WHITNEY SOUTH SEA EXPEDITION

of

THE AMERICAN MUSEUM OF NATURAL HISTORY

Extracts from the Journal of

ERNEST H. QUAYLE

Assistant Field Naturalist

Book XIX through Book XXIV

September 24, 1921--March 31, 1922.

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BOOK XIX.

Tahiti.

Aorai, Vairao, Moorea.

September 24--November 3, 1921.

September 24

We left camp this morning at 7:45, after waiting at length for the sun to thaw us out. Made the rope-cliff (4400 feet) in one hour, but it took another hour to lower the packs and dogs and ascend the narrow ridge to the water can at four thousand feet. Here we ate breakfast of cheese (a little was left), beef, salmon, and cocoa with milk cold. Straightened up the can to gather more water for the next party. Found note from Krauth saying he had arrived there safely. It is very hot going through the ferns along this ridge where there is not a breath of air stirring and sunshine facing us. I believe I am carrying the heaviest pack today.

No birds, not even hawks, were seen. Along the lower part of the trail just above the cliffs I found some mistle-toe parasitic upon two of the shrubs,--the edible berry ( ) and the red flower ( ). There was also a willow-like

HOME SIX.

Tenth.

Aorai, Vaitao, Moorea.

September 24--November 3, 1921.

September 24

We left camp this morning at 7:45, after waiting at length for the sun to leave us out. Made the rope-cliff (4000 feet) in one hour, but it took another hour to lower the packs and dogs and expand the narrow ridge to the water can at four thousand feet. Here we ate breakfast of cheese (a little was left), bread, salmon, and cocoa with milk cold. Straightened up the camp to gather more water for the next party. Found note from Kenyon saying he had arrived there safely. It is very hot going through the ferns along this ridge where there is not a breath of air stirring and mosquitos feasting on us. I believe I am carrying the heaviest pack today.

No birds, not even geckos, were seen. Along the lower part of the trail just above the cliffs I found some elatia-like parasitic upon two of the aurons,--the edible berry ( ) and the red flower ( ). There was also a willow-like

shrub which becomes quite prominent along this next ridge. The ravine above the fei camp should produce several numbers and keep us busy collecting for a week. This ridge is much longer than I expected. We have already been an hour on it and have not yet arrived at the turn down into the deliciously cool ravine, where I, for one, will take a bath, and when cool many a sup of that icy water. I can see where there is a lot of collecting in this ravine, and even on this ridge from the water can down. What a blessing those two water cans were, so judiciously placed at the summit and here at 4600 feet on a prominent hill of the ridge! What with the two ravines half way between them and camp, we got along without much suffering from thirst. We might have filled our canteens for this stage had we thought it so long and bothersome. How in thunder did Gautier ever make the summit and back in one day? It is needless to say that he left a voluminous record of his trip in a double bottle up there, probably better than our brass tube, though the cork should have been a glass stopper.

What perfect weather we have had for this trip! For once the elements were with me. Rain would have been bothersome, and more numerous clouds would have obstructed the view.

Just heard a rail piping in the ravine below us. I had anticipated as much, but this evidence of his presence will add zest to camping up here in the ravine, where we will now leave the shelter, for at camp we can build us a fei house. Still, at second thought, it will be less work to carry the tent back up here than to build the fei house. Our Aorai plants will about

shrub which becomes quite prominent along this east ridge. The ravine above the tent camp should produce several members and keep us busy collecting for a week. This ridge is much longer than I expected. We have already been an hour on it and have not yet arrived at the turn down into the dolicious coal ravine, where I, for one, will take a bath, and wash coal away a cup of that icy water. I can see where there is a lot of collecting in this ravine, and even on this ridge from the water can down. What a blessing these two water cans were, so judiciously placed at the summit and here at 4600 feet on a prominent hill of the ridge! What with the two ravines half way between them and camp, we got along without much suffering from thirst. We might have filled our canteens for this stage had we thought it so long and rather-some. Now in summer did Gaetler ever make the summit and back in one day? It is needless to say that he left a voluminous record of his trip in a bottle stuck up there, probably better than our brass tube, though the cork should have been a glass stopper.

What perfect weather we have had for this trip! For once the elements were with me. Rain would have been tantamount, and more numerous clouds would have obstructed the view.

Just heard a rail piping in the ravine below us. I had anticipated as much, but this evidence of his presence will add zest to camping up here in the ravine, where we will now leave the shelter, for at camp we can build us a fat house. Still, at second thought, it will be less work to carry the tent back up here than to build the fat house. Our Agral plants will about

fill the blotters.

We found notes from Krauth as he entered the ravine at four-thirty P. M., and as he left it at five P. M. He was evidently following the trail well, but the worst of it yet to go. Had a good bath in the deep pool just where we leave ravine.

We arrived at camp fifteen minutes past twelve. There we found the goat departed. The hound commenced baying below camp, so we rushed down there but found no goat. At camp we found Moyle's blanket as evidence that he and Teiho had passed all right, and a note from Krauth as follows:

"Quayle:

"As you did not show up at noon, I have continued on to Papeete. The supplies left were of no manner of use to me, as I had no knife to break into a can.

"The goat looked at me so pitifully whenever I went near it that my heart was touched and I set it at liberty. See you in Papeete if I get there myself.

C. P. K.

"I also took a candle. I will leave marks on my trail. I took a little cheese. Only thing I could get at."

It is sufficient to say that there were both ham and sausage in the same bag as the cheese and rice, beans and sugar, tea and coffee; and in the other bag, two loaves of bread. Well, it was his fast day anyway. The other fellows seem to have taken but little or no grub themselves. One badly battered meat can is evidence that they at least attempted to open it. The goat

fill the waters.

We found notes from Frank as he entered the trains at Four-Ability F. W., and as he left it at Five F. W. He was evidently following the trail well, but the worst of it yet to go. Had a good bath in the deep pool just where we leave trains.

We arrived at camp fifteen minutes past twelve. There we found the boat departed. The found commenced baying below camp, so we traded down there but found no boat. At camp we found Doyle's blanket as evidence that he and Tolio had passed all right, and a note from Frank as follows:

"Doyle:

"As you did not show up at noon, I have continued on to Rapeete. The supplies left were of no manner of use to me, as I had no knife to break into a can.

"The boat looked at me so pitifully whenever I went near it that my heart was touched and I got it at liberty. See you in Rapeete if I not there myself.

C. F. K.

"I also took a candle. I will leave marks on my trail. I took a little cheese. Only thing I could get at."

It is sufficient to say that there were both men and samples in the same bag as the cheese and rice, beans and sugar, tea and coffee; and in the other bag, two loaves of bread. Well, it was his fault day anyway. The other fellows seem to have taken but little or no grub themselves. One badly battered wash can is evidence that they at least attempted to open it. The boat

incident certainly reveals the character of Krauth. Besides being chicken-hearted he is also an anti-vivisectionist. Well, they did help defray expenses somewhat and justified the two packers who were needed to carry the grub up here. Matete and I are now alone with a grub-stake that will last us at least a week without stinting at all. We have beans, rice, oatmeal, corn-meal, beef, salmon, assorted meats, ham, sausage, cheese, milk, jam, butter, coffee, tea, a little chocolate, and one loaf of bread. The failure of our biscuits certainly hurt us seriously.

Fei camp, 3750 feet elevation. I spent the afternoon putting plants into blotters. Not counting mosses, we collected twenty-three numbers. The necessity to hurry back to camp and the lack of food prevented more careful work. But I am quite satisfied with the summit collection. The ravine where we obtained water at 5600 feet might have given more.

7:05 P. M. The first Noha calls. Monday we will search this neighborhood for inhabited nests. There were several birds calling, especially between ten and eleven o'clock, and again about three o'clock. We should be able to find inhabited nests somewhere.

For some reason or another the two natives, Hiro and Tuaurae, were very slow in leaving this side of the mountain. They yelled considerably. I think they went after goats. We could get no explanation from them. Nothing more occurred until about five o'clock, when we were startled by what sounded very like their yell. Hallooing at length brought no answer. Again at seven o'clock we heard the same thing. It certainly was not a goat. Again I climbed the tree beside camp with the lantern and

being chicken-hearted he is also an anti-vivisectionist. Well, they did help darkey express somewhat and justified the two packers who were needed to carry the grub up here. Mateta and I are now alone with a grub-stake that will last us at least a week without eating at all. We have beans, rice, oatmeal, corn-meal, beef, salmon, assorted meats, ham, sausage, cheese, milk, jam, butter, coffee, tea, a little chocolate, and one loaf of bread. The failure of our biscuits certainly hurt us seriously.

At camp, 3700 feet elevation. I spent the afternoon putting plants into blotters. Got soaking mosses, we collected twenty-three numbers. The necessity to hurry back to camp and the lack of food prevented more general work. But I am quite satisfied with the summit collection. The ravine where we obtained water at 5800 feet might have given more.

7:05 P. M. The first Nuns calls. Monday we will search this neighborhood for inhabited nests. There were several birds calling, especially between ten and eleven o'clock, and again about three o'clock. We should be able to find inhabited nests somewhere.

For some reason or another the two native, Hiro and Chaura, were very slow in leaving this side of the mountain. They yelled considerably. I think they went after grass. We could get no explanation from them. Nothing more occurred until about five o'clock, when we were startled by what sounded very like their yell. Ballooing at length brought no answer. Again at seven o'clock we heard the same thing. It certainly was not a goat. Again I climbed the tree beside camp with the lantern

yelled, but was not answered. About ten o'clock the same call came again. Once more we yelled but no reply. Later in the night, about moonrise, I was awakened by that call. Had Krauth missed the trail? No, it was not his voice nor call, and he would at least answer a fellow. Was it a native? Matete got no answer in Tahitian. Then was it one of those spirits (Tupapahu) which the natives think haunt these regions? Ah! There it is again and a second time, plainly, distinctly and gratifyingly. "Cock, a doo, a doo!" It is Moa aviri, the jungle fowl. How one's imagination can get the best of one! I asked Hiro to return and inform me if both "popa" failed to reach Papeete. Krauth should have remained in camp at least until Moyle returned. Well, I'm glad it's all over. After all, one is better off by oneself than with second rate people when it comes to a hard hike.

September 25

The roosters are crowing considerably this morning, verifying the calls of last night. Unless one hears the entire crow, it is very easy to mistake it for a human yell. Spent the day in camp reading and writing letters, only attending to drying plants.

First Noha heard this evening at 7:04. Several heard throughout night, being loudest at two A. M.

September 26

After changing the driers, we went over to the Noha ridge beyond the ravine where we get the water. Low down on the ridge success rewarded our first effort. The pup got very

came again. Once more we yelled but no reply. Later in the night, about midnight, I was awakened by that call. Ed French raised the finally. No, it was not his voice nor call, and he would at least answer a fellow. Was it a native? Didn't get no answer in Tahitian. Then was it one of those spirits (Tupapahu) which the natives think haunt these regions? Ah! There it is again and a second time, plainly, distinctly and pretty-pretty. "Coco, a coo, a coo!" It is the avirl, the jungle fowl. How one's imagination can get the best of one! I asked Biro to return and inform me if both "pops" failed to reach Papeete. French should have remained in camp at least until Doyle returned. Well, I'm glad it's all over. After all, one is better off by uneasy than with record rate people when it comes to a hard hike.

September 28

The roosters are crowing considerably this morning, verifying the calls of last night. Unless one hears the entire crow, it is very easy to mistake it for a human yell. Spent the day in camp reading and writing letters, only attending to drying plants.

First Tuna heard this evening at 7:24. Several heard thunderbolt night, being loudest at two A. M.

September 29

After changing the drivers, we went over to the Tohua ridge beyond the ravine where we got the water. Joe down on the ridge succeeds remarked our first effort. The pup got very

excited and dug like a trooper. He may make just the dog we need. To prevent him from killing the young bird in the nest and to save him from getting his nose bitten, I held him back until we secured the bird, which is quite full grown, no down being noticeable on his feathers. He seems a little small and light boned. Two more holes farther up proved to be already deserted, but undoubtedly they were inhabited this summer by the sign and feathers about. One was some four meters in length, and half a meter below the surface with many roots above it. It commenced under a slanting stump and proceeded uphill. The other was much shorter but also entered beneath a sloping tree trunk. These moss-covered, almost horizontal tree trunks appear to be favorite landing and taking off places for this bird.

We continued searching until ten o'clock; then, staking the young bird in what remained of its nest-burrow, we returned to camp, intending to take over the blankets and sleep just above the nest and try to catch the old birds when they come in during the night. We should be able to locate other inhabited burrows from that vantage point as I did last March. This afternoon we will go up trail from camp and place fern leaves over all the holes we find to show whether or not they are entered during the night. At the other burrows the little pup somewhat lost interest, though he did exceptionally well at the digging. I hope he has his full growth now; in fact, he is a little too large to enter the burrows without digging. A very small terrier would be greatly preferred. Returning to camp we had to refrain from helping him up steep places, for he is getting spoiled at that by being assisted too much on the mountain trail.

To prevent him from killing the young bird in the nest and to save him from getting his nose bitten, I held him back until we secured the bird, which is quite full grown, no down being noticeable on his feathers. He seems a little small and light boned. Two more holes farther up proved to be already deserted, but undoubtedly they were inhabited this summer by the sign and feathers about. One was some four meters in length, and half a meter below the surface with many roots above it. It commenced under a standing stump and proceeded uphill. The other was much shorter but also entered beneath a sloping tree trunk. These moss-covered, almost horizontal tree trunks appear to be favorite landing and taking off places for this bird.

We continued searching until ten o'clock; then, seeing the young bird in what remained of its nest-burrow, we returned to camp, intending to take over the blankets and sleep just above the nest and try to catch the old birds when they come in during the night. We should be able to locate other inhabited burrows from that vantage point as I did last March. This afternoon we will go up trail from camp and place traps leaves over all the holes we find to show whether or not they are entered during the night. At the other burrows the little gap somewhat lost interest, though he did exceptionally well at the digging. I hope he has his full growth now; in fact, he is a little too large to enter the burrows without digging. A very small terrier would be greatly preferred. Returning to camp we had to retreat from helping him my steep places, for he is getting spoiled at that by being assisted too much on the mountain trail.

Expecting to put in a night shift, we changed the blotters, ate luncheon, and then took an afternoon nap. At four o'clock we again changed the blotters, packed up bedding,and with some boiled rice and the coffee pot and lantern set out for the diggings. Very light showers with a good wind, which may blow off any threatening storm. Matete, while investigating the burrow which we found so long last March and empty when we had dug it out, located a new hole beside the old entrance. It was very likely that of the birds who found their old burrow dug up. We followed it one meter and a quarter when I was able to reach a bird with the "tipi". Noha Uri did his share of the digging and got more excited than ever. He finally enlarged the hole sufficiently to get his nose near the bird which sat fairly facing him. Her fighting only increased his excitement, but, fearing the fight might break a possible egg (and glory be! it is not only possible but actual!), I removed the bird to a sack we brought along for the purpose. Now the question is, what is the best method of capturing the mate? I think I'll leave the egg in the nest as I have left the young bird in the other. This should prove a very interesting night, also a cool one out here on this exposed shoulder of the mountain. I am wondering if we will this evening make the acquaintance of "Seven O'Clock" . Well, we will be able to snooze from then until ten or perhaps eleven----or even all night, for not a bird was heard nearby until two-thirty in the morning, when one was heard above us. I lay awake and saw it swoop down over our ridge but a few feet high. It never returned. The moon approaching its dark phase was hidden by clouds above

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the mountain. The lack of moonlight may account for the lack of flying and calling birds which a week ago were quite numerous. We had considerable rain during the early morning.

September 27

Another shower threatening at daylight, we packed up, gathered in the two birds and the egg, which, in spite of my precautions to wrap it and put it in a can, got broken in transportation to camp. Fortunately I measured it. Length circumference, 18 cm. Widest circumference 14.9 cm. One end was considerably smaller than the other but not so much as the average hen's egg. The shell was white, though badly stained by the very red soil of the burrow; incubation almost complete and had I not been so delighted to secure the egg I might have let the birds incubate the young one. I doubt if I could have successfully blown the egg, so nearly incubated was it. Young bird appeared all black.

The other burrow held a surprise in the fully grown young bird having come out of it and having started up the trail towards the landing place. The staking rope entangled it. Does this mean that the young birds, when nearly full grown, go out of the burrows all night to meet their parents on the flying field, or even to take practice flights? I thought this bird was small, but now that it lies beside the old bird I can detect no difference in size. A few more of these dark moon nights might be of value regarding the flights of this shearwater. When I come to think of it, most of their flying has been during

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the moonlight portion of the night. Evidently parent birds leave their young more than one night without food. They may wait until they have accumulated as much as they can comfortably carry before coming in from sea to feed the young. It is rather disappointing to spend an uncomfortable night in wind and rain and obtain no better results than these for the effort.

Apparently I erred in calling the first bird a young one, for after opening the body I found it a male with slightly swollen sexual organs. Is he an unmated one with the homing instinct so strong that he has burrowed this den and lined it with sticks of straw and fern? He was in rather poor condition, evidently having not fed very well. The other bird was a male also, but good and fat. A bird collector certainly gets all out of skinning practice here at Tahiti, especially when he isn't very expert to begin with.

The day has turned good and hot and our Aorai plants are drying out so well that we will collect about camp this afternoon while keeping our eyes open for shearwaters above camp. We went instead over to the ridge and photographed the burrows dug out yesterday, the ridge, ravine and hillside. Matete found a promising hole, but after digging it out found the birds of this season departed. We collected some seven plants there, one new tree and the others epiphytic plants growing on the tree trunks, including two flowering ones, one liliaceous (or at least bulbaceous), a fern, a moss, and one stranger to me. Down in the ravine we picked up a flowering herb, a flat, moss-like stranger, and a fern upon the fronds of which were growing some other plants, or perhaps the gametophytes of the fern.

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The day has turned cool and hot and our burrel plants are drying out so well that we will collect about noon this afternoon while keeping our eyes open for shearwaters move camp. We went instead over to the ridge and photographed the burrows dug out yesterday, the ridge, ravine and hillside. Mabie found a promising hole, but after digging it out found the birds of this season departed. We collected some seven plants there, one new tree and the others epiphytic plants growing on the tree trunks, including two flowering ones, one lilaceous (or at least liliaceous), a fern, a moss, and one stranger to me. Down in the ravine we picked up a flowering herb, a flat, moss-like stranger, and a fern upon the trunks of which were growing some other plants, or perhaps the gamotophytes of the fern.

The shearwaters commenced calling at 6:45 this evening, and have continued at intervals for three hours. One Rao (P. neglecta) was heard once. Throughout the night calling was fairly frequent, but not so much as a week ago during our first night at this camp. These birds seem to be above us, though the seven o'clock one sounded like the ridge we have worked. A rather windy night.

September 28

Looked like rain this morning, but it proved to be only a cloudy day. We had poor success with shearwaters. Found one promising hole with a feather or two just below the one where we got one bird last March, but there was nothing in it. Below there we found the feathers and skeleton of a bird which had met some tragic death. The bones, which were still held together by the cartilage, seemed to indicate that the bird had got tangled in a mass of ferns. Of course it might have been sick, but one would suppose, if able, it would prefer to die in a burrow. At any rate, there it is as evidence that tragedy is sometimes the lot of this mountain-nesting bird. We dug out two more holes on the ridge across the ravine. The sign looked old, and they proved to be deserted.

After collecting plants until well past noon, we returned to camp via the Noha ridge ravine. I ran up and had a glimpse of the two burrows, but there were no signs of birds having visited them since we found the two. I think we have covered this location fairly well for them, and also for plants, but we can get a dozen more specimens of them I suppose. At least we

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September 28

Looked like rain this morning, but it proved to be only a cloudy day. We had poor success with observers. Found one promising hole with a feather or two just below the one where we got one bird last March, but there was nothing in it. Below there we found the feathers and skeleton of a bird which had met some tragic death. The bones, which were still held together by the cartilage, seemed to indicate that the bird had got tangled in a mass of ferns. Of course it might have been alive, but one would suppose, if able, it would prefer to die in a burrow. At any rate, there it is as evidence that tragedy is sometimes the lot of this mountain-nesting bird. We dug out two more holes on the ridge across the ravine. The signs looked old, and they proved to be deserted.

After collecting plants until well past noon, we returned to camp via the home ridge ravine. I ran up and had a glimpse of the two burrows, but there were no signs of birds having visited them since we found the two. I think we have covered this location fairly well for them, and also for plants, but we can get a dozen more specimens of them I suppose. At least we

should find more by following up the main ravine. Of course if we took the minute mosses and lichens many more might be collected. I would do this if time permitted and drying apparatus were sufficient. The plans for tomorrow are to go up the ravine collecting and searching for rail where we heard them on our descent from the mountain.

6:45 when the first shearwater was heard. It called around very close for some time. Others were heard at length during the night and especially towards early morning, but I could get no definite location from them. Showers through the night but not very heavy.

September 29

Rather late in starting this morning. A hawk called as it flew about the ridge above us. Myna birds are here in a few numbers. After changing blotters (we have more plants than half of them, which makes me think that perhaps we shouldn't try to get five specimens of each number) we took the mountain trail until it left the fern ravine for the ridge. Following on up the ravine we have arrived at a favorable place for rail just at the very hours when one can least expect them. What a fern-dale this is! Tree ferns predominate (I have yet to find a second species) with their tall, even, stately trunks partially obscured by epiphytic mosses and climbing ferns. Then there are what I call bush-ferns, a cluster of fronds emanating from a stump that stands above the ground. In some locations these shoots are prostrate, but the fronds arise in a bushy cluster.

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8:45. When the first shearwater was heard. It called around very close for some time. Others were heard at length during the night and especially towards early morning, but I could get no definite location from them. Showers through the night but not very heavy.

September 29

Rather late in starting this morning. A hawk called as it flew about the ridge above us. Gum birds are here in a few numbers. After changing blotters (we have more plants than half of them, which makes me think that perhaps we shouldn't try to get five specimens of each number) we took the mountain trail until it left the fern ravine for the ridge. Following on up the ravine we have arrived at a favorable place for rail just at the very hours when one can least expect them. What a fern-dale this is! Tree ferns predominate (I have yet to find a second species) with their tall, even, stately trunks partially obscured by epiphytic mosses and climbing ferns. Then there are what I call vine-ferns, a cluster of fronds emanating from a stemp that stands above the ground. In some locations these shoots are prostrate, but the fronds arise in a bushy cluster.

Among these are the broad fronded ferns at their best, where I measured two fronds three meters and .2 in length. There is the regular ground jungle of fronds of three or four species arising from the prostrate stems sometimes in clusters but usually singly. Then there are climbing vine ferns which find their way to sunlight by catching supports of any nature. The stem is equipped with minute, recurved thorns which hold securely to clothing, but are not scratchy because of their smallness.

A fine rain is now commencing. There is one thing very noticeable in these quiet solitudes, the bothersome buzzing of flies. There are upwards of a dozen near here and they keep up a perpetual buzz which is quite disconcerting to one trying to listen for the faintest whimper of a rail. I do not blame Mr. Beck for being unable to sit patiently waiting for rail to look him up. It is very trying upon the laziest of men, and what must it be to one who is all energy and vim?

Took a few pictures when the light was best, and, after waiting some three hours without hearing anything of the rail, we attempted to ascend a ridge to the left for the purpose of searching for shearwaters, but soon discovered that that particular ridge was far better adapted to rail than to seabirds, as it is very thickly covered with ferns and brush. We even retreated and returned to camp down the ravine and regular trail, picking up some more of the prominent mosses and a beautiful specimen of liverwort.

A late dinner tasted very good even if it was the same old rice, jam, and salmon. We need some fresh fruit, but should be able to hold out until Monday when we will retreat, if not

Among these are the broad fronded ferns at their best, where I measured two fronds three meters and .3 in length. There is the regular ground jungle of fronds of three or four species arising from the prostrate stems sometimes in clusters but usually singly. Then there are climbing vine ferns which find their way to sunlight by catching supports of any nature. The stem is equipped with minute, recurved thorns which hold securely to clothing, but are not strongly because of their smallness.

A rind rain is now commencing. There is one thing very noticeable in these quiet solitudes, the boisterous speaking of flies. There are swarms of a dozen near here and they keep up a perpetual buzz which is quite disconcerting to one trying to listen for the faintest whisper of a trail. I do not blame my book for being unable to sit patiently waiting for trail to look him up. It is very trying upon the instinct of man, and what must it be to one who is all energy and vim?

Took a few pictures when the light was best, and, after waiting some three hours without hearing anything of the trail, we attempted to ascend a ridge to the left for the purpose of searching for sheetwaters, but soon discovered that that particular ridge was far better adapted to trail than to sandbrake, as it is very thickly covered with ferns and brush. We even retreated and returned to camp down the ravine and regular trail, picking up some more of the prominent mosses and a beautiful specimen of liverwort.

A late dinner tasted very good even if it was the same old rice, jam, and salmon. We need some fresh fruit, but should be able to hold out until Monday when we will retreat, if not

sooner.

We decided to commence our retreat in the morning, but during the night the Noha called so numerously that I decided to make another effort to find birds. At six-thirty we again heard Rao, and a little later I could hear distant calls of that species. Some of the Pirae cliffs are inhabited.

September 30

We sallied forth this morning after changing the plant driers, and went over the ridges above camp very thoroughly, but found nothing. We also visited the ledge of rock near the ridge and investigated all the holes in it. There were several, from small ones the size of a man's wrist to large ones that admit one's body horizontally. In depth they extend back several meters, but probing failed to arouse any inhabitants.

Returned to camp and took lunch with us down to ravine where we get water. We ate there, then assailed the Noha ridge above there to the left. Low down on the point of it we found a promising hole showing signs of recent inhabitation such as feathers, tracks, etc. However, after digging it out we got no response. We next tried the dry, exposed grass and fern-covered north slope, but found no signs there, being too rocky for one thing. Proceeding up the ridge, we took the goat hunters' trail to the left along the face of the canyon wall, and followed it several hundred meters. We found one hole directly beneath a tree. Feathers and tracks promised success, so in spite of the fact that it evidently burrowed deep into the hillside we set

sooner.

We decided to commence our return in the morning, but during the night the bons called so amorously that I decided to make another effort to find birds. At six-thirty we again heard bon, and a little later I could hear distant calls of that species. Some of the birds oddly are imbedded.

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We sallied forth this morning after changing the plant driers, and went over the ridge above camp very thoroughly, but found nothing. We also visited the ledge of rock near the ridge and investigated all the holes in it. There were several, from small ones the size of a man's wrist to large ones that admit one's body horizontally. In depth they extend back several meters, but probing failed to arouse any inhabitants.

Returned to camp and took lunch with us down to twelve where we got water. We ate there, then assailed the bone ridge above there to the left. Low down on the point of it we found a promising hole showing signs of recent inhabitation such as feathers, droppings, etc. However, after digging it out we got no response. We next tried the dry, exposed grass and fern-covered north slope, but found no signs there, being too rocky for one thing. Proceeding up the ridge, we took the goat hunters' trail to the left along the face of the canyon wall, and followed it several hundred meters. We found one hole directly beneath a tree. Feathers and droppings presented themselves, so in spite of the fact that it evidently burrowed deep into the hillside we set

to and dug it out. It was but three meters or so in length, but the end was at least two meters below the surface directly above it, and when we did reach probing distance we found it empty. This nest had more lining of dead ferns, "ieie", and similar stick straws than any I have yet found. There were several feathers in it. Here, again, the landing place was the moss-covered, almost horizontal tree trunk above the burrow.

Going beyond there until brush stopped our progress, we got off the goat trail and I lost my hat. Returning to camp, when we came out upon the Noha ridge I saw suspicious looking sign, so searched the ravine below and at some distance located a burrow. Here the pup,who had shown a marked indifference at all the burrows save those two where we first found birds, became very energetic, sniffing about the trails, and finally reached the conclusion that I held of the nest being inhabited. He took an active part in the excavation. Towards the end I think the bird nipped his nose a couple of times by the furious attack he made upon it. If birds were plentiful enough to let him maul one, I think he would be more enthusiastic about searching for holes, but what would happen to chickens in Papeete? So we held him from destroying the birds, and incidentally saved him from getting nipped seriously. This burrow was not well nested either in size or lining. The single bird is apparently an old one. What is it doing sticking around the burrow? What a lot is yet to be learned of the habits of such birds as these!

to and dug it out. It was not three meters or so in length, but the end was at least two meters below the surface directly above it, and when we did reach probing distance we found it empty. This nest had more lining of dead leaves, "lole", and similar stick stuff than any I have yet found. There were several feathers in it. Here, again, the landing place was the moss-covered, almost horizontal tree trunk above the burrow.

Going beyond there until dusk stopped our progress, we got off the good trail and I lost my hat. Returning to camp, when we came out upon the Rose ridge I saw suspicious looking sign, so searched the valley below and at some distance located a burrow. Here the pug, who had shown a marked indifference at all the burrows save those two where we first found birds, became very energetic, sniffing about the trails, and finally reached the conclusion that I held of the best going inhabited. He took an active part in the excavation. Towards the end I think the bird nipped his nose a couple of times by the furious attack he made upon it. If birds were plentiful enough to let him meet one, I think he would be more enthusiastic about searching for holes, but what would happen to chickens in Tuesday? So we held him from destroying the birds, and incidentally saved him from getting ripped seriously. This burrow was not well marked either in size or lining. The single bird is apparently an old one. What is it doing attacking around the burrow? That a lot is yet to be learned of the habits of such birds as these!

October 1

Again last night the calling birds were quite plentiful; certainly we will not annihilate this colony. Early in the evening, about seven-fifteen, two birds were heard over at the ridge. During the night more were heard there, and also some along the ridge on the back trail; that will be our work today. Myna birds are chirping around camp this morning. We hear them of mornings and evenings regularly. Saw a swallow above the brush, and three tropic-birds far out above the canyon yesterday.

The bird we brought into camp yesterday was a female with eggs distinct, the larger ones .15 cm. in diameter. No one largest. The oviduct is small and unstretched as if no egg had been laid this season. Another mystery! Is she an old maid?

According to indications of calling birds, we tackled the ridge along the back trail but found it so fearfully covered with brush that we could locate nothing in the bird line. We brought back two new trees and a fern for the plant collection. Returning along the trail we were surprised to see the pup sniffing suspiciously about beneath a rock and tree stump. Then we found some feathers in the trail. It was a very hard burrow to dig out since it penetrated between rocks. At the end of it we found the usual enlarged hole with a nest of a few dry sticks of ferns and leaves of "ieie" and feathers. It had evidently been inhabited this year but the birds had departed.

In the evening calling commenced at 6:40 and continued until 7:30. Then there came the usual lull until perhaps ten o'clock. During the night calling was either less frequent than formerly or else I slept more soundly. We are determined to move

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The bird we brought into camp yesterday was a female with eggs distinct, the larger ones .15 cm. in diameter. No one largest. The oviduct is small and wrinkled as if no egg had been laid this season. Another mystery! Is she an old maid?

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down Monday, but we will have a difficult task for our loads will be heavy,--fully twice as heavy as they were last March.

October 2

A splendid, sunshiny day, excellent for drying plants, which will lighten our burdens a few ounces. Also a rather stiff breeze which has been scattering the winged seeds of the "Piti" broadcast all day. We have also lessened our burden somewhat by eating up most of the canned stuff. If there were only birds enough, say swifts or rails, to shoot away three boxes of ammunition we would be considerably better off in more ways than one. When and where will we ever find those swifts? I doubt if they now exist on this island, but they may be confined to some pocket. Why should they have become extinct? What enemies have they? As for the ground pigeons and sandpipers, we will indeed be surprised if ever we come across them. The gallinule also seems to have been exterminated. How the advance of mankind is marked by destruction!

October 3

Showers passed over during the night with a rather heavy breeze blowing. Not many shearwaters heard. We packed up this morning and have come some fifty yards along the trail for our first rest. Have at least twice as much as would make a good, heavy load. We may yet be obliged to make two journeys. I have only the plants, papers and blotters, press, lantern, and canteen, but it makes a real man-sized load,--about all one should put on a good, strong pack horse. Friday I lost my hat, so will have a

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October 3

Showers passed over during the night with a rather heavy breeze blowing. Not many observations heard. We packed up this morning and have come some fifty yards along the trail for our first rest. Have at least twice as much as would make a good, heavy load. We may yet be obliged to make two journeys. I have only the plants, papers and bottles, press, lantern, and cartridges, but it makes a real man-sized load,--about all one should put on a good, strong pack board. Friday I lost my hat, so will have a

hot time of it along the open ridges unless we can devise a fern-shade.

Another fifty yards, with a little excitement at the ravine we had to cross. Here, where Matete tells me that Moyle took a downhill side-slip of several yards, my footing failed me. I caught a branch of the Piti (Q 18) and held the load until Matete returned to my rescue. Then, in our attempt to move on, the branch broke under the strain, and I, with the pack, descended to the next ledge below the trail. It was not at all dangerous, but just the least bit exciting. How can these natives carry as much as they do? Matete has more than I have and gets along fairly well with it. The carriers coming up the mountain brought more than we are taking down, and it did not phase them very much, though they did rest a great deal. It is, I suppose, another example of the old blacksmith's saw: "A strong back and a weak mind." Well, one should not wish for all the blessings in the world.

Fifty yards or less farther. I have divided my load into halves, and find them each quite heavy enough. They will be deposited at the head of the ravine not very distant from here, and we will go on down with light packs. Will send Matete and another native back tomorrow for them. I consider my time worth more than the cost of a native packer.

At the ravine we left the two bags of plants, blotters, and papers well covered with oilcloth against possible rains. Our packs are still too heavy, but we can make the orange grove with them and either return tomorrow for the rest, or go on down and send up a native with Matete. We are now taking our first rest

Another fifty yards, with a little excitement at the ravine we had to cross. Here, where Matete tells me that Moyle took a downhill side-slip of several yards, my footing failed me. I caught a branch of the Pitt (q 16) and held the load until Matete returned to my rescue. Then, in our attempt to move on, the branch broke under the strain, and I, with the pack, descended to the next ledge below the trail. It was not at all dangerous, but just the least bit exciting. How can these natives carry as much as they do? Matete has more than I have and gets along fairly well with it. The carriers coming up the mountain brought more than we are taking down, and it did not phase them very much, though they did rest a great deal. It is, I suppose, another example of the old blacksmith's saw: "A strong back and a weak mind." Well, one should not wish for all the blessings in the world.

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on the ridge where the sunshine forced me to make a shade with a blotter. Even with these lightened loads we find frequent rests very comfortable. We are determined to follow our own ridge trail in preference to Tuaurae's steep inclines. Ours is the shortest and easiest. The wind blowing up the canyon is spreading broadcast the winged seeds of Piti (Q 18). No wonder it is so widely distributed! A hawk above the ridge ahead of us.

We have arrived at the highest orange trees, 2800 feet elevation, where we found but green ones. The Pirae boys have kept them pretty well hauled out of here. It is such an easy jaunt for them to come up early in the mornings and get back home early in the afternoon with a load of twelve to sixteen strings, or thirty francs worth. Matete took a beautiful run down a steep slope with his load rolling down after him. It straddled a tree and broke the pole. One bundle came rolling towards me, and, although my own footing was insecure, I succeeded in stopping it. The boy's latest suggestion is that we go on to Papeete tonight. We will do well if we reach the water camp in the orange ravine, still six hundred feet below us. When I slid over the rock back near camp I smashed the crystal of my watch so that I had to pack it away. I have no idea of the time except that it is past noon. Myna birds eating green oranges here.

It wasn't so bad from there on down to the camp at 2200 feet. We found a tree not far down the Orange Ravine where four good oranges were obtained. At the camp site we left in plain view everything except gun, camera, field glasses, coat and

on the ridge where the sunshine forced me to make a shade with a blotter. Even with these lightened loads we find frequent rests very comfortable. We are determined to follow our own ridge trail in preference to Tenaya's steep ingulfing. Ours is the shortest and easiest. The wind blowing up the canyon is spreading broadcast the winged seeds of fir (p 16). No wonder it is so widely distributed! A hawk above the ridge ahead of us.

We have arrived at the highest orange trees, 5300 feet elevation, where we found but green ones. The Sierra boys have kept them pretty well hauled out of here. It is such an easy jaunt for them to come up early in the morning and get back home early in the afternoon with a load of twelve to sixteen oranges, or thirty francs worth. Mateto took a beautiful run down a steep slope with his load rolling down after him. It attached a tree and broke the pole. One bundle came rolling towards me, and, although my own footing was insecure, I succeeded in stopping it. The boy's latest suggestion is that we go on to Paqueete tonight. We will do well if we reach the water camp in the orange ravine, still six hundred feet below us. When I slid over the rock back near camp I smashed the crystal of my watch so that I had to pass it away. I have no idea of the time except that it is past noon. Yours dirty eating green oranges here.

It wasn't so bad from there on down to the camp at 5300 feet. We found a tree not far down the Orange Ravine where four good oranges were obtained. At the camp site we left in plain view everything except gun, camera, field glasses, coat and

knapsack. We ate another lunch (at the green oranges we had a can of salmon) of oatmeal and milk, with lemonade to drink. Then with our light packs we struck down trail at a rapid pace in spite of the afternoon heat. We are now cooling off in the shade of the upper mango tree just before verging out into the blazing sun along the dry-fern ridge trail. We should make Papeete early. A few kingfishers and mynas noticed along the ravine. Still windy.

We found the Papenoo stage jitney near Pirae and had it take us to town, where we heard strange stories about both Krauth and Moyle. Krauth lost himself somewhere below camp, and spent four days getting to Papeete. He told the Yerex's that he passed through a great deal of lantana and grass that cut him. He clambered over cliffs, one of which he claims to have been five hundred feet high, but good ledges on it. He was certainly at fault for leaving camp alone, but I, too, am to blame for not investigating that yelling we heard Saturday afternoon and night. My only excuse is that I received no answers when I replied to the calls, and I am certain that I can and did yell much louder than even a native. The resemblance of the night call to a rooster's crow stopped my worrying. But I certainly was to blame for not investigating more closely and with more than hallooing.

Moyle, I hear, is sick in the hospital with infected leg scratches and a boil. It seems that he had had foot trouble before. The next trouble was that Hiro had been unable to get his wages via a note I gave him. I should have referred him to Manu.

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Coyle, I hear, is sick in the hospital with infected leg scratches and a boil. It seems that he had had foot trouble before. The next trouble was that Ifro had been unable to get his wages via a note I gave him. I should have referred him to Ernam.

Now besides the trouble of getting the stuff back out of the mountain I have several things to straighten out.

October 4

First upon the scene this morning was Hiro looking for his pay. So we went down town, got some money, and settled with him, at the same time hiring him to go back up and carry down the outfit. After lunch I went down to the hospital and saw Moyle, who isn't very bad. His pictures of the trip came out excellently, and I must obtain some of them later. Leaving him after settling his pro-ration expense of the trip, I met Krauth. Treated him to ice-cream and cake while he related his experiences during the four days. It was not Krauth yelling Saturday night a week hence. He was somewhere in the head ravines of Hamuta then. He lost the trail where we were unable to follow it in March. Our ridge trail is certainly much better.

At the hotel I packed and took jitney to Pirae trail at three o'clock. There are four goats on the second ridge east of us, but we gained too much on them and will not connect at the junction of our ridges just before we take a sidehill trail.

We are now resting where the trail verges upon the Hamuta gorge. How did Krauth ever survive a descent into that gorge? He mentions a six hundred foot cliff over which he descended, but allows that it probably looked larger than it really was. The only possible chance is for him to have taken a ravine very high up on the trail while it was following along the ridge. There are two large cliffs along it, one perhaps three hundred feet, and the other, where the ravine drops into the gorge, four

mountain I have several things to straighten out.

October 4

First upon the scene this morning was Eric looking for his pay. So we went down town, got some money, and settled with him, at the same time hiring him to go back up and carry down the outfit. After lunch I went down to the hospital and saw Doyle, who isn't very bad. His pictures of the trip came out excellently, and I must obtain some of them later. Leaving him after settling his pro-ration expenses of the trip, I met Frank. Treated him to ice-cream and cake while he related his experiences during the four days. It was not Frank yelling Saturday night a week hence. He was somewhere in the head reaches of Remuda then. He lost the trail where we were unable to follow it in March. Our ridge trail is certainly much better.

At the hotel I packed and took Jiney to Pine trail at three o'clock. There are four goats on the second ridge east of us, but we gained too much on them and will not connect at the junction of our ridges just before we take a sidehill trail.

We are now resting where the trail verges upon the Remuda gorge. How did Frank ever survive a descent into that gorge? He mentions a six hundred foot cliff over which he descended, but allows that it probably looked larger than it really was. The only possible chance is for him to have taken a ravine very high up on the trail while it was following along the ridge. There are two large cliffs along it, one perhaps three hundred feet, and the other, where the ravine drops into the gorge, four

or five hundred. It is hardly probable that he got lost that soon, for he mentions the second fei slope. That would throw him into the ravine that enters the orange ravine just a few hundred feet below where our trail leaves the orange ravine bed and comes out around the sidehill to this ridge. It really wouldn't be so awfully difficult to make that with ropes and a "tipi" for clearing brush and scaling cliffs, but he did get experience. Ah, there is a clump of bamboo! If he remembers two such clumps (for there's another down in the bottom of the gorge) that must have been his route. The drop into the gorge by that route is not near a hundred feet, and is the highest cliff along it. Neither is it abrupt. No doubt there are plenty of waterfalls ten to thirty feet in height hidden by the trees from my view. Were it a clear, sunshiny day I would try for a picture of the head ravines and gorge, down some of which he must have found his precarious way. He attributes his life to the Holy Trinity; I think what he needs is a little confidence in his own human ability.

From there we pushed on until we reached the water. Hearing a rooster crow, I loaded the gun and kept a sharp look-out along the trail. Going up the ravine after our wash and drink, I saw a chicken in the vale below, while Matete caught sight of one above the trail. In trying to see where he was pointing I lost track of mine, but rushing up trail got a shot, and got the bird he had seen. It is a red rooster upon which we will dine tomorrow after I make up his skin.

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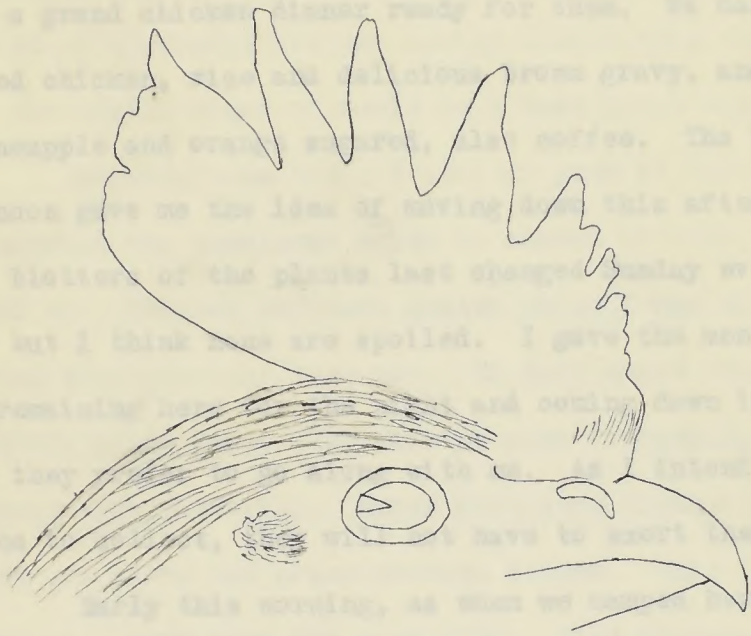
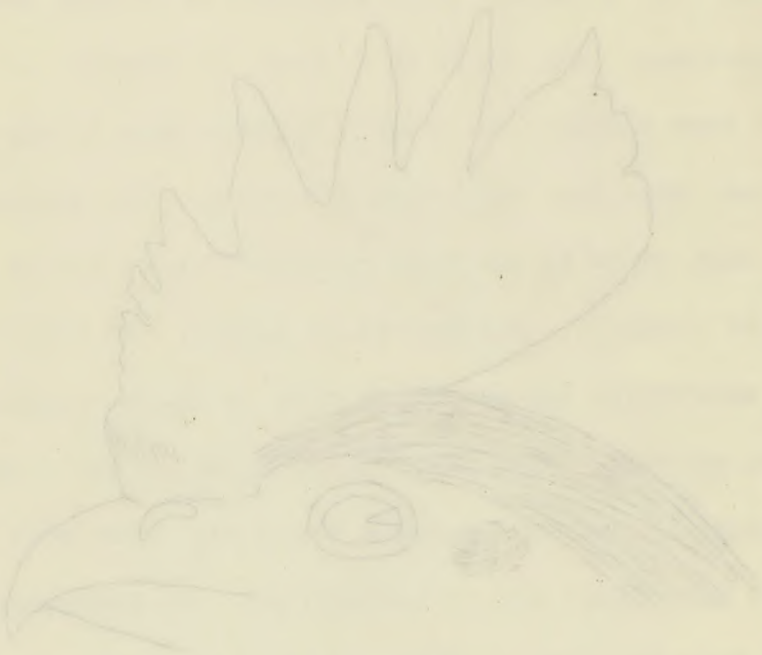
From there we panned on until we reached the water. Fearing a rooster crow, I loaded the gun and kept a sharp lookout along the trail. Going up the ravine after our wash and drink, I saw a chicken in the vale below, while Mateto caught sight of one above the trail. In trying to see where he was pointing I lost track of mine, but rushing up trail got a shot, and got the bird he had seen. It is a red rooster upon which we will dine tomorrow after I make up his skin.

October 5

Awoke at early dawn and roused the boys that they might get a fairly early start for the plants. Spent the morning just before and after breakfast skinning the rooster shot last evening. He was of the brown-red type. The comb was as illustrated. Eyes were a very reddish orange instead of the usual yellow.



With gun and ammunition, binoculars, camera and plant press, I followed up Tuaurae's trail and am now where we saw the blooming "Auti", the only place I have seen it in bloom (Q31). It is a very widely distributed and useful native plant. From a tree top here at this ridge which separates the head ravines of the left fork of Hamuta I am surveying the country. The Pua Tumu is here,--the Rupi Fig. Down in the fei ravine beside the orange ridge, where Tuaurae and I camped, the pup, while rambling around in fox terrier style, flushed some fowl, but I could not



see to shoot. I am confident that here on the left is the ravine Krauth descended. I'll take a look around for his tracks. In the top of the Pua Tumu I found two vines not yet collected, the orchid (?) and two other epiphytes, besides lichens. A black cloud threatening and the boys passing down the ridge decided me against looking for Krauth's trail. So I hastened to camp and had a grand chicken dinner ready for them. We had soup with rice, fried chicken, rice and delicious brown gravy, and for desert, pineapple and orange sugared, also coffee. The boys returning at noon gave me the idea of moving down this afternoon. Changed the blotters of the plants last changed Sunday evening. Very wet but I think none are spoiled. I gave the men the privilege of remaining here for the night and coming down in the morning, but they prefer to go along with me. As I intend to stop several times to collect, they will not have to exert themselves.

Early this morning, as when we camped here before, we heard a warbler chirruping. At noon he called, so I coaxed him. He flew overhead from one side of the ravine to the other twice, but I could not drop him. It is interesting to know they are here. Matete returning from washing the dishes called me to see a centipede, "Viri", eleven centimeters in length. It is the second I have seen in Tahiti, which shows that they are not nearly so thick as reports have them. Well, we are about ready to start now.

Collecting along the way takes time and doesn't rest the feet, but it does rest the shoulders. Matete's load was too large (as much as Hiro's) so we each relieved him of some.

see to about. I am confident that here on the left is the ravine Frank described. I'll take a look around for his trunks. In the top of the tree there I found two vines not yet collected, the orchid (?) and two other epiphytes, besides lichens. A black cloud threatening and the boys passing down the ridge decided me against looking for Frank's trail. So I hastened to camp and had a grand chicken dinner ready for them. We had soup with rice, fried chicken, rice and delicious brown gravy, and for dessert, pineapple and orange sugared, also coffee. The boys returning at noon gave me the idea of moving down this afternoon. Changed the blotters of the plants last change Sunday evening. Very wet but I think none are spoiled. I gave the men the privilege of remaining here for the night and coming down in the morning, but they prefer to go along with me. As I intend to stop several times to collect, they will not have to scare themselves.

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Mine keeps getting heavier. We ran down into the ravine where a goat trail led the way, and thought we saw Krauth's trail. If he struck the ravine where I think he did, he followed down alongside the trail within fifty feet of it. He may have come down the next ravine, however, which this orange ravine enters just below a much used resting place at 1700 feet by a succession of small waterfalls with pools below them. If he came down that one he is excusable for not having looked upon this side slope for the trail, since it would be a hard climb out.

Hearing some fowl, I left my pack at the trail and went up through the candlenut woods in search of them, but could not catch up. The men may have passed while I was up there. I have waited some time for them now. We have heard three or four warblers along here. The dove is also frequently heard. Kingfishers very plentiful. Mynas more than plentiful. The weaver birds are along the grass-covered ridges. This is as lively a place as I have seen for some time. Five o'clock and everything chirping.

The natives of Makatea say that Noha lives on a gelatinous, oily substance that shows a phosphorescence.

"Opea" is the old name of the swift.

p. 23 11

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The natives of Rakotea say that none live on a geldi-mona, only spectres that show a phosphorescence.

"Ope" is the old name of the swift.

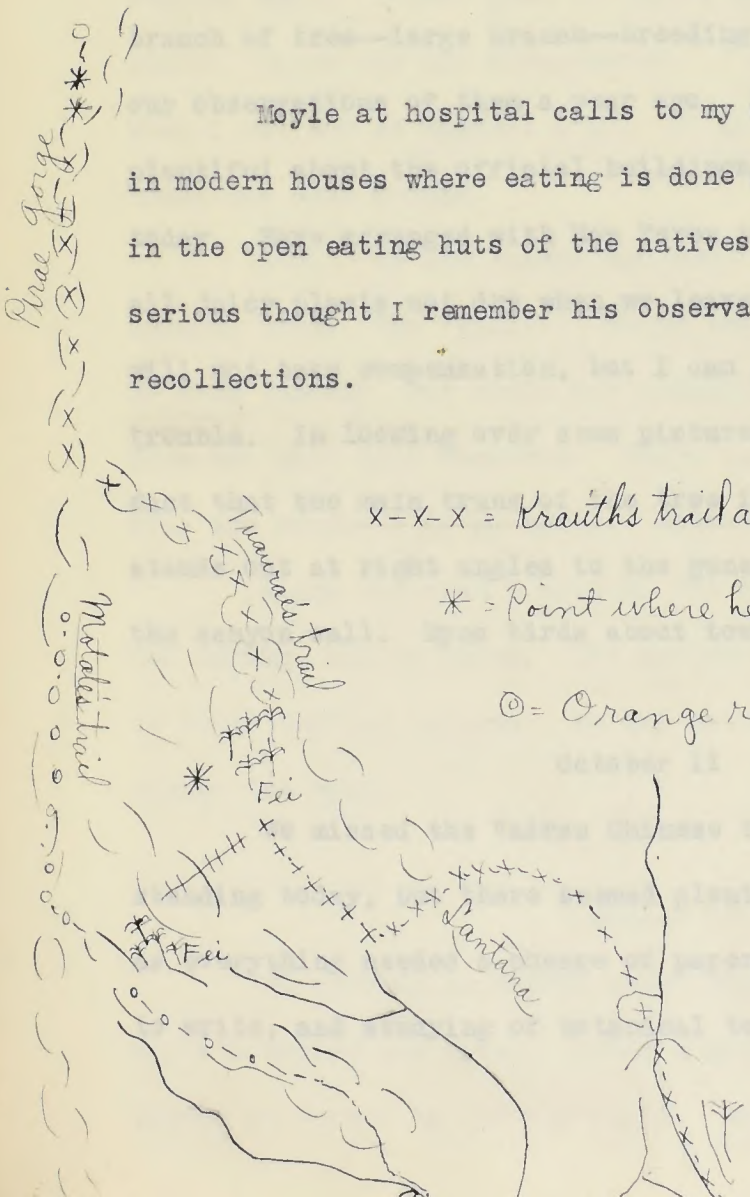
The natives claim that Meho hides in the mud of marshes with only its head protruding, hence its invisibility.

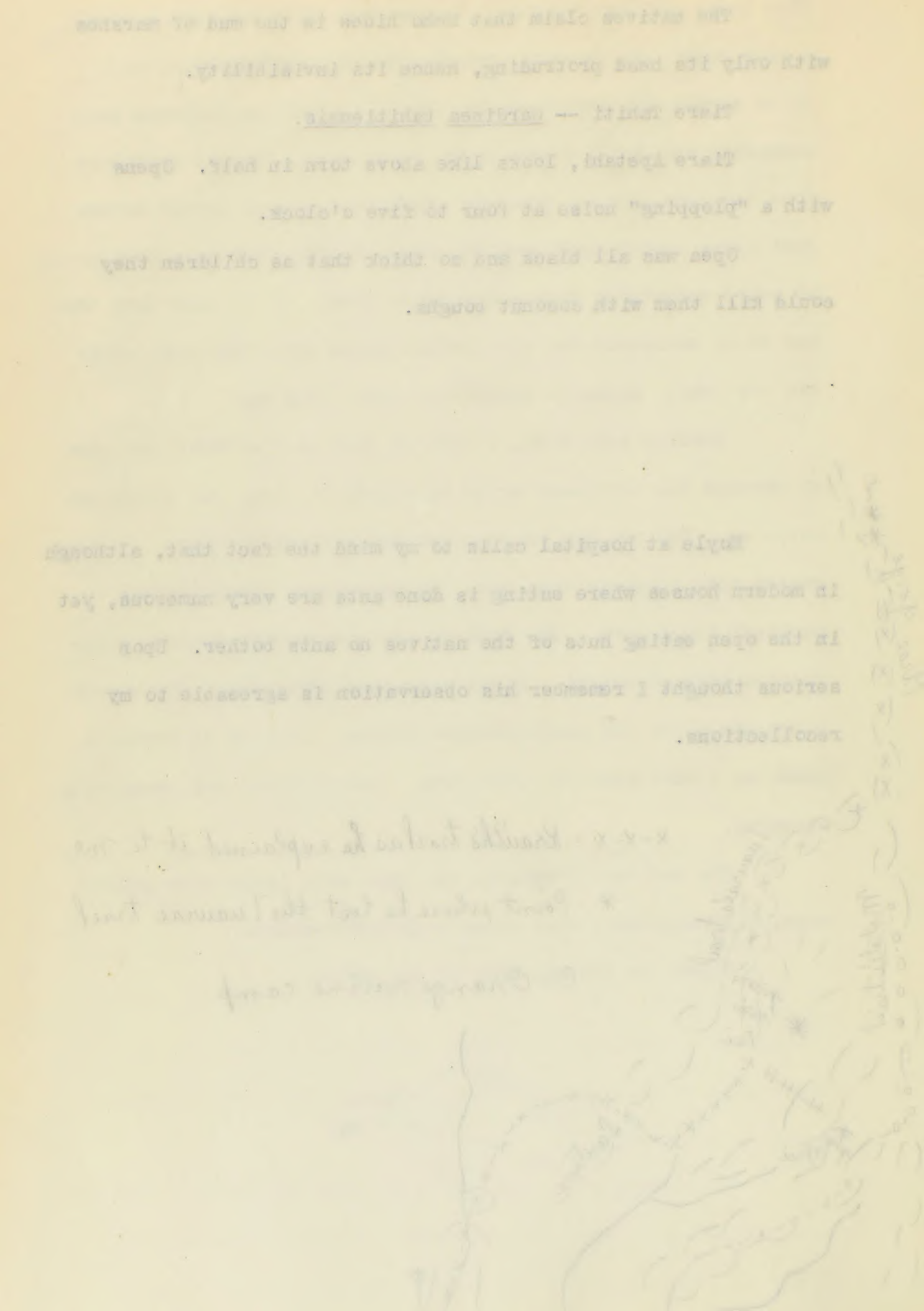
Tiare Tahiti -- Gardinea tahitiensis.

Tiare Apetahi, looks like above torn in half. Opens with a "plopping" noise at four to five o'clock.

Opea was all black and so thick that as children they could kill them with coconut boughs.

Moyle at hospital calls to my mind the fact that, although in modern houses where eating is done ants are very numerous, yet in the open eating huts of the natives no ants bother. Upon serious thought I remember his observation is agreeable to my recollections.





October 6--9

Thursday to Saturday I spent in Papeete drying and working over plants and pictures and notes, studying language and native names with Stimson.

October 10

Spent this morning looking over all negatives taken since leaving San Francisco. Only ninety-one are printable. I numbered them and put them away in albums.

At the Yerex's in afternoon I noticed myna birds on branch of tree--large branch--breeding. This corresponds to our observations of them a year ago. Weaver birds are quite plentiful about the official buildings. Very hot and sultry today. Have arranged with Max Yerex to have papers changed on all juicy plants not dry when we leave for the peninsula. He will not take compensation, but I can give him something for the trouble. In looking over some pictures, I was struck by the fact that the main trunk of the tree in the fei camp picture stands out at right angles to the general slope of the face of the canyon wall. Myna birds about town observed building nests.

October 11

We missed the Vairau Chinese truck through a misunderstanding today, but there seemed plenty to do with the plants, as everything needed a change of papers; then there were letters to write, and studying of botanical terms.

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We missed the Yaqui Indians from through a misunder-standing today, but there seemed plenty to do with the plants, as everything needed a change of papers; then there were letters to write, and studying of botanical terms.

October 12

The "Tahiti" having arrived last evening, I remained in town to get off some presents and more letters with Krauth who is returning in the steerage, poor cuss! He would have been stranded had I not taken his Los Angeles check for twenty-five dollars.

October 13

What a job it is to catch any truck other than the regular mail! I went down to Beck's and dropped in at the Yerex place. There the pup disappeared. I sent Matete down after him when I met him at Maxwell & Co. It is somewhat past two and no truck has come around.

3:30. We are loaded and down town at a Chinese store loading more. The "Tahiti", which the French would not allow to dock Tuesday, but which got alongside the wharf last evening, does not sail till tomorrow. There is a large cargo of copra, oil, and coconuts to go north. We're off.

Along the road I noticed but very few tatlers, one or two herons, and no terns. The yellow-bills have probably gone to their nesting islands. We did not encounter any land birds except the myna.

October 14

We arrived at Vairao about eight o'clock and put up in a place beside the river. After a good meal upon sardines and cheese we turned in for the night. Away from electric lights

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and people one gets an opportunity for a real sleep. One of the native men of this house is going along to show us the cave where Opea dwells. May it at last prove to be the swift, but I fear it will be but the swallow!

We followed a trail up the Nohu river, where there were more fords than I ever yet have encountered. The flora strikes one immediately as being more like the upper stretches of the mainland. Ferns and moist zone plants hang well down in the valley. No birds but the myna after more than an hour's walk. At last we flushed a rooster. I took a long distance shot but could not drop him. Elevation four hundred feet. This appears to be an excellent valley for fei. The sun shines upon the valley wall up canyon, a wall of perhaps one thousand feet. It is covered above with tree ferns, just below which the fei are in great beds with a few tree ferns growing amongst them and other brush interspersed. No tree ferns below the fei. Kingfishers were noticeable with the binoculars.

We have arrived at the cave and find it well inhabited by a flock of Opea. They may be swifts too. But how to get at them? They come out too high up to reach from the river. We have climbed up level with and opposite the top of the cave, about one hundred feet high, but can not see the birds against the dark shadow. One I hit fell somewhere between us and the boys below. If we find it we will know. The cave is an undermined hillside on the outer side of a very sharp curve in the course of the river. A tongue of the opposite hill protrudes almost in under the cliff above the cave. My sucking has brought a cuckoo into the trees on the opposite ridge. Some

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Opea chased him a short ways. These Opea seem to go in flocks of half a dozen or so, often flying high aloft and over the ridges. I would estimate about thirty birds living under this cliff. They disappear at times, then return in groups. The nests are clustered beneath a ledge at the top of the cave out of gun shot. Now the problem is how to get them. The boys failed to watch for the falling birds so the two I killed were not found.

Returning to the village we collected some new ferns and one or two new herbs and trees. In the hibiscus woods at an elevation of two hundred feet I found the orchid (Q 58) growing, and two vines bearing blooms, one with three clusters of buds beside the one in bloom. These possessed no semblance of the lavender color observed on the first ones found. When it came to collecting,the ferns were not so different from those we have already gathered. It is understood from natives that Tautiria possesses a breadfruit which is the best on the island. It grew wild only at Tautiria, which points out the probability that this peninsula should have indigenous flora, though there is little to hinder spreading to the mainland through Taravau. Reached the house just in time to put plants in to press before dark.

October 15

The men talked about going after ducks this morning, but no one showed up until well past daylight. Decided to try elsewhere for swifts, and if unseccessful to return to the cave Monday with blankets and food for at least one night. Along the

Opsa climbed his a short way. These Opsa apes to go in flocks of half a dozen or so, often flying high aloft and over the rivers. I would estimate about thirty birds living under this cliff. They disappear at times, then return in groups. The nests are clustered beneath a ledge at the top of the cave out of gun shot. Now the problem is how to get them. The boys failed to watch for the falling birds so the two I killed were not found.

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road we shot with the auxiliary a weaver bird (red-rumped) and a myna. The pup Noha showed no interest in them whatever. Down the road always we found the orchid growing on Puro tree trunks right beside the road. Saw one Opea but could not determine whether swallow or swift. The boy came into a maupi grove to look for Opea, which would mean swallows no doubt. The side hill northeast of the road is covered with maupi and other trees, all buried beneath dense overhanging growths of Puhui, the vine so abundant in these islands; it has a white blossom and long suspended stem. Stimpson informed me that the long, hanging stem of this plant furnishes the most delicious drink imaginable. Today I tried it and the sap certainly had a nice flavor. By cutting a long section one could easily get three or four swallows of refreshment. The main trouble would be that the vine seldom grows far from water; during the dry season, however, one might come across the vine before reaching water and so enjoy the drinking of its sap.

The day proved a failure regarding birds, so we collected the few plants we came across and returned to the house early in the afternoon. Along the automobile road we found the orchids in considerable numbers and blooming profusely; they are inconspicuous, however, beneath the boughs of hibiscus. A sedge was the next most interesting plant found by the beach.

October 16

Spent the day writing letters and reading. The natives here are positive that the hawk eats the swifts. How can it catch them? It seems very improbable and yet the disappearance of the

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one has been coincident with the introduction of the other. It might be possible for them to catch the smaller bird on the nests, but in the air it seems very improbable.

October 17

Packed up and struck up stream for the Opea cave, where I will camp a couple of nights in an attempt to get some birds. These may be but swallows but I'll not say so until I see one, at least, dead in my hands. I pray they are the swifts which apparently are not to be found elsewhere.

Up stream a ways Matete takes me over to a large boulder of conglomerate with a hole through it, no doubt where a buried tree trunk has rotted away. By beating either end of the hole with a clump of fern leaves the boy produces a reverberating, drum-like noise. I have heard of such places elsewhere in Tahiti.

In getting native names for plants, to show what effect civilization is having, the long ribbon-like fern epiphytic on under parts of tree trunks is called "riboni", while the orchid is called "onioni" from the resemblance of its leaves to an onion, or "vanilla" which shows rather keen judgment in placing it with the only other representative of the family to be found here.

We stopped and pitched camp at 550 feet elevation, somewhat farther below the Opea cave than I thought, but as two birds were flying about I thought it a good place. The native went after fei while Matete and I came on up to the cave. I certainly failed to comprehend its magnitude Friday. Here we are now seated upon the apex of the talus slope below it. This slope is

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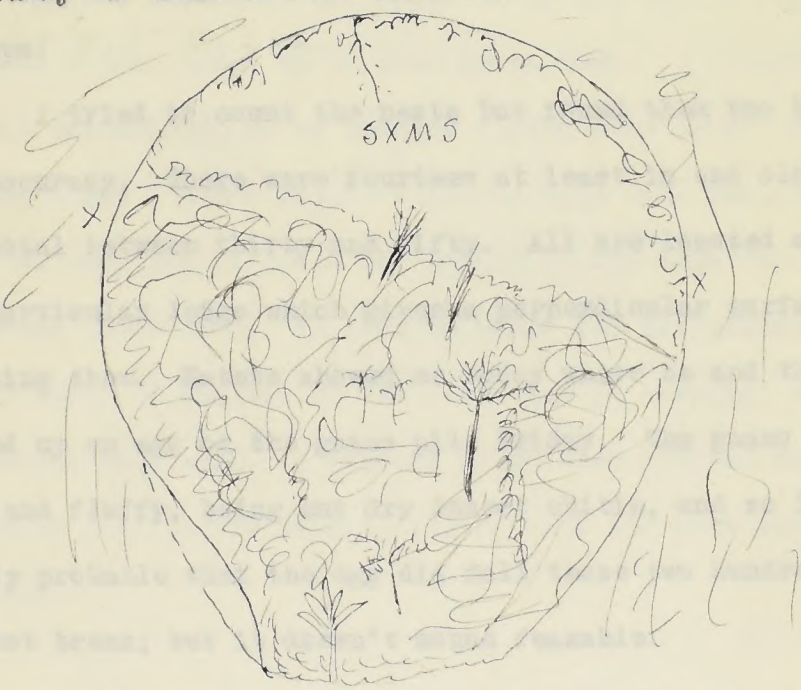
mostly broken rock fallen from above but mixed with it is the guano from the swift nests above. A handful of it shows the chitinized portions of undigested insects in enormous numbers. Just below, towards the river, is a bed of Apura (Arum sp.) which is moistened by the dripping of water from the face of the cliff above the cave and enriched by the guano bed behind it. The river is twenty-five or thirty feet below us, while the great arch of the cave is beyond gunshot overhead. I cannot for the life of me phase the nests of the birds. A twenty-two rifle or my pistol might get something. At my shot the birds fluttered out to the number of at least twenty-five, but there is positively no reaching them from here. I believe the bird nests are fully two hundred feet above me.



From where I sit the two sides marked "X" meet at an angle of 75°. "A" is at 60° from horizontal. The drawing is a bit too nearly round; it should be more horseshoe shape, half a centimeter narrower on each side making it about the proper

nearly broken rock fallen from above but mixed with it is the guano from the swift nests above. A hundred or it above the obliterated portions of undigested insects in enormous numbers. Just below, towards the river, is a bed of Aquna (Arum sp.) which is scattered by the dripping of water from the face of the cliff above the cave and enriched by the guano bed beneath it. The river is twenty-five or thirty feet below us, while the great arch of the cave is beyond pistol overhead. I cannot for the life of me place the nests of the birds. A twenty-two rifle or my pistol might get something. At my shot the birds fluttered out to the number of at least twenty-five, but there is positively no reaching them from here. I believe the bird nests are fully two hundred feet above me.

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proportion.

Three tropic-birds were soaring above not long ago, volplaning against the wind. Of all aeroplane-like birds they are the most graceful. Of course the reference should be reversed, for Nature's aeroplanes were flying before the Wright brothers'. From binocular studies of these Opea I am positive they are the swifts. If I could depend upon Matete's keeping his eyes open and watching for the fall of birds I would again tackle the point which all but pokes its nose into this cave. He is sleeping now, however, and so I can hardly depend upon him. Of course, two boys are worse than none, as was proved Friday. Perhaps left to himself he might redeem his good name. What attraction can I use to bring down these birds? Patience perhaps!

I tried to count the nests but found them too bunched for accuracy. There were fourteen at least in one cluster, the total between thirty and fifty. All are located around one particular ledge which gives a perpendicular surface for sticking them. Matete showed me today where he and the boy picked up an egg on the guano pile Friday. The guano is quite soft and fluffy, being but dry insect chitin, and so it is barely probable that the egg did fall those two hundred feet and not break; but it doesn't sound feasable.

At last one of the birds drops below the squadron above. Lower and lower it comes and now it is within range. One barrel misses, but the other gets him and he falls on the gravel of the stream-bed. Matete runs after him while I remain on the guano heap all anxiety and anticipation. But alas! the bird has rufus

proportions.

Three triple-birds were soaring above not long ago, volplaning against the wind. Of all aeroplane-like birds they are the most graceful. Of course the reference should be reversed, for Nature's aeroplanes were flying before the Wright brothers'. From biocular studies of these Opes I am positive they are too swift. If I could depend upon Estete's keeping his eyes open and watching for the fall of birds I would again tackle the point which all but poker its nose into this cave. He is sleeping now, however, and so I can hardly depend upon him. Of course, two nops are worse than none, as was proved Friday. Perhaps left to himself he might redeem his good name. What attraction can I use to bring down these birds? Fetishes perhaps!

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below the beak; he is but the common swallow. Again I take the binoculars and observe that all the birds in the squadron above are as light gray beneath the tail as this one. My one and only hope of finding swifts left in Tahiti has vanished. I had banked so much upon this famous Vairao cave, and now to find the birds but common swallows is very discouraging.

Tomorrow if we can find a suitable exit from this gorge we will assail one of the ridges and at least make a good plant collection. Next in order is the rail which is supposed to abound somewhere in this district. When we stopped at the cave I felt a bad pain in the lower part of my groin. It is a very sickening feeling. Shot a swallow but we could not find it.

