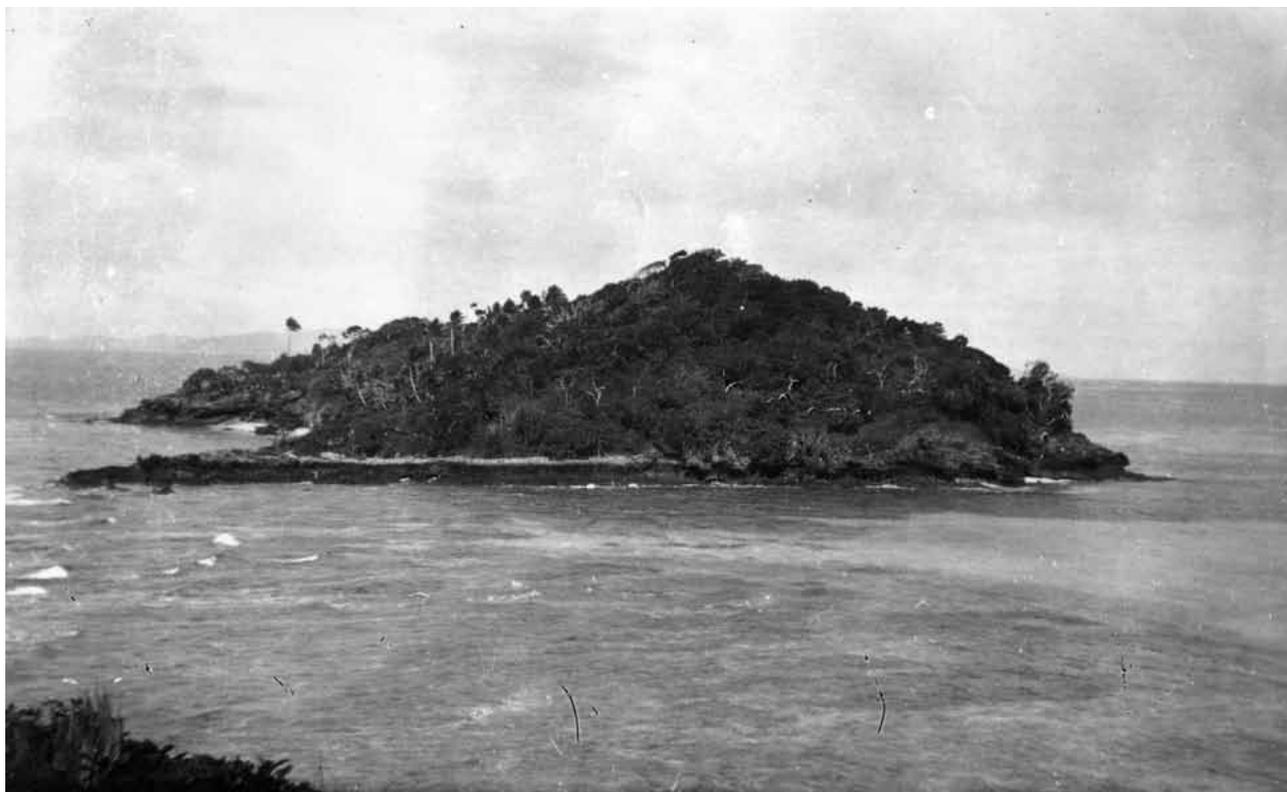
Up anchor at 9:45 and underway for Kimbombo islets, passing thru the Sovu entrance.

The islets are three in number, surrounded by a barrier reef with entrance on the N.W. The largest islet, 190 feet high and about 300 x 400 yards, is of rough elevated limestone, covered with low forest. The other two islets are smaller and of volcanic material. The middle islet is about 100 x 60 yards and 120 feet high with a sand and lava pebble beach on three sides and a steep cliff on the fourth (north and north-west) rising from a cut shelf of the same material. This cliff consists of bedded conglomerate-lava rocks in coarse sandstone, separated by beds of (Tuff ?) in thin strata similar to those of Olorua. (See sample). The islet has a rounded summit covered with small trees and a few coconut palms along the beach. The smaller islet consists of a steep pinnacle of the same material completely surrounded by a sand beach, with coconut palms on the south and a few small trees on the summit. A line of reef runs out to a patch of flat rocks on the N.E. and a similar reef connects the islet with two flat rocks to the south. The large islet rises from the undercut shelf. It has two small rocks off its N.W. side

Anchored off S.W. side of large islet at 1:45 P.M.

Went ashore on the middle islet with two of the sailors at about 2 P.M. On the beach we found the remains of an improvised canoe. It consisted of a rough log above which was fastened a framework tied on sticks inserted in the log.

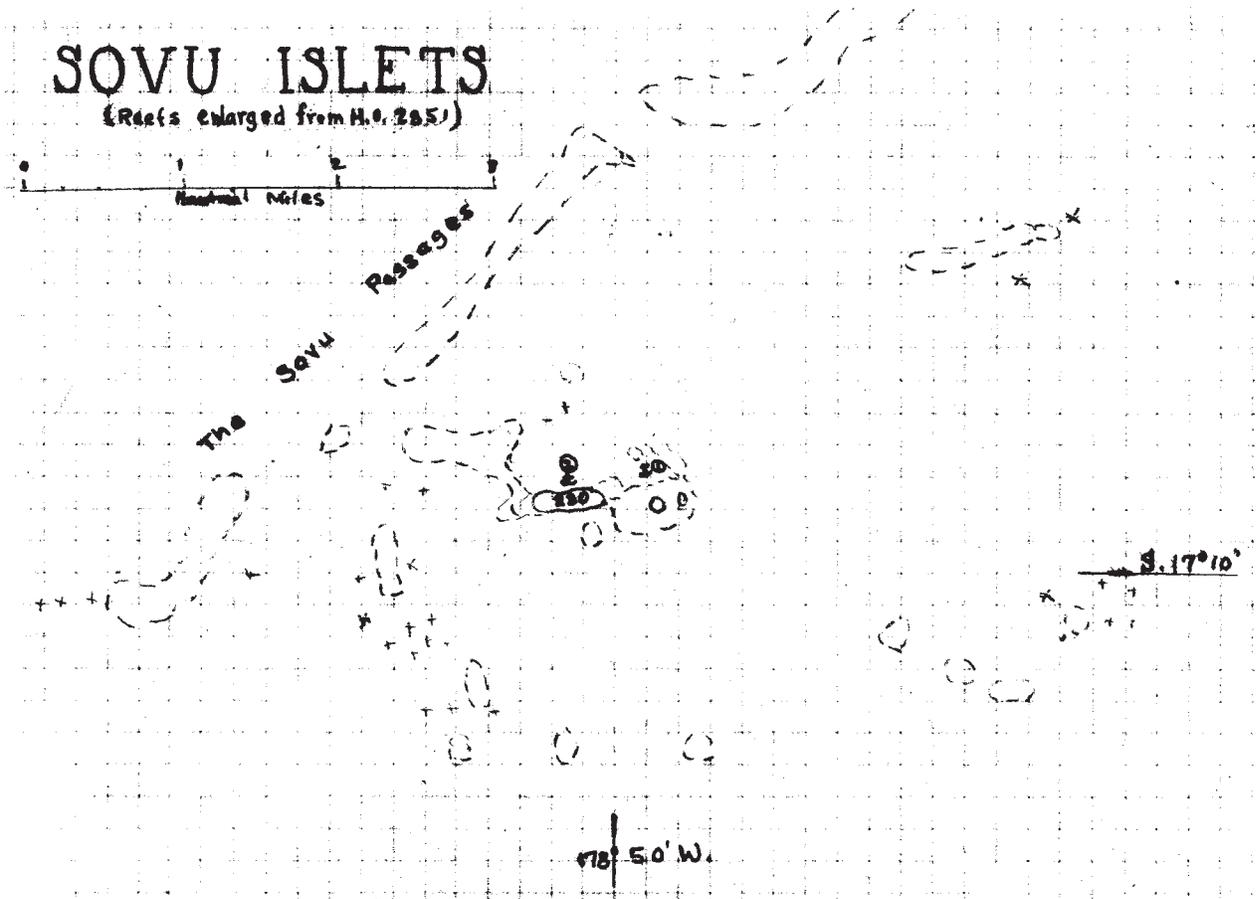
The bedded strata dips to the east and north-east at about 30° on both ends of the island where it is exposed. (N. and S.E.). It looks the same sort of material as on Olorua (see samples).



Roll 70:3 Middle islet, looking west.



Roll 70:4 Kimbombo islets from the west by south (true).



The slopes are covered with numerous *Casuarinas* and a low open growth of the usual beach and lowland trees-including *Scaevola*, *Tournefortia*, *Hernandia peltata*, milo, *Ficus*, the orange berry "pigeon" tree, etc. and with the four common vines *Ipomoea pes-capri*, *Ipomoea* with white flowers, 3-leafed pubescent legume with pink flowers, and the yellow flowered burr. Numerous *Pandanus*.

Saw several gray, spotted eels.

Dominant insect a greenish crane-fly. Collected a number and variety of specimens in about half an hour - leafhoppers, bugs, flies, a bee, wasps, moths, spiders, etc.

Returned to schooner at 4 P.M.

Developed two rolls of films in evening.

Monday, Sept. 29, 1924.

Ashore for 2 1/4 hours at 6:45 on the larger islet. It is perhaps the roughest island we have visited in Lau, although portions of other islands have been as rough. It is subcrescent shaped rising gradually with limestone "bad-land" formation on the S.W. and dropping off sheer on the N.E. for the whole 190 feet. The N.W. side is a lower cliff and the S.E. tapers down to a point.

The island is covered with the usual trees, shrubs and herbs found on rough limestone islands. Found one of the larger "strangler" banyans with new light green leaves (# 591). Insects except small moths and mosquitoes scarce. A number of red brown ants and the white and black and red-brown and black butterflies present. Usual small landshells on leaves of herbs and shrubs. Also quite a few on leaf mold. Took a paper bag full of the latter. Small purplish to red-brown coconut crabs. Saw scores of "flying foxes" - fruit bats with light brown bands about their necks.

Returned to schooner at 9 A.M. and underway for Wailangilala island. Spent morning wrapping up alcoholic specimens. Anchored off S.W. side at 12:30.

The island is flat with a sand or slab sandstone beach. It is surrounded by a fringe of the usual beach plants including *Scaevola*, *Tournefortia*, puapua, *Acacia laurifolia*, *Pandanus*, *Pemphis*, milo, etc., with *Ipomoea pes-capri* and the yellow flowered creeper beneath. The interior supports a grove of coconuts, numerous papaya trees and such plants and trees as *buka*, *Hernandia peltata*, the tree with the large peltata leaves and sub-spiny capsules, noni, "maile" fern, tree with serrate leaves and pendent spikes, etc.

Great numbers of noddy terns nesting in the coconut palms.

Pumice spoken of in Pilot book quite scarce now.

Toward the north-east end there is a narrow sand and coral isthmus which separates a small clump of trees from the main wooded portion of the island. This northeast portion has a beach of broken coral and here the reef is fringing on the east and north.

Insects, especially small moths and leafhoppers, quite abundant. *Tournefortia* moth, a small brown moth and the black white spotted butterfly; spiny legged grasshopper and smaller brown Acridid; a brown longicorn and gray weevils on *Scaevola*; small Asilid, Stratiomyid and very small yellow-brown flies; small flies; small black *Agromyzid* fly (possibly the cause of the leaf mines), leafhoppers, small bugs, bees, about *Scaevola*. The latter also about the yellow flowers of the burr vine. Large yellow & fuscous spider and smaller spiders. Caught several beetles & sowbugs in dry leaves. Most of the small leafhoppers, etc. in grass.

Gecko and skink under log on beach.

Ascended the Wailangilala Light House, a metal cylinder 96 feet high. From the top, despite the overcast horizon a fine view was obtained, both of the island and the neighboring reefs and islands. Mr. G.E. Jay, the lighthouse keeper had only been on the island 3 months. He and his Indian assistant occupied very comfortable houses. The water supply is caught from rain on the galvanized tin roofs.

Tuesday, Sept. 30, 1924

Underway at 8:30 for Naitamba, the late start being due to rough weather and difficulty in getting up the two anchors.

The island is 1 1/2 by 2 miles, trapezoidal in outline, composed of limestone and volcanic material, with a central basin containing scattered woods and coconut groves. On the north are two wooded limestone ridges, located at the N.W. and N.E. corners. The west slope is volcanic, backed on the south by a high limestone ridge which continues around the south side and ends in a high flat topped peak with precipitous S., N. and E. slopes.

Ashore at 11:15 and met Mr. G. H. Henning, the owner, and his wife. They have a very attractive homestead on the west side. Anchorage possible off the coral heads on the west side, when the wind is off shore.

Several tracks lead over the ridge and traverse the central basin, in which is situated the bulk of the coconut plantation. There are low places in the enclosing wall on the N. and S.E. The basin is underlain by both volcanic and limestone rock, if one is to judge by the outcrops, the latter perhaps predominating, with very good soil. There are numerous patches of lowland forest within the basin between the groves of palms, and more dense growth on the slopes. In places additional clearing is in progress and great numbers of young coconut palms have been set out. Caught a few beetles and some small pseudoscorpions in the dead leaves. Butterflies very abundant especially about the fields of milk weed. Monarchs, the small red brown and fuscous species, *H. bolina* with both yellow and dull colored females, swallow-tails, yellow sp. orange sp., *Lycaenid* blues, black and white, "dead leaf", etc. A few small moths, small and large orthoptera, flies, etc.



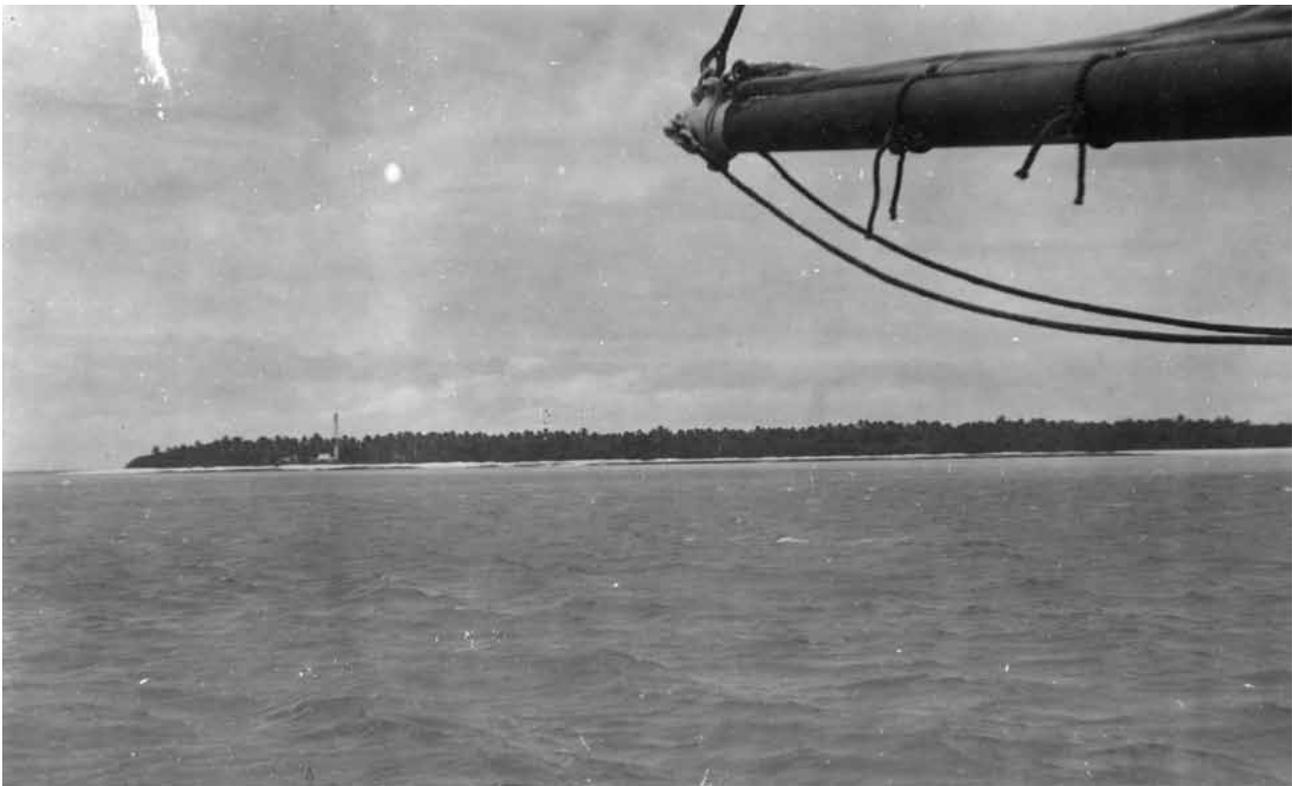
Roll 70:5 Middle island looking N. by E.



Roll 70:6 Large island looking N. by E.



Roll 71:1 Improvised “canoe” and the two sailors, Steven (mate) and Nicke. Larger islet in the background.



Roll 71:3 Wailangilala island from the S.W.

WAILANGILALA I.

(Enlarged from H.O. 2851)

0 1 2 3
Nautical Miles

16°45'

Ship passage 70 yds.

L.H. 70'

179°05' W.

Quite a number of Casuarina trees:- in rows in the basin and patches on the S.W. rim.

From the S.E. side could see Malima islands-low with sand beaches.

This flat topped peak rises perpendicularly for its upper 1/3 (200' ±) on three sides, sloping down in a ridge on the W. It looks like a shaft of limestone, but samples taken from the foot of the cliff have the appearance of basalt. At the spot where the samples were taken, (on the south side) the cliff was not only perpendicular, but it overhung the talis slope and dipped water out on it. It is limestone further to the west.

No mongoose, minah birds, guava, lantana, klu; patch of Rryophyllum on S.W. side. Found a large tree of the species with yellow flowers and white floral leaves, which I had seen before only as scrub. It had a trunk 25 to 30 cm. dia. and stood 5 or 6 m. high.

Fish wall in S.W. bay.

Small lizards abundant; larger gray green lizards present. Saw a small rat, and a cat which had gone wild. Wild goat tracks in the limestone rocky portions. Numerous purple land crabs also in this part.

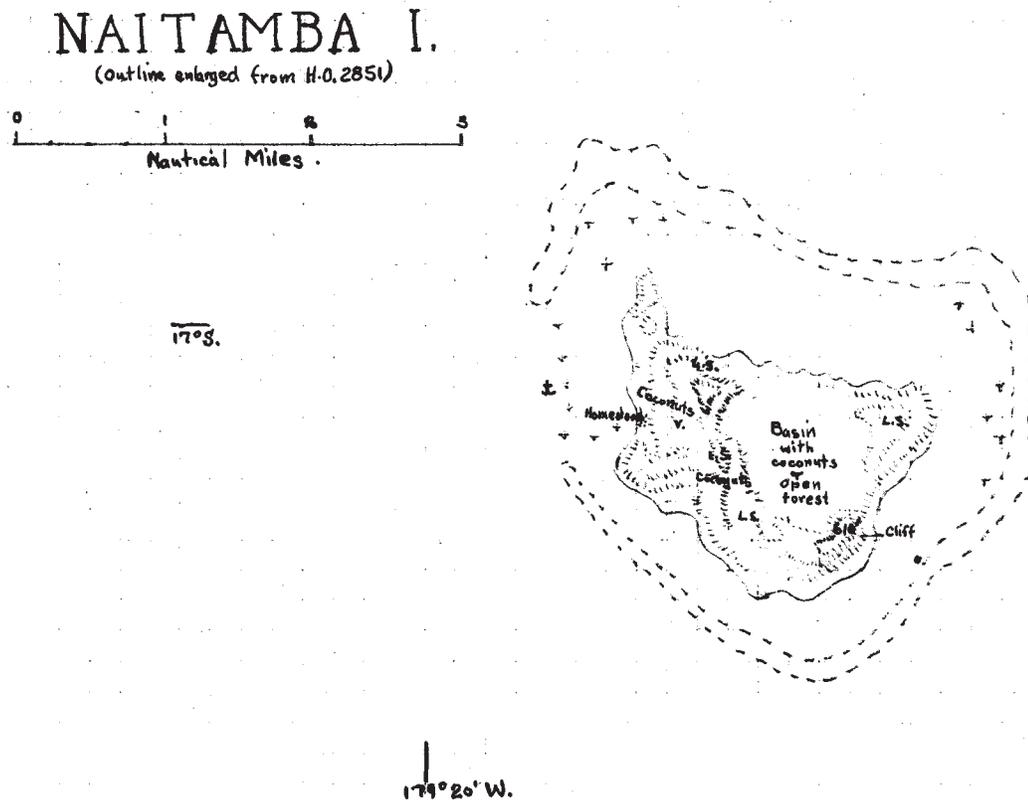
Mr. Beck caught three wingless insects (probably Pupipara) on a specimen of "flying fox" bat.

"Afternoon tea" with Mr. & Mrs. Henning. They would like information on eye worm of chickens. They call the island Naitauba,

Wednesday, October 1, 1924.

Underway at 4:30 for Yathata.

Kaimbu is a low, flat island, composed of wooded limestone. It has a grove of coconut palms on the central highest portion, which has an elevation up to 150 feet. This extends down into the beach on the N.W. and S.W., the village being located in the former. (N.W.). Most of the beach is undercut limestone, but there are a few stretches of sand.



Yathata, viewed from the north, does have a slight resemblance to a cap, the rounded central peak being the "button." This steep high peak is of limestone as are its N., S.W. and W. slopes. The S.E. hill is grassy volcanic formation. On the N.E. and W. are broad flats with coconut palms, sand beach and beach trees.

Four small islets and two rocks on the reef between the two islands. The largest is 90 feet high, covered with coconuts and beach trees and is called Nuku luvi by the natives (Pilot book calls it Nuku levu). One of the others, 30' high, is called Rambuld. Off the north side of Yathata are two large and four small islets averaging 20 to 30 feet in height, with scrub and a few coconut palms. They are called Matindrotu, -western large one, Naniu-middle large one, with coconut grove, and Vatu Matau, -two eastern ones.

Ashore at 8:15. Started the day off right by having a small vokai (green lizard) run up my trouser leg on the beach.

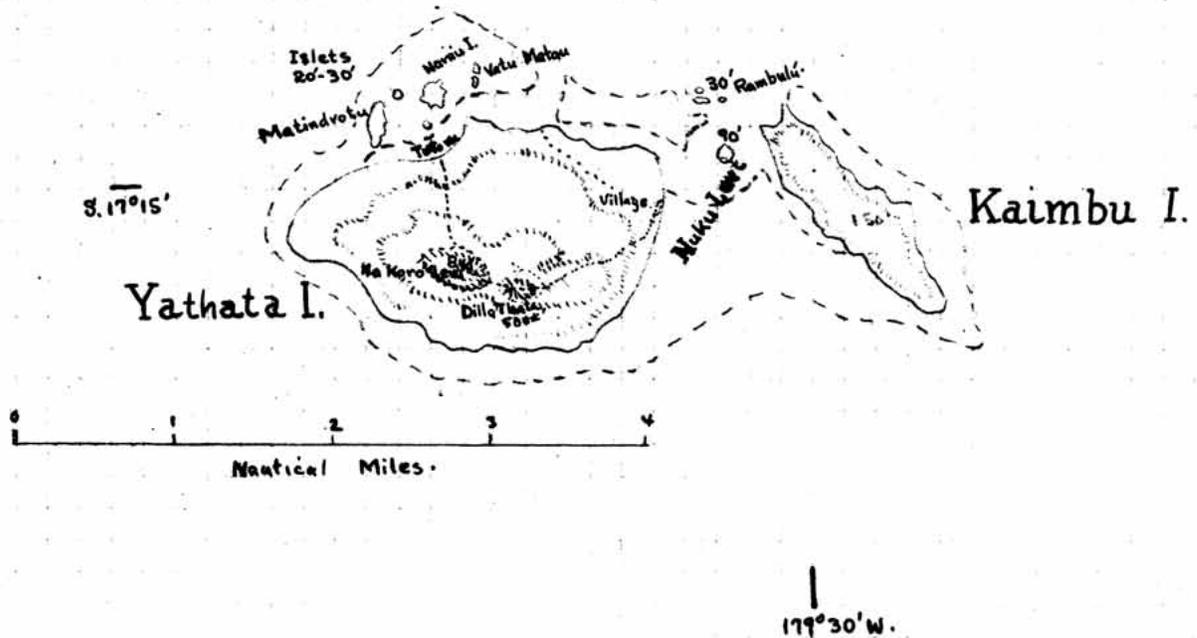
Across N.E flat on trail thru the coconuts and lowland trees to the village which is located on east side. There are about 25 or 30 native houses and a frame church. S.W. of the village a few hundred yards is a small pool of fresh water, full of wigglers and greenish scum and with numerous waterstriders.

Trail leads up over the rounded S.E hill of volcanic material, covered with the usual grass, scrub and pandanus. Soil on the north side a rich red-brown, with numerous small cultivated patches and scattered coconut palms. Small patches of sisal on slopes.

An obliging native piloted me along a trail which led thru an open lowland forest with occasional groves of coconut, completely around the high central peak. He had never been up the peak and said I would find it very bad going. Contrary to his prophecy I found a good trail leading up to the very summit. Along it were numerous built up walls and platforms.

Explored the flat summit of Na Koro Levu (840'), which is about 50 yards by 150. It is covered

YATHATA (Cap) I.
and
KAIMBU I.
(Outlines enlarged from H.O. 2851)



with ancient walls and platforms the remains of which are still in excellent condition for study. Small groves of lemon trees. this old fortified village was well situated. The north and south slopes drop very steeply-in places perpendicularly, and the east and west slopes are none to gentle.

Descended again by the trail after obtaining specimens of two new plants - a Freycinetia-like liana and an orchid, and followed a trail leading around the north slope of the central peak, thru coconut groves, dense forests and rough limestone country to a sandy bay on the N.W. called Tatovu. Off and in it are five small islets (above mentioned).