Matete proceeded far ahead of me and was in camp when I, to avoid a ford, kept up in some Apura beds. I flushed a rooster but was not loaded, so he escaped flying over camp. When I arrived there I found Matete with the dogs (one from the house where we stop has followed us) trying to run down the chicken in the brush below camp. My side pain was too bothersome to join in the hunt. A swallow or two about during evening, and the inevitable myna bird. A curious kingfisher aroused our own curiosity just before dark by flying into the tree branches overhead.

October 18

Moving about camp this morning was accompanied by such sickening sensations that I remained in bed all day. In the evening I felt considerably better, so have hopes for improvement

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Tomorrow if we can find a suitable mule from this gorge we will search one of the ridges and at least make a good plant collection. Next in order is the trail which is supposed to abound somewhere in this district. When we stopped at the cave I felt a sad pain in the lower part of my groin. It is a very sickening feeling. Not a swallow but we could not find it.

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October 18

Having spent camp this morning was accompanied by such sickening sensations that I remained in bed all day. In the evening I felt considerably better, so have hopes for improvement

in the morning. A hawk, flying low down above the tree tops, passed over camp, but the gun being unloaded I was not quick enough to shoot him. Swallows about occasionally. Myna birds observed flying mountainward from below in morning, and returning down valley in evening. Occasional kingfisher heard. Roosters crowing in the morning. Showers in late afternoon.

October 19

Passed a very restful night and feel very hale and hearty this morning. Have walked about a bit, but feel no side pains. Upon awakening this morning I felt something crawling about my left ear. I reached up and pulled it off said appendage. It felt larger than the usual run of camp vermin, so I held it long enough to have a good look at it. One look was quite sufficient to make me hurl it wildly from me. A small, black scorpion! It was a good thing I did not squeeze it very hard. What large claws they have here, heavy and broad but flat! The abdomen is comparatively short and very narrow. I will probably remember to shake my shoes before putting them on this morning, a little precaution that should always be carried out where scorpions and centipedes are found. But neither are either as thick or as dangerous here as reported. During the thirteen months I have seen but two centipedes, and, save aboard ship, but this one scorpion. Like all other possible dangers, fictionists have made the most of them, meaning not only writers but also talkers. Mosquitoes are a little bothersome here, as is to be expected in a moist region.

More light showers this morning. A native simply cannot

passed over camp, but the gin being unloaded I was not quick enough to shoot him. Swallows about occasionally. Myna birds observed flying mountainward from below in morning, and returning down valley in evening. Occasional kingfisher heard. Roosters crowing in the morning. Showers in late afternoon.

October 19

Passed a very restful night and feel very hale and hearty this morning. Have walked about a bit, but feel no side pains. Upon awakening this morning I felt something crawling about my left ear. I reached up and pulled it off said appendage. It felt larger than the usual run of camp vermin, so I held it long enough to have a good look at it. One look was quite sufficient to make me hurl it wildly from me. A small, black scorpion! It was a good thing I did not squeeze it very hard. What large claws they have here, heavy and broad but flat! The abdomen is comparatively short and very narrow. I will probably remember to shake my shoes before putting them on this morning. A little precaution that should always be carried out where scorpions and centipedes are found. But neither are either as thick or as dangerous here as reported. During the thirteen months I have seen but two centipedes, and, save aboard ship, but this one scorpion. Like all other possible dangers, climates have made the most of them, meaning not only writers but also talkers. Mosquitoes are a little bothersome here, as is to be expected in a moist region.

More light showers this morning. A native simply cannot

cook two things at once. If the coffee pot is on the fire, anything else must wait until it is taken off. This morning our prospects for coffee are slim since the fire will not burn. There is a black ant here which does not seem to travel in armies but alone. They wander all over the blankets and everything else, including one's person. Gnats, too, come in for their share of trouble-making; but a little distance from water and they cease to bother.

The vegetation here is rather mixed. Candlenut, maupi, hibiscus, "mati", and a mango make the tree portion; fei, apura, and many ferns, with a few herbaceous plants, fill in beneath the trees. Tree trunks and rocks are well moss-covered, and where the banks are steep ferns overhang in profusion.

We had light showers this morning while getting out of canyon, and evidently avoided a heavy rain which reached even to the village during mid-day. No birds of any nature except the myna observed en route. In the late afternoon I followed down road to the fern brake where the natives claim Meho, the rail, lives. Adjoining the brakes are light hibiscus thickets with "maapape", the water-weed in which the rail lived at Vaihiria. Myna birds rather abundant here. No sounds of rail yet. I am sitting upon one of the semi-prostrate branches of the hibiscus. I had Noha up beside me. Suddenly he made a few quixotic movements and jumped to earth, there to rid himself of numerous little red ants. He certainly disturbed a nest of them. Now he comes back to investigate. He gets restless and tries to draw me away from my vigil. The one biggest trouble about rail hunting is the mosquito. It usually abounds wherever there is

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The vegetation here is rather mixed. Dandelions, maqui, bilsbeue, "mati", and a mango make the tree position; fel, ayura, and many ferns, with a few herbaceous plants, fill in beneath the trees. Tree trunks and rocks are well moss-covered, and where the banks are steep ferns overhang in profusion.

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a possibility of the rail. How strange that this rail should not have been at least heard and reported by collectors since Forrester's day! The birds are plentiful enough, and frequently heard, but seeing them and getting them is quite another matter. While I listened Matete arrived to help in the search. But in spite of another half hour of listening not a word did we hear of the rail. Matete assured me that this was the place that the natives said abounded in Meho. We will give it the early morning test it deserves, but it is not the best place on earth for seeing them.

October 20

Heavy rain at daylight prevented us from going out after rail. Later in the morning we went down that way and took a canoe out to the gravel island (coral gravel). Before that we picked up a reef heron along the lagoon shore, the smallest I have yet noticed. While yet two hundred yards or more from the island five plover flushed. They did not come near enough for a shot. Why should they be so wild? Here they are seldom molested. One or two yellow-billed terns about the lagoon, but they did not approach within range. A flock of birds just off the reef fishing, so we paddled out there. The main flock departed seaward ere we arrived, but several boobies and six frigates remained near at hand but did not come above the reef. Also some noddies and yellow-billed terns were discernible.

Returned to shore. Picked up a tatler and then above the fern brake shot two white gygis terns. I let Matete practice skinning on the tatler, a male with small organs, not

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Returned to shore. Placed up a trailer and then above the fern brake shot two white egrets terns. I let Stete practice stalking on the trailer, a male with small organs, but

in a very fat condition, and on a myna bird he caught. With a little practice he could easily make a fair skin. My own work doesn't begin to be what it should. Too much field hunting and not enough skinning has certainly not improved my speed or art.

We got in just in time to avoid a very heavy shower and a succession of them continued throughout the afternoon. As the natives desired some myna birds to eat, we killed five for them. They claim to like the bird very much, and cooked in a Tahitian Umu even a starling or crow might be edible.

October 21

If it rained yesterday morning it certainly poured down this morning. The river is considerably swollen. Interior hunting being impractical owing to threatening heavy rains vouchsafed by the flooded streams, we again took to the beach. Obtained four noddies, two that were perched upon coconut palm leaves, and two flying in from lagoon. There were perhaps a dozen observed during the morning. Early courtships apparently. No active nesting as in November of last year at Papeari. Along the shore we picked up two tatlers with winter plumage well advanced. Also found a pair of white gygis terns fluttering about a mango tree, and obtained them with but slight damage. No other birds observed during the morning jaunt outwards along lagoon shore toward Tehupoo.

The lagoon tide is very low this week (due strangely to the last quarter of the moon). No, that won't work out true to the laws of gravity and attraction. This solar tide at Tahiti

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Along the shore we picked up two tattlers with winter plumage well advanced. Also found a pair of white egrets terns fluttering about a mango tree, and obtained them with but slight damage. No other birds observed during the morning. Went outwards along lagoon shore toward Tamapoo.

The lagoon tide is very low tide week (due strangely to the last quarter of the moon). Oh, that wow't were out true to the laws of gravity and attraction. This water tide at tahiti

certainly should be investigated thoroughly. With the quiescent lagoon giving a fair mean level, a careful study could easily be made and some very interesting facts revealed about the odd tidal conditions that prevail here where lunar influences seem very minor indeed.

Have just made the uncomfortable discovery that I have picked up a veritable army of "cooties", which is one more reason for my detestation of the Polynesian natives. Some people think them cleanly, but can lousy people be clean? They may wash a dozen times a day but they never take any trouble to get rid of the lice. Occasionally you will see a child scratching furiously in her hair. When she backs up to her mother the latter will run down the vermin; not very far removed from our anthropoid ancestors, I say. Returning to the house, I stripped down and poured a half cup of kerosene over my hair, then soaped it for several minuted. Had the satisfaction of seeing several lifeless vermin in the suds. But Matete! I could not lay hands on him to get that kerosene into his mass of black hair, a richly inhabited jungle I'm sure from the way he rakes it with his claws every now and then. I had him inspect my head after the bath and he admitted that there were no "utu" remaining. But, being a native, he would just as soon have some excuse for scratching his head. Personally, dandruff suits me.

We dine today upon "pahua", the mollusk with the semi-spherical door to his coiled shell house. These buttons are very numerous all about these lagoons. The mollusk lives out on the reef where it no doubt finds abundant seaweed forage. "Pahua" is the bivalve which presents the beautiful frill of

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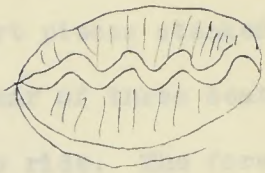
rich purple in the coral beds. This is my first meal of them. I do not like the taste at all and they are too rubbery, all except the one round disc of valve closing muscle, and that was fairly edible. The rest I fed to the dog Noha; he is a very handy table accessory.



Matete spoiled both of the tatlers, doing worse than he did yesterday. I did no better and spoiled both of the gygis terns. They were evidently mating, as both female and male organs were swelling a little. The noddy, too, is swelling as much, or even a little more in the males. Felt much better after making a tolerably good skin of the swallow, and the noddies of course gave no trouble. Lack of funds drives me back to Papeete tomorrow.

October 22

Took the Chinaman's truck for Papeete at eight o'clock. They are loading some posts on now. I'm curious as to where they go. I have seen my first white man afflicted with elephantiasis. By all the gods of Polynesia, what a damnable curse!

The tide is defying the laws by being low at eleven o'clock. Myna birds find a good forage along the exposed lagoon shoals. A few reef herons and yellow-billed terns along the shore. Notes hardly worth recording except to show that a

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very noticeable scarcity even of sea birds exists in Tahiti.

Having gathered a load of fei, copra, soap cakes and sundries, the "Tinto" is now trying to find place for half a load of lumber of various lengths. Short pieces stacked above the bags of copra projecting over the rear of three seats sent me into the front seat where I intend to ride. The fore ends of the long scantlings are dangerously near my plant bags. In fact, I had to shove them back a little to be sure they would not rub. The Chinamen certainly are hard after the business, which here is rapidly becoming theirs. No wonder California objects to yellow men! I'll object more strongly than anyone else when I return home. I've had my lesson of racial equality. I'm solidly and intolerantly firm for a white America. While upon the racial question, what a shame it is that some of these Polynesian islands could not have been left as reservations for the Polynesian race, untouched by white men! But that could hardly be, for we are so domineering that we would have influenced them one way or another. Will our domineering secure us the future?

Arrived in town about three P. M.

October 23

Worked on plants, finding one package of Fantana plants a bit mildewy and damp. How much drying must they get? Mr. Beck came in this afternoon, and it certainly felt good to see him again. He had good success and put up his usual quantity of high quality specimens. I sent Matete out to find Tafai for

very noticeable scarcity even of sea birds exists in Samoa.

Having gathered a load of fuel, copra, copy canoe and sundries, the "Pinto" is now trying to find place for half a load of lumber of various lengths. Short pieces stacked above the bags of copra projecting over the rear of three seats sent me into the front seat where I intend to ride. The fore ends of the long scantlings are dangerously near my plant bags. In fact, I had to shove them back a little to be sure they would not run. The Chinaman certainly are hard after the business, which here is rapidly becoming theirs. No wonder California objects to yellow men! I'll object more strongly than anyone else when I return home. I've had my lesson of racial equality. I'm solidly and intolerantly firm for a white America. While upon the racial question, what a shame it is that some of these Polynesian islands could not have been left as reservations for the Polynesian race, untouched by white men! But that could hardly be, for we are so domineering that we would have intermeddled them one way or another. Will our domineering secure us the future?

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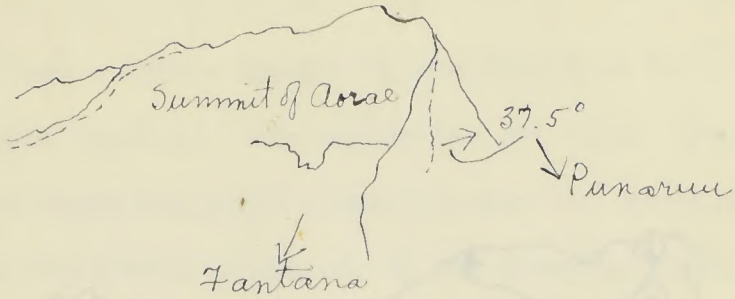
the purpose of getting native names of plants.



October 25

Tafai says rabbits are to be found in the mountains of Tahiti. They cannot be very numerous or I would have seen some of them. Tafai gave the names of the plants he knew. A man named Tu Nuto has agreed to meet me upon my return from Moorea and tell me the names and medicinal uses of each.

October 26

Took boat for Moorea this morning. Sea but slightly rippled. Swells not large. The birds observed while crossing were: one yellow-billed tern; four noddy terns; three red-legged boobies. A flock of boobies and lesser noddies were fishing in our course. The boobies were resting upon the water for the most part, rising at our approach. The lesser noddy apparently does not frequent the Tahitian lagoon shores, for I have not recorded one inside the lagoon. Here they appear more numerous than the noddy itself. No tubinares observed on trip across.

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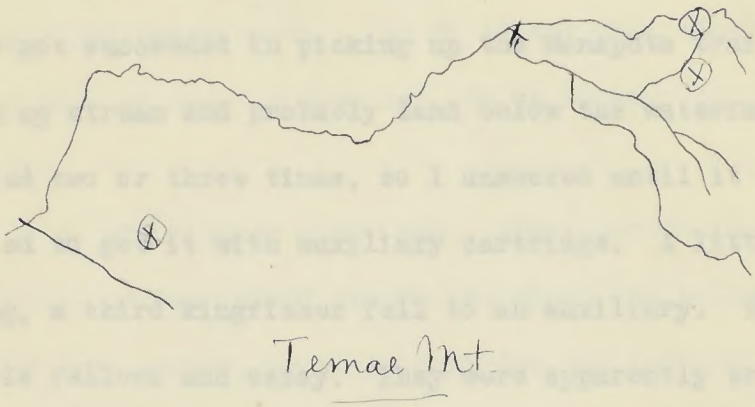
O'Reilly says there has been little, if any, rain since I left. The hills and ridges certainly seem brown and sere.



Temae Mt. "X" marks locations of shearwater (P. rostrata) colonies found in July. Peak where Meho (rail), Porzana sp. (?) were searched for and nest and eggs found. A school of porpoise in the pass very close to ship.

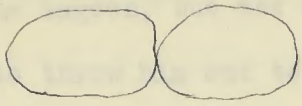
Arrived at Afareaitu at 9:45. Had lunch with O'Reilly after straightening out equipment, and then struck out for the mountains towards Monaputa trail. We passed a rock wall which showed the first signs of artistic rock forming I have come upon. To the northward of the village of Afareaitu there are numerous old Marais and rock walls. The face of this one was very even

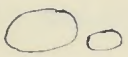
O'Reilly says there has been little, if any, rain since I left. The hills and ridges certainly seem brown and bare.

Image 14. "X" marks locations of anemovator (E. rostrata) colonies found in July. Peak where zone (red), Foraxus sp. (?) were searched for and nest and eggs found. A school of porpoise in the pass very close to ship.

Arrived at Alrawaiin at 2:45. Had lunch with O'Reilly after straightening out equipment, and then struck out for the mountains towards Hamgarin street. We passed a rock wall which showed the first signs of artifacts rock forming I have seen upon, to the northward of the village of Alrawaiin there are numerous old burials and rock walls. The face of this one was very even

and regular with chipped down boulders about the size of a man's head, and oblong ovoid in shape. Tried to get a picture.



Just a little beyond, Matete showed me two kingfishers very close together. One number ten got them. They had light and dark plumages, quite different from the Tahitian bird. We have not succeeded in picking up the Monaputa trail, so will work up stream and probably land below the waterfall. A dove called two or three times, so I answered until it came overhead. Failed to get it with auxiliary cartridge. A little farther along, a third kingfisher fell to an auxiliary. They are curious little fellows and sassy. They were apparently breeding since the first two were male and female with swollen gonads. Male was as follows:  . Strange that one only was overly swollen. The third bird was a male with gonads  about that size and equal. No overly large egg in gonad of female, but several were larger than the rest. Made three fair skins. If it weren't for this fellow's large head he'd be a prize bird to handle.

We ascended the Monaputa trail to an altitude of 350 feet, when, hearing a bird, we stopped to listen. Could not at first make out with assurance whether Omamao, the warbler, or the myna. So we sat still and listened long and attentively.

Awoke two hours later, having remained up until after midnight overhauling old journals, and having arisen before five this morning to catch the boat. So I rated two more

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We succeeded the Honeycomb trail to an altitude of 380 feet, when, hearing a bird, we stopped to listen. Could not at first make out with assurance whether Cassmo, the warbler, or the myna. So we sat still and listened long and attentively.

Among two hours later, having reclimed up until after midnight overhauling old journals, and having arisen before five this morning to catch the heat. So I taked two more

hours of sleep alright. Killed a male dove returning, but carelessly cut the tail off in skinning. Also obtained a tatler along the lagoon, but the dog in retrieving it from the water (I had to throw him out to the bird) spoiled the specimen. The dove was a male with gonad 1.2 cm. long and .6 cm. wide. The doves we met down in the breadfruit trees just above the Maroes. Also heard kingfishers there. The birds are down among the plantations here as much as they are out at Papeari or Hitia on Tahiti.

R L

At six o'clock after tea I had a native take me in a canoe out to the island beside the pass. We walked around the island just before, or while darkness was falling. Heard a tatler, but there were no birds in the tree tops when I shot to scare them.

Again coming to Moorea makes me wonder if the lake and the lagoon, land-locked streams, have been collected for fish. The fish in the lake here at Moorea must certainly be of vast interest. What and where is its nearest of kin? No fish about these regions is like it that I know of. Forrest says the "Albatross" certainly did not collect fresh water fishes. We should be accompanied by an ichthyologist. He could also handle land snails and reptiles, both of which are very low in number of species.

October 27

Daylight this morning was ushered in by several roosters

hours of sleep alright. Killed a male dove returning, but carelessly cut the tail off in skinning. Also obtained a tailor along the lagoon, but the dog in retrieving it from the water (I had to throw him out to the bird) spoiled the specimen. The dove was a male with pound 1.5 oz. long and .6 oz. wide. The doves we met down in the breadfruit trees just above the barrow. Also heard kingfishers there. The birds are down among the plantations here as much as they are out at Paparri or Bitia on Tabiti.

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Again coming to Rotoroa makes me wonder if the lake and the lagoon, land-locked streams, have been collected for fish. The fish in the lake here at Rotoroa must certainly be of vast interest. What and where is the nearest or kind of fish about these regions is like it that I know of. Forrest says the "Alexroa" certainly did not collect fresh water fishes. We should be accompanied by an ichthyologist. He could also handle land snails and reptiles, both of which are very low in number of species.

October 27

Daylight this morning was wakened in by several roosters

crowing, prominent among them the wild cock. Mr. O'Reilly has her. He kept a pair of them tied up only four days and now they remain about like tame chickens. Creedland thinks that fact evidence that the bird is nothing but the tame chicken gone wild in the jungle. Creedland also tells of common tame chickens taken to his island in the Paumotus, which, after being turned loose for a few weeks, were as able to fly as these wild birds. But I have yet to see such graceful flight among tame chickens as these wild ones portray. Furthermore, the small size and gracefulness of this pair of O'Reilly's is remarkable. They are larger than most bantams but more slender and graceful, which I attribute to their flight. They have gone across the road and into the bush this morning. Another thing is that distinctive and specific crow. It was readily distinguished this morning from the three or four other birds' calls. Of course they may be but a variety; a little experimenting in breeding would determine that point. If they cross and produce fertile chicks, are they specifically different? The natives claim they do this, but it should be scientifically experimented upon. Moorea would be just the place for the experiment. It is possible that the natives introduced them, and so brought in a variety with different characters than the European birds; but Stimpson tells me that the native traditions say the "Moa" was here when the natives arrived. The term "famu" which distinguishes the tamed fowl signifies "which has been fed". Will try photographing O'Reilly's birds Sunday.

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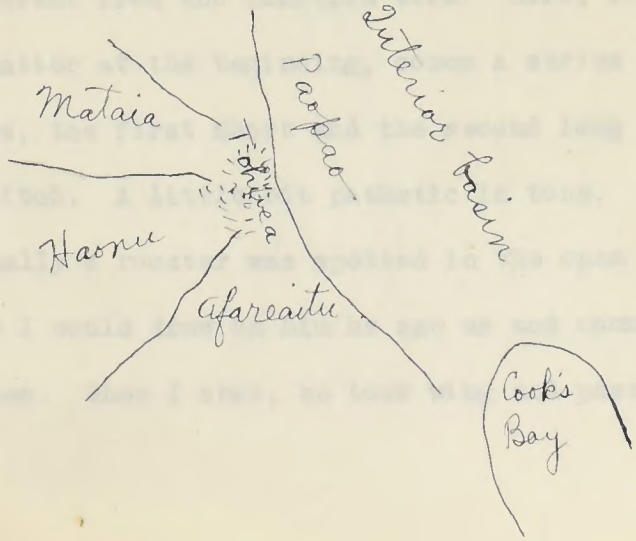
At seven o'clock we left in the canoe for Mataia, a much cheaper mode of travel than horse and cart. The first bird observed is a gygis tern, "Itatae", flying inland from above the lagoon. Clouds about Tahiti this morning. Perfectly clear here. Nice, undulating swells are coming in from the pass, but these out riggers ride the wave with marvellous ease and apparent safety so long as the weight is toward the out rigging. Three more gygis terns are hovering above the coconut palms south of the village. It is their nesting season.

With the triangles I estimate the slopes of Tahiti very nearly fifteen degrees from horizontal, the Point Venus slope being a trifle under, and the Papara slope being a little more. Tohivea is a block of lava, having a roughly ? base. One ridge extends northwestward between Afareaitu and Paopao valleys; another ENE between Afareaitu and Haomu; another ESE between Haomu and Mataia; the fourth between Mataia and ; and a fifth between ? and Paopao or the east half of the interior basin of Moorea.



It seems obvious we left in the canoe for Matala, a much cheaper mode of travel than horse and cart. The first bird observed is a sooty tern, "Italian", flying inland from above the lagoon. Clouds about Zenkti this morning. Perfectly clear here. Tree, undulating swells are coming in from the pass, but these out-riggers ride the wave with marvellous ease and apparent safety so long as the weight is toward the out-rigging. Three more sooty terns are hovering above the coconut palms south of the village. It is their nesting season.

With the triangles I estimate the slopes of Zenkti very nearly fifteen degrees from horizontal, the Point Venus slope being a trifle under, and the Papara slope being a little more. Tonives is a block of lava, having a roughly [illegible] base. One ridge extends northwestward between Afaresitu and Tuopao valleys; another SW between Afaresitu and Haapu; another SSE between Haapu and Matata; the fourth between Matata and [illegible]; and a fifth between [illegible] and Papara or the east half of the interior basin of Moreno.

Off Haomu we are in the trade wind which comes at about SE x E around the Papara point of Tahiti. Here on the point of the Haomu-Mataia ridge are a few clusters of the ironwood trees; farther up the ridges they are more plentiful.

At Mataia the noddies were flying above the coconut palms in considerable numbers, but not in thick flocks at all. They were mostly in groups of three, four, or five. We arrived much earlier than I expected, and, after buying provisions at the store, Matete and I packed outfit about two kilometers up the valley, taking trail up small stream coming down from left ridge. I hoped it would lead me to the crossing into next valley, but it doesn't as we have found out since luncheon. There was an old man with three hounds in a little hut just above us. He says four dozen chickens were sent to Papeete from here just recently. Matete is setting some traps now. Mosquitoes are very numerous and bothersome.

Left Matete setting traps and worked along hillside a way before following up a dry ravine where Maupi groves furnished fair traveling. Nothing occurred except for two or three kingfishers giving that distinctive call of theirs, quite different from the Tahitian bird. Here, following the excited chatter at the beginning, comes a series of two-noted calls, the first short and the second long and about the same pitch. A little bit pathetic in tone.

Finally a rooster was spotted in the open maupi grove, but before I could draw on him he saw us and commenced dodging behind trees. When I shot, he took wing and passed within

On Noemu we are in the trade wind which comes at about SE x E around the Negros point of Fanfti. Here on the point of the Noemu-Batia ridge are a few clusters of the ironwood trees; farther up the ridges they are more plentiful.

At Batia the noddies were flying above the coconut palms in considerable numbers, but not in their flocks at all. They were mostly in groups of three, four, or five. We arrived much earlier than I expected, and, after buying provisions at the store, Tatete and I paddled until about two kilometers up the valley, taking trail up small stream coming down from left ridge. I hoped it would lead me to the crossing into next valley, but it doesn't as we have found out since lunchtime. There was an old man with three mounds in a little hut just above us. He says four dozen chickens were sent to Napeete from here last recently. Tatete is setting some traps now. Mosquitoes are very numerous and bothersome.

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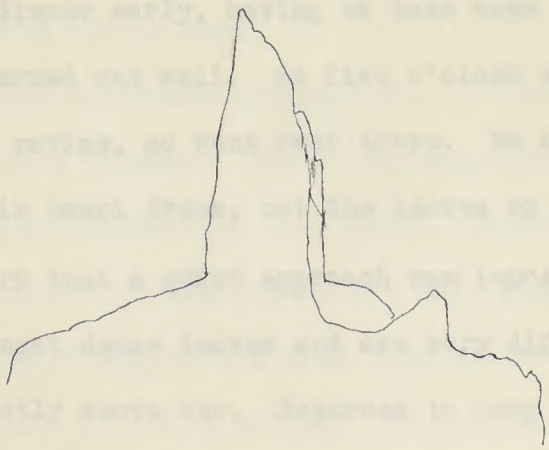
Finally a rooster was spotted in the open mangi grove, but before I could draw on him he saw us and commenced dodging behind trees. When I shot, he took wing and passed within

good range of me but I seemed to miss him entirely. He was mostly black. Stopping just above this place, I heard doves calling. One came into trees overhead and I got him. It will be worth while to get a few at this season. I hardly think the young birds are very big yet, but if they were breeding in June and July they ought to be about half grown at least. I have searched at length for the nest of these birds but have not seen one.

Attained an altitude of one thousand feet, and then being able to see over into the warbler vale next to the southwest, I worked around and onto the intervening ridge, where I am now perched upon a rock listening for warblers. Doves, kingfishers, roosters, and myna birds are all I hear. What a well forested valley this is! The Moorea valleys are not like the Tahitian gorges. In fact, they are broad U-shaped valleys revealing considerably more weathering than the Tahitian ones.

Here is an end view of the Moorean equivalent to the Diadime. It hardly has the grace of that rock, however.

Mouaroa from Mataia ridge.



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Attained an altitude of one thousand feet, and then being able to see over into the warlier vale next to the southwest, I worked around and onto the intervening ridge, where I am now perched upon a rock listening for warblers. Doves, kingfishers, roosters, and some birds are all I hear. What a well forested valley this is! The Quorra valleys are not like the Tahitian gorges. In fact, they are broad ( )-shaped valleys revealing considerably more weathering than the Tahitian ones.

Here is an end view of the Quorran equivalent to the Diadime. It hardly has the grace of that rock, however.

Quorra from Matala ridge.

On the further slope of Mataia valley the forest consists more of the tall "Vii" trees from which the natives make their canoes, and the fruit of which is very delicious. Ripe fruit falls to the ground in July. (Roosters are crowing profusely.) The ridge here is mostly covered with Puro, just a few Pini being mixed in. There are trees with primately separated leaves, like acacias, quite frequently spotting the forest green with a different shade. There is an occasional ironwood, a few clumps of bamboo, maupi groves, and the vii, also a tree with light, blue-gray foliage which tones down the green. There are many other things before reaching the inevitable coconut palms, but one can name only the more prominent. There is a low pass over this ridge a little farther on, and I am hoping it will have a trail leading down towards camp.

The trail was there, a goat trail coming from the back on the sidehill, in which it soon dispersed. It saved wallowing through ferns over the summit hills, however. I blazed a trail down the ravine until I reached a main trail which seemed also to come down from the pass. Proceeded on to camp without seeing anything to shoot at.

We ate dinner early, having to bake some flapjacks for bread, which turned out well. At five o'clock we heard roosters crowing across ravine, so went over there. We found the roosts of five birds in Maupi trees, but the leaves on the ground are so thick and dry that a quiet approach was impossible. Also they roost amongst dense leaves and are very difficult to see, even when directly above one. Returned to camp without game

On the farther slope of Kahale valley the forest contains more of the tall "vii" trees from which the natives make their canoes, and the fruit of which is very delicious. Ripe fruit falls to the ground in July. (Boosters are growing protusely.) The ridge here is mostly covered with fern, just a few fini being mixed in. There are trees with prickly scented leaves, like acacias, quite frequently spotting the forest green with a different shade. There is an occasional ironwood, a few clumps of bamboo, nauqi groves, and the vii, also a tree with light, blue-gray foliage which tones down the green. There are many other things before reaching the inevitable coconut palms, but one can make only the more prominent. There is a low pass over this ridge a little farther on, and I am hoping it will have a trail leading down towards camp.

The trail was there, a good trail coming from the back on the ridge, in which it soon dispersed. It gave walking through ferns over the summit hills, however. I chased a trail down the ravine until I reached a main trail which seemed also to come down from the pass. Proceeded on to camp without seeing anything to shoot at.

We ate dinner early, having to make some flapjacks for bread, which turned out well. At five o'clock we heard boosters crowing across ravine, so went over there. We found the roosts of five birds in dead trees, but the leaves on the ground are so thick and dry that a quiet approach was impossible. Also they roost amongst dense leaves and are very difficult to see, even when directly above one. Returned to camp without game

for the day, except a dove which I again spoiled in the skinning.

October 28

Hit the trail at six. White terns above trees and weaver birds and myna in trees. Kingfishers, doves and fowl calling. Noha, the pup, smelled chickens, so I turned him loose in a thicket, hoping the birds would flush into range, but they treed so we followed in. Got below one hen but missed her on the wing. Tried the main trail seen yester-evening. It led towards the main Mataia valley, so we had to leave it. Had to wallow through ferns to get to goat trail. Very hot.

Down the Omamoa side does not promise very rapid traveling. It will make at least a good day's trip with little time for the hunting up the other valley. Saw two hawks while we were on the ridge, but they did not come over us. It was rather a steep drop down through maupi, hibiscus and candlenut trees, with very little brush but plenty of loose rocks. Just before arriving at the stream-bed we passed through a rather extensive field of vanilla. Followed up the stream but took a different trail to the one followed in July. Ran into first warblers at 850 feet. Secured one of them.

Followed up trail and crossed over to orange trees where birds were obtained in July. Saw three kingfishers at a distance and tried a shot at them but missed. Obtained a green dove by calling while we ate lunch. No more birds have called. Matete desires to return by the pass, against my desire to drop down to lagoon and follow it around. A black cloud is coming

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Hit the trail at six. White terns above trees and weaver birds and cyms in trees. Kingfishers, doves and fowl calling. Zoba, the pup, smelled chickens, so I turned him loose in a thicket, hoping the birds would flush into range, but they treed so we followed in. Got below one hen but missed her on the wing. Tried the main trail seen yester-evening. It led towards the main Takala valley, so we had to leave it. Had to wallow through ferns to get to goat trail. Very wet.

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over Tohivea from ENE.

The warbler's gonads were about this size 8 and soft and milky-like. The dove, kingfisher and hen were all shot in the abdomen and spoiled, but I was too tired to skin them last night.

We returned by the pass, and I lost my spectacles somewhere while resting. I am at least a month from another pair. Descending, we picked up a kingfisher, and later flushed a chicken. As she did not fly I started to stalk her, but the pup created such a barking about a log that we were forced to give him our attention. Beneath it we found and captured a lone chick. Holding it so that it peeped a lot, we attracted the hen, and although she kept well under cover I caught sight of her tail and blazed away. She took wing poorly and disappeared in a wounded condition, but ceased to cackle shortly afterwards. We searched about but found nothing of her. Soon we started down the ravine for camp and the dog began scenting and shortly after routed the wounded hen from a pile of leaves in which she was safely hidden from sight. He rapidly caught her.

As we approached camp we heard a rooster crow across the ravine. Went over and, unknown to me, the boy separated from me. I saw the fowl hiding in some brush and raised the gun to shoot when I realized the boy had left me and gone around to the further side of the brush. So I had to stand by and not shoot till the birds (there were three hens, a rooster, and a half grown chick) moved away. Missed two shots at the flying

over Tonkwa from NNE.

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birds through the jungle. Later we heard a chick or two peeping there. Arrived at Matea with our load at four o'clock. Tried to get some yellow-bill and noddy terns but failed to drop them. Shot a tatler out in water and the pup went after it, retrieving it beautifully. Too much wind for canoeing back to Afareaitu, so the man carried the load, with Matete's help, along the road. I came on ahead.

October 29

Packed up what stuff I wouldn't need until next week and shipped it to Papetoi, c/o Wood. With the help of the Chinamen we can carry the rest. Although I have seen tropic-birds flying over the coconut palms towards the mountains from here, when I went over to the rock this morning I found no signs of habitation. This is a bold bit of lava standing prominently above the trees not far from the roadway. In it are several holes, but in one deeper than the rest sticks are piled in considerable numbers. A native boy with me in July claimed it to be the tropic-bird's nest, but I doubt it, as there are no feathers or sign nearby. Noddies and yellow-billed terns, though not numerous, were occasionally seen this morning. Tatlers are now quite numerous again, and most are in their southern plumage already.

In the afternoon I hiked up into the waterfall valley just north of Afareaitu. The waterfall after this long period of drought is a mere thread of white dangling over the black strip of moistened cliff, on either side of which vegetation

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hides the rocks. The head of the valley into which the stream enters by the waterfall is well wooded by the usual ravine trees, giving it the tropical, dark green hue. On the north rise several prominent bluffs with attractive holes in their faces, but no birds are near them. Opposite is a fern-covered ridge, recently burned, and now a discordant black blotch on the landscape. One year of rain, however, and it will not be noticeable. With the exception of two kingfishers seen, and a few doves and fowls heard, the natural history is very quiet. That is, all but the mosquitoes, which are exceedingly active. After a shower this morning the weather has been threatening. But for the babble of the nearby brook, perfect solitude would reign. A little climbing up either side hill will take a fellow up out of the sound of it. Any person desiring solitude can certainly find it here. How lacking in temptation is a place so quiet when one has once been over it! If you cannot hear, or at least imagine the next ravine as the habitat of desirable specimens, it is not so tempting to climb to it.

In a position that commanded the head of the valley I still hunted by watching and listening for half an hour. Nothing was heard and less seen. Now as I return down trail a lone dove and a distant rooster break the absolute solitude. Were the kingfisher here not more noisy than his Tahitian cousin, Moorea would be of less interest than the other island to the inland traveler. There seems to be a great deal more soil here, which probably accounts for the different appearance of the foliage. Except for the valley plateaus, Tahiti is all gorges

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and mountains, with nothing to compare to the broad valleys and the interior basin of Moorea. Now the crickets have commenced chirping. A weaver bird reminds me that after two months of hunting in this island I have not found the third species, the red-cheeked without the red rump, which we found in Tahiti. Another very noticeable thing here is the almost total lack of swallows, only one having been observed thus far. Monday I will again visit the cliffs at Paopao where I obtained it and heard the shearwater, Rao (P. neglecta). Returned to O'Reilly's without further encountering any birds, although I saw one noddy above the trees. Since I have been ready to shoot them, none have come within range.

October 30

O'Reilly has a pair of wild fowl which has afforded me some close-up studies of the birds. The cock is a trim little fellow, no heavier but more elongated than a bantam. He is evidently a young bird and has the distinctive crow of the wild fowls. (Figure I.) The little hen I could not get to see closely, but she greatly resembles an old hen O'Reilly purchased for me. (Figure 2.) He also obtained a very handsome cock, black-breasted and tailed, neck feathers a rusty gray, upper wing coverts a reddish brown, scapulars and saddle feathers corresponding to neck, secondaries a pale chocolate brown. I have been wondering if it would be possible to send them alive to America, and if they would be of interest to the Museum; hence I will take them to Papeete in a box to consult Mr. Beck.

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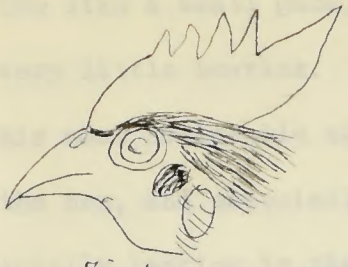
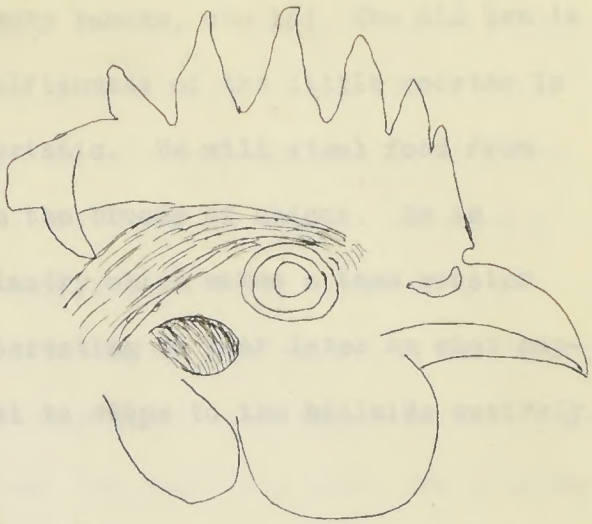


Fig. 1



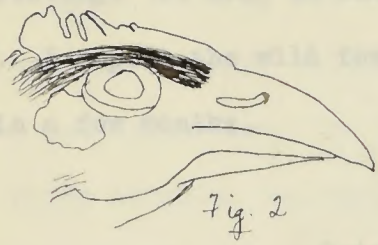


Fig. 2

Fig. 3

Today because I was not out hunting I saw tropic-birds, noddies, yellow-billed and white terns. In the afternoon I gave the bulk of equipment to the Chinamen to transfer around to the Paopao, whither we will hike by mountain routes tomorrow with light packs.

Here in the tropics the chickens roost high in the trees,- there is no other place for them. An interesting incident is to watch a hen with young chicks towards dusk. She flies into the lower branches of a tree and remains there at length while the chicks below peep piteously. After a while the hen comes down to earth, but later performs in the same manner. This method should teach the young to fly early.

The small wild rooster, after being fed a few days, was turned loose, and, although a bit scary, remained about the house. But each day he has fed farther towards the hills, and now spends most of the day back of the plantation. Instead of roosting in the trees along the beach he roosts with the little

hen in the Puro trees near the hillside. They are here now. How like a small game, or heavy bantam, she is! The old hen is very little heavier. The selfishness of the little rooster is his most noticeable characteristic. He will steal food from the hen, and especially from the broods of chicks. He is totally lacking in that gallantry which makes a tame rooster interesting. It will be interesting to hear later on what happens. I expect the wild fowl to elope to the hillside entirely within a few months.

October 31

Even as it is, we have fairly heavy loads to carry over the pass to the Paopao from Vaiari (?). It is a very clear day, although the wind continues ENE. In coming along the road I was struck by the uncivil attitude of passing natives to the boy with me. If unknown, he says, they never speak,--about like our own people in cities. As for me, I prefer to see the farmers in an outlying district greet everyone with a hearty, sincere "How d'e do!" It does away with that feeling of being a stranger in an inhospitable land. I put these natives down as just that inhospitable. They only give where they can expect full compensation. Heartless and insincere, they ask one to come and eat when they don't mean it. They give presents in anticipation of greater gifts in return. An insincerity that grates upon the nerves pervades them. Matete does not like Moorea. There are no natives near, and he hasn't gone anywhere to form acquaintances.

O'Reilly had three young ducklings, and Sunday he turned

hen in the two trees near the hillside. They are here now. Now like a small game, or heavy bantam, who is! The old hen is very little heavier. The selfishness of the little rooster is his most noticeable characteristic. He will steal food from the hen, and especially from the crooks of chickens. He is totally lacking in that gallantry which makes a tame rooster interesting. It will be interesting to hear later on what happens. I expect the wild fowl to elope to the hillside entirely within a few months.

October 21

Even as it is, we have fairly heavy loads to carry over the pass to the Saopao from Vaiari (?). It is a very clear day, although the wind continues ESE. In coming along the road I was struck by the unduly attitude of passing natives to the boy with me. If unknown, he says, they never speak,--about like our own people in cities. As for me, I prefer to see the farmers in an outlying district greet everyone with a hearty, almost "how d'e do!" It does away with that feeling of being a stranger in an inhospitable land. I put these natives down as just that inhospitable. They only give where they can expect full compensation. Heartless and insincere, they ask one to come and eat when they don't mean it. They give presents in anticipation of greater gifts in return. An insincerity that grates upon the nerves pervades them. Hatate does not like Soorua. There are no natives down, and he hasn't gone anywhere to form acquaintances.

O'Reilly had three young donkeys, and Sunday he turned

them loose in a bit of slough for a swim. In the evening, upon rounding them up, one was found missing. The mysterious disappearance we suspect to be due to abduction by the crabs which infest this neighborhood, but we have only suspicious evidence. The staple article of diet of the crabs is leaves, especially of the Puro. The ground is kept scrupulously clean of them.

As we start up the valley beyond the inner end of the bay some natives "paurau" extensively about some manu. A lad climbs a tree and brings down the legs and head of a hawk, and a young lady comes carrying the whole of a bird save what the maggots had disposed of. It seems they caught them in one of the snare traps, but whether or not they used bait I could not discover. It is well to know the bird has some enemies, else it might over-run these islands. Still, now that it has killed off the Rupi, is it not best to let it live and eat a few of the plentiful rats? Having let the hawk into the country, it is too late to try to exterminate such a hardy bird. It is eating rats in some numbers here in Moorea, and the few chickens it can get it deserves for the rats it kills. But we intelligent beings act so ignorantly concerning the other animals which aid or injure us.

There were several tatlers along the shore and the dog, Noha, was right after them. I was very surprised to see them hovering near him and alighting very near him along the shore. A little fooling like that would give a cat ample opportunity to catch them. Here are two wasps alighted upon a banana blossom. What can they be after?

The following sketch is of Monaputa as it appears from

them loose in a bit or slough for a week. In the evening, upon rounding them up, one was found missing. The mysterious disappearance we suspect to be due to abduction by the crabs which infest this neighborhood, but we have only suspicious evidence. The staple article of diet of the crabs is leaves, especially of the Puro. The ground is kept scrupulously clean of them.

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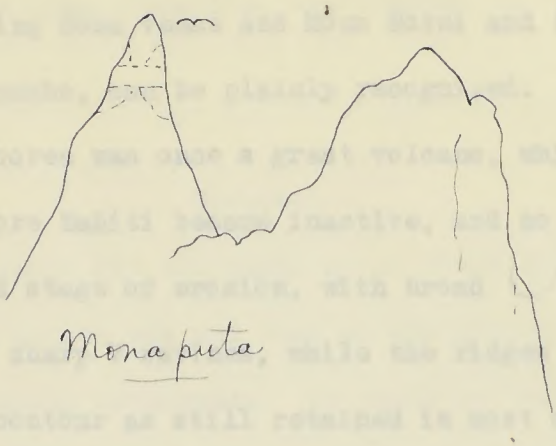
There were several twiters along the shore and the dog, Cona, was right after them. I was very surprised to see them hovering near him and alighting very near him along the shore. A little fooling like that would give a cat ample opportunity to catch them. Here are two wagps alighted upon a banana blossom. What can they be after?

The following sketch is of Konajuka as it appears from

the northeast end, which is wider than the face through which the spear (?) hole penetrates. A hawk is soaring above it.



At one of our rests I called a cuckoo. I feared they had left these islands, but at last my calling brought one into the tree overhead. How difficult it is to see them! Their spotted plumage is perfect camouflage. Two or three other rests were employed in cooing to doves, but none of them came very close. Another time we dined upon Papayas while resting, with myna birds our only company. We failed to follow the trail through some bananas, and so had to pick our way to the summit of the ridge. We found where someone had cut lightly along the trail we encountered. Followed it to the summit. Very strong wind ENE.

The twin valleys of Opunho and Paopao appear to be fearfully dried up. The fern brake ridges are brown and sere, and the plants, like lantana, haven't much color in them, not even green. Many ferns are shriveled and show a decided lack of moisture. The streams are running but very little water, and

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it is usually quite warm. Have heard nothing of bird life here on the ridge where we have rested at length and lunched. Elevation twelve hundred feet.

From here the old wall that crossed at the head of Cook's Bay, connecting Mona Temae and Mona Rotui and its continuation beyond the Opunho, can be plainly recognized. I have little doubt that Moorea was once a great volcano, which ceased erupting long before Tahiti became inactive, and so is now in a far more advanced stage of erosion, with broad U valleys instead of gorges or sharp V ravines, while the ridges have lost their former even contour as still retained in most of the Tahiti slopes. A good deal of that erosion had evidently taken place before the present sea level was reached. The sinking of the land has drowned the valleys, but a long stage of rest has permitted most of the interior valleys to be graded down fairly well. Also, there has been just a slight uplift, as is evidenced by the old coral deposits around the lagoon now a meter or so above sea level; it is especially noticeable at the islands. All is not a steady sinking or uplifting, but rather a wavering of the coast line is evidenced by these islands.

Descending into the Paopao took more than two hours. One could make better time around the road, even if there were a well defined trail across this way. Noha worked hard on chicken scent today and flushed four birds (I doubt if he can be controlled), two of them passing within range, but I failed to get shots at them. Another alighted high in a tree, but I must have shot carelessly, for he took wing and flew well. The birds

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do not fly so far from the dog as they do when flushed by man. If they would merely tree, even a fox terrier would be good. He certainly has the ability to scent them out. We were fortunate to find a Chinaman at the road and so secure some bread. He comes here from Afareaitu, overlapping two Marepa Tintos' routes.

November 1

We stopped for the night at J. Frank Stimpson's house, Paopao. The native was not home at our arrival, but came in his canoe shortly afterwards. He tells me that the Upoa, meaning Rao, P. neglecta, is not to be heard any more. Sure enough, throughout the evening and early morning not a sound of them was heard! How careless of these natives not to distinguish between the calls of the Upoa and Rao! They are quite distinct in tone. These cliff-nesting Rao evidently have not been caught by the natives over here, or their error would be evident. This morning we will visit the cliff in search of swallows, one of which I obtained here in July.

We are up in that same cave I visited in July. We brought a special pole along and prodded about in the hole above the dung pile, but obtained not a sound of birds. Seeing something white in the detritus on the floor of the cave, I investigated and found it to be salt. It is all through the matrix of the conglomerate which composes this soft zone, signifying, no doubt, that here once upon a time was the seashore, and the conglomerate was a gravelly beach. But why no fossils? Nor could it have been an old beach, because the component pebbles are but slightly

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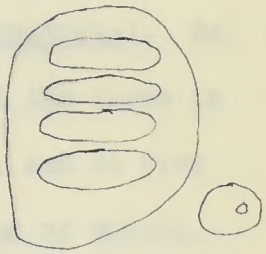
smoothed down. I have just returned along the entire accessible portion here and have failed to find the least sign of fossil. Banded sand and gravel show up plainly enough in places, but a general conglomerate seems to hint at a beach at the base of a precipice where large boulders could occur. Perhaps a microscopic examination of the salt and its surrounding sediment might reveal minute life of interest.

The first sign I have seen of a leaf-cutting bee in these islands was here, where one about this size  was carrying a piece of leaf. He flew off with it. There are also here three different kinds of wasps at least, one with a series of elongated cells placed side by side; another with solitary circular cells of mud; and the third with paper nests suspended from the roof of the cave, not large. It is too bad that the whole biological field isn't being covered at the same time; but such expeditions require great leadership no doubt.



This conglomerate layer continues some ten meters below the roof of the cave. Another shelf below I investigated carefully but found no sign of fossil recognizable by the unaided eye. The matrix below seems to be more set, and so crumbling does not occur so rapidly as in the cave above. In these rocks I saw a green skink unlike any I have observed elsewhere on the island. The bronze-backed, blue-tailed variety is very common in Moorea.

We dropped down through the brush on the steep talus

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We dropped down through the brush on the steep talus

slope between the cliff and the bay. The dog picked up chicken scent very well, but is too much fox terrier and uncontrollable. I have been obliged to prohibit Matete from speaking to him. He is spoiling the pup by playing with him, and by the usual native lack of effort to control. Doves are calling but seem to be rather reticent and will not come near me. The woods here are composed for the most part of the hibiscus with its irregularly directed trunks; in places rather inaccessible but elsewhere fairly open. One or two noddies above this inner bay and three gygis terns at the end of it this morning. Took some photographs of the cliffs and Monaputa.

After lunch, when the Tinto came, we left. Saw several noddies and a yellow-bill at mouth of the bay. Came on to my guide of two months ago. He tells me that he again visited Mona Petui and obtained five shearwaters (P. rostrata). He says Noha were much nearer than where we found the three in July. We came on over to Papetoi in the cart, and at five P. M. took canoe for the island at the west end of Moorea. The canoe, the same one we used in July, has a rather large hole in the stern which keeps Matete busy bailing. In this portion of the lagoon rocks of coral protrude. We picked up two yellow-billed terns along the route, but did not go out of our way for them.

November 2

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above the flock of boobies, and I succeeded in getting one of them. The other two left at my commencing to shoot. I also got a few boobies, but this morning they were in such poor condition from bleeding that I did not make any up. Matete climbed a tree and brought in two alive. One of them he choked, and the other died during the night. There were easily a hundred of them here last night. All but one belated bird had left the roost when we awakened at five. Awake quite often during the night, I listened for the call of the Upoa, but failed to hear it. This morning I made up the terns and frigate bird, showing no increase in speed.

I let the boys, the canoe owner having a permit, walk around the island with the gun while I skinned birds. They came back with two Upoa and the report that the Chinaman hears them a great deal at night. We have just finished lunch and will spend the afternoon searching for and marking nests so Mr. Beck can come and photograph them.

Again I must note down the very interesting geological study there is to be made here. Of course it is a study of geology in the making. The base of this island is a mass of coral comglomerate cemented into a solid rock. In the bed are blocks of corals and even shells very similar to those found in the loose gravel immediately above. Are such beds being cemented together in these lagoons at present? It is very likely, for of just such a mixture are the bottoms of the lagoons composed. Moved camp to the northwest end of the island where we will listen to the Upoa tonight.

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Upoa commenced just as we were finishing supper about seven o'clock. Then we heard one flying above us. I went out with the lantern and dog, and soon located one in some pandanus leaves. Marked it. The Chinaman burning charcoal here was visiting his burns and one Upoa flew into him. I have heard of that often but have not observed it myself. One flew above me but did not come down to the light. Matete brought the Chinaman's bird to me. Had a difficult job giving them to thoroughly understand that we wanted to try to get some photographs, and so want as many birds here as possible. So we spent an hour and a half walking around listening for the deep monotone, death call of the Upoa. In that manner we located at least ten or a dozen. Several were about at large, much to the amusement of the dog Noha, and unless we watched him closely he would rout others out before we knew where they were located.

Now within a stone's throw of our bed there is the noise of sand being thrown vigorously upon pandanus leaves. A bird is burrowing. After a spell of this noisy scratching he goes below, or so it sounds. Or perhaps he has heard or smelled us and ceased his efforts. In so far as I have yet heard, these birds give a different cry to the two black species found at Christmas Island. There is a light ash gray color below the throat and a barred shading on the back that I do not remember on the P. chlororhynchus.

Awake during the night at various times, I heard the Upoa calling. While flying about they give slightly different notes, one on the intake, the other on the outbreath, apparently.

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It certainly is not so deep and guttural as the Christmas Island birds, but that might have been P. chlororhynchus. Yet P. nativitatis was flying about there more than the other. This calling is indeed uncanny, being very like a painful agonized moan. Such a cry might indeed arouse the natives' superstitions regarding death. This call is far different from the sharp, clarion ring of the second note of Pt. neglecta, Rao, and totally unlike the whistling call of Pt. rostrata (Noha), although it somewhat resembles the groan occasionally following Noha's whistle, and could be compared to the guttural first note of Rao, but neither are very nearly similar. I would place the note at about lower "C", key of C.

During the night came the guttural, rattling croak of the Oio, lesser noddy, which we have not seen by daylight either here or at Tahiti, and so have not obtained. They can be had at sea, however, in any quantity. This native says they nest in June here and fly about the trees in the daylight; but either he is mistaken or else we just didn't happen upon a nesting colony. We heard plenty of birds at night about the Afareaitu district. Also saw some Itatae, white gygis terns. The myna is the only land bird we have encountered.

Just at about daylight, after the last Upoa calling, I heard the flapping wings of the lesser noddy leaving the tree tops above us. While I was taking some pictures, a lesser noddy flew over the island and fortunately I obtained it. The lagoon is exceptionally clear this morning, and what a wealth of life it is!

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November 3

An ichthyologist would be in his glory here this morning, for we have seen dozens of fish in species and dozens of each kind. Also saw the first ray I have observed in these waters; I never imagined they could travel so rapidly. One of the commonest is the fellow who carries the ram above his head, a formidable appearing old warhorse. It is very amusing to watch them dart into the recesses of the coral as they see the canoe. Next to birds I think fish are the most interesting zoological study, unless it might be insects, but they are so vastly impossible. One simply has to specialize on an order of insects.

We are now above the deep channel and even the marvelous light we have this morning cannot penetrate its depth, or is it that the bottom is so even that no objects stand out as the coral rocks elsewhere? That is the explanation,for there appears a kite-like shadow with a long, thin tail, a stinging ray at rest along the sandy bottom. It is more shallow now. This sandy bottom is pierced by thousands of small holes, and now and then there is the trail of something, perhaps a holothurian, across it. In these shallower lagoons where forage of seaweeds abounds the holothurians are very numerous. They do not get very large,--how can one describe their measurements? Now there's the lie for me! We just passed two, ten or fifteen centimeters in diameter and at least thirty long, much larger than any I ever saw at Pacific Groves. But they are scarce, the most of the others being less than ten wide and seldom thirty in length.

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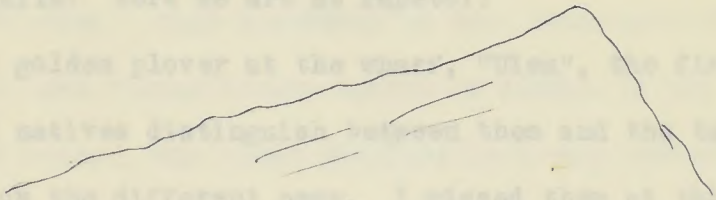
Of all the fishes the most interesting are the little

blue and the green ones so plentiful about each clump of coral, into which they disappear instantaneously. Another amusing fellow is an almost colorless fellow along the sandy bottom, lurking beside a burrow into which he darts at our approach. There is one with plenty of color decorations about the head.

Larapa comes to interfere with my reflections. Four of them perched upon rocks. I called them over to me after the first shot missed, and dropped one with a broken wing. The others came around their fallen comrade, and I obtained a second one. Swollen shells prevented further slaughter. Both birds in good, clean shape. We are now approaching the point of land where I obtained five birds in August. None in this neighborhood.



Mona Rotui shows more plainly than any other in Moorea the former contour of the island. The lava flows were evidently at an angle of twenty degrees from horizontal, the distinct bands being easily discerned from here. The inner slope is much steeper and certainly hints very strongly at a crater within, or, as it appeared while driving around the Opunho bay, a double crater with the ridge running from Rotui to Monaroa being the low separation between them. There may have been a smaller

blue and the green ones so plentiful about each clump of coral, into which they disappear instantaneously. Another amusing fellow is an almost colorless yellow along the sandy bottom, darting beside a barrow into which he darts at our approach. There is one with plenty of color decorations about the head.

Larger oceans to interfere with my reflections. Four of them perched upon rocks. I called them over to me after the first shot missed, and dropped one with a broken wing. The others came around their fallen comrade, and I obtained a second one. Swollen shells prevented further slaughter. Both birds in good, clean shape. We are now approaching the point of land where I obtained five birds in August. None in this neighborhood.

None Point shows more plainly than any other in Ponape the former contour of the island. The lava flows were evidently at an angle of twenty degrees from horizontal, the distinct bands being easily discerned from here. The inner slope is much steeper and certainly rises very strongly at a crater within, or, as it appeared while driving around the Ponape bay, a double crater with the rides running from Kotat to Nonsere being the low separation between them. There may have been a smaller

crater behind Papetoi, or that may be but an eroded basin. I cannot understand why there should be so many ironwood trees on the west end of the island, and only isolated clumps elsewhere. The leeward position may account for it, but I hardly think so. I am inclined to think man has destroyed them elsewhere, but why no stumps or signs? If this tree really is very low in the order of seed plants, why are not fossil remains of it found in these islands? Is it possible that all this volcanic action was prior to the origin of trees? I have seen many very likely beds of conglomerate, but not a sign of fossil wood in them. Volcanic ash seems very scarce, and that, of course, may account for lack of fossils. Were the volcanic eruptions all of molten lava which destroyed rather than preserved fossils? Here we are at Papetoi!

Two golden plover at the wharf, "Uiea", the first time I've heard natives distinguish between them and the tatler, or even mention the different name. I missed them at thirty-five yards. Along the road to Rotui we picked up a gygis tern and a plover. Also killed some myna birds in flock shots for the natives who like to eat them. There were slight showers during the afternoon. Barometer down another tenth of an inch makes me suspicious of stormy weather. Wind still north of east.

The yellow-billed terns evidently are not approaching the laying season, or is it that these are mostly young birds with no inclination to breed? The fact that this bird does not nest about here has made particular note of them worth while. From the development of their gonads I have been unable to determine anything regarding their season. No doubt the

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homing instinct is coincident with swelling organs, and such birds migrate.

The live Upoa that the guide brought home to exhibit to his folks was finally given to me to skin. It proved to be a male with gonads swollen well up, being 1.7 cm. in length and very milky. The white gygis tern was with its mate which I barely wing-tipped and which flew to sea, and the gonads were swelling, but had not yet reached a breeding size; nor had those of the lesser noddy, although they, too, appeared to be swelling. The plover, of course, was very small. This bird was upon the beach with a tatler.

The beach here at the point of land between the bays of Paopao and Opunho is the liveliest place I've yet come across for hermit crabs. What a mockery to call them hermits! You don't find them hiding in any burrow or cavern in the rocks like other crabs. Why these dwellers in houses portable should be called hermits is a mystery. Better call them tramps, for surely they are the ideal traveler. Not only do they carry their bed, but even their house they pack upon their back; and they eat along the road. Beach-comber would apply even better, for they are veritable scavengers along the beach. Of course, some go far inland carrying sea-shells high up mountain slopes to fool future geologists.

Here is a litter of shell and coral fragments with sea-weed mixed in it. Move an arm and you will hear a rattle of shell houses tumbling amongst the fragments. What a refuge those shells are to a soft-bodied crab, and how securely and

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firmly do the claw doors fit, locking out any prowling house robber! Such a variety of dwellings, from unique little brown-striped or spotted bungalows to large, ornate, Victorian mansions! Some are very plain and simple concrete structures, serviceable but commonplace. And what novel tenants these crabs are! When growth makes moving to larger quarters necessary, all they have to do is unhook their retrogressed legs from the interior rooms and pass out the hall with all their furniture and take up residence in the new abode. Here's a fellow who had an eye for beauty, though it costs him some extra effort, for the beautiful, long, bright, shiny shell is two or three times as heavy as is necessary for a fellow his size,--a marble palace of pretension. Is it any wonder that nature fakirs give animals human instincts? Seen through human eyes, what animal does not reflect some of our varied characteristics? And if we are a part of all life (which can hardly be doubted), is it not barely possible that even hermit crabs have inherited many of our wanderlust characteristics?

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BOOK XX.

Moorea, Tahiti, Tetiaroa.

Voyage to

Raiatea, Mopelia, Scilly.

November 4--December 16, 1921.

November 4

Here is evidence that the so-called hermit crabs meet in congregation for social purposes. There were thirty of them when I arrived, but less now. They're not at all quarrelsome like some California species. Some of them show a decided laziness by trying to steal a ride on another's shell. Here is one little fellow trying to occupy the one good room in an old, wornout house. But the interportion still persists and his encrumbrances are too much for him. He cannot turn his house over, but when I turned it over for him he was able to drag it away.

Marurai drove us to O'Reilly's this morning. Saw only a few yellow-billed terns, one lesser noddy, a gygis, a duck above Lake Temae, and weaver birds and mynas galore. For the

BOOK XX.

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Salates, Hopelia, Solily.

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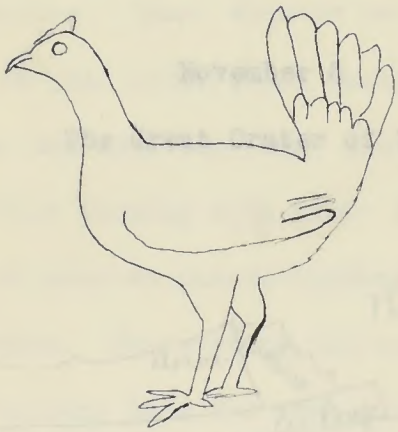
Natural drove us to O'Neilly's this morning. Saw only a few yellow-billed terns, one lesser noddy, a egrets, a duck above lake Tessa, and wandering birds and egrets galore. For the

afternoon I have the two wild fowl to make up. It is interesting that the hen, evidently an old bird, is as wild as ever; the rooster has tamed down a little.

1. Vai pahu Fatoai, according to Marurai.

The young pair are still perfectly tame about the place, so evidently age has something to do with domestication. I had noticed before, but failed to record, the erect carriage these wild fowl possess. They are graceful as the trimmed bantam, or even more so, with strong wings and a large tail which is customarily held as the illustration below shows. The two sides of the tail spread in a fan-like manner whenever the breeze comes up astern.



The old hen was tough to skin, but the rooster was abominable. I had to use the scalpel to cut the ligaments holding the skin to the flesh. It was a trying, maddening job, but certainly he was worth it, being about the most beautiful specimen of the wild bird I have yet discovered. The hen, too, was an exceptionally interesting bird as regards her feathers. The mottling on them is remarkably attractive, and it is, furthermore, quite distinctively the wild fowl's

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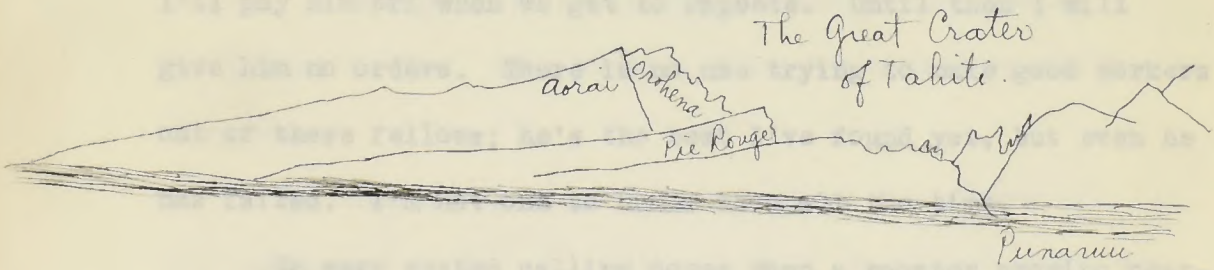
feathering. The young hen about this place shows a less intensive mottle. This older bird has not the graceful proportions of the other, but youth may explain the charm of the younger chicken. It is doubtful, however, if the young rooster will ever be as large as this older cock, nor will he be as magnificently colored. Here at least is one interesting bit of bird life which not only is rather attractive as sport, but also as game for the table. The question is how interesting or valuable are the birds to the Museum? We dined upon the hen, but decided it would not hurt the rooster to cure through the night.

1432 ♀ Wild fowl. # 1.

1433 ♂ " " # 1.

November 5

The Great Crater of Tahiti.



Orohena is a perfect continuation of the general slope of Aorai as seen from Afareaitu, Moorea.

We came up into Afareaitu valley to look for warblers or whatever birds we might find. Observed a tropic-bird above the cliffs beside the Monaputa ravine, also two or three lesser noddies above the coconuts, four white gygis terns as we came

feathering. The young man about this place shows a less intensive mottle. This older bird has not the graceful proportions of the other, but youth may explain the charm of the younger chicken. It is doubtful, however, if the young rooster will ever be as large as this older cock, nor will he be as magnificently colored. Here at least is one interesting bit of bird life which not only is rather attractive as sport, but also as game for the table. The question is how interesting or valuable are the birds to the museum? We dined upon the hen, but decided it would not hurt the rooster to come through the night.

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November 6

The Great Crater of Tahiti.

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We came up into Afaresitu valley to look for warblers or whatever birds we might find. Observed a tropic-bird above the cliffs beside the Hongerie ravine, also two or three lesser noddies above the cocoanuts, four white egrets here as we came

up the trail through the plantations behind the village, one of which I obtained fairly clean. Have heard but few birds in the valley, so turned my attention to plants. Found a real brilliant flower, seldom seen because a vine blooming above the tree tops. # 138. Collected ferns along the stream when we reached it.

While I was collecting, Matete went off playing; that's about all he has done in Moorea, carried the loads I've put on him, but used no initiative. He has not even lighted a fire without instructions, and has totally neglected to clean the gun. In other words, he's stale as can be, sick of his job or homesick for Papeete, two months being too much for his native constitution. Then, when he deliberately called the pup away from me just after I had called him myself, I decided that the climax had arrived. What can a man do with a pup if a native is always playing with him? I have informed him that I'll pay him off when we get to Papeete. Until then I will give him no orders. There is no use trying to make good workers out of these fellows; he's the best I've found yet, but even he has failed. I'm not one to humor them all the time.

We were seated calling doves when a rooster crowing near-by attracted our attention in his direction. Twenty meters or so from the trail we saw a hen jump down from a fallen branch into the grass below. I let the boy's "paurauing" throw me off my own estimate of where she was. He acted as if he could see her. We both stepped over her, and when she flew up I missed her a mile. The nest, which I tried to photograph, has six

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We were seated calling dogs when a rooster crowing nearby attracted our attention in his direction. Twenty meters or so from the trail we saw a hen jump down from a fallen branch into the grass below. I let the dog's "pointing" throw me off my own estimate of where she was. He acted as if he could see her. We both stepped over her, and when she flew up I shared her a mile. The next, which I tried to photograph, was six

eggs in it. They may be too far incubated to blow, but I'm going to make the effort. The nest is scooped out of loose, coarse rock fragments in the corner between two boulders as big as one's head. It is lined with dry grass and was fairly well obscured by the grass above it. The hen resembled very closely # 1432. The mottled dull gray feathers are a perfect adaptation to the color scheme in the vicinity of the lava rocks. We failed to find her by following off in the direction she flew.

Returning down valley we obtained a dove with little purple in his cap (# 1437), but the retrieving of the dog rather upset the feathers, and besides I shot him rather heavy. Later on I killed another, and a very light phase of kingfisher (1435). At the village of Afareaitu there were half a dozen or more noddies (20), but I was unable to hit more than one, which fortunately had an egg ready for laying (# 1436). Here the native boys interfered with the pup's retrieving, quite aggravating my temper. A hawk (37) flew about the plantation but I could not get a shot at him. Have hired a canoe for a trip on the lagoon tomorrow.

An interesting event occurred about the plantation. An old inhabitant of the plantation, a tame mongrel rooster, returned from his sojourn at the neighboring plantation, much to the disturbance of the little wild rooster. He exhibited real bantam gameness and crowed defiantly even until the other fellow got within two meters. Then he ran and kept well beyond the reach of the big heavyweight. (What chance would Kilbane have with Dempsey?) But the little fellow was defiant and impertinent

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the minute the husky quit chasing him. The wild boy crowed "Victory!", and he certainly did win the race. Next came the hawk, and instantly there was a flutter of wings and a "Caw" of warning, and the wild fowl were beneath some tall sheltering grass. They came out cautiously. (1 and 37.) How have these fowl realized that the hawk is their enemy? If they were introduced by natives, how many generations has the fear been passed along?

November 6

Too windy for observations in the lagoon. Noddy and white gygis (5) terns about the trees this morning in no numbers to speak of. The big mongrel rooster is making overtures to the trim little wild chicken this morning. (1) She is femininely evading him, even taking wing when his attentions are overbold. But these island fowl are tenacious in courtship, and the little hen will have to be upon her guard all day while her suitor is present. Here are four gygis terns fluttering overhead, now rushing like four chariot horses in a great, curving flight to seaward. Some antics above the lagoon and then a dash off into the dazzling morning sunshine! There is a gray-back tern (16) flying along the verge of the coral bed beyond the channel, the first I have seen in this locality. Beck collected them at sea a year ago. The yellow-billed terns are along the reef beyond; white gygis above the lagoon nearer and a noddy, so the identification is easy by comparison through the binoculars. There were two of them.