Here fell in with a crowd of girls and women, a man and a boy just returning to the village from fishing. Accompanied them east along the beach as far as our landing place.

Aboard the schooner, which had spent the day tacking back and forth, there being no anchorage, at 4:30 P.M.

Underway immediately for Nukutolu islets.

The insect fauna of Yathata was rich in moths, butterflies, and flies. Found a few small landshells. Numerous small lizards and a moderate size purplish species. Hermit and purplish red-brown land crabs plentiful.

Between 20 & 30 T[ons] of copra a year are dried on Yathata. It is sold thru Taviuni.

Passed close by the eastern Nukutolu islet. It is low with continuous sand beach underlain by slab sandstone. The flat interior is covered with beach trees and coconut palms, reaching a total height of 100' above the sea. The islet is elliptical in outline, 250 to 300 yards by about 350 yards (N-S.) and surrounded by a fringing reef.

The middle islet is somewhat lower, the trees being reduced to scrub on the east side and with few



Roll 71: 5. The high flat-topped peak (610'), looking S. by W. along the coconut-covered east ridge, Naitaumba I.

coconuts except on the S.W. side. It is also elliptical in shape and about the same size or slightly smaller than the eastern islet. The fringing reef does not extend as far off the N.W. point as indicated on the chart (H.O. 2851), it being only about 1/4 mile off shore. There is a rock on the reef off the S.S.W. side. A narrow arm of the fringing reef connects it with the smallest and most western of the islets.

This western islet is even lower, not over 50 or 60 feet high to the top of the bushes. It is just a flat with open covering of scrub. A rocky shelf extends to the south for about 100 yards more.

Anchored at 6:05 to the westward of the middle islet in 10 fathoms.

Thursday, Oct. 2, 1924.

The "France" dragged off the reef at 2:30 A.M. Mr. Beck decided that we would not waste a day on the Nukutolu islets and so we beat back to Vatu Vara during the early morning hours, reaching the north side at 7:15.

This island, when viewed from the east or west resembles a high crowned (à la William Jennings B—) hat. From the north it resembles a fireman's helmet. Though small in size the island has a central peak rising to a height of 1030 feet.

Landed with ease on the north side at 7:30, at about high tide. Landing would be possible thru a small gap in the reef (at present marked by a stick) at practically any time of the tide except perhaps with an on shore (Northerly) wind.

Met on beach by the native overseer. The island belonged to the late Capt. Wilson, who built a neat, substantial frame house on the north-west sand beach and set out numerous coconut palms. A path leads from the landing place to the house around the north-west point, traversing two small flats covered by coconut palms and fronted by sand beach.

From the house a trail leads up onto a shelf on the north side of the high central peak. This shelf



Roll 71:6 The central high peak (Na Koro Levu, 840') looking west along the north side of the high S.E. grassy slope.

has a good soil and is covered with coconut palms and small cultivated patches, and by native forest which thickly covers the remainder of the limestone rough slopes. There are a few orange trees.

The central peak, which rises very steeply on all sides, is called Dillana. Was told that it has an ancient fortified village (Koro Matua) site on its broad basin-like summit, and that two old trails (Sala matua) lead up to the top, one from the S.W. up the rounded knife edge ridge and one from the N.E. Being on the N. side, attempted the N.E. approach. The talis slope, though rough with broken limestone is fairly free from underbrush and offers no difficulty. The forest is composed for the most part of small trees, of the lowland forest type. A few small moths, but other insects scarce. Landshells not abundant, but a few both on green leaves and rock face. Cycads quite numerous toward top of slope. Also considerable Pandanus.

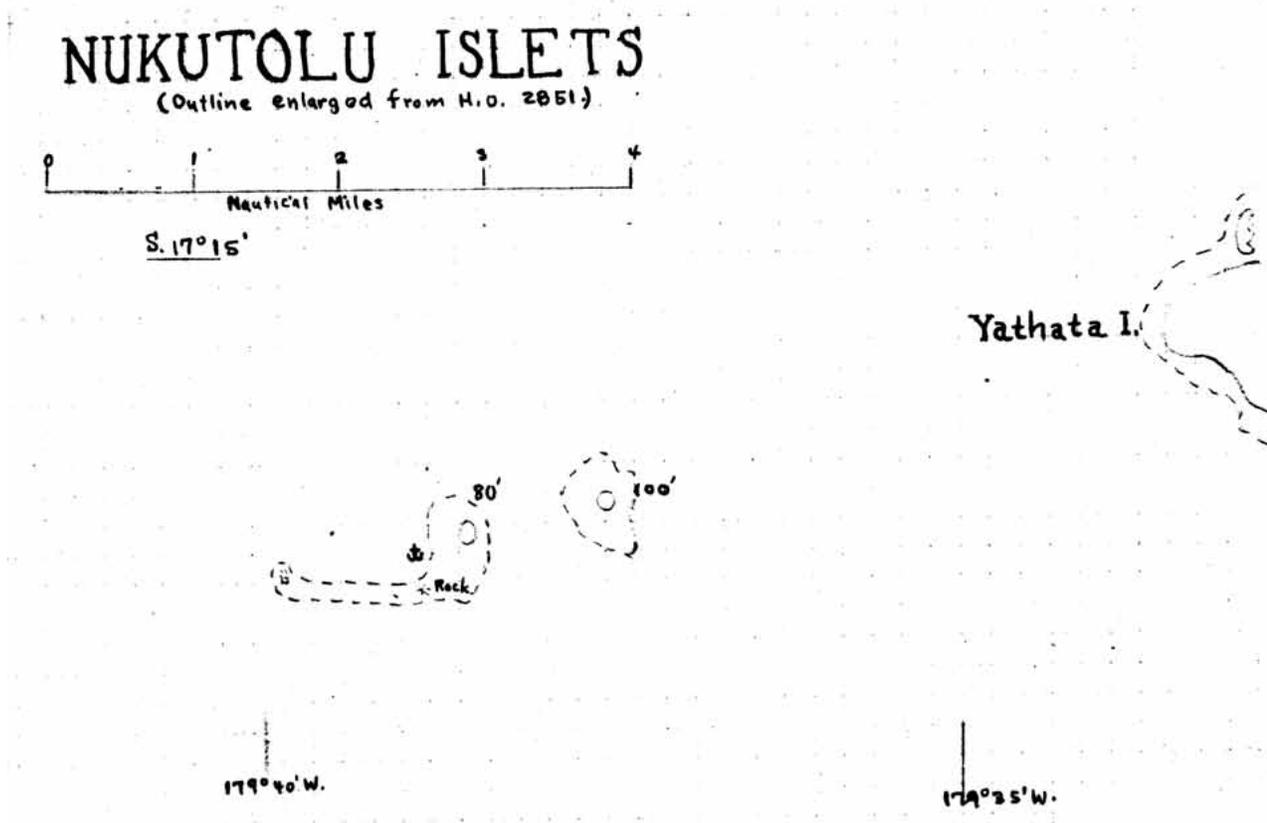
The last 100 feet over most of the sides is a sheer drop. There is a small gap on the N.E. which allows one to clamber up from the top of the slope to the rim. This route was utilized by the former inhabitants, some portions of the ancient trail remaining.

The summit is a shallow basin about 300 to 400 yards across, nearly circular and sloping gently toward the S.W. where the rim is absent.

The top was fully as difficult to traverse as the slope, being eroded into jagged mounds and sheer walled pot-holes,- typical bad-land formation. Toward the West side there are larger pockets with good soil. Worked over half way across searching in vain for signs of the ancient village, which is probably on the SW. side at the top of the better approach.

The summit is densely wooded. The air was full of the chirping of small birds, and numbers of white butterflies floated lazily from tree to tree, hovering especially about the lehuas,- a mass of brilliant red bloom.

Descended over the same route, meeting Mr. Beck in the coconut grove on the shelf and accompanying him to the N. beach. On the way down found a tree with its lower trunk covered with Orchid



595. Also another different orchid (# 596) and the liana # 594. Collar like bracket ferns common on the trees. Picked up a sprouting cycad seed. Saw H. bolina caterpillars on the leaves of several plants.

Looked for cowries on the reef for a few minutes.

On board schooner at 4 P.M. and underway immediately for Suva, this being the last of the Lau islands.

From the S.W. the island again appears like an old slouch hat. Too far away to photograph but drew profile.

Friday, Oct. 3, 1924.

At sea all day enroute to Suva which we reached at 8. P.M. Passed the Makura off the mouth of the harbor.

Spent morning cleaning up my locker and getting all specimens together. Carried them below in afternoon and packed some of the Lau plants.

Wrote a popular article for the Suva Times and Herald at the request of Mr. Beck. Typed part of a list of Lau birds compiled by Correia.

Saturday, October 4, 1924.

Suva Harbor. Finished list of Lau birds on typewriter - one copy for Am. Mus. Nat. Hist. are for Mr. Beck, one for Correia and one for Bishop Museum. Read mail. Afternoon typed Photograph data.

To library securing two books about Fiji which read in evening:-

1. Lorimor Pison, *Tales From Old Fiji*, London 1907 Several legends concerning Lau: "How the Mosquito Came to Oneata." "Why the Kings of Lakemba are called the Lords of Naiau," etc.
2. Thomas Williams, *Fiji and the Fijians* and James Cabent, *Missionary Labors Among the Cannibals*. 2 vol. 1870. London.



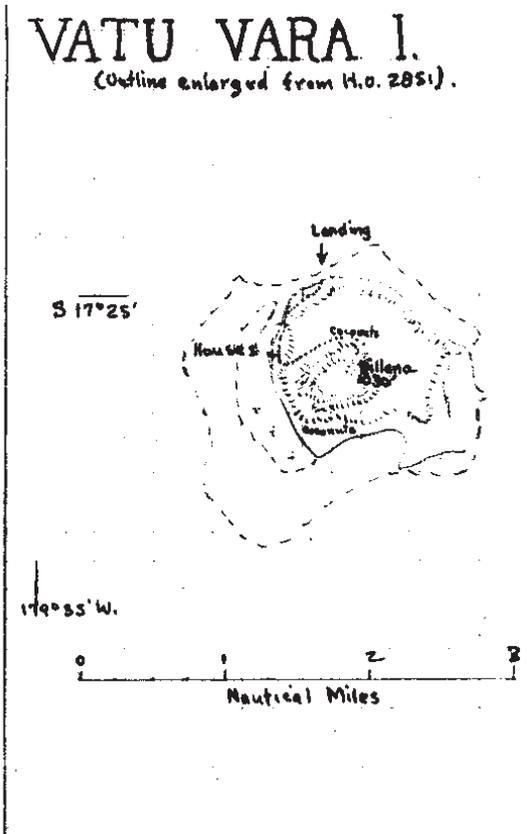
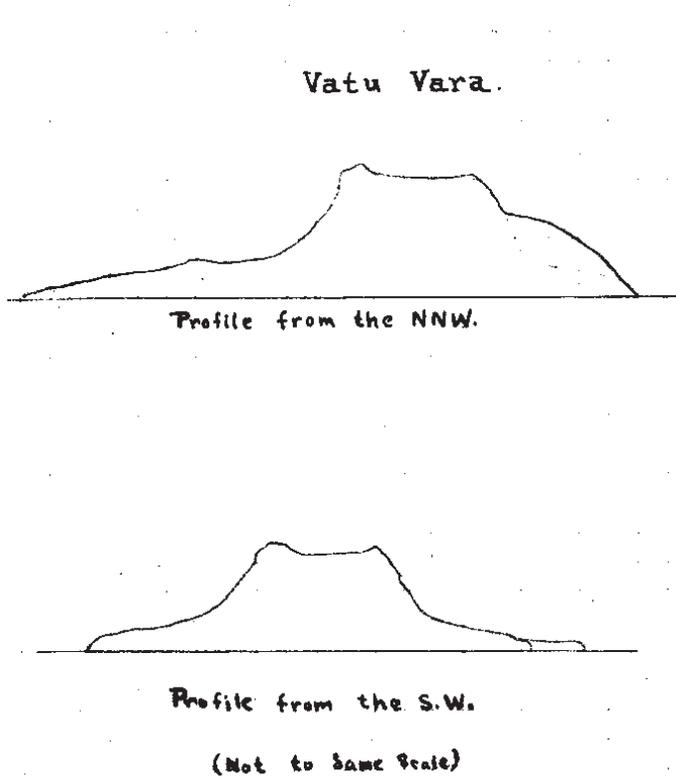
Roll 72:2 Kaimbu and the east end of Yathata from the summit of Na Koro Levu (840').



Roll 72:3 The fishing party.