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November 8

Too windy for observations in the lagoon. Muddy and white egrets (3) terns about the trees this morning in so numbers to speak of. The big mongrel rooster is making overtures to the trim little wild chicken this morning. (1) She is femininely evading him, even taking wing when his attentions are overbold. But these island fowl are tuneafons in courtship, and the little hen will have to be upon her guard all day while her suitor is present. Here are four egrets terns fluttering overhead, now running like four chariot horses in a great, curving flight to seaward. Some auklets above the lagoon and then a dash off into the dazzling morning sunshine! There is a gray-back tern (16) flying along the verge of the coral bed beyond the channel, the first I have seen in this locality. Back collected them at sea a year ago. The yellow-billed terns are along the reef beyond: white egrets above the lagoon water and a muddy, so the identification is easy by comparison through the binoculars. There were two of them.

Having one shell left, I violated the Sabbath and went out in the canoe but missed the bird I shot at. They are indeed the gray tern Beck obtained just before we went to Christmas Island. Matete did not know their native name, showing they cannot be familiar about Papeete where he has lived most of his days.

Matete has returned from a trip to the island in the canoe. I had noticed he was well over opposite the pass. He tells us he saw a shark, "Moo" and made for the island instantly. There he remained until courage returned to him. Now he points to some snags in the side of the boat and claims they are the teeth marks of the shark. I doubt it. How thrilling it would have been to have had it happen while in the canoe myself! I can easily imagine the hair on the back of my neck standing rigid in terror. How little does the lagoon level vary here, seldom ever twenty inches I would say.

Another thing peculiar to this country as compared with the few lands I'm acquainted with is the action of the mosquitoes. They persist but a very short while after dark and never return during the night, but are on the job just at the first peep of dawn. This is true of both the plain colored one and the black and white legged fellow. The way they attack a fellow behind the ears and on the further side of the arms from the face is strikingly noticeable.

November 7

There are two varieties of fish caught in the Temae lake, the one illustrated (while the Moorea boat was heaving badly, and I almost heaving also) on the following page, and another

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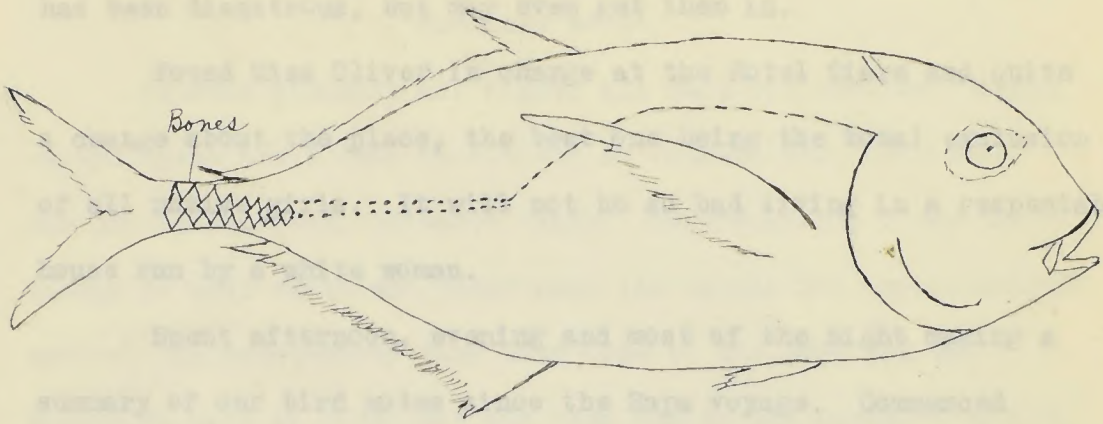
There are two varieties of fish caught in the Tamao lake, the one illustrated (while the Moorea boat was heaving badly, and I almost heaving also) on the following page, and another

which I will draw later on. I understand that the same fish are found in brackish lakes elsewhere in Polynesia.

Paaihere

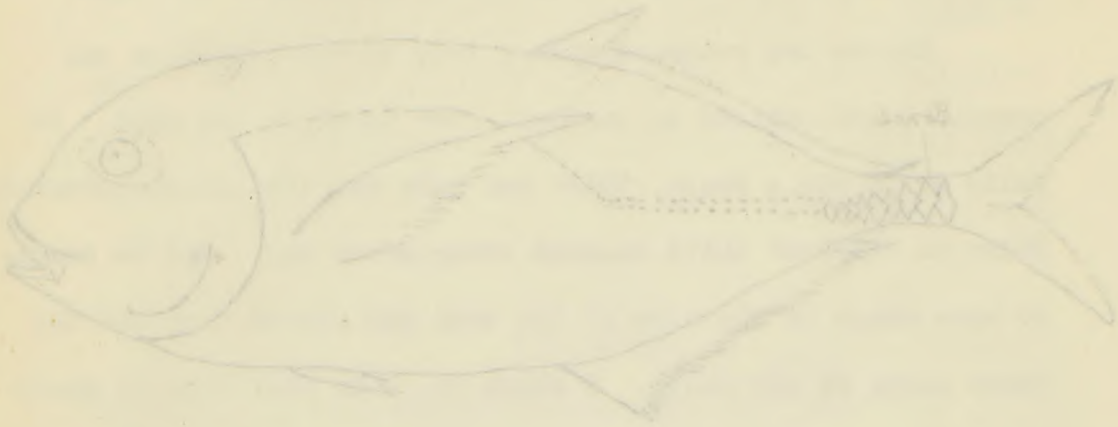


This is not the bony fish.

We had a very rough passage, and while trying to draw the fish I got quite uncomfortable inwardly. Too splashy to keep notebook open all the time, especially as we came around the reef to the pass against the wind ENE.

Mr. Beck corrects me upon the terns observed here and at Moorea Sunday. They are the gray-backed tern of the Onychoprion genus. It is very significant that we have not noticed this bird around during several months. I watched closely for shearwaters, but observed nothing during the two hours of passage. The Noha and Rao are past nesting now, but the Upoa, P. chlororhynchus subspecies, wedge-tailed, black shearwater is nesting at Motu Faone, but may be going out to sea the opposite direction, or directly out from the island. Boobies are in scattering groups of two, three, or,in a few cases, more,--always the

which I will draw later on. I understand that the same flies are found in Brazilian lakes also.ie Polypedia.



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red-footed one. Mr. Beck also corrected me on the noddy which is but the common one and not the lesser.

Will make an effort to get plants packed and away on this boat. Postponing the notes to get better native names has been disastrous, but may even get them in.

Found Miss Oliver in charge at the Hotel Tiare and quite a change about the place, the best one being the total exclusion of all native girls. It will not be so bad living in a respectable house run by a white woman.

Spent afternoon, evening and most of the night making a summary of our bird notes since the Rapa voyage. Commenced work upon plant labels which I had postponed, desiring to be able to fill out dialect names and economic uses. This information will have to be sent in later; to get it I must retain one set of plants.

November 8

Up and at the plant notes at five A. M., but decided that typing them completely would require more time than exists between now and ship sailing, so have decided to use stamps wherever ten or more labels bear the same information such as island, collector, and the like. Spent the day straightening out the plants which have become well mixed up numerically. I went through them all and put prominent number in red pencil twice on each newspaper. Put them in proper order, took out my retained set, and packed the rest for shipment.

8 P. M. Started in on labels and worked steadily until

red-footed one. Mr. Beck also corrected me on the rudy which is but the common one and not the lesser.

Will make an effort to get plants packed and away on this boat. Postponing the notes to get better native names has been disastrous, but may even get them in.

Found Miss Oliver in charge at the Hotel Tiare and quite a change about the place, the best one being the total exclusion of all native girls. It will not be so bad living in a respectable house run by a white woman.

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eleven-thirty, slept until two, and then set to work in earnest. Still at the typing which takes quite a bit of time. Got to printing towards night.

November 9--10

Printed steadily all night, all day, and the next night, except three hours from one-thirty to four-thirty. Finished the job on Thursday, November tenth. Unfortunately I was too sleepy to keep awake and proof-read the labels for typographical errors. At four-thirty took them down to the boat (it was booked to sail at five) and saw them inside the purser's office. Returned to the hotel and attempted to write letters but was too sleepy. Awoke when the steamer whistle blew at eleven A. M. Spent the afternoon and evening visiting with Mrs. Yerex and her son and daughters. They leave tomorrow for New Zealand. What will this place be without them to visit?

November 11

The "Tahiti" did not sail until after eight-thirty, so had a last glimpse and short visit with the best girls, and certainly the best woman in the Pacific Isles, as known by me.

Am now celebrating the signing of the armistice by blowing the wild hen's eggs we collected in Moorea.

1. Chick feathered.

2. Incubation commenced.

3. Chick feathered.

4. " "

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1. Union feathered.
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3. Union feathered.
4. " "

5. Incubation commenced.

6. " "

Spent the rest of the day writing out the Moorea labels and studying botanical terms.

November 12

A shower last evening and one early this morning with a black cloud above the mountains convinced me that it would be folly to go up the canyon, so went out in canoe and collected fifteen numbers of the most prominent seaweeds in the lagoon-bed and on the reef itself. The algous growth does not seem to be so important here as it is in the colder zones, but there is quite a carpet of "weeds" on the flat part of the reef behind the point of breakers. In the lagoon itself the flora is mostly near the shore line where the coral sand and sediment forms a level bottom. Some of them are well attached to corals, however. Epiphytic growth does not seem to be so prominent as one would expect.

November 13

Seaweeds are drying splendidly. Spent the day writing and reading.

November 14

Took bicycle, dog and shotgun, and went out to get a few myna birds for speed practice. Found them as clever as ever while I was afoot with the gun. At such times I was unable to get within auxiliary range, even at the Chinaman's

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where they were in the truck garden and in the trees overhead. As I rode along the road they paid little attention to me, so I tried shooting with one hand while riding along. The first shot proving successful, I kept at it and in that manner killed four. The rest were obtained by stopping beneath birds in tree branches and merely resting upon one foot. Found and obtained one young bird, # 1439, being fed by old birds. The other birds were in the swelling stage. They are mated already; in fact, it seems they are invariably and nearly always in pairs or else family groups. Their most characteristic habit is that of perching upon the backs of animals, especially horses and pigs. Dogs and cats invariably draw from them a warning "Caw". One bird I wounded, and when the pup went after it (he retrieved all nine birds splendidly) the other birds flocked about just above him, allowing me to get one on the wing with the auxiliary. But when I held the wounded bird above the bush tops they would merely fly towards me and when within ten meters or so would swerve away, evidently having seen me. Also saw some plover in a meadow. Tatlers on the beach, and white terns above the tree tops. As for the speed, I but succeeded in keeping all the birds under forty minutes, with some down to thirty-three.

November 15

Didn't go out as early in the morning, and consequently found fewer mynas along the road. At the Chinaman's I stopped in, and by getting what birds would let me get within auxiliary range, and a few doubles with large shells, I soon obtained

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November 18

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twelve. The few I got nearby were obtained by my mixing in with the Chinamen and surprising the few birds that came down to eat garbage with the pigs.

Returning to Papeete, I obtained two of three white terns which were flying above the mango trees alongside the roadway. Although the two obtained were of opposite sex, I am almost certain that from their actions I obtained the interloper rather than the male mate. The third bird flew high after the other two were killed, so I was unable to get it. Took ample time to make up the terns, but got four myna done in two hours.

November 16

Two of the eight myna I saved over for this morning were spoiled, but the rest made up all right. Would have gone up Fantana for the night but for severe toothache in afternoon, following visit to dentist.

November 17

We got away before daylight. Four gygis terns were in lower canyon, but flying too high to reach. When will these myna birds reach their natural limitation as to numbers on this island? Food supply is probably their one great check, and they are such omnivorous creatures that in the abundance of a tropical island that seems unlimited. Along the canyon wall this morning they were seen in considerable numbers, perched upon the lantana which so densely clothes the canyon

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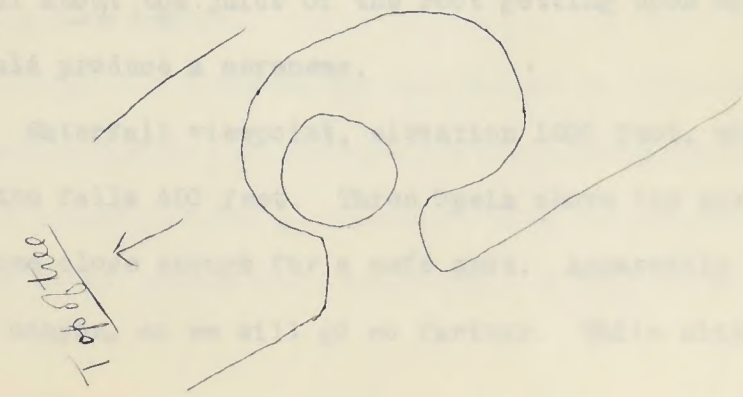
slopes. From the water-house down, they are very prevalent. It takes just about an hour of average walking to reach the water-house.

At last the swift, and so near at hand too! This only goes to show that one can't always judge a bird when flying high above. There are four of them, if they're not swallows, above the water-house. To the forks of the stream without further incident. There kingfishers attracted our attention. Shot one which the dog failed to bring to me,--Matete found him chewing at it. Time to use pins.

The stump of a tree was perforated with a series of holes, five centimeters in diameter and sixteen centimeters apart, except where knots prevented them. Suspecting them to be nests, I cut down the stump for inspection. Then I did one of the most foolish things I ever did, letting the stump fall. We found three broken eggs when we climbed down to it. It was less heavy than it appeared, and we might easily have let it down gently. Photographed four of the holes. Shot the other two of three birds seen here, both at one shot.

One nest had two entrances at right angles to each other, the vertical diameter of the room being twelve centimeters horizontal, eight centimeters.



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One nest had two entrances at right angles to each other, the vertical diameter of the room being twelve centimeters horizontal, eight centimeters.

The other is more spherical, measuring 11.5 centimeters vertically and twelve centimeters across, and was at least that deep. One of the birds I laid upon the log above this nest while photographing it. He measures nineteen centimeters over all, fourteen from tip of beak of base of tail, and eleven from culmen to tail. There cannot be much room to turn around in these nests. Four other holes are striking because each one of them ends at a "worm" hole, one centimeter in diameter. Is it not probable that these birds have bored for the grub that made that hole? How closely or distantly related are these birds to the woodpecker? Being insectivorous, one can believe them capable of boring into dead trees for food. But it would require more evidence than this. There were no less than eleven holes in this stump, and only three of them show signs of having been enlarged for nests. The nests had no lining whatever in them.

Rain as was to be expected, but only in showers of no great extent. At the little stream crossing the trail at an elevation of 850 feet we found the Api (Arum sp.) in bloom, if the spathe can be termed a bloom. In collecting it I was obliged to take leaves small enough to fit in the portfolio, but measured the largest one present. Matete warned me to be careful about the juice of the root getting upon my arm, where it would produce a soreness.

Waterfall viewpoint, elevation 1200 feet, which would give the falls 450 feet. Three Opeia above the pocket, but would not come close enough for a safe shot. Apparently heavy rain in upper canyon, so we will go no farther. While sitting here, we

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Waterfall viewpoint, elevation 1400 feet, which would give the falls 400 feet. Three Opels above the pocket, but would not come close enough for a safe shot. Apparently heavy rain in upper canyon, so we will go no farther. While sitting here, we

saw a mistletoe on a tree which leans far out over the pocket, a hair-raising place to go for a specimen. But ah! there is one much nearer at hand and not leaning out so far; perhaps we can make it. Another tree beside the trail and above level land.

We went on up to the parapet above the falls, hoping to get a shot at the Opeia soaring above them. Every Opeia I see now will be a swift, especially in this canyon. Had no luck. Followed down into stream-bed just above the fall. There are three or four good, deep pools, the second up stream being for the most part inside a cave. I took my clothes off and swam across lower pool in an effort to look over the brink of the fall, but it was of no use. The brink slopes rather steeply for fifteen feet or so before the water takes the plunge, and footing down there was not secure enough to be tempting, nor would the view be worth the risk.

There is a stone here above the falls that very closely resembles sandstone. It grinds off into a yellowish brick dust with my hob-nails. Two hawks and a tropic-bird seen above lower canyon. Down at the bridge while we were eating lunch, another Opeia came into stream-bed over tree tops. Second shot dropped him,--another swift! It was here that I got swallows last year, here and down canyon.

Below the forks we saw but one white tern and two Opeia flying high aloft. At the water-house a heavy shower caught us, and except for the oil-cloth covered basket, we would have had wet birds, ammunition, and films. ("Winter" rains) "Spring

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showers" are upon us apparently. Mr. Beck was as surprised as myself about swifts.

Old sailor: "Mollyhawk"--large albatross, black and white. 40°--50°--Cape Good Hope, Cape Horn.

Society Commercial, German house, received some hawks from Europe and made a present of them to the Government, who thanked them for the beneficial act. (Ten years ago)

Ducks, Rupi, green parakeet (Dr. Davis of Papeete). Dr. Davis has promised to get me the exact date of introduction.

November 18

At four A. M. when the alarm rang it was raining heavily, so I did not go out to Fantana as planned. Worked upon plants, overhauling everything and putting seaweeds in newspapers. Also sprinkled them with napthalene shavings. Typewrote botanical terms, and packed for journey to Tetiaroa this night.

For lunch today we had plant # 183 boiled. It tastes very squash-like, but is more translucent in appearance, and perhaps nearer a cooked cucumber in taste than a squash.

Heavy showers very frequent all morning. Very sultry in the afternoon. Much running around is necessary getting ready even for such a little journey as the one to Tetiaroa. The picture I took of the wild fowl nest at Moorea turned out exceptionally well, as did others. To bed tonight on the boat.

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Society Commercial, German house, received some books from Europe and made a present of them to the Government, who thanked them for the beneficial act. (Ten years ago)

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For lunch today we had plant # 165 boiled. It tastes very squash-like, but is more tenaciousnt in appearance, and perhaps nearer a cooked cucumber in taste than a squash.

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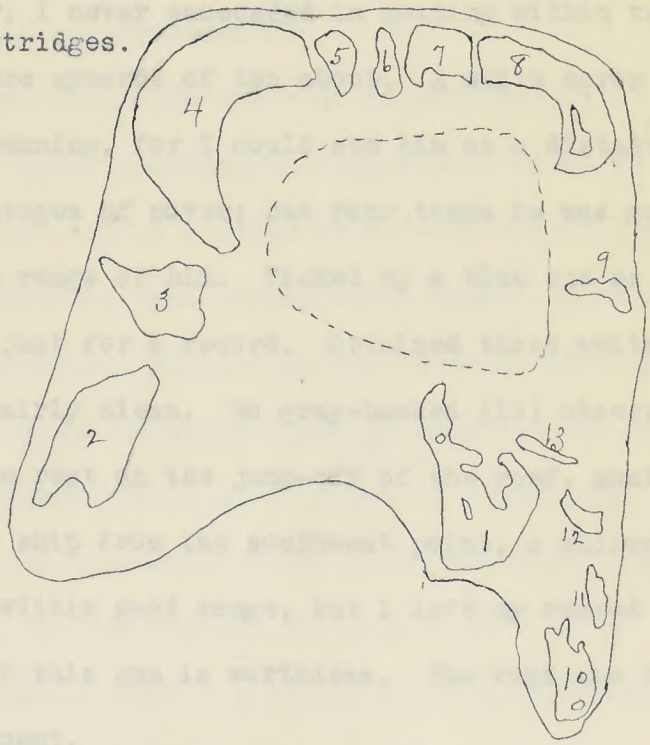
Tetiaroa

November 19

Having forgotten bread, I sent Matete out for some at midnight, when he said the bakers opened shop. Of course he failed to return in time to catch the boat. A rather rough sea. We pulled in to the east of the island and are now fishing westward along the reef. Evans and Onad each have caught a good fish.

Many noddies (both kinds) and boobies present, a few frigates, and one or two white terns. Saw a white reef heron. Went ashore and had tea with Russell. Off on hunt. Noddies, white terns, and a blue reef heron, then later a white one. Discovered ejector on the new gun did not work, and had to ram out empty cartridges.



We landed on island # 1 (Rimatara), the home motu on motu 13. The noddies are nesting, either in low bushes or on clumps of sticks in dead bush on ground. Egg collected and

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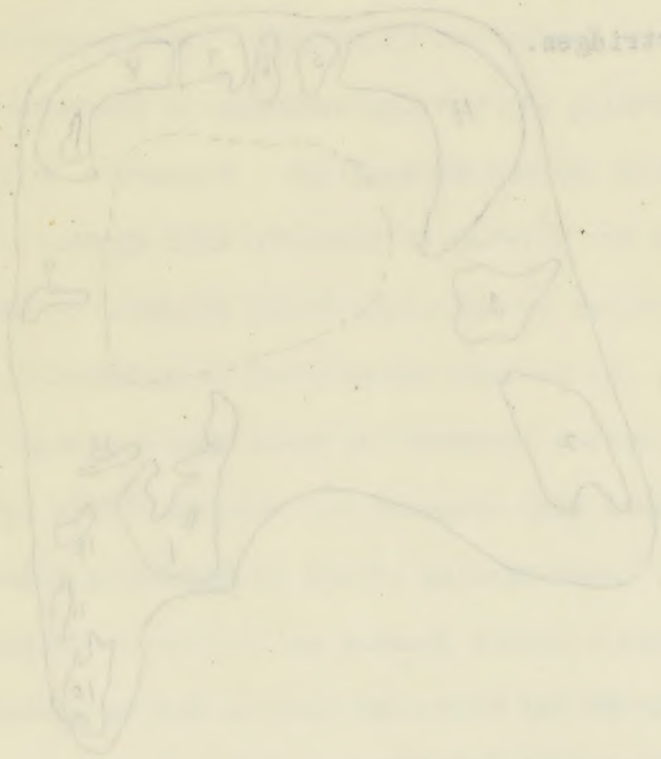

We landed on island # 1 (Mamatela), the home main on note #4. The noddies are nesting, either in low bushes or on clumps of sticks in dead bush on ground. Egg collected and

bird killed. Tatlers and plovers. Also obtained a yellow-billed tern of two seen, and a lesser noddy here along motu 13. Our boat approaches the jump-off.

During the afternoon hunt several boobies, all of the plumage phase of the two obtained, passed over me headed for the farther islands, where Mr. Russell says they nest. I saw a few with white underparts but none exceptionally white. Only a few frigate birds about and none within range. I came across curlews in the low bushes between the mud flat and lagoon. They did not fly, apparently aware of the shelter afforded by the bush; nor could I get within range of them. The golden plover were not detectable on the brown mud where they invariably were found except when moving. That meant they had seen me, and, as they are very shy, I never succeeded in getting within range although there were upwards of ten about. A white heron proved to be even more cunning, for I could see him at a distance and had all the advantages of cover; but four times he was gone when I got within range of him. Picked up a blue one as we boarded the boat just for a record. Obtained three white terns during day, all fairly clean. No gray-backed (16) observed.

Here, as we rest on the jump-off of the reef, awaiting the return of the ship from the southwest point, a yellow-bill sits upon a rock within good range, but I left my ramrod ashore and the ejector of this gun is worthless. The boys are laughing at my predicament.

5:45. A few more boobies flying northward. Two more curlews just raised out of the trees and flew south, paying no attention to my calling. I attracted one as we came down the

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beach to the boat, and held him while I loaded; then he caught the wind and came sailing overhead at a rapid rate. I fired just before he got above me, and strangely enough dropped him. Some fifty yards farther along the beach he fell like a stone.

This island averages about eight feet above the water as it now is. Regular tides do not appear to go much higher, though storms no doubt wash a third or half way up the beach. The coconut trees are mostly young here and have a rather ill-appearing yellowness about them. The bush appears to have been fairly dense at one time. Russell says it should have been left alone until the trees were able to make their own shade.

November 20

We made the "jump off" the reef in good form. It gets a little exciting while awaiting the opportune moment to see the ebb of each wave expose a meter or more of vertical coral. The boys wading held the boat safely above where the undertow plunges back seaward, until a favorable swell came up; then they shoved off and sprang aboard, and we shot out far and clear of the dangerous reef. Evans gave me his line and I pulled in the smallest fish of the day's catch of twenty-seven. They sold this morning for 450 francs, 350 clear.

As we approached Tahiti a sailor in furling the foresail, which helped us before the fair wind, was knocked overboard. We ran him down at seven knots the first circle, then shut off the engine and were a long time in getting around. My electric

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As we approached Vanikoi a sailor in furling the foresail, which helped us before the fair wind, was knocked overboard. We ran him down at seven knots the first circle, then shut off the engine and were a long time in getting around. My electric

flash helped find him.

November 21

Myna carrying food to young obtained along roadside. Dr. Davis informs me that the hawk (Circus gouldi) was introduced in 1885 by Herr Jorss, head of the Society Commercial, a German house here. He presented them to the Governor and was officially thanked for the beneficial act. There is little doubt that the Rupi (pigeon), the duck (Anas superciliosa) and the parakeet (Vini sp. ?) have been almost, if not entirely exterminated by them. They are now eating rats, and, having done the above damage,may now prove beneficial. Their increase has been very slow apparently. In the thirty-six years they should have increased to a far greater number than are present now. Apparently they have some check holding them down, which is well, else the other birds would suffer similar fate to the Rupi, Vini, and Moora.

The Tetiaroa plants were swarming with ants when we set to work this morning. The native boy, Matete, showed up and changed old blotters which suffered two days of neglect. He only laughed at missing the boat. Yesterday I met a young American, an amateur nature artist; he had heard of me and desired an acquaintance. Finding the native boy missing, he offered to help at the same wage. If he can do all the boy can, which is not much, and in addition has a little intelligence, surely it will be better to pay him the meagre hire of the native for helping with the plants, carrying packs, and cooking, etc.

flesh helped fine fine.

November 21

Pigs carrying food to young obtained along roadside.

Dr. Davis informs me that the dove (Zenaida asiatica) was introduced in 1880 by Herr Dorse, head of the Society Commercial, a German house here. He presented them to the Governor and was officially thanked for his beneficial act. There is little doubt that the Tagal (pigeon), the dove (Zenaida asiatica) and the parakeet (Vini sp.) have been almost, if not entirely exterminated by them. They are now eating rats, and, having done the above damage, may yet prove beneficial. Their increase has been very slow apparently. In the thirty-six years they should have increased to a far greater number than are present now. Apparently they have some check holding them down, which is well, also the other birds would suffer similar fate to the Tagal, Vini, and doves.

The Tatiaro plants were swarming with ants when we set to work this morning. The native boy, Ketete, showed up and dumped old bloomers which smelled two days of kerosene. He only bragged at wheeling the boat. Yesterday I met a young American, an amateur nature artist; he had heard of me and desired an acquaintance. Finding the native boy missing, he offered to help at the same wage. If he can do all the boy can, which is not much, and is and/also has a little intelligence, surely it will be better to pay the wages this of the native for helping with the plants, carrying boxes, and cooking, etc.

If he proves more than mediocre in his water-color work that alone should be an additional advantage for definite work on colors of flowers, birds' eyes, bills and feet, not to mention natural sketches in natural habitats.

We spread all the plants out in the morning sunshine. Every time I took a plant inside to press I turned the others, exposing the hiding ants to the sunshine. The result was very gratifying, for the canvas is now littered with sun-killed ants. The ants at Tetiaroa, so Russell says, are not plentiful enough to keep scale insects in check. These plants apparently were covered with scale insects, from which the ants obtained considerable larvae food. These ants curled up in a very few seconds when exposed to the sunshine. Mr. Beck dropped in a few minutes and added his help and opinions on the plants.

Not being required by the dentist until Thursday, I decided to make a journey up Fantana starting this evening just before dark. Made up packs and outfitted with food for two nights. Johnston very enthusiastic about getting in the field. I am determined to give him a hard rub to discover what merit he has as a mountain climber and observer.

We struck out at six. After having kept the pup in the house all afternoon, we let him wander away as we started out, and never thought of him until we reached the Fantana road. He did need exercise so badly too. Little forgetfulness like this is a habit of mine. We created quite a bit of interest among the native passers-by in starting late of an evening and carrying our own packs.

It he proves more than mediocre in his water-color work that alone should be an additional advantage for definite work on colors or flowers, birds' eggs, bills and feet, not to mention natural knowledge in natural history.

We spread all the plants out in the morning sunshine. Every time I took a plant inside to press I turned the others, exposing the drying ants to the sunshine. The result was very gratifying, for the canvas is now littered with ant-killed ants. The ants at Tolstoya, so Smaroll says, are not plentiful enough to keep scale insects in check. These plants apparently were covered with scale insects, from which the ants obtained sustenance larvae food. These ants curled up in a very few seconds when exposed to the sunshine. Mr. Peer dropped in a few minutes and added his help and opinions on the plants.

Not being required by the dentist until Tuesday, I decided to make a journey up Kanawha starting this evening just before dark. Made up packs and outfitted with food for two nights. Johnston very enthusiastic about getting in the field. I am determined to give him a hard run to discover what merit he has as a mountain climber and observer.

We struck out at six. After having kept the pup in the house all afternoon, so let him wander away as we started out, and never thought of his until he reached the Kanawha road. He did need exercise so badly too. Little Forgetfulness lives this in a habit of mine. We created quite a bit of interest among the native peasantry in starting late of an evening and carrying our own packs.

November 22

Kingfisher in hibiscus wood above camp this morning, but we could not locate their nest. A tropic-bird left for sea before six, traveling low down in the canyon. Myna present. We had a good breakfast on oatmeal. Thank God for a white companion who likes white food!

Hit the trail shortly after six. Observed nothing but mynas to this first rest on the hill trail. Here comes a measuring-worm down my overalls. He is not striding 13-14 mm. along the steel tape. On up the trail at the "Api" rivulet (850 feet) we found an eel and prawns in the pool. Heard kingfishers, called a dove and saw a tropic-bird. The doves are rather infrequent down here. At fall-view we observed two tropic-birds about opposite wall. These birds are all the yellow-bill unless specially noted otherwise. As yet I have not observed the red-tailed or red-billed about Tahiti or Moorea. Yet I have seen dozens of the yellow-billed so as to recognize them by the white tail, or black scapulars. A good volume of water coming over the falls and descending straight to bottom as a mass, with spray only blown to leftward.

We found a very interesting rose-red flower growing here at the fortification, one commonly planted around the plantations; also a pink-flowered climber. Some alligator pears, circular instead of round; I tasted one, but it had a doubtful appearance so we threw it away. Along the trail after crossing the stream we came to a huge boulder of conglomerate with convenient sleeping quarters beneath it. Two swallow nests

Overlooking

Kingfishers in bilious wood above make this morning, but we could not locate their nest. A trogon-like bird for one before six, traveling low down in the canyon. Pine overhead. We had a good breakfast on oatmeal. Thank God for a white companion who likes white food!

Off the trail shortly after six. Observed mistake too myrmes to this first test on the Mill trail. Also occasion a measuring-worm down my overalls. He is not attaching 15-16 ms. along the about tape. Up up the trail at the "high" crystal (880 feet) we found an owl and grouse in the pool. Heard kingfishers, called a dove and saw a trogle-bird. The doves are rather infrequent down here. At fall-view we observed two trogle-birds alert opposite wall. These birds are all the yellow-bill wilson specially noted otherwise. As yet I have not observed the red-tailed or red-billed mount tanzi or doctes. Yet I have seen dozens of the yellow-billed so as to recognize them by the white tail, or black mandible. A good volume of water coming over the falls and descending straight to bottom as a mass, with spray only blown to leftward.

We found a very interesting rose-red flower growing here at the fortification, the commonly planted around the plantations; also a pink-flowered climber. Some milkweed pears, circular instead of round; I tasted one, but it had a doubtful appearance so we threw it away. Along the trail after crossing the stream we came to a huge boulder of conglomerate with convenient sleeping quarters beneath it. Two hollow nests

here with one pair of birds fluttering about and alighting on dead branches. Undoubtedly they are Hypurolepis tahitica, which we have collected frequently all about Tahiti. This pair I will leave undisturbed because of its proximity to Papeete. I have hopes of a visit when eggs are in the nest, one nest being apparently inhabited. How restless and alert these little swallows are! They are always on the lookout for passing insects at which they dart from the tree branch, then flutter about somewhat before settling back again. The rufus throat shows up well as he turns his head this way and that. Zip! five meters like an arrow, an open mouth (right above us 5 m. so we could see it all), and a flying retreat. I believe from the movement that he saw an insect at that distance, and he apparently obtained the morsel. A neat little pile of guano below the nest, samples of which are in the pocket in notebook. Elevation 1400 feet.

Had no difficulty in following the trail on up stream, which it crossed and recrossed several times. Gathered some new appearing moss and a fern at 1850-1900 feet. Found ripe oranges still persisting on a tree at 2050 feet, a few of which we enjoyed. Either myna birds or fowl were eating fallen fruit. Drosophila were present in usual abundance. We passed a lone native victim of elephantiasis carrying down a small load of fei. Last evening two out hunting "oura" (prawns) came over to our camp. They could not fathom our sleeping beneath the starry dome when there were two huts within a hundred meters of us. We gave them a bite of bread and cheese; they enjoy

here with one pair of other flycatchers about and alighting on dead branches. Undoubtedly they are Sooty Jacos flycatchers, which we have collected frequently all about Cuzco. This pair I will leave undisturbed because of its proximity to Pagoda. I have hopes of a visit when eggs are in the nest, one nest being apparently inhabited. How restless and alert these little swallows are! They are always on the jump for passing insects at which they dart from the tree branch, then flutter about somewhat before settling back again. The green throat moves up well as he turns his head this way and that. Mr. Fly catcher like an arrow, an open mouth (right above me I s. so we could see it all), and a flying start. I believe from the movement that he saw an insect at that distance, and he apparently obtained the morsel. A neat little pile of guano below the nest, samples of which are in the pocket in notebook. Elevation 1600 feet.

Had no difficulty in following the trail on my return, which it crossed and recrossed several times. Discovered some new appearing moss and a fern at 1800-1900 feet. Found ripe oranges still petrifying on a tree at 2100 feet, a few of which we enjoyed. Either open birds or food were eating fallen fruit. Drosophila were present in usual abundance. We passed a long native village of alcoxantlanis carrying down a small load of fat. Last evening two out hunting "oxen" (pumas) came over to our camp. They could not fathom our sleeping towards the starry dome when there were two into twinkling campfires behind of us. We gave them a bite of cheese and cracker; they enjoy

both because unused to them.

Sometime during the night another native passed us. He seemed quite surprised to find us lying there. They cannot understand anyone starting upon a journey at sundown. Just below this orange tree we had rather steep climbing among boulders. Here our trail left us, but fei trails are all along this west side of the canyon. We found a ripe bunch of fei and are lugging two extra meals through a forest of food. Myna is the one dominating bird here. By the looks of the map we are on the ridge which should lead us along to the left of the Diadime, where I understand a trail leads over into the Punaruu.

We were on the talus slope of a cliff of that ridge, but it did not lead us above the pocket of the stream. At 2400 feet we reached waterfalls of about one hundred feet in height. Had a hard task getting above them, but made it by pulling things up in relays with the two trunk straps tied together for rope. Johnston shows good "guts", but is a little unused to the hills, and gets a bit nervous going up steep places above cliffs. Of course this was an exceptional test, far worse than the rock on the Mt. Aarai trail which turned back Krauth. Johnston never hesitated to come along with me, although he one time remarked that it was folly to go over such a place with no definite purpose in view. He does not realize how anxious I am to get to the head of Fantana canyon. In the climbing my watch crystal broke very strangely, a half moon piece falling out of it. Our one accident was the loaf of bread falling down one of the portages and necessitating a return trip with the straps to get

both because amused to them.

Sometime during the night another native passed us.

He seemed quite surprised to find us lying there. They cannot understand anyone sleeping upon a journey at anytime. That be-low this orange tree we had rather sleep oblivious among bandoras. Here our trail left us, but fat trails are all along this west side of the canyon. We found a ripe bunch of fat and are lugging two extra meals through a forest of food. Here is the one abandoning bird here. By the looks of the map we are on the ridge which should lead us along to the left of the Diablos, where I understand a trail leads over into the Tepecuan.

We were on the false slope of a spur of that ridge, but it did not lead us above the pocket of the stream. At 4000 feet we reached waterfalls of about one hundred feet in height. Had a hard task getting above them, but made it by pulling things up in relays with the two trees strong tied together for rope. Johnston above good "guide", but is a little amused to the mile, and gets a bit nervous going up steep places above cliffs. Of course this was an exceptional test, far worse than the rest on the Mt. Aural trail which turned back Kenyon. Johnston never hesitated to come along with us, although he one time remarked that it was really to go over such a place with no defi-nite purpose in view. He does not realize how anxious I am to get to the head of Santa's canyon. In the climbing my water crystal broke very strangely, a half moon piece falling out of it. For one moment was the fear of bread falling down one of the portages and necessitating a return trip with the escape to get

it. It took us at least two hours to get above the fall, where we found enough level ground beneath an overhanging cliff to spread our blankets. We had a good feed upon oatmeal, corned beef, tea, fei, and bread and jam, after considerable exercise fanning the fire. The wood of the yellow-flowered, podded, primate-leafed tree so common about the hillsides is not the best of fire-wood.

The ravine we entered above the fall takes in the tree fern zone foliage. In fact, a tree fern stands on the brink of the falls. There is a fascinating view from there looking down into the fei-floored valley below the cliffs on either side. There is no sign of trail here, so the Punaruu is virtually hopeless. No birds except the myna, which is still plentiful, and one swallow as we climbed above falls.

November 23

It was quite cool during the night and really chilly this morning, with a mist above us which has now cleared away. The cliff below which we slept is gloriously ferned with long, hanging fronds from above, and maiden-hair and small ferns below with the long mosses, while the rocks are covered with liverworts and short moss. It would not have taken much of a flood to have washed us out of here. It is very difficult to get a fire started and hard to keep it going in these damp ravine bottoms; while the wood here is quite damp and moist.

Myna birds all about the farther ridge this morning with nothing else heard or seen. Even kingfishers and doves

it. It took us at least two hours to get above the fall, where we found another level ground beneath an overhanging cliff to spread our blankets. We had a good feed upon venison, corned beef, tea, fat, and bread and jam, after considerable struggle taming the fire. The wood of the yellow-flowered, peaked, prickly-leafed tree so common about the hillsides is not the best of fire-wood.

The ravine we entered above the fall takes in the tree fern zone foliage. In fact, a tree fern stands on the brink of the falls. There is a fascinating view from there looking down into the fal-floored valley below the cliffs on either side. There is no sign of trail here, so the traverse is virtually hopeless. No birds except the ogre, which is still plentiful, and one swallow all we climbed above falls.

November 23

It was quite cool during the night and really cold this morning, with a mist above us which has now cleared away. The cliff below which we slept is gloriously fretted with long, hanging fronds from above, and maidenhair and small ferns below with the long mosses, while the rocks are covered with liverworts and short moss. It would not have taken much of a flood to have washed us out of here. It is very difficult to get a fire started and hard to keep it going in these damp ravine bottoms; while the wood here is quite damp and rotted.

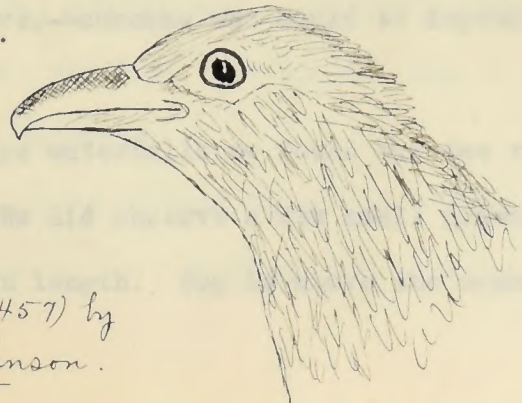
Ogre circs all about the feather ridge while morning with raining also hard or soon. Ogre clearings and burns

are scarce in this upper valley as they were above the lower falls too. No sound of chickens or other birds. No rail.

We strike up the ravine, an extremely picturesque tropical growth of ferns and mosses with a few interspersed higher plants. The cold stream of clear, sparkling water comes over moss-covered rocks into shimmering pools. A few of the rock fish here, but no prawn or the trout-like fish.

At 2600 feet we find ourselves in a pocket, which we propose to work for specimens, not attempting any search for trails out. We know our trail in can take us out, although Johnson (like all first-comers into the tropic islands) thinks the unknown may be better than where we have been. I have learned my lessons in that respect and must have either a well marked trail or else retrace my own tracks.

While on a small ridge between the main stream and a small rivulet, we observed two birds in the tree tops on the opposite slope of the canyon. It was a grayish bird which I took for a cuckoo, as it later proved to be. In the following sketch, the shaded portion of upper mandible horn blends into whitish-flesh below. The outer rim of the iris is a drab yellow, the iris hazel brown. The scales of legs are pea-green, tipped with yellow; claws black. The expression of the sketch is very natural.



Original drawing (p.2457) by David Johnson.

are scarce in this upper valley as they were above the lower falls too. No sound of macaws or other birds. No trail.

We strike up the ravine, an extremely picturesque tropical growth of ferns and mosses with a few interspersed higher plants. The cold stream of clear, sparkling water comes over moss-covered rocks into embowering pools. A few of the rock fish here, but no prawn or the trout-like fish.

At 5000 feet we find ourselves in a pocket, which we propose to work for specimens, not attempting any search for trails out. We know our trail in can take us out, although Johnson (like all first-comers into the tropic jungle) thinks the unknown may be better than where we have been. I have learned my lessons in that respect and must have either a well marked trail or else retrace my own tracks.

While on a small ridge between the main stream and a small rivulet, we observed two birds in the tree tops on the opposite slope of the canyon. It was a grayish bird which I took for a cuckoo, as it later proved to be. In the following species, the shaded portion of upper mandible horn blends into whitish-flesh below. The outer rim of the iris is a drab yellow, the iris itself brown. The scales of legs are pea-green, tipped with yellow; claws black. The expression of the species is very natural.

It was sitting upon the branch of a tree when a small bird, the size of the kingfisher, appearing dark brown or even black, darted at the gray bird from a tree branch above. Then the gray bird took in after the brown bird and chased it some distance through the tree tops, during which performance I heard the flying chatter of the kingfisher sounding just as he calls when I disturb him. My first impression, however, was that the bird was the black warbler, both from flight and color. Considerable calling has failed to bring any other bird to light except the one cuckoo obtained very near the scene of above action; myna birds and kingfishers heard about. After calling an hour or so it is almost evident that the flycatcher (Pomera nigra) is not here, and yet these negative records are not absolute. Nothing tempting above, so we now retreat.

Returned to camp, picking up plant specimens on the way. Ate a lunch of fei and what other food was present. Part of a can of beef, left after two meals, which never would have been left with a native along, was not only full of flies, but also alive with maggots about half a centimeter long. The portaging was not so bad; I remained above passing things down to Johnson who shows very good nerve today, now that he knows what is safe and what is not. How splendid it would be to have him along in place of a native,--someone who could be depended upon without instructions!

Below the waterfalls we found but the rock fish; no large prawns. We did observe a few small prawns above the falls about 3-4 cm. in length. Fog is above the mountain which rises

It was sitting upon the branch of a tree when a small bird, the size of the wingfisher, wandering down lower or even higher, darted at the gray bird from a step branch above. Then the gray bird took it after the brown bird and chased it some distance across the tree tops, during which performance I heard the flycatcher cry of the kingfisher sounding just as he calls when I disturb him. My first impression, however, was that the bird was the black warbler, both from flight and color. Considerable calling has failed to bring any other bird to light except the one cuckoo obtained very near the scene of above action; some birds and wingfishers heard about. After calling an hour or so it is almost evident that the flycatcher (Tyranny mexte) is not here, and yet these negative records are not absolute. Totally tempting above, so we now retreat.

Returned to camp, picking up plant specimens on the way. Ate a lunch of fat and what other food was present. Last of a can of beef, left after two meals, which never would have been left with a native alone, was not only full of flies, but also alive with maggots about half a centimeter long. The parsnips was not so bad; I remained above passing things down to Johnson who shows very good nerve today, now that he knows what is here and what is not. How splendid it would be to have him along in place of a native,--someone who could be depended upon without instructions!

Below the waterfalls we found not the rock flat; no large pools. We did observe a few small pools above the falls about 2-4 cm. in length. Fog is above the waterfall which does

high and steep above this ravine four thousand feet. Myna birds chirruping below falls on cliffs high above as well as low down. Our trail along the fei slope west of the stream is fairly easily followed. This canyon is walled in with precipices here, but no tropic-birds have been seen above the lower falls. Gathered a small bunch of fei.

We found our packs very heavy, especially after adding the fei and several oranges to them, and so were unable to get down to the swallow rock where I hoped to camp. Found a nice camp beneath the "Piti" tree (Q 18) where natives have stopped before. A large, roomy space well roofed with boughs, near water and ample wood, with fei and Opuhi on all sides of us leaves little to be desired. Here is a native already on his way for fei. He informs us that the trail to the Punaruu, which is used by natives in pig hunting, turns eastward just below here and goes over into the east fork and on up toward the Diadime.

During the night I heard several Rao (Puffinus obscura) and a few Noha (Aestrelata rostrata), the former early in the evening just after dark, while the latter was during the night. Just before daylight the Rao were calling not very far away, either passing near us or else from nests in the cliff just above us. This is rather late for nesting. Myna commenced just before the last Rao called, and continued chattering until broad daylight. No rail nor fowl were heard. One or two kingfishers are chattering. No doves.

We left a pile of half-baked fei beside the remnant of a fire that failed us last evening. We were too all in to fan

high and steep above this twelve foot waterfall fall. Some pitch overhanging below falls on cliffs high above as well as low down. Our trail along the fel slope west of the stream is fairly easily followed. This canyon is walled in with granodiorite here, but a tropic-girth have been seen above the lower falls. Discovered a small bunch of fel.

We found our packs very heavy, especially after adding the fel and several oranges to them, and so were unable to get down to the shallow rock where I hoped to camp. Found a nice camp beneath the "Fill" tree (§ 16) where activer have stopped before. A large, roomy space well roofed with boughs, near water and ample wood, with fel and Cypsel on all sides of as leaves little to be desired. There is a notive already on his way for fel. We injures so that the trail to the Tunnerm, which is used by natives in pig hunting, turns westward just below here and goes over into the next fork and on up toward the Diadiam.

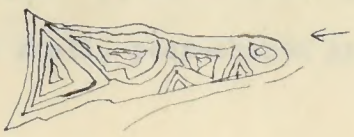
During the night I heard several Geo (Lorikeet species) and a few Ziwa (Australian rosella), the former early in the evening just after dark, while the latter was during the night. Just before daylight the Geo were calling not very far away, either passing near us or also from nests in the cliff just above us. This is rather late for nesting. Ziwa commenced just before the last Geo called, and continued chattering until broad daylight. No rail nor fowl were heard. One or two kingfishers are chattering. No doves.

We left a pile of half-burnt fel beside the remnant of a fire that failed on last evening. We were too all in to fan

it, so ate a cold supper and turned in. This morning the same wood, once started, burned very well indeed. My experience has convinced me that the North American Indian's small fire is no good in Tahiti; what one needs here is a large pile of wood on hand to burn as soon as any flame is acquired. Once started well, it will continue to burn if the pile is large enough, and the coals formed are ample for cooking purposes. It is surprising to find the amount of heat there is in the coals of these extremely soft woods, the "Piti" and "Puro" for instance.

November 24

The native told us of the Punaruu trail, so we kept our eyes open, and sure enough we found a well defined trail running up to the ridge eastward, where we now are gazing at the Diadime. The trail cuts over just above the third rock pinnacle, or last rock pinnacle on the ridge. Above this pinnacle was a swift but he would not come down and we could not go up. Here the Puro grows to the very ridge from the bottom of the canyon. The "Pua", fig-like Rupi food is here with the orchid upon it; the Piti is along the ridge and down the slope into the middle fork; lantana is everywhere. One or two tree ferns are present at the lower edge of this zone. By cutting away the brush I was able to take a view of the Diadime with the top of a "Pua" tree in one corner of the picture. Johnson is going to try to paint me a Rupi upon it. This near view of the Diadime shows that it does have considerable depth, not being quite such a narrow knife-edge as it appears from the Punaruu (arrow).



it, so pile a coals supper and turned in. Pile burning the same wood, once started, burned very well indeed. My experience has convinced me that the North American Indian's small life is no good in Tahiti; what one needs here is a large pile of wood on hand to burn as soon as any flame is required. Once started well, it will continue to burn if the pile is large enough, and the coals formed are ample for cooking purposes. It is surprising to find the amount of heat there is in the coals of these extremely soft woods, the "Pati" and "Faro" for instance.

November 24

The native told us of the Tuamotu trail, so we kept our eyes open, and sure enough we found a well defined trail running up to the ridge southwest, where we now are resting at the Diadema. The trail cuts over just above the white rock pinnacle, or last rock pinnacle on the ridge. Above this pinnacle was a cliff but he would not come down and we could not go up. Here the Faro grows to the very ridge from the bottom of the canyon. The "Pea", fig-like food is here with the ground open for the Pati is along the ridge and down the slope into the middle zone; lantana is everywhere. One or two true ferns are present at the lower edge of this zone. By cutting away the brush I was able to take a view of the Diadema with the top of a "Faro" tree in one corner of the picture. Tomorrow is going to try to point me a road upon it. This near view of the Diadema shows that it does have considerable depth, not being quite such a narrow knife-edge as it appears from the Tuamotu (arrow).

There is a cliff across the bottom of the valley at about our present altitude where cliff-nesting birds might be found. My next journey here will be up this east valley and down the Punaruu if possible.

We saw nothing until at the "Api" stream just below the fall observation point, where we obtained a green dove after a very prolonged search for it on the steep slope of the ravine. Took some pictures of ourselves before the waterfall (where I saw a swift) and of the native who has his seven bunches of fei, about one hundred kilograms, and is coming down trail behind us. They do not use the old steel girders, preferring to cross the river twice on the secure footing of bedrock. We went down and crossed there, stepping stones over the west fork, and wading with our shoes off across the main river.

Shot a kingfisher at the little stream where we camped on the up trail. Lower down I obtained eight myna birds; gave six bodies to a native with us, saving the young bird and one old one, and the six stomachs. Arrived at hotel after dark, just in time for Thanksgiving dinner with ice cream. At midnight there was an unusually pronounced crowing of the domestic fowl.

The following was written while three men who know conditions and natives were conversing over wine glasses, and around them:

Avaro: a narcotic poison used by women especially to commit suicide; by men to poison fish. It is a small, green tree, with three leaves from stem; small, pear-shaped green

There is a cliff across the bottom of the valley at about our present altitude where cliff-nesting birds might be found. My next journey here will be up this east valley and down the Tumaren if possible.

We saw nothing until at the "Agi" stream just below the fall observation point, where we obtained a green dove after a very prolonged search for it on the steep slope of the ravine. Took some pictures of ourselves before the waterfall (where I saw a swift) and of the native who has his seven bundles of fel, about one hundred kilograms, and is coming down trail behind us. They do not use the old steel girders, preferring to cross the river twice on the secure footing of bedrock. We went down and crossed there, stepping stones over the west fork, and wading with our shoes off across the main river.

Shot a kingfisher at the little stream where we camped on the up trail. Lower down I obtained eight more labels; gave six bodies to a native with us, saving the young bird and one old one, and the six stomachs. Arrived at hotel after dark, just in time for Thanksgiving dinner with ice cream. At midnight there was an unusually pronounced crowing of the domestic fowl.

The following was written while three men who knew conditions and natives were conversing over wine glasses, and around them.

Ayero: a narcotic poison used by women especially to commit suicide; by men to poison fish. It is a small, green tree, with large leaves from stem; small, pear-shaped green

fruit; ripe fruit is reddish.

The orange tree is used by natives to manufacture wooden pointed spears. Now there is an argument as to whether a woman with a pereu can catch the prawn, "Oura", beneath the rocks and weeds more rapidly than "Tane" can with a spear. "Tane" doubts it. One party claims that the "Oura" far up in the streams where no one has pursued them can be picked up by the hand.

"Api" after being cooked four or five hours and thoroughly mashed up is mixed with coconut milk, packed in bamboo, and cooked in oven. If no coconut, the taro leaves are mashed into pulp to make the dough,--Api poe. Eaten with sugar it is delightful.

Bamboo poison: A native woman had met a popa (white man) and become pregnant. She took her two sons with her, ate avava, and was sleeping when the boys returned. The fruit is delicious and sweet, causing merely a passing into sleep. District Hitia. Only two trees quite near Hitia,--the first river to right of Hindu's house two or three hundred yards. In the valley among the coconut trees, maa pape, orange trees etc.

Pua rata: the most fragrant of Tahitian flowers, a burst of pinkish white stamens with white petals.

A warning that should always be taken to heart is the fact that the natives will never go into the mountains following a heavy rainstorm.

The fei where thickest is often full of a hard, stone-like substance like small volcanic stone, which can be mashed by a knife, a fibrous, woody structure.

fruit; ripe fruit is reddish.

The orange tree is used by natives to manufacture wood in polished spoons. Now there is an argument as to whether a woman with a person can catch the person, "Ours", banana the roots and weeds more rapidly than "Theme" can with a spear. "Theme" denies it. One party claims that the "Ours" far up in the stream where no one has pursued them can be picked up by the hand.

"Ipi" after being cooked four or five hours and thoroughly masked up is mixed with coconut milk, packed in a bamboo, and cooked in oven. If no coconut, the taro leaves are masked into pulp to make the dough.--Ipi poe. Eaten with sugar it is delightful.

Bamboo poison: A native woman had met a pope (white man) and became pregnant. She took her two sons with her, ate away, and was sleeping when the boys returned. The fruit in delicious and sweet, causing merely a passing into sleep. District Kitia. Only two trees quite near Kitia.--the first river to right of Hindu's house two or three hundred yards. In the valley among the coconut trees, max pape, orange trees etc.

The rata, the most fragrant of Malaitan flowers, a beast of flaxen white stamens with white petals.

A warning that should always be taken to heart is the fact that the natives will never go into the mountains following a heavy rainstorm.

The rat where talokast is often full of a hard, stone-like substance like small volcanic stone, which can be smashed by a knife, a fibrous, woody structure.

November 25

Spent day on birds and plants. By continually changing blotters and sun bathing them, I hope to be able soon to refill. Also spent an hour or so in Dr. William's "Siege Perilous" while he ground my molars. We talked Tetiaroa mostly; my rebate is not to be so much because one Wilson refused to pay any of his fare. The fish had to stand that.

November 26

Spent the day changing blotters and tinkering upon camera, gun, and equipment. There being a good sling upon the new 12 gauge, I have decided to put holders for it upon the mountain gun, the 20 gauge Ithaca. The twelve does not eject shells at all yet.

November 27

C. B. Nordhoff tells me that he was having a native clean out the tops of the coconut palms about his place and that the native found two two-franc bills amongst the litter of which the myna had built an enormous nest. He affirms that he, himself, saw the bills found. He relates other similar incidents, one where a hundred-franc note was found in a nest. He says the nests, when near a house, are composed of all manner of rubbish and curious small articles, especially paper; and that the nests are two or more feet in diameter. He also adds that the birds fought ferociously, and that the native was afraid of their getting him in the eyes. Nordhoff asserts

November 24

Spent day on birds and plants. My continually changing blotters and sun bathing them, I hope to be able soon to refill. Also spent an hour or so in Dr. William's "Stage Territory" while he grind my molars. He talked Teitzers mostly; my rebate is not to be so much because one Wilson refused to pay any of his fare. The fish had to stand that.

November 26

Spent the day changing blotters and tinkering upon camera, gun, and equipment. There being a good sling upon the new 12 gauge, I have decided to put binders for it upon the mountain gun, the 20 gauge Ithaca. The twelve does not eject shells at all yet.

November 27

O. S. Mordhoff tells me that he was having a native clean out the tops of the cocoanut palms about his place and that the native found two two-frame bills amongst the litter of which the apes had built an enormous nest. He affirms that he, himself, saw the bills found. He relates other similar incidents, one where a hundred-frame note was found in a nest. He says the nests, when near a house, are composed of all manner of rubbish and various small articles, especially paper; and that the nests are two or more feet in diameter. He also adds that the birds fought furiously, and that the native was afraid of their getting him in the eyes. Mordhoff asserts

that a rat would never have the slightest chance with these birds, and that undoubtedly they drive the rodents out of trees in which they nest.

November 28

No native boy this morning. After changing plant blotters and having an early breakfast, I left on bicycle for Fantana in preference to Mission Ridge which would have necessitated carrying gun through town and a hot, dry climb carrying all equipment myself. In Fantana I do not have to carry water anyway. Will take the Punaruu trail this trip.

At the water-house there is not the ghost of a sign of the swift. Here we saw four eleven days ago, and in September they were quite plentiful all up the canyon, if they were the swifts, as I now suspect. Evidently they are nomadic in their habits. I hope to get one about the falls or the pinnacles just above them.

Just before arriving at the Levy plantation, where I left the bicycle, I saw a yellow-billed tropic-bird flying about the cliffs at perhaps one hundred yards above me. He would not come down. At the plantation I saw a white tern, two green doves, and heard the kingfisher. Plenty of mynas of course, which is to be taken for granted here in Tahiti unless especially noted otherwise.

Fantana falls today have their characteristic pose. The water boils over the rounded brink, shoots out into the fall, forms arrow-points which drop half the distance before

that a rat would never have the slightest chance with these birds, and that undoubtedly they drive the cobras out of trees in which they nest.

November 26

No native boy this morning. After changing plant pilsters and having an early breakfast, I left on bicycle for Tamatave in preference to Mission Bidge which would have necessitated carrying gun through town and a hot, dry climb carrying all equipment myself. In Tamatave I do not have to carry water anyway. Will take the Tamatave trail this trip.

At the water-house there is not the ghost of a sign of the swift. Here we saw four eleven days ago, and in September they were quite plentiful all up the canyon. If they were the swifts, as I now suspect. Evidently they are nomadic in their habits. I hope to get one about the falls or the pinnacles just above them.

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Tamatave falls today have their characteristic pose. The water boils over the rounded brink, shoots out into the fall, forms arrow-points which drop half the distance before

the up-canyon breeze disperses them into mist, which it blows against the east wall of the pocket. There the particles gather once more into streams of frothing water which fall over the lower rocks into the shadowy pool at the bottom. There is a charm about a waterfall which enchants the soul of man like a beautiful woman,--it is always a pleasure to gaze enraptured at them! With a bicycle it is no trick to reach this point in less than three hours. I see no signs of swifts about this place this morning. The nearest tree to the swallow nest on the big boulder above the falls and on across the creek was swaying too much to form a steady rest for my camera. No birds about this morning.

From the old shack I saw a tropic-bird flying about the cliff opposite. From a hole in the cliff a second bird appeared, and without hesitating set out seaward. The other circled at least a dozen times and several times paused with balancing wings upon shrub branches; then at last she made the proper sweep and effected a clear landing into the hole about one meter above the shrubs. It was quite amusing to see how she came away, rising at a rapid angle, and then volplaned in a long swoop for the hole. She tried first a right, then a left swoop, but was not regular in altering them. The successful attempt was a back sweep from the left, making a half turn into the hole. The yellow bill, black scapulars and white tail were plainly visible with the binoculars. My attempts to whistle her over to me were futile. Tail feathers not overly long, but the second bird's were apparently much longer.

A hawk comes soaring along the cliff far above me, sails

the up-canyon breeze disperses them into mist, which it blows against the east wall of the pocket. There the particles gather once more into streams of trickling water which fall over the lower rocks into the shadowy pool at the bottom. There is a charm about a waterfall which enchants the soul of man like a beautiful woman,--it is always a pleasure to gaze everywhere at them! With a bicycle it is no trick to reach this point in less than three hours. I see no signs of swifts about this place this morning. The nearest tree to the swallow nest on the big boulder above the falls and on across the creek was swaying too much to form a steady rest for my camera. No birds about this morning.

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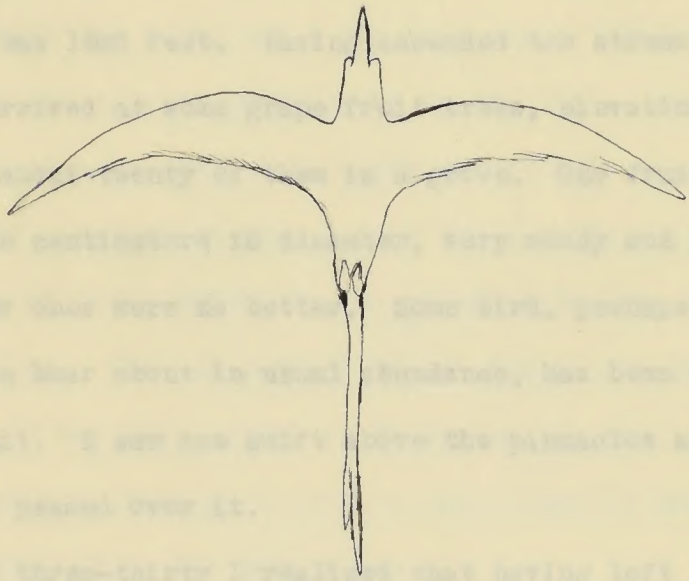
A hawk comes soaring along the cliff far above me, sails

along it and back to the shoulder where he alights upon a prominent rock for a short spell. He hops off carelessly, flutters about the rocks below him as if attempting to catch something, but takes wing and again commences soaring along the face of the canyon wall. An effort to rain was unsuccessful. Heavy fog banks above the ridges.

Again the tropic-bird! I keep the glasses on him and count. The thirteenth effort is fairly successful. He alights and folds his wings, but, losing his balance, takes wing again.



Next four attempts circles to the right, the eighteenth to the left, a figure eight and once more on the right. Twenty and twenty-one he aims at another bush. Back again to the one below the hole. The twenty-sixth is another good one; he pauses several moments. Thirteen is his lucky number. Time and again he makes the effort. Two natives arrive while I'm counting and take great interest in it. On the sixty-ninth effort he gives up the bush and makes a clear dive into the hole above the bush.

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High up among the clouds are three other tropic-birds and the natives claim they are P. lepturus. They look large up there. He says the Tauvai (P. rubricaudus) is found in the mountains of Hitia. I wonder. So far I have not identified one on Tahiti or Moorea.

On up trail and to the right. A pause at the ridge for another attempt to photograph the Rupi tree and the Diadime. Dropped down into west fork. At crossing I saw a large eel about as long as the shotgun. He took to the bottom of the pool so I could not shoot him, nor would he scare out of it. The ridge was 1400 feet. Having ascended the stream a way, I have now arrived at some grape fruit trees, elevation 1800 feet. There are about twenty of them in a grove. One fruit I tried was fifteen centimeters in diameter, very woody and no juice. The smaller ones were no better. Some bird, perhaps the myna which I can hear about in usual abundance, has been eating the fallen fruit. I saw one swift above the pinnacles along the ridge as I passed over it.

At three-thirty I realized that having left the "tipi" where I had cut the grape fruit it would be rather uncomfortable camping out for the night, so I finished the food and turned back down. At the ridge there were two swifts above the pinnacle, and I succeeded in calling one of them down within range but missed him. Down below the swallow rock I saw three swallow, a hawk, and myna. The hawk saw me from a distance. Got a shot at the swallows but missed. Nothing further until we passed the French wall beside the top of the falls. Then the dog, who had

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been sniffing the trail rather excitedly, left me and later I heard him barking at something. The "something" evidently retaliated and sent him back howling. He was so scared that he even yapped when I came upon him. Perhaps it was a goat.

He performed in such a manner when we were climbing the ridge from the east fork that I must record it. Two or three times he got beneath my feet and even caught the strap of the gun in his mouth and pulled on it. I thought him playing. But he would go up the trail ahead of me and pause, looking back as if to ask why I was so slow. Finally, after he had returned to me and caught the strap and I had told him to "Haere", he picked up a stick and started carrying it up the hill. Was he trying to tell me that he could help carry something? At any rate, he was perfectly satisfied when I gave him the oil-cloth bag in which were three of these notebooks, my sun-glasses, two pencils, and two triangles. This he carried to the top of the ridge very proudly. He was very useful in following the trail down stream. There is such a tendency to lose a trail here in Tahiti that a dog is worth having for that alone.

November 29

Had a tooth filled today after these two weeks or more of preparation. Paid up hotel bill and decided to move to less expensive place. My eyes bothered me badly towards evening, so that I could do no light work.

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November 22

Had a tooth filled today after these two weeks or more of preparation. Paid up hotel bill and decided to move to less expensive place. My eyes bothered me badly towards evening, so that I could do no light work.

November 30

A sleepless night and eyes that could not read or write is certainly torture. How I wish we could get off on a trip! I've had too much of this place, yet there is still much to be done scientifically. Mr. Beck came up this morning. Had another tooth filled. We decided to remain here on account of handy room for junk to accumulate.

Off at noon and up Mission valley to photograph kingfisher nests. I climbed up the old, rotten stump by the aid of two saplings, and found three eggs in the nest. They corresponded very nearly to the ones I photographed in section at Fantana. The entrance hole to this was longer. At the entrance it sloped slightly upward, as most of them do. There was no lining in the nest. While I was at the tree top, the female (black-throated) bird dove very closely by me, scolding sharply. Both the birds perched in nearby tree tops, scolding while we were fooling about the nest. Collected both birds and nest. Down the canyon by the old house beside a little side stream we found another nest, and it, too, had three eggs in it. Three nests now have contained three eggs each, all about the size, shape and construction of the ones photographed.

December 1

Packed up this morning to go to Papenoo, but the stage would not take me nor even one bag of equipment; so I rode out to Pirae on bicycle and ascended that canyon. I was a little too late, for some natives had gone up canyon just ahead of me.

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December 1

Started up this morning to go to Tapasco, but the stage would not take me nor even one bag of equipment; so I rode out to Pine on bicycle and searched that canyon. I was a little too late, for some natives had gone up canyon just ahead of us.

There was no chance for fowl behind them. Heard kingfishers and saw doves and myna low down. Myna all the way up canyon as far as I went. Elevation 1000 feet. Four tropic-birds flying above me. Threatening to shower. The canyon bottom is well covered with "Moa pape", but no sign of rail in it. Must rush back now or am likely to get thoroughly drenched by rain. By the binoculars I could see that the canyon wall is forested mostly by "piti" (18) and "puro" (17). Though exceptionally steep these slopes are well forested over.

1:40. The doves I have observed today seemed to be feeding upon the blossoms of the candlenut tree, so I collected one here for its stomach. At noon I had a bad case of cramps which laid me out for an hour. They had called a halt during the morning, and required two or three rests while returning down canyon. At the village, where I was obliged to stop to pump up my bicycle, I had some hot tea and Chinese cakes, which afforded temporary relief. At the hotel, Mrs. Oliver gave me a shot of brandy which made me feel much better. However, during the night I had another spell of agony.

Rains were rather frequent during the afternoon, even down along the coconut belt. A month of heat now has been with a little rain in the mountains, but not to equal last year.

December 2

Sick-a-bed all day. Castor oil, and a little relief in evening. Mrs. Beck called and informed me that Mr. Beck had obtained several birds at sea, among others, a Jaeger.

There was no chance for fowl bonnet there. Many kingfishers and sea doves and egrets lay down. Gone all the way up canyon as far as I went. Elevation 1000 feet. Four vultures-like flying above me. Forestaking to shower. The canyon bottom is well covered with "the pape", but no sign of rail in it. Must rush back now or am likely to get thoroughly drenched by rain. By the binoculars I could see that the canyon wall is forested mostly by "pilt" (Ia) and "puro" (IV). Though exceptionally steep these slopes are well forested over.

1:30. The doves I have observed today seemed to be feeding upon the blossoms of the abundant trees, so I collected one here for its stomach. At noon I had a bad case of cramps which laid me out for an hour. They had called a halt during the morning, and required two or three rests while returning down canyon. At the village, where I was obliged to stop to pump up my bicycle, I had some hot tea and Chinese cakes, which afforded temporary relief. At the hotel, Mrs. Oliver gave me a shot of brandy which made me feel much better. However, during the night I had another spell of agony.

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December 3

Went down to Beck's and skinned birds all day, putting up but seven boobies in nine hours. Upon regular meals. I ate some candy purchased at a stand. Then during the night I found out what caused my cramps. More castor oil.

December 4

A day of sleep mostly, and a little caution as to eating. This evening I take bread and milk. Mr. Beck came up to inform me that the cablegram had arrived telling him to buy the schooner 'France'. I will go to leeward islands for a month.

December 5

We all but missed seats in the big stage this morning, but managed to squeeze in alongside two big, fat, native ladies. It might be of ethnological interest to note what slaves these people are to the "aiu", sucking babe. Here is a woman with a babe clinging to her breast like a marsupial, half an hour already. The baby isn't sucking at all, just clinging on for comfort. There he will remain too, for the minute he is taken away he'll howl bloody murder. The way the youngsters scream in rage when set down to walk themselves (two to three years of age) is striking indeed. They flounder in the dirt until picked up raging as I never heard child before. The hard-working dames pick them up, set them astride one hip, and hold them with one arm. Here is a young, chocolate-brown belle with face powder applied in splotches, and small pimples as thick as

December 3

Went down to Mack's and swimmer mites all day, putting up but seven bookies in mike hours. Been regular mania. I ate some candy prepared at a friend. Then during the night I found out what caused my cramps. More castor oil.

December 4

A day of sleep mostly, and a little caution as to eating. This evening I take bread and milk. Mr. Mack came up to inform me that the cablegram had arrived telling him to buy the schooner 'France'. I will go to Samoan islands for a month.

December 5

We all but missed seats in the big stage this morning, but managed to squeeze in alongside two old, fat, native ladies. It might be of ethnological interest to note what slaves these people are to the "sin", smoking habe. Here is a woman with a babe clinging to her breast like a marsupial, half an hour already. The baby isn't sucking at all, just clinging on for comfort. There he will remain too, for the minute he is taken away he'll howl bloody murder. The way the youngsters scream in rage when set down to walk themselves (two to three years of age) is striking indeed. They clamber in the air until picked up raging as I never heard child before. The hard-working dames pick them up, set them sturdily on a hip, and talk them with one arm. Here is a young, chocolate-brown belle with face powder applied in spirtcher, and small pingles as thick as

the average freckles; but she is not of the husky type.

We passed the place we expected to work, so went on around the point until we reached the next sizable stream, "Naruta" on the map. Natives give us encouraging information, but they invariably do that. Unfortunately it is a pig valley, and apparently well stocked. The first note is a cliff overhanging the stream-bed and containing half a dozen swallow nests. I poked one down and saw that it resembled the swallow nests in every respect. No birds here, and the nesting season approaching! One is flying about nearby, but does not seem attached to these nests. Undoubtedly the swallow. Myna and kingfisher plentiful.

While lunching we saw two tropic-birds high aloft. Two pair of swallows above different points on the ridge, and two myna chasing a cuckoo across the canyon. Also saw a hawk above the ridge. Here are the creek boulders alive with a small crane-fly (body 6mm. and wings 6mm.) slightly larger than an average mosquito,--legs 1.5 cm. long. They cling to the under surfaces of the rocks or to spider webs and at my approach set up a veritable jig dance, but soon settle down, or up, again. Very numerous.

A dog most certainly pays for his keep. We are going along up stream looking for such birds as one could expect, but the dog has his nose open as well as his eyes, and makes an excursion to one side. Very soon there comes his "game" bark. There is no mistaking it, so we hasten to his assistance. Sure enough! He has found game. What is the shearwater Noha

the average fresolist; but she is not of the lanky type.

We passed the place we expected to work, so went on around the point until we reached the next sizable stream, "Marta" on the map. Natives give us encouraging information, but they invariably do that. Unfortunately it is a pig valley, and apparently well stocked. The first note is a cliff overhanging the stream-bed and containing half a dozen swallow nests. I poked one down and saw that it resembled the swallow nests in every respect. So birds here, and the nesting season approaching! One is flying about nearby, but does not seem attached to these nests. Undoubtedly the swallow. Eyes and binoculars plentiful.

While lunching we saw two tropic-birds high aloft. Two pair of swallows above different points on the ridge, and two eyes chasing a condor across the canyon. Also saw a hawk above the ridge. Here are the creek bonifaces alive with a small crane-fly (body 6mm. and wings 6mm.) slightly larger than an average mosquito,--legs 1.5 cm. long. They cling to the water surfaces of the rocks or to spider webs and at my approach act up a veritable jig dance, but soon settle down, or up, again. Very numerous.

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(P. rostrata) doing down in the bottom of this canyon? No chance for the bird to take wing down here. Is it a young bird which tried his wings a little too soon? No sign of down-edged feathers, nor does he appear to be a sick bird. Tying his legs and beak, I carry him alive in my jacket. The head of the ravine looks threatening where it turns sharply to the left; and sure enough, we later find ourselves in a pocket where the perpendicular walls rise a thousand feet on three sides. A hawk circles the cirque twice; evidently they have some definite purpose for this soaring alongside steep cliffs. One sees them so frequently doing that that one concludes there must be game to capture by it.

If the Rupi pigeon is here, he is very unresponsive. There are plenty of myna present. They are living upon the fei which are inaccessible to man on the face of these steep canyon walls. There are several large, ripe bunches on the opposite wall from us. We have ascended a hundred feet or so above the river on the shoulder inside the bend in the gorge on a fei trail. Elevation 1150 feet. There is quite a fire in the hills somewhere above us and to windward. Burnt brush has been fluttering down into this gorge all day, and now it is quite hazy with smoke. I see no use of sleeping over night up here.

All along the stream-bed today there have been piles of shells of the fresh water mollusks, resembling if not specifically Limpets. These are unmistakably refuse piles of some bird's feast. As yet I have been unable to get accurate evidence as to just what bird is guilty. The natives claim it is "Au", the green heron, but it is strange that we have not seen

(?. rosirsis) coming down in the bottom of this canyon? To change for the bird to take wing down here. Is it a young bird which tried his wings a little too soon? Is also of down-edged feathers, nor does he appear to be a size bird. Tying his legs and back, I carry him alive in my jacket. The head of the raven lower thereabouting where it turns sharply to the left; and here upward, we later find ourselves in a pocket where the perpendicular walls rise a thousand feet on three sides. A dark circles the cirque twice; evidently they have some definite purpose for this soaring alongside steep cliffs. One sees them so frequently doing that that one concludes there must be game to capture by it.

If the Rock pigeon is here, he is very unrecognizable. There are plenty of swns present. They are living upon the fat which are inaccessible to man on the face of these steep canyon walls. There are several large, rige bunches on the opposite wall from us. We have ascended a hundred feet or so above the river on the shoulder inside the head in the gorge on a fair trail. Elevation 1100 feet. There is quite a fire in the hills somewhere above us and to windward. Hard brush has been flint-tering down into this gorge all day, and now it is quite hazy with smoke. I see no use of sleeping over night up here.

All along the stream-bed today there have been piles of shells of the fresh water mollusks, resembling if not specifically lampsis. There are considerably torms piles of some bird's feast. As yet I have been unable to get sufficient evidence as to just what bird is guilty. The natives claim it is "Ax", the green heron, but it is strange that we have not seen

one of them all day. I would not be surprised if it were the myna which is here in abundance, but I have not observed them down in the bed of the stream. If I see any fly from the stream-bed I'll collect them for the stomachs. One swallow about during evening, but I did not bother him. Nothing else occurred. Few mosquitoes here.

December 6

The day dawned in the natural history world with mosquitoes and dog fleas rivaling for first place. The scratching hound at the foot of the bed awoke me to the hum of the mosquitoes. A kingfisher next startled the last dim darkness of night. Then the myna commenced his morning services. From bed I saw two of them descend into the stream-bed, and as we descended the river we scared two of them out of the creek channel. It is very likely that they are the culprits that feast upon the mollusks. I missed the one I got a long shot at. How wild they are out here! It is difficult to get even a distant shot at them. At the road obtained two white terns before striking along towards Papeete.

Had a look at the three "Grottoes" and obtained a new maiden-hair fern in them. Here the movie outfit erected a most abominable paper maché "god" for their picture. Any heathens incapable of so little art certainly would be low in the scale of human advancement. It still stands to abominate the entrance to the "grotto".

On to the little lagoon in a semi-circular, cliff-

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On to the little lagoon in a semi-circular, cliff-

enclosed pocket, where the reef heron were in abundance. We are looking for nests while awaiting the stage. Myna birds are exceedingly numerous. Food abundant. A hawk came overhead, greatly disturbing both the myna and the herons. They both took wing to other parts, returning when the hawk left. Many myna in a flock above while the hawk was here. Collected two herons from trees in which they were perching for no apparent reason save to rest or perhaps shade up, although they do seem to be paired off.

We found no sign of nests, so went on down road to a trickle of water where we lunched on coffee, bread and jam. Here we waited for the stage. Two early trucks passed us by unnoticed. We found and collected a nest of kingfisher eggs just as the truck arrived. Conditions in all respects similar to those previously described. The hole was in an old, dead tree where the wood was so rotten that I could readily pull it away to enlarge entrance for my hand. No lining in nest. Three eggs. Also collected one bird a few meters from the nest. A shower struck us just beyond Punaruu river.

December 7

Packing this morning for the leeward islands, where I will work until our schooner is ready for the Paumotu trip. Very stormy day following heavy rain during the night, which delayed the loading of the ship. Consequently no sailing yet, and perhaps not for some time. Got all my junk aboard. The schooner is the 'Curieuse', and a sail ship only, which may not make very rapid time. One of the crew was on the 'Moana' and has already started me off as "Orare", which is translated as

enclosed bonnet, where the rest bunch were in abundance. We are looking for nests while awaiting the stage. The birds are exceedingly numerous. Food abundant. A hawk came overhead, greatly disturbing both the myna and the barons. They both took wing to other perts, returning when the hawk left. Many myna in a tree above while the hawk was here. Collected two barons from trees in which they were perching for no apparent reason save to rest or perhaps change up, although they do seem to be paired off.

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"Orali" and somewhat recalls my yodel. Got a typewriter from Reynolds to take with me, which will permit a little work being done while aboard.

December 8

Leave Tahiti on 'Curieuse'

Prospects of getting away today are good, but one never can tell.

Left at 3:45 and passed out of reef. White gygis tern there. Red-footed booby plentiful just outside the reef.

4:15. "Rao", shearwater observed. (Puffinus obscura.)

4:35. "Noha", shearwater, observed. (Puffinus rostrata) and others observed until five o'clock.

5:00. Four boobies (Sula piscator) heading toward Moorea.

The 'Curieuse' is a ninety-ton, two-mast schooner with cabin berths for four, including the Captain. We commenced the journey with but a light breeze. Cloudy and hazy but no rain, so that sleeping on the topside promises its usual comfort. My pneumatic mattressed sleeping bag is certainly the thing for this life, and not at all too warm.

December 9

Awoke to find our schooner listlessly lolling on a calm sea and still within sight of Moorea in spite of the haziness. No birds noticeable until well along in the morning, when boobies commenced passing occasionally. Saw three gray-backed terns, but they passed us by with little notice. At three this

"Orali" and somewhat recalls my yacht. Got a typewriter from Reynolds to take with me, which will permit a little work being done while aboard.

December 8

Leave Tahiti on 'Cariteas'

Prospects of getting away today are good, but one never can tell.

Left at 5:45 and passed out of reef. White egrets (ers) there. Red-footed booby plentiful just outside the reef.

4:15. "Hao", absentwater observed. (Puffinus opisenus.)

4:25. "Xoha", absentwater,observed. (Puffinus reykjaeg)

and others observed until five o'clock.

5:00. Four boobies (Sula piscator) heading toward Moorea.

The 'Cariteas' is a ninety-ton, two-mast schooner with cabin certha for four, including the captain. We commenced the journey with but a light breeze. Cloudy and hazy but no rain, so that sleeping on the topside promises its usual comfort. My pneumatic mattressed sleeping bag is certainly the thing for this life, and not at all too warm.

December 9

Awoke to find our schooner listlessly loiling on a calm sea and still within sight of Moorea in spite of the distance. No birds noticeable until well along in the morning, when boobies commenced passing occasionally. Saw three grey-backed terns, but they passed us by with little notice. At three this

afternoon a small flock of boobies, noddies and white terns were fishing off our stern.

Huahine in sight at five P. M. More boobies this afternoon, not in large flocks. Towards six, a small flock about half terns and half boobies was observed off the starboard bow at some distance. We are creeping along just a little. Will not make Raiatea tomorrow morning at this rate.

While sitting here, I was struck by the little gusts of breeze which seem to hit us periodically. Observing that the swells seemed to come at about the same time, I finally connected the two. The breeze is from the time we pass the crest of a swell until we are down in the trough; the lull comes as we ascend the next swell. The breeze increases until the bottom of the trough is reached. Apparently it is caused by the acceleration of the ship in descending, the lull by the retardation in ascent. A mean of the two would give the velocity of the wind, which is very little better than nothing.

We have a very good crew and a jovial, fat, and snoring Captain; a sociable and pleasant supercargo; a reliable and efficient mate (ex-bo's'n of the 'Moana'); a very good and serviceable cook; and a jolly crew of native sailors. The dog and I rival one another for sleepiness.

Early in the evening a breeze came up, very gently at first, but at ten o'clock we were sailing along at about four knots. A bit too overcast for the moon to shine except at brief intervals.

afternoon a small flock of booobies, noddies and white terns were flaunting off our stern.

Midnight in sight at five P. M. More booobies this afternoon, not in large flocks. Towards six, a small flock about half terns and half booobies was observed off the starboard bow at some distance. We are creeping along just a little. Will not make Palates tomorrow morning at this rate.

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Early in the evening a breeze came up, very gently at first, but at ten o'clock we were sailing along at about four knots. A bit too overcast for the moon to shine except at brief intervals.

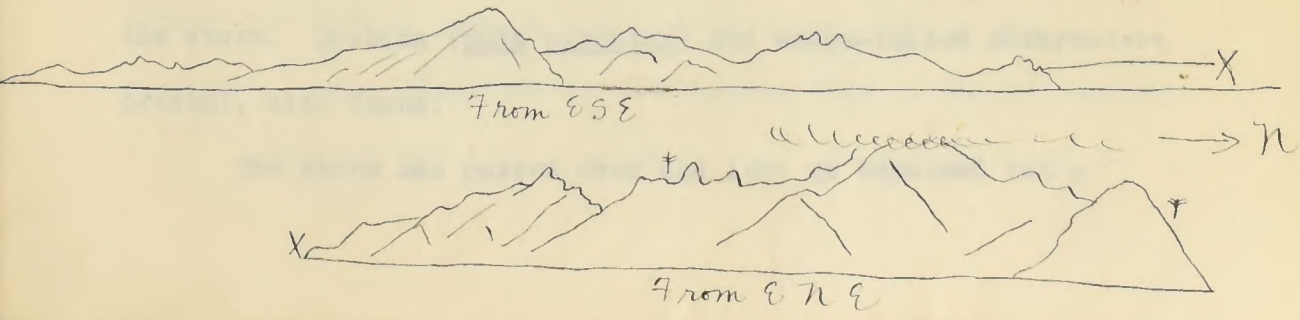
December 10

Awoke this morning with Huahine about four points off our port bow. We are still traveling along at about four knots, and should arrive at Raiatea about two o'clock.

5:25. Boobies out here about ten miles off shore to windward. Squalls about but none have struck us yet. One above Huahine now. The supercargo says that elephantiasis is very prevalent here. A benevolent government would have medical experts working out a cure, or at least preventative, for this accursed affliction.

7:00 A. M. ENE of Huahine, but a very few miles off. A black shearwater not identified. White tern also.

The south side of this island has a dry, brownish appearance, like the north side of Moorea. Again a black shearwater, but too distant to recognize. The southern portion does not appear to be high enough to penetrate the cloud bank, which may account for its vegetation being of the dry nature. The northern portion has at least the main peak inside the clouds, and the ridges approaching it are covered with more luxuriant foliage. I cannot yet discern whether or not the tree fern is present, but using ✝ as a symbol for the denser foliage I have marked the points along the ridges where it appears. A black cloud now hangs above this northern mountain and evidently is showering that portion of the island profusely.



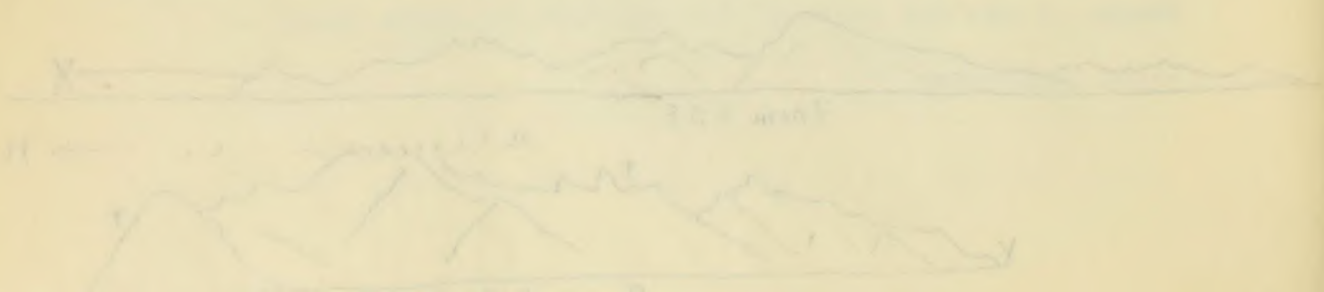
December 10

Awoke this morning with Huahine about four points off our port bow. We are still travelling along at about four knots, and should arrive at Raiatea about two o'clock.

8:30. Boobies out here about ten miles off shore to windward. Squalls about but none have struck us yet. Cue above Huahine now. The supercargo says that elephantiasis is very prevalent here. A benevolent government would have medical surgeons working out a cure, or at least preventative, for this accursed affliction.

7:00 A. M. EWE of Huahine, but a very few miles off. A black shearwater not identified. White tern also.

The south side of this island has a dry, brownish appearance, like the north side of Moorea. Again a black shearwater, but too distant to recognize. The southern portion does not appear to be high enough to penetrate the cloud bank, which may account for its vegetation being of the dry nature. The northern portion has at least the main peak inside the clouds, and the ridges approaching it are covered with more luxuriant foliage. I cannot yet discern whether or not the tree fern is present, but using ⅄ as a symbol for the denser foliage I have marked the points along the ridges where it appears. A black cloud now hangs above this northern mountain and evidently is showering that portion of the island purposely.



A yellow-billed bo's'n at rest upon the sea. We steer the ship for it, but it takes wing just beyond range and my shots are ineffective. Boobies, apparently all Sula piscator, and again the black shearwater and this time near enough for me to see the wedge-shaped tail of Puffinus pacificus. Another crosses the bow but just beyond range. A white-bodied booby with it. Off the starboard bow a fishing flock is made up mostly of the boobies and the two noddy terns; but flashes of white give evidence of white terns and possibly tropic-birds; while above the flock, on widespread, motionless wings, soar the pirate frigate-birds. We are now passing where the flock first appeared, and belated boobies and terns cross our bow headed for the block still observable abaft the starboard beam at least a mile away.

How interesting it is to sit here on the jib-boom where the breeze strikes one with a vengeance and the prow of the vessel splashes through the frothing sea, watching these intensely amusing feathered fishermen! How they swoop and swerve in unison as the school of fish beneath them progress in their journey to nowhere! A squall is coming up.

And now a Noha (P. rostrata) passes us. Apparently the shearwaters here are as numerous as at Tahiti and Moorea.

1:00 P. M. We are just outside the Raiatea pass and in a heavy rainstorm with a head wind. Nothing is visible through the storm. Boobies (Sula piscator) and wedge-tailed shearwaters present, also terns.

The storm has passed over and left us becalmed but a

A yellow-billed boatbill at rest upon the sea. We steer the ship for it, but it takes wing just beyond range and my shots are ineffective. Booties, apparently all Sula piscator, and again the black albatross and this time near enough for me to see the wedge-shaped tail of Tachytrina tenuirostris. Another crosses the bow but just beyond range. A white-bodied booby with it. Off the starboard bow a flashing flock is made up mostly of the booties and the two noddy terns; but flashes of white give evidence of white terns and possibly tropic-birds; while above the flock, on widespread, motionless wings, soar the pirate frigate-birds. We are now passing where the flock first appeared, and belated booties and terns cross our bow headed for the block still observable abaft the starboard beam at least a mile away.

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And now a Mola (Ex. rostrata) passes us. Apparently the shearwaters here are as numerous as at Tahiti and Moorea.

Lat 2°. E. We are just outside the Galapagos zone and in a heavy rainstorm with a head wind. Nothing is visible through the storm. Booties (Sula piscator) and wedge-tailed shearwaters present, also terns.

The storm has passed over and left us beclouded but a

half mile or so outside the pass. The boys let out the whale boat and attempt to tow us in, but we make poor progress for an hour, when a motor boat comes out to tow us in.

The island, just fresh from a bounteous shower, looks verdantly green above the customary fern brake ridges. The usual fringe of cocomut palms adorns the skirting lagoon shore. From this view it appears to be in a stage of erosion between that of Tahiti and Moorea. There are two prominent elevations, the one to the south being the smaller. The north is a large, massive hill with a rather even summit as viewed from this pass (NE), with ravines which pour their precipitation into the valleys below over prominent cascades. Taha is somewhat lower and its circular shape is evident even from sea level. Through the lagoon between the two now appears the classic Rock of Bora Bora. It indeed deserves all its advertising, for it looms up against the skyline in a most majestic manner.

Lesser noddies and boobies present here in considerable numbers. The pass is studded by two picturesque islets, on a tree of one of which were perched two reef herons, one white, upon which I centered a picture of the islet.

It will be four P. M. before we land, not giving me much chance to hunt. But perhaps I can get a little done, and if they don't get through here today we must remain in port until Monday, which will give me tomorrow to spend high in the mountains taking observations and hunting back on Monday morning.

Yellow-billed tern present at the reef and on rocks in

half mile or so outside the pass. The boys let out the whale boat and attempt to tow us in, but we made poor progress for an hour, when a motor boat came out to tow us in.

The island, just fresh from a bombardment shower, looks verdantly green above the customary form single ridges. The usual fringe of cocoanut palms adorns the skirting lagoon shore. From this view it appears to be in a state of strife between that of Tahiti and Moorea. There are two prominent elevations, the one to the south being the smaller. The north is a large, massive hill with a rather even summit as viewed from this pass (NE), with ravines which pour their precipitation into the valleys below over prominent escarpes. Uahu is somewhat lower and its circular shape is evident even from sea level. Through the lagoon between the two now appears the classic look of Cora Cora. It indeed deserves all its advertising, for is loom up against the skyline in a most majestic manner.

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It will be four P. M. before we land, not giving me much chance to hunt. But perhaps I can get a little done, and if they don't get through here today we must remain in port until tomorrow, which will give me tomorrow to spend hour in the mountains taking observations and tracking game on Monday morning.

Tailor-billed birds present at the reef and on rocks in

shallow lagoon. (Thalasseus bergii subsp.)

Raiatea name for kingfisher is "Otatare".

We landed at 4:50. I went ashore and inquired the nearest place to find "Manu" birds. Some boys took me to a cow pasture where there were half a dozen golden plover. I took a flying shot at two and missed them both. Heard doves in woods beyond, so went there and found four kingfishers and three doves in one hour.

December 11

The kingfisher has a call quite distinct from the Tahiti and Moorea birds. This is more like the distress squeal of a jack-rabbit than the typical chatter of "Ruro". There he gives me a little chatter in with his jack-rabbit squeal. A little observation soon located their nest, in which were but two eggs. Here an evident lining of sawdust filled the hole about one or two centimeters deep. The female, a dark belted bird like # 1489, I blew to pieces with a # 6 shell which I had just previously inserted at sound of a hawk overhead and had forgotten. The male I lost by wounding with the auxiliary. The dog is doing nothing in the line of retrieving today.

I have a light pack and a little grub for a night camp somewhere in the mountains. Saw the gendarme before starting. Along the road to left from the dock and up the first draw, again to right up smaller draw, both of which were well wooded. Bananas growing to one hundred meters. Fei here also. Papaya peppers. Doves plentiful, myna and kingfishers,--the reliable

shallow lagoon. (Thalassoma petroli ichep.)

Relative name for kingfisher is "Ulatara".

We landed at 4:30. I went ashore and inquired the nearest place to find "Sauu" birds. Some boys took me to a cow pasture where there were half a dozen golden plover. I took a flying shot at two and missed them both. Went down in woods beyond so went there and found four kingfishers and three doves in one hour.

December 11

The kingfisher has a call quite distinct from the Tahiti and Moorea birds. This is more like the distress squeal of a jack-rabbit than the typical chatter of "Sauu". There he gives me a little chatter in with his jack-rabbit squeal. A little observation soon located their nest, in which were but two eggs. Here an evident lining of rawhunt filled the hole about one or two centimeters deep. The female, a dark boiled kind like # 1440, I blew to pieces with a # 6 shell which I had just previously inserted at round or a bank overhead and had for-gotten. The male I lost by mounting with the auxiliary. The dog is doing nothing in the line of retrieving today.

I have a light pack and a little grub for a night camp somewhere in the mountains. See the predators before starting, along the road to left from the house and up the first draw, again to right up smaller draw, both of which were well wooded. Immense growing in one hundred meters. Not here also. Passage peppers. Dove plentiful, myna and kingfishers,--the reliable

three inhabitants of the Society Island woods. It is very hot and there is no water, but there are vines climbing into the tree tops. I tap two or three lengths and drink the sap from them. It certainly is delicious, but suppose one should be poisonous? Well, the risk is less annoying than the thirst. Have had poor luck here. These doves seem to carry a load of shot like the white men in Papeete carry rum, safely if not sanely.

Up through the hibiscus and pandanus on this north side of the slope and down through the dry fern brake on the south slope. Why this inversion of slope exposure? The north slope gets more sun than the south. Why, then, a foliage requiring more moist conditions? Into the main draw which I should have ascended from below, and where there is water, thank God! Sap may suffice for a while, but it isn't exactly water. A bath from the waist up and a cool rest in the shade of the maupi trees proved very refreshing.

No doves cooing here, no mynas and thus far no kingfishers. No fruit as yet, which may account for the lack of birds. The prawn is here in the pools. I wonder if they will prove to be different varieties in these various islands. The dove and kingfisher here are quite different from the Tahitian birds. Also the land snail, of which I have gathered a few, are much larger. The foliage thus far seems to be very similar. If the botany of these islands proves to be quite similar, some light should be thrown upon how recent their segregation has been. It is delightfully cool down here.

Followed on up a sort of trail which I lost in a side

these inhabitants of the Swiftly Island woods. It is very hot and there is no water, but there are vines climbing into the tree tops. I hop two or three lengths and drink the sap from them. It certainly is delicious. Had anyone one should be poisonous? Well, the risk is less occupying than the desert. Have had poor luck here. Monkeys seem to carry a load of shot like the white men in Kipsoto carry rum, safely if not sanely.

Up through the dishevel and rockbound on side north side of the slope and down through the dry lava trace on the south slope. Why this inversion of slope economy? The north slope gets more sun than the south. Why, then, a foliage requiring more moist conditions? Into the main draw which I should have ascended from below, and where there is water, thank God! Sap may suffice for a while, but it isn't exactly water. A bath from the waist up and a cool rest in the shade of the mangal trees proved very refreshing.

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hill grove of the papillionaceous tree with primate leaves and a scarlet red seed which is used for beads. Seedlings cover the ground very thickly and the grove is just not too dense to permit one to get through it with a pack on. Here, as well as at the last writing, I succeeded well in calling doves and I got the dog to working again. Kingfishers I could not get. Heard tropic-birds above me and a hawk.

Followed along the talus slope of loose boulders of the peculiar pinkish gray volcanic rock here and came out upon a typical red gumbo ridge. Looking the country over I saw that I had made a poor selection of trail. Must cut down into one of the two long ravines which penetrate to the backbone of the island. By following up them or the ridge between I will get to the main ridge, but the highest point looks almost hopeless now. Last evening as I finished hunting and again this morning I saw a hawk. Have they flown hither from Tahiti and Moorea, or were they brought here by some wiseacre?

Found first ravine bone dry, with brush cutting to get out of it; then another spell of fern brake before reaching the puro and pandanus of the next, which also was dry but led shortly to a good stream where we quenched our thirst and bathed a bit. We struck it just above a considerable cascade which has quite a pool at the bottom where the side bank is being rapidly undermined. The ravines here show a depth of soil which indicates, I believe, a longer stage of erosion than at Tahiti. These ravines are not as sharp as those  , a broad  type about half way between Tahiti and Moorea.

hill grove of the pamplimousses tree with delicate leaves and a scarlet red seed which is used for beads. Creeping over the ground very thickly was the grove is just not too dense to permit one to get through it with a pack on. Here, as well as at the last stream, I succeeded well in calling doves and I got the dog to working again. Nightfaners I could not get. Heard tropic-birds above me and a hawk.

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Found first native home day, with brush cutting to get out of it; then another spell of rain broke before reaching the pure and pandanus of the mauk, which also was dry but led shortly to a good stream where we quenched our thirst and bathed a bit. We struck it just above a considerable cascade which has quite a pool at the bottom where the side bank is being rapidly undercutted. The ravines here show a depth of soil which indicates, I believe, a longer stage of erosion than at Tahiti. These ravines are not as steep as those /, a broad 4 type about half way between Tahiti and Moorea.

A student of volcanic rocks would find very interesting work here. It is pleasant to get away from the ordinary Tahitian lavas. Not a sound of any bird heard here during rest. Slept an hour here and it somewhat rested my eye which got a bad poke with a twig during the morning.

Following up stream we came into a regular hotbed of chicken sign. The dog immediately got busy and soon worked out a hot trail which he followed up the side of the ravine. I heard him flush the chicken all right. Later on we flushed a second one in the ravine but could not get a shot. A third one near the head of this second or third cul-de-sac. Obtained some doves and two male kingfishers. When I hear the latter and cannot locate them I call a dove into the neighborhood. That makes the kingfisher angry and he chases the dove away. Then I watch him alight upon returning. What a racket he creates when chasing the dove,--like a parrot screeching!

About three o'clock I stopped for lunch, and, to my dismay, found the can of corned beef badly spoiled. The dog finally condescended to eat it. Took a biscuit and went down to the creek where I made myself a cup of coffee with cold water. Here again I discovered I had forgotten both sugar and milk. Caught the prawn with my hands. It is no easy task cornering those highly active creatures in rocks and roots. Took ridge to left and found, as I feared, that the backbone was still beyond another deep ravine. Did not feel like crossing it so late, so stopped for the night and built a small fern hut against a maupi tree trunk which affords something approaching levelness.

A student of volcanic rocks would find very interesting matter here. It is pleasant to get away from the ordinary Eastern lava. Not a sound of any bird heard here during rest. Slept an hour here and it somewhat rested my eye which got a bad poke with a twig during the morning.

Following up street we came into a regular hotbed of chicken sign. The dog immediately got busy and soon worked out a hot trail which he followed up the side of the ravine. I heard him flush the chicken all right. Later on we flushed a second one in the ravine but could not get a shot. A third one near the head of this second or third cul-de-sac. Obtained some doves and two male kingfishers. When I hear the latter and cannot locate them I call a dove into the net, apparently. That makes the kingfisher angry and he chases the dove away. Then I watch him alight upon returning. What a racket he creates when chasing the dove,--like a parrot screaming!

About three o'clock I stopped for lunch, and, to my dismay, found the can of cooked beef badly spoiled. The dog finally succeeded in get it. Took a biscuit and went down to the green water I made great a cup of coffee with cold water. Here again I discovered I had forgotten both sugar and milk. Cooked the prawn with my hands. It is no easy task cooking those highly active crustacea in cups and pots. Took rides to left and found, as I recall, that the backcross was still beyond another deep ravine. Did not feel like crossing it so late, so stopped for the night and built a small fire but against a dead tree trunk which airtrin something approaching lovelness.

Heard the unmistakable piping of the rail, so we'll have that villain to hunt for. I waited half an hour or more hoping one would come into the open trail, but no chance. Have heard but the one. From four o'clock on, I heard something that worried me decidedly. It was a coarse, guttural croak, and I do not believe any sea bird made it. It came invariably from uphill and not far distant. As nearly as I could imitate it, it brought no results save a few apparent answers about dusk. The nearest explanation I can make for it is the "gekko", but it seemed far too loud for that little lizard. In fact, it was so loud that I put the shell in the gun in place of the auxiliary when I got the answers. So there is that besides the rail to keep us occupied when we come definitely to Raiatea. Many mosquitoes humming about but none bothering me.

December 12

Awakened at one A. M. by flashes of lightning, but if there was accompanying thunder I could not distinguish it from the pounding surf on the reef below, which bursts forth with volume every now and then. The top cross piece of my lean-to broke early in the night. I just got up and replaced the leaves above the caved-in end and it makes a better hut than before with one end well closed in. Had the satisfaction of hearing profuse raindrops augment the dew dripping just after I finished the repairs. Heard a rail piping. There is one thing a naturalist should not neglect to mention, and that is the continuous cricket-like chirruping which fills the night air here. Elevation

Where the unmistakable lying of the rail, so we'll have that villain to hunt for. I waited half an hour or more for one would come into the open trail, but no chance. Have heard but the one. From four o'clock on, I heard something that worried me decidedly. It was a cowbell, distant dreamy, and I do not believe any sen bird made it. It came inverbingly from uphill and not far distant. As nearly as I could indicate it, it brought no results save a few apparent answers about dues. The nearest explanation I can make for it is the "gecko", but it seemed far too loud for that little lizard. In fact, it was so loud that I put the shell in the gun in place of the auxiliary when I got the answers. So there is that besides the rail to keep us occupied when we come definitely to Salaise. Lady mangoloes humming about but none bothering me.

December 12

Awakened at one A. M. by flashes of lightning, but if there was accompanying thunder I could not distinguish it from the pounding surf on the reef below, which bursts forth with volume every now and then. The top cross piece of my lean-to broke early in the night. I just put up and replaced the leaves above the caved-in one and it makes a better hut than before with one end well closed in. Had the satisfaction of hearing pretense naindrops augment the dew dripping just after I finished the repairs. Heard a rail piping. There is one being a naturalist should not neglect to mention, and that is the continuous cricket-like chirping which fills the night air here. Elevation

two hundred meters. The rain does not seem to penetrate my shelter, for which I am duly thankful to the maupi tree above me, but large drops strike the ferns now and then.

Roasted my ten prawns by the candle flame, and now propose to indulge in a two A. M. "lobster" feed. In spite of the rain the chirruping insects continue. The prawn dipped in lemon juice and salt were delicious. A little bit of ship's biscuit went well with them. It drips steadily, meaning the rain or heavy fog or whichever it is.

Rain settled down steadily shortly after three, and continued until about seven. It was very amusing during the night whenever a clap of thunder came. The dog, to whom lightning and thunder were strangers, rushed out barking vociferously as if something were very near and dangerous.

Packed away yesterday's birds in the knapsack, and, after making up the pack, got into my damp clothes and struck out for the village. Picked up but one kingfisher and one dove on entire trip down stream. Nor did we see a sign of chickens. Also picked up a yellow-billed tern by wading out in shallow lagoon after one of two which perched upon two low stakes. Both were in line, but the further one was not injured.

Arrived at ship just before nine. We were delayed just long enough for me to get a bath and wash out my sweaty, muddy clothes. Spent rest of day making up the birds. It being rather calm, we did not get out of the lagoon off the westward of Taha until after three o'clock. Then a fair breeze took us to the vicinity of Bora Bora, where were many birds fishing. We landed

two hundred meters. The rain does not seem to penetrate my shelter, for which I am duly thankful to the mango tree above me, but large drops strike the tarps now and then.

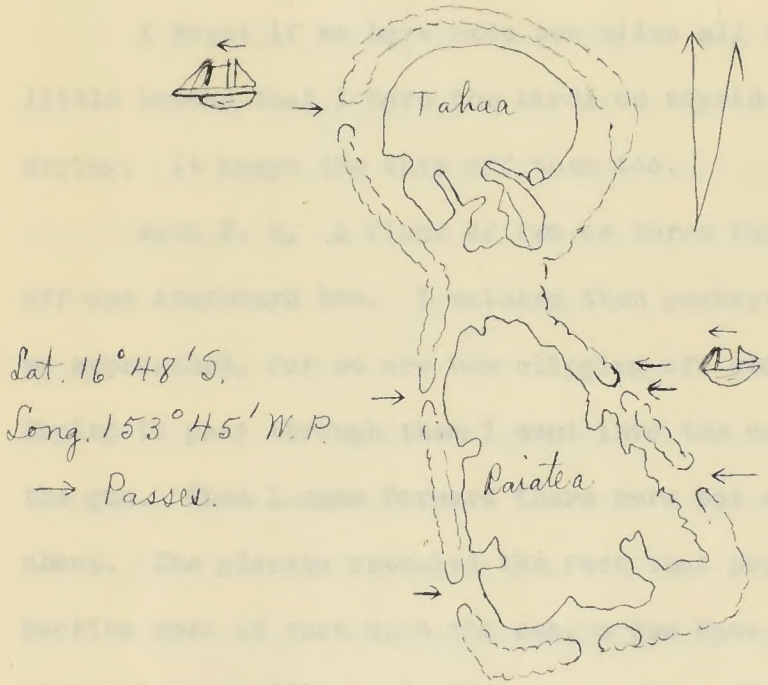
Roasted my ten prawns by the candle flame, and now proceed to indulge in a two A. M. "breakfast" feed. In spite of the rain the obtruding insects continue. The prawn dipped in lemon juice and salt were delicious. A little bit of ship's biscuit went well with them. It drips steadily, wearing the rain or heavy fog or whatever it is.

Rain settled down steadily shortly after three, and continued until about seven. It was very amusing during the night whenever a clap of thunder came. The dog, to whom lightning and thunder were strangers, roared out barking vociferously as if something were very near and dangerous.

Packed away yesterday's birds in the knapsack, and, after making up the pack, got into my damp clothes and struck out for the village. Picked up but one kingfisher and one dove on entire trip down stream. Nor did we see a sign of cockatoos. Also picked up a yellow-billed tern by wading out in shallow lagoon after one of two which perched upon two low stumps. Both were in line, but the further one was not injured.

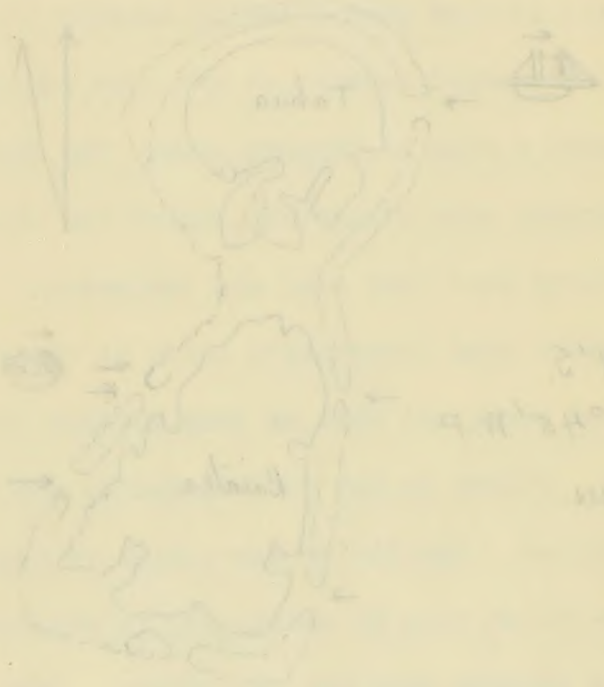
Arrived at ship just before nine. We were relieved just long enough for me to get a bath and wash out my sweaty, muddy clothes. Spent rest of day making up the birds. It being rather calm, we did not get out of the lagoon off the southward of Kona until after three o'clock. Then a fair breeze took us to the vicinity of Bore Bore, where were many birds flocking. We landed

one large tunny, and had a shark following us too. There were any number of Upoa, wedge-tailed shearwaters,in the fishing birds, and once I saw a white-breasted petrel. One of the shearwaters crossed our bow just right, and I got him. It is interesting to see the birds flying about where they expect the fish. Then the bonitos start splashing somewhere near and the birds congregate there. The boobies and terns dive, the former alighting as did also the shearwaters and the petrel.



Raiatea and Tahaa are both enclosed within the one reef, the only example of this circumstance in these eastern islands, so I believe. We entered through the double pass, which is formed by one islet being in the center of it off the west of Raiatea, and left through the east pass opposite Tahaa. There are islets to the north of Tahaa along the reef where, no doubt,

one large bunny, and had a shark following me too. There were any number of dogs, wedge-tailed shearwaters, in the flapping birds, and once I saw a white-breasted petrel. One of the shearwaters crossed our bow just right, and I got him. It is interesting to see the birds flying about where they expect the fish. Then the boniteo start splashing somewhere near and the birds congregate there. The boonies and terns dive, the former alighting as did also the shearwaters and the petrel.



Bateles and Tahma are both enclosed within the one reef, the only example of this circumstance in these Gaetano Islands, so I believe. We entered through the double pass, which is formed by one islet down in the center of it off the west of Bateles, and left through the east pass opposite Tahma. There are islets to the north of Tahma along the reef where, no doubt,

the Upoa are nesting.

We have had but little wind since sundown. Lightning and thunder in the distance, an effect that tempts me to risk storms and sleep on the topside. Nothing but a slight drizzle, and so the topside was far better than the cabin. Our breeze was but temporary, or local, with a shower. A seaman would call it a squall, so we soon settled back into the listless lolling which characterizes this trip.

December 13

I doubt if we have made ten miles all day. There is so little breeze that I have the birds on topside in the sunshine drying. It keeps the ants off them too.

3:00 P. M. A flock of two or three hundred birds fishing off our starboard bow. I watched them perhaps half an hour as we approached, for we are now clipping off about four knots. Hoping to pass through them I went into the cabin and got out the gun. When I came forward there were but a few birds flying about. The glasses revealed the fact that practically all the boobies were at rest upon the sea, a few Upoa, wedge-tailed shearwaters, noddies and white terns alone flying about. The frigate birds are noticeable here by their absence. Saw none yesterday nor today. Nor have we seen a tropic-bird in the same time.

Towards evening we picked up a little, and during the night had a rather bad squall or two. Very clear, full moonlight. Heard the "kavika", sooty tern, during the night.

the doors are nesting.

We have had but little wind since swamping. Lightning and thunder in the distance, an effect that keeps me to rink actors and sleep on the topside. Nothing but a slight drizzle, and so the topside was far better than the cabin. Our course was but temporary, or local, with a mover. A seaman would call it a squall, so we soon settled back into the listless rolling which characterizes this trip.

December 13

I doubt if we have made ten miles all day. There is so little breeze that I have the birds on topside in the swamping drying. It keeps the ants off them too.

5:00 P. M. A flock of two or three hundred birds flashing off our starboard bow. I watched them perhaps half an hour as we approached, for we are now dipping off about four knots. Hoping to pass through them I went into the cabin and got out the gun. When I came forward there were but a few birds flying about. The glasses revealed the fact that practically all the boobies were at rest upon the sea, a few Tern, wedge-tailed shearwaters, noddies and white terns alone flying about. The frigate birds are noticeable here by their absence. Saw none yesterday nor today. Or mire we soon a frigate-bird in the same time.

Towards evening we picked up a little, and during the night had a rather bad squall or two. Very clear, full moon-light. Heard the "Davies", early turn during the night.

December 14

"Kavika" day. The sooty terns kept getting more numerous and coming more frequently as we approached Mopelia, where they are in considerable numbers, but nothing like at Christmas Island. Also other terns and boobies are present. We are not going inside with this boat, nor can I get the exact drift of arrangements as to the future. This schooner may not go on to Scilly, in which case I suppose I'll go over there in the little 22-ton 'Pastime'. A small sail-canoe has come out to converse with us. It looks like no shore today unless I go in the canoe.

And so it proved, for they report that the 'Pastime' has gone to Scilly with the big boat, so we go on to that island without stopping here. Since the 'Pastime' is going back and forth between the two islands frequently I'll have an opportunity to visit this island on her. Another possibility is to go ashore in this canoe for a day or so until this ship returns from Scilly, with the bare probability of having to go back there. If that were certain, I should chance it, but my destination being Scilly I'm going there by the first opportunity. This island can be more easily worked another time, or as I return. The boys tell me there is a small "Vini" here, no doubt a parakeet.

Beside the pass into the lagoon of this island, Mopelia, is the end of the hulk of one of the German raiders protruding from the surf. She raised havoc with schooner traffic during the early part of the war, but met her fate on the reef beside the pass. "Soedler", or some such name as nearly as I could

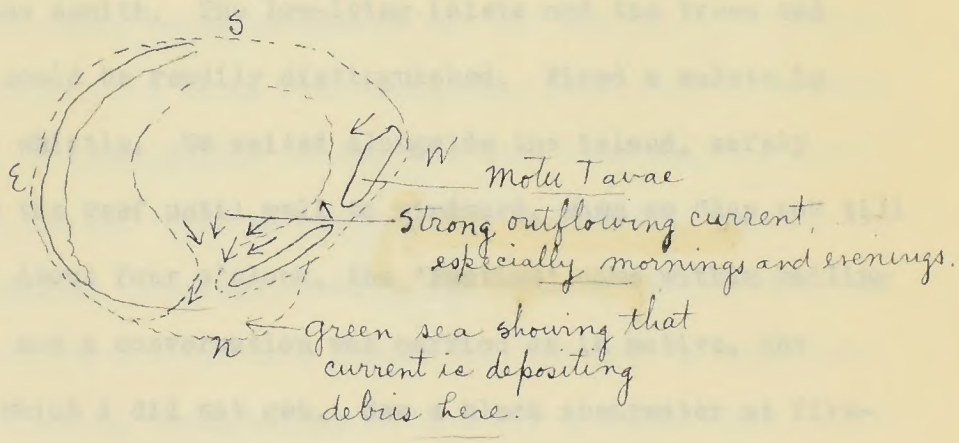
"Tavita" day. The young terns kept getting more numerous and nesting more frequently as we approached Uspella, where they are in considerable numbers, but nesting also at Uretabwea Island. Also other terns and boobies are present. We are not going inside with this boat, nor can I get the exact drift of arrangements as to the future. This schooner may not go on to Sollly, in which case I suppose I'll go over there in the little 22-ton 'Pastime'. A small sail-dance has come out to converse with us. It looks like no shore today unless I go in the canoe.

And so it proved, for they report that the 'Pastime' has gone to Sollly with the big boat, so we go on to that island without stopping here. Since the 'Pastime' is going back and forth between the two islands frequently I'll have an opportunity to visit this island on her. Another possibility is to go ashore in this canoe for a day or so until this ship returns from Sollly, with the rare probability of having to go back there. If that were certain, I should change it, but my identification being Sollly I'm going there by the first opportunity. This island can be more easily worked another time, or as I return. The boys tell me there is a small "Vini" here, to donor a parakeet.

Beside the pass into the lagoon of this island, Uspella, is the end of the bulk of one of the barren reefs projecting from the surf. The raised bevee with schooner scattle during the early part of the war, but not her fate on the reef beside the pass. "Schadler", or some such name as nearly as I could

catch the Captain's pronunciation.

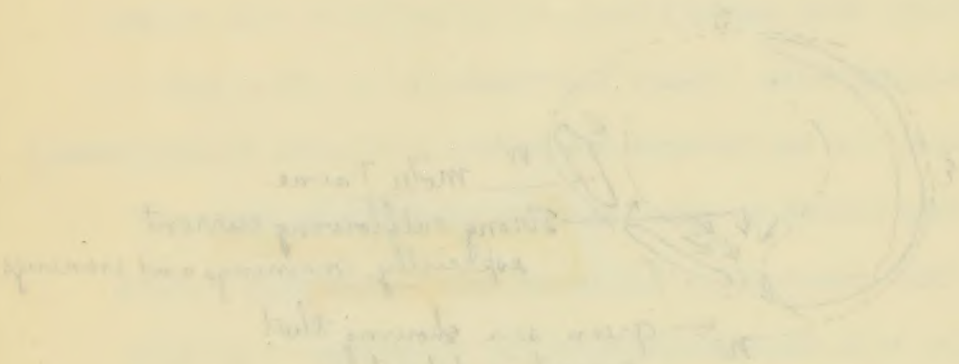
As we leave the island, one frigate-bird is seen. Sooty, white and lesser noddy terns were the only other birds noted, besides the few boobies. The following sketch is the island of Mopelia as it appears from here, drawn to show the predominance of land on the windward side and secondary to northwest from whence the storms come (?), while southwest is quite free of land. The long east strip alone is planted and is much longer in proportion than drawn. I'll check it later.



We arrive at Scilly: A mile or so off shore and not many birds about. Just after dinner the sailor at the wheel shouted "Upoa!", so I rushed forward with the gun. Did not get a shot at him. While here I saw three white-bellied shearwaters, throats black. They struck me as being smaller than the Noha. Hope to find them on Mopelia or Scilly. I shot a sooty tern, but the sailors failed to pick him up with the net. Since then I have missed three or four shots. No more shearwaters in

match the Captain's pronunciation.

As we leave the island, one frigate-bird is seen. Sooty, white and lesser noddy terns were the only others sighted, besides the few booies. The following sketch is the island of Topelia as it appears from sea, drawn to show the predominance of land on the windward side and accordingly to northwest from whence the storm came (?), while southwest is quite free of land. The long east strip alone is planted and is much longer in proportion than drawn. I'll show it later.



We arrive at Solity: A mile or so off shore and not many birds about. Just after dinner the sailor at the wheel shouted "Opal!", so I rushed forward with the rum. Did not see a shot at him. While here I saw large white-billed shearwaters, throats black. They attack me as being smaller than the sooty. Hope to find them on Topelia or Solity. I shot a sooty tern, but the sailors failed to pick him up with the net. Since then I have shaped course for Fanu atoll. In more shearwaters in

sight, so back to the cabin.

At six-fifteen we pass through the edge of a fishing flock of birds, mostly the "Kavika" (O. fuscatus subsp.), and the red-footed booby (Sula piscator). I cannot detect anything else except the white terns. I got one sooty tern. The fishing flock again comes near us, but there are no birds in it that I want,--boobies, sooty and white terns.

December 15

We arrived at Scilly Island during the middle of the night, which was exceedingly brightly illuminated by the full moon in the zenith. The low-lying islets and the trees and breakers could be readily distinguished. Fired a salute in lieu of a whistle. We sailed alongside the island, safely away from the reef until well to windward, when we "lay to" till morning. About four o'clock, the 'Pastime' came within hailing distance, and a conversation was carried on in native, the trend of which I did not get. Saw a black shearwater at five-thirty this morning. We are now pulling into the island, and so I'll probably get ashore this morning. What the 'Pastime' is or is not going to do I cannot find out, but I should worry for a week or so.

There was also a frigate-bird soaring about with no evident purpose early this morning. All through the night could be heard the calls of the "kavika", which is best imitated by pronouncing their name in a squeaky tone in the roof of one's mouth well back towards the throat, as one would mimic a cat "Meow". Five just passed on rapid wing, and two of them

night, so back to the ship.

At six-fifteen we pass through the edge of a fishing flock of birds, mostly the "Davies" (G. Tenuirostris ssp.), and the red-footed booby (Sula piscator). I cannot detect anything else except the white terns. I get one scoly tern. The fishing flock again comes near us, but there are no birds in it that I want,--boobies, noddy and white terns.

December 16

We arrived at Solity Island during the middle of the night, which was accordingly brightly illuminated by the full moon in the south. The low-lying islets and the trees and breakers could be readily distinguished. First a saluto in lieu of a whistle. We sailed alongside the island, safely away from the reef until well to windward, when we "lay to" till morning. About four o'clock, the 'Pentime' came within hailing distance, and a conversation was carried on in native, the trend of which I did not get. Saw a black snearwater at five-thirty this morning. We are now pulling into the island, and so I'll probably get ashore this morning. What the 'Pentime' is or is not going to do I cannot find out, but I should worry for a week or so.

There was also a frigate-bird soaring about with no evident purpose early this morning. All through the night could be heard the calls of the "Davies", which is best indicated by pronouncing their name in a squeaky voice in the rear of one's mouth well back towards the throat, as one would chide a cat "Shoo". Five just passed on rapid wing, and two of them

"tumbled" in that characteristic style of theirs.

Before I realized the fact, they were calling for my stuff to go ashore in the boat already lowered and banging against the ship with every wave. I hurriedly packed as best I could and shoved the things out to them. Had I stopped to think that we had to go over the reef I would have taken more time and pains. At the reef were the shore natives awaiting us. Nor were they alone, for just as we arrived, the dorsal fin of a shark cut the water beside our boat. Woe unto him who falls outside the reef! Then there was shouting of "Auti", and we looked back to see a great comber approaching. Shipped a bit of sea and rushed madly shoreward, but not passward! We struck heavily against the coral rock beside the pass, but fortunately slid upon it sufficiently to keep the boat from toppling backward or sidewise. Then we passengers,--supercargo, Captain and myself,--rushed to safety, leaving the sailors to take care of the "junk". Wave after wave struck the boat and splashed into it, but strangely enough, none of my stuff got seriously damaged so far as I can detect. It took all the men present from both ships and the land to pull the heavy whale boat on into the lagoon. Then came the boat of the 'Pastime', and it, too, failed to strike the pass, which, by the way, is a small depression in the reef about five meters wide. Instead of being abrupt it slopes gently back into the lagoon and so makes a sort of boat-landing place.

The cargo of the second boat got thoroughly wet. She swerved, or pivoted, where she struck and so, when the next sea

"tumbled" in that characteristic style of theirs.

Before I realized the fact, they were calling for my stuff to go ashore in the boat already lowered and banging against the ship with every wave. I hurriedly packed as best I could and shoved the things out to them. But I stopped to think that we had to go over the reef I would have taken more time and pains. At the reef were the more native swelling sea. For were they alone, for just as we arrived, the dorsal fin or a shark cut the water beside our boat. We said nim who falls outside the reef! Then there was shouting of "Ikri", and we looked back to see a great comber approaching. Shipped a bit of sea and rowed madly onward, but not passed! We struck heavily against the coral rock beside the pass, but fortunately slid upon it sufficiently to keep the boat from toppling backward or sideways. Then we passed over,--my crew, captain and myself,--rushed to safety, leaving the sailors to take care of the "junk". Wave after wave struck the boat and splashed into it, but strangely enough, none of my stuff got seriously damaged so far as I can detect. It took all the men present from both ships and the land to pull the heavy whale boat on into the lagoon. Then came the boat of the "Tautuna", and it, too, failed to strike the pass, which, by the way, is a small depression in the reef about five meters wide. Instead of being swept it slopes gently back into the lagoon and so makes a sort of boat-landing place.

The crew of the second boat got thoroughly wet. She swerved, or pivoted, where the others did so, when the boat was

struck her broadside, she shipped most of it. The steersman broke his oar-rudder trying to keep her end on. They are still bailing out the brine. They are now getting out the 'Pastime' boat. It has to be turned in that small depression. Ten men are holding it there while the crew of four get on their marks. All ready with oars poised! A large sea is approaching. Everyone pushing--no, let's wait for the next sea. Here she comes combing gloriously.--Time out for pictures.--The 'Pastime' boat made a good clearance and got safely away.

Now the 'Curieuse' boys are in the pass. Shove away! Well, I got a picture of that, but curses! what I thought the best and used my # 6 exposure on was but a little ripple. Here comes a real comber, and she swamps the boat and turns her sidewise. Another comber! Four badly scared sailors are unable to make headway. One bar is broken and the steersman goes overboard, also one oarsman. Is the shark on the job? No, thank God!

As soon as I can reload I take some more pictures. They are now pulling the boat up over that point of the reef we struck. By George! There is danger in this business. The men rush areef and pull with the rescuers.

Now we are going to the islet. The boys are going around to leeward to launch their boat next time. Sooty, both noddies, white and yellow-bill terns were noticed. Also several frigate-birds observed. Here comes a sailor with my lost shoe. I thought the shark had that ere this. What a "paurau" now exists! Well, they have a good sense of humor and are having some good

strong but broadside, one capsized most of it. The steersman broke his oar-rudder trying to keep off and on. They are still bailing out the water. They are now getting out the 'lifetime' boat. It has to be turned in that small depression. Ten men are holding it steady while the crew of four get on their marks. All ready with oars poised: A large sea is approaching. Everyone ready--no, let's wait for the next sea. Here she comes glorious--Shove out for pictures.--The 'lifetime' boat made a good clearance and got nicely away.

Now the 'Surfrance' boys are in the pass. Shove away! Well, I got a picture of that, but curses! when I thought the boat was used up a square on was but a little right. Here comes a real comber, and she swamps the boat and turns her sideways. Another comber! Four badly soaked sailors are unable to make headway. One oar is broken and the steersman goes overboard, also one oarsman. In the start on the job? No, thank God!

As soon as I can relaxed I take some more pictures. They are now pulling the boat up over that point of the reef so secure. By George! There is danger in this business. The men rush ashore and pull with the rescuers.

Now we are going to the island. The boys are going around to learn to launch their boat next time. Sorry, with mishaps, white and yellow-bill terns were noticed. Also several frigate-birds observed. Here comes a sailor with my lost shoe. I thought the sharks had that are this. What a "Jonah" one sailor! Well, they have a good range of fuses and are having some good

laughs about the experience now. Twenty frigates (Fregata minor palmerst.) are above the island south of us. I think I have also noticed the common booby (S. leucogastra plotus).

We approach the village at eight A. M. It is a beautiful little collection of native houses in the coconuts. Met the natives and must talk Tahitian now as none talk English. The "Vini" parakeet is present. Mr. Graffe brought out an ornate wine bottle and a note on frail paper that reads

" 22/3/18

------d Evans of

...ickona, B. C.

Longitude 122 East. Latitude 14 South. Bound from Melbourne to Portland cargoed with copra and at present 75 days out. So far all is well. Whoever picks this up may the blessing and peace of our Lord Jesus Christ be with him.

Samuel A. Holdsworth,

Godfearing American Seaman.

South Pacific. "

I went out at nine o'clock and obtained nine "Vini", parakeets, before eleven. I could not get the tenth without shooting those in the coconuts about the houses, so had to be content with nine. Two appear to be young birds. They are apparently feeding upon the blossoms of the bush, though these about the houses seem contented in the coconut trees, and it is quite possible that they find the blossom of that also nutritious. A good collection of stomachs will be valuable.

Langue about the experience now. Twenty friends (Francis Minor Wainwright) are above the island posts of us. I think I have also noticed the common body (E. Isocomarte Alpina).

We approach the village at eight A. M. It is a beautiful little collection of native houses in the cocoanuts. Not the natives and must talk Tahitian now as none talk English. The "Vini" parakeet is present. Mr. Graffe brought out an ornate wine bottle and a note on frail paper that reads

" 12/3/18

------d Owens of

...idcoma, S. O.

Longitude 152 East. Latitude 14 South. Bound from Melbourne to Portland carrying with coyra and at present 75 days out. So far all is well. Whoever picks this up may the blessing and peace of our Lord Jesus Christ be with him.

Samuel A. Bidlawerth,

Godfearing American Seaman.

South Pacific. "

I went out at nine o'clock and obtained nine "Vini", parakeets, before eleven. I could not get the tenth without shooting those in the cocoanuts about the houses, so had to be content with nine. Two appear to be young birds. They are apparently feeding upon the blossoms of the bush, though those about the houses seem contented in the cocoanut trees, and it is quite possible that they find the blossom of that also meritious. A good collection of atomons will be valuable.

I am sorry I have not more jars. Noddy and white terns are flying about and perching in trees on this islet. Also saw several tatlers, plovers, a curlew and a reef heron. No signs of shearwaters as yet, nor do the natives seem to know aught of them either here or at Mopelia. But the white-breasted ones seen yesterday probably rest on one of these islands.

I got my tenth bird and winged the eleventh to please the natives here at the houses. The eleventh I'm trying to keep. I hope to be able to trap some others with him as a decoy. Found these birds exceedingly fat, 1-2 mm. thick all over the rather tender skin. It rained heavily from 2-4:30 P. M. Only a few squeaks were heard during the shower, but immediately afterwards the coconut grove was alive with squeaks again. There is no fear of these little fellows being exterminated the way they hang about the village.

I forgot to mention that the 'Curieuse' boat got quite a hole knocked into her side. The boys patched it today. The leeward side of the island proved to have too much sea also, so there was no cargo unloaded subsequent to our two boats. That means all day tomorrow here.

A red-tailed tropic-bird (Phaethon rubricaudus) just passed in a business-like manner along the lagoon shore. Noddies and white terns are flying about the lagoon, a flock of about twenty fluttering close to the water at the edge of the shallow water and channel. Three boobies are sailing along as if with intent to get somewhere in perfectly aligned file and distance. It is good to see a little order in these flying

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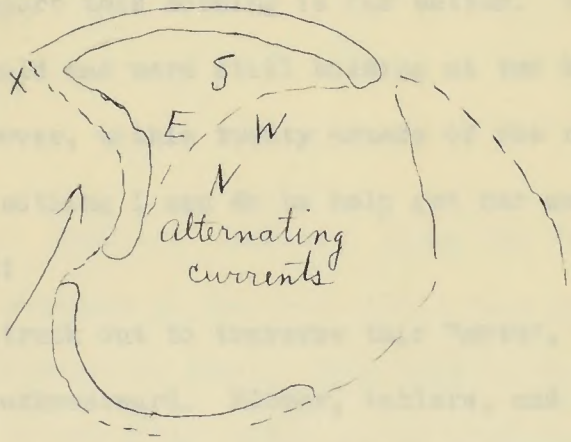
squadrons once in a while. A pair of white terns above tree tops have regulation manoeuvers, but usually all that family is haphazard. The flock of noddies just created quite a fuss as if they were getting some fish; then away went half of them in a hurry across the lagoon. Dinner, as was luncheon, on turtle steak, liver, and potatoes.

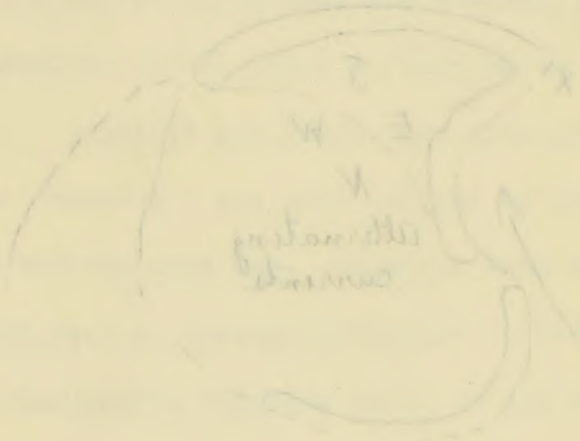
9:00 P. M. The schooner 'Curieuse' is pounding upon the reef at the further end of this island. No lives lost at last report. The sailor who could talk the best English came ashore in the boat to report the trouble. He says the wind died down while they were in the great hook formed on the east and north of this island, which has something of the shape of the following sketch.



The easterly current drove them shoreward, whereupon they let out their anchors full length but got no secure hold. When the wind came up it drove them against the reef, where they are now being dashed to pieces. The men could, no doubt, get safely ashore if she goes to pieces. My loss is insignificant,--one hundred negatives, the Raiatea birds, about three rolls of films, and notes on eighty plants. The latter and the birds can be duplicated, but of the negatives I have not a

aquadrons come in a while. A pair of white terns above tree tops have regulation maneuvers, but usually all that family is dispersed. The flock of noddies just crested quite a time as if they were getting some fish; then away went half of them in a hurry across the lagoon. Dinner, as was Jacobson, on turtle steak, liver, and potatoes.

9:00 P. M. The schooner 'Curiosa' is anchoring upon the reef at the farther end of this island. Mr Ives lost at last report. The sailor who could talk the best English came ashore in the boat to report the trouble. He says the wind died down while they were in the great moon forced on the east and north of this island, which has something of the shape of the following sketch.



The easterly current drove them sideways, whereupon they let out their anchors full length but got no secure hold. When the wind came up it drove them against the reef, where they are now being damaged to pieces. The man could, no doubt, get safely ashore if she goes to pieces. My loss is insignificant,--one numbered cognitives, the Jamaica birds, about three rolls of film, and notes on slightly plants. The latter and the birds can be duplicated, but the negatives I have not a

full set of prints. What a peculiar sensation it is to think that the ship we slept upon last night in the very same place where she was "laying to" today is now upon the reef! These "almosts" are certainly interesting.

The natives have gone by land and sea to help those still on the ship. I feel about as helpless as the women sitting on the beach sand and still in their huts. I waded out to the reef and watched the boys come over it in the boat,-- better than we did during the daytime. What will be the plans now, I wonder.

December 16

The report this morning is far better. It seems the anchors did hold and were still holding at two P. M., with the boat, however, within twenty meters of the reef. They say there is nothing I can do to help get her away, so on with the hunt!

Have struck out to traverse this "motu", which extends far to the southwestward. Plover, tatlers, and a heron along the lagoon shore. Both noddies flying about lagoon and land, also a few white terns and one or two yellow-bills. Saw one small, gray-blue tern too far to shoot. The natives report no "kavika" on this island, which is decidedly interesting. I'll watch for them and the gray-backed (O. lunatus). Of first interest are fifteen red-footed boobies perched upon the tallest tree in the immediate neighborhood, basking in the morning sunshine and preening their feathers. Three have

full set of plates. What a peculiar sensation it is to think that the ship we slept upon last night is the very same place where she was "laying to" today is now upon the reef! These "slocsts" are certainly interesting.

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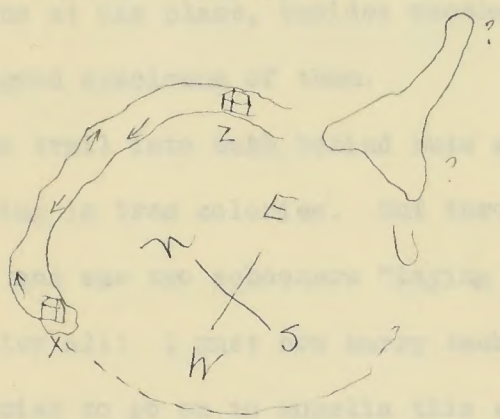
flown and another has come back. His neighbors object to his location,--rather unsociable creatures. Most of them are in juvenile plumage, only one of thirteen being white-breasted. Except for their unsociableness, there seems to be little "booby" life to be learned from them at this distance. Another comes in, but takes a far out perch. So far I would term this a "Noddy" island, but I did see some "kavika", at least half a dozen, and get shots at two.

My journey today along the inner shore from Z to X, and back along ocean shore or reef.



(Very badly out of shape. See later maps.)

Noddies! Noddies! Noddies! Along the "motu" nothing but noddies. Luncheon at the four little huts on further end of islet at northwest of atoll. From here to the south'ard end on around to the little islet on the southeast there is but the reef, with a long sand islet to about the west. Thence on around to the southeast nothing but the breakers, and so far away that only the spray of the waves can be seen. What an awful place for a ship approaching from the southwest on a dark night!

At last I came upon another little blue tern and obtained it. What a delicate little fellow, with a fitting little trilling call. After quite a gap the parakeets are again plentiful with

flown and another has come back. His neighbors subject to his location,--rather unmoldable creatures.- Most of them are in juvenile plumage, only one of thirteen being white-breasted. Except for their unmoldableness, there seems to be little "body" life to be learned from them at this distance. Another comes in, but takes a far out period. So far I would term this a "Noddy" island, but I did see some "Terns", at least half a dozen, and get shots at two.

My journey today along the inner shore from X to X, and back along ocean shore or reef.

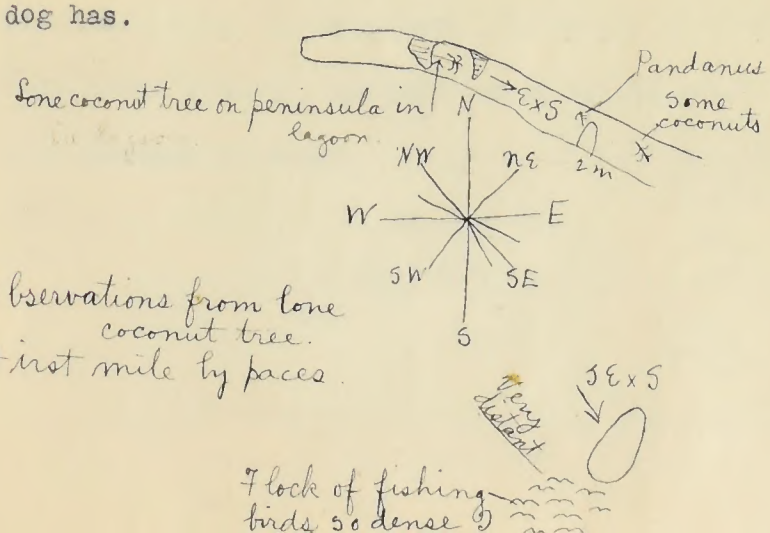
Noddies! Noddies! Noddies! Along the "coast" nothing but noddies. Lunchoon at the four little islets on further end of islet at northwest of atoll. From here to the south'ard and on around to the little islet on the southeast there is but the reef, with a long sand islet to shore the west. Thence on around to the southeast nothing but the breakers, and so far away that only the spray of the waves can be seen. What an ideal place for a ship approaching from the southwest on a dark night!

At last I came upon another little bits tern and obtained it. What a delicate little fellow, with a fluffy little trailing tail. After quite a gap the terns are again plentiful with

their perpetual little two-note squeak, until they decide I'm dangerous, then they shriek the decision to the others as they fly rapidly away from me. I will collect all the young birds I can on the return trip, but will have to hurry along to get there by three o'clock as I promised. Saw an unmistakable common booby (S. leucogastra plotus). Found downy and well feathered nestlings of the red-footed booby. Will put up a few if I remain on this island as planned. Here are several frigate-birds. Plover and tatler very plentiful, and three white herons at one place, besides another seen earlier. May get a few good specimens of them.

Took trail into bush behind huts and found the lesser noddy nesting in tree colonies. Cut through with machete to raar beach and saw two schooners "laying to"; so the 'Curieuse' is safe after all! I must now hurry back to other village lest they wish to go on to Mopelia this evening.