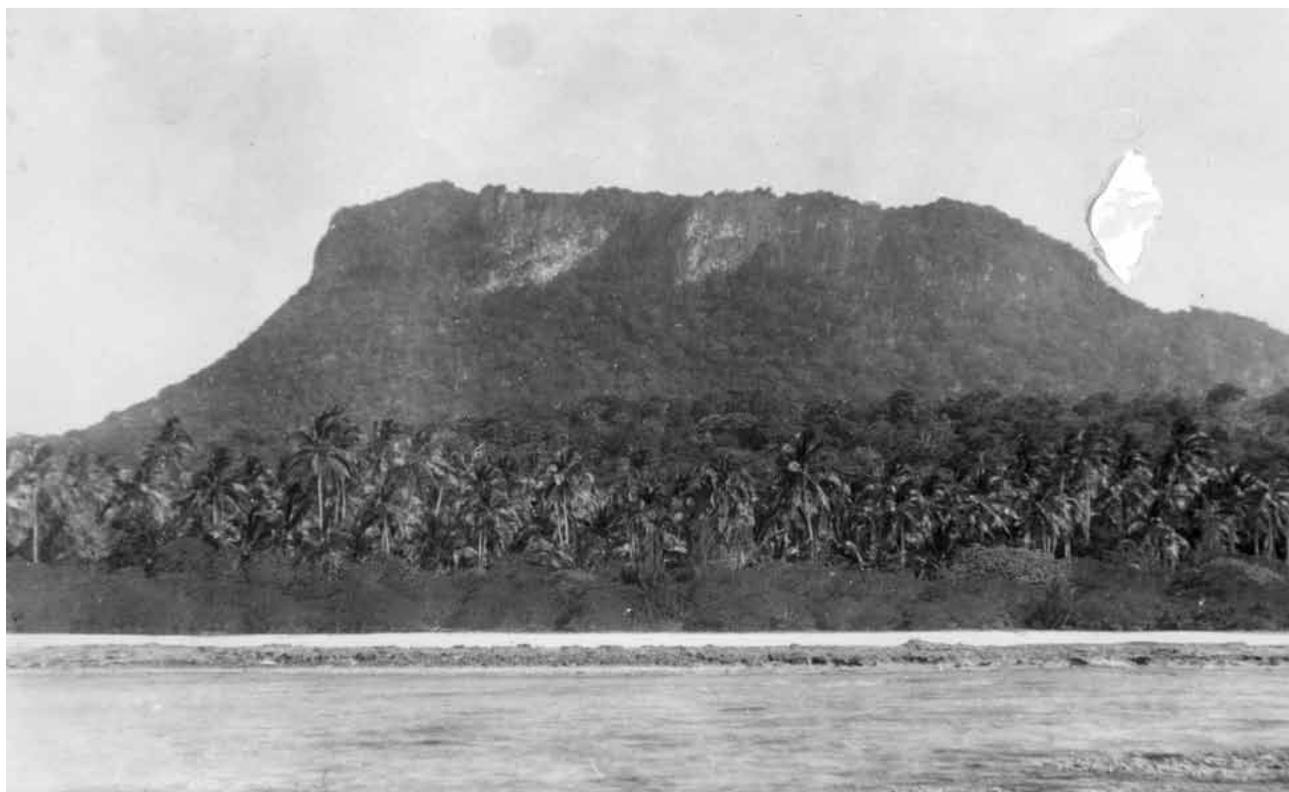


Roll 72:4 Returning homeward with the spoils, along the "Sala kai."





Roll 72:5 Looking S.S.W. across the summit basin of Dillana from the highest point (1030') which is on the N.E.



Roll 72:6 Dillana peak from the N.W. reef, looking S.S.E.



Roll 73:1 North side of the island looking S. by E.



Roll 73:2 Vatu Vara looking E. by N.

Fairly good history, and account of people, agriculture, customs, etc. Missionary activities at Lakemba, Ono, etc.

Sunday, October 5, 1924. Suva.

Spent part of morning packing up specimens in hold. Rest in reading the two books. Secured some interesting information concerning the times of Governor Thurston from an old sea captain.

Afternoon called on Bachs. Church and band concert. Several ant lions larvae and stone chisel presented to Museum.

Monday, Oct. 6, 1924. Suva.

Carried box of skulls for Mr. A.M. Lea up to Burns Philp Office and turned it over to Mr. Mewton.

Called at Dept. of Agriculture and made an informal verbal report to Mr. A. Despeissis, the Acting Superintendent of Agriculture concerning insect pests of coconuts in Lau, with specimens of leaves attacked by Agonoxera argaula Meyr. and a fungus. Reported the Levuana absent. The leaf mining moth, Agonoxera argaula Meyr. present on many of the islands and the effects of the Phasmid (Lepophus cocophagus) "walking stick" called by the natives "minimata" apparent everywhere. No serious banana pests noted. Weeds prevalent; the worst of them—guava, verbena, lantana not abundant.

Limestone rocks containing a low percent of phosphates on Ongea and Ththia.

Returned botany book to Mr. J.G.C. Campbell, the Mycologist. He introduced me to Mr. Robert Boyd, Chairman of Native Lands Commission. Made an appointment for conference same time after the finish of the Legislative Council Session to discuss the people and conditions in Lau.

Purchased some films and personal articles. Cashed order on Union Shipping Co. for \$50. from Bishop Museum. Dental appointment.

Developed last rolls of films.

Tuesday, Oct. 7, 1924. Suva.

Purchased packing case for 5/- and packed up the last of the Lau specimens. Found a sample of coral limestone rock for the Department of Agriculture. Obtained bill of lading.

Purchases in town. Dental appointment.

Wednesday, Oct. 8, 1924.

Asked by Mr. Barker, editor of Fiji Times and Herald to act as special representative of the paper at the Levuka Jubilee. Accepted because Mr. B. has a number of old books which are in the Bishop Museum Want List.

Carried my 12 boxes of specimens over to Warehouse on wharf.

Dental appointment. To library and looked over a number of books on Fiji.:-

Edward's Australasian Catalog. A catalog of books relating to Australasia, Malaysia, Polynesia, the Pacific coast of America and the south seas. London. 1899.

(Francis Edwards, 88 High St., Marylebone) lists 3000 books with classified index by subjects and places.

H. Stonehewer Cooper, The Islands of the Pacific, their Peoples and Their Products.

London. Richard Bently and Son. 1888. Good account including cotton on Mango.

John Horne, A Year in Fiji or an Inquiry into Botanical Agricultural and Economic Resources of the colony. Stanford and Robertson. London. 1881.

Appendix contains list of Fiji plants and meteorological data.

Mrs. Smythe (wife of Col. W. J. Smythe), Ten Months in the Fiji Islands. Henry and Parker. London and Oxford. 1864.

Guy E. Schofield, The Pacific, its Past and Future. London. 1919. An excellent brief Summary of Pacific islands.

Presented librarian with Report of Director for 1923.

Put the two steamer trunks into storage at government wharf.

Thursday, Oct. 9, 1924.

Suva to Levuka.

Underway at 6:45 for Levuka, having in addition to regular party on board Mrs. Beck, Mrs. F. H. Rogers and Miss F. E. Pennington.

During part of passage read portions of J. H. DeRici, "Fiji, our new province in the south seas," London. 1875.

Off the south end of Ovalau at 3:45. The S.W. end of Ovalau is low, rising into bold volcanic hills toward the east. Lower slopes grassy behind a fringe of coconuts. Wooded above. Central portion low with another range of wooded hills on the west side.

The famous and historic old seaport town of Levuka is situated at about the middle of the east side. There is no harbor, but the roadstead is protected by a barrier reef, thru which there are two entrances near the town.

Levuka is a picturesque spot, nestling at the foot of bold ridges which separate two steep valleys. The waterfront is lined with shops and warehouses. Behind this is the residence section, with attractive homes perched on the hillsides. All the coconut palms along the shore and running up into the valleys are browned by the ravages of the coconut moth, Levuana iridescens, looking as if they had been burned.



Roll 73:3 The S.E. coast of Ovalau looking N.N.W. Levuka is at the extreme right.

Ashore and met several persons of interest, including Mr. D. J. Solomon, the Mayor, and Mr. Wm. Adam King owner of the "Polynesian Gazette."

"Pioneer" bearing Acting Governor and party arrived at 5:45 with band playing. It was met by two native canoes with large mat sails. Band went ashore and paraded streets.

Harbour full of steamers, ketches, and cutters from all parts of the group, with more arriving.

Friday, October 10, 1924.

Fiji Jubilee Celebration, Levuka

Outline Summary of the Principal Events.

Crowd assembled in and about palm thatched pavilion at Nasova, within 150 yards of the site of old Government House where deed of cession was signed 1874.

Special seats for "old identities" who had been present or in Fiji at time of former gathering. These included J McFagan, Tom Bryson (Sr.), Tom Curtis, James Palmer (Sr.) Charles W. Thomas, J. Wallbrook, A. J. Swann, and H. L. Kennedy (the latter in Ba at the time).

Mr. C. E. de F. Pennefather, the district commissioner in charge of gathering.

Principal chiefs of Fiji and representatives from every province, seated on mats opposite stand. Under the direction of Hon. Ratu Pope, the ranking chief.

Governor and party arrived at 11. Salute 17 guns. Old lali beaten by Ratu Tomasi (or Takaulau) of Ngau, the only chief present who had been at former ceremony, just as it had been beaten in 1874. Band played "God Save the King" and Union Jack unfurled.

Governor presented with whale-tooth tambua, the personal gift of Ratu Pope. Yang-gona stalks present and drink prepared while the natives chanted. Most in European coats and lavalavas; some in barbaric costume, with faces painted. Yanggona presented with much ceremony to His Excellency, Thomas Edward Fell; Chief Justice, Sir Alfred E. Young; Acting Colonial Secretary, Douglas Roy Stewart; Capt. Smyth of the H.M.S. "Laburnam"; Colonial Treasurer, Herbert M. Rushton, and Mayor David J. Solomon.

Governor read speech (which has been printed), recalling the events and deeds of cession of 50 years before and summarizing the achievements of the 50 years. He closed by reading cables of congratulation from the retiring governor, Sir. C. H. Rodwell, and old Fiji residents now in Australia. He thanked the chiefs for the ceremony.

Speech interpreted by Governor's Aid, Ratu Secole.

Reply to his excellency by Hon. Ratu Pope (in Fijian).

Remarks by Mayor Solomon, thanking Governor for attending and giving a few anecdotes of early Levuka.

Governor shook hands with native chiefs and delegates.

Presents to Governor of huge turtle, large cooked pigs and pile of yams; which the governor returned to the natives for their feast.

Band paraded streets to and thru Levuka.

Afternoon given over to childrens' sports on the park playground. Greatly enjoyed despite heavy shower of rain.

Native canoe races postponed until Monday P.M.

Evening-Jubilee Ball in Town Hall. Well attended, many in evening dress, a few in fancy costumes. Showers.

Saturday, October 11, 1924 Levuka.

Football and Mekes

Semifinals of Soccer Championship for the "Ricarnie" cup presented by Brotherton Bros. of Manchester to encourage sports among the Fijians. 1st. Competition among teams of the various provinces. Cup a facsimile of the famous old English Soccer Cup, and competition governed by same rules.

Morning - Lomai Viti defeated Rewa. 3 to 0

Afternoon - Naitisiri defeated Tailevu 2 to 0

Mekes beautifully performed despite showers of rain.

First 9 women dancers, then 34 men dancers. Costumes of masi (tapa) and native fiber "ribbon". Faces blackened or painted.

People of Bau staged old time meke, using spears, war clubs and feather and reed head dresses. Faces and breasts blackened. Some with valuable necklaces and breastplates. Governor presented with necklace of boar's tusks. Natives in turn presented with several tambuas thru the acting Colonial Secretary. The scheduled mekes were followed by several impromptu ones by the enthusiastic natives and a general exchange of gifts.

Evening Children's costume ball.

Sunday, October 12, 1924.

Finish of Suva-Levuka launch race.

1st Tai Turaga. End Adi Cakau. 3rd Thelma.

Special church services. One union service being held out of doors.

(See below for collecting done)

Monday, October 13, 1924.

Championship football game, won by Nartasiri 2 to 1.

Regatta Day. Boat races all day.

Reported the four days activities for the Fiji Times & Herald. q.v.

Monday, October 12, 1924.

Collected specimens of eggs, larvae and pupae of Levuana iridescens from a very badly infected coconut palm in the yard of Mr. R. Kendrick. Also noted that the larvae were eating on the leaves of nearby banana plants and found eggs laid on the same.

Tuesday, October 14, 1924.

Ashore at 8 A.M. and after taking roll of films to local photographer walked north along beach road to Waitovu valley. Up south ridge and followed trail well up into the rainforest.

The lower foothills are covered with a great number and variety of lowland weeds including lantana, Koster's curse, "mile-a-minute", Bidens, papus thistle, etc. There are also cultivated areas containing taro, yams, bananas and yanggona (yagona).

Lizards abundant: the common striped olive green species, a larger light green and gray species, and a large dark fuscous species.