The second paced mile brought me to the cove from lagoon between some pandanus trees on the west and another lone coconut palm. In the reef-shoals are several mushroomed coral rocks. It is too hot to stop long unless I take to water as the dog has.



their perpetual little two-note squawk, until they decide I'm dangerous, then they shriek the damnation to the others as they fly madly away from me. I will collect all the young birds I can on the return trip, but will have to hurry along to get there by three o'clock as I promised. Saw an unmistakable common scoop (S. leucocephalus pileatus). Found downy and well feathered nestlings of the red-footed booby. Will put up a few if I remain on this island as planned. Here are several frigate-birds. Plover and tattler very plentiful, and three white herons at one place, besides another seen earlier. Say yet a few good specimens of them.

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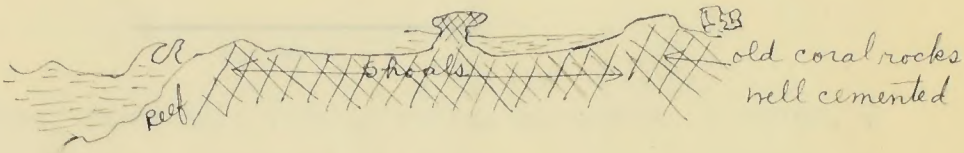
The second wooded mile brought me to the cove from lagoon between some pandanus trees on the west and another lone coconut palm. In the reef-shoals are several monstrous coral rocks. It is too hot to stop long unless I take to water as the dog has.

The third mile reached exactly to the end of the broad lane north of the main village at the turtle pen. A circular enclosure of rocks surrounds some lagoon about waist deep; the boys are getting out the turtle to take to Papeete. They get on them and tap with a rock, making the turtle swim them out to the boat. If I have a Sunday to myself while here or while over where these turtles naturally come ashore to lay, I'll get some photographs.



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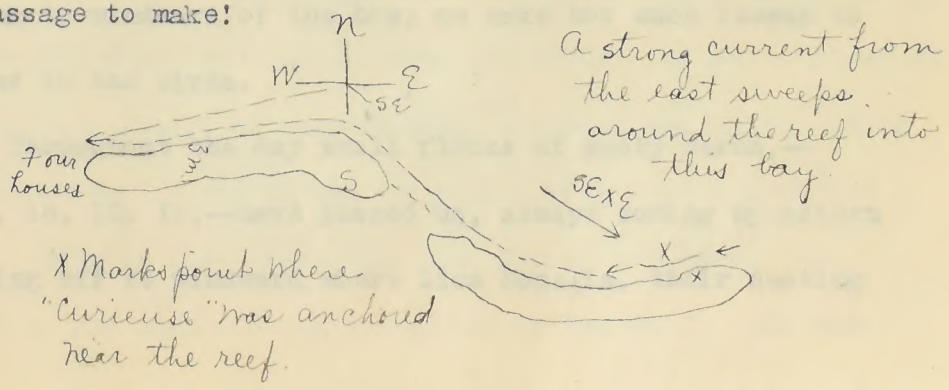
BOOK XXI.

Scilly, Mopelia.

December 16, 1921--January 2, 1922.

December 16.

Leave Scilly and at 3:30 are off for Mopelia with one gun, one bag of "junk", sleeping bag, camera, glasses, plant portfolio, and bird bag, and pup. Half a dozen "kavika" as we leave the village. Graffe and his "vahine" are in the boat, also five turtles, and four fish. It is too long (perhaps six meters) to be turned in the passage way except while a wave is in it. Now we are poised and ready to go. I have the camera secured to the boat and my field glasses are still about my shoulder. We're off to a clean passage. Here comes a wave! We ship but a little sea. What an intricate passage to make!



FOUR YEAR.

Solily, Hopelia.

December 16, 1921--January 2, 1922.

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Leave Solily and at 3:30 are off for Hopelia with one gun, one bag of "junk", sleeping bag, camera, glasses, plant portfolio, and bird bag, and pup. Half a dozen "waving" as we leave the village. Grafts and Ma "waving" are in the boat, also five turtles, and four fish. It is too long (perhaps six months) to be turned in the passage way except while a wave is in it. Now we are poised and ready to go. I have the camera secured to the boat and my field glasses are still about my shoulder. We're off to a clean passage. Here comes a wave! So only put a little box. Just an instructive passage to make!

The little blue tern is called "ore ore". We have a full cabin this trip with Graffe and his "vahine" along, but we're mostly top-siders when it comes to sleeping. Few birds are about as we head into the wind on our course back to Mopelia. A few sooty terns. The dog-house went ashore, and so Noha has elected to be an addition to the quarterdeck. He disapproves absolutely of the reptile class, and the main deck is occupied by the turtles.

December 17

Sooty terns this morning coming up astern. A booby, a noddy and a shearwater smaller than the Upoa, throat darker than breast and belly; under part of wings at about the tibia-tarsal joint flashes brightly, but not white, in the sunshine. Sooty terns quite numerous. A small number of sooty and noddy terns and half a dozen boobies have kept just ahead of us for some time. I got one sooty but he elected to alight too far abeam for us to pick him up. I thought for certain that one of the boobies was the large blue-faced, but it might have been merely a very white bodied red-leg. I killed one of the shearwaters but we could not get the ship over to him. It is black, but too small for the wedge-tailed. The trouble was shooting to windward of the bow; we make too much leeway to get over to the birds.

Throughout the day small flocks of sooty terns,--14, 20, 18, 22, 16,--have passed us, always coming up astern and going off to windward where lies Mopelia, their nesting

The little nine-foot is called "Ore Cart". We have a full cabin this trip with Gertie and Mia "waiting" along, but we're mostly top-siders when it comes to sleeping. Few birds are about as we head into the wind on our course back to Topolia. A few sooty terns. The dog-house went ashore, and so none has elected to be an addition to the quarterdeck. We disapprove absolutely of the reptile class, and the main deck is occupied by the turtles.

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The bo's'n is on the masthead looking for land, which is now astern our port beam at considerable distance. We are still on the starboard tack and will turn about and head leisurely in to land during the night. Dinner tonight was a feast à la tortoise, consisting of turtle soup, blood pudding, turtle steak smothered in onions, turtle stew, and that greenish, sweet lining of the upper shell, whatever it is.

The sooty terns become more numerous as we approach their nesting island. Throughout the moonlight night their characteristic cry could be heard overhead.

December 18

Early this morning we pulled in towards the island and "lay to" until after daylight. As day broke the terns flying seaward were rather numerous, but nothing like Christmas Island. Noddies and white were along with the sooty. At six o'clock we are having a squall of considerable duration and fairly heavy precipitation. I can detect no effect of a shower upon the terns. Several were about the boat during the squall but seemed to pay little or no attention to the rain. How much

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more rapidly the little white tern flutters its wings when flying than its larger cousins! Yesterday I timed several sooties for fifty flaps, and they ranged between twenty and twenty-five seconds. The regularity of their effective, even strokes attracted my attention, and so I amused myself half an hour or so timing them. As for the little white, I am unable to count rapidly enough, or else my eyes fail to detect the beats sufficiently to permit the counting. There is no trouble in getting the sooty terns at fifty per twenty seconds. I would estimate the little white, then, at at least half as many more wing beats in the same length of time, seventy-five or thereabouts.

Vau--red-footed booby.
Karena--common booby. } Tuamotu.
Kena--blue-faced booby.

7:30. We're off in the speedy little sail canoe. How rapidly it flies through the water which cuts about six inches below the gunwales! Only occasionally does it lap into the central cockpit. The ends are decked. Left sleeping-bag and one bag of equipment aboard. This being sundown there was no occasion to overload the little "vaa". It is not exactly a native canoe. The following is a cross-section of the beam. She is well stream-lined, however, and has an outrigger of good size; also has a balance rail upon which the sailors sit to balance the lateral pressure upon the sails. We have to tack far over to the ENE before we make the diagonal run through the narrow pass beside the German raider.

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We make the reef beside the pass, and a boy gets out with a tow line to pull us against wind and tide. The reef overhangs the channel which has a fairly blue color and hence good depth. The pass is about thirty meters across and at least two hundred meters in length.

I had them let me off on the SW side of the pass; then waded across various bits of lagoon the last four hundred meters to the west motu (Motu Tavae). I reached my arm-pits once or twice. Sooty, yellow-bill, white and the noddy terns objected vociferously to my intrusion. On the first two small motu I found the common boobies nesting, but hastened on to the further island as I must be back at one o'clock for the boat. They have recently cleared for planting this motu, on which they wisely have left a few trees. Perched on one of these trees I found a sickly-looking frigate-bird. Took three pictures, one in tree top, one on tree trunk about one meter high, and one as he was again alighting on his original perch. (All pictures were failures, due to poor films.) I should be saying "her", unless it be a young male(?). I also destroyed the fallacious understanding I had from Mr. Beck that the frigate-bird could not take wing from the sea. I carried this fellow out into the lagoon and set her into the water. Nothing to it! She just spread those enormous wings, braced her feet, and without running at all simply raised off the water, facing windward. I'm going to try her again, and this time I'll start her facing leeward. Well, she failed to make it, but the experiment was hindered by her struggling and getting her wings wet.

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I feared I would not have time to do much writing on the further island. I walked around it and played I was out on a Sunday curlew hunt, getting four birds for our table. I was struck decidedly by the number of noddy terns, there being more than I have yet seen in an equal area. They were perching about in the scattered trees which have been left after the majority of the brush has been cleared away. There were also many white terns with them again,--more than I saw at any given locality on Christmas Island. Around the shore there were a few yellow-bills and now I do not doubt a few gray-backs, which I then mistook for sooties, two of which I shot at to settle my doubts but missed . Around on the west end of the island was the sooty colony. I would estimate it at about four or possibly five hundred meters in diameter, extending inland from the seaward shore of the islet. The ground was fairly black with them; and when I finally shot, they darkened the sky just about as much as any birds ever do perhaps, but certainly did not shade the sun as fictitious writers often claim. Perhaps they were in the neighborhood of one meter apart over the area their nests covered for three or four hundred meters deep. This would run them into the second hundred thousand, so I'll take back even that estimate and say thousands and let it go at that. No one can estimate such an enormous flock accurately.

As for the eggs on the ground, I got them down right. The cleared lanes for planting are sixteen of my feet wide (4.352 meters). I collected four dozen eggs (48) along there, and then measured forty-four of my feet (11.968 meters), which

I feared I would not have time to do much writing on the farther island. I walked around it and placed I was out on a muddy earlier beat, getting four birds for our table. I was struck decidedly by the number of muddy terns, there being more than I have yet seen in an equal area. They were perching about in the scattered trees which have been left after the majority of the brush has been cleared away. There were also many white terns with them again,--more than I saw at any given locality on Christmas Island. Around the shore there were a few yellow-bills and now I do not doubt a few gray-backs, which I then mistook for scotias, two of which I shot at to settle my doubts but missed . Around on the west end of the island was the sooty colony. I would estimate it at about four or possibly five hundred meters in diameter, extending inland from the seaward shore of the islet. The ground was fairly black with them; and when I finally shot, they darkened the sky just about as much as any birds ever do perhaps, but certainly did not shade the sun as fictitious writers often claim. Perhaps they were in the neighborhood of one meter apart over the area their nests covered for three or four hundred meters deep. This would run them into the second hundred thousand, so I'll take back even that estimate and say thousands and let it go at that. No one can estimate such an enormous flock accurately.

As for the eggs on the ground, I got them down right. The cleared lanes for planting are sixteen of my feet wide (4.882 meters). I collected four dozen eggs (48) along there, and then measured forty-four of my feet (13.366 meters), which

places the nest very nearly one meter apart through the runways which cover perhaps three-fourths of the area occupied. Say 300 meters of runway, 300 meters long, which is conservative: that would give 90,000 eggs, which would require 180,000 birds. Well, maybe there are that many. By George! I've a notion to go back there, traverse every lane and count all the eggs I can see, or at least step off the exact measurements of the width and length of the colony. In collecting the eggs I commenced to select them for differences in shape and appearance, but decided that such a method was unscientific, though it may be good collecting. Therefore I collected four dozen just as I came to them, most of which broke before I blew them. That should give a fair average of their shape, color and size.

Neither saw nor heard a single young bird, which may be due to the fact that the natives have been here en masse to clear brush and likely ate all the eggs laid while they were here. (This they later affirmed upon my inquiry.) I ate one dozen boiled in seawater for lunch, with the help of the pup. Found three gecko playing about some old water cans, in which one was drowned. Collected them.

Returning, we found the water about eight or ten inches deeper, but fortunately struck good places, and having everything tied upon the gun which I carried up on my shoulder nothing got wet. The dog bravely commenced the long swim ahead of him, but after crossing the first channel he decided to return to land. I was obliged to go after him and drag him through the water about one-third across; then he was willing to follow

places the tide very nearly, and water spout through the rushes which cover perhaps three-fourths of the area concerned. Say 300 metres of rushes, 200 metres long, which is conservative; that would give 60,000 eggs, which would require 120,000 birds. Well, maybe there are that many. My Gosport! I've a notion to go back there, traverse every lane and count all the eggs I can see, or at least step off the exact measurements of the width and length of the colony. In collecting the eggs I concerned to select them for differences in shape and appearance, but decided that such a method was unscientific, though it may be good collecting. Therefore I collected four dozen just as I came to them, most of which broke before I blow them. That should give a fair average of their shape, color and size.

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rather than go back. There was a strong current flowing from the reef towards the lagoon in all of the channels, which made the dog's task that much more difficult.

On one of the barren gravel banks between the southwest islet and the next bearing vegetation I found more than thirty yellow-bill terns, and with them the one I take to be the gray-back. I may be mistaken, but they looked gray-backed to me. I'm going back to collect. And on the gravel, going and returning, was a little downy youngster. To which does it belong,--yellow-bill, gray-back, or sooty, for there were two or three of them overhead? I tried in vain to find out. The birds that flushed first from the spot where he was were the yellow-bill and gray-back mixed. Well, I brought the little fellow along because they may be able to tell at the Museum.

I found the boat which I had seen coming across the lagoon during my return journey awaiting me. They were taking the supercargo out to the ship, so I asked for my possessions to be sent in and decided to await their return. They are decidedly slow in getting here. I returned to the nearest islets and collected all the noddy eggs I could find. They were nesting in the green shrub which habitually adorns these islets. I photographed some of the low nests and the general appearance of the brush. The nests were invariably clusters of twigs in the forks of branches from .6 meters to 4 meters above the ground. There were about as many old nests as there were occupied ones, but no downy young anywhere.

Next I collected a dozen sets of the common booby, which

rather than go back. There was a strong current flowing from the east towards the lagoon in all of the channels, which made the dog's task that much more difficult.

On one of the barren gravel banks between the southwest islet and the next bearing vegetation I found more than thirty yellow-bill terns, and with them the one I take to be the gray-back. I may be mistaken, but they looked gray-backed to me. I'm going back to collect. And on the gravel, going and returning, was a little downy woodpecker. So which does it belong,--yellow-bill, gray-back, or scaly, for there were two or three of them overhead? I tried in vain to find out. The birds that flushed first from the spot where he was were the yellow-bill and gray-back mixed. Well, I brought the little fellow along because they may be able to tell at the museum.

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Next I collected a dozen nets of the common scaly, which

I found nesting along the cleared lanes of the two islets nearest the pass. Their nests were clusters of coarse twigs and dead leaves gathered into a considerable circular nest about five to ten centimeters deep and sixty to seventy in diameter. There were two or four in each of the short planting lanes, never nearer together than four meters. I succeeded in getting very near one bird on her nest, but as a rule they were far too wild to permit approach. I stalked the dozen or less perched on rocks out in the shallow lagoon, and took a couple of snaps at them, as it is a very characteristic pose which I have not yet observed of the red-footed. While approaching this islet a dark-phase young bird, which looks to me like a red-foot, flew over me very low down; so the second time I winged him with a chunk of coral. Found a young white tern also, which gives me a very fair day, what with all the eggs and curlews. I got a splendid dose of mites from the eggs collected, especially the sooty terns.

The boys found it necessary to get in close to the reef before coming up abreast the pass. They have certainly been a long while getting here. Slow, drizzly rain. I waded out to the "tanks" of the German ship and when the boys came along the edge of the pass on my side, after fussing several minutes on the opposite side where the outrigger bothered them, I went to help tow the sail canoe against wind and a very strong current. It was five o'clock then, and we did not get beyond the pull of the current until 5:40. Our first tack took us over near the northeast of the atoll, where I saw some houses. Upon inquiry, I discovered that there were a few people there.

I found nesting along the central lanes of the two islets nearest the pass. Their nests were clusters of coarse twigs and dead leaves scattered into a considerable circular nest about five to ten centimeters deep and sixty to seventy in diameter. There were two or four in each of the short plantlike lanes, never nearer together than four meters. I succeeded in getting very near one bird on her nest, but as a rule they were far too wild to permit approach. I stalked the dozen or less perched on trees out in the shallow lagoon, and took a couple of snaps at them, as it is a very characteristic pose which I have not yet observed of the red-footed. While approaching this islet a dark-phase young bird, which looks to me like a red-foot, flew over me very low down; so the second time I winged him with a charge of coral. Found a young white tern also, which gives me a very fair day, what with all the eggs and cuttlefish. I got a splendid dozen or mixes from the eggs collected, especially the sooty terns.

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Why, then, should I waste an hour or two tacking back and forth across the full length of the lagoon? I had them put me and the dog ashore, where I soon had a change of clothes and then skinned out the curlews and pickled my three gekkos. The little tern of which I was in doubt the boys say is undoubtedly a "kavika". One of my noddy eggs is hatching. May he survive the ordeal and so make a downy specimen! Two of the curlews had overly full stomachs. I saved all four of them, but unfortunately neglected to bring a jar. Broke the neck of a perfume bottle and am using it. One of the boys says that there is another flock of "kavika" over on the north of this island where I'll find plenty of young birds. No one seems to know anything definite about shearwaters, so it will probably be up to the dog to find them. Although much sea shipped into the canoe nothing is damaged.

December 19

After making up the curlews I went out, and in one hour got a cuckoo, white heron, white tern, and ten parakeets, but was unable to find any juvenile plumage of the latter. About three o'clock, upon hearing a curlew near at hand and desiring one more parakeet to make the eleven I had labels for, I again went out for half an hour. Got the birds and another tern. From the porch during the afternoon I shot another white heron and two yellow-billed terns. The natives being unable to catch some of their chickens, I let the "Captain" take the gun to kill them. He brought me in a plover, which makes seven of the sixteen birds present here according to the Walker boy

My, then, should I waste an hour or two tacking back and forth across the full length of the lagoon? I had taken out me and the dog ashore, where I soon had a smorgs of oloroses and then skinned out the curlews and plucked my three geese. The little tern of which I was in doubt the boys say is undoubtedly a "kwikie". One of my moddy eggs is hatching. May he survive the ordeal and so make a sowny specimen! Two of the curlews had overly full stomachs. I saved all four of them, but unfortunately neglected to bring a jar. Broke the neck of a perfume bottle and am using it. One of the boys says that there is another floor of "kwikies" over on the north of this island where I'll find plenty of young birds. No one seems to know anything definite about shearwaters, so it will probably be up to the boy to find them. Although much has shipped into the canoe nothing is damaged.

December 19

After making up the curlews I went out, and in one hour got a goose, white heron, white tern, and two parakeets, but was unable to find any juvenile plumage of the latter. About three o'clock, upon hearing a curlew near at hand and detailing one more parakeet to save the eleven I had labels for, I again went out for half an hour. Got the birds and another tern. From the porch during the afternoon I shot another white heron and two yellow-billed terns. The natives being unable to catch some of their chickens, I let the "kwikies" take the rest to kill them. We broiled one in a plover, which makes seven of the sixteen birds present here according to the Skinner boy

who is here with the natives. The cuckoo and one parakeet I cut up so badly that I threw them away. The parakeets proved too much for me at two an hour.

On the lagoon today I saw a strange thing. A yellow-bill tern dove near the shore and apparently got a fish; then a large noddy chased him for all the world like a frigate until well out in the lagoon. The yellow-bill screamed all the time. I was unable to see whether or not the noddy succeeded in making the other disgorge, but the mere fact that he chased the other bird with malice is interesting indeed.

The latest news this evening is that we get away for Scilly early in the morning. Listened during the early evening for shearwaters but heard nothing.

December 20

Awaking at three o'clock, I arose and set to work upon the birds, and so was well through when the boats finally arrived. In our boat, a flat-bottomed tub, we have no less than twenty-nine passengers, not counting three dogs and a pup and some cargo. The turtle situation here is a replica of man's greed everywhere. The nests were all robbed and the old turtles killed for food. Now that the colony is moving to Scilly, it is probable that there are enough young left to restock the place. At Scilly they are not going to allow egg-eating and are going to limit the turtle killing. The killing of the "vini", parakeet, is a five dollar (French) fine, as is also the climbing of the coconuts. They can eat all the

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"kavika" eggs they wish, but the sooty tern has been robbed of its eggs so much that it is probable they have developed the habit of relaying. Some birds survive the hunger of mankind. Walker says the killing of any bird is a five dollar fine, which no doubt accounts for the white reef herons being quite prevalent. Their feathers being desirable for fish hooks, they would probably be exterminated or checked down at least, as they appear to have been in Tahiti. One of the canoes has gone over to the "kavika" colony to get eggs. It has been about two weeks, they say, since they were last collected there. December and June are the nesting seasons, according to Walker.

Walker says: The 'Sea Adler' had three American Captains aboard who advised that the Germans anchor just outside the reef. With an off-shore wind and outflowing current, all went well until morning, when tide and wind turned and put the vessel on the reef. The lessee of these islands, Miller, came up with a schooner load of provisions, which the Germans captured. They left the Americans and Mr. Miller marooned on the island. The Americans took an open boat, rigged up a sail, and struck out for Tahiti, but the trade winds were too much for them. Consequently they sailed, in the remarkable time of eight days, to Samoa, whence they cabled to Tahiti. That is an interesting little war story of which we have heard but little.

Two men have died here recently from eating poisoned fish, a fish which at times is very good eating. There's a white man here who spent a year at Christmas Island. He claims to have found the nest of the "kiwi", the bristle-thighed curlew,

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on Christmas Island, near the wreck of "Icu". Interesting if true. He claims emphatically to have shot the bird while on the nest. Says there are not many but a few there, which makes me all the more anxious for a year's vacation on that interesting place. He also asserts that he saw a love bird (parakeet?) with red bill and feet on Cook Island. Probably down from Fanning, a wanderer. He reports that the curlew nests in December and January, which adds all the more doubt to his assertion because that is the wrong season for them.

A boat put out for the island with boxes and cans,--I understand they are off this last moment for bird eggs. I drop into it and come ashore at the pass where we find Graffe and two assistants counting the nuts that have been landed for planting here. Apparently now we will not go after the eggs.

Just saw two frigates chasing a third one which had found something to eat. They made it surrender the food, too, when one of the pursuing frigates stole the morsel. Had just a little stroll through the nearest motu-iti, where half a dozen white terns, some noddies and common boobies, flew about me. Flushed the three winter tourists from Alaska,--tatler, plover, and curlew; also the reef heron and again a white one. Here I have seen twice as many white as blue.

Again we are off for the ship. Well, we may get away this time, yet one of the sail-boats has gone off towards the bird colony as if for eggs. The out-going current in this pass is so strong that it deadens the swells of the ocean almost immediately. The current can be seen four hundred meters out

on Darkness Island, near the wreck of "Ceo". Interesting if true. He claims emphatically to have seen the bird while on the nest. Says there are not many but a few there, which makes me all the more anxious for a year's residence on that interesting place. He also asserts that he saw a large bird (pterodactyl) with red bill and feet on Cape Island. Probably some crazy sailor, a wanderer. He reports that the curlew moult in December and January, which adds all the more doubt to his assertion because that is the wrong season for them.

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Just saw two frigates chasing a third one which had found something to eat. They made it surrender the food, too, when one of the pursuing frigates stole the morsel. Had just a little scroll through the nearest nest-list, where half a dozen white terns, some noddies and common boobies, flew about me. Finished the three winter tourists from Alaska--tattler, plover, and curlew; also the rare heron and again a white one. Here I have seen twice as many white as blue.

Again we are off for the ship. Well, we may get away this time, yet one of the mail-boats has gone off towards the bird colony as if for eggs. The cut-throat current in this pass is so strong that it dashes the boats of the down almost immediately. The current can be seen four miles outside.

in the sea. The bottom can still be seen where we are, but soon it drops rapidly into the dark blue deep. The ship comes in rather closely here. What a sardine box it now is!

December 21

Had two little showers during the night but my sleeping quarters withstood the storms in spite of their being head on. We are at Scilly, and no 'Pastime' in sight. Everyone is wondering what has happened to her. I was requested to wait a few boats before going ashore. I finally landed at nine o'clock and went out on home islet after terns and young parakeets. Obtained three of the latter, four noddies, two lesser and one white tern. There is a white heron near the house, but I cannot get within range of him, nor could I get near one along the reef.

The heron skins from Mopelia were rather dried out and difficult to make up; they also required considerable washing. What was worse, I had a severe headache above the eyes from lack of glasses, and so could develop no speed. The result was that I did not get any of noddies done, and the two lesser ones spoiled during the night. Cats or rats also got into my birds and rather riddled one young parakeet during the night.

No news of the 'Pastime' except that she went away Sunday after having requested a case of beef and being given three tins. I don't blame her, but she's likely to upset my program, because I cannot get finished here before the 'Curieuse' leaves tomorrow.

is too near. The bottom can still be seen where we are, but soon it drops rapidly into the dark blue deep. The ship cosmos is rather closely here. What a marvellous box it was in!

December 21

Had two little showers during the night but my sleeping quarters withstood the storm in spite of their being head on. We are at Sollly, and no 'Pasteur' in sight. Everyone is wondering what has happened to her. I was requested to wait a few days before going ashore. I finally landed at nine o'clock and went out on some islet after terns and young parakeets. Obtained three of the latter, four noddies, two lesser and one white tern. There is a white heron near his house, but I cannot get within range of him, nor could I get near one along the reef.

The heron skins from Lopelia were rather dried out and difficult to make up; they also required considerable washing. What was worse, I had a severe headache since the eyes from lack of glasses, and so could hardly go ashore. The result was that I did not get any of noddies home, and the two lesser ones spoiled during the night. Cats or rats also got into my birds and rather ruffled one young parakeet during the night.

No news of the 'Pasteur' except that she went away Sunday after having repaired a case of beef and being given three tins. I don't miss her, but she's likely to upset my program, because I cannot get finished here before the 'Curlewse' leaves tomorrow.

December 22

I was given a boy today to wait upon my every need. Finished up the noddies before going afield. No boats were available, so we came along the reef where tatlers and plovers were present in fair number. Also the reef heron, and of four seen, three were white ones. They apparently run mostly white here. Came on down to the nearest lesser noddy nesting colony, which we found in shrubs five or six meters high. Several young birds perched upon the small cluster of dead leaves in forks of branches. I photographed three of them; also took three views of the windward reef, one with a mushroom. There are just a few twigs in these nests, which are mostly dead leaves forming a rather flat upper surface. On one side of the planting lane are eight nests, all but one in the branches of one shrub. On the other side a dozen or so more are scattered. The birds observed at the further end of this islet last week were grouped very much more densely in trees. I have not yet found any fresh eggs here, so that may mean a trip elsewhere.

Here comes the boy with an egg, which, though not fresh, may be blowable; it measures 99 x 120 mm. and is marked with characteristic tern brown splotches on a dull white background. The birds have been clattering hoarsely ever since we stopped here for lunch, as they flew about or alighted on the tree branches.

Here are three skinks (Moo) eating ants by the dozens. It's good to see something feasting upon the tropical pests.

December 22

I was given a boy today to walk upon my every need. Maintained up the roadtop before going ashore. No boats were available, so we came along the reef where tattlers and plovers were present in fair number. Also the reef heron, and of four seen, three were white ones. They apparently run mostly white here. Came on down to the nearest lesser noddy nesting colony, which we found in shrubs five or six metres high. Several young birds perched upon the small cluster of dead leaves in forks of branches. I photographed three of them; also took three views of the wedgetail reef, one with a mushroom. There are just a few twigs in these nests, which are mostly dead leaves forming a rather flat upper surface. On one side of the planting lane are eight nests, all but one in the branches of one shrub. On the other side a dozen or so more are scattered. The birds observed at the farther end of this islet last week were grouped very much more densely in trees. I have not yet found any fresh eggs here, so that may mean a trip elsewhere.

Here comes the boy with an egg, which, though not fresh, may be plowable; it measures 22 x 120 mm. and is marked with characteristic tern brown splotches on a dull white background. The birds have been clattering incessantly ever since we stopped here for lunch, as they fly about or alighted on the tree branches.

Here are three white (too) noddy nests by the dozens. It's good to see something feasting upon the tropical pests.

We collected five young birds and returned to the village, where I surprised myself by keeping well under two birds per hour, including washing of white terns; but found that I pulled or pushed feathers out very badly in scraping fat hurriedly. One lesser noddy complete in twenty-three minutes.

Had a bath in brackish slough water before dinner. The 'Curieuse' did no unloading today, so again I had young Walker as a housemate for the night. He told me I would find yellow-billed terns nesting over where we are going in the morning.

December 23

They ring gongs around here before daylight, half an hour or so before the chickens crow, just to raise the cooks. We're off at six for the southeast islet. Thirty frigates are soaring above it. White and noddy terns are plentiful along the lagoon shore. A pair of herons, one white and one blue. A young frigate on a low shrub.

Just as we left, Graffe reported a sail in sight, which they think is the 'Pastime', so my time will probably be limited, after all, to four or five days at best. I shall work accordingly and save up a box of young birds and eggs to take care of aboard ship as we tack westward.

The bush here has not yet been cut away, so I'll collect plants and get some photographs of it in its native state. Parakeets in abundance heard and seen from the boat. Some sooty terns fly over, so I drop one lest I leave here, too, without a record specimen of a very common bird. When I shoot,

We collected five young birds and returned to the village, where I surprised myself by keeping well under two pints per beer, including wearing of white terns; but found that I smiled or pushed feathers out very badly in scraping fat horribly. One lesser noddy complete in twenty-three minutes.

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December 22

They ring bells around here before daylight, half an hour or so before the chickens crow, just to raise the cocks. We're off at six for the southernmost islet. Thirty frigates are soaring above it. White and noddy terns are plentiful along the lagoon shore. A pair of herons, one white and one blue. A young frigate on a low shrub.

Just as we left, Charlie reported a sail in sight, which they think is the 'Pastime', so my time will probably be limited, after all, to four or five days at best. I shall work accordingly and save up a box of young birds and eggs to take care of aboard ship as we tack westward.

The bunk here has not yet been cut away, so I'll collect plants and get some photographs of it in its native state. Terraces in Australian beard and sash from the boat. Some noddy terns fly over, so I drop one last I leave here, too, without a record specimen of a very common bird. When I shoot,

hordes of white and the noddy terns raise from the bush. As I look back along the islet, the white are flickering like snowflakes or large frost flakes in the morning sunshine. The common booby they call "Kareva". It is interesting to find Taumotu names of birds non-resident of Tahiti, but found in the Taumotu Islands.

We are splashing along at a fair clip now. To prevent leeway, they tie a paddle alongship at the beam. Our outrigger raises two feet or so above the water. It makes me a bit uneasy, and I lean far to port. While I'm at it, I may as well have them take me to the furthermost point and work this way from there. A few coconut trees there too, which is some temptation on these hot and thirsty days. I can see two or three white herons along the shore which now is a little distant. Young boobies are flying about occasionally. The indentations of the lagoon into the narrow islet are frequent and of considerable extent along here.

By going to the furthermost point I stand better chances of finding shearwaters, but the natives know little concerning them. Walker saw one dead Upoa, so I told him to tell my boy where it was. It might have been sick and drifted in, but the chances that a colony is in the neighborhood are greater than anything else I've heard of. Have seen or heard nothing around here. I may spend Monday night on this island. Here's a flock of fishing birds out in the lagoon, so away we go before the wind, headed for them at six knots!

Now we are amongst them. They are nearly all lesser

horses of white and the muddy terra rules from the beach. As I look back along the islet, the waits are flickering like snowflakes or large frost flakes in the morning sunshine. The common coots they call "Karuva". It is interesting to find Tuamotu names of birds non-resident of Tahiti, but found in the Tuamotu Islands.

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By going to the furthermost point I stand better chances of finding shearwaters, but the natives know little concerning them. Walker saw one dead upon, so I told him to tell my my where it was. It might have been sick and drifted in, but the chances that a colony is in the neighborhood are greater than anything else I've heard of. Have seen or heard nothing around here. I may spend tomorrow night on this island. There's a flock of fishing birds out in the lagoon, so away we go before the wind, headed for them at six knots!

Now we are amongst them. They are mostly all lesser

noddies, hundreds of them, some red-footed boobies, a few white terns and very few noddies. They are well scattered and flying windward. Some splashing occurs off our starboard beam. Like a great army in perfect control those hundreds of white-capped fishermen swerve evenly and regularly and fly rapidly for the point of concentration, where they collect en masse to attack the submarine enemy below. I watch them through the binoculars until the splashing ceases. Boobies alight and dive like giant bombers in a great squadron of smaller fighting planes. Now there are little groups of twenty to fifty white-capped black birds afloat in perfect order on the rippled lagoon. It has cost us dearly, for we must tack back to land against the stiff trade wind. These are great little boats, and with a rudder of any size would make good headway into the wind. I greatly prefer this port tack (or is it starboard when the wind comes from the right of the bow?) because the outrigger takes the pressure of the sails. The fishing flock is now far across the lagoon toward the further point of the village islet. I believe two-thirds of this island is nothing but reef, the islets forming a mere fringe on the windward side of the atoll.

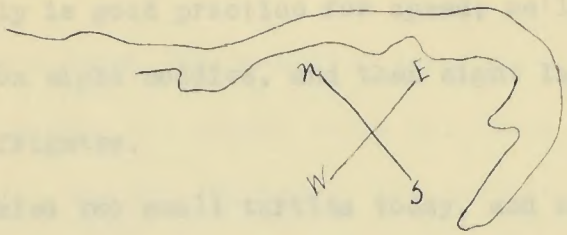
We pass through a scouting squadron of two or three hundred lesser noddies, with a few accompanying young red-footed boobies. Again we find them resting upon the water in groups of well over fifty. Our large outrigger sinks rather deeply, at times until the beam drags. As we near the land, the white terns increase in frequency. The boys can see the sails of the 'Pastime', but it was worth while to go out and see the lesser

noddies, hundreds or them, some red-footed boobies, a few white terns and very few noddies. They are well scattered and flying windward. Some splashing occurs off our starboard beam. Like a great army in perfect control these hundreds of white-capped fishermen sweep evenly and regularly and fly rapidly for the point of concentration, where they collect en masse to attack the submarine enemy below. I watch them through the binoculars until the splashing ceases. Noddies alight and dive like giant kingfishers in a great squadron of smaller fighting planes. Now there are little groups of twenty to fifty white-capped black birds sailing in perfect order on the rippled lagoon. It has cost us dearly, for we must track back to land against the stiff trade wind. There are great little boats, and with a rudder of any size would make good headway into the wind. I greatly prefer this port tack (or is it starboard when the wind comes from the right of the bow?) because the outrigger takes the pressure of the sails. The fishing floor is now far across the lagoon toward the further point of the village islet. I believe two-thirds of this island is certainly not reef, the islets forming a more fringe on the windward side of the atoll.

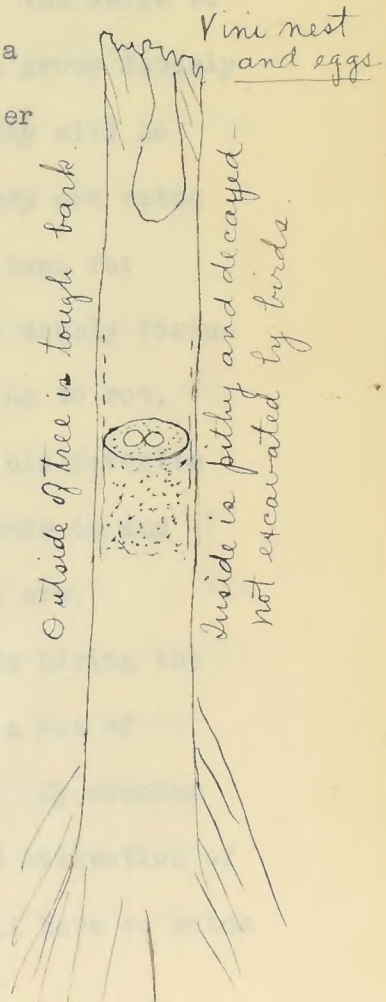
We pass through a scattering squadron of two or three hundred lesser noddies, with a few accompanying young red-footed boobies. Again we find them resting upon the water in groups of well over fifty. Our large outrigger sinks rather deeply, at times until the seam dries. As we near the land, the white terns increase in frequency. The boys can see the sails of the 'Pastine', but it was worth while to go out and see the lesser

noddies fishing, even at the cost of an hour.

We were landed at a turtle pen in a cove of the corner curve of the motu, whence we followed along the lagoon shore until past the first colony of frigates, where a rough count put at least one hundred in the air above us, intermingled with red-footed boobies and white terns. I tried two pictures.



Went on over to sea shore and followed it around to cove leading to small coconut grove, where we refreshed ourselves. Took a stroll along to spit of land, where I took a flock shot at some noddy terns, getting nine. Later I picked up another "kavika" and a curlew. In an old rotten pandanus stump I found the eggs of the parakeet. The top of the stump was broken off and twisted together with a hole at the bottom of the twist. About one foot below the hole the stump was fitted with "sawdust", on the surface of which the eggs rested.



Three boys arrive in one of the canoes. We had more illegal refreshments with them, and then decided to go back with them rather than walk and wait for the other canoe at five o'clock. Along the route there were

Went on over to see shore and followed it around to cove leading to small coconut grove, where we refreshed ourselves. Took a stroll along to spit of land, where I took a flock shot at some muddy terns, getting none. Later I picked up another "Kavika" and a curlew. In an old rotten pandanus stump I found the eggs of the parakeet. The top of the stump was broken off and twisted together with a hole at the bottom of the twist. About one foot below the hole the stump was filled with "sawdust", on the surface of which the eggs rested.

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at least three colonies of frigate birds of thirty to fifty each. I killed three males, one female, and one young bird, besides three common boobies and a white tern.

Arrived at the village shortly after one o'clock. Found my little Mopelia white tern dead, so had to make it up also. Had considerable washing on the two "kavika" and white tern. Did up the first noddy in the surprising time of eighteen minutes. This certainly is good practice for speed; we'll see what I can do tomorrow on eight noddies, and then eight large birds,-- boobies and frigates.

I pickled two small turtles today, and hope they are large enough to be of interest. Also photographed the one big fellow we found at the end of the island. It seems they come ashore at night and lumber up across the sands of the shore to feed upon the coarse green-leaved low shrub which grows densely in the uncut bush of these islets. Here, too, they will no doubt shortly become extinct, not only because they are eaten steadily, but also because of the cutting of the bush for planting coconuts. The little "vini" parakeet is doubly fortunate because many pandanus stumps are left standing to rot, while the flower of the coconut palm seems to be his favorite diet. This, no doubt, accounts for their prevalence in and about the village, where the oldest coconut palms are.

Deciding that the lack of change would make hiring the children to catch lizards not feasible, I opened a box of crackers and offered them a cracker for a lizard. My cracker box was rapidly emptied, but I have a fairly good collection of "skinks", though no geckoes were brought in. I'll have to catch

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one and give the next box for them only. Also must bribe them to catch me some rats, for they are evidently the small Polynesian here.

I find that I am to have very little time to myself while here, for there are three or four fellows determined that I shall teach them to speak English. Well, maybe I'll learn a little Tahitian at the same time, and so it won't hurt me to spend an hour or so.

We saw a dozen yellow-billed terns on a low sand-bank in the shallow between the islets where the boats land. The supposed 'Pastime' was the 'Curieuse' around here unloading her freight in an effort to get away on the return journey tonight. Well, I may not be able to get any birds of value, but I'll certainly get some practice skinning while here, and a series of sea birds from this region will not go amiss. Further search may also reveal more eggs of the vini. There are several dark-plumaged red-foot boobies here, but I have seen nothing that looked like a young flying common booby.

I walked along the coast considerable distance today again, hoping to pick up the little blue tern or to come across the blue-faced booby, but saw no signs of either. The ocean shore of these islets is quite neglected by the bird life. Of course it is exposed to the almost perpetual trade wind. At one place I found a great block of coral rock cast up and overturned from its original position as a "mushroom" out in the shallow within the reef, apparently by some terrific storm. I photographed it, as well as the mass of drifted coral blocks which forms the foundation of the islets. But what storms they must

one and give the gears for four teams only. Also must bribe them to catch me some rain, for they are evidently the small dolpowers here.

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be to pile them up so far above the surf! On the end of the islet is some splendidly fine and clean coral sand, which is the characteristic of all the inner or lagoon shore.

We cut across the islet through pandanus and other trees and shrubs. I was quite surprised at the dampness of the soil under the rubbish where the trees were fairly thick. Found the common atoll fern growing abundantly; also other small moisture liking plants. I foolishly put off collecting because I didn't like the idea of carrying the plants as far as we thought we should have to go afoot. If I get done with my birds tomorrow (which I hardly expect to) I'll get what I can from the near neighborhood of the village. Took some pictures of the vegetation, which I hope will turn out well, although I have no idea as to the proper exposure here as compared with Tahiti. The water and coral may have some effect on the light which does appear brighter on the ground glass with the closed stop.

Today is apparently pay day, as the boys are all lounging around the manager's house, and some are lined up in typical payline fashion. Darwin remarks in his "Voyage of the Beagle" that one gets as used to the brown skin as the white. He had been in Tahiti only three days when he made the remark, as I remember. I have been here fifteen months and simply cannot get used to the brown skin,--perhaps it is because the color represents the people to me. I cannot get used to their ways at all. They haven't those qualities of friendship which sink home. Neither do they seem to possess deep affection or sacrificial love for their near relatives. There may be more excep-

be to pile them up so far above the sand! On the end of the islet is some splendidly fine and clean coral sand, which is the characteristic of all the inner or lagoon beaches.

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tions than I think, and of course I must admit that I do not know their language well enough to know what they say. Yet how little do we judge people by what they say! Our judgment is mostly based upon their actions and what they do. The natives do what habit and custom in Polynesia induces them to, and are shocked as well as other people at non-conformity.

December 24

Last evening after dinner I made bodies for the eight remaining terns and the boobies and frigates. While doing so, my native students came in to "talk Brittany". But the crowd increased, and to amuse them I went through my series of songs. How pleased they are with a change of "himem"! Even my discordant singing amuses them.

Spent the day at the skinning table, so have little to note. The young noddy which I collected six days ago at Mopelia I killed and made up. The eight noddies took me just three hours, which is not very good. But the worst were the big birds. I skinned them all out, then scraped all the fat off all but one male frigate and the old female, which I ripped up so badly at about five-thirty that I threw her away in disgust and set the others to one side.

Neither did I work on this Christmas Eve. I read until I felt sleepy. The natives are singing hilariously.

December 25

There were not so many infernal noises this morning, just a few gongs to rouse the cooks; so I slept on in comfort and did

them than I think, and of course I want which what I do not know their language well enough to know what they say. Yet how little do we judge people by what they say! Our judgment is mostly based upon their actions and what they do. The natives do what their and custom in Polynesia induces them to, and are shocked as well as other people at non-conformity.

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Spent the day at the estimating table, so have little to note. The young cockly which I collected six days ago at Tepoilla I killed and made up. The night watches took us just three hours, which is not very good. But the worst were the big birds. I skinned them all out, then scraped all the fat off all but one male frigate and the old female, which I tripped up so badly at about five-thirty that I threw her away in disgust and set the others to one side.

Neither did I work on this Christmas Eve. I read until I felt sleepy. The natives are singing hilariously.

December 25

There were not so many informal noises this morning. Just a few going to rouse the cooks; so I slept on in comfort and did

not get up until the late hour of six-thirty. Had coffee individually by myself in my own hut with George Washington coffee and cold water. What a blessing it has been, with my teeth sensitive to hot drinks! Also had tea biscuits, jam, and coffee with milk; after which I opened my one solitary Christmas gift, a parting present from Madame Beck. It is a can of Swallow and Ariell's Canterbury fruit cake and is delicious. How well one appreciates being ever so slightly remembered at Yuletide! Here there are not even "Merry Christmas" greetings. Trite though that custom is, it's a pleasant one and when not present, past remembrances seem to have been very sincere.

Well, I did receive another present. One of the native boys brought me in a white tern,--how obtained I know not. It has a little blood on the head and the beak seems injured, but otherwise it looks clean. I gave him bounteously of cookies and cake, which may encourage others to bring in birds obtained. No news of the 'Pastime', and I guess I am marooned all right. Perhaps I should have returned to Raiatea on the 'Curieuse'.

I find from my notes taken while reading the "Voyage of the Duff" that they sighted this (Scilly) island on August 8, 1797, and speak of it as "Scilly of Wallis", so I suppose that navigator was the discoverer of this atoll in the year 1767, a hundred and fifty-five years ago.

I neglected to mention the trumpeting noise made by the male frigate birds as they sit upon the bushes or nests with inflated pouches. We heard it several times while following along the islet Friday, and again while returning. It is

not get up until the late hour of six-thirty. The coffee individually by myself in my own hut with George Washington coffee and cold water. That's a blessing it has been, with my tendency to not drink! Also had tea biscuits, jam, and coffee with milk; after which I opened my one solitary Christmas gift, a parting present from Madame Zook. It is a can of Swallow and Ariell's Canterbury fruit cake and is delicious. How well one appreciates being ever so slightly remembered at Yuletide! Here there are not even "Merry Christmas" greetings. Trite though that custom is, it's a pleasant one and when not present, just remembrances seem to have been very sincere.

Well, I did receive another present. One of the native boys brought me in a white tern,--how obtained I know not. It has a little blood on the head and the beak seems injured, but otherwise it looks clean. I gave him boomerangs of cocktes and coke, which may encourage others to bring in birds obtained. So much of the 'Pastime', and I guess I am entitled all right. Perhaps I should have returned to Malaita on the 'Curieuse'.

I find from my notes taken while reading the "Voyage of the Pert" that they sighted this (Sulliy) Island on August 6, 1797, and speak of it as "Sully or Malita", so I suppose that navigator was the discoverer of this atoll in the year 1767, a hundred and fifty-five years ago.

I neglected to mention the trumpeting noise made by the male frigate birds as they sit upon the bushes or perch with inflated pouches. We heard it several times while following along the inlet Friday, and again while returning. It is

rather high-pitched, a sort of "Whoo-whoo-whoo-whoo" about as rapidly as one can get them out. About two notes above upper 'C', and rounded. It is not a far reaching sound by any means.

December 26

A dinner bell can ring half an hour, but unless these natives are ready they'll not even hurry to their meals. How terribly indifferent they can be to everything, from eating and working to friendship! The natives think it a huge joke to shout out "Sailoh! Pastime!", but it begins to look as if it were a serious matter indeed, for had she but gone to Mopelia she should have returned long since.

Spent this morning finishing up the six big birds saved of Friday's collection and getting ready for field in afternoon. Will take one of the sail canoes and search for the little blue terns on the other long islet. If unsuccessful ashore or in lagoon, where as yet I have seen but the one, I'll take a boat and have some boys row me up and down just off the reef where we saw several when boarding the 'Curieuse' in the afternoon of the sixteenth.

The natives spent Christmas mostly in song. What lovers of chanting they are, yet what poor music they have! It is all a similar chant like well timed monotony. At first it is fairly interesting, but it soon grows monotonous or even irksome. The only pleasant thing about it is that it does express a perfectly care-free and jovial nature, which is the chief characteristic of the race. However, I am of the opinion that a little bit of seriousness and purpose would make them a more agreeable people

rather high-pitched, a sort of "Ooo-ooo-ooo-ooo" about as rapidly as one can get them out. About two notes above upper 'C', and rounded. It is not a far resulting sound by any means.

December 20

A dinner bell can ring half an hour, but unless these natives are ready they'll not even hurry to their meals. So tarrily indifferent they can be to everything, from eating and working to friendship! The natives think it a huge joke to shout out "Salish! Pastime!", but it begins to look as if it were a serious matter indeed, for had she not gone to Kapella she should have returned long since.

Spent this morning climbing up the six big birds saved of Friday's collection and getting ready for flight in afternoon. Will take one of the small canoes and search for the little blue tern on the other long islet. If unsuccessful ashore or in lagoon, where as yet I have seen but the one, I'll take a boat and have some boys row me up and down just off the reef where we saw several when boarding the 'Caribsuse' in the afternoon of the sixteenth.

The natives speak Chinese mostly in song. Most lovely of character they are, yet what poor music they have! It is all a similar chant like well timed monotony. At first it is fairly interesting, but it soon grows monotonous if ever tiresome. The only pleasant thing about it is that it does express a perfectly care-free and joyful nature, which is the outer manifestation of the race. However, I am of the opinion that a little bit of aviousness and rapture would make them a more agreeable people

to be amongst.

From the village here we have a view that is not a little inspiring. The wooded islets, dark green above the white coral sand, brace on either side the opalescent and usually quiescent lagoon, which forms the dark blue line of the horizon where water and hazy atmosphere join in the distance. There is usually a slight breeze rustling the cocopalm fronds, and ever the dull roar of the distant surf behind. Terns are flying about here in respect to numerical ratio the lesser noddy, noddy, white, yellow-bill, sooty, and little blue tern; the red-footed booby is fairly common in juvenile plumage, common booby much less frequent, frigate-birds plentiful. No tropic-birds yet observed, nor shearwaters.

After lunch I took a canoe and sailed along the shore of the northeast motu without seeing any signs of the blue tern. On the spit of land at near end of the motu were several yellow-bill terns which I saw resting here towards one o'clock Friday; but when I returned this evening I found but two in that vicinity. Evening and morning are their fishing hours, and at such times one sees them flying along the lagoon just off the shore, or following the verge of the shallow and channel parts. The two I collected were both in juvenile plumage, if the gray crest signifies that stage. We saw three others as we were landing a little down-shore.

Stopped to get young birds, but the first stop yielded only a downy booby. I saw a strange plumage phase flying about so took it also. We saw several downy young of these birds at

to be enjoyed.

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Stopped to get young birds, but the first nest yielded only a downy booby. I saw a strange plumage plover flying about so took it also. We saw several downy young of these birds at

different places along the motu, but none that looked different from the ones we put up at Christmas, so I am postponing them until later time makes them worth taking. Saw as many as fifteen common boobies flying about and was tempted to take a mottled-breasted one, but refrained, deeming it less important than other birds.

At last we arrived at the place desired and found in one group of shrubs, about seven or eight meters wide, four downy young and five eggs. I saw ten old birds, male and female, raise from here as we approached, and I was obliged to drive three from their nests,--females. Of the five eggs, three taken from under birds were longer than the other two, but the nests appeared in all respects similar, and differed from the nest on which a young red-footed booby sat. It was quite surprising to find the booby in this colony of frigates. How interesting it would be some time when marooned indefinitely upon a bird island to substitute a booby egg in a frigate's nest and vice versa. I wonder if they would raise their foster children. One of the boys brought me an egg which he claimed was that of a white tern. One never can train them to leave things where found and call us to them. Took a picture of the three frigate young collected; also one of a booby, and later a well feathered young noddy.

There being little or no wind along shore, we cut off for the small motu at east end of islets. Here the turtle are coming ashore much more frequently than elsewhere, but how long will they last with 125 working people living upon them? This

different places along the coast, but none that looked different from the ones we had up at Gardiner, so I am postponing them until later time when there is more time with taking. Saw as many as fifteen common boobies flying about and was tempted to have a mottled-breasted one, but refrained, deeming it less important than other birds.

At last we arrived at the place desired and found in one group of shrubs, about seven or eight meters wide, four downy young and five eggs. I saw ten old birds, male and female, rise from here as we approached, and I was obliged to drive them from their nests,--females. Of the five eggs, three taken from older birds were longer than the other two, but the nests appeared in all respects similar, and differed from the nest on which a young red-footed booby sat. It was quite surprising to find the booby in this colony of frigates. How interesting it would be some time when motioned inadvertently upon a bird island to substitute a booby egg in a frigate's nest and vice versa. I wonder if they would raise their foster children. One of the boys brought me an egg which he claimed was that of a white tern. One never can trust them to leave things where found and call us to them. Took a picture of the three frigate young collected; also one of a booby, and later a well feathered young booby.

Here being little or no wind along shore, we put off for the small reef at east end of Islets. Here the turtle are feeding nearer shore more frequently than elsewhere, but too long will they last with the working people living upon them. This

islet has the customary noddies and white terns and boobies, with the little parakeet, curlew, plover and tatler. Not many frigates observed about here. Saw a flock of fifteen or twenty sooty terns and a few yellow-bills out along the reef. Although there is plenty of sandy beach and low scattered bush here, I saw no signs of the blue tern. In the brushy interior there was not the least indication of shearwaters. My dog is not working well in this hot, waterless country. It may be that there are no tubinares, but I haven't much confidence in him. The native boy got him too much interested in "crabs".

I am resolved now to take a boat and try up and down just outside the reef where I saw several of the little blue ternlets, hoping that luck will be with me. I have tried in vain to see them with binoculars from shore, but realize how difficult that would be. My young frigates climbed to the ridge of the house, and there they are perched wondering, no doubt, where their old folks are. They refused to eat a morsel of fish taken from the stomach of a tern.

December 27

It seems impossible for me to get enough sleep, although I go to bed at dark about seven o'clock. When the gongs ring in the morning I still long to lay abed and find it difficult to arise before six, due no doubt to the lack of glasses and this perpetual coral sand glare. Spent this morning making up birds, having a great deal of feather washing to do.

But alas! Though the 'Pastime' left its boat, it did not leave oars to propel it, so I cannot hunt outside the reef.

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Not alas! Though the 'Fairline' left its boat, it did not leave oars to propel it, so I cannot hunt outside the reef.

A very threatening squall stopped us from going out in the "Vaa", so I am working on young birds which have been left long enough anyway. Was ever mortal so tempted? Tomorrow an open boat sets sail for Mopelia to get provisions which the 'Pastime' should have brought over. I am tempted to go after Onychoprion lunatus, but hardly think the few birds I could get would justify the four days the trip would occupy. But how I would like the adventure! For the chances of their missing the island are great indeed. The range of vision from a low boat is so extremely small and coconut trees so low that they could pass within twenty miles and never see the place, or even at ten. And then there's the possibility of storms. Surely these boys are brave sailors to set forth on such a venture where no absolute necessity demands it; but if they like sugar so well that they'll risk their lives for it, well and good.

How like frogs croaking the noddy frequently sounds, especially when it croaks at both in and out breaths!

December 28

To better resist the temptation of an adventure at sea in the open boat, I'm taking a canoe out across the lagoon to a long barren strip of sand with the hopes that little "Ore ore" is "'a'a" there. The fishing flock is off towards the center of the lagoon, whither are flying belated fishermen from the nesting trees of the lesser noddy along the motu. I am having trouble about their native name. The boys here call them "kikiriri", the Taumotu name which aims to and somewhat succeeds

A very threatening squall slopped on from Salve and in the "Vaa", so I am working on young birds which have been left long enough anyway. Has ever mortal so temptest! Tomorrow an open boat sets sail for Upolis to get provisions which the 'Festina' should have brought over. I am tempted to go after Gay Dorsion Jimmins, but hardly think the few birds I could get would justify the four days the trip would occupy. But how I would like the adventure! For the chances of their missing the island are great indeed. The range of vision from a low boat is so extremely small and account from so low that they could pass within twenty miles and never see the place, or even at sea. And then there's the possibility of storms. Surely these boys are brave sailors to set forth on such a venture where no absolute necessity demands it; but if they like sugar so well that they'll risk their lives for it, well and good.

Sow like from cracking the body frequently comes, especially when it crosses at both in and out breaths!

December 23

To better resist the temptation of an adventure at sea in the open boat, I'm taking a canoe out across the lagoon to a long narrow strip of sand with the hopes that little "Cru cru" is "a'a" there. The flowing flood is off towards the master of the lagoon, whilst are flying belated flamemen from the nesting trees of the lesser noddy along the main. I am having trouble about their native name. The boys here call them "Kikirini", the Samoan name which also is and accordant accords

in imitating their nesting call. The name "Oio" they apply to the greater noddy, while in Tahiti "Oa" designates the latter and "Oio" the former. The fishing flock is off a good two miles and yet covers three fields of the binoculars. How well adapted are these fishermen! Could mankind's fishing fleets travel as these fellows do and so keep up with the schools of fish, how much more successful they would be! After writing a sentence, one has to look considerably off to one side or the other, for there is no telling where to find the flock again.

If these two men are not going to fish (and they have no spears) I'll have them follow up the flock. I want some more adult lesser noddies anyway. A white heron down in the brown rocks below highest high tide is very conspicuous, but when on the gravel or sand he is very inconspicuous, and the glasses are needed to tell whether he's a lump of coral or a bird.

We are approaching the lower end of the motu where I nooned the first day here. Noddy and white terns above the bush. A straggling yellow-bill and lesser noddies are coming from the colony. A heron on the water's edge, white again. A tatler calls, and the parakeet can now be heard.

These natives get an idea into their heads and you can't budge them. They want to plant me here, insisting that there are no birds out on the sand islet I desire to visit. At last I convince them that I want to go out there, and off we go. But the trees have taken the wind out of our sails and so we make very little progress. From the end of this "village motu", mushroom blocks of coral rock stand about one meter above the

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These native get an idea into their heads and you can't budge them. They want to plant me here, insisting that there are no birds out on the sand islet I desire to visit. At last I convince them that I want to go one there, and off we go. But the trees have taken the wind out of our sails and so we make very little progress. From the end of this "village motu", mangrove islets of coral rock stand about one meter above the

lagoon level at irregular intervals. Their tops are so regularly at the same level that they strike me as having been elevated to their present position from a former one below lagoon level. Their distribution is just about as frequent as the clumps of living coral now dotting the lagoon bottom where we are sailing just inboard from them. Weathering has, however, altered their appearance greatly.

Here is a young "karina", common booby (S. leucogastra plotus), circling about us. He looks desirable. A good shot before the bow. We arrive at Motu Taropapa and obtain one of the two birds of that name the first thing by following along the ridge of white coral gravel next the lagoon. We come upon a little blue ternlet, and, after wounding it with the auxiliary, resort to a large shell and get it. So our trip here has not been in vain. As we follow along the motu we see signs of turtle here, apparently searching for egg-laying sites.

I am decidedly interested in the geology in the making here. The reef is about one kilometer beyond us with a clean shallow lagoon. But while I write, four "kavika" fly overhead, failing to come close enough to shoot. We start out to take a good look at this geology, the boy carrying the gun, when two gray-back terns (Onychoprion lunata) come near. By the time the boy catches up they have got beyond reach, but I call them back and drop one of them. Then a little blue ternlet comes in from seaward. We have to chase him at length, but succeed when he finally approaches us. Indeed our trip was worth while.

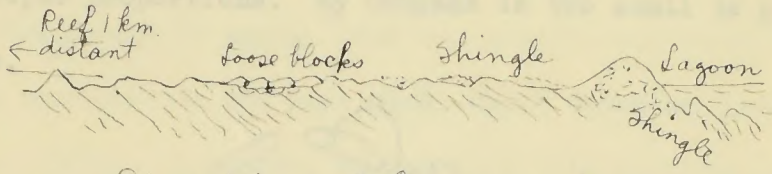
Back to geology. There are about two hundred meters of

lagoon level at irregular intervals. Their tops are so regularly at the same level that they strike us as having been elevated to their present position from a former one below lagoon level. Their distribution is just about as frequent as the change of living coral now dotting the lagoon bottom where we are sailing just inboard from them. Weathering has, however, altered their appearance greatly.

Here is a young "Darina", common booby (S. leucogaster piotus), circling about us. He looks desirable. A good shot before the bow. We arrive at Nuku Taropepe and obtain one of the two birds of that name the first thing by following along the ridge of white coral gravel near the lagoon. We come upon a little blue terrier, and, after wounding it with the auxiliary, resort to a large shell and get it. So our trip here has not been in vain. As we follow along the path we see signs of turtle here, apparently searching for egg-laying sites.

I am decidedly interested in the geology in the making here. The reef is about one kilometer beyond us with a clean shallow lagoon. But while I write, four "Darina" fly overhead, failing to come close enough to shoot. We start out to take a good look at this geology, the boy carrying the gun, when two gray-back terns (Anous tenuirostris Lugete) come near. By the time the boy returns up they have got beyond reach, but I call them back and drop one of them. Then a little blue terrier comes in from seaward. We have to chase him at length, but succeed when he finally approaches us. Indeed our trip was worth while, back to geology. There are about two hundred meters of

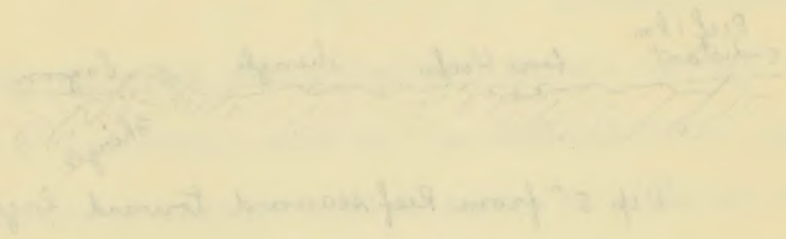
rock extending seaward from the shingle or gravel ridge at the lagoon edge of this motu. Here there are fourteen ridges in all, the following being a very diagrammatical illustration, but sufficient to explain the idea.



Dip 5° from Reef seaward toward lagoon.

These ridges are the uppermost edges of layers of cemented shingle corresponding in coarseness and, as nearly as I can determine, structure to the loose shingle which forms the base of the ridge along the lagoon. Here on the leeward side of the atoll there is land being formed entirely different from that to windward, and undoubtedly much more slowly. This is composed of fine gravel and sand cemented into distinct stratified layers ranging from five to fifty centimeters in thickness. I do not believe the dip of these strata is due to any uplift but rather to their deposition; yet it is possible that the whole has been raised a few feet and that the deposition was just below the lagoon surface. However, there is always the possibility that the same forces now at work have been working throughout time infinite; which leads me to believe that these layers are similar to the shingle now resting upon their windward edge near the lagoon. There are rough blocks strewn about them, blocks

rock extending seaward from the angle of gravel ridge at the lagoon edge of this atoll. Here there are fourteen ridges in all, the following being a very diagrammatical illustration, but sufficient to explain the idea.



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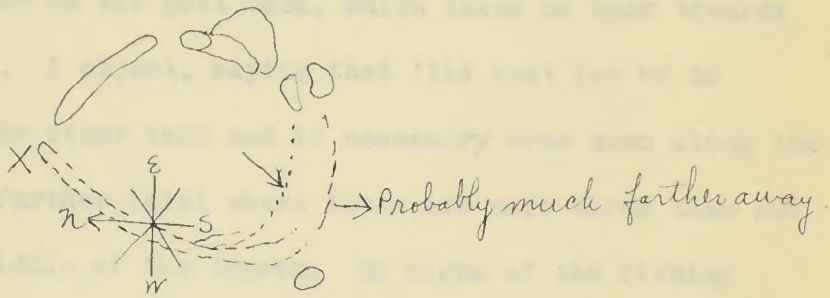
of the same material which perhaps have been broken off the upper edges of the strata by storms.

Got three or four yellow-bill terns of a small flock here. We followed along two miles of this low gravel islet, no part of which is two meters above lagoon level. It seems to extend as much farther. The following sketch is not to scale nor has it the proper proportions. My compass is too small to give good angles.



It is not exactly circular and is perhaps six or eight miles in diameter. X to O is the low gravel islet we are on now.

After wading out to the canoe I am convinced of my explanation of these strata, for along the face of the shingle beach are similarly sloping rock formations, evidently in process of construction. Here the dip is perhaps more than five degrees, about seven or eight, the less dip being near the surface of the water. These formations extend half a hundred meters into the lagoon, where the water gets about waist deep. Blue water is about three or four hundred meters out, and it is good and blue too. Jimmy Dexter says it is about thirty fathoms at the deepest. It is quite a little sea in itself, and no doubt harbors a fairly interesting as well as numerous fauna. What an immense amount of ichthyological and marine invertebrate work is yet to be done

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Not there or four yellow-gill beans of a small clove here. We followed along two miles of this low gravel islet, no part of which is two meters above lagoon level. It seems to extend as much farther. The following sketch is not to scale nor has it the proper proportions. My compass is too small to give good angles.

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in these atolls and all coral islands! What zones or currents bear like species? What species are indigenous? What are the habitats of them and of the cosmopolitan species?

Here's a very dark phase of the red-footed booby; if time ever lags with me I'll certainly get some of the darkest. Here we were going along almost on a dead course for the village and with leeway to spare, when the native bo's'n at the rudder throws her over on the post tack, which takes us back towards the low islet. I object, saying that 'tis best for me to continue on the other tack and if necessary come down along the shore of the further islet where there are more birds than out here in the middle of the lagoon. No signs of the fishing flock anywhere. About fifteen frigate birds are flying fairly high off towards the southeast. How like a flock of soaring buzzards they appear, circling about! How rapidly they can change their location! They are now south of us. There are no fishing birds beneath them. It would not at all surprise me to see them actually do their own fishing. I have observed more than once that they steal from one another as well as from boobies and terns. When collecting the downy young the other day one delivered his breakfast at my approach. It consisted of three or four squids and portions of two good-sized fish.

Well, my judgment of our proper course was correct, for we are holding our point against the leeway and should run in to the village without another tack. She holds up into the wind very well indeed. We are holding our course for the house all right, but so very close hauled that we are barely

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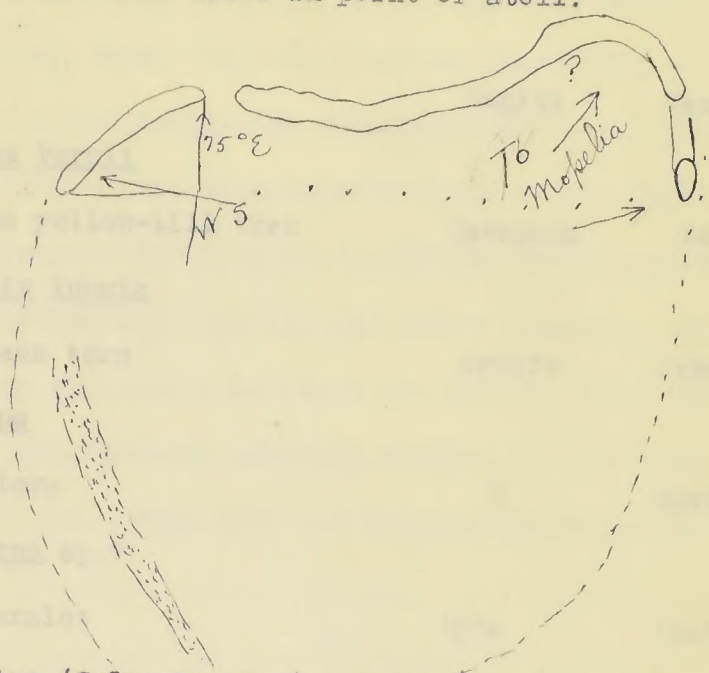
making three miles an hour.

If the small motu is one half mile long, it is eight miles away, showing that the land is all to windward. It is also very interesting to recall that Mopelia lies about ESE by compass from here. Note arrow in point of atoll.



A few boobies (Sula piscator) and lesser noddies about, but the lagoon is very quiet. It is not deserted, though, for a fishing flock is seen far off to the south, not a large one. We approach one of those small flocks of lesser noddies at rest upon the water. I have the boys pass to leeward and try a pot-shot into their sterns, for they invariably face windward. Get only two, but drop three more from the air. That gives me plenty of work for the rest of the day, and perhaps a little too much. This habit of resting on the water so much, in marked contrast to the white terns, is perhaps one reason why their feet are so much more perfectly webbed.

Into port at a few minutes past eleven. Traveled at

making turns using an oar.

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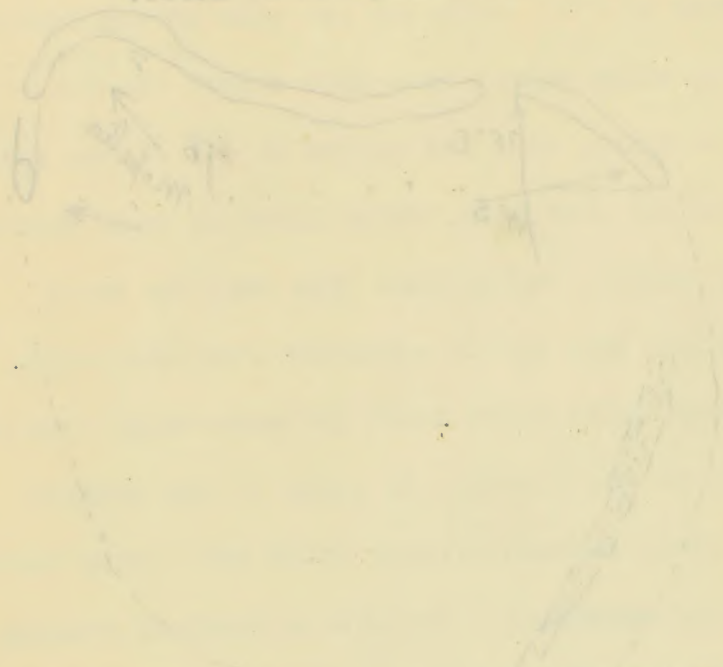

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Into port at a few minutes past eleven. Traveled at

about two miles per half hour for three halves. The distance across the lagoon is six miles.