The rainforest is luxuriant with fairly open stand of trees, many of them familiar species, but a few new to me or seen only on Viti levu. Tree and other ferns numerous. Fairly dense undergrowth of



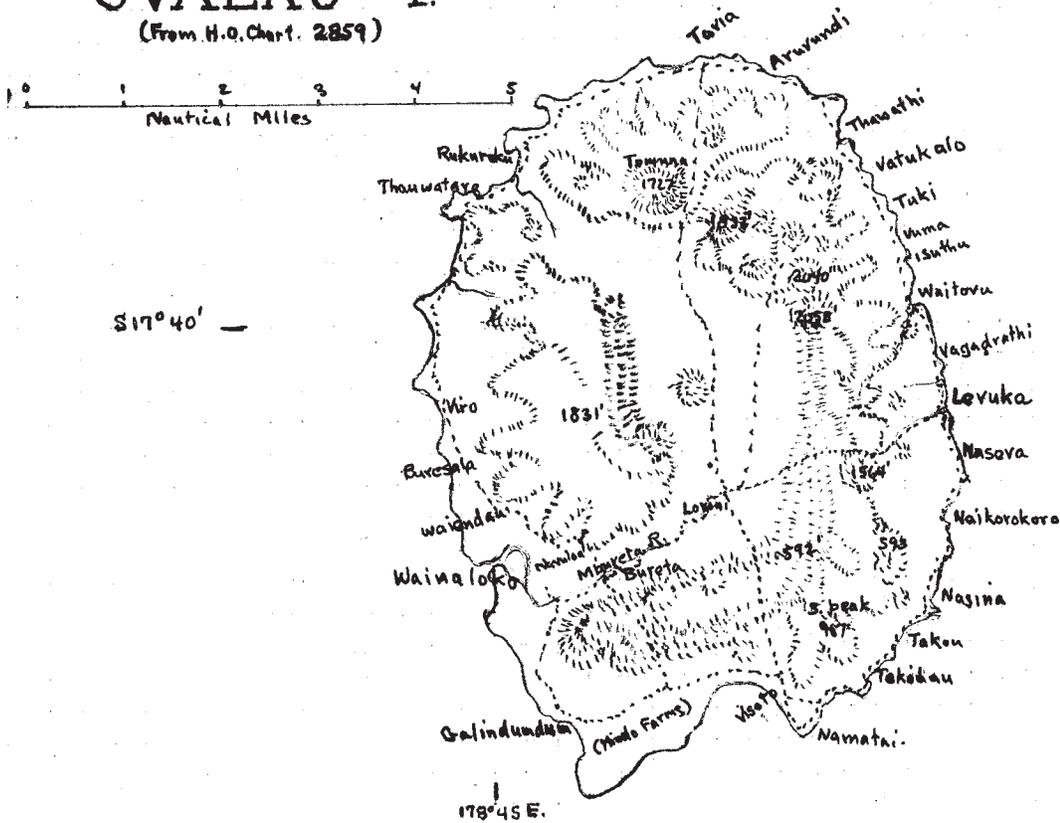
Roll 73:4 Typical rugged peak north side Waitovu valley.



Roll 73:5 Levuka roadstead and slopes. Note "Pioneer" going out. Looking S.E.

OVALAU I.

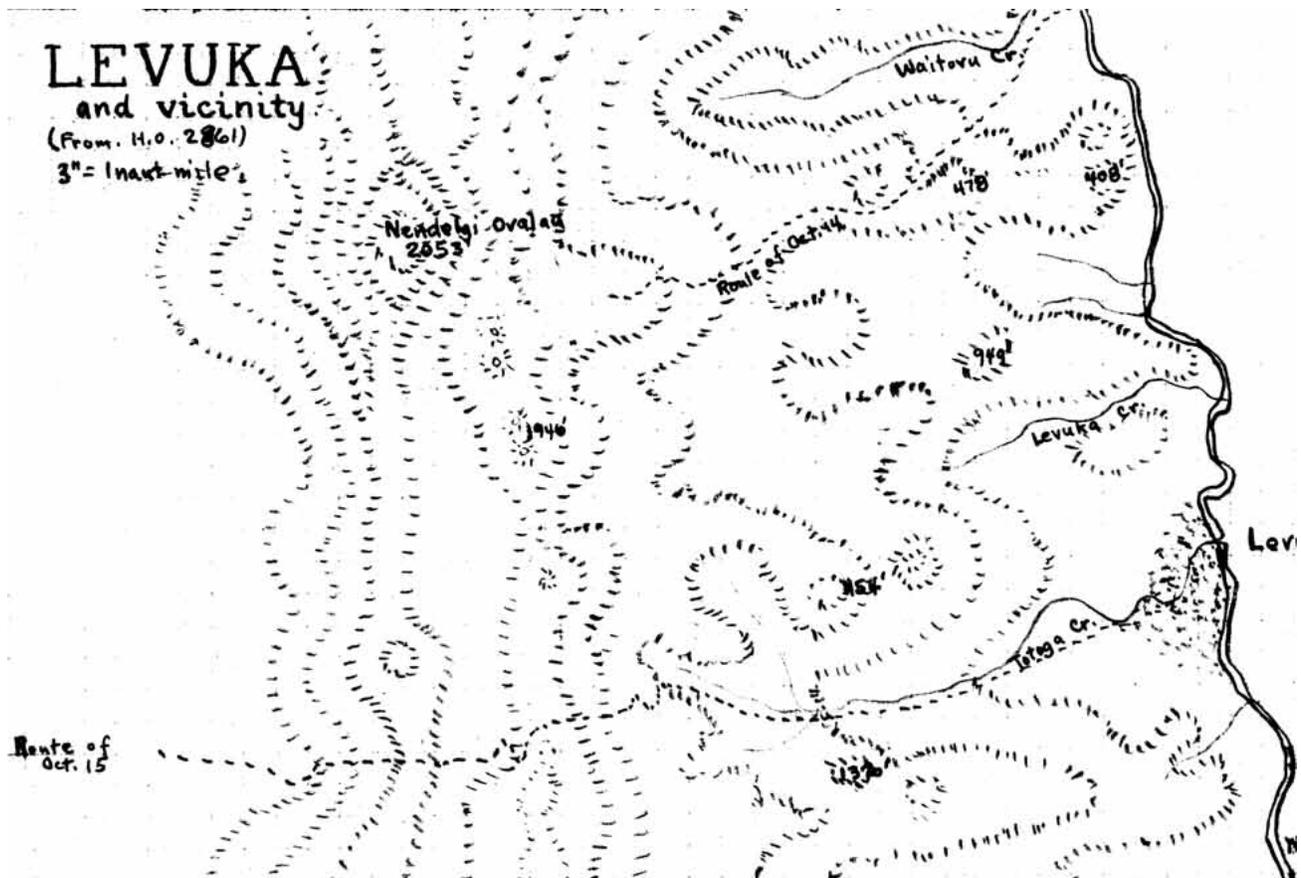
(From H.O. Chart. 2859)



LEVUKA and vicinity

(From H.O. 2861)

3" = 1 naut. mile





Roll 74:1 Scene along trail, where it rises up a cliff face by a fall. The last part of the rise is steep, zig-zagging over the lowest part of the ridge.

located on the bank of the stream, in the south-central portion of the basin. The other village-Bureta, is out of sight down the gap.

The principal vegetation on the nearby hills, in the vicinity of the pass, consists of the banana-like plant found so commonly in Samoa, tree and other ferns, and a moderately open stand of rainforest trees-few exceeding 18 to 25 feet in height. The ridge drops away steeply on its west side into the basin. Along the trail are numerous weeds and a few cultivated patches, principally taro.

In the far distance rise the high, pointed peaks of north-eastern Viti Levu, visible over the N.W. ridge of Ovalau. The main island to the S.W. is low, except for the hazy highland in the vicinity of Colo-i-Suva and beyond.

herbs shrubs and vines. Collected several new plants and a variety of insects, especially large fuscous craneflies.

Returned to Schooner at 3:45 P.M. stopping at the office of the Polynesian Gazette to obtain a copy.

Mr. Beck collected a black beetle on trail, and a flat brown tick which he thought was associated with a yellow dove.

Wednesday, Oct. 15, 1924. Ovalau

Ashore at 6:45 stopping in at Mr. Chapman's to arrange for photographs of the Jubilee.

Up trail behind Levuka which leads over the pass to Lovoni, as far as the summit. The trail leads up a fertile valley of the Makiki type, shallow, steep and "V" shaped, there being many rapids and small falls in the stream which is crossed and followed by the trail. Caught quite a number of insects and a frog.

The center of Ovalau is a deep basin surrounded by high ridges, draining out to the WSW thru the Bureta river. The surrounding ridges are forested on their lower slopes which are covered with grass, ferns and high weeds - esp. Köster's curse. A broad stream-the Bureta River, drains the basin, finding its source in numerous valleys. There are two large clumps of Levuana browned coconut palms-conspicuous against the green floor and between them scattered patches of palms, along the stream. The village of Lovoni is



Roll 74:2 and 3. Panorama, looking down valley behind Levuka, Ovalau I.

The sign at the summit of the trail (and a similar one at its east foot above Levuka) regarding sanitation and water supply reads as follows:-

“Mo Ni Kila

Sa tabu ni dua na tamata me mi se veka ena bati ni uciwai. Sa tekivu ena vanua oqo ka yala ena gusu ni vaivo sat u kina e dua na vola vaka oqo.

Ia ke dua e bea nai vakaro oqo ena beitaki sara ki na Veilewai.

Ena saumi na tamata sa kumea e no 5/-na silini.

H. C. Pilling.”

(Translation by E. H. B.)

“Be it Known (that)

It is unlawful for man to “stool” along this stream.”

Conspicuous among the insects were:-small brown and white butterflies, orange and fuscous skippers, a few swallowtails, diptera of various kinds; Ichneumonid and black wasps, etc.

Lizards of at least 2 spp. sunning themselves on bare rocks. Caught specimen of the smaller kind, but unable to catch the large blackish sp.



Roll 74:4 Looking into Lovoni and Bureta from the summit.



Roll 74:5. The N.W. range from summit of the trail.



Roll 75:2. N.W. bay, Wakaya, (where Graf von Luckner was captured). "France" and "Arieta" in foreground.

The large fuscous and yellow spider abundant here as it is also about Suva.
Returned to schooner in middle afternoon.

Thursday, Oct. 16, 1924. Wakaya I.

Ashore with mail and luggage to send to Suva. Returned to schooner and nearly completed MS on Regatta for Suva Times Herald; forwarding same by mail.

Underway at 11:40 for Wakaya, where we arrived after a smooth trip, at 2:40 P.M.

Ashore with Mr. Beck and called on the owner of the island, Mr. and Mrs. Claude de Mouncey. Mr. de Mouncey had recently purchased the island for £11,000 from the Fiji Government, who had bought it from the previous owners. It is the second largest privately owned island in Fiji (Mango being larger) and at present produces 250 tons of copra yearly, with prospects of more in the near future. In addition to domestic animals there are wild goats, wild cattle, wild pigs and wild deer.

Explored the north end of the island. This portion is a good example (at present) of land which has been cleared and then neglected and allowed to run riot. All the Fiji weeds are present (except Köster's curse) including "mile-a-minute," guava, lantana, gasu, forming a tangled jungle between the coconut palms, except where overshadowed by hau or milo thicket.

Day mosquitoes abundant.

The island is of volcanic origin, the north beaches being alternately sand and volcanic rock-black scoria and conglomerate (pudding stone). The north point is underlain by scoria and supports only grass, weeds and some wind swept casuarinas, stunted coconuts, and scrub. The beach has a line of the usual *Tournefortia*, yellow composite, "lau talatalo" (in Fijian *viavia*, *Crinum asiaticum*), *Acacia laurifolia*, *puapua* (or *buabua*) *milo*, *Scaevola*, *Pandanus* and the like.

Beneath milo thickets and scrub the hillsides are clear, fairly gentle in slope, and covered with loose rocks of volcanic material.



Roll 75:3. Mr. Beck and Mr. de Mouncey with the N.W. bay background.

Insect life especially abundant and interesting. No landshells noticed.

Told that both brown and gray snakes present, but saw none.

Dinner with Mr. & Mrs. de Mouncey at their attractive home, their son, Mr. Hunt and Mr. Gibbs, also present. Mr. de Mouncey is a prominent Suva accountant and an artist of no mean ability.

Friday, October 17, 1924. Wakaya & Wakaya-lailai.

Ashore at 6:30 and followed the main track the entire length of the island.

The island made up of volcanic material which outcrops as “pudding stone”?- a dark gray to light brown rock, with quantities of small dark crystals resembling olivenes.

Saw a number of familiar plants including patches of Lucaena glauca Lauci (kukui), rewa, wild lemons, etc. Milkweed and monarchs. Fences, coconut trunks, trees and ground in places festooned with “mile-a-minute”. A large “Wata” (copra dryer) on central hill.

Collected a moderate size Tipulid-like Nemocura, swarms of which seen dancing in the air.

The southern portion of the main island, north of the isthmus is covered with a scrub of guava, Pandanus, sisal, plume grass, cycods, and coconut palms.

Remains of old stone walls and house sites on the isthmus, surrounded by groves of wild lemons and cycads.

Saw several deer in one’s and two’s; more numerous toward south end.

Wakaya lailia is rocky, xyrophytic, covered with small trees, grass and scrub, and the home of numerous wild goats and deer.

Returned to the Vata over nearly the same route, the side trails running into the main trail followed out.

Green blow flies of various sizes very abundant about sacks of copra.

Followed branch trail to the highest point of the island, elevation about 580 feet. Here are located



Roll 75:4. South end of Wakaya, called Wakaya lailai, connected with main mass by a narrow isthmus, looking south from south slope of main mass.



Roll 75:5. West side of isthmus, looking toward Wakaya lailai.



Roll 75:6. Mr. R. H. Beck, head of the expedition, with north-west point of Wakaya-lailai in background.

gasau (plume) grass, scrub and weeds, including guava.

The southern bays are choked with mangrove swamps. The slopes bear a luxuriant growth of weeds, scrub, pandanus, tree ferns, and scattered trees. Koster's curse dominates the weed growth, here as elsewhere, forming 6 to 8 foot stands. This portion of the island is not much cultivated, but has a number of small Hindoo farms.

Walked entirely around the south end of the island, past Galindumdum and the swampy north of the Bureta river, called Wainaloku. People here are few and far between. Would have done much better to have taken another and more direct trail to Bureta over the hill, but this I did not know at the time. Missed the branch trail leading up the Bureta River.

The day had been a bright sunny one, but now it began to rain hard. Took refuge in a deserted

two large Ficus trees between which is the raised platform of an old native house all but a few beams of which have disappeared.

Entertained Mr. & Mrs. de Mouncey, their son, Mr. Hunt and Mr. Gibbs at dinner aboard the "France", and showed them the preserving portion of the process.

Saturday, October 18, 1924.

Packed up. Drew sketch maps of Ovalau and Ba to Singatoka coast. Underway for Levuka, with Mr. de Mouncey & son in their cutter "Arieta" at 8:20 A.M. Three ton cutter with 6 h.p. motor.

Arrived Levuka at 10:35 and took room at Royal Hotel. Saw Mr. Chapman, photographer, about developing films and spent part of the afternoon securing information about Ovalau from D.C. Pennefather and about Ba from Mr. Kendrick.

Sunday, October 19, 1924.

Left hotel at 7:30, stopping at Nasova to secure letters of introduction to Buli Bureta and Buli Lovoni from D.C. Pennefather.

Followed on down S.E. coast of Ovalau, along a fair road.

As one proceeds south the forest recedes onto the higher slopes, the forehills being covered with



Roll 76:1. Wakaya from extreme west point of Wakaya lailai, looking N. by W.



Roll 76:2. The isthmus, looking N. by E.



Roll 76:4. Wakaya and isthmus. from Wakaya-laelae.



Roll 76:5. Fish wall in Mataua Levu bay, S.E. side Wakaya, looking north.



Roll 76:6. The copra wata near center of Wakaya with Mr. Gibbs, Mr. de Mouncey Jr. and natives at right.



Roll 77:1. Old house site and banyan tree; summit of Koro levu, 580'.



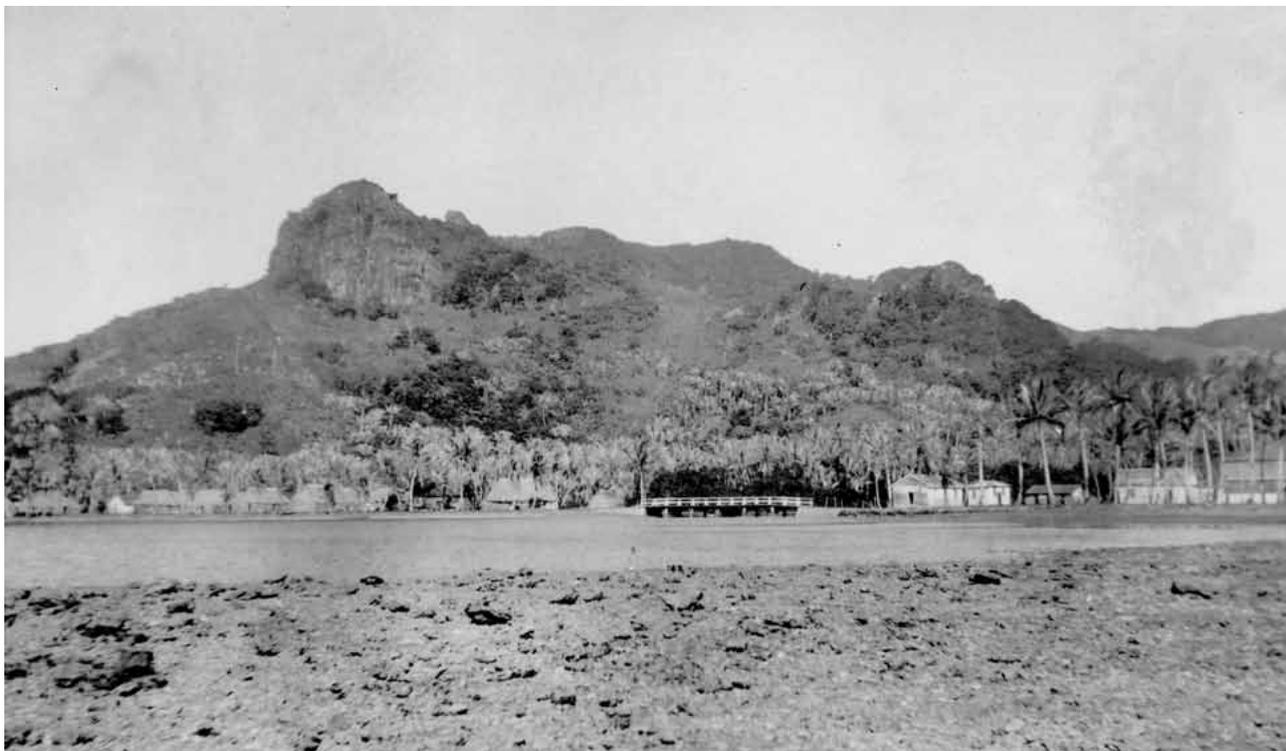
Roll 77:2. Ovalau island from east, at 6 miles.



Roll 77:4. Levuka from entrance thru reef.



Roll 77:5. Naikorokoro village and foothills, looking N.W.



Roll 77:6. Takon village looking W., with South Peak (967') in background. Note the appearance of the coconut palms, browned by Leuvana.

native house. During a lull located a native down the trail and enquired the trail. This he showed me, but as the rain commenced again spent the night in another deserted hut which boasted a bed constructed of split bamboo and grass on a wood frame. The native, who turned out to be a Solomon Islander helped me make a fire. We conversed in "pigeon English" and "beche-de-mere," the first time I had actually heard a native talk this famous trade language of the S.W. Pacific. Jack London gives a good account of it in his "Cruise of the Snail."

Spent a very comfortable night, thanks to my mosquito net. Had I not had it, there would have been very little sleep, for the night mosquitoes were present in legion.

Monday, Oct. 20, 1924.

Bureta and Lovoni

Up at 6 A.M. but waited until 8 A.M. for my Solomon Island friend who said he would be back in the morning. As he did not arrive, went on and had no difficulty in following the trail up the Bureta River to the village of Bureta. The trail crosses the river several times (it is small here) and finally goes off to the right and rises over a low ridge. It leads thru an open forest of lowland trees, with numerous tree-and other ferns. After crossing the ridge it hits the good trail (from the S. coast) and soon after reaches the village of Bureta.

Bureta is made up of four towns all under Simon, Buli Bureta, a very pleasant old fellow. Tai is on the south side of the river, Nasaga and Nasato on the opposite bank and Navuloa about 1/2 mile NW. on the trail to Waiendau, Buresala and Viro. The Buli, Simon, took me on a tour of inspection to Navuloa, where I met the chiefs and young men, had a coconut, and drank lemonade made by the wife of Tunu Makumbai, a chief of some rank.

Returned to Nasoto and had dinner at the Buli Bureta (Simon)'s home. They are all good Catholics.

The Buli's wife presented me with pandanus basket.

Left for Lavoni at 1:50. The trail crosses the Bureta River seven times between Bureta and Lovoni, some of the fords being over knee deep. It traverses an area covered with grass land and weeds with scattered coconut palms. There are several large clumps of bamboo along the stream. The slopes above are wooded.

Found Mr. & Mrs. Correia living with the missionary (Protestant in Lovoni) so arranged to spend the night there. Found several of the persons in the village could speak fair English. Interested them in the wants of the Museum and succeeded in purchasing the following valuable ethnological specimens:-

Ethnological Specimens Purchased at Lovoni

	<u>Price</u> Shillings
1 <u>Liku</u> , meka dance skirt, used at the Jubilee Mekes Made of <u>voivoi</u> (Pandanus carivosus) fringed at top of <u>vau</u> bark (Hibiscus tiliacens)	2/-
1 Stone hatchet and handle; handle of vau; fastening sinnet called magimagi (coconut fiber)	3/-
1 <u>Rubu foifoi</u> (little basket) made of voivoi (Pandanus)	1/-
1 Ai wau (war club) made of dowa	5/-
1 Iki (Samusamu-[tapa] beater) made of Cau	1/6
2 Taria-war skirts, (worn when going out to fight)	1/6
1 Small <u>Iki</u>	(and photograph) 1/-



Roll 78:1. Some of the young men of Navuloa.



Roll 78:2. Buli Bureta, his wife and children. (This is his 3rd wife. Two have died).



Roll 78:3. Athura, the Catholic missionary & child in front of the church.

Yaqona (Yang-gona) Ceremony.

In the evening was greatly honored by the Buli Lovoni and young men by being accorded a full Yaqona ceremony, such as is given for high chiefs, the governor and the king of England. It was a replica of the ceremony at Nasova.

First the mixer of the Yaqona, who was all toggged out in fancy liku, and strings of flowers and leaves, announced that the Yaqona was about to be made.

Then the mixer of the Yaqona places the powered root in the bowl. An assistant adds water and the liquor is mixed and strained. Each straining is accompanied by a chant. The chant is begun by one native (leader), a second joining in after a few bars and the whole company chanting before the end of each verse. The chant verse pauses as the strainer is shaken and begins again with the next straining.

When the mixing and straining is completed the mixer claps his hands and the “server” suddenly appears from outside. He is even more gorgeously arrayed in liku and garlands. The chant is repeated once more as the server takes the first bowl and with great grace and bodily rigidity holds it aloft and slowly assumes a squat position always holding the bowl at arms length.

It is then carried to the person to be honored, (in this case to me) and a portion is poured from the large coconut shell into a small drinking shell. As the Yaqona is served the whole assembly repeats a ritual in chorus, and as it is drunk they clap in unison until the drinking (which is supposed to be done slowly) is finished. Then, as the empty bowl is tossed with a spin to the mat covered floor they all shout “matha” (“empty” or “dry”) and applaud the emptying of the bowl.

After this had been done twice for our benefit, four of the girls performed a make. They were attired in red blouses, white lavalava and wreaths and fiber ribbons. The chanting and movements were well done, but of the now familiar type (see account at Oneata). I presented each with a shilling—which is the custom—as an encouragement. The chants were rather monotonous and modern. One was

about the Kaiser and a soldier. Another about a chief who wanted a hut made but had no material from which to make it, etc. scarcely worth translating. The movements apparently had nothing to do with the words, although they were always performed the same for the same chant.

The Buli Lovoni is the active little man whom I met on the trail crossing the pass, Oct. 15. He also was one of the leaders in the Levuka makes. Very pleasant man although he spoke no English.

I gave the natives a long spiel about the work of the Museum and why we were down in the South Pacific collecting plants, catching insects, shooting birds and picking up ethnological specimens and information. When translated into Fijian the chorus of "venaka! venaka!" showed that they understood and approved.

Tuesday, Oct. 21, 1924. Lovoni to Levuka.

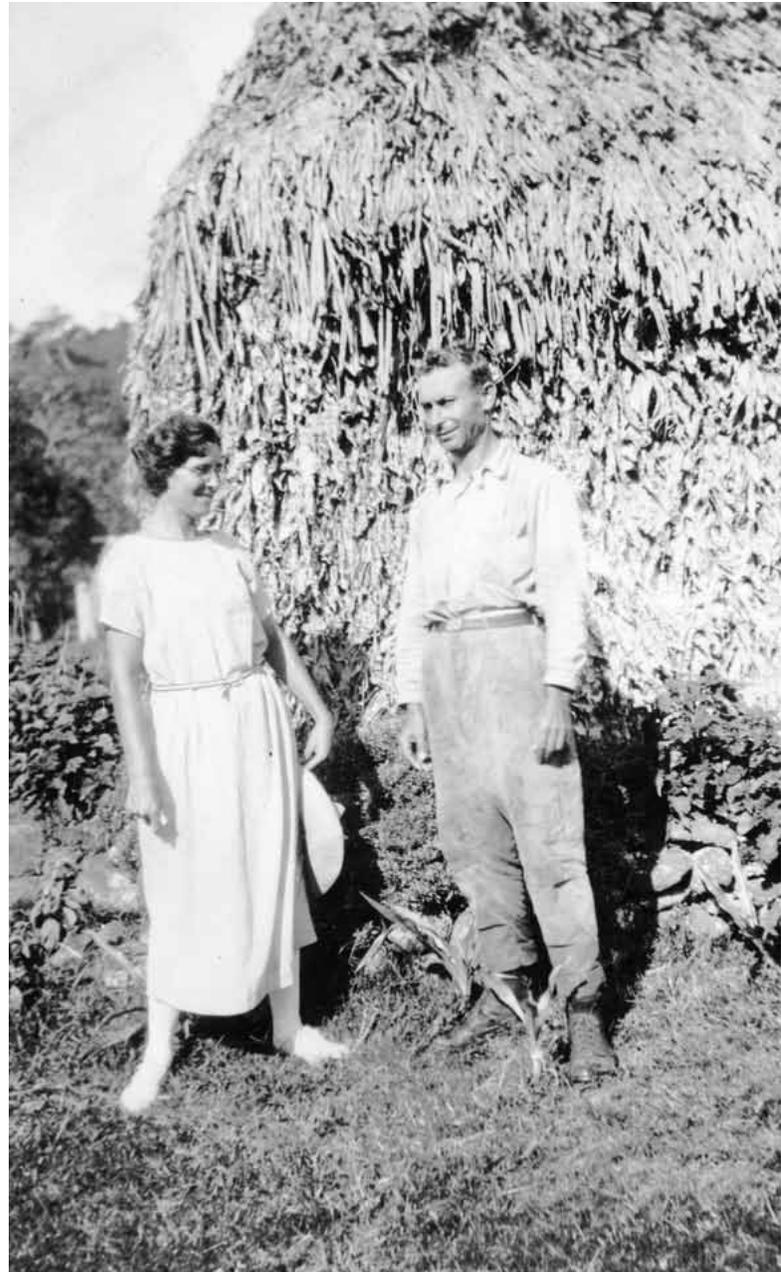
Awakened at 5:30 by the missionary with bread and tea. Completed map of Ovalau interior and gathered topographical and other information until breakfast - 8 A.M.