As near as I can make out from two natives and a Taumotu man who knows his birds very well, the following are the native names:

	Tahiti	Taumotu
Thalasseus bergii		
Crested yellow-bill tern	Tarapapa	Tara
Onychoprion lunata		
Gray-back tern	Oreore	Oreore
O. fuscatus		
Sooty tern	?	Kavika
Procelsterna sp.?		
Gray ternlet	'A'a	'Ga'ga
Anous stolidus pileatus		
Noddy	'Oio Oa	'Goio Oio
Megalopterus melanogenys		
Lesser noddy	'I'iri'iri Oa Oio	Kikiriri
Leucanous sp.?		
White tern	Itatae	Kirarahu

I put the apostrophe before the "g" to signify that peculiar "ng" sound they give it. They said the "Oa" was also a name for the noddy given when their calls sound like that.

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	Tagoti	Amogota	
Thalassoma hebraeum			
Crested yellow-bill tern		Garuoro	Tern
Gymnogrion lineata			
Gray-back tern	Oroore		Oroore
G. Tuscatua			
Sooty tern			
Procelsterna sp.?		Ravika	
Gray tortler	'ia		'Ua'ua
Anous stolidus pileatus			
Noddy			
	'Oio Oa		'Oaio Oio
Neanlocterna melanocephala			
Lesser noddy			
	'I'iri'iri Oa Oio		Kiririri
Anous sp.?			
White tern			
	Ifaina		Ifaraua

I put the apostrophe before the "a" to signify that peculiar "ng" sound they give it. They said the "Oa" was also a name for the noddy given when their calls sound like that.

Here were half a dozen or more natives well along in years who did not know the names of these very common birds. Yet I have heard the admirers of them as savages say how observant they are! Like all people, they have their intelligent few and their ignorant mass. I find them capable of doing things they have seen done, but they lack the initiative intelligence to find out things for themselves.

Very warm and sultry, with showers early in the night. Blustery. Read considerable in Darwin's "Coral Reefs", especially the introduction which states the other theories. It is probable that no one theory accounts for all the coral islands. Very possibly all the theories advanced combine to bring about conditions as they are. Much work and thought can still be spent upon it.

December 29

I should not do any lantern reading nor night work without my spectacles. My eyes are very tired this morning, irritating me considerably. Worked on birds this morning, filling out with downy young. At lunch today we had greens, or salad as they term it, a native bush leaf, "Horahora", onion, oil and vinegar. It was very good in spite of a slight "stink-bug" taste, and no doubt healthful where our diet is so much protein and starch. I propose going over to the southeast motu to spend the night searching for shearwaters, or at least listening for them. I may not get the canoe until late in the afternoon.

Did not get away until five o'clock. I killed all the

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Did not get away until five o'clock. I killed all the

young birds and it took me until four-thirty to do them up. Then of course the dog was missing. We have had the wind from the northwest since the showers last night. The boys on their perilous voyage to Mopelia in the open boat no doubt welcomed it. A small flock fishing towards mid-lagoon, and stragglers passing occasionally. The flock has increased to one of considerable size and is composed mostly of the inevitable lagoon tern, "kikiriri", and a few larger birds. How like a swarm of house-flies around the rear door of an Idaho restaurant they look! A few large blue-bottles are amidst the swarm. Another flock ahead coming our way.

We pass through a portion of the flock, most of which is lesser noddies. A few yellow-bill and white terns. Red-footed boobies frequent and some common ones too. What magnificent divers are the yellow-bill, or crested terns! They surpass the boobies, but the tropic-birds surpass them. I have not seen many of the latter fishing. The sooty terns also should be efficient in their alertness. Five or six came over us, but I was unable to get any of them. The boobies have a habit which is not to good advantage when it comes to fishing (or so it seems to me) of skimming low over the surface. Several times I saw them raise from that position and poise for a dive, but the fish apparently had moved. Those which were aloft and dove, and those that got up four or five meters and then plunged certainly made exhibition performances and cut the water clear as a whistle. They go down too, remaining submerged a few seconds.

young birds and it took me until four-thirty to do them up.

Then of course the dog was missing. We have had the wind from the northwest since the showers last night. The boys on their perilous voyage to Dopelia in the open boat no doubt welcomed it. A small flock flashing towards mid-lagoon, and stragglers passing occasionally. The flock has increased to one of considerable size and is composed mostly of the inevitable lagoon tern, "Xikirit", and a few larger birds. Now like a swarm of house-flies around the rear door of an Indio restaurant they look! A few large blue-bottles are amidst the swarm. Another flock ahead coming our way.

We pass through a portion of the flock, most of which is lesser noddies. A few yellow-bill and white terns. Red-footed boobies frequent and some common ones too. What magnificent divers are the yellow-bill, or crested terns! They surpass the boobies, but the tropic-birds surpass them. I have not seen many of the latter flocking. The noddy terns also should be efficient in their alertness. Five or six came over me, but I was unable to get any of them. The boobies have a habit which is not to good advantage when it comes to fishing (or so it seems to me) of swimming low over the surface. Several times I saw them raise from that position and poise for a dive, but the fish apparently had moved. Those which were adrift and dove, and those that got up four or five meters and then plunged certainly made exhibition performances and cut the water clear as a whistle. They go down too, remaining submerged a few seconds.

Somebody has again shaken the screen and the black swarm rises far off to the north. There is a high sea beyond the reef where the breakers are rolling up in great style and are highly reflected in the evening sunshine. Towards the sun the spray looms up like the smoke of a prairie fire.

The croak of yellow-bills attracts me to the southward where a small flock is fishing very near by. About ten or a dozen yellow-bills plunge superbly from six meters or so and croak excitedly as they try to follow the fish. Half a dozen dainty little fluttering white terns lightly drop to the surface of the water and rapidly arise after picking up a tiny fish. One or two young boobies are splashing heavily here and there; and everywhere are the fluttering lesser noddies, swarming in rather dense masses where the fish are most plentiful, keeping one or two meters above the water; now they drop (they hardly fold their wings long enough to dive) to the water, where, with upheld wings still fluttering, they pick up the tiny fish and then arise. Some of them do dive a little, but I saw none completely submerged. Two old frigates now descend from their observation point and harass the noddies until a cargo is heaved overboard; then there is a struggle betwixt the erstwhile allied pirates for the prize. How human is all life, or better, how natural is mankind in his every action!

6:00 P. M. We are not far off the island and fortunately will reach it in time to let me walk around it before dark. Chances of finding birds should be improved at this hour of the day. Saw not one noddy after getting a few hundred meters beyond

Somebody has again awaken the porpoise and the black swarm rises far off to the north. There is a high sea beyond the reef where the breakers are rolling up in great style and are highly reflected in the evening sunshine. Towards the sun the spray looms up like the smoke of a prairie fire.

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8:00 P. M. We are not far off the island and fortunately will reach it in time to let me walk around it before dark. Chances of finding birds should be improved at this hour of the day. Saw not one noddy after getting a few hundred meters beyond

the passage between village and long motu until arriving at this little motu.

Noddies flying about and croaking hoarsely. "Au-au" or "U-au" repeated often in a coarse guttural croak imitates them fairly well. They are certainly plentiful here, accompanied by the "clucking" little white terns, which have also a very sharp little squeaky call. Now and then a yellow-bill along the lagoon shore. Lesser noddies are coming in from the "fly swarm" out in the lagoon and insisting that their name is "kikiriri". Now some kavika fly overhead coming from across the lagoon heading for Mopelia. I fail to touch them. My shooting arouses the island inhabitants, and in greater numbers they fly about the tree tops. Several red-footed boobies here too. As I walk around the islet the three common shore birds and the reef heron announce their presence, the latter by flight only. More "kavika" and I get one from high overhead, a good clean specimen. What speed and alertness they have!

Return to camp at dark. No signs of tubinares. Found a speckled crab about ten inches long, and conducted him to camp. The dog found him. He spends all of his time lately hunting crabs or else chasing fish in the shallow lagoon. Hermit crabs are very thick here. I counted thirty in less than two square meters, and while we were eating, twenty-four crept over the sandy beach towards the sea. They are all about the same size in the mollusk shell which is capped by a semi-spherical ? when living. They take these far from their natural habitat. There is also a characteristic rock crab hereabouts, though

the passage between village and long moon until arriving at this little moon.

Noddies flying about and crowding noisily. "Ah-ow" or "O-ah" repeated often in a coarse guttural croak imitates them fairly well. They are certainly plentiful here, accompanied by the "clucking" little white tern, which have also a very sharp little squeaky call. Now and then a yellow-bill along the lagoon shore. Lesser noddies are coming in from the "fly away" out in the lagoon and insisting that their name is "kikirik". Now some kavika fly overhead coming from across the lagoon heading for Sopelia. I fail to touch them. My shooting around the island lamentable, and in greater numbers they fly about the tree tops. Several red-footed boobies here too. As I walk around the islet the tiere noddies shore birds and the reef heron announce their presence, the latter by flight only. Here "kavika" and I get one from high overhead, a good clean specimen. What speed and alertness they have!

Nature is deep at dark. No algae or tubinares. Found a speckled crab about the inches long, and exhausted him to deep. The dog found him. He spends all of his time lately hunting crabs or else chasing fish in the shallow lagoon. Sandy areas are very thin here. I measured thirty in less than two square meters, and while we were eating, twenty-four crept over the sandy beach towards the sea. They are all about the same size in the mallock shell which is hidden by a semi-tubular when living. They take these far from their natural habitat. There is also a diatomaceous rock crab hermitcrab, though

they seem similar on all the islands,--a broad flat yellow crab, very alert and active.

10:00 P. M. Apparently there are no petrels nor shearwaters here. Nothing but the croaking noddy or an occasional squeaking white tern or the squeak of the red-footed booby heard so far. What an awful place to have been shipwrecked upon before coconuts were planted here! I would like to know whether or not the coconut grew originally on these atolls. I do not believe it did; certainly it did not flourish on some of them, else there would now be more old stumps. Of course it is quite possible for a coconut to be brought here by ocean currents. If floating seeds are to account for the vegetation of these islands they should show some relationship to tropical America. There are many things, no doubt, which the natives have carried with them, but if currents have helped, the relationship should trace back eastward against the current; which leads me to wondering whether or not that might not also account for the lack of coral growths on the leeward shores of continents. Corals in their pelagic stage undoubtedly are preyed upon by some of the vast sea life, and as the currents along the leeward side of continents come in from the cooler zones it is probable that there are few, if any, young corals afloat to start the colonies, temperature as well as current or direction of current having its effect. On the windward side, however, the strong Equatorial drift would carry living corals against the lands. Wave action seems about as heavy along the Pacific coast of America as it does on these islands, so I don't think tidal force alone is

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deficient to leeward of the great land masses.

All through the night the croaking of the noddies continued, but nothing else. No tubinares heard. Towards daylight the noddies increased in number and called more excitedly. They were joined by lesser noddies and white terns; and occasionally boobies were heard.

December 30

5:00 A. M. Rain during the night forced us to draw our feet in under the small shelter of plaited palm leaves set up by turtle hunters. Shortly after five o'clock the yellow-billed terns commenced croaking as they passed along the lagoon shore. Went out before breakfast and started a crude map of the islet. While so employed, two "kavika" came quietly and slowly over me. I got them both. Also shot a white tern, winging it with the auxiliary while it fluttered low overhead. A squall drove me into camp. There is still a high sea and northwest wind this morning, which means storm. It has continued throughout breakfast.

At my shooting this morning the birds that rose from the bush had a marked white appearance. At least four-fifths of them seemed to be the white terns. Lesser and noddies made up the bulk of black; not many boobies, but at daylight I saw them striking out in twos, threes and fives, etc. for their day's search for food. Several yellow-billed terns about, and a couple of sooty terns. Saw both blue and white herons this morning; they are crafty fellows, the white more so seemingly

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than the blue. I have not been able to get one here at Scilly yet, but have not concentrated upon them.

Had intended to collect plants today, but the rain has altered that intention. I may fill the canoe with some of the less abundant vegetation and put it in press after it dries. I haven't papers enough to waste on wet plants. Where one does so much traveling by canoe papers are soon destroyed, especially by wrapping birds shot into the water. After a lapse, another squall spreads across the lagoon.

I got a few moments between showers and went down to the sand spit to measure distance here. On the spit were ten yellow-bill terns and a few more noddies. I tried sneaking upon them (I can never resist the temptation of a pot-shot), but not getting more than four in line and then rather distant I refrained from shooting. Then I saw a strange bird, for this island, approaching. He was flying rather high, but I took a chance shot as he passed overhead. It was "Tavae" (Phaethon rubricaudus), the red-tailed tropic-bird and the first and only one I have observed this trip.

This shelter slopes the wrong direction, and what is worse, it leaks a trifle. The native has been out in both showers cleaning dishes. They do not bother much about rain. Well, they have nothing to get wet but their skin,--no birds, paper, cotton, shells, notebooks; they are like the animals--rain is of little discomfort if they are busy. Guess I'll go out now and see how these birds take the rain.

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They were flying about in only a few instances, being mostly perched. Continued map and collected plants, took pictures, etc. Took pictures of Motu Hunu from the northeast sand-spit, of the low wind-blown shrub in the cemented rock platform facing the reef to windward, of the "mushroom" blocks of coral rock in the bit of lagoon between the reef and the motu, rocks which appear to be remnants of a former extension of the cemented platform; another picture of broken fragments covered and mixed with the shingle where cemented platform gives place to the shingle surrounding bush covered portions of motu.

Returned to camp at noon to find no canoe in sight,-- a native's ten o'clock! Killed some white terns during morning and found one young noddy with just a few pin feathers forming. The southwest sand-spit is well speckled with noddy terns at present. The two sand-spits show plainly enough how this shingle portion of the motu is built up or maintained. The shelf of the lagoon is within a few meters of them, the contours coinciding closely.

The canoe is just coming, so I must go after plants from the interior where the ferns grow. Found the fern and collected also the broad-leaved, large-trunked tree, and also the running vine, leaving at least one more tree besides coconut and pandanus and one herb of the damp interior and a grass. Found an odd specimen of the downy noddy and took a photograph of it.

We left motu at 1:27 and are clipping off well over four knots. In looking across the lagoon I observed that the lone

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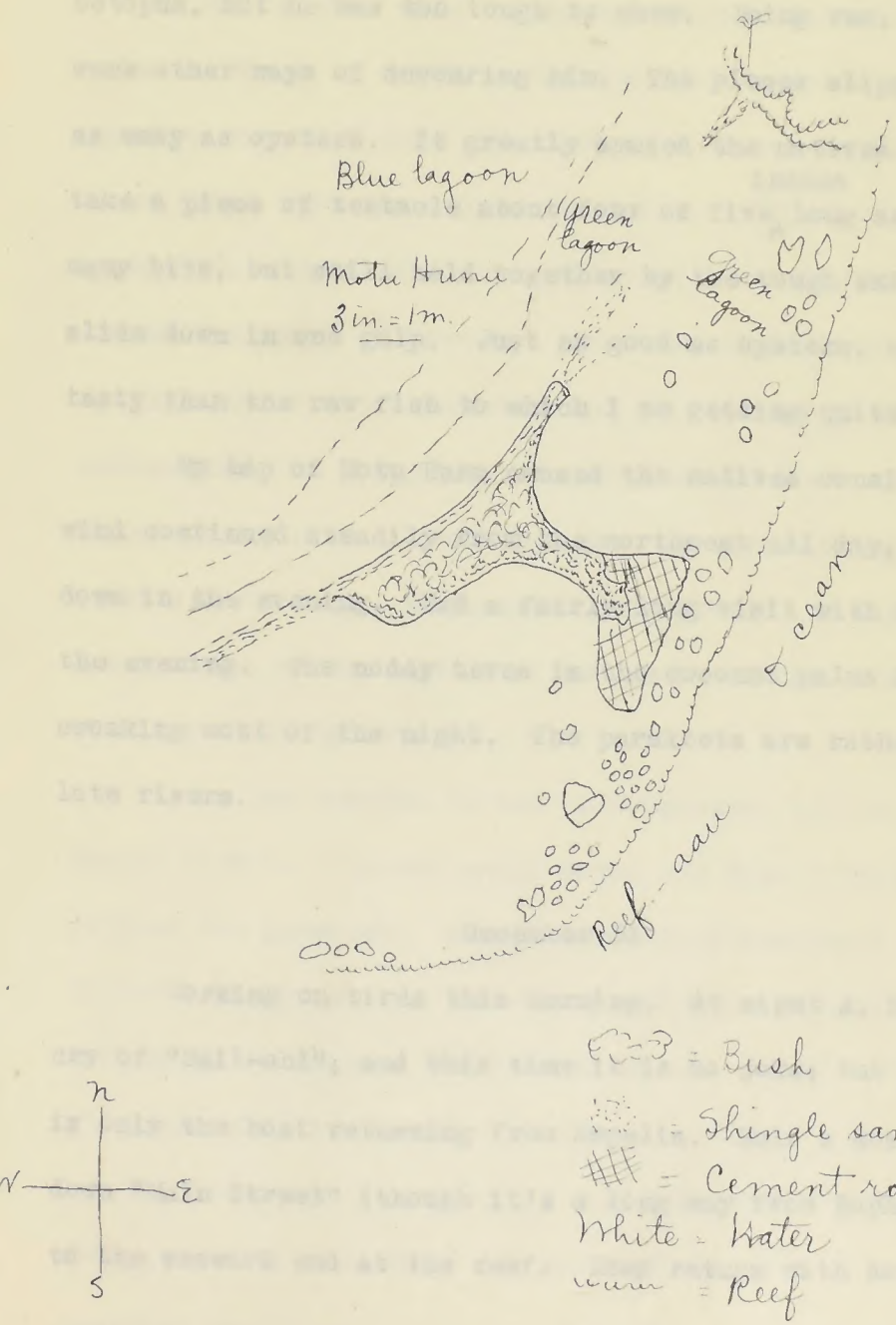
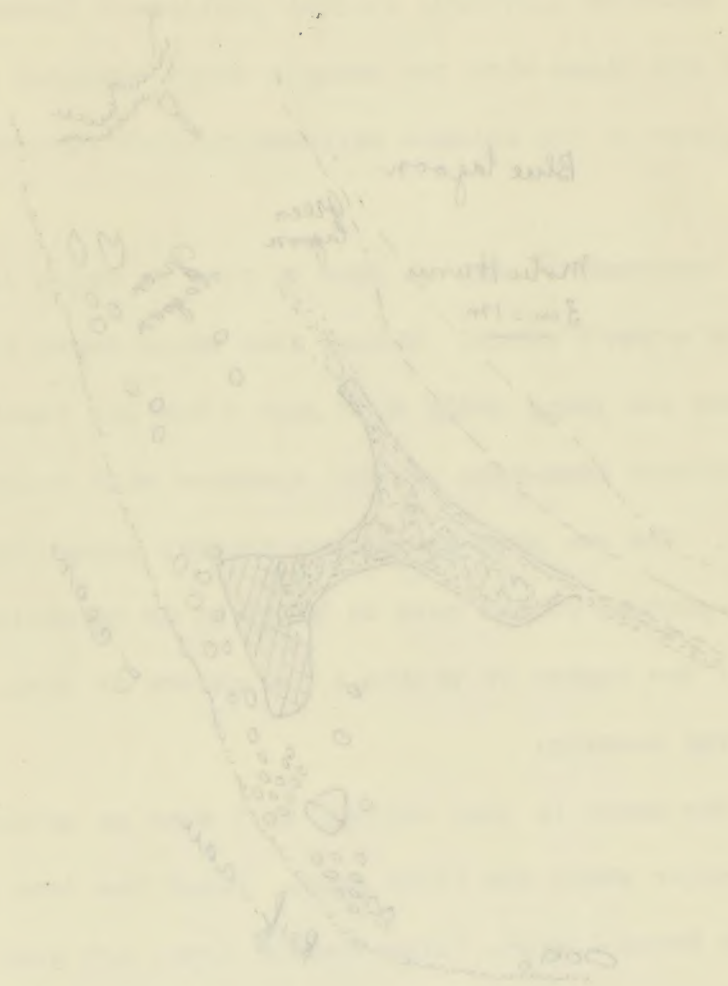
palm tree which paced one mile from further village just filled the field of my binoculars at 6 X. So I set up two branches of coconut palm five meters apart; then measured off a perpendicular to their line in meters and went along it until the field at 6 X just included the five meters. This was at exactly fifty meters, or a ratio of one to ten. That would give ten miles across the lagoon.



palm tree which passed one mile from further village just filled the field of my binoculars at 8 X. So I set up two branches of coconut palm five meters apart; then measured off a perpendicular to their line in meters and went along it until the field at 8 X just included the five meters. This was at exactly fifty meters, or a ratio of one to ten. That would give ten miles across the lagoon.



We made the village in forty minutes after having traveled too rapidly for writing. I picked out two dark-breasted common boobies from a flock of upwards of twenty that came over us as we passed their hangout on the long motu. Nothing else of unusual occurrence. Was very poor at the skinning and washing of sooty terns. Threw away worst one of three at that. At dinner tonight we had, besides the customary raw fish, some raw octopus, but he was too tough to chew. Being raw, however, there were other ways of devouring him. The pieces slipped down almost as easy as oysters. It greatly amused the natives to watch me take a piece of tentacle about four or five inches long and cut into as many bits, but still held together by the tough skin and let it slide down in one gulp. Just as good as oysters, and more tasty than the raw fish to which I am getting quite accustomed.

My map of Motu Hunu amused the natives considerably. The wind continued steadily from the northwest all day, but died down in the evening. Had a fairly long visit with Graffe in the evening. The noddy terns in the coconut palms keep up their croaking most of the night. The parakeets are rather quiet and late risers.

December 31

Working on birds this morning. At eight A. M. came the cry of "Sail-oh!", and this time it is no joke; but perhaps it is only the boat returning from Mopelia. Half a dozen boys race down "Main Street" (though it's a long way from Gopher Prairie!) to the seaward end at the reef. They return with doubtful

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December 21

Working on birds this morning. At eight A. M. came the cry of "Sail-ho!", and this time it is no joke; but perhaps it is only the boat returning from Nopella. Half a dozen boys race down "Main Street" (though it's a long way from Gopher Prairie!) to the seaward end at the reef. They return with Donald

information, so I give my binoculars to an older youth and off he goes to determine what it is. -- 'Pastime', which they say has but been to Mopelia and back at six days each way. Holy mackerel! How long will it take to get to Tahiti on that ship?

No more trips to Mopelia unfortunately. 'Pastime' will leave sometime next week for Raiatea via Mopiti. I may drop off at the latter place and take my chances at getting away.

Having just made up the two dark-breasted common boobies makes me think it worth noting that of the boobies of this species seen both here and at Mopelia where they were nesting, these three were the only dark phases. All the others, perhaps seventy to a hundred different birds, were white below the dark throat feathers. I have not yet found them nesting here at Scilly, but hope to next week and to find downy young. I will collect all the young birds I can find from now on for work while aboard ship. I have the boy out now with basket and gun, searching for eggs, young birds, and "Vini", the parakeet. He brought two of the latter in just before lunch. Northwest wind once more this afternoon.

The boy brought in one more parakeet and three nestling lesser noddies. As one small downy had died I made it up and pickled the parakeet. Except for record specimens of heron, tatler and plover, and the cuckoo which is reported by the natives to be here as well as at Mopelia where I found it, the specimen being destroyed.

There were several pigs unloaded from the 'Pastime' today, and two sucklings are now hanging up here in the "galley" awaiting cooking for our New Year's feed. Dinner is already

information, so I give my binoculars to an older youth who off he goes to determine what it is. -- 'Martins', which they say has but been to Hopelia and back at six days each way. Holy macaroni! How long will it take to get to Manit on that ship?

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The boy brought in one more parakeet and three nesting lesser noddies. As one small downy had died I made it up and plucked the parakeet. Except for record specimens of heron, tatler and plover, and the cuckoo which is reported by the natives to be here as well as at Hopelia where I found it, the specimen being destroyed.

There were several pigs unloaded from the 'Martins' today, and two auxiliaries are now hauling up here in the "valley" awaiting cooking for our day laser's feed. Dinner is already

half an hour late and no one is coming yet, except the cats and dogs which begin to arrive at the first tinkle of the bell. Here, as elsewhere, the natives keep about one rooster to every three or four hens; and of an evening the fighting that goes on is something astonishing. In some places the coconut palms are low enough and near enough to the houses for the chickens to get upon the fronds to roost.

Went to bed early after a very little reading. The natives had commenced to "sing" out the old year some hours before. They are great chanters but one can hardly credit them with song. I was awakened at midnight by a continued shouting and the beating of all the old cans about camp (and it will be remembered that one-third of the cargo of the 'Curieuse' was old junk.) So it isn't quite as uncivilized as it sometimes seems.

January 1, 1922.

A French-Tahitian handshake with everyone this morning, but a good old English "Happy New Year". Caught a rat in the trap last night, a small fellow darker than the usual Polynesian rat. Off this morning to make a map of the home islet, "Motu Fare". The Long islet is called "Motu Roa".

The celebration last night was mostly commemorative of the occupation of the new village at the end of the motu, facing the boat reefing point (you couldn't exactly call it a landing point). It is a very neat little village and quite attractive while the palm frond walls and roofs are still

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The celebration last night was mostly commemorative of the occupation of the new village at the end of the motu, facing the boat tracing point (you couldn't exactly call it a landing point). It is a very neat little village and quite attractive with the palm frond walls and roofs are still

verdant. It is excessively hot today; I'm thankful for the pacing I did on the sixteenth, for it will save me about six miles of travel today as it is very nearly along a straight line. How large is the circle when three miles appears very nearly straight?

The fishing birds were hastening across the lagoon to windward southeast this morning in elongate thin layers about ten meters above the water. Occasionally a booby dropped out of rank and plunged into the lagoon, probably sighting a submarine.

Legend of map of Motu Fare and notes concerning vegetation, reef, shingle, lagoon, etc.

A. Shingle beach in shallow lagoon; depth 1-1.5 meter, with blocks of living coral scattered.

B. End of "road" at shingle beach.

C. "Cross-roads."

D. End of cross-road (Main Street old village) and shingle beach. Here the shelf of conglomerate extended forty strides; reef about sixty beyond with mostly water 1-1.5 meter deep.

E, F, G. Points along edge of conglomerate shelf. The shingle gradually closes in until at G it reaches the edge of shelf. The bush also comes down with the shingle, the outer bush being 219, the inner 220-223, and pandanus. The shelf here at G is fully twice as high above lagoon level as at D and B. Between the shelf and the reef the water is confined

verdant. It is accordingly not today; I'm thankful for the reading I did on the eighteenth, for it will save me about six miles of travel today as it is very nearly along a straight line. How large is the circle when three miles appears very nearly straight?

The fishing birds were basketing across the lagoon to windward southeast this morning in elongate thin layers about ten meters above the water. Occasionally a body dropped out of rank and plunged into the lagoon, probably alighting a submarine.

Legend of map of Kotu Bara and notes concerning vegetation, reef, shingle, lagoon, etc.

A. Shingle beach in shallow lagoon; depth 1-1.5 meter, with blocks of living coral scattered.

B. End of "road" at shingle beach.

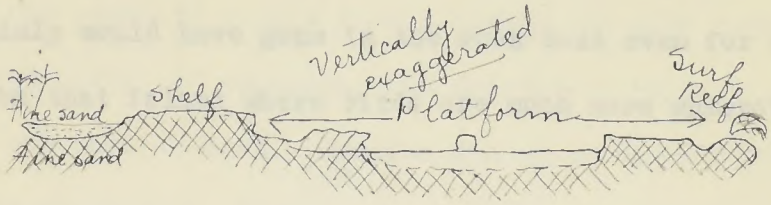
C. "Cross-roads."

D. End of cross-road (main street old village) and shingle beach. Here the shelf of conglomerate extended forty strides; reef about sixty beyond with mostly water 1-1.5 meter deep.

E, F, G. Points along edge of conglomerate shelf. The shingle gradually closes in until at G it reaches the edge of shelf. The bank also comes down with the shingle, the outer coral being 2½, the inner 450-kkk, and paukanna. The shelf here at G is fully twice as high above lagoon level as at D and E. Between the shelf and the reef the water is confined

to channels, especially one main channel along the edge of shelf from which short channels cut the coral platform seaward to the verge of the reef. Most of this platform is at present exposed but receives the flood of each wave. The sea strikes heavily here. The shelf consists of angular fragments of coral well cemented into a mass of conglomerate; beyond the channel everything appears to be living. All loose fragments apparently have been washed upon this shelf and into the shingle above it where somewhat rounded pebbles are mixed with sand. The shelf does not appear to be cemented; shingle similar to that at present here. It is, furthermore, two meters above the platform, extending from it towards the reef which is at about low (but not lowest) tide level.

Between G and H the shingle ceases. The shelf at H has somewhat the following contour. Fine sand covers most of



the conglomerate behind the shelf. In front of the shelf there are a very few loose fragments. The channel has widened out here and the reef is more continuous but still is cut with channels. The platform is higher, and from its dark gray color I judge it composed of dead coral, only the living rocks being a "dung" color. The channel bottom is clean sand, and rather finer than that upon the shelf. A small grove of coconuts here.

Proceeded to end of lane at I, and thence proceeded up it

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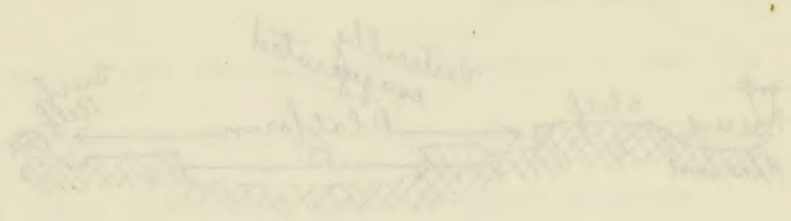
Between C and E the shingle ceases. The shelf at E has somewhat the following contour. The sand covers most of



the conglomerate behind the shelf. In front of the shelf there are a very few loose fragments. The channel has widened out here and the reef is more continuous but still is cut with channels. The platform is higher, and from its dark gray color I judge it composed of dead coral, only the living rocks being a "gray" color. The channel bottom is clean sand, and rather finer than that upon the shelf. A small grove of cocoanuts here.

Proceeded to end of lane at I, and thence proceeded up it

to a good cross lane near turtle pen, where I made a last sketching observation. Error at A was but .03 of a mile, not bad for instruments at hand! My angles on the further end of the island, however, were too far off to put down. A base of half a mile with a crude plane table is not very accurate for measuring six miles, when to get across the base you have to take 506 observations.

"Sail-oh! Botino!" Hurrah! The boys are back from their open boat journey, making the trip to and from Mopelia in one day less than half the time which the 'Pastime' required for the same trip. No wonder they call her the 'Pastime'-- that's evidently her forte. As fer adventure, it now appears that a voyage on the 'Pastime' is likely to be more interesting than the open boat journey would have been; and unfortunately we are not going to Mopelia unless for the purpose of getting a water cask (they have but one on board). Had I known that, I certainly would have gone in the open boat even for one day more on that island where birds are much more numerous than here.

January 2

Am out to map Motu Roa and search along it for blue and gray-back terns. Two of the latter flew overhead as we crossed the channel in a sail-less canoe. Homu has gone on up the lagoon with canoe and outfit. I am pacing up reef side of motu.

to a good green lake near Turtle Pond, where I made a last astronomic observation. Later on I saw not .05 of a mile, but had for instrments at hand! My angles on the further end of the island, however, were too far off to put down. A base of half a mile with a crude plane table is not very accurate for measuring six miles, when to get across the base you have to take 500 observations.

"Hail-oh! Hoiton!" Hurrah! The boys are back from their open boat journey, making the trip to and from Hopelia in one day less than half the time which the 'Seatime' required for the same trip. So wonder they call her the 'Seatime'--that's evidently her forte. As for adventure, it now appears that a voyage on the 'Seatime' is likely to be more interesting than the open boat journey would have been; and unfortunately we are not going to Hopelia unless for the purpose of getting a water cask (they have but one on board). But I know that, I certainly would have gone in the open boat even for one day more on that island where girls are much more numerous than here.

January 5

As out to sea, sets Don and sweeps along it for nine and twenty-hours time. Two of the latter flew overhead as we crossed the channel in a mad Hiss dance. Some has gone on up the lagoon with oars and outfit. I am going to lead ship of moto.

Legend of map and notes.

A. Here the shelf conglomerate is very pronounced, but only one meter or so above lagoon level. The channel between it and the reef, on what I term the "platform", is so shallow that I wade clear across without getting water in my boots thirty centimeters high. Studied the reef a few moments and noted the preponderance of calcareous, coraline algae; very few real corals present. Just within the platform channel, however, the corals proper were very noticeable. Too much credit cannot be given the coraline algae, to which at least half, and perhaps more, of this reef building is due. Thorough investigation of many reefs, and at least a very thorough study of one should be made to settle this question. But where in the world is a man who specializes upon marine algae and coralines? Those specialists are very scarce. Clearing of the brush on this motu commences today. 219 has an extent of at least one tenth of a mile from A toward the motu bush which is composed mostly of pandanus, 223 scattering through 219 and along the edge of bush. Noddies and white terns flying above bush in abundance. Three curlews just came over from Motu Fare.

B. Innermost curve of "Curieuse Bay". The shelf continues prominent about twenty meters wide barren, then covered with shingle and sand at edge of bush. Platform very even and regular as compared with that on the north of Motu Fare. Few channels cutting it seaward. Outer edge just a few centimeters, six to twelve perhaps, above water at present level.

Lagoon of map and notes.

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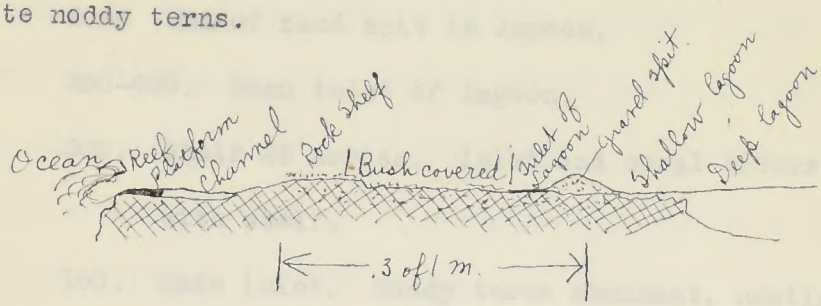
3. Innermost curve of "Curious Bay". The shelf continues prominent about twenty meters wide inside, then covered with antigia and sand at edge of beach. Platform very even and regular as compared with that on the north of Rotu Tapu. Few channels cutting it seaward. Outer edge just a few centimeters, six to twelve perhaps, above water at present level.

C. Shelf, reef and platform same as above except a little more of platform along channel blackened or dead. The bush here is but one to two meters high for two or three hundred meters inland, with occasional pandanus (224,223) trees standing three to four meters. 219 is very low towards outer edge, virtually down on the rock of the shelf, thence grading up to one or two meters at about fifteen degrees slope.

Common boobies frequent here, which is opposite their banquet near lagoon shore of motu.

D.

E. Motu very narrow here and bush only low scattering shrubs. Cross line run to gravel spit at lagoon edge and sites taken on inner side. Fourteen frigate birds in the bushes where I obtained downy young and eggs a few days ago, eight male and six female. Three males had expanded pouches. Lesser and white noddy terns.



Walking across the motu here revealed loose conglomerate of the angular blocks, gravel and sand similar to that composing the shelf. The shelf itself is about .6 meter higher than the general level of the interior motu here, which is composed as

C. Shelf, reef and platform same as above except a little more of platform along channel bleached or dead. The bush here is but one to two meters high for two or three hundred meters inland, with occasional pandanus (ESA,ESB) trees standing three to four meters. Slip is very low towards outer edge,virtually down on the rock of the shelf, thence grading up to one or two meters at about fifteen degrees slope.

Common boulder frequent here, which is opposite their banquet near lagoon shore or motu.

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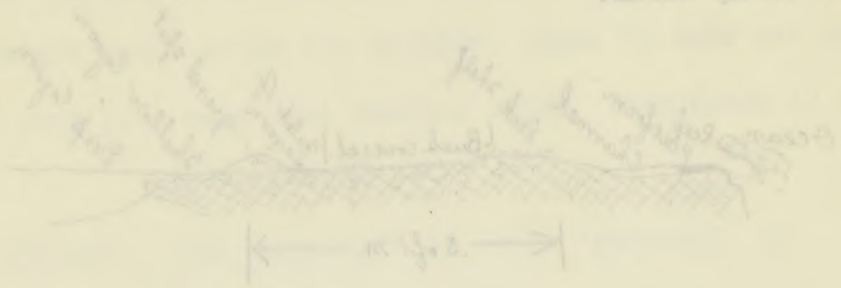

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above mentioned. These angular blocks are particularly noticeable where islets of the lagoon (very shallow) encroach upon them. The cross section on foregoing page is at E, vertically exaggerated.

I saw twelve frigate birds in a group by themselves out in the lagoon. One was carrying a fish, and the rest were following her, one or two harassing her as they do other birds. Finally she was forced to drop the morsel. Another picked it up and the performance was repeated, but when she dropped it none of them succeeded in regaining it. So they flew away in disgust.

Found a noddy downy, and later an egg on a block of coral rock about half a meter high. Started to collect, but decided to stop here tomorrow and photograph them.

F. Just beyond and inland is a rather dense grove of pandanus, but it is very small indeed.

100. Brush to shelf.

200. End of sand spit in lagoon.

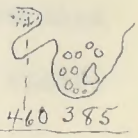
200-400. Hunu inlet of lagoon.

300. Shelf 25 across. Inlet and coral blocks level with shelf.

100. Main inlet. Noddy terns abundant, nesting upon the coral blocks. Shelf at 327-355. Only 12 strides wide from platform channel to inlet of lagoon.

385. End of deep inlet.

At 600 the tall bush reached the very edge of shelf almost three meters in. The



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E. Just beyond and inland is a rather dense grove of pandanus, but it is very small indeed.

100. Brush to shelf.

200. Mud or sand spit in lagoon.

200-400. Shum inlet or lagoon.

300. Shelf 22 across. Inlet and coral blocks level with shelf.

400. Main inlet. Moddy terns abundant, nesting upon the coral blocks. Shelf at 327-333. Only 12 strides wide from platform channel to inlet or lagoon.

500. Mud or deep inlet.

At 600 the tall bush reached the very edge of shelf almost three meters in. The

shelf lowered to about highwater level, where it continues on to beyond coconut grove.

At 530-560 there are half a dozen "mushroom" boulders on the platform in a line that hints of the wearing inward of the waves at this point. There is an unusual amount of driftwood along here, including boxes, spars and planks, which shows that currents head in here. (It was somewhere along about here that the 'Curieuse' was thrown in against the reef, but saved herself with twenty fathoms of anchor chain.)

At the coconut grove I found the boy encamped in some good huts. We lunched upon coconut wine. Frigates are soaring above us here. I just watched one with the glasses for one full minute. She was coming WNW, then swerved N and fluttered her wings once while turning--fifteen seconds. For fifteen seconds more she sailed directly into the north wind, but seemed to lower or coast down just a little; another slight movement of her left wing and she swerved off to the E x N and for thirty seconds rapidly sailed into the distance and out of sight behind bushes without so much as a perceptible quiver of a feather nor loss of altitude. How is it done?

From G to H plus 100. The shelf dips seaward as if the outer portion had been undermined and let down upon the bed of the platform channel, which is fairly deep here, and fifty strides wide. It is now high tide and fairly large waves are lapping the shelf.

shelf located 10 about 14-meter level, where it sometimes on to second coconut grove.

At 500-600 there are half a dozen "waterfrons" bordering on the platform in a line that plays of the wearing inward of the waves at this point. There is an unusual amount of driftwood along here, including boxes, spars and planks, which shows that currents head in here. (It was somewhere along about here that the 'Corlyman' was thrown in against the reef. Not saved herself with twenty fathoms of anchor chain.)

At the coconut grove I found the boy encamped in some good huts. We lunched upon coconut wine. Frigates are soaring above us here. I just watched one with the glasses for one full minute. She was coming NNW, then swerved S and fluttered her wings once while turning--fifteen seconds. Her fifteen seconds more she sailed directly into the north wind, but lowered to lower or coast down just a little; another slight movement of her left wing and she swerved off to the S x W and for thirty seconds rapidly sailed into the distance and out of sight behind banana without so much as a perceptible quiver or a feather nor loss of altitude. How is it done?

From S to W plus 100. The shelf dips seaward as it has outer portion and been undermined and let down upon the bed of the platform channel, which is fairly deep here, and fifty minutes wide. It is now high tide and fairly large waves are lapping the shore.

Apparently the solar tide predominates, but as it is now new moon the lunar would be pulling up also at present. The bush here is two to four meters high and is the same as the low flat shrub of more windward exposure. The one nearest me has a stem gnarled and knotted to excess and spread over a meter of rock into which its roots penetrate. Apparently the shelf has been cemented around those growing roots. Judging by the stump I would estimate the shrub at somewhat over one hundred years of age. There certainly are problems to be solved on these atolls.

H plus 400. The last three hundred strides have been along an irregularly indented shelf line.

300-400. The brush across islet is here low and sparse as contrasted to the tall and dense vegetation of F 500-H 300. Opposite here are two prominent coconut trees out towards lagoon end of tall bush, and two others in bush farther east. Shelf here is thirty strides wide, then covered with coarse sand. Two ridges of shelf rock exposed parallel to outer edge of shelf. Platform wider and channel deeper than formerly.

I is the inverted "mushroom" I photographed on first visit to this motu. How blind and unobservant we were not to find the nest of the common booby on its summit! We climbed half way up, as I remember,

Apparently the solar tide predominates, but as it is now new moon the lunar would be pulling up also at present. The mean mark is two to four metres high and is the same as the low flat shrub of more windward exposure. The one nearest me has a stem excited and knotted to excess and spread over a meter of rock into which its roots penetrate. Apparently the shelf has been demeaned around these growing roots. Judging by the stumps I would estimate the shrub at somewhat over one hundred years of age. There certainly are problems to be solved on these atolls.

N plus 400. The last three hundred strides have been along an irregularly indented shelf line.

300-400. The brush across islet is more low and sparse as contrasted to the tall and dense vegetation of 2 300-N 300. Opposite here are two prominent coconut trees out towards lagoon and of tall bush, and two others in bush farther east. Shelf here is thirty strides wide, then covered with coarse sand. Two ridges of shelf rock appear parallel to outer edge of shelf. Platform wider and somewhat deeper than formerly.

I is the inverted "mushroom" I photographed on first visit to this motu. How blind and unobservant we were not to find the nest of the common booby on its summit! We climbed half way up, as I remember,

but not clear to the top. Now I came up here the better to take sightings and found that the two common boobies (S. leucogastra plotus) perched on it had an egg in a nest of coarse twigs and dry leaves and grass.

From the summit of this rock, which is at least three meters high, I get a good view of the bush covering this portion of the islet. 219 is again dwarfed; 220, 221, 222 are low, 1-2 meters, and extend a hundred meters inland where the tree forms, all of which are not yet collected, take supremacy in a very close growth with the inevitable pandanus conspicuous.

Boobies (Sula piscator) are perched here and there in larger branched trees. A frigate is after one now. He is savage and pecks viciously at the bird which takes wing, croaking hoarsely. But the frigate is the master of the air and easily keeps up with his prey, catching the booby by the wing several times. But perhaps he doesn't like me, for when within twenty meters of me he gives up the chase. "Karina" is quite disturbed about my plane table being above her nest. I am not going to disturb it yet; yes, for that will be a record of their nesting on Scilly as well as Mopelia.

J. K. L. Finished the outer edge of the motu. Here the shelf was unusually wide and the platform even more so, with mushroom rocks rather prevalent on it. On

but not closer to the top. Now I came up here the better to take sightings and found that the two common boobies (S. leucogaster plotus) perched on it had an egg in a nest of coarse twigs and dry leaves and grass.

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Boobies (Sula piscator) are perched here and there in larger branched trees. A frigate is after one now. He is savage and pecks viciously at the bird which takes wing, crowding nearsely. But the frigate is the master of the air and easily keeps up with his prey, catching the body by the wing several times. But perhaps he doesn't like me, for when within twenty meters of me he gives up the chase. "Karlma" is quite disturbed about my plane table being above her nest. I am not going to disturb it yet; yes, for that will be a record of their nesting on Sofilp as well as Lopelis.

A. K. L. Finished the outer edge of the atoll. Here the shoal was gradually wide and the platform even more so, with numerous rocks rather prevalent on it. On

these rocks the common booby is wont to sit conspicuously throughout the day. At L the shelf is cut off sharply by a broad strip of lagoon coextensive with the platform channel. Half a dozen large "mushroom" rocks here, and about midway towards Motu Hunu a large bit of old shelf and then more "mushrooms" connecting with the shelf cut board from Motu Hunu show that at one time, in all probability, the islets were contiguous.

M. On the sand spit. I'm out on the end of it, taking notes. There are half a dozen sharks playing about in the shallow lagoon; they're small ones, though, but these natives are horribly afraid to tackle wading from here to Motu Hunu through water only waist deep. This sand spit is good evidence that wave washed material accumulates where counteracting currents and waves meet. Both lagoon and channel wavelets have washed little ridges along the edges of this spit head, which extends .170 of a mile towards Motu Hunu in about .1 of a mile from the edge of the shallow lagoon shelf. It is of course a continuation of the gravel lagoon shore of this motu.

The usual flock of noddies is upon it. Have stopped at the first coconut tree for refreshments. The dog is nosing about very curiously, but he's been hunting crabs for so long that he has forgotten the shearwaters, I fear. Nevertheless, I get up and

these rocks the common motif is sent to sit contemplatively throughout the day. At I the shelf is cut off sharply by a broad strip of lagoon coexistensive with the platform channel. Sail a dozen large "mushrooms" rocks here, and about midway towards John Dunn a large bit of old shelf and then more "mushrooms" commencing with the shelf out board from John Dunn show that at one time, in all probability, the islets were continuous.

K. On the sand spit. I'm out on the end of it, taking notes. There are half a dozen sharks playing about in the shallow lagoon; they're small ones, though, but these natives are horribly afraid to topple walking from here to John Dunn through water only waist deep. This sand spit is good evidence that reef wanded material accumulates where counteracting currents and waves meet. Both lagoon and channel wavelets have washed little ridges along the edge of this spit head, which extends .1VO of a mile towards rock Dunn in about .1 of a mile from the edge of the shallow lagoon shelf. It is of course a continuation of the gravel lagoon shore of this motu.

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root around among the fallen coconut and pandanus leaves in search of tubinares, but no signs whatever. Twenty-three frigate birds soaring above the lagoon. Certainly they have the secret of the air, but of course they have a far greater expanse of wing per weight than any bird I know about. There are scales at camp, and I'll try to remember to take in a couple to weigh. Flocks of sooties have been flying over all day. One I kept around me and close overhead for some time, but he was lost from his fellows and was associating at the time with low-flying noddies.

Well, my boy has some intelligence, for he met me at M with the canoe and that saves an immense amount of walking. Along the lagoon shore at the many inlets there is that shingle of sharp-edge rocks which forms the conglomerate shelf. Here, just beyond M, is a narrow place where the inlet virtually reaches across the islet but does not cross the shelf itself. Its floor is of the shingle, and, being very shallow, the water gets almost too hot to wade through. The shallow lagoon reaches out here fully one-quarter of a mile. The bush along the lagoon shore is about four to five meters high to its verge. There is invariably a beach of coarse gravel, one to two meters, between the water and the bush, except, of course, where the inlets break through the gravel beach and spread over the lagoon floor.

Along with many other things, we neglected to bring the lantern; so I am trying to get a fire built which will give some light. As we approached the shore across the corner bay at an inlet near four coconut palms, we came upon the roosting place

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Along with many other things, I neglected to bring the lantern; so I am trying to get a fire built which will give some light. As we approached the shore across the darker bay at an inlet near four coconut palms, we came upon the roosting place

of a large colony of frigate birds. I shot just to get them all into the air at once. There were at the very least two hundred, but my boy insisted upon three and was perhaps nearer right. These native woods simply refuse to give light, except, of course, coconut boughs, but they burn so fast that it keeps one busy feeding them upon the fire.

We reached camp about six and had dinner at seven. This is a very interesting camp site amongst the noddies and white terns and boobies and frigates, with a few little parakeets squeaking about. But coming in the canoe sort of upset my mapping. I'll have to measure across from the line along the outer shore at one of the low-bushed places on either side of here. I think an hour or two of plant collecting here will give me the balance of the native plants of these islets. How remarkable it is that anything grows here naturally! What was its origin? Are the seeds like the coconut,--capable of floating for long periods in the ocean and then germinating all the better for the salty bath? I picked up a wooden-coated nut today along the beach of the shelf; it had evidently been washed about at length. The kernel within appears to be perfectly sound and healthy, but one would have to plant it to determine whether or not it would grow. The wide distribution of the pandanus is very probably due to its cone of seeds floating in ocean currents.

Upon arising I went down to the beach and found the water at high tide, or just receding. Three waves just flooded the shelf while I was sitting upon a drifted block of conglomerate

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Upon arising I went down to the beach and found the water at high tide, or just receding. There were just ripples the night while I was sleeping upon a drifted block of coralinesque

upon the shelf perhaps fifteen minutes. The shingle in the lagoon inlets is at just about the level of mean high tide, or .3-.4 meters lower. The cementing of this conglomerate must take place where water, preferably warm, permeates the mass, or both along the face or reef side of the islets and on the lagoon side as well. It is a little interesting to note that the mouths of the inlets extend farther into the lagoon than the stretches of land between them. This would be accounted for in case storms sweep across the islet through these inlets, which are in most cases bordered by low bush, or, as at the one between F and H, only scattered low bush with the inlet up against the shelf itself.

Rather than the channels between islets filling and uniting the islets, Scilly presents the opposite condition. There is very little doubt that Motu Roa and Motu Hunu were once connected. Now they are separated by more than half a mile of lagoon. The inlet between F and H further shows that a portion of the islet there has been considerably torn up and disturbed. The inlet at P shows signs of carrying a considerable current or flood lagoonward. There are difficulties here to the steady progress of Darwin's theory!

upon the shelf perhaps fifteen minutes. The ruling in the lagoon inlets is at just about the level of mean high tide, or 3.-4 meters lower. The cementing of this conglomerate must take place where water, preferably warm, permeates the mass, or both along the face or rear side of the inlets and on the lagoon side as well. It is a little interesting to note that the mouths of the inlets extend farther into the lagoon than the stretches of land between them. This would be accounted for in case storms sweep across the inlet through these inlets, which are in most cases bordered by low bank, or, as at the one between 7 and 8, only scattered low bush with the inlet up against the shelf itself.

Rather than the channels between inlets filling and uniting the inlets, Solly presents the opposite condition. There is very little doubt that Nos 6 and 7 and 7 and 8 were once connected. Now they are separated by more than half a mile of lagoon. The inlet between 7 and 8 further shows that a portion of the inlet there has been considerably torn up and disturbed. The inlet at 7 shows signs of carrying a considerable current or flood lagoonward. There are difficulties here to the steady progress of Darwin's theory:

BOOK XXII.

Scilly

Voyages to
Raiatea, Bora Bora, Tahiti.

January 3-31, 1922.

January 3

A shower this morning from three-thirty until five-thirty. The "Vini", parakeet, commenced squeaking very early, at least five o'clock and has continued until six. Noddies about as thick as usual, and the little white terns abundant. Can hear the lesser noddies too. Plants this morning; eggs and young living birds and perhaps half a dozen or ten more parakeets. As my corn-meal and cotton are getting rather low I am forced to work on small birds.

Here I went out botanizing and bird hunting, and upon my return found that I had lost my fountain pen. Well, I had carried it six months anyway, and that's a record. A heavy storm came up which lasted from eight until past one o'clock. After storming myself and getting well drenched in an effort to find the pen, we decided to beat it for the village. Had to

pole and tow the canoe down the lagoon shore against the storm and got just as wet where we were not wading as below. The hob-nailed half soles are gone from my boots,--used only here at Scilly and three days at Raiatea. I can see about five, or maybe more, dollars a month gone for footwear in the Taumotus. Wading, especially in salt water and over jagged coral, is more than even Chippewa boots can be expected to stand. Tennis shoes lasted but one day and the soles are all but off another pair of rubber-soled shoes I had along.

I went over to the Boss's house and inquired about the 'Pastime', but he only smiled and shook his head. So I ate lunch and set to work skinning some parakeets and a plover I had killed this morning. At three-thirty the storekeeper came to inform me that the ship sailed at five o'clock. "Holy Pahi!" Well, I buried the remaining four parakeets in the corn-meal (a good experiment) and set to packing. At four-fifty we loaded the junk into the skiff and set out. Made a good passage of the reef into a rather quiescent sea, where we are now lolling about. How many days to Mopiti? There is no telling! Six to Mopelia (forty miles) and Mopiti is one hundred and forty miles. I'll wager that I shall have time to blow what few eggs have not popped, write data, and dry plants.

The 'Pastime' is a twenty-five ton yawl (?), two masted, and with an auxiliary engine that won't aux, or is at least "ill". Our Captain is the fellow who engineered, with the aid of Stephen, the 'Pro Patria' on our trip to Rapa last year. A cook and three sailors, one of which no doubt is mate, make

pole and for the canoe down the lagoon where against the storm and got just as wet where we were not paddling as below. The hub-nailed hair soles are gone from my boots,--used only here at Solly and three days at Matafee. I can see about five, or maybe more, dollars a month gone for footwear in the Samoetua. Trading, especially in salt water and over jagged coral, is more than even Ojibwaw boots can be expected to stand. Tennis shoes lasted but one day and the soles are all but off another pair of rubber-soled shoes I had along.

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The 'Pastime' is a twenty-five ton yawl (?), two masted, and with an auxiliary engine that won't suck, or is at least "iff". One captain is the fellow who engineered, with the aid of Stephen, the 'Pro Patria' on our trip to Apia last year. A book and three sailors, one of which no doubt is mate, make

up the crew. The passengers are myself, the dog, ten turtles, and the cargo. I stopped long enough at the turtle pen this morning to scrape three barnacles off the back of one of the turtles. They may, and no doubt will be of interest to someone. Sorry it was raining too heavily to get a picture of the coral today. By the amount of pumping that the sailor is doing the ship takes in plenty of bilge water. We are boatless, not even a skiff of any kind aboard. What wind we have is fair, and we are already out where Scilly looks low.

As we towed our canoe down the lagoon beach today during the heavy storm we saw most of the birds humped up on the bushes. A few old frigates, twenty or thirty, were soaring aloft and the common and red-footed boobies came out to look us over. I shot a white-bodied and a dark phase of the latter in hopes that there will be time to make them up before they spoil. Tried to get a heron and tatler as records, but I had put it off too long and now luck was against me. The terns were conspicuously humped up on the bush, the white ones down low in the shelter of the bushes. The noddies were higher up, and the lesser noddies were on the branched trees where they are accustomed to perch in small groups, not very close together here. Frigates and red-footed boobies scattered about on shrubs, mostly 223 and tall 219.

During the storm today with the wind westerly it was perfectly evident that this lagoon is capable of considerable waves, which pile up the gravel banks along the inner shore of the motu. The shallow part of the lagoon where we waded

up the crew. The passengers are myself, the dog, ten turtles, and the cargo. I stopped long enough at the turtle pen this morning to escape three barnacles off the back of one of the turtles. They may, and no doubt will be of interest to someone. Sorry it was raining too heavily to get a picture of the corral today. By the amount of pumping that the sailor is doing the ship taken in plenty of oily water. We are boatless, not even a skiff of any kind aboard. That wind we have is fair, and we are already out where really looks low.

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During the storm today with the wind westerly it was perfectly evident that this lagoon is capable of considerable waves, which pile up the gravel beach along the lower shore of the motu. The shallow part of the lagoon there is washed

while towing the canoe was composed of the coarse angular blocks which make up the islet. Upon them at the water's edge the gravel bank is built, and within it the bush commences. Whether or not the lagoon is filling up is doubtful, except in so far as lagoon corals grow therein as they do along the shallow portion, and the general deposition of sediment.

Some sooty terns flying and calling over the masthead. How it amuses the sailors when I mimic their call! We have a new moon to enlighten our journey. Although I was two weeks at this island I should have very much enjoyed one more to make a more thorough study of it. But while concentrating upon birds I'll have to be satisfied with these hurried glimpses as we touch and go here and there in our mad rush for specimens. Personally I think specimens without very detailed notes and life habit studies are rather insignificant. Too much natural history is determined in laboratories; never yet has enough been obtained in the field.

It was no little disappointment last night to hear not the slightest indication of a tubinares. It is odd indeed if they have totally neglected this island, but I have traversed all through the motu from end to end and around again without seeing any sign; and wherever I thought they could land or take wing I searched through dead rubbish nearby. All along the sand and gravel I watched for their tracks but no sign. I haven't much faith in the dog. All he has done here is chase crabs and fish, and play with the native children. Well, that's about all one really could expect of a terrier.

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January 4

Had some showers during the night, accompanied by a good, stiff, westerly breeze which is speeding us on our way to Maupiti. Although not feeling very energetic, I set to work and skinned the four parakeets. Rather sick all day, but later I managed to finish the four birds. Two boobies and two young noddies spoiled. Sooty terns about during night and all this morning; also three or four flocks of boobies, white and noddy terns during the day. Saw one shearwater, smaller than the Noha and white beneath. Broke out the new gun, having broken cocking lever and ejector of the old one. The ejector on the new one does not work. Too seasick to work, read, or write.

January 5

Heavy showers during the night which drove into the corners of my sleeping-bag. I shall have to put some flaps over then. Was ever anything manufactured exactly right in the line of camping equipment? As for its being water-proof, there is no doubt of that.

Blew a few eggs until showers drove us off the deck. The wind is wrong for the Maupiti pass, so we are heading on for Raiatea. To the southward of Bora Bora the wedge-tailed shearwater has been very frequent and one white-breasted bird, perhaps P. rostrata, the Noha, which the natives claim is abundant in these leeward islands. The wedge-tails are invariably heading for Bora Bora, whither I shall follow them on

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Also a few days until showers drove us off the deck. The wind is wrong for the Bangkok run, so we are heading on for Saigon. So the southward of Cora Lea wedge-tailed shearwater has been very frequent and one white-breasted bird, perhaps P. roseiceps, the Tonga, which the native claim is abundant in those Samoan islands. The wedge-tails are invariably heading for Cora Lea, whither I shall follow them on

Monday unless I receive orders from Beck otherwise. We have had the one-lunged engine running most of the day, so I've kept as far forward as possible to avoid its smells. There certainly must be some sizable colony of the wedge-tailed shearwaters at Bora Bora, no doubt upon the low islets of the reef which are characteristic of that place. We have seen at least twenty and probably thirty during the last hour. Not being able to make port tonight, the Captain has offered to pick up anything killed, even to turning the ship about,-- a rather generous offer from a native Captain. Apparently the aim is to pass Raiatea on the port; "lay to" beyond the island to windward through the night, and run in with the wind the first thing in the morning.

If the cloud banks are at their customary level, Raiatea is well above two thousand feet in elevation. On this leeward side there is at least one deep valley extending into the highest portion of the mountain. Red-footed boobies also are heading for Bora Bora from within ten miles or so of Raiatea. Apparently that is the bird island of this group. "Upoa! Upoa!" Starboard!" I got this one, and unless I'm mistaken it's the small black shearwater that I shot going on the 'Curieuse' and failed to get. I labelled this "Off Bora Bora" because it was flying towards that island along with all the others observed, except the white-breasted one, although they were nearer the islands of Raiatea and Taahaa. Two of the nestlings were still alive, so I also made them up.

A few light showers in the night but nothing to bother

Sunday unless I receive orders from Jack otherwise. We have had the one-hinged engine running most of the day, so I've kept as far forward as possible to avoid its smells. There certainly must be some sizable colony of the wedge-tailed shearwaters at Sora Sora, so goods upon the low islets of the reef which are characteristic of that place. We have seen at least twenty and probably thirty during the last hour. Not being able to make port tonight, the Captain has offered to pick up anything killed, even to turning the ship about,--- a rather generous offer from a native Captain. Apparently the aim is to pass Malaites on the port; "lay to" beyond the island to windward through the night, and run in with the wind the first thing in the morning.

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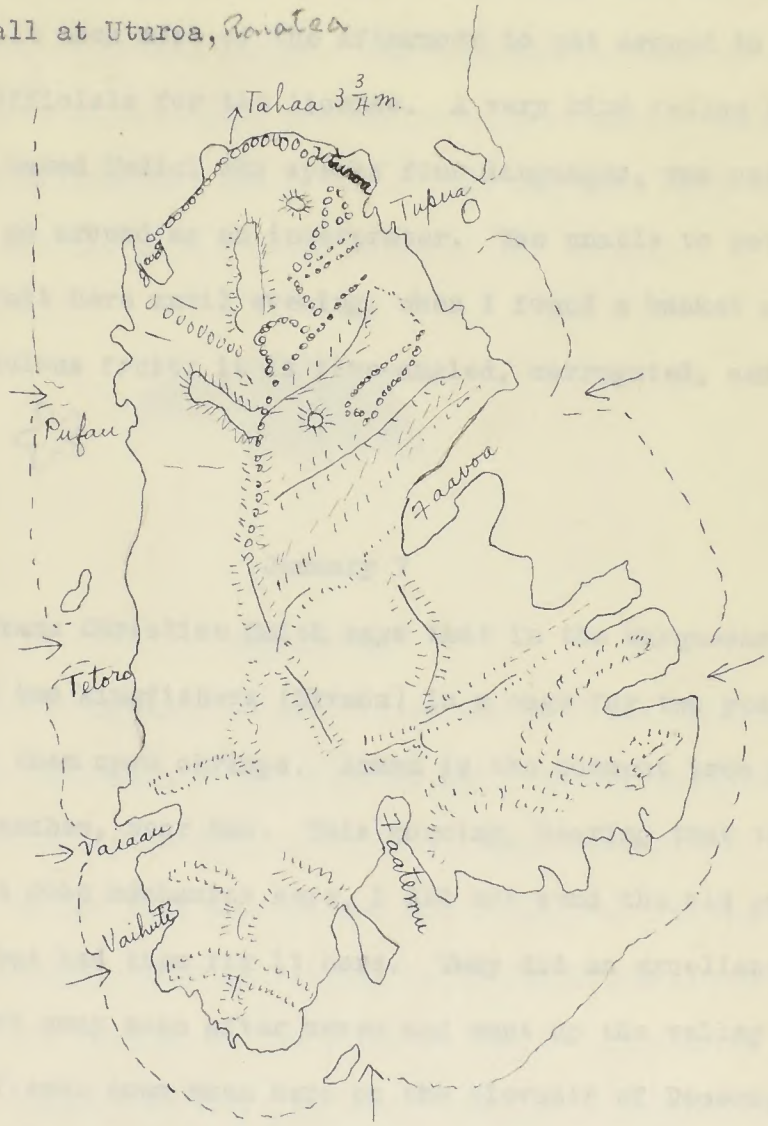
A few light showers in the night but nothing to bother

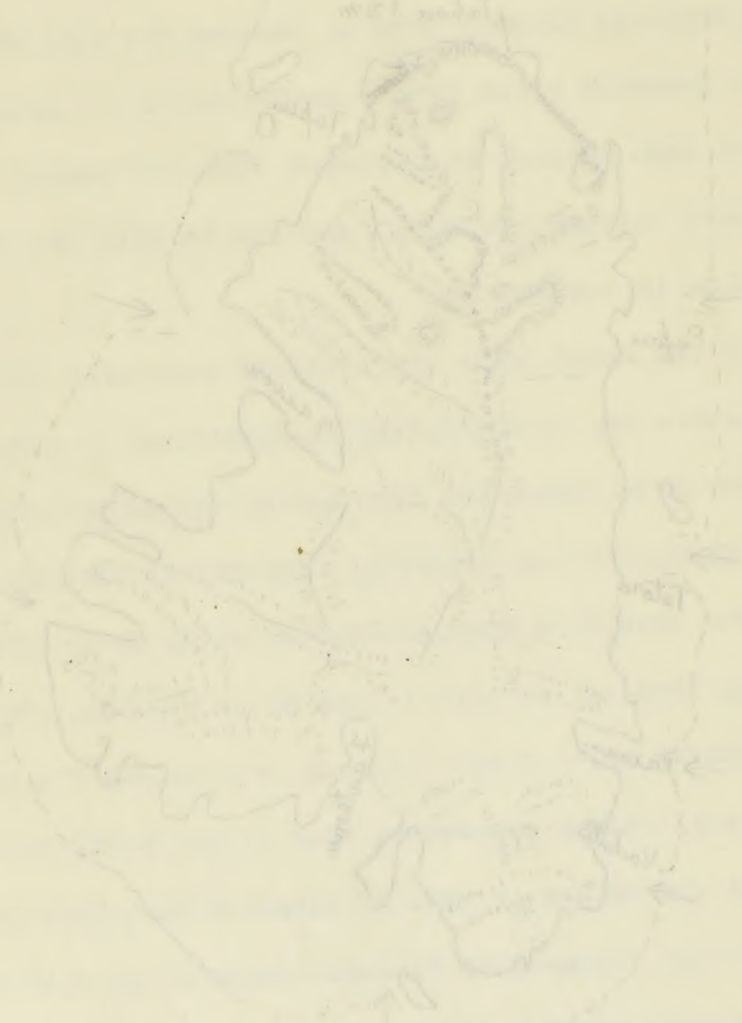
about. We "lay to" till morning as it would be wholly impractical to try the pass and lagoon channel by the falling dusk of evening. Surely Bora Bora will be a good field for shearwaters; I hope there is some good sand for skinning.

January 6

The following is a hurried copy of a huge map on the hotel wall at Uturoa, Raiatea



Raiatea



I am spending the day going from one official to another in an attempt to get my permit extended for this year. My mail has preceded me to Bora Bora. News has it that the 'Curieuse' left here for Tahiti day before yesterday; I guess the 'Pastime' will have the laugh on them all right. Thirteen and a half days from Scilly! That was a long trip indeed.

Obtained license and took care of plants and packed birds. It took most of the afternoon to get around to the proper officials for the license. A very kind fellow here, an Italian named Medici who speaks four languages, was only too glad to go around as an interpreter. Was unable to get any fresh fruit here until evening, when I found a basket of a new acidulous fruit; it is five-angled, corrugated, and very juicy.

January 7

Franz Christian Smith says that in the Marquesas his aunt had two kingfishers (Hivaoa) in a cage for two years and they fed them upon shrimps. Amanu is the coconut tree with three branches, near Hao. This morning, hearing that there were some good mechanics here, I did not send the old gun to Tahiti; but had them fix it here. They did an excellent job.

Got away soon after seven and went up the valley beyond the one I came down when here on the eleventh of December. It is the valley of the waterfall which is seen to the left of the table mountain or mesa opposite the two islet entrance. A boy went along with me; he is a fine young chap and talks English well.

I am expecting the day going free one official to another in an attempt to get my permit extended for this year. My visit has prevented me to form more. Here has it that the 'Quirosa' left here for Tahiti day before yesterday; I guess the 'Pacific' will have the laugh on them all right. Thirteen and a half days from Sollly! That was a long trip indeed.

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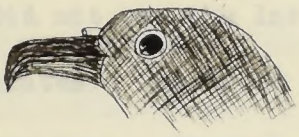
Got away soon after seven and went up the valley beyond the one I came down when here on the eleventh of December. It is the valley of the waterfall which is seen to the left of the large mountain or hill opposite the two islet entrance. A boy went along with me; he is a fine young man and talks English well.

We obtained five doves by shooting some heavily with large shells. Saw but two kingfishers and obtained them. Burst into a flock of chickens and got one out of the air, then missed a running shot. Later I flushed several single fowls and heard some young chicks and roosters. The dog works well enough in cold, mountainous country, and surprised me decidedly by almost drawing a goat by his own efforts. She had a very young kid, so we let her go. Had a difficult time getting the dog to give up. Nothing new and no sign of rail. Made up birds in afternoon. The father of the boy gave me some mango pie and all the milk I could drink at our return.



January 8

The young frigate died today and so I was obliged to break the Sabbath and take care of him. Met J. Ralph Hart, of whom I had frequently heard as a famous hunter. Of chief interest is the fact that he and his family are responsible for the several names in bottles in the upper cave (large rock) of the Papenoo on the Vaihiria trail. He informs me that the Omamau (warbler) is here; that his old bird dog once captured a rail; that he once killed two ducks, smaller than the common ones and with more spoon-like bills; that he has seen chickens killed by the kingfisher; that the hawk is

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rapidly diminishing the ducks; that I'll find no birds high on the mountain, but that the "Tiare Tahiti" is only half a flower up there, and other less important things. I am to have his boy to guide me to the highest summit to sleep overnight Tuesday. We are now speeding across the lagoon to Tahaa in his motor boat with which he and his family came from Huahine this morning in three and a half hours. Yellow-bill terns on the reef-stakes all the way across. Lesser noddies crossing the lagoon in low characteristic flight.