(Epriame spoke excellent English and read such things as the Auckland Weekly News. He let me have an Iki, a stone hatchet and two ancient Taria which had belong to his father and grandfather, at a very low figure only requesting that I take his picture).

Left Lovoni at 9:15, following the trail over the ridge pass to Levuka. The trail rises fairly steeply along a valley, then up a ridge between the heads of two valleys and finally zig-zags to the summit pass (reached Oct. 15) up a steep valley head. The valleys and slopes are thickly covered with vegetation. There are scattered forest trees, banana-like "laufau", vines-particularly "mile-a-minute" and weeds, including tall thick "Köster's curse."

The resting places along the trail are called "cagocago" (thangothango). They usually consist of a number of flat rocks to sit on and a small pile of firewood beside the ashes of a campfire.

There are patches of cultivated taro even well up the slope.



Roll 78:4. Mr. and Mrs. Correia, at Lovani.



Roll 78:5. Epriane Kaitani and wife.

Underway at 12:30. Met Mr. G.R. Smith of the C.S.R. Co. and Col. G.J.L. Golding, Fiji Inspector General, on the "Adi Keva". Captain Low was very kind in telling me about all the points of interest we passed.

The north end of Ovalau is much like the south. Two low gaps between higher peaks in the basin wall; forested above and with gasau grass below, together with weeds, grass and scrub. Bays beaches lined with coconut palms, turned brown by the ravages of Levuana. A small village in each bay.

After rounding the north end, course due west past the small island of Naigani. This has a grassy central portion, a wooded east point - rounded peak, and a scrubby south hill. Coconut groves on both east & west sides. Casuarinas.

Steered toward two conical peaks on Viti Levu, Tovu Levu and Tova lailai.

Arrived Levuka at 11 A.M. after one hour and forty-five minutes walk. Bought the natives a can of kerosene, salt, bread, matches, in return for their services and kind entertainment.

Lunch at Royal Hotel. Got films from Chapman (photographer). Box from Burns Philp Co. which packed with latest specimens. Out to tea with Mrs. Beck and supper at Kendrick's.

"Adi Keva" stuck in Rewa rivers and did not arrive so slept at Royal Hotel.

Wednesday, Oct. 22, 1924. Levuka to Ellington.

Packed up and changed plant blotters. The latter left in charge of Mrs. Beck to take to Suva. Billed all baggage but knapsack of necessities to Suva by freight. Talk with Mr. Solomon, Mayor of Levuka, at his bakery. Caught a brown sphinx moth in Royal Hotel lobby.

"Adi Keva" arrived 10:30. "France" arrived from Makangai Island at 11: and gave me a chance to say goodbye again to Mr. Beck and Capt. Stenbeck before leaving.

Most courteous letter from Capt. Joske, who said he had made preparations for my stay in Ba.

Ticket Levuka to Lautoka cost £ 2-7-6.



Roll 78:6. Sami, the missionary (my host); his father, Samueli Saurara and his (the old man's) nephew Wui, who packed my stuff over the ridge.



Roll 79:1. Wui, with my specimens, at the pass summit, Lovoni basin and Bureta Gap in background.

Reached Ellington at 7 P.M. After discharging passengers and mail for Penang mill and surrounding country left the wharf and anchored in passage between Nananu islands and mainland to escape the swarms of mosquitoes and sand flies which infest the wharf.

Thursday, October 23, 1924. Lautoka.

“Adi Keva” underway at 5 A.M. cut between the islets and along the coast to Lautoka.

The islets here are covered with grass, scrub, fern, etc. Penang mill is located in a deep bay on the opposite side of a narrow peninsula from Ellington and about 7 or 8 miles distant. The mill has been running about 40 years.

A mill at Ellington for a while was owned by Mr. Leaf. It was later abandoned. Mr. Leaf also planted coconuts on the nearby islets. He tried bananas, planting the individual fruit, black end up, but gave it up, declaring the soil unfit for this crop, when they did not grow.

The stretch from Penang to Namuka (behind St. John’s Islands) has been largely settled by Hindus, who raise rice, beans, and other native food stuffs on their little farms. Behind rises the Kauwandra range, full of legends and romantic history.

Navatu belongs to Benessa estate-made money from peanuts.

Mr. Low told me that the Hennings, of German extraction, were the prominent people in the early days of Fiji. They were generous and capable business men - and real “gentlemen.”

One was the father of Mr. Henning, owner of Naitaumba Island, his mother being a high chiefess related to the mother of Ratu Pope, etc.

Capt. Low’s mother was a chiefteness of Ba, his father a planter, residing at Lakemba in the cotton days and later in Levuka, at a time when that village was at war with Lavoni.

Mr. Low pointed out the saddle in the ridge in which is located Nandarivater. Here is located a Sanatorium and a saw mill is under construction, the road leading up behind the Yangara estate of 6,000 cattle.

Passed mouth of Ba at 9:30, the mill at Rarawai being visible in distance.

Lautoka is situated on a flat extending north-west from the Thonoa range. To the east the foot hills run up to a high ridge 4000' high. The harbor is protected by a small island and there is a long pier.

Met at wharf by Mr. Robert Veitch, Entomologist of C.S.R. and conducted to the “Rest House” - a very pleasant, homelike boarding place maintained by the Sugar Co. for their visitors. Had lunch there. Spent the afternoon at Mr. Veitch’s office talking over the entomology of Fiji in particular and the Pacific in general.

Delightful evening at Rest House, where Miss A.T. Smythe makes visitors feel very much at home. Among other people met Mr. B.L. Field, interested in cotton growing and in charge of a small ginning mill; Mr. Erik Vine - solicitor and Barrister; Col. Goldring; Miss Doris Norton.

Friday, October 24, 1924. Nandi and Lautoka.

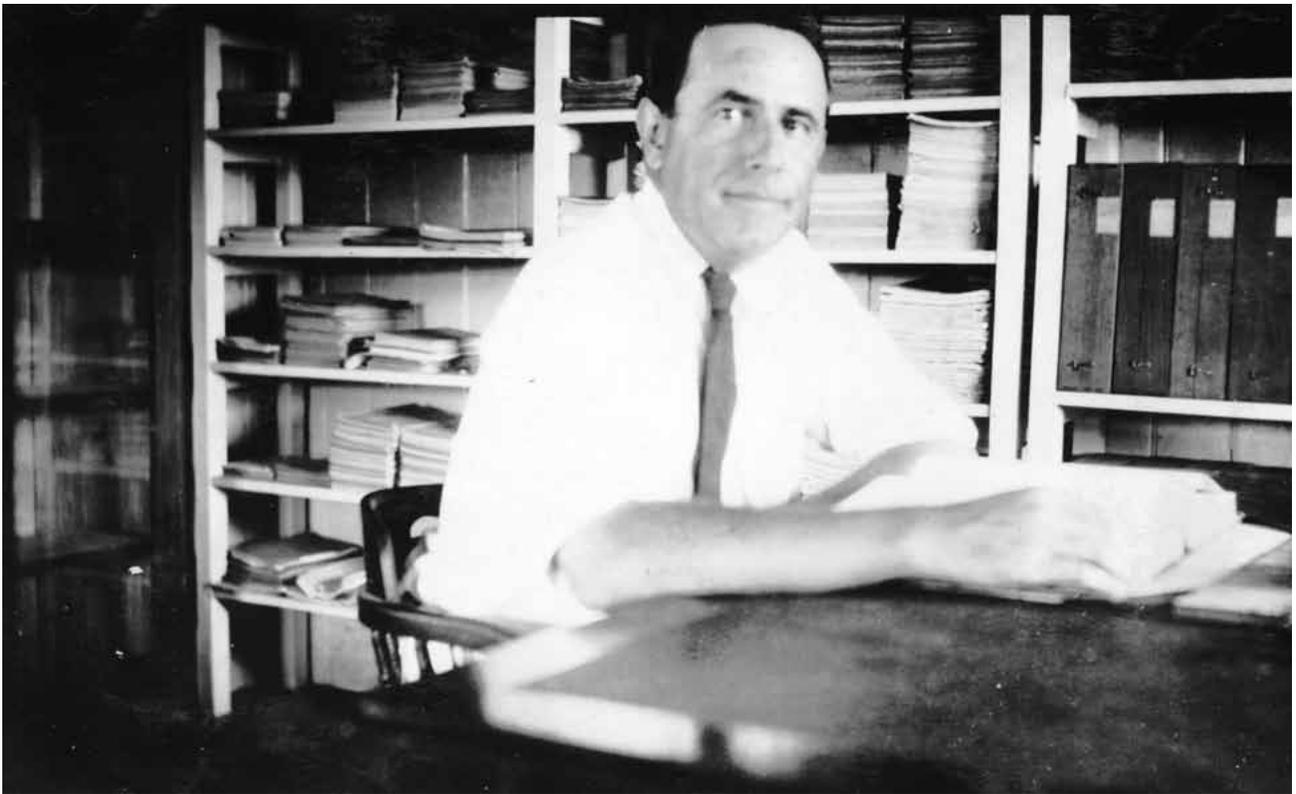
Auto trip to Nandi with Mr. Erik Vine.

On way down came upon a bruised and shaken up Indian with his Ford in the ditch. Took him to Police Inspector Starlake and then to hospital. He told an impossible story of having been dragged from his car, beaten and the car wrecked. Found subsequently that he had been drunk and driven the car into the ditch himself. Story invented to save his license and reputation - typical of the Indian coolie mind.

Nandi (or Nadi, as it is spelled) is a small village, situated in the middle of a broad alluvial plane, surrounded by high hills and watered by a large river. It is the residence of the District Commissioner, Ex Commander Wm. Burrows R.N. and here is located the court house. Mr. Vine has a little office in the town.



Roll 79:3. Lautoka mill and general location from the boat just before docking.



Roll 79:5. Mr. Robert Veitch at his desk. Bookshelves and boxes of specimens in background.

Portions of the flat are planted to sugar cane. Other portions are covered with small farms. Here and there a group of native houses dot the flat.

Had lunch with Mr. S. F. Sanders, police commissioner for the district.

Returned to Lautoka in late afternoon. Heavy rain for rest of evening.

Saw a very good motion picture- "Penrod and Sam" at local show in company with friends.

Saturday, October 25, 1924. Lautoka.

Spent most of day looking over the insect collection of the Colonial Sugar Refining Co. in Mr. Veitch's office. The collection is of good size, about the same size or somewhat larger than that at the Suva Department of Agriculture and has the advantage of being very largely and carefully named, the identification having been made by the Imperial Bureau of Entomology (Guy A.K. Marshall), London. Entered the names and brief description of species in the systematically arranged list begun in the Department of Agriculture, last June.

Met and cordially greeted by Mr. A.M.O. Farquhar, Manager of Lautoka Mill and Attorney for C.S.R. Co. in Fiji. He offered me every facility within the power of the Company during my stay, saying that the representatives of the C.S.R. Co. had always been received with such kindness in Honolulu that he welcomed this opportunity to reciprocate.

Large number of people over from Ba region to play golf.

Well attended dance in evening. These English people are great dressers. Dress and evening clothes even in the "wilds" of Lautoka.

Sunday, Oct. 26, 1924.

Read sections of Wilkes narrative of the U.S.E.E. (an abridged edition published in England) loaned me by Mr. Veitch. Spent the rest of the day making notes on the insect collection at Mr. Veitch's office.

Regarding the scarcity of house flies in Fiji, Mr. Veitch said that a Phelangid parasite had been introduced by Jepson in 1911, which is said to have caused the sudden disappearance of house flies 1911-1912. The presence of Pheidole megacephala may also be a factor of perhaps even greater importance.

Tea with Mr. and Mrs. Veitch, meeting Mr. G. R. Robertson, field overseer of the plantation. He is greatly interested in tropical agriculture and has the best collection of modern scientific books of any private individual met in Fiji.