Plenty of decomposed lavas are forming red soil ridges on this side of Tahaa. I took a short run up into the nearest bay, undoubtedly a drowned valley, and found doves and a kingfisher there. Did not see the latter but their call sounded exactly as at Raiatea. The doves look the same. The rail is also reported from here. Several yellow-bills along the lagoon shore. Natives had a young white tern nestling. We chewed some sugar-cane before leaving. Yellow-bill terns on most of the stakes and two stranded tree stumps near which we passed. On a floating buoy was a gray-back tern. We got very close before he flew and there is no doubt as to its being Onychoprion lunata.

January 9

The hotel proprietor, M. Medici, and I arose at four A. M. this morning and have hiked out at least six or seven kilometers to some sloughish bays where ducks are supposed to be found sometimes. We found nothing but plovers and tatlers. Crossed intervening ridge to second bay. Am sitting on the

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ridge waiting for them. Saw a small, light colored bird fly over the ridge, and from its call and flight I think it is but the yellow weaver bird, brought in, perhaps, as at Tahiti. The most important note here, and one we are wont to neglect is that the country is as thoroughly over-run with the myna (Acridotheres tristis) as is Tahiti. At Tahaa also they were more than abundant.

I have informed my fellow huntsmen of my intention to return over the mountain. Here there are numerous gently graded, reddish-soiled, fern-covered ridges ascending to the backbone of the island at about one thousand feet. They are at that stage of erosion where the valleys are broadly shaped, and the ridge tops undulating. The rock in situ is a bluish volcanic which weathers rapidly into dull clayish soil, which is frequently tinged red by iron contents. The ferns here, where not burned off, are but knee high and offer no trouble to climbing. Fortunately, lantana is not present. There is a tall coarse grass here, upon the seeds of which the yellow weaver birds (which are very abundant) seem to be feeding.

On a point commanding two well wooded vales I have stopped to rest and observe. Doves and kingfishers, chickens, myna, and the yellow weaver birds are heard. Not much flying around. It is very odd that the doves here and in Tahiti and Moorea do not sport in the air over these ridges as the birds in the Marquesas Islands do. Still, hawks being present forty years would begin to have an effect upon the birds selected to meet the new environment of an aerial enemy. Bamboo thickets

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in left vale but no sign of warblers. Heard two cats "meowing". Rain is imminent.

Over a knob-hill and down into the broad head of a ravine filled with a growth of guava, where myna birds are exceptionally thick. They eat the fruit, but I have found none at present that are ripe. Along the divide between two ravine heads, or one head and another side ravine; here is a rock wall of old age and rather tumbled down and overgrown; nothing noticeably important concerning it. The other ravine was some hundred feet deep, very steep and well wooded with sizable trees. Obtained two kingfishers here, and while confabbing with doves shot a hawk that circled down within range. Later I was whistling for cuckoo when a second hawk came overhead, but didn't get him. Evidently they are all ears for birds here.

Up out of the ravine after a brief struggle with the "ieie", or climbing pandanus, and up the ridge towards the so-called Plateau Temehani. A small grove of puro and other trees affords a brief rest in welcome shade. Although mostly cloudy, the sun is fearfully hot when it does shine. In an attempt to locate the trail on which I slept before, I cut up too high and got into some bad brush. Retreated down valley and found later that it led into the one I followed down last trip. Heavy showers frequently this morning. Saw three lone roosters but could not get good shots at them. It is strange that there are not more hens about.

Obtained another kingfisher, and while following down stream with the dog just ahead of me we flushed one from the

in left vale not no sign of warblers. Heard too late "meowing". Rain is imminent.

Over a knob-hill and down into the broad head of a ravine filled with a growth of ferns, where open glades are exceptionally thick. They set the fruit, but I have found none at present that are ripe. Along the divide between two ravine heads, or one head and another side ravine; here is a rock wall of old age and rather tumbled down and overgrown; nothing noticeably important concerning it. In other ravine was some hundred feet deep, very steep and well wooded with sizable trees. Obtained two kingfishers here, and while overlooking with dove shot a hawk that circled down within range. Later I was waiting for cuckoo when a second hawk came overhead, but didn't get him. Evidently they are all onto for birds here.

Up out of the ravine after a brief struggle with the "lake", or climbing pandanus, and up the ridge towards the so-called plateau Tacoma. A small grove of pine and other trees afforded a brief rest in welcome shade. Although mostly cloudy, the sun is fearfully hot when it does shine. In an attempt to locate the trail on which I slept before, I got up too high and got into some bad brush. Retreated down valley and found later that it led into the one I followed down last trip. Heavy showers frequently this morning. Saw three lone roosters but could not get good shots at them. It is strange that there are not more hens about.

Obtained another kingfisher, and while following down stream with the dog that shoot at me we flushed one from the

ground alongside the creek. It lit in low branches and held a prawn in its beak. I was loaded for chicken, and ere I could put the auxiliary barrel in the gun the dog moved and scared the bird away. But there was no mistaking that prawn, which was about five or six centimeters in length.

Proceeded on down canyon, with a side trip after crowing rooster, but he got into deep bush. Picked up tatler along beach. The duck hunters had tatlers, one plover, and two reef herons, white and blue, so I have plenty of work especially with a headache and sore eyes to contend with. They tell me here that some peacocks brought into this island some time ago are now wild up in one of the valleys, destroying fruit. A hunt is planned for Saturday.

January 10

Off at four-thirty with my boy guide who takes me to his home for a cup of tea before starting. There another lad joins us, the first ten years and the second thirteen,--that age of energetic youth which knows no fatigue. Ascended from there to the ridge nearby at five hundred feet elevation and proceeded along its broad (100--300 meters), gently graded top (A to B) for twenty minutes without stops and reached an elevation of one thousand feet. There is a grass here that is very common in places excluding everything else except occasional clumps of ferns. Cliffs on either side the ridge but not very high ones. No birds.

The backbone of the island descends from plateau Temehani

ground alongside the creek. It lit in low branches and held a crown in its beak. I was loaded for eiderdown, and so I could put the auxiliary barrel in the gun the dog moved and scared the bird away. But there was no mistaking that crown, which was about five or six centimeters in length.

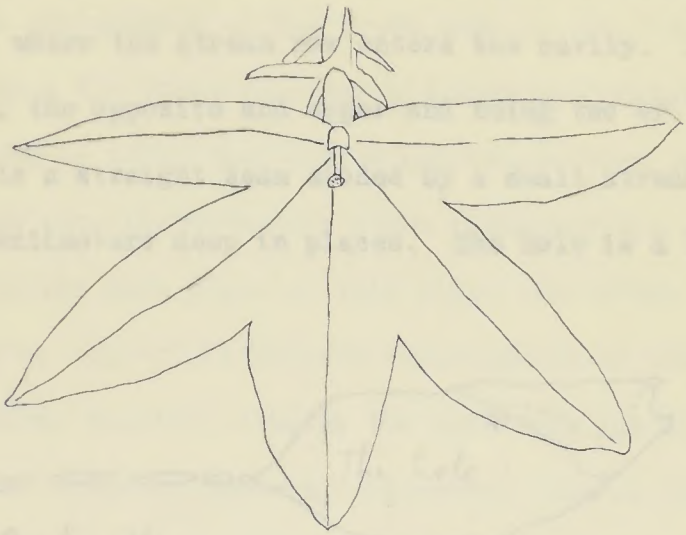
Proceeded on down canyon, with a side trip after crowing rooster, but we got into deep brush. Picked up tailer along beach. The duck hunters had tattles, one plover, and two reef herons, white and blue, so I have plenty of work especially with a headache and sore eyes to contend with. They tell me here that some peacocks brought into this island some time ago are now wild up in one of the valleys, destroying fruit. A hunt is planned for Saturday.

January 10

Off at four-thirty with my boy guide who takes me to his home for a cup of tea before starting. Three another lad joins us, the first ten years and the second thirteen,--that age of energetic youth which knows no fatigue. Ascended from there to the ridge nearly at five hundred feet elevation and proceeded along its broad (100--300 meters), easily graded top (4 to 5) for twenty minutes without stops and reached an elevation of one thousand feet. There is a grass here that is very common in places excluding everything else except occasional clumps of ferns. Cliffs on either side the ridge but not very high ones. No birds.

The backbone of the island descends from plateau Tenahani

to 850 feet, just below where I crossed over yesterday. From there we ascended to eighteen hundred feet where we found the first tiare a petahi, which does indeed resemble the tiare Tahiti cut in half. The corolla is a long tube with five petal-like serrations in the flare all on one side.



To the east is a broad valley head of several ravines bushed by pandanus and "ieie". Along the ridge we have often met with exposed rock which has a very slippery, grayish clay surface. Most of the ridges are a reddish volcanic with scattered loose fragments of rough volcanic rock that has resisted weathering. When broken this is usually a pinkish gray. Blue clay is found in situ with specks of brown and red, and crystals which would barely scratch the knife blade.

Have seen five hawks (one pair) and found a dung pile composed of rat fur, small white feathers like those of the

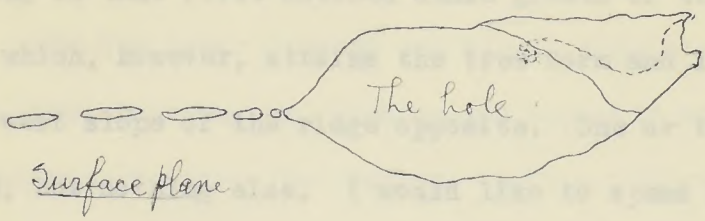
to 500 feet, just below where I crossed over yesterday. From there we ascended to eighteen hundred feet where we found the first flare a pretty, which does indeed resemble the flare shown out in Ariz. The corolla is a long tube with five petal-like extrusions in the flare all on one side.

To the east is a broad valley bound by several ridges washed by pendanos and "isle". Along the ridge we have often met with exposed rock which has a very slippery, greasy clay surface. Most of the ridges are a reddish volcanic with scattered loose fragments of rough volcanic rock that has resisted weathering. When broken this is usually a pleasing gray. The clay is found in site with spaces of brown and red, and crystals which would barely scratch the knife blade.

Have seen five hawks (one pair) and found a dung pile composed of rat fur, small white feathers like those of the

white tern, and bones. Nothing but a few clumps of feathers were there, not sufficient to identify the bird eaten.

At 2050 feet we came to the Lost Creek, a very small stream--barely a trickle--which falls into a hole which is about three or four meters wide and eight or ten long. There still remains evidence of the stream's having formerly flowed over the rock surface across the long axis of the hole, and opposite where the stream now enters the cavity. Here below the hole, the opposite and upper end being two or three meters higher, is a straight seam eroded by a small stream of water twenty centimeters deep in places. The hole is a little more



than twice as deep as it is long, or at least sixteen meters. Ferns and moss cling to the sides of the hole below, and shrubs hang over the brink for two or three meters. How strikingly different is the vegetation here from that at Tahiti! The pandanus groves I mentioned are certainly interesting in being composed of a variety of that tree I have not seen elsewhere. They seem to prefer moist boggy soil, which is abundant on this clayey hill. The brush is barely knee high along the trail since we got above the grass belt. It is composed of several bushes and shrubs that I have not seen elsewhere.

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At 5000 feet we came to the last Grass, a very small stream--merely a trickle--which falls into a hole which is about three or four meters wide and eight or ten long. There still remains evidence of the stream's having formerly flowed over the rock surface across the long axis of the hole, and opposite where the stream now enters the cavity. Here below the hole, the opposite and upper end being two or three meters higher, is a straight seam eroded by a small stream of water twenty centimeters deep in places. The hole is a little more

than twice as deep as it is long, or at least sixteen meters. Ferns and moss cling to the sides of the hole below, and shrubs hang over the brink for two or three meters. Now strikingly different is the vegetation here from that at Tamiti! The pandanus groves I mentioned are certainly interesting in being composed of a variety of that tree I have not seen elsewhere. They seem to prefer moist boggy soil, which is abundant on this clayey hill. The brush is barely knee high along the trail since we got above the grass belt. It is composed of several bushes and shrubs that I have not seen elsewhere.

That hole seems to be the chief attraction up here, for there the trail ends. We went on a little further endeavoring to get up on the hill above, but found the pandanus in groves impenetrable in spite of its lowness; so we ate our lunch and are now returning. There is a heavy fog anyway, and no indications of proper conditions for shearwater burrows. The boys are greatly amused by the field glasses.

We are pausing at the lower edge of the fog belt. How sharply does the ridge vegetation denote the change of environment! Here is still that varied and interesting low bush, and there less than thirty meters below commences the grass and dry ferns. On the east slope of this ridge and in the valley head adjoining is that first noticed dense growth of the dwarf pandanus, which, however, attains the tree form and is rather high on the west slope of the ridge opposite. One or two more hawks noticed, but nothing else. I would like to spend a night where I could listen in near one of these pandanus thickets. They appear to be ideal rail territory.

Seeing two tropic-birds (yellow-billed) flying about some cliffs, I descended the point to its verge and am trying to decoy them over a place where they can be picked up. Here are two more close enough to recognize all their characteristics and even to shoot but not to get afterwards. With time to kill here, I shall revisit this place and perhaps sleep above these cliffs. This is that valley flowing west which makes the northernmost pass on that side, Pufau. It is rimmed with cliffs on this south side, over which are some neat little waterfalls.

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Ironwood tree above the cliff.

I tried to get the boys to cut down a valley with me, but since they were determined to stick to their ridge trail home I parted company with them at the lowest swale in the ridge and took a fork leading into the creek descended yesterday. Had a very pleasant run for a hundred feet or so through nothing but grass which tripped me up when I struck a patch that was tangled and over my knees. The first place I struck was a swale rather flat-floored and wooded with puro, forming a very pleasant grove and open. A trail led out of it over a small ridge where the fern-brake was breast high, and thence into a maupi grove. The maupi have since been rather continuous. Flushed a young chicken when first I struck stream. The dog later flushed one bird I didn't see. The next, a reddish brown hen, fled up the opposite bank and then took wing openly across the ravine. Only a very poor shot could have missed her. Heard three kingfishers but have been unable to locate any of them. Am some way down yesterday's stream where a dry swale of puro comes in from the right. Up there a hen is cackling. Away!

Picked up one kingfisher and three doves just before reaching the plantations. One was tailless, and when I ripped her skin badly I threw her away. One was a laying bird, which seems rather late in the season. The two males appeared to be past breeding, their organs being dark colored and not overly large.

I forgot to note that the stomach of the hawk

ironwood tree above the cliff.

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8

I forgot to note that the stemson of the same

was completely empty, with not a vestige of food in it and none noticeable in the intestines.

The little parakeet from Scilly died this evening. He had lost entirely that thick layer of fat which characterized all the other birds taken. Having lived upon the blossoms of an atoll, he apparently could not find sustenance on those from here, including coconut flowers (?).

January 11

Had intended taking in the big fishing event of today, but hearing late last night that a boat,--Peters Brothers',-- was going around to "Upoa" (?) valley, I requested permission to go along and was granted the privilege. It was in that valley that J. R. Hart saw the warbler and any number of kingfishers which he wants killed because of their destructive (?) habits. They shoot them with a .22 for amusement because they think they kill the chickens. In the future if they find certain beetles killing coconuts or destroying other trees they will wonder where the pests came from. How little certain men understand the nice balance of nature!

The natives here also claim that the hawk destroys the kid goats, but I certainly doubt that. It is far more likely that native dogs go hunting of their own accord, and during the night or day get the kids. Certainly this island, with its wealth of grass-covered hills (if the grass be edible) should support and be over-run with goats, as is Rapa. There is more grass here than anywhere except at Rapa of the islands

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Summary II

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which we have thus far visited. There is a sedge which grows in the fog belt and just below it quite extensively. Yesterday the mechanics fixed my Papeete gun and I rebroke the Union. Today being a holiday, they will not work, and, besides if the ship comes today, I'm taking passage upon it. It is expected by some Chinamen here that it will go to Bora Bora, but the limited equipment will not permit my remaining there over the doubtful and unknown time between vessels. I will ride over, however, with the hopes of picking up some more shearwaters.

No one here seems to know anything about any kind of shearwaters, and, as I have seen none about, I have made little effort to find them. There is a flock of tame pigeons about this wharf; I counted thirty of them. In a land so rich with food why doesn't the pigeon run wild and hold its own against all enemies?

J. R. Hart informs me that the valley wherein I have obtained the two hens was stocked with tame chickens which have interbred with the wild. This explains the Plymouth Rock gray killed Saturday and the off-colored one yesterday. The roosters seen have all four been of the reddish brown variety.

Half a dozen terns are perched upon the log float off this wharf. I request that we go out, and am rewarded. One bird I get as we pass the float and two more from the air, for they are gray-backed and small; they may be O. lunata in juvenile plumage, but I hardly think so. All six were the same, no yellow-bills being with them. We are now stopping at the wharf at Tupua valley, the small one I ascended when here in December.

which we have come for visited. There is a ledge which grows in the fog belt and just below it quite extensively. Yesterday the woodsmen fixed my Paperete gun and I recovered the Union. Today being a holiday, they will not work, and, besides if the ship comes today, I'm taking passage upon it. It is expected by some Chinaman here that it will go to Sara Sara, but the limited equipment will not permit my remaining there over the doubtful and unknown time between vessels. I will ride over, however, with the hope of picking up some more shearwaters.

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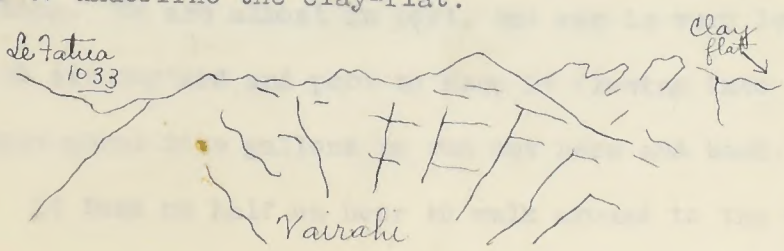
There are at least a dozen little white terns flying about the mango trees.

What signify the islands which flank the passes of a barrier reef such as this at Raiatea Tahaa? Is it not the very best of evidence that islands are built up where conflicting currents meet? Here the waves and tide battle against the outflowing current from the lagoon. From the mountain yesterday I noticed particularly that islets flanked several of the passes into the reef. At Moorea, however, the leeward motu are not near a pass of any kind. There we have an opposite phenomenon from that of Scilly and Mopelia, where the motu are on the windward portion of the reef.

The place where we stopped yesterday appears, from here, to be as it looked between fogs, a rather flat-topped mountain; a large block of that grayish, fine grained volcanic rock with its clayish surface. It is flanked on this face by a steep cliff (not vertical) some few hundred feet in height; then a timbered slope and another steeply inclined and brush-covered jump off into the large open valley below.

Vairahi is a still wider valley surrounded above by a knife-edged ridge totally unlike the clay-flat to which it is connected by a series of sharp ridges and ravines. Here the strata (?), probably of lava, can be seen dipping northward so as to underline the clay-flat.



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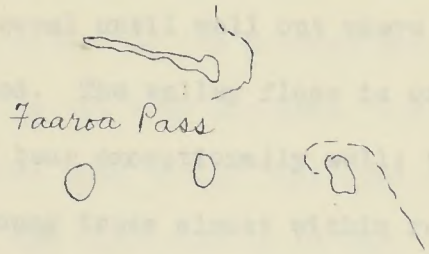
What signify the islands which flank the passage of a barrier reef such as this at Malaiba Cumaat? Is it not the very best of evidence that islands are built up where conflicting currents meet? Here the waves and tide battle against the outflowing current from the lagoon. From the mountain yesterday I noticed particularly that islets flanked several of the passes into the reef. At Moorea, however, the lagoonal moln are not near a pass of any kind. Here we have an opposite phenomenon from that of Bailly and Nepalis, where the moln are on the windward portion of the reef.

The place where we stopped yesterday appears, from here, to be as it looked between Toga, a rather flat-topped mountain: a large block of that grayish, fine grained volcanic rock with its clayish surface. It is flanked on this face by a steep cliff (not vertical) some few hundred feet in height; then a timbered slope and another steeply inclined and grass-covered jump off into the large open valley below.

Yairahi is a still wider valley surrounded above by a knife-edged ridge totally unlike the clay-flat to which it is connected by a series of sharp ridges and terraces. Here the strata (?), probably of lava, can be seen dipping northward so as to underline the clay-flat.

Avera is a deep cirque-like valley in front of the mountain, Tefatua, which is south of the above and connected to it with a swayback. Avera is quite crater-like in appearance, with low walls on the east side.

Next is the drowned valley of Faaroa with its low-lying hills beyond, and a considerable swamp in the arena-like valley at its head. From the general appearance of the island thus far I would judge it to be a great volcano with perhaps several craters at about this locality. The slope of the mountains from this highest Tefatua to the end beyond Uturoa is that of flowing lava; while this face of the hills is next thing to vertical.



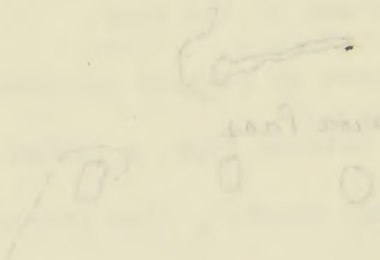
Here again are the islets on either side of the pass. Here have been noddy terns on rocks along the fringe shelf at several places. White terns are flying about a great deal but not overly abundant. The reef extends far out beyond this pass. Here is a small knoll of coral on exposed blocks, on which are some twenty odd noddies and one yellow-bill.

I am to have four hours of hunting, which should net me something. We are almost in port, but gas is very low and we have to sit for'ard and port to keep it flowing into the engine. It takes about five gallons to run out here and back.

It took me half an hour to walk around to the valley

Avera is a deep crater-like valley in front of the mountain, Tarawa, which is south of the above and connected to it with a sandspit. Avera is quite crater-like in appearance, with low walls on the east side.

East is the drowned valley of Ferron with its low-lying hills beyond, and a considerable swamp in the crater-like valley at its head. From the general appearance of the island thus far I would judge it to be a great volcano with perhaps several craters at about this locality. The slope of the mountains from this highest region to the sea beyond Tarawa is that of flowing lava; while this face of the hills is most lying to vertical.



More again are the islets on either side of the lagoon. Here have been muddy terrs on rocks along the fringe small at several places. White terns are flying about a great deal but not overly abundant. The reef extends far out beyond this lagoon. There is a small knoll of coral on exposed blocks, on which are some twenty odd noddies and one yellow-bill.

I am to have four hours of hunting, which should not be something. We are almost in port, but gas is very low and we have to alt for'ard and port to keep it flowing into the engine. It takes about five gallons to run out here and back.

It took me half an hour to walk around to the valley

"Upoa"; so I had but two hours for hunting as we set twelve instead of one as sailing time. But that means one for natives; Vahine Hart set the hour ahead, and now at one o'clock we have waited an hour for her. Quite a load of people are going up, three men and one other woman. With two auxiliary sails of a kind we should make fair time going up. There is another motu along the reef, and apparently at a pass. ("Yes!" says a native near me.)

Upoa valley is thoroughly planted and well kept. It is a very level floored valley, as is also the one between it and Faaroa. Streams flooded inland considerable distance; end of bay very shallow and filled with miry sediment and black muck; no coral until well out where deep clear water of lagoon is reached. The valley floor is of a very rich clay soil. Coconuts bear exceptionally well; there are plenty of large nuts on young trees almost within reach of gun. Oranges here are ripening; always a welcome treat is the first orange of the season. Vanilla does well,--a tinto was sorting some in the store where we lunched.

I found the noddy (Anous stolidus pileatus) and the white tern (?) very plentiful flying above the trees in this valley. Heard a few doves and three kingfishers down near the road. I missed a shot at the latter on the wing, and hastened on up valley in search of the reported warblers. There is ample room for two or three days of hunting here, and I have but two hours! I succeeded in getting up beyond plantations to the native woods but found nothing there during the fifteen or

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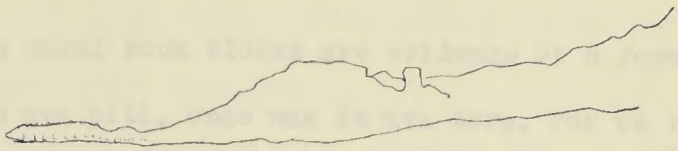
twenty minutes spent calling and listening.

Upoa valley is identified by a "plum pudding" rock sitting on the ridge beyond the valley. It is an extensive vale reaching well up under the large mountain at this end of the island,-



the south rim of the great crater(?). One motu off pass Faaroa is situated half way betwixt the reef and the island; it is a small one. There is a very interesting bank of clouds extending from Huahine to the highest mountain of Raiatea, while elsewhere, save in the very distance, the sky is intensely blue. The mountain above Upoa valley just penetrates a mass of cloud about it, while the clay-flat is in fog. I believe it is that clay-flat around the hole which bears the name Temehani, which on my map outline, page 92, I have placed along the lower portion of the ridge to the north. The Tiare Apetahi is said to be confined strictly to that locality, so if it be a new species it should be named "Temehaniensis".

I am informed that the cloud bank often extends in this peculiar manner from Huahine here and that it is a sign of rain. There is another bank extending from Huahine to Taha; and I would not be surprised if a third one which passes behind Tahaa does not extend to Bora Bora. It is strikingly brought to notice here how mountains attract clouds.

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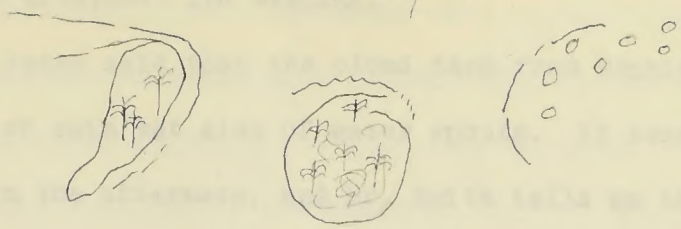
Upoa valley is identified by a "plum pudding" rock sitting on the ridge beyond the valley. It is an extensive vale reaching well up under the large mountain at this end of the island.-

the south rim of the great crater(?). One mote off Pasoa Pasoa is situated half way between the reef and the island; it is a small one. There is a very interesting bank of clouds extending from Tuahine to the highest mountain of Nalotea, while elsewhere, save in the very distance, the sky is intensely blue. The mountain above Upoa valley just penetrates a mass of cloud above it, while the clay-flat is in fog. I believe it is that clay-flat around the hole which bears the name Temamai, which on my map outline, page 22, I have placed along the lower portion of the ridge to the north. The Tiare Apetahi is said to be confined strictly to that locality, so if it be a new species it should be named "temamaiensis".

I am informed that the cloud bank often extends in this peculiar manner from Tuahine here and that it is a sign of rain. There is another bank extending from Tuahine to Tuna; and I would not be surprised if a third one which passes behind Tuna does not extend to Tore Tore. It is strikingly brought to notice here how mountains attract clouds.

te ava piti



If the coral rock blocks are evidence of a former island, this pass, te ava piti, once was te ava toru, for on the south reef of the pass are several blocks of rock.

We are now out from beneath the cloud bank and have a very noticeably heavier breeze. Is there a belt of calms extending along those banks of clouds?

Two white herons over on motu piti. Down at Upoa I saw several blue ones, an interesting color variation. A native explained the lack of white birds at Tahiti by the natives taking all young birds and old ones obtainable for their feathers to make fish hooks. Does this not also explain why the white birds are more wild than the blue, a very noticeable thing? As for Tahiti, Natural Selection no doubt has greatly eliminated the tendency to breed white because those tending to breed blue were left to breed by that arch enemy of all nature,--mankind.

Arriving at the wharf only an hour and a half after leaving, a distance of nine miles at least.

Out on the spar-float are more gray-back (not O. lunata) terns, and Peter is kind enough to go over there with the boat. I loaded both barrels with tens, and as we came in line with the spar at a perfect range I tried to pull both triggers. The choke-bored barrel got all eight of the birds on the spar,

If the coral rock blocks are evidence of a former island, this pass, to avu pitt, once was to avu tere, for on the south reef of the pass are several blocks of rock.

We are now out from beneath the island bank and have a very noticeably heavier breeze. Is there a belt of calms extending along these banks of clouds?

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Arriving at the wharf only an hour and a half after leaving, a distance of nine miles at least.

Out on the spur-float are more grey-back (not G. Impula) terns, and water is kind enough to go over there with the boat. I loaded both barrels with tens, and as we came in line with the spur at a decent range I tried to pull both triggers. The choke-bored barrel got all eight of the birds on the spur.

greatly amusing the natives and giving me a good lot of work for the afternoon and evening.

Peter said that the cloud bank from Huahine was not only a sign of rain but also of water spouts. It became very black later in the afternoon, and Mr. Smith tells me that five water spouts (two very large ones) passed within plain view. Dog-gone it! I must have been busy.

The 'Florina' arrived this evening, but the 'Moana' left an hour or so earlier and she got the mail. Beck told the Captain that he had written me, via 'Moana', to return because he is waiting with our schooner. So I'm aboard in the morning and off for Bora Bora. One night with the Upoa! Is it worth it?

Was unable to make any speed on the terns, most of which were shot through the head, and consequently required a little washing. How fortunate to get ten terns without any blood on the white breasts! Packing required considerable time, and so I had less sleep this night than any of the last week. Was unable to get yellow weaver birds and one dove skinned.

January 12

Patio is the hooked-bill at Tahaa. The doves at the dock peck rice from the mat bags in which the Chinamen receive it. Up at five and finished packing and got aboard ship with time to spare and only forgot the dip-net. We got away before eight. The other passengers are a Chinaman, a middle-aged, and a young vahine who is about as neat a girl as I have seen anywhere in these islands,--the woman of a Chinaman, so I am told.

greatly amusing the natives and giving me a good lot of work for the afternoon and evening.

Peter said that the cloud bank from Bualiha was not only a sign of rain but also of water spouts. It became very black later in the afternoon, and Mr. Smith tells me that five water spouts (two very large ones) passed within plain view. Gorgeous!! I must have been busy.

The 'Florina' arrived this evening, but the 'Noana' left an hour or so earlier and she got the mail. Jack told the Captain that he had written me, via 'Noana', to return because he is waiting with our schooner. So I'm aboard in the morning and off for Bora Bora. One night with the Goat! Is it worth it?

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January 12

Patio is the hooked-bill at Nanaa. The doves at the door pass rice from the nest bags in which the Chinaman receive it. Up at five and finished packing and got aboard only with time to spare and only forgot the dip-net. We got away before eight. The other passengers are a Chinaman, a middle-aged, and a young native who is about as neat a girl as I have seen anywhere in these islands,--the woman of a Chinaman, so I am told.

They seem to like the tinto far better than the white man. Well, who could like a conceited race anyway? One who looks down upon you is detestable indeed. Yet I, for one, maintain that the races should not mix as they do here.

The hotelkeeper presented me with a nestling kingfisher last evening. Although I looked about thoroughly whenever I heard the kingfishers, I was unable to locate any nests this trip. I was particularly anxious to find one for the young birds, which should be well grown now as is this one. More than once I saw old birds carrying food, and once the shrimp, so I'm going to try feeding this fellow prawns.

There were more gray-back terns (unbridled) on the spar this morning. Lesser noddy flying close to the lagoon. Along Tahaa the white terns are plentiful above the tree tops. The ships sail along within two hundred meters of the points of that island. There are some well wooded valleys here, which should prove good hunting. How interesting a good series of the birds from these two islands will prove to be! What variations will occur here where even the rails could fly across if pushed hard enough? A school of porpoise are playing about in the deep lagoon between us and the island. How smoothly they cut the water when they come to the surface, and how well rounded are their bodies to suit the arc on which they rise!

The birds will, however, not be quite so interesting as the plants, land snails and lizzards, which have no means of aerial travel. For what they have to tell us they are indeed fascinating. Birds, of course, are the most interesting to

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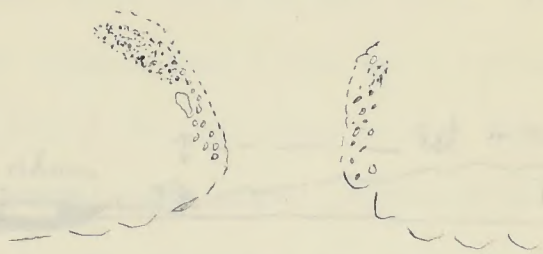
collect and study in the field, and have their problems to be solved as well, but not so much insular ones, except the very few land birds like the warbler, kingfisher and rail and parakeet. How unfortunate that we have been unable to get more rail! I think we should spend more time (for it certainly takes time) endeavoring to catch them instead of this mad rush for great numbers of more easily obtained birds. Not only for their rarity should they be sought, but for what they might have to tell us about land connections of a former day.

Out the pass. Here there are no brush covered islets.



Three red-footed boobies come down the reef in proper formation. Yellow-billed terns are in single flight or conspicuously perched on the blocks of coral standing above the water on the platform of the reef. On either side of the pass were such blocks, not of uniform height as are those where former islets have been washed away, and very irregularly scattered over everything. The tinto aboard has an umbrella, and now I see the wisdom of carrying one. Rain is "Aita pea pea", but this sunshine is "Merohoi ino" and "Puai vea vea". More boobies are following along the reef, and gray-back terns are both near to and distant from the reef. Some of the white spots on the

collect and study in the field, and have their problems to be solved as well, but not so much learning ones, except the very few land birds like the meadlar, whitetaker and rail and yellowlegs. How unfortunate that we have been unable to get more rail! I think we should spend more time (for it certainly takes time) endeavoring to catch them instead of this mad rush for great numbers of more easily obtained birds. Not only for their rarity should they be sought, but for what they might have to tell us about land connections of a former day.

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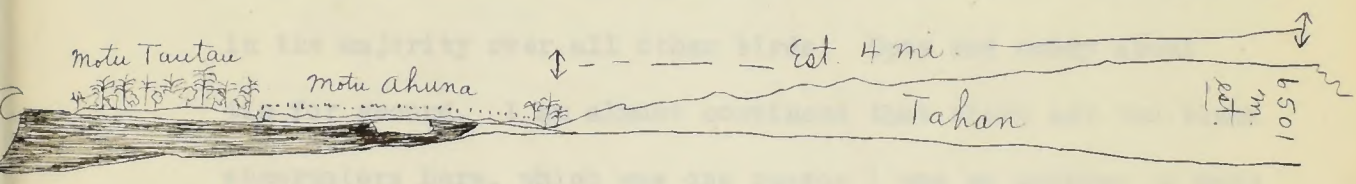
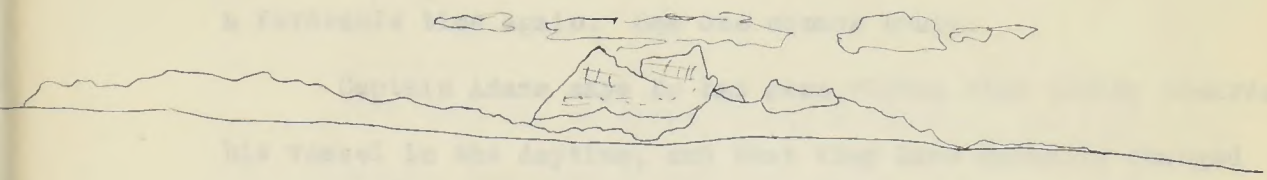
coral blocks are due to their shiny breasts.

As we passed the end of the reef I was struck by the appearance of the mountain slope, that gentle incline of a lava flow and the steeper inland descent from the summit.





What a mass of coral there must be here if the slope of the hill is continuous beneath the sea! What eons of time were necessary for its accumulation! But how many more will be necessary before the mountain is buried and an atoll formed of the reef!

The clouds today greatly resemble those of yesterday, and there are practically none between here and Bora Bora. Apparently Bora Bora is barely 650 meters in height, if the

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The islands today greatly resemble those of yesterday, and there are practically none between zero and zero here. Apparently zero zero is barely 500 meters in height, if the

clouds are true to form and back at Raiatea they cross at the clay-flat.

I snooze an hour, sharing my air-mattress with the elder vahine who is seasick, and with the tinto who uses the foot for a pillow. I awake! Was it intuition? We are approaching a flock of birds at rest,--boobies, wedge-tailed shearwaters, noddies, and lesser noddies. What a fool to forget the dip-net! I could have easily picked up three or four shearwaters to keep busy upon as we circle the island to get around to the pass.

Three miles south of Bora Bora. Boobies! Boobies in greater numbers than I ever saw in a flock before and greatly in the majority over all other birds. Upoa and noddy about tie for second. I am almost convinced that there are two black shearwaters here, which was one reason I was so anxious to make the trip while they are nesting for we may not be here at such a favorable time again. Saw one common booby.

Captain Adams says he has seen flying fish coming towards his vessel in the daytime, and that they have actually changed their course of flight and dodged the ship.

The mountainous, or at least hilly, islet is called Motu Toupua. Islet beside pass,--Motu Ahuna. Bearing E by N from Mona Tetarapaia it has a decided overhang to the southward. What an attractive island! No wonder it has received so much advertising! That rock, Tetarapaia, which bears ENE (and we are nearly off its point) certainly rivals the Diademe of Tahiti and is far more conspicuous.

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Three miles south of Kora Kora. Noddies! Noddies in greater numbers than I ever saw in a flock before and greatly in the majority over all other birds. Uppa and noddy about tie for second. I am almost convinced that there are two black shearwaters here, which was one reason I was so anxious to make the trip while they are nesting for we may not be here at such a favorable time again. Saw one common booby.

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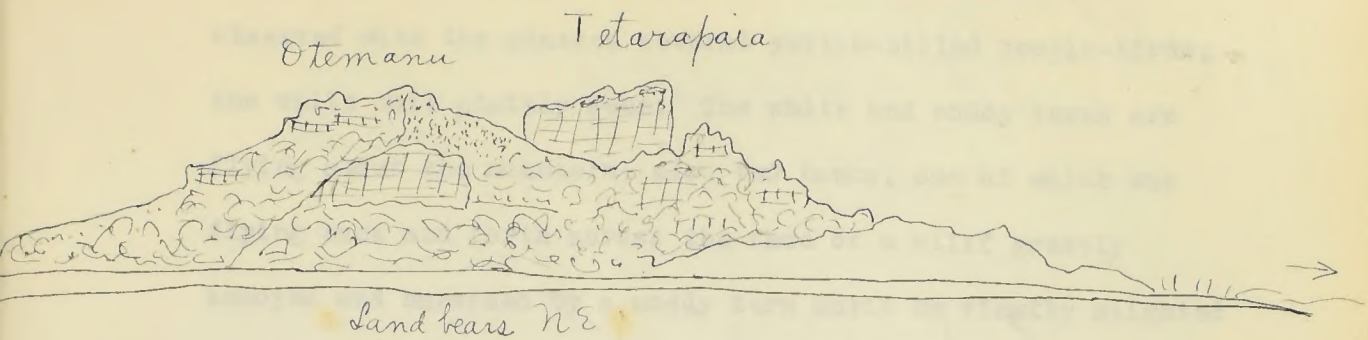
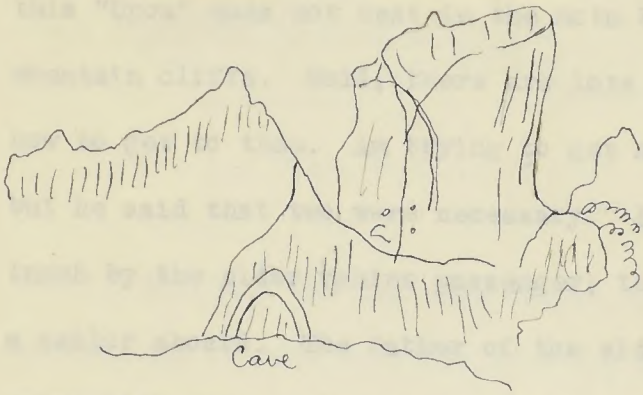
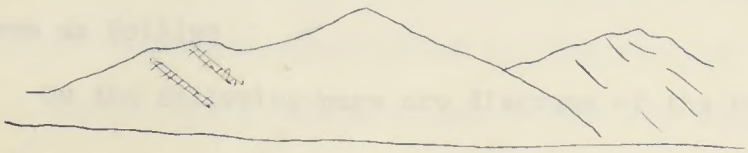
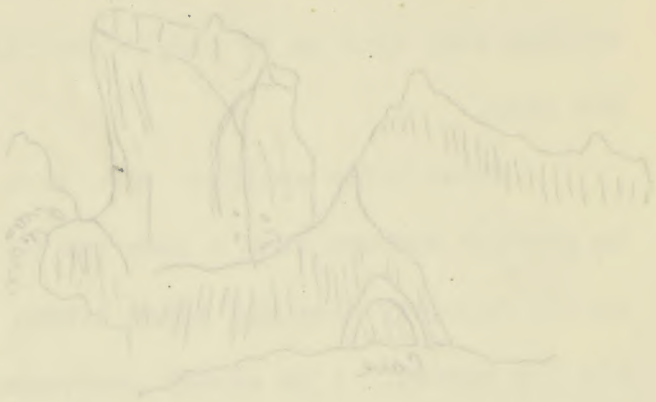
The Kornatzkous, or at least Billy, Islet is called Iten Tongua. Islet beside pass,--Kotu Ahuna. Bearing E by N from Kora Kora Taiarapia it has a decided overhang to the southward. What an attractive island! No wonder it has received so much advertising: that rock, Taiarapia, which bears SEx (and we are nearly off its point) certainly rivals the Diadems of Tahiti and is far more conspicuous.





Bora Bora is, as Darwin's cut indicates, just the top of a mountain, but I would say that he erred on the side of conservatism, as was his wont, in the angle of the slope from the shore of the island seaward. Here is Motu Toupua with lava dipped sixty degrees. Why not as he says, conclude that it continues at that angle under the sea?





From the dock, while pausing a moment to eat, I observed with the glasses several yellow-billed tropic-birds; the white tail plainly seen. The white and noddy terns are flying about the mountain; also two hawks, one of which was flying back and forth across the face of a cliff greatly annoyed and harassed by a noddy tern until he finally alighted in a hole behind some bush. No other birds observed.

Ashore! Three different men have firmly declared that this "Upoa" does not nest in the motu but in the holes in the mountain cliffs. Well, there are lots of holes if I only knew how to get to them. Am trying to get a man to go up with me, but he said that two were necessary. I was called in to another lunch by the elder vahine passenger; the young one is consort of a sailor aboard. The father of the elder is a man well on in years with gray mustache. He has now gone for the man who can best show me the way to the habitat of this Upoa, which he claims is a smaller bird than that at Tahiti. Is it?

We ascend through coconut plantations which blend into the vanilla. The latter is supported on guava trees which seem to furnish just the proper shade and height of rest. This extends up 130 meters, where the native bush commences to cover that steep talus below the cliffs drawn on the preceding page. Kingfishers heard and two seen flying, much resembling the Raiatea bird. Doves heard, but none will approach. The guide says Vini is here, a small blue bird with parrot beak. Is it the same as Scilly?

On the following page are diagrams of the Upoa nests and holes.

From the dock, while pausing a moment to eat, I observed with the glasses several yellow-billed tropic-birds; the white tail plainly seen. The white and reddy terns are flying about the mountains; also two hawks, one of which was flying back and forth across the face of a cliff greatly annoyed and harassed by a reddy tern until he finally alighted in a hole behind some bush. No other birds observed.

Ashore! Three different men have firmly declared that this "Upoa" does not nest in the rocks but in the holes in the mountain cliffs. Well, there are lots of holes if I only knew how to get to them. Am trying to get a man to go up with me, but he said that two were necessary. I was called in to another launch by the older vanine passenger: the young one is consort of a sailor aboard. The father of the older is a man well on in years with gray mustache. He has now gone for the man who can best show me the way to the habitat of this Upoa, which he claims is a smaller bird than that at Tahiti. Is it?

We wound through coconut plantations which blend into the vanilla. The latter is supported on guava trees which seem to furnish just the proper shade and height or rest. While ascends up 100 meters, where the native bush commences to cover that steep talus below the cliffs drawn on the preceding page.

Kingfishers heard and two seen flying, much resembling the Malaise bird. Dove heard, but none will approach. The guide says that is here, a small blue bird with parrot beak. Is it the same as Dollig?

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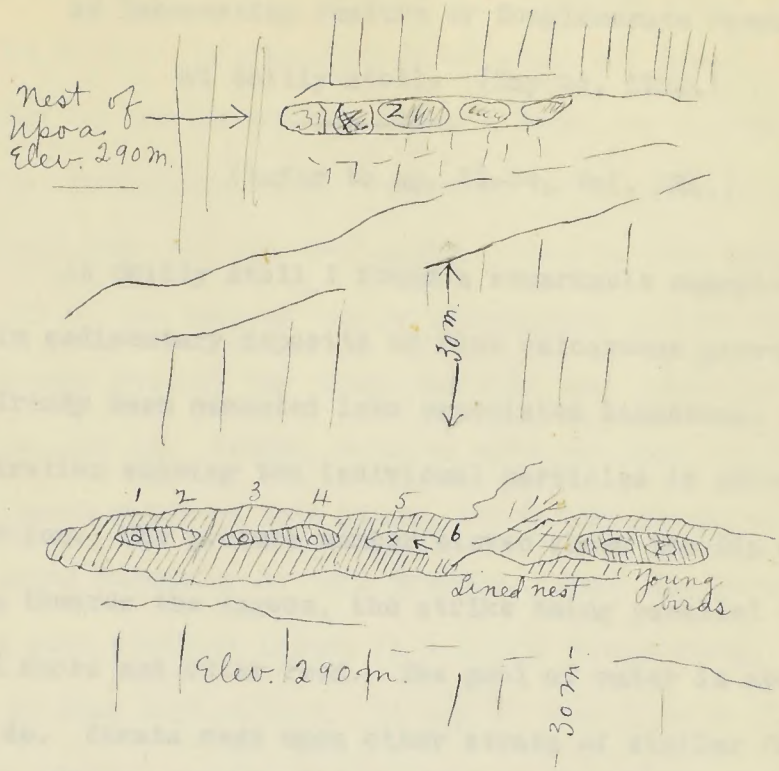
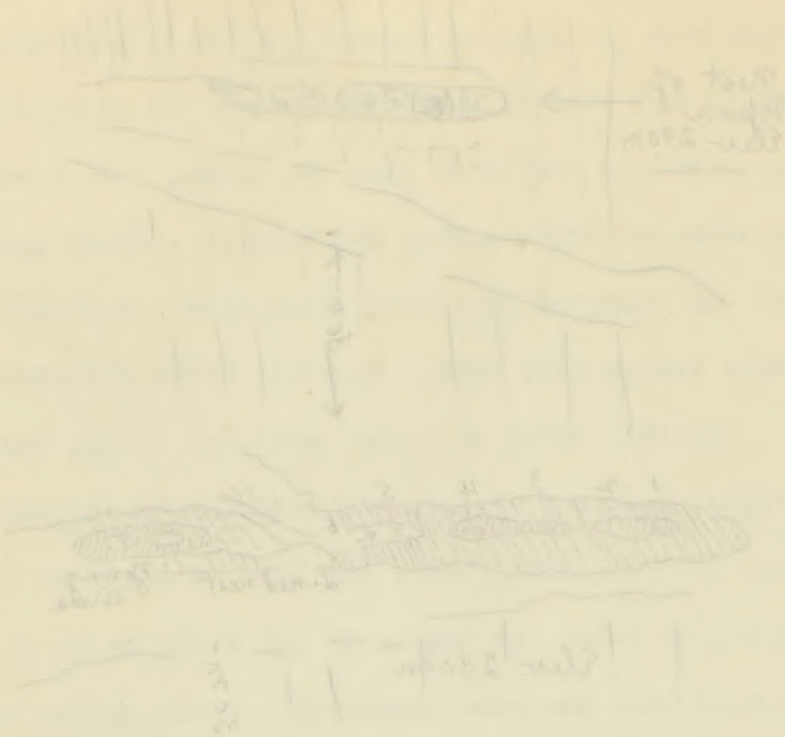


The nest was unlined, debris upon bottom of coarse sand; another egg in next hole (Z), but old and broken. Considerable dung facing rock below the row of apertures. Apertures 1, 3 and 4 were two meters in depth from face of cliff above. Number 2 was three meters deep. Apertures were 25--30 centimeters vertical, and 40--50 horizontal measurements. Our efforts were not in vain, for after returning with the one I saw a promising hole of similar structure on the other side of our ascent. The native told me it was "aita maitai", but I got up here easy enough and found one, two, four, eight more birds. Some were downy young and also eggs. One nest only of the hole nests was lined; one under bush was well lined; others well floored with detritus. One rotten egg in hole number 4, where there was a bird on another egg,--plenty of room for two birds. Quite a cake of guano--floor of cave. Cave six meters long, forty centimeters high at mouth, and one meter plus in general



An Interesting Feature of Conglomerate Formation

at Scilly Atoll, (May 28, 1922.)

(Refer to pp. 31-34, Vol. XXI.)

At Scilly Atoll I found a remarkable example of "overlap" in sedimentary deposits of fine calcareous gravel which has already been cemented into brecciated limestone. A good illustration showing the individual particles is photograph number ten. The picture number eleven shows the dip of the strata towards the lagoon, the strike being parallel to the lagoon shore and outer reef. The pool of water is about mean low tide. Strata rest upon other strata of similar formation, the overlap being plainly visible in this picture as well as in number twelve. In the latter the present gravel (pebbles slightly larger than seas) can be seen as a white mass converging into the white of the water. In number eleven small patches of this gravel are visible below the natives where it is pocketed.

These overlapping strata are about two hundred meters in width, extending from the lagoon shore to the reef-shelf which is nearly a kilometer in width. I counted fourteen successive layers of this breccia at one place. The formation extended for the two miles that I followed it, and appeared to extend as much farther, or more, to the southward. It commenced on the northwest of the atoll, about one kilometer from the westernmost end of the home islet. The pebbles composing the breccia are very similar, if not exactly like, those which make up the gravel bank at the lagoon shore. This gravel bank

An Interesting Feature of Conglomerate Formation at Sailly Atoll. (May 28, 1922.)

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is in places two meters high and frequently rests upon strata of the breccia outcroppings which occur all along it. When I waded out to the sailing canoe I found the uppermost layer of the overlapping strata extending fifty meters from the gravel bank out into the shallow lagoon, which is four hundred meters. The dip of the various layers corresponds to the incline of the gravel beneath the water wherever the latest strata does not replace it. Wading revealed also the high temperature of the lagoon water at this place, which very likely accounts for the rapid cementing of this breccia. That the formation should be in such distinct layers is a little disquieting, but there must be some explanation. It may be that five to fifty centimeters, which I record as the limit of thickness of the strata, is the limit of depth of cementing forces at the point of deposition. Once the conglomerate became cemented it would form a layer. Yet it is not unreasonable to expect the successive layers to be firmly cemented to the underlying ones. Such, however, has not been the case, as is evident in photo number eleven, where the strata are plainly separable from one another.

How far these strata extend into and towards the lagoon at their lower end I have no idea. I noted that the uppermost one reached some fifty meters out into the shallow edge of the lagoon. In all probability that is the extent of the other layers. It is correspondingly about the limit of the finer portion of the gravel, beyond it being a gray silt which extends out to the deep blue, but is spotted with small mounds of coral.

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I also obtained at Scilly some fairly representative illustrations of the marine shelf which invariably extends from the verge of the outer reef where the surf breaks to the beach of gravel cast up by high gales. On the back of photo number one I have copied "wood cut number three", "a vertical section, supposed to be drawn at low water from the outer coast across one of the low islets...to within the lagoon". Darwin, 'Coral Reefs', Chapter One. All the pictures from number one to eleven bear letters corresponding to those in the cross-section.

In number one the flat (C) submerged shelf between the verge of the reef (B) and the mean high tide shore (D) is seen flooded with water. In this very shallow channel clumps of coral can be plainly seen cut under by the water. These, as well as the low projecting ledge of brecciated coral rock (D), have a uniform level top which is little higher than the living mounds at (B) where the waves break. It appears to me, after observing this feature to be very common in lagoons of barrier reefs and this portion of atolls and especially where no islets exist in the latter, that this is nothing more or less than the wearing away of the original reef. These blocks are more conspicuous in number two, as is also the low, projecting shelf of brecciated coral rocks. The shape of the boulders making up this shelf is direct evidence that they were never washed about much as beach rock. They are much more angular than the present beach rock, which often contains boulders of the conglomerate.

I also obtained at Solly some fairly representative illustrations of the marine shelf which invariably extends from the verge of the outer reef where the surf breaks to the beach of gravel cast up by high seas. On the back of photo number one I have copied "wood cut number three", "a vertical section, supposed to be drawn at low water from the outer coast across one of the low islets...to within the lagoon". Darwin, 'Coral Reefs', Chapter One. All the pictures from number one to eleven bear letters corresponding to those in the cross-section.

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Figure three shows one of the mushroom boulders from the shelf channel overturned and deposited upon the adjacent projecting shelf. (At Marutea an extremely low tide permitted me to reach the very verge of the reef dry shod. While out there I noticed that the projecting shelf, (D) in illustrations, was on a level with the mounds coated with living "nullipores" on which I stood.) The native standing beside the boulder gives some idea of its size. A pair of common boobies, Sula leucogastra plotus, had a nest upon the pedestal base, now the top of the rock. That rock corresponded in structure to the shelf on which it rested. I have read somewhere that portions of previous islets were still visible in lagoons. Such rocks as these were referred to. That they were fully developed "motu" I doubt. This formation appears to be the foundation of nearly all lagoon islets, but an accumulation of loose fragments piled high by storms is necessary to make a real islet not flooded by spring high tides. In my journals previous to this I have referred to these as "elevated reefs", especially in writing about Moorea. Now, however, I am almost certain that they are remnants of the verge of the reef before it grew seaward. Where the protective coatings of gravel and later vegetation have accrued, weathering by highly solvent rainwater and washing by lagoon currents have been checked. The open shelves, however, could not resist heavy tropical rainstorms for many centuries, so would soon wear away until the storm waves were able to break them into boulders and wash them away.

Figure three shows one of the quarrying boulders from the shelf channel overturned and deposited upon the adjacent projecting shelf. (It marks an extremely low tide permitted me to reach the very verge of the reef dry shod. While out there I noticed that the projecting shelf, (3) in illustrations, was on a level with the mounds coated with living "millipores" on which I stood.) The native standing beside the boulder gives some idea of its size. A pair of common bowlers, Eulia lamourouxia plotina, had a nest upon the pedestal base, now the top of the rock. That rock corresponded in structure to the shelf on which it rested. I have read somewhere that portions of previous islets were still visible in lagoons. Such rocks as these were referred to. That they were fully developed "motu" I doubt. This formation appears to be the foundation of nearly all lagoon islets, but an accumulation of loose fragments piled high by storms is necessary to make a real islet not flooded by spring high tides. In my journals previous to this I have referred to these as "elevated reefs", especially in writing about Nooreas. Now, however, I am almost certain that they are remnants of the verge of the reef before it grew seaward. Where the protective coatings of gravel and later vegetation have accrued, weathering by highly solvent rainwater and washing by lagoon currents have been checked. The open shelves, however, could not resist heavy tropical rainstorms for many centuries, so would soon wear away until the storm waves were able to break them into boulders and wash them away.

The brecciated limestone in the projecting shelf is composed of blocks of coral of all imaginable shapes and sizes. That of the overlapping strata at Scilly was of a much finer grain, but the peggles or particles composing it were more angular than smoothed, showing that they had not remained any extensive length of time as beach gravel before being cemented into the limestone.

Since the waves usually strike the reefs at an angle, water is forced upon them from one side and consequently strong currents develop along the shallow shelf. Into this shelf channel come fragments of rock broken off the reef and detritus washed from the beach at (E). Often portions of this shelf are covered with a fine calcareous silt which prevents fixed forms of living organisms from locating upon it. Often living mounds of lagoon corals thrive in the channel. Often it is barren rock, as at S. Marutea, evidently washed clean.

This tidal flat has its peculiar ecology and affords favorite fishing grounds for the natives with spears by day and machete and torch by night. Here the lobsters (?) and prawns are caught; here the button-footed mollusks are obtained, and several varieties of fish; here also dwell sea-urchins with long pointed spines which cause painful wounds in bare feet; holothurians also are abundant here. Not alone in the fishing are the natives. Terns, especially the lesser and common noddies and the white, are frequently observed flying along in search of food. Reef herons find it very bounteous in their favorite foods. Tatlers and plovers are common during their

The brecciated limestone in the protecting shelf is composed of blocks of coral of all irregular shapes and sizes. Most of the overlapping strata at Kotlly was of a much finer grain, but the pebbles or particles composing it were more angular than rounded, showing that they had not remained any extensive length of time on the beach travel before being cemented into the limestone.

Since the waves usually strike the reefs at an angle, water is forced upon them from one side and consequently strong currents develop along the shallow shelf. Into this shelf channel come fragments of rock broken off the reef and detritus washed from the beach at (2). Often portions of this shelf are covered with a fine calcareous silt which prevents fixed forms of living organisms from locating upon it. Often living mounds of lagoon corals thrive in the channel. Often it is barren rock, as at S. Barrier, evidently washed clean.

This tidal flat has its peculiar ecology and affords favorite feeding grounds for the natives with spears by day and machete and torch by night. Here the lobsters (7) and prawns are caught; here the button-footed mollusks are obtained, and several varieties of fish; here also dwell sea-urchins with long pointed spines which cause painful wounds in bare feet; holothurians also are numerous here. Not alone in the feeding are the natives. Birds, especially the lesser and common sandpiper and the white, are frequently observed flying along in search of food. Heat becomes tired it very lowlands in their favorite food. Waders and plovers are common during their

season here, and where introduced, the myna finds marine variations to his diet.

BOOK XXIII

Voyage of the 'France'

to

Ravaivai, Austral Islands and Rapa Island.

February 1-26, 1922.

February 1

4:00 P. M. Left the wharf at Papeete, Tahiti, bound for Rapa.

4:23. Passed through the reef; all hands busy hoisting the sails.

4:50. Ran the engine until well out beyond reef, when we took up a course of due south. A fair wind about north.

5:03. The Pomarine Jaeger (identified by R. H. Beck) flew past above within a hundred meters or so. Previously had noted P. rostrata and P. neglecta besides the boobies and white and noddy terns which were in a small fishing flock. Rain clouds are hugging the summits of Tahiti.

After dinner there were seven P. rostrata about,-- more than we ever saw before.

BOOK XXIII

Voyage of the 'Tranoa'

to

Rarotonga, Austral Islands and Tuna Island.

February 1-26, 1922.

February 1

4:00 P. M. Left the wharf at Papeete, Tahiti, bound for home.

4:30. Passed through the reef; all hands busy hoisting the sails.

4:50. Ran the engine until well out beyond reef, when we took up a course of due south. A fair wind about north.

5:05. The towering Saddle (identified by R. H. Beck) 1100 feet above within a hundred meters or so. Previously had noted T. rostrata and E. modiolus besides the boobies and white and sooty terns which were in a small floating flock. Rain clouds are hugging the summits of Tahiti.

After dinner there were seven E. rostrata about,—more than we ever saw before.

About town today everything was amusing from the doctor's inspection of the crew (too bad they didn't start that in 1843 instead of at this belated time). Mr. Beck was the only male person exempt. Next we discovered that we would have to apply for new passports now in order to have them in time for our next journey. So that did start something, for I had let mine lie in the police office ever since our arrival here sixteen months or more ago. Curtis went with me to "parley Francais", and after hitting two or three wrong houses we succeeded in getting it without trouble. The next trouble was in getting American dollars. Then there was boating trunks and boxes from Mr. Beck's after taking a boat load of rubbish out in the lagoon. One load in the small boat left but little for the afternoon. All was ready and the last franc spent by three o'clock, when it was discovered that two of the crew had not returned with the whale boat. I went and found them in Drollet's old saloon; one of them is a Drollet and somewhat white. They were drinking and I had quite a job pulling them away. Drollet was quite intoxicated and could not console himself about being taken away from his vahine for six months.

Aboard ship he was a good sailor though drunk, but it was extremely amusing to watch him lolling around while hoisting ropes. We greenhorns, Curtis and I, got around in the way of the sailors considerably but managed to get a good bit of exercise hoisting sails. Curtis goes on watch with the mate; I stand when I want the exercise or pleasure, and probably will

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Almost daily he was a good sailor though drunk, but it was extremely amusing to watch him lolling around while holding rope. We greenhorns, Curtis and I, got around in the way of the sailors considerably but managed to get a good bit of exercise hoisting sails. Curtis goes on watch with the mate; I stand when I want the exercise or pleasure, and probably will

relieve the boys on the dog watch at times when I'm wakeful.

We had a very good meal this evening, cooking having commenced this morning at coffee. The fresh beef and ice start us off well. As purser I call in the cook every evening to account for the provisions broken into during the day. In this manner we hope to keep tab on how long things are lasting and ration them so as not to run out before the allotted six months are over.

Our engine ran splendidly for the portion of an hour that we used it. They say it is a very economical engine, using but four gallons of gas an hour and making seven knots easily in calm weather. Our engineer seems to be a very efficient fellow. In fact, we seem to be exceptionally well crewed and officered,--a well manned ship.

The Captain has got out his nautical books and I find that they are the ones Evans recommended. I am plunging into them tonight and will get what I can out of them before looking for diversion elsewhere. What a pleasure it is to be at sea, and especially under such favorable conditions as these! Few men, if any, of those who have toured the world were so fortunate as we are. There was the 'Albatross' and the 'Challenger' and a few other scientific ships, but where was any ship sent out to collect one class of anything? Beck rates it, however, for he certainly has spent a lifetime at this work when he probably could have made more at other occupations. Personally, I consider myself very fortunate indeed to have the privilege of working with him.

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One interesting feature of a schooner voyage is the live stock carried. We have a pig and the two dogs, which latter I turned loose as we cast off and ordered them before the mast. The old dog and the pig have had several encounters already. Flora doesn't seem to make herself very much at home aboard ship. We have plenty of cockroaches too.

7:00 P. M. Made twelve miles by log.

February 2

Had one fairly heavy squall during the night. Rain clouds about all morning. The wind died down early in evening and so we made but little progress, the log at six A. M. reading but twenty miles.

Boobies about this morning but not so very plentifully. One P. rostrata and one tropic-bird are the most interesting notes. The sailors thought it Tavae (Phaethon rubricaudus), but Mr. Beck decided in favor of P. lepturus, the yellow-billed "Petia". In one flock of boobies was one common booby (Sula leucogastra plotus).

Spent the morning cleaning guns, until at ten o'clock a squall threatened. Being a little dizzy headed I laid off work and am now out on the rear platform, writing up notes.

10:00 A. M. Log, thirty and one quarter miles. Course by the wind, south.

Tahiti and the Presquille were very prominent all morning but are now hidden by squalls. From this viewpoint, bearing due north, the central peaks of both portions of the island present a very rugged appearance. Moorea was also

The interesting feature of a subsequent voyage is the live stock carried. We have a pig and the two dogs, which latter I turned loose as we cast off and ordered them before the mast. The old dog and the pig have had several encounters already. Pigs doesn't seem to make herself very much at home aboard ship. We have plenty of cockroaches too.

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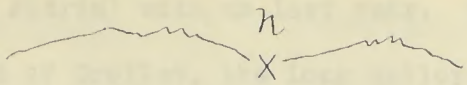
Spent the morning cleaning guns, until at ten o'clock a squall threatened. Being a little dizzy headed I laid off work and sat now out on the rear platform, writing up notes.

10:00 A. M. Log, twenty and one quarter miles. Course by the wind, south.

Tahiti and the Tuamotus were very prominent all morning but are now hidden by squalls. The tide viscount, bearing due north, has central peaks of both portions of the island present a very rugged appearance. Moorea was also

visible for a short while during the early morning.



(Taravao--X).

The wind is southeast and so we are close hauled and making fair progress. Now for a pleasant journey. It certainly feels good to be at sea. I think I'm all sailor.

12:00 M. Position by Au. Lat., 18° 11' S.

Long. 149° 23' W.

Log, 36 miles.

A very heavy rain this noon, preceded by a gust of wind and then calm. Mr. Beck saw another Jaeger; he thought it the smaller one of the two collected off Tahiti.

It was just a little past noon when the Captain called me up to look at a peculiar light green spot in the ocean. We could not make out what it was, but it certainly did resemble a shoal. It could not have been whale or school of fish since it remained stationary while we slowly passed within about two hundred meters of it. I climbed the rigging to about twenty-five feet and it certainly did look like a shoal. The color was a light emerald green. There was no sign of a breaking sea above it, so it must be very deep and certainly not dangerour to small craft. From its color, however, it is apparently within twenty feet of the surface.

4:00 P. M. Another rain, which is more than a squall, commenced just before the port watch went on duty. This watch is composed of Charlie Olson, mate; C. C. Curtis, seaman

visible for a short while during the early morning.

(Tarawa—I).

The wind is southeast and so we are close hauled and making fair progress. Now for a pleasant journey. It certainly feels good to be at sea. I think I'm all sailor.

12:00 M. Position by Am. Eph., 1°° 11' N.

Long. 149° 23' W.

Log, 22 miles.

A very heavy rain this noon, preceded by a gust of wind and then calm. Mr. Cook saw another lagoon; he thought it the smaller one of the two collected off Tahiti.

It was just a little past noon when the captain called me up to look at a peculiar light green spot in the ocean. We could not make out what it was, but it certainly did resemble a shoal. It could not have been whale or school of fish since it remained stationary while we slowly passed within about two hundred meters of it. I climbed the rigging to about twenty-five feet and it certainly did look like a shoal. The color was a light emerald green. There was no sign of a breaking sea above it, so it must be very deep and certainly not large enough to small craft. From its color, however, it is apparently within twenty feet of the surface.

4:00 P. M. Another rain, which is more than a squall, commenced just before the port watch went on duty. This watch is composed of Charlie Olson, helm: G. G. Curtis, seaman

extraordinary; and Parau, king of Papoi eaters who was on the 'Pro Patria' with us last year. The starboard watch is composed of Drollet, the Long Sailor, and another native. As a rule I am not fond of remaining below decks, but so well has this schooner been cleaned out that very little, if any, copra odor remains, and the cabin is so commodious that the air in it is not at all bad. Every day adds more to the fact that Beck selected a fine ship.

9:30 P. M. Heard a sooty tern, a single bird. Very cloudy, although just before dark Tahiti appeared as two islands and Mona Tohivea of Moorea could be distinctly seen. All the other hills there were below the horizon, but not very much so judging from the amount of Tohivea visible. How far distant are we when the mountains 2000-2500 feet high are no longer visible?

February 3

The wind came up about nine or ten o'clock, clearing away the clouds and giving us good headway, so that this morning at five-thirty the log read seventy-six and one quarter miles. Have already seen a red-footed booby and three black shearwaters, very likely the wedge-tailed but not close enough to identify. We are once more upon our true course SSE 1/4 E.

There is one of the parasitical wasps crawling about my note book now, a little black fellow about fifty mm. long. Comstock describes a very similar one (if it is not the same,

astronomicry; and Tarn, king of Tagal motors who was on the 'Iro Jatula' with us last year. The stateroom which is composed of Drolleb, the long sailor, and another matiro. As a rule I am not fond of remaining below decks, but so well has this schooner been cleaned out that very little, if any, copra odor remains, and the cabin is so commodious that the air in it is not at all bad. Every day adds more to the fact that Beck selected a fine ship.

8:30 P. M. Heard a rusty horn, a single blat. Very cloudy, although just before dark Tanit appeared as two islands and some Tonives or Moores could be distinctly seen. All the other hills there were below the horizon, but not very much so judging from the amount of Natives visible. How far distant are we when the mountains 3000-4000 feet high are no longer visible?

February 2

The wind came up about nine or ten o'clock, clearing away the clouds and giving us good headway, so that this morning at five-thirty the log read seventy-six and one quarter miles. Have already seen a red-footed booby and three black shearwaters, very likely the wedge-tailed but not close enough to identify. We are once more upon our true course SSE 1/4 E.

There is one of the Tanatlical waves crawling about my note book now, a little dizzy fellow about fifty cm. long. Osmotonk describes a very similar one (if it is not the same,

for the parasite usually accompanies its host) as Evania appendigaster. It is undoubtedly one of the Ensign-flies with its pennant attached dorsally to the thorax. This is but a young fellow not yet proficient with his wings. What an enormous host in numbers he has to prey upon! What enemies he himself must have to be kept so well in check! Here also is a house fly, indomitable companion of man, and traveler to distant parts where climate will permit him to live. He is perhaps outrivaled in distribution by the species Pediculus vestimenti, but the fly can go where man is not, so perhaps they make up in number for their lack of cosmopolitanism.

In reading over the notes on the cuckoo, it came to my notice that dates of birds seen are desirable. Perhaps a summary may be of interest.

Cuckoos Plentiful.

January:

February: Heard and seen at Rapa and Ravaivai.

March: Tahiti, Society Islands and Rurutu, Rimatara, Austral Islands.

April: Tubuai, Rapa.

May: Tubuai.

June: ? Tahiti or Moorea (See notes for this month).

Cuckoos not plentiful

July: Moorea.

August: Moorea, Tahiti.

for the parent is usually accomplished the most) as *Dasyia sunsuellicauda*. It is undoubtedly one of the Malaya-flies with its permanent attached horsefly to the tarsus. This is but a young fellow not yet continent with his wings. That an enormous beast in numbers he has to carry about somehow he himself must have to be kept so well in check! Here also is a house fly, indomitable companion of man, and traveler to distant parts where climate will permit him to live. He is perhaps unrivaled in distribution by the species *Pediculus vestimenti*, but the fly can go where man is not, so perhaps they make up in number for their lack of cosmopolitanism.