Caught a specimen of a small brown sphinx moth, Macroglossum hirundo Bois. subsp. vitiensis Roth. at light in Mr. Veitch's home.

Monday, October 27, 1924. Lautoka

Spent the day finishing up notes by checking thru Mr. Veitch's list of identified species (from Imp. Bur. Ent.) from Fiji. Mr. Veitch suggested the following possible sources of information on Fiji insects:-

R. J. Tillyard, Dragonflies of Fiji, with special reference to a collection made by Mr. H.W. Simmonds, on the Island of Viti Levu Trans. Ent. Soc. London 1923; III-V, pp. 305-346.

Champion (Beetles) Ann. & Mag. Nat. Hist.

Blair "

Lanig (Homoptera) "

Sampson "

Sechar " " " "

Meyrick (Lepidoptera), "Exotic Microlepidoptera" (Edward, Meyrick, Thornhanger, Marlborough, Wilts, England)

Waterson, (chalcids), Bul. Ent. Research.
 Turner (Lepid.) Proc. Ent. Soc. (London)
 Brunner (Orth.) Proc. Haw. Ent. Soc.
 Green and Lanig (Coccids) Bul. Ent. Research
 Nobles, Cotton and cotton pests.
 Graeffe, (Publications) Godeffroy Mus. Hamburg.

Looked over copy of "Hill Tribes of Fiji", by A. B. Brewster. London. 1922. Good illustratives, very good information. Maps.

Dinner with Mr. & Mrs. A.M.O. Farquhar and daughter. Mr. Farquhar is a man of great executive ability and tremendous driving power. Had a delightful evening.

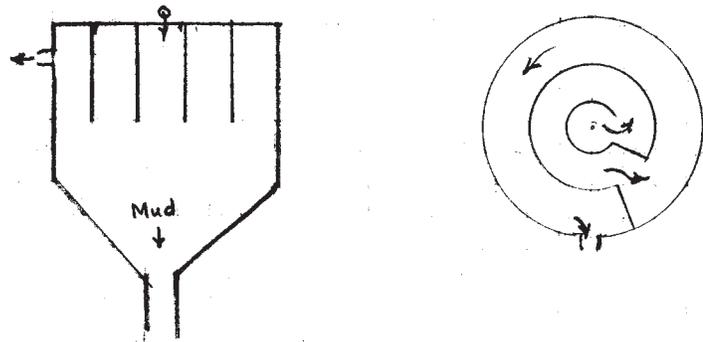
Tuesday, Oct. 28, 1924. Lautoka.

Visited the Lautoka sugar mill, being shown the entire process by Mr. Day, chief chemist and superintendent of the mill.

The cane, chiefly Badilla, is brought in to the mill on small cars, drawn by stetam locomotives. As the cane is bought from the persons raising it by sugar content. Every 10th or 15th car is isolated for special analysis.

Automatic rake unloaders similar to those in Hawaii. Crushing in two sets, each made up of board belt, cutting knives, shreaders and 3 mills of 3 rollers. The rollers all have the same size grooves (medium) and obtuse v-shaped depressions to prevent slipping. The main difference from Hawaiian methods in the crushing process is the extensive merseration. Hot juice and water are abundantly sprayed on the bagass after each crushing and the material is pushed thru two long juice and water baths. The dilution is as much as the evaporators will stand.

The heating is the same as in Hawaii. More lime is added than in Hawaii, the lime being made on the premises from coral limestone. There are no settling tanks, a perpetual settling device taking their place. This consists of a circular tank cone-shaped at the bottom with a spiral partition. The whole juice and lime is admitted at the middle and is circulated thru the spiral by a stirring device. The clarified juice flows over a weir and the mud which settles to the bottom is run off to the mud presses. The mud is again put in solution after the first pressing and run thru a second set, leaving less than 2% in the final mud cake which is used for fertilizer.



Settling Device

There are two sets of evaporators of different sizes, both being in series, (steam from one going over to boil the next). Four grades of sugar are made in the half dozen vacuum pans. Only three are used for export, the 4th grade (made from syrup & molasses from # 3) being used as seed in the other three. These three first grades are sold as A. B. and C. grade sugar. No dryer, the sugar being air dried as it passes along the worm screw. Weighed, sacked and sewn by hand in 160 and 240 lb. sacks.

The bagass is used directly as fuel in the furnaces, but owing to the low fiber content it isn't sufficient to supply the necessary power. Hence coal is used in some of the furnaces.



Roll 79:6. Mr. Field and part of his cotton ginning plant.

Bought ticket Lautoka to Suva on S.S. "Suva", £ 2-10-0.

Visited Mr. B.L. Field's cotton ginning mill. The cotton is raised by Indians. He grades it onto four classes. At present there are three gins and one press. Both the baled cotton and the whole seed are shipped to England. Indian workers, including women and boys are used.

Mr. Veitch would like a copy of Hebard's Orth. & Dermaptera of Hawaii.

Up to Mr. Veitch's office in afternoon.

Mr. Veitch said that there had been practically no Entomological work done in Fiji between 1885 and 1905, so that there is little use looking for a bibliography during that period.

Mr. Veitch came to Lautoka in 1914. He had previously been an assistant to Mr. Guy A.K. Marshall at the Imperial Bureau of Entomology.

Visited the Machine shops, lime kiln with Mr. Veitch and inspected one of the nearby recently planted fields. Pest situation very promising. Nothing very bad except the borer. The moth borer in young leaves causes but little damage. So called "Fiji disease" rare.

Met Mr. A.M. Saxby, one of the Engineers of the mill who told me some very enlightening facts about engineering requirements in British Colonies.

Wednesday, Oct. 29, 1924.

"Suva" expected to go out at 10 A.M. but did not leave until 4:20 P.M. The hourly postponements prevented any amount of time being used on shore.

Best map of Australia which I have seen yet is one to the scale of 1/5,702,400, "Map of Commonwealth of Australia showing Railways," H.E.C. Robinson Ltd., 221-3 George St., Sydney. (Posted in saloon of "Suva.")

Route of "Suva" down past Nandi and Mami passage and around south-west point (Singatoka district).



Roll 80:1. Mr. Rober Veitch; S.S. Suva at Lautoka pier.

Thursday, Oct. 30, 1924.

Suva.

“Suva” docked 7:15 A.M. Took room at Waimano House. Repacked baggage sent down by freight. Called on Mr. Barker, editor of Times and Herald; library; Mr. A. Despeissis, Supt. of Agric. And Mr. R. Boyd, Chairman of Native Lands Commission. He kindly offered to furnish any information within his knowledge at any time. Discussing the Fiji Historical Society he deplored their habit of writing vague, general papers and suggested the director of the Bishop Museum try to persuade them to work on smaller, more definite and specific problems such as a study of the Fijian “Cats Cradle” and the like.

Developed three rolls films at Mr. Bach’s.

Dinner with Mr. and Mrs. Rogers, Mrs. Beck present.

Friday, October 31, 1924. (No. 1)

Suva.

Dentist at nine. (Necessary work – £ 2-2-0.)

Called on The Hon. T.E. Fell, acting Governor of Fiji at 10: Presented him with packet of Bishop Museum publications and told him of the success of my trip. He was very pleasant, expressing his appreciation of our work and for the publications and saying that he would read them - esp. the Tongan sayings, with much enjoyment.

He told me officially that Mr. Lea had found a Tachinid fly which parasitized a moth closely related to Levuana iridescens.

His excellency wished to be remembered to Mr. MacInerny (Shoe Store Proprietor) Honolulu.

Called again on Mr. Despeissis who gave me further data on the possible parasite for Levuana.

The Tachinid fly is a parasite on Pollanisus (Procoris) subdolosus Wek. From Queensland, N.S.W., etc. which is found associated with plants of Myrtus racemulosa and Eugenia carissoides. Another possible parasite is recorded in the last Agricultural Circular (p. 3).

“Nassau” grass or Reed = *Eulalia haponica* Trin.

Called on Mr. Campbell, Mycologist, who wishes me to find out for him what is done in Hawaii for the “Soft rot of Pineapples”, (*Thielaiopsis paradoxa*) and other information (Bulletins etc.) on banana and pineapple diseases.

Mr. C. R. Turbet, Vetrenarian, wished to know what ticks there are in Hawaii & remedy. He also would like a small quantity of algarroba beans (without bruchid pests) to experiment with.

Evening at Mr. Bach’s.

Caught “Niagara” at 10 P.M. Capt. A. C. Showman, new Commander.

Friday, Oct. 31, 1924. (No. 2)

“S.S. Niagara”.

The date repeated because of crossing the 180th meridian. Taviuni to the north; Vatu Vara, Yathata, Kanathea, Kimbombo, and Wailangalala passed on the south. Saw three of the Ringgold to the north and between them and Taviuni the moderately hilly islands of Ngamea and Lauthala.

Spent the greater part of the day bringing this notebook nearly up to date.

Passed Fotuna in evening. Perfect weather, clear and smooth. “Niagara” very steady.

Position noon: 16° 14' S. 178° 55' W. Run. 211 mi. From Suva 211. To Honolulu 2570.

Saturday, Nov. 1, 1924.

“S.S. Niagara”.

At sea. Clear and smooth. Spent morning finishing up notes and talking “Polynesian Research” with several interested persons.

Afternoon continued work on preliminary report, drawing charts of some of the islands visited in Lau and listing the islands visited.

Noon Position: 10° 28' S. 176° 04' W. 383 mi. From Suva 594. To Honolulu 2187.

Sunday, November 2, 1924.

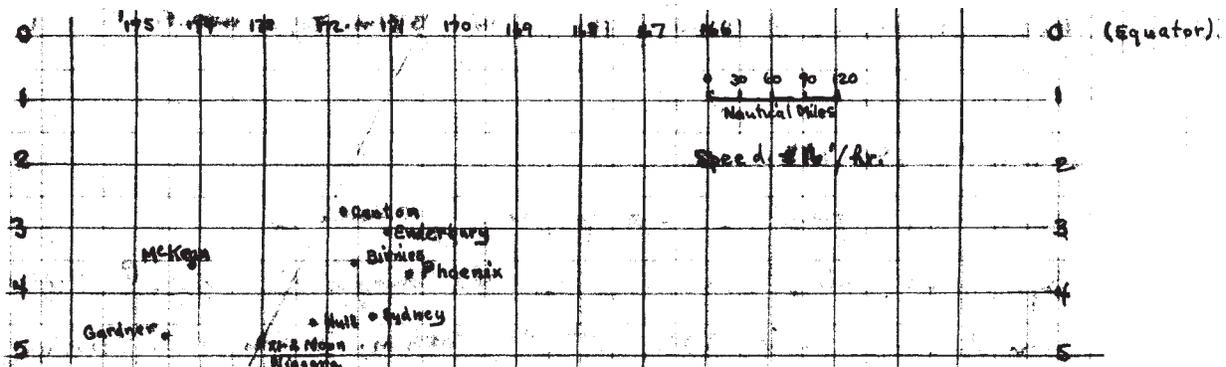
Sea continues smooth. A few tropical squalls in the morning in sight. The rest of the day clear and warm. A few sea birds flying about in the morning, probably from the Tokelaus or Hull Islands. These increased in number during the afternoon as we approached Phoenix Islands. In the morning noticed especially a large sheerwater-like bird with moderately long head. The quantities of birds flying in the afternoon included for the most part sooty (?) terns—wings black above, white below, breast white neck white and head black cap and white below.

Fairly stiff breeze from N.E. accentuated by speed of boat.

Tabulated some census data for Lau in the afternoon.

Noon position: 40° 48' S. 173° 00' W. 386 mi. From Suva 980. To Honolulu 1801 mi.

According to this position we passed Hull Island (about 45 mi. to south of us) at 2 P.M. and should pass within 10 miles or so of Canton at about 9 P.M. if the same course is maintained.



Monday, Nov. 3, 1924.

Clear and smooth; temperature somewhat cooler, although not disagreeably warm at any time during the trip. No sea birds in sight. Passed the equator at 6:50 A.M.

Spent entire day 9 A.M. to 4 P.M. making respectable copies of maps of individual Lau islands (such as those included in these notebooks, to accompany preliminary report on Lau.

Noon Position N. $0^{\circ} 35'$ $169^{\circ} 55'$ W. 371 m. To Honolulu 1430. From Suva 1351.

Tuesday, Nov. 4, 1924.

Somewhat rougher and partially cloudy.

Spent morning finishing up the maps of Lau. P.M. expense account.

Noon position: N. $6^{\circ} 20'$ $167^{\circ} 08'$ W. 383 mi. To Honolulu 1047. From Suva 1734.

Wednesday, Nov. 5, 1924.

Clear; smooth and moderately cool.

Spent most of the day writing preliminary notes on the Lau islands; Kambara to Latei tonga.

Noon Position:- $12^{\circ} 87'$ N. $163^{\circ} 44'$ W. 401 mi. To Honolulu 646. From Suva 2135.

Flying fish numerous at times.

Thursday, Nov. 6, 1924.

Clear, smooth and a cool breeze.

Noon Position:- $17^{\circ} 39'$ N. $160^{\circ} 34'$ W. 370 mi. To Honolulu 276. From Suva 2505.