In reading over the notes on the cuckoo, it occurred to my notice that dates of birds seen are desirable. Perhaps a summary may be of interest.

Cuculus fizzipini.

January:

February: Heard and seen at Hope and Navivai.

March: Tahiti, Society Islands and Samoa, Timatara, Austral Islands.

April: Tubuai, Hope.

May: Tubuai.

June: ? Tahiti or Moorea (See notes for this month).

Cuculus rot plenitini

July: Moorea.

August: Moorea, Tahiti.

September: Tahiti.

October: Tahiti.

November: Moorea.

December: Mopelia, Society Islands (reported plentiful).

Thus far we have found nothing but negative information regarding their nesting habits. Everywhere I have offered one hundred francs for any definite information concerning the nesting habits of this puzzling bird; but all the natives will say is that it nests in the inaccessible holes of cliffs, which has no backing of fact but is only a surmise. Personally, I have seldom seen the cuckoo about the cliffs. It frequents the dense forest, mostly places where the large green grubs and gekkoes dwell.

7:15 A. M. Temperature of sea water at three readings, 81° F.

" " air in shade, 79° F.

Two tropic-birds flying about but not posing for a successful shot. P. lepturus, yellow-billed, and here is another; the natives call him "Petia". He simply will not come down within range and to windward of the masts. We have a bright and warm sun this morning, so I think I'll wash out my clothes which I've had soaking since we left Papeete.

12:00 M. Lat. 19° 31' S. Long. 149° 02' W. Gr.

Log, 102 miles.

Temperature of air in cabin, 82° F.

Sea water (average of three readings), 81.3°.

6:00 P. M. Temperature of air in cabin, 83.5°. Squalls.

Sea water (average of three readings), 81.5°.

September: Tahiti.

October: Tahiti.

November: Moorea.

December: Hopelia, Society Islands (reported plentiful).

Thus far we have found nothing but negative information regarding their nesting habits. Everywhere I have offered one hundred francs for any definite information concerning the nesting habits of this puzzling bird; but all the natives will say is that it nests in the inaccessible holes of cliffs, which has no bearing of fact but is only a surmise. Personally, I have seldom seen the cuckoo about the cliffs. It frequents the dense forest, mostly places where the large green grubs and cuckoos dwell.

7:10 A. M. Temperature of sea water at three readings, 82° F.

" air in shade, 79° F.

Two tropic-birds flying about but not posing for a successful shot. P. lepturus, yellow-billed, and here is another the natives call his "Tetia". He simply will not come down within range and to windward of the boats. We have a bright and warm sun this morning, so I think I'll wash out my clothes which I've had soaking since we left Papeete.

12:00 M. Lat. 19° 31' S. Long. 149° 02' W. Cr.

Log, 102 miles.

Temperature of air in cabin, 89° F.

Sea water (average of three readings), 81.4°.

6:00 P. M. Temperature of air in cabin, 83.5°. 3 miles.

Sea water (average of three readings), 81.8°.

Air on deck during squall, 75°. Clouds. No rain at ship but showers nearby.

7:00 P. M. 120 miles.

A small shearwater astern just before dusk. During the squall we made about six or seven miles in a little more than an hour. It is again calm and we are lolling about in characteristic schooner style. Our mate is an interesting sailor of Scandinavian extraction. He has had considerable experience and doesn't mind telling about it. The most interesting tales are those concerning his voyages to Christmas Island and Samoa in the long lost 'Tamarii Moorea'.

Today the mate built our skinning table and put up the drying shelves. I had a little difficulty extricating a tack from the shift key mechanism of the Corona. Did a big wash this morning and bathed myself and both dogs. Rinsed clothes with salt water, much to the surprise of the natives.

February 4

The calm of the early evening gave place to a light breeze abaft which shoved us along fifteen miles by the log during the night.

6:00 A. M. Temperature of sea water, 80.9° F.

" " cabin, 80.2° F.

Log, 135 miles.

Tropic-birds are about this morning, upon several occasions prior to seven-thirty A. M. Twice there were three at once, and shortly after three white terns; also saw a noddy tern. The tropics are apparently the red-tailed; the natives

Air on deck during squall, 78°. Clouds. No rain at sea, but showers nearby.

Vicc E. N. 130 miles.

A small cloudburst storm just before dawn. During the squall we made about six or seven miles in a little more than an hour. It is again calm and we are lolling about in characteristic schooner style. Our mate is an interesting sailor of Scandinavian extraction. He has had considerable experience and doesn't mind telling about it. The most interesting tales are those concerning his voyages to Christmas Island and Samoa in the long lost 'Samuel Moores'.

Today the mate built our skylight table and put up the drying sashes. I had a little difficulty extracting a tack from the adult key mechanism of the Moores. Did a big wash this morning and bathed myself and both dogs. Rinsed clothes with salt water, much to the surprise of the natives.

February 4

The calm of the early evening gave place to a light breeze about which moved us along fifteen miles by the log during the night.

6:00 A. M. Temperature of sea water, 80.9° F.

" " cabin, 80.2° F.

log, 150 miles.

Tropic-birds are about this morning, upon several occasions prior to seven-thirty A. M. Twice there were three at once, and shortly after three white terns also gave a motley turn. The tropics are apparently the rendezvous; the natives

swear it. Flying too high for shooting.

Just before eleven o'clock, however, while I was busy threading labels, another pair came about the boat. I touched one behind, but on the second I made a clean shot, breaking his wing. He fell close enough to be picked up from the ship after throwing her hard over to port. This was a juvenile plumaged bird, possessing one fairly long tail feather. No doubt most of the others were the yellow-billed too, P. lepturus.

12:00 M. Lat. 20° 16' S. Long. 148° 51' W.

Log, 150 miles.

Even gray-smoky clouds; no rain; little breeze from north.

Temperature of cabin, 81.7° F.

" " sea water, 81.2° F.

6:00 P. M. Log, 160 miles.

Temperature of cabin, 78.2° F.

" " sea water, 80.8° F.

A slow drizzle of rain all afternoon except for short lulls. The breeze swung to the northwest but did not get very strong even during showers. While I was making up the tropic-bird a shark was caught aft, a small fellow with five gill slits and a broad nose, and but one dorsal fin. I pickled two remoras that were clinging to him. Cut off the fins to dry for the Chinamen and threw the body overboard.

February 5

6:00 A. M. Log, 175 miles.

Thin streaks of clouds, light breeze NNE.

cover it. Flying too high for anything.

Just before eleven o'clock, however, while I was busy threading labels, another gale came about the boat. I tumbled one behind, but on the second I made a clean shot, breaking his wing. He fell close enough to be picked up from the ship after throwing her hard over to port. This was a juvenile plumaged bird, possessing one fairly long tail feather. No doubt most of the others were the yellow-billed too, I. lepturus.

12:00 M. Lat. 23° 10' S. Long. 140° 51' E.

Log, 180 miles.

Even gray-smoky clouds; no rain; little breeze from north.

Temperature of cabin, 81.7° F.

" " sea water, 81.3° F.

6:00 P. M. Log, 190 miles.

Temperature of cabin, 79.2° F.

" " sea water, 80.8° F.

A slow drizzle of rain all afternoon enough for short lulls. The breeze swung to the northwest but did not get very strong even during showers. While I was working up the tropic-bird a shark was caught aft, a small fellow with five gill slits and a broad nose, and but one dorsal fin. I plucked two remora that were clinging to him. Cut off the fins to dry for the Chinamen and threw the body overboard.

February 2.

6:00 A. M. Log, 175 miles.

Rain showers or clouds. Light breeze N.

Temperature of cabin, 79.8°.

" " sea water, 80.8°.

Typical dawn with brilliant coloration in the horizontal zone below the long stretches of clouds. No birds about this morning as yet.

7:30. A sooty tern flying about the ship within a few meters of it, as if desirous of landing aboard. It is apparently tired or sick.

12:00 M. Lat. 21° 16' S. Long. 148° 44' W. Gr.

Log, 188 miles.

Temperature of cabin, 86.5° F.

" " sea water, 81.6°.

Hot sunshine and very little breeze. The deck is uncomfortably hot to bare feet. The boy at the helm is getting considerable use out of the old umbrella that I brought along from Beck's when ordered to throw it away. It may leak rain but it makes some shade.

In the late afternoon another yellow-billed tropicbird came over to call upon us. It being Sunday, he of course came well within range, flying unusually low.

Am reading the 'Everyman' edition of Captain Cook's voyages. From excerpts of the Captain's own journal given in notes, the original is far more interesting and better written than this edition. Having left out latitudes and longitudes, there is no means of telling what islands are mentioned, as the names are erroneous or else changed since. This volume may be interesting to the average public but it has no

Temperature of air, 72.5°.

" " sea water, 80.8°.

Typical dawn with brilliant noctilucca in the morlacca-tal zone below the long attenuae or cirrus. No birds about this morning as yet.

7:30. A sooty tern flying about the ship within a few meters of it, as if desirous of landing aboard. It is apparently tired or sick.

10:00 A. Lat. 23° 16' S. Long. 142° 44' W. Ca. Log. 1.4 miles.

Temperature of air, 82.8° F.

" " sea water, 81.8°.

Hot sunshine and very little breeze. The deck is uncomfortably hot to bare feet. The top at the main is getting considerable use out of the old umbrella that I brought along from Zack's when ordered to throw it away. It may look rain but it makes some shade.

In the late afternoon another yellow-billed tropic-bird came over to call upon us. It being Sunday, he of course came well within range, flying unusually low.

In reading the 'Argonaut' edition of Captain Cook's voyage. From excerpts of the Captain's own journal given in notes, the original is far more interesting and better written than this edition. Having left out latitudes and longitudes, there is no means of telling what islands are mentioned, as the names are erroneous or also changed since. This volume may be interesting to the average public but it has no

scientific or natural history value whatever.

The evening is very pleasant after the excessively hot day,--one of those fascinating evenings which gives the sea a great deal of its appeal and charm. There are clouds, small, light, fleecy sailed ships with level keels skudding in echelon above the horizon, with here and there more widely spreading banks of thin, smoky cumuli.

6:00 P. M. Log, 202 miles.

Temperature of cabin, 83.5°.

" " sea water, 81.4° F.

The sunset effect was one of those marvelous soft tint colorations so peculiar to the belt of the trades, where the whole circle of sky near the horizon is used as a canvas. The first tinting appears opposite the sun, and the last effects are in the neighborhood of the sunset. At first there is a little too much glare of gold and amber in the west; but later that fades into those shades of lavender and old rose, pink and light orange which tone into the gray blue of the thin clouds. The sea forms an unbroken circle of darker steel gray below the ash gray of the lower sky. Now comes a splash of pale cardinal red across the western clouds, a most pleasant tint; it lingers a moment and is gone. The east is now deepening from gray, which still prevails to north and south, towards the azure blue of night, while the trade clouds float in soft fleecy whiteness against it. A well executed painting answers a certain purpose in the dull atmosphere of house and office of crowded city, but after all there is but one real

scientific or natural history value whatever.

The evening is very pleasant after the exceedingly hot day,--one of those fascinating evenings which gives the sea a great deal of its appeal and charm. There are clouds, small, light, fleecy masses scattered with level keels scudding in echelon above the horizon, with here and there more widely spreading masses of thin, smoky cumuli.

6:00 P. M. Lat. 32° miles.

Temperature of cabin, 82.5°.

" " sea water, 81.4° F.

The sunset effect was one of those marvelous soft tint colorations so peculiar to the belt of the trades, where the whole circle of sky near the horizon is used as a canvas. The first tinting appears opposite the sun, and the last effects are in the neighborhood of the sunset. At first there is a little too much glare of gold and amber in the west; but later that fades into those shades of lavender and old rose, pink and light orange which tone into the gray blue of the thin clouds. The sun forms an unbroken circle of darker steel gray below the ash gray of the lower sky. Now comes a splash of pale cardinal red across the western clouds, a most pleasant tint; it lingers a moment and is gone. The east is now deepening from gray, which still prevails to north and south, towards the same blue of night, while the trade clouds float in soft fleecy wilderness against it. A well executed painting answers a certain purpose in the dull atmosphere of home and office or crowded city, but after all there is not one real

Artist Whose works cannot be imitated.

February 6

6:00 A. M. Log, 217.3 miles.

Temperature of cabin, 80° F.

" " sea water, 80.8°.

None but the typical trade clouds this morning and little or no improvement in the breeze. The only consolation is that what wind we have is well aft, and so with widespread sails we make a little progress. Just as we were sitting down to coffee, a tropic-bird, red-billed, came up astern. He crossed over and was about two hundred meters distant when I got on deck with the gun. My call attracted his attention to such an extent that he approached to within a few meters astern the ship. After considerable circling he started across the bow and I took a chance at him through the davits of the little boat. Just connected enough to force him to sea some four hundred meters off the starboard bow. Headed ship for him and shot him again while on the water, although there was hardly any necessity for it. Quite bloody on the regulars and wing coverts.

Later a noddy tern was seen. At noon another red-billed tropic was about, but I missed him clean.

12:00 M. Log, 225 miles.

Lat. 22°12' S. Long. 148° 23' W. Gr.

Temperature of cabin, 85°.

" " sea water, 81.6°. Hot sunshine.

trial hose works cannot be indicated.

February 6

6:00 A. M. Log, 217.5 miles.

Temperature of cabin, 80° F.

" " sea water, 80.6°.

Done but the typical trade clouds this morning and little or no improvement in the breeze. The only consolation is that what wind we have is well aft, and so with widespread sails we make a little progress. Just as we were sitting down to coffee, a tropic-bird, red-billed, came up astern. He crossed over and was about two hundred meters distant when I got on deck with the gun. My call attracted his attention to such an extent that he approached to within a few meters astern the ship. After considerable circling he started across the bow and I took a chance at him through the davits of the little boat. Just connected enough to force him to sea some four hundred meters off the starboard bow. Needed only for him and shot him again while on the water, although there was hardly any necessity for it. Quite bloody on the regulars and wing covers.

Later a noddy tern was seen. At noon another red-billed tropic was about, but I missed him clean.

12:00 M. Log, 225 miles.

Lat. 22°12' S. Long. 163° 38' W. Gr.

Temperature of cabin, 82°.

" " sea water, 81.6°. Set sunshine

6:00 P. M. Log, 240 miles.

Temperature, cabin, 85°.

" , sea water, 81.2°.

Hot sun all day; deck seams cracking. Trade clouds somewhat larger than yesterday and darker beneath. Light patches of cirrus here and there. Sea very tranquil. Light breeze from northwest which permits us to maintain our course at SSE. Horizon an unbroken, even line with no perceptible swells. It is splendid weather for hunting if there were any birds about, but save for the two red-billed tropics and the noddy noted, it has been a birdless day.

At the sunset this evening we again have the circular canvas marvelously tinted. One's neck should be a universal joint to enable one to observe it all. Not to mention the hues of lavender and drab along the eastern horizon, there is a strikingly pleasant burnished bronze color between the cloud zone and the horizon to westward, into which the sun now sinks. The rolling cumuli above are of a dark smoky hue. Low clouds in the west below which the sun dropped are most royally fringed with gold now,--a border more marked than I ever before noted. Elsewhere the continual change from one soft tone to another keeps one turning about for fear of missing one setting of the magnificent scenery. What an hour is this just before and after sunset for the human soul to gain a peaceful attitude!

8:00 P. M. long, 240 miles.

Temperature, cabin, 82°.

" , sea water, 81.5°.

Hot sun all day; does seem tranquing. Trade clouds somewhat larger than yesterday and darker beneath. Light patches of cirrus here and there. Sea very tranquil. Light breeze from northwest which permits us to maintain our course at 220. Horizon an unbroken, even line with no perceptible swells. It is splendid weather for hunting if there were any birds about, but save for the two red-billed tropics and the noddy noted, it has been a birdless day.

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With the aid of the ten-power eyepiece, my binoculars revealed some interesting mountains on the edge of the light on the moon. It is amusing to see the progress of the sunshine across the sphere. No wonder the early Greeks realized that the heavenly bodies were mostly spherical and the earth of the same shape. The wonder is that the people of the dark ages accepted Ptolemy's idea. But the world occasionally is blessed with a Copernicus to upset tradition and conformity of thought.

February 7

The sea is more tranquil than ever this morning, but we have more breeze and it is coming from a more westerly direction. The 'France' seems to be a very good sailor and plods along at two knots or better with the wind barely strong enough to be felt on the face. Quietly we move too, for there is hardly a ripple on the ocean and but very light and almost noiseless splashes off our bows. While I write this there comes a resounding splash astern,--fish in pursuit of their breakfast!

6:00 A. M. Log, 266 miles.

Temperature of cabin, 79.5°.

" " sea water, 80.2°.

12:00 M. Log, 273 miles.

Lat. 23° 14' S. Long. 147° 55' W. Gr.

Temperature of cabin, 83.6°.

" " sea water, 81.6°.

While bailing up the water to measure its temperature I noticed innumerable little floating masses of a hair-like

With the aid of the ten-power eyepiece, my binoculars revealed some interesting mountains on the edge of the light on the moon. It is amazing to see the processes of the sunshine across the spheres. No wonder the early Greeks realized that the heavenly bodies were really spherical and the earth of the same shape. The wonder is that the people of the dark ages accepted Ptolemy's idea. But the world occasionally is blessed with a Copernicus to upset tradition and conformity of thought.

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8:00 A. M. Log, 580 miles.

Temperature of cabin, 78.8°.

" " sea water, 80.2°.

12:00 M. Log, 592 miles.

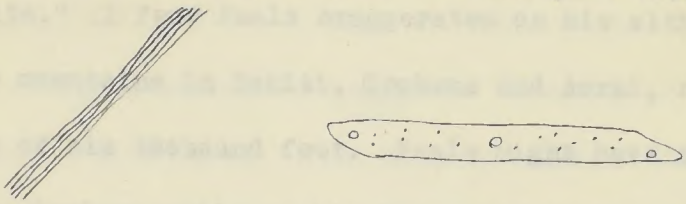
Lat. 22° 14' S. Long. 147° 20' W. Gr.

Temperature of cabin, 83.8°.

" " sea water, 81.6°.

While hoiling up the water to measure its temperature I noticed innumerable little floating masses of a jelly-like

mesh. Not being able to get any in the bail, I spread some cheese cloth over the loop of our dip-net, and after getting some rusty smears upon the net decided they were the remnants of the floating mesh. The microscope revealed a series of linear threads which do not appear to be algae, but look more like needle peridiniae. They were four or six in a bunch and many smaller entangling ones. With them was a long diatom and many small disc-shaped ones. I was just this morning



remarking how we might as well be taking plankton samples while traversing these seas. It would not take much time. The aforementioned mesh-like masses were in a belt through which we sailed for more than an hour, the belt extending in an east and west direction. The floating meshes were from the size of one's thumb to as large as one's hand. They glittered very noticeably in the sunshine. Nothing else was noticeable. There was no stinging effect from handling them as the natives thought there would be. Other than this, our day has been unusually calm.

For a week now we have had a very tranquil ocean, and but a light breeze with a few squalls. I never saw the Pacific so pacified. The swells are but low and very gentle. What breeze we have is sufficient to ripple the surface enough to prevent its being glassy calm. Ravaivai is sighted thirty-seven

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remarking how we might as well be taking plankton samples while traversing these seas. It would not take much time. The aforementioned moss-like masses were in a bait through which we sailed for more than an hour, the bait extending in an east and west direction. The floating masses were from the size of one's thumb to as large as one's hand. They glittered very noticeably in the sunshine. Nothing else was noticeable. There was no stinging effect from handling them as the natives thought there would be. Other than this, our day has been unusually calm.

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miles ahead.

In reading through the bird notes I am led to comment upon Peale's remarks concerning "Thalassedroma oceanica" or an ally of it: "...in the mountains of Tahiti (6000 feet or more) in October, at the same locality where Pterodroma rostrata was found, but the specimens shot fell in dense forests, thousands of feet below us and were not found ... resembling oceanica, rather larger but all the under-parts were white." I fear Peale exaggerates on his altitudes. Only two mountains in Tahiti, Orohena and Aorai, rise to the altitude of six thousand feet. Peale might have attempted ascending Orohena while on his Papenoo-Vaihiria trip. From my experiences on either side of Orohena I doubt if he found suitable nesting sites for P. rostrata, which I found no higher than 3800 feet, and as low as 1900 feet. On Orohena there is no likely looking, soil covered ridge for burrows. The pass between the Papenoo and Vaihiria is but 2800 feet high along the route and there one might find cliffs a few hundred feet high, but thousands is evidently exaggerated, unless Peale had made a side trip ascending Tetufera, which is the third highest mountain in Tahiti and is 5800 feet high. There he might have found P. rostrata too. As for his "Oceanodroma sp.", from its description I would judge it to be but P. neglecta which agrees in size and white under-parts and nests in holes in the cliffs along most of the ridges, both high and low, in Tahiti and Moorea. At present it is next to impossible to get a native guide to take one to the cliffs where caves exist, because of

miles ahead.

In reading through the field notes I am led to comment upon Peale's remarks concerning "Thalassarchas cauta" or an ally of it: "...in the mountains of Tahiti (6000 feet or more) in October, at the same locality where Ptero dromas fraterkula was found, but the specimens shot fell in dense forests, thousands of feet below us and were not found ... resembling cauta, rather larger but all the under-parts were white." I fear Peale exaggerates on his altitudes. Only two mountains in Tahiti, Orohena and Aorai, rise to the altitude of six thousand feet. Peale might have attempted ascending Orohena while on his Pagano-Vaihiria trip. From my experiences on either side of Orohena I doubt if he found suitable nesting sites for P. fraterkula, which I found no higher than 3800 feet, and as low as 1800 feet. On Orohena there is no likely looking, soil covered ridge for burrows. The pass between the Pagano and Vaihiria is but 2800 feet high along the route and there one might find cliffs a few hundred feet high, but thousands is evidently exaggerated, unless Peale had made a side trip ascending Tohuiera, which is the third highest mountain in Tahiti and is 3800 feet high. There he might have found P. fraterkula too. As for his "Pseudodromas sp.", from its description I would judge it to be but P. neglecta which appears in size and white under-parts and nests in holes in the cliffs along most of the ridges, both high and low, in Tahiti and Moorea. At present it is next to impossible to get a native guide to take one to the cliffs where caves exist, because of

burial caverns they do not wish to reveal to specimen hunting "popaa". After the months we have spent in all manner of Tahitian mountains, I doubt the existence of Peale's lost petrel.

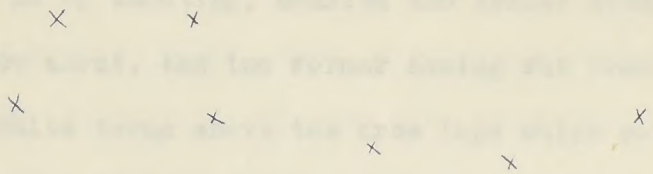
February 8

Forgot temperatures last night.

5:25 A. M. Temperature of cabin, 79°.

" " sea water, 79.5°.

We approached the Island of Ravaivai as long as good moonlight permitted us to do so with safety. Just as the moon was setting we lay to the westerly wind until dawn. Awakened by the shifting of the sails. I enjoyed half an hour of star gazing. A planet, probably Mars, located just west of Scorpio was shining with a very bright light. But of chief interest was the Great Dipper, the best friend of our northern skies, which stood just above the hazy zone near the horizon and gave us a homelike greeting. It must then be more than 23° from the pole.



At daylight we brought about and headed in towards land, starting the engine at five-twenty. Noddies soon appeared upon the scene, flying seaward very low down. One

burial caverns they do not wish to reveal to specimen hunting "popes". After the writing we have spent in all manner of Tahitian mountains, I doubt the existence of Peale's lost petrel.

February 6

Forgot temperatures last night.

8:25 A. M. Temperature of cabin, 79°.

" " sea water, 79.5°.

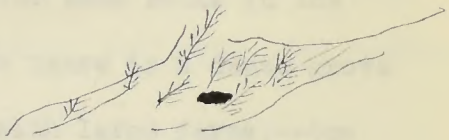
We approached the Island of Nuvaivai as long as good moonlight permitted us to do so with safety. Just as the moon was setting we lay to the westerly wind until dawn. Awakened by the splitting of the sails. I enjoyed half an hour of star gazing. A planet, probably Mars, located just west of Scorpio was shining with a very bright light. But of other interest was the Great Dipper, the best friend of our northern skies, which stood just above the hazy zone near the horizon and gave us a homelike greeting. It must then be more than 25° from the pole.

* * *

At daylight we brought about and headed in towards land, starting the engine at five-twenty. Sudden moon appeared upon the scene, flying scarred very low down. One

or two white terns and one little blue ternlet have been observed. Neither are very thick.

Landed and went with Curtis to the mountain ridge where a gentle slope of forest leading to a grass slope breaks through the wall of cliffs which form this northern side of the mountain. Elevation two hundred meters at ridge. I saw a yellow-billed tropic-bird fly into a clump of ferns not far above the talus slope on the face of the west cliff. After shooting twice at the spot and not scaring him out, I went over and climbed along to the place. By clinging to the fern roots I was able to pull myself up far enough to grab him. Then I called Curtis over, got the egg and handed it to him. Got down without mishap. The nest was a flattened place on, or in, the bed of ferns. Above it a rock extends outward so as to afford some shelter. The nest as I felt it (I could not get high enough to see) was very flat, with but a slight depression. The fern roots and dead stems, of course, formed the nest.



At my shooting, noddies and lesser noddies and white terns flew about, the two former coming out from the cliff rocks. White terns above the tree tops which cover the lower talus slope. Up here at the base of the cliffs, we are collecting herbs, bushes, ferns and grass. Two days and limited blotters will not permit much plant collecting. This morning I thought I saw many lesser noddies, judging by their flight.

or two white terns and one little blue heron have been observed. Neither are very tame.

Landed and went with Gertie to the mountain ridge where a gentle slope of forest leading to a grass slope breaks through the wall of cliffs which form this northern side of the mountain. Elevation two hundred meters at ridge. I saw a yellow-billed tropic-bird fly into a clump of ferns not far above the talus slope on the face of the west cliff. After shooting twice at the spot and not seeing his out, I went over and climbed along to the place.

By clinging to the fern roots I was able to pull myself up far enough to grab him. Then I called Gertie over, got the egg and handed it to him. Got down without mishap. The nest was a flattened place on, or in, the bed of ferns. Above it a rock extends outward so as to afford some shelter. The nest as I felt it (I could not get high enough to see) was very flat, with but a slight depression. The fern roots and dead stems, of course, formed the nest.

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Here at the cliff they are more plentiful than the larger species. Neither will place for a shot. On the south slope of the hill were red-billed tropics, and from the woods below came the cuckoo's call, which I thought I heard during our ascent. Curtis is picking up plant work rapidly and with initiative, which is a great help.

On up the ridge where noddies were plentiful. Seeing no difference in vegetation, and certainly nothing enticing in the bird line farther up the ridge, we have cut down from the summit towards the brink of the north cliff where we saw a small trickle of water going over some rocks in the bottom of an open ravine. Just above there is a dense grove of puro hibiscus filling the ravine with large ferns,--too dense for hunting but might contain rails. Saw three frigate birds above the island this morning. At present there are two yellow-billed tropics flying out over the cliff. Saw noddies alighting on ledges of cliff. No lesser noddies along ridge.

Along the summit even the guava had disappeared, leaving the rocky ridge to the grass, sedge, a few herbs and ferns. Lichens cover the rocks about the cliff. Down here in these moist ravines (open washes above the cliff brinks) the primrose-like plant, moss, grasses and sedges are up to the waist. The birds will not come over accessible ground, so we might as well call it a plant day and return. Left Curtis taking plant notes on his own. If he picks that up well he'll certainly earn his keep and meagre hire, not to mention his standing a watch with the sailors.

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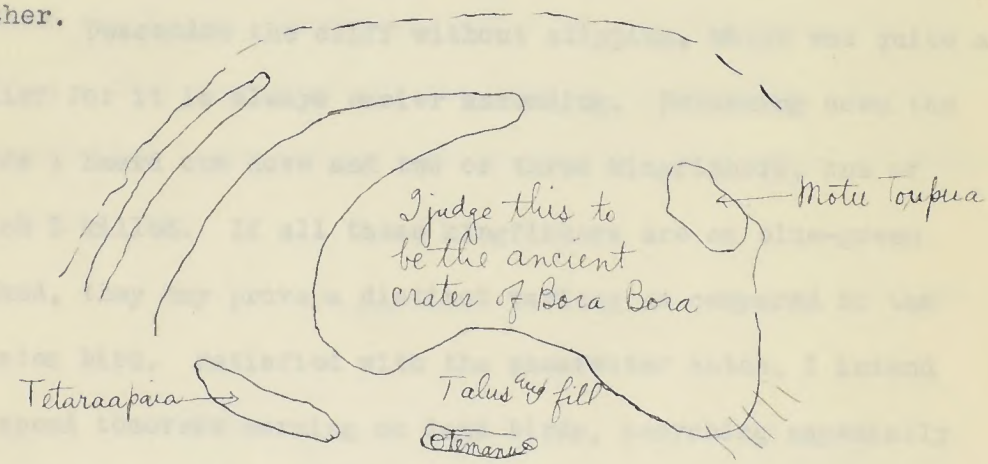
depth, with the nest holes extending in sometimes another meter. These holes are too frequent in occurrence not to have some significance. They are in all dimensions similar to the rooms at the end of Noha burrows. Although above, below and around them is a rather hard rock, is it not possible that with centuries of continual scratching, clawing, and "beaking" these birds and their ancestors have burrowed out these apertures here where erosion first gave them an inkling that a soft layer prevailed here?

Sea bird flies are frequently lighting upon me. Lice from guano are crawling all over me; I look like a stoker, and the dirt on my clothing, face and hands is not clean coal carbon either.



(1) Egg, cracked and rotted en route,--164 by 131 mm.

(2) Rotten egg of # 4 measured 162 mm. plus 133 mm.

(3) One hatching in # 7 measured 157 by 130.

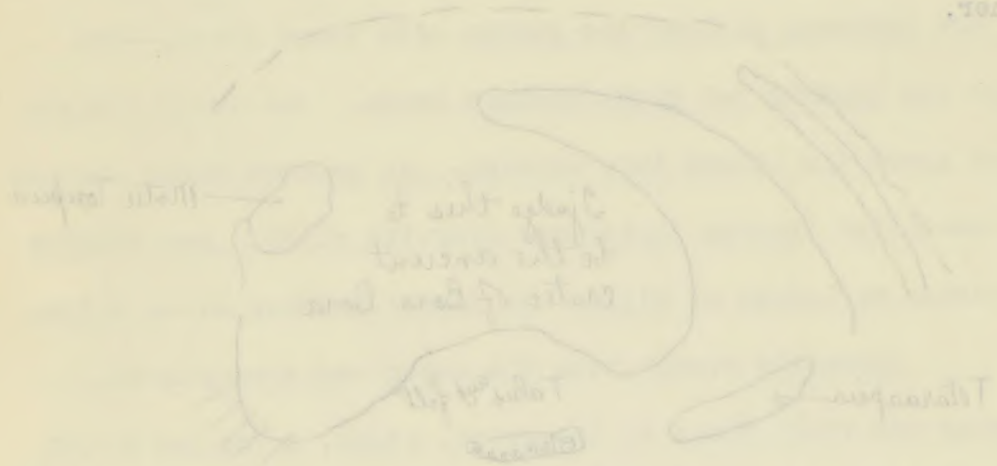
(4) The first one found on other side of ascent measured 166 by 135.

(5) Egg cracked en route or in collecting,--164 by 129 mm.

Two downy and four eggs unbroken as yet, but I'm not down out

depth, with the nest holes extending in sometimes another meter. These holes are too frequent in occurrence not to have some significance. They are in all dimensions similar to the roses at the end of them burrows. Although above, below and around them is a rather hard rock, is it not possible that with generations of continual scratching, clawing, and "beaking" these birds and their ancestors have burrowed out these apertures here where erosion first gave them an inkling that a soft layer prevailed here?

See bird files are frequently lighting upon me. Like iron ants are crawling all over me; I look like a shower, and the dirt on my clothing, face and hands is not clean coal carbon either.



(1) [illegible], cracked and rotted en route,--1.64 by 1.31 m.

(2) Rotten egg of ♀ measured 1.52 m. plus 1.35 m.

(3) One hatching in ♀ 7 measured 1.57 by 1.30.

(4) The first one found on other side of mount measured 1.55 by 1.30.

(5) [illegible] cracked en route or in collecting,--1.49 by 1.29 m.

Two dummy and four eggs unstolen as yet, but I'm not down out

of here either with the eggs.

Puffinus pacificus eggs of birds # 1659--1666.

Mopelia Note.

Captain Adams says that when he was at Mopelia one month before the wreck of the 'Sea Adler' the village motu colony of Kavika laid eggs a few inches apart (exaggerated I think); that the young birds literally covered the motu; that a tidal wave came along and killed every bird, piling dead bodies two feet deep along the shore by the village. This is exaggerated, no doubt, but good to show that they have other enemies than man.

Descended the cliff without slipping, which was quite a relief for it is always easier ascending. Returning down the woods I heard one dove and two or three kingfishers, one of which I killed. If all these kingfishers are as blue-green backed, they may prove a distinct variety as compared to the Raiatea bird. Satisfied with the shearwater catch, I intend to spend tomorrow morning on land birds, searching especially for the Vini. We passed through the marshes behind the village and flushed three ducks, but I missed twice at perfectly good targets. Hope also to get some white terns late in the morning so they will not spoil. The guide says the "Meho" (rail) is here, but up in the mountains and not in these well grown marshes of the "fill".

No more ducks seen or heard. There was too much singing and "paurauing" near the boat to hear anything of Upoa. Made

of here either with the eggs.

Puffinus gravis eggs or birds 1889--1896.

Hopelia Note.

Captain Adams says that when he was at Hopelia one month before the wreck of the 'Sea Adler' the village moth colony of Xavica laid eggs a few inches apart (exaggerated I think); that the young birds literally covered the moth; that a tidal wave came along and killed every bird, piling dead bodies two feet deep along the shore by the village. This is exaggerated, no doubt, but good to show that they have other enemies than man.

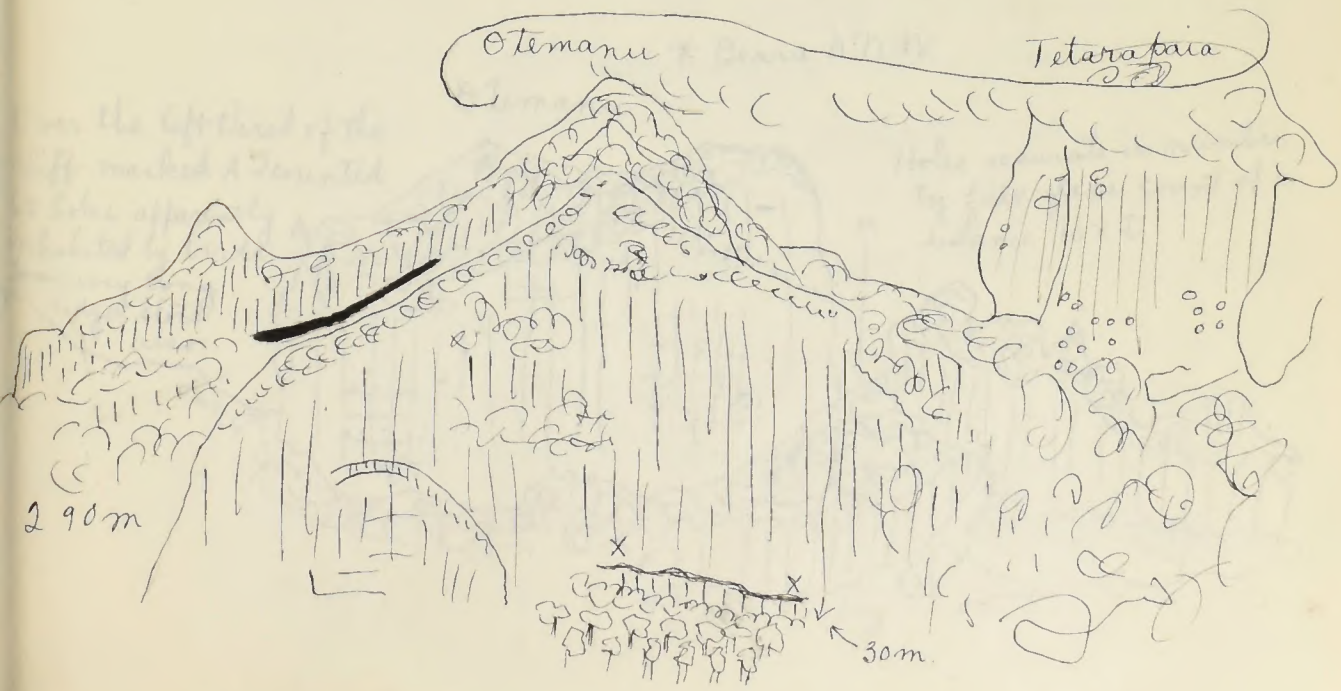
Descended the cliff without slipping, which was quite a relief for it is always easier ascending. Returning down the woods I heard one dove and two or three kingfishers, one of which I killed. If all these kingfishers are as blue-green backed, they may prove a distinct variety as compared to the Kalatoa bird. Satisfied with the observator ostom, I intend to spend tomorrow morning on land birds, searching especially for the Vini. We passed through the marshes behind the village and flushed three ducks, but I missed twice at perfectly good targets. Hope also to get some white terns late in the morning as they will not spoil. The guide says the "Kobo" (rail) is here, but up in the mountains and not in these well grown marshes of the "Vili".

No more ducks seen or heard. There was too much slapping and "paranaing" near the boat to hear anything of Dyca. Made

up the two birds and went to bed for the first six hour sleep of the week. Still feeling greatly elated over Upoa catch. One young bird was so nearly butchered that I helped him out. I dried him with cornmeal and put him in a little cotton for the night. Number two is now quite a fluffy ball of down. He had no doubt just hatched.

I have attempted in the following sketches to illustrate the extent of the holes in the mountains Tetarapaia and Otemanu. In the latter especially the majority of the holes appear to be in soft locality, as they are in that portion of the mountain which is undermining the upper part. From my visit to the nests yesterday I am quite convinced that these birds help deepen the holes. Especially would this be the case when desiring a rest they find all the deep holes occupied. Not appreciating light and heat while nesting, they would endeavor to deepen them.

(My guide says these names are reversed.)



up the two birds and went to bed for the first six hour sleep of the week. Still feeling greatly elated over Upon eaten.

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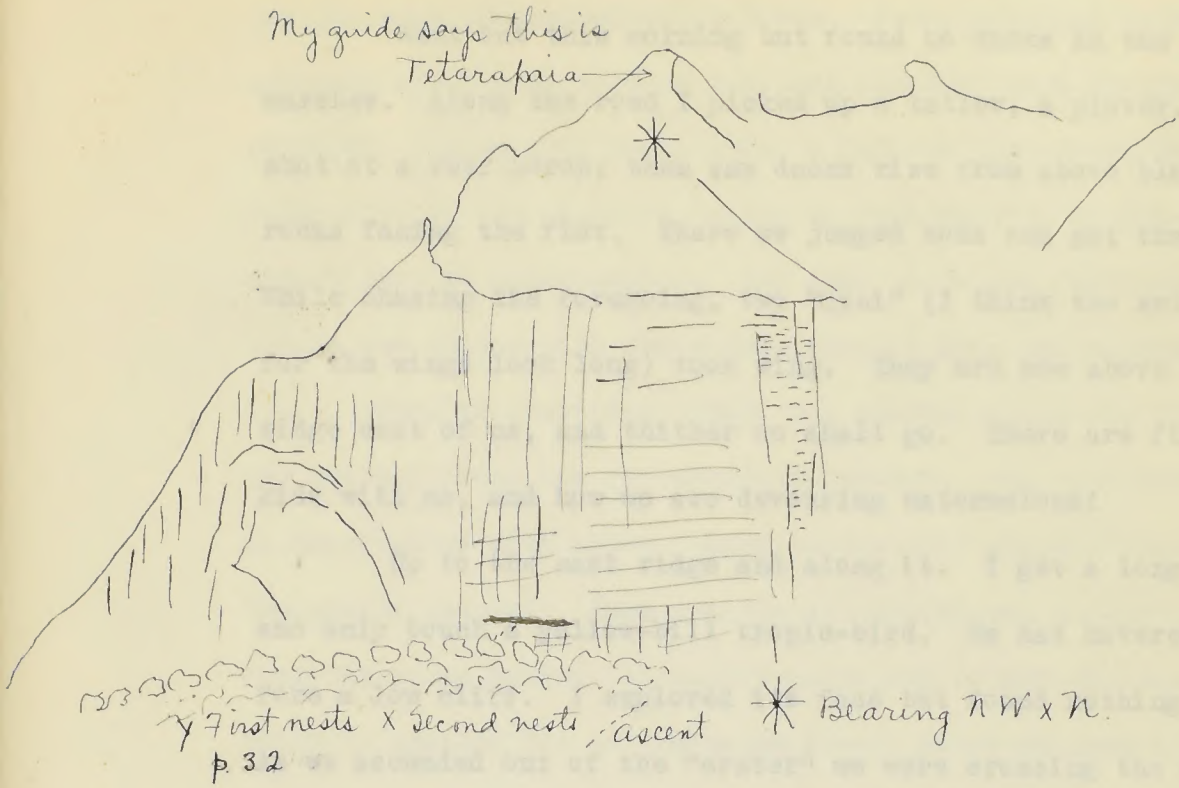
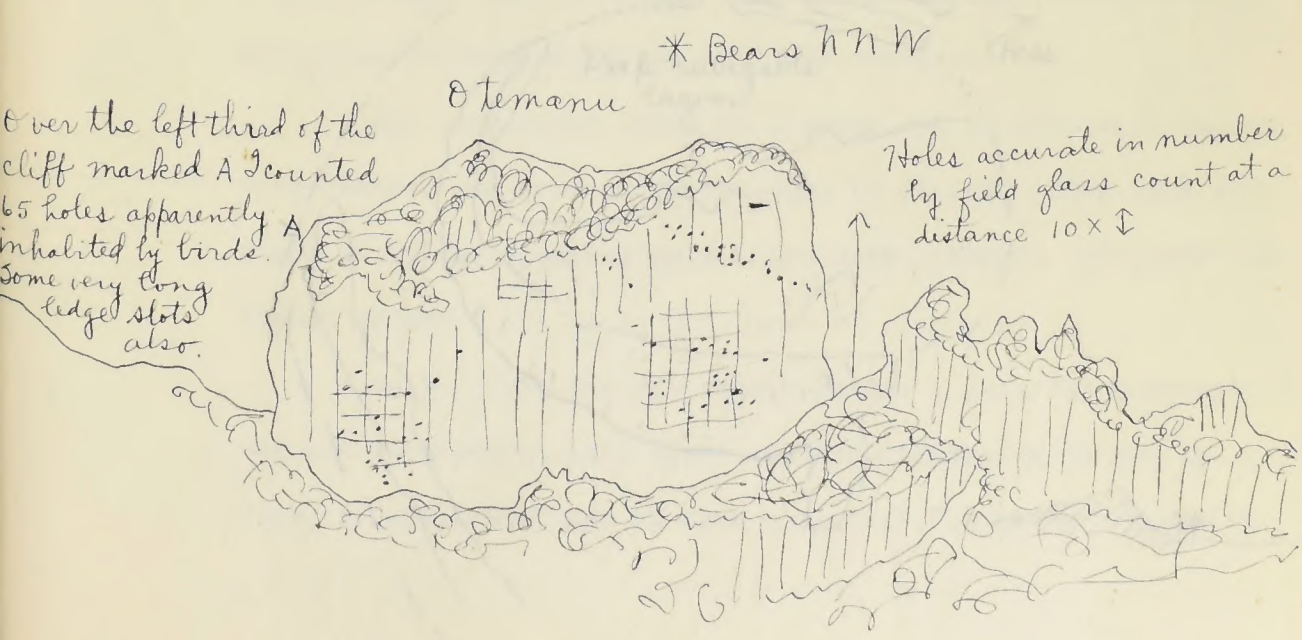
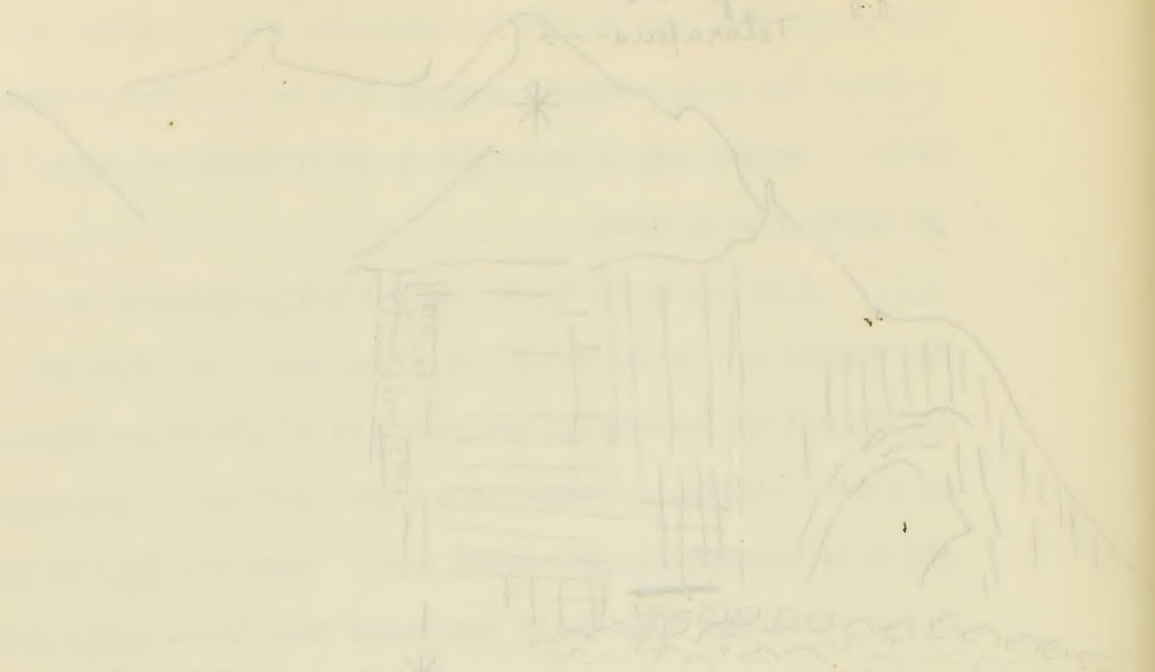

My guide says this is Tetarapaia
Y First nests X Second nests, Ascent p. 32
Bearing NW x N.

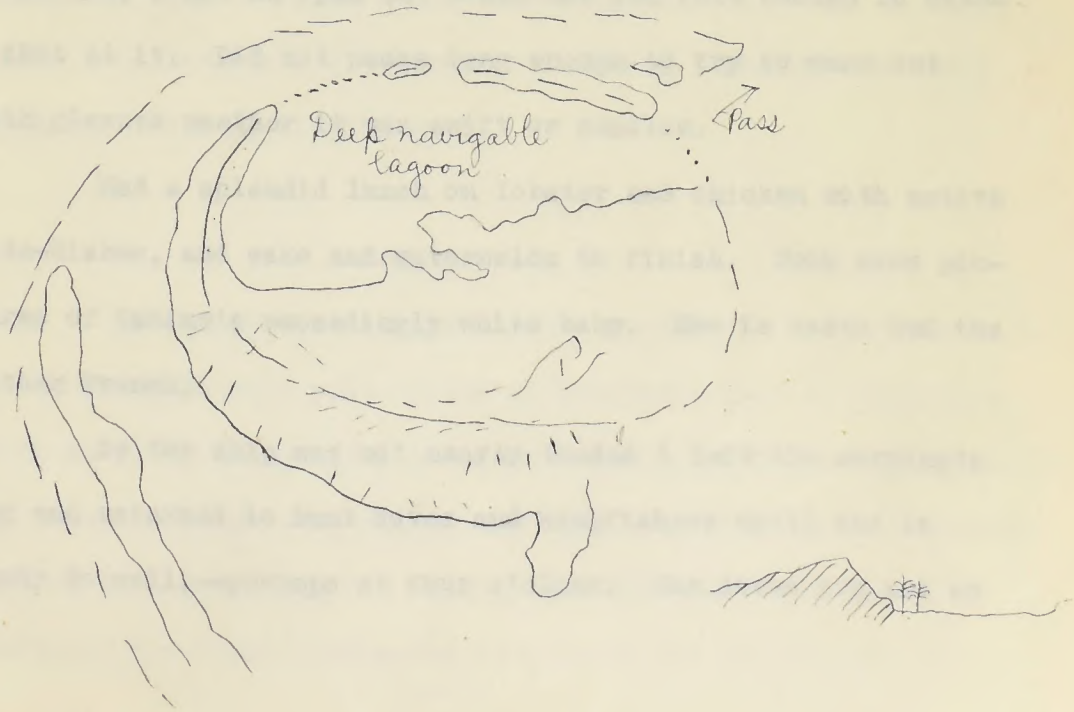

Bears NNW
Otemanu
Over the left third of the cliff marked A I counted 65 holes apparently inhabited by birds. Some very long ledge slots also.
A
Holes accurate in number by field glass count at a distance 10 x



January 13

Went out this morning but found no ducks in the marshes. Along the road I picked up a tatler, a plover, and shot at a reef heron; then saw ducks rise from above black rocks facing the flat. There we jumped some and got three. While chasing the foregoing, two "Opei" (I think the swift for the wings look long) took wing. They are now above the ridge east of us, and thither we shall go. There are fifteen kids with me, and how we are devouring watermelons!

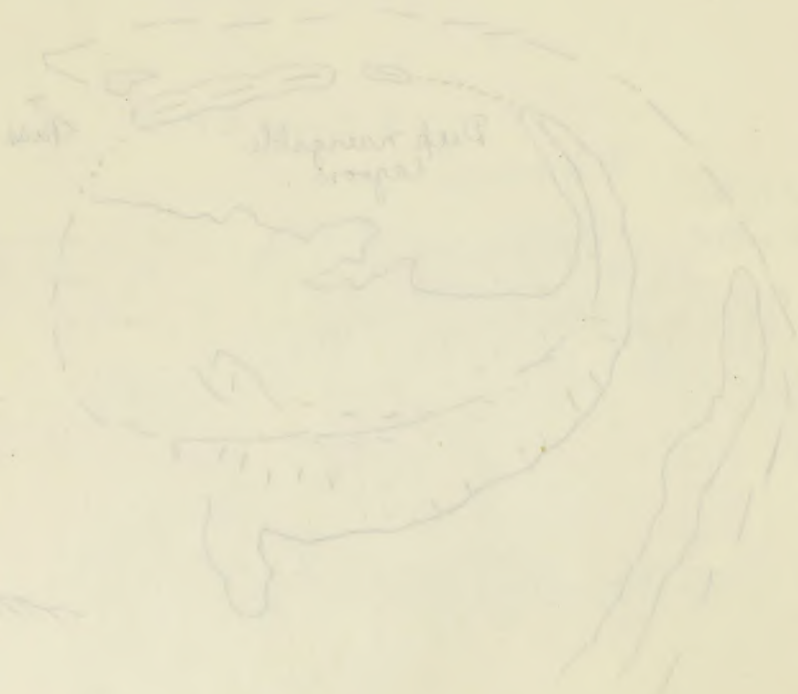
Up to the east ridge and along it. I get a long shot and only touch a yellow-bill tropic-bird. He had hovered before a low cliff. I explored its face but found nothing. As we ascended out of the "crater" we were crossing the edges of layers of lava, which continues to heap up the evidence that Bora Bora is a submerged crater.



January 13

Went out this morning but found no game in the marsh. Along the road I flushed up a snipe, a plover, and shot at a reef heron; then saw ducks rise from above black rocks facing the flat. There we jumped some and got three. While chasing the foregoing, two "hyas" (I think the swift for the wings look long) took wing. They are now above the ridge east of us, and thither we shall go. There are fifteen kids with me, and now we are devouring watermelons.

Up to the east ridge and along it. I got a long shot and only found a yellow-bill tropic-bird. He had hovered before a low cliff. I explored its face but found nothing. As we ascended out of the "crater" we were crossing the edges of layers of lava, which continues to keep up the evidence that here Bora is a submerged crater.



I counted 65 holes on the left of Otemanu, all of which had the sign of habitation by birds. Dung splotches below them. All were capable of holding one, and in many cases several pairs of birds. There must be at least a hundred such holes on the other side of the mountain "right of this face". On the farther side I have no observations. And then there are countless other cliffs and ledges with their dwellings of Upoa and Monaroa.

Time to start for lunch, but shucks! along the ridge to the coconut trees for refreshments instead. The rock just above is honeycombed with holes. Lava layers here are dipping from the crater seaward. Shot a noddy and scared out a couple of dozen from the rocks beyond. I cannot pause any longer up here. The swift or swallow has not revealed itself since we came up. Shot some white terns (two in one shot) returning down to the village. While I was calling doves the kids made so much noise that I fired them home. Just before reaching Fare Vahine, where I lunched, I saw an Opea but could not run fast enough to catch a shot at it. Did not pause long enough to try to make out with glasses whether it was swift or swallow.

Had a splendid lunch on lobster and chicken with native side-dishes, and cake and watermelon to finish. Took some pictures of Vahine's exceedingly white baby. She is caste and the father French.

As the ship was not nearly loaded I left the morning's bag and returned to hunt doves and kingfishers until she is ready to sail,--perhaps at four o'clock. The doves are not so

I counted 65 holes on the left of Steamer, all of which had the sign of habitation by birds. Dung splotches below them. All were capable of holding one, and in many cases several pairs of birds. There must be at least a hundred such holes on the other side of the mountain "right of this face". On the farther side I have no observations. And then there are countless other niffs and ledges with their dwellings of Ugos and Tomatoes.

Time to start for Imsom, but shucks! along the ridge to the coconut trees for refreshments instead. The rock just above is honeycombed with holes. Lava layers here are dipping from the crater seaward. Shot a noddy and scared out a couple of doves from the rocks beyond. I cannot pass any longer up here. The swift or swallow has not revealed itself since we came up.

Shot some white terns (two in one shot) returning down to the village. While I was calling doves the kids made so much noise that I fired them home. Just before reaching Fare Vaaine, where I lunched, I saw an Ugos but could not run fast enough to catch a shot at it. Did not pause long enough to try to make out with glasses whether it was swift or swallow.

Had a splendid lunch on lobster and chicken with native side-dishes, and cake and watermelon to finish. Took some pictures of Vaaine's exceedingly white baby. She is caste and the father French.

As the ship was not nearly loaded I left the morning's bag and returned to hunt doves and kingfishers until she is ready to sail,--perhaps at four o'clock. The doves are not so

easily called as at Raiatea and have a habit of flying well up above the trees. I often see two close together. Kingfishers are usually heard scolding as they depart for distant safety. I think I heard the vini, but could get no results by calling. Very sultry and hot, and thunder in the distance. Several pairs of noddies flying about the big arched cave.

Captain Adams says he caught a young tatler on the beach at Mopelia (?); also that the kini nest there (?).

Left at four-thirty but did not reach the dock at Raiatea until well past midnight. With the aid of the full moon my flashlight enabled me to work on deck. The cabin is absolutely unbearable on account of the open door to the engine room. I snatched two hours of sleep at dark and four hours here at the dock. Was too busy with birds as we left Bora Bora to make any observations. Two old and all young Upoa having died from heat or possibly from injuries in dropping them down from the nest shelf increased the burden of my dead birds considerably. I relieved it some by pickling one downy Upoa and a bloody kingfisher.

January 14

We finally got away at about ten o'clock. The letters of Beck's that this post office so foolishly sent to Bora Bora told me of Dr. Campbell's being in Papeete and for me to endeavor to reach there ere he sailed four days ago. The worst luck I've had on this job! But I'm hard at the skinning, with hopes to save all the birds unless the tern skins get too dry before I

usually called as at Saints and have a habit of flying well up above the trees. I often see two alone together. Kingfishers are usually heard scolding as they depart for distant safety. I think I heard the vireo, but could get no results by calling. Very noisy and busy, and hunting in the distance. Several pairs of robins flying about the big eroded cave.

Captain Adams says he caught a young tailor on the beach at Topolia (?): also that the mind nest there (?).

Left at four-thirty but did not reach the dock at Saints until well past midnight. With the aid of the full moon my flashlight enabled me to work on deck. The cabin is absolutely unbearable on account of the open door to the engine room. I snatched two hours of sleep at dark and four hours here at the dock. Was too busy with birds as we left Sora Sora to make any observations. Two old and all young Upos having died from heat or possibly from injuries in dropping down from the nest shelf increased the burden of my dead birds considerably. I relieved it some by picking one downy Upoa and a bloody kingfisher.

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We finally got away at about ten o'clock. The lantern of Rock's that this post office so resolutely sent to Sora Sora told me of Mr. Campbell's being in Papeete and for me to endeavor to reach there are he sailed four days ago. The worst luck I've had on this job! But I'm hard at the pumping, with hopes to save all the birds unless the tern eating rat too day before I

can wash and stuff them.

Hot and squally. Everyone on board is asleep most of the time, including the man at the wheel. I, too, have dropped off at the slightest opportunity. A flock of fishing birds off Huahine; mostly boobies, but with white terns and Upoa very prominent. Several noddies seen off Raiatea. The hotel keeper at Raiatea let me take his fox-terrier, "Flora", for the purpose of raising "rail chasers".

January 15

Although I feared the ducks, as they were not scraped and poisoned, would spoil, I simply didn't feel able to work, so I slept all day. We found ourselves very near Vaiau which lies forty miles to the southwest of Moorea. It is a low, regularly shaped mountain timbered over, and the island is encircled by one continuous reef motu, according to Captain Adams. Our engine worked only in spasms today, so at evening we could still see Vaiau. Wind dead ahead.

January 16

Awoke with the sun and set to work on birds. The ducks were spoiled; the rest are not so bad if a fellow could just get a little calm so as to be able to handle the wrapping cotton. I am putting them temporarily into paper. The little kingfisher died this morning, having refused to eat the prawns we secured for him at Bora Bora.

can weak and stuff them.

Hot and sunny. Everyone on board is asleep most of the time, including the man at the wheel. I, too, have dropped off at the slightest opportunity. A flock of flashing birds off Bashima; mostly booby, but with white terns and Tropic very prominent. Several noddies seen off Malaita. The hotel keeper at Malaita let me take his fox-terrier, "Flora", for the purpose of raising "real chasers".

January 15

Although I feared the dukes, as they were not scraped and poisoned, would spoil, I simply didn't feel able to work, so I slept all day. We found ourselves very near Vatom which lies forty miles to the southwest of Moorea. It is a low, regularly shaped mountain timbered over,

and the island is encircled by one continuous reef note, according to Captain Adams. Our engine worked only in spasms today, so at evening we could still see Vatom. Wind dead ahead.

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We are tacking against a heavy head wind this morning, with everyone trying to make the engine run. Waves splashing, as they did all day yesterday, prevent working on birds above, and lack of room and sickness prevent work below. In fact, we are loaded to above the gunwales, and as a consequence salt water flowed into the engine through the exhaust. Moorea growing more distant.

Manuary 17

We worked well around to the north of Moorea during the night, but only by sailing against a head wind, and later we were rather becalmed. Awoke this morning to find no wind, and the boat lying off Moorea but a few miles to the northward. It seems that the engineer, who was in the special favor of the young vahine returning from Bora Bora to Raiatea, neglected to stock up with cylinder oil at the latter place, and consequently we are now unable to run the engine. Food and water are scarce, the water cans having been left where the salt water splashed into them. The water is so brackish that it makes one thirsty to touch it; so I am unable to blow eggs. However, I find two of the Upoa dead, and so have a little work for the morning. A breeze is arising now at about nine o'clock.

Last evening I saw two small petrels with white breasts and underwing coverts. They were about the size of Puffinus neglecta, but of course any identification was impossible. They did not approach close enough for shooting. We were about twenty miles west of Moorea at the time. Soon after the morning

We are heading against a heavy head wind this morning, with everyone trying to make the engine run. Have splashing, as they did all day yesterday, prevent working on birds above, and lack of room and windows prevent work below. In fact, we are loaded to score the gunwales, and as a consequence salt water flowed into the engine through the exhaust. Scores growing more distant.

January 17

We worked well around to the north of Scores during the night, but only by sailing against a head wind, and later we were rather beaglued. Awoke this morning to find no wind, and the boat lying off Scores but a few miles to the northward. It seems that the engineer, who was in the special favor of the young valine returning from Lora Nora to Malaton, neglected to stock up with gylinder oil at the latter place, and consequently we are now unable to run the engine. Food and water are scarce, the water cans having been left where the salt water splashed into them. The water is so brackish that it takes one thirsty to touch it; so I am unable to blow eggs. However, I killed two of the Dyce dead, and so have a little work for the morning. A breeze is arising now at about nine o'clock.

Last evening I saw two small petrels with white breasts and underwing coverts. They were about the size of Puffinus assimilis, but of course any identification was impossible. They did not approach close enough for shooting. We were about twenty miles west of Scores at the time. Soon after the morning

sun becomes unbearably hot the tradewind arises. It is quite surprising what velocity it attains within a very few minutes following almost a dead calm. White terns, noddies and boobies are very frequent when this near Moorea. We are now off the point of Temae.

As we approach Tahiti I have seen two or three of the little gray-back terns like those obtained at Raiatea, along with white and noddy terns and boobies. They were perched upon or flying above debris, apparently floating out of the pass. The wind arising at nine o'clock brought splashes of spray over the deck, preventing work on the birds. It will be a little hard to settle down to skinning upon arriving, but necessary for a couple of hours. Through the pass at two-twenty. Heavy wind continues.

Beck met us at the dock and had the boat of the 'France' to carry birds etc. to his house. He says the steamer sailed last Sunday, taking Dr. Campbell with it. Off to the tinto's for something to eat.

After making up the two Upoa, I returned to the dock and transferred my bed and baggage to the schooner, 'France'. What a magnificent boat she is, with graceful lines and all the conveniences desirable for South Sea traffic! She has two good masts, a good galley, sailors' quarters before the mast, a splendid cabin and a good sizable quarter-deck; but best of all, she has good ladders up the rigging so I can ascend to the masthead at will to look down into coral atolls as Darwin did. Mr. Beck mentioned rooms and lodging while in Papeete,

sun bounces unmercifully off the treacherous drifts. It is quite surprising what velocity it attains within a very few minutes following almost a dead calm. This terse, meddlesome and boorish are very frequent upon this near coast. We are now off the point of Lemsa.

As we approach Sadit I have seen two or three of the little gray-back terns like those obtained at Malaita, along with waits and noddy terns and boobies. They were perched upon or flying above debris, apparently floating out of the pass. The wind arising at nine o'clock brought spindrift of spray over the deck, preventing work on the birds. It will be a little hard to settle down to skinning upon arriving, but necessary for a couple of hours. Through the pass at two-twenty. Heavy wind continues.

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After making up the two lots, I returned to the dock and transferred my bed and baggage to the schooner, 'France'. What a magnificent boat she is, with present items and all the convenience desirable for South Sea traffic! She has two good masts, a good galley, officers' quarters before the mast, a splendid main and a good sizable quarter-deck; but best of all, she has good ladders up the rigging so I can manage to the masthead at will to look down into coral atolls as Darwin did. Dr. Cook mentioned room and lodging while in Tagaste,

but who could ask for more than a private yacht? This is my home during my sojourn in Southern Seas. Why add additional expense when our benefactors are treating us as only princes (of science or research) could expect to be treated?

January 18

Tied Flora, the fox-terrier bitch, to the rigging last night to be sure not to lose her. Noha, himself, disgusted when I made him sleep before the mast, jumped ship and went somewhere ashore. I just couldn't sleep until I had looked all over, and well satisfied I am with the 'France'. She is surely some schooner, though I suppose "yacht" is hardly any too good a name for her now.

Worked on Upoa this morning, and at the same time visited in a manner with Mrs. Beck. Poor woman! what a tragedy that she cannot stand the sea, and so help Beck enjoy the final fruits of his thirty years of labor for science,--and such labor as it has been! He is the greatest human dynamo that I have yet seen, and above it all a man one more than admires.

January 19

Heard the myna birds break out into a mad chatter of many voices during the night, three or four times. While out for breakfast I got a collar for my dog and a swivel link to fasten the two together. Over to the ship-yard with our tall, husky sailor, and back with the Fan Fan. Boated pickled specimens and Raiatea birds to Beck's, where I opened

out who could see for more than a private reason. This is my case during my sojourn in Southern Cass. Why add additional expense when our benefactors are treating us as only patients (or aslands or runaways) which expect to be treated?

January 12

Bad Mora, the fox-terrier bitch, to the tingling last night to be sure not to lose her. Poor, himself, disgusted when I made his sleep before the meal, jumped only and went somewhere ashore. I just couldn't sleep until I had looked all over, and well satisfied I am with the 'trance'. She is surely some sojourner, though I suppose "yonk" is hardly any too good a name for her now.

Worked on Yoga this morning, and at the same time visited in a manner with Mrs. Cook. Poor woman! what a tragedy that she cannot stand the sea, and so holy book enjoy the final fruits of his thirty years of labor for science,--and such labor as it has been! He is the greatest human dynamo that I have yet seen, and above it all a man one more than admirable.

January 13

Heard the wyna birds break out into a mad chatter of many voices during the night, three or four times. Quite out for breakfast I got a collar for my dog and a swivel link to fasten the two together. Over to the sail-yard with our tail, happy sailor, and back with the van. Stayed picked eucalyptus and talains with Jo Cook's, where I opened

the day blowing eggs.

January 20

Succeeded in getting eleven common booby eggs, most of which were still apparently fresh. If there were no interfering causes this would lead one to think that the laying season was a very marked one, but there are two things which might be the explanation of the general freshness of the eggs. First, I found the natives and supercargo collecting eggs to eat. Although they look sunward through all they collect, still if they visit the colony frequently enough they will tend to keep the nests cleared up. Second, the fresh eggs seem to have survived being knocked about one month before being blown. Several having birds in them were discarded after breaking. Most of the sooty terns, however, were fresh but too frail to carry about.

In running over notes I noticed that of the seventeen Raiatea green doves, fourteen were males, two questionable, and but one female, due no doubt to the system of calling used in collecting them. Since the one female bird collected was laying, the rest might have been setting and so one would not find many about. Many of the males were feeding young, however, and should not the females also be about and feeding young?

I was somewhat surprised to find that I had preserved but thirty-eight stomachs from the two hundred birds collected, but lack of jar space prevented retaining sea bird gullets. I am particularly anxious to find out what the kingfisher's diet is. Windy squalls this afternoon.

the day blowing eggs.

January 20

Succeeded in getting eleven common booby eggs, most of which were still apparently fresh. If there were no interfering causes this would lead one to think that the laying season was a very marked one, but there are two things which might be the explanation of the general freshness of the eggs. First, I found the natives and supercargo collecting eggs to eat. Although they look searched through all they collect, still if they visit the colony frequently enough they will lead to keep the nests cleared up. Second, the fresh eggs seem to have survived being knocked about one month before being blown. Several having birds in them were discarded after breaking. Most of the booby terns, however, were fresh but too frail to carry about.

In running over notes I noticed that of the seventeen frigate frees above, fourteen were males, two questionable, and but one female, due no doubt to the system of calling used in collecting them. Since the one female bird collected was laying, the rest might have been setting and so one would not find many about. Many of the males were feeding young, however, and should not the females also be about and feeding young?

I was somewhat surprised to find that I had preserved but thirty-eight specimens from the two hundred birds collected, but lack of Japanese prevented retaining one bird grilled. I am particularly anxious to find out what the Kingfisher's diet is. Windy squalls this afternoon.

January 21

Went over all pickled stuff today and made out stomach information blanks. Carried plants back from ship where I had left them during fumigation.

There is an increased number of beach-combers adrift here now, and I doubt if a single one of them has refrained from asking Mr. Beck for a billet on the 'France',--America and the race first is their plea. But what awful Americans and what tarnished whites they are! For the like of them we certainly have not the least sign of a billet.

Here is a six inch dorsal fin cutting the water not many meters off the wharf. Perhaps it is not dangerous, but I, for one, care not to swim in this harbor.

January 22

Had planned running out to Papeari to visit with "Borneo" Smith (Harrison W.), James Norman Hall and Frisbee, but seeing a steamer off the reef, I decided to remain aboard ship and keep the typewriter busy. Am still copying nautical information.

The steamer 'Waitamata' is at the wharf unloading cattle, two of which they have already given a bath in the lagoon. It certainly is interesting to watch these natives trying to lead a beef steer,--half a dozen of them on a hauser line ahead, one holding a short line aloft the bow and several prodding with long poles. They are careful to keep well beyond the reach of hoof and horns.

January 21

Went over all pickled stuff today and made out economic information blanks. Carried plants back from ship where I had left them during fumigation.

There is an increased number of beach-combers ashore here now, and I doubt if a single one of them has refrained from asking for. Back for a billet on the 'France',--American and the race first in their plea. But what awful Americans and what tarnished whites they are! For the like of them we certainly have not the least sign of a billet.

Here is a six inch dorsal fin cutting the water not many meters off the wharf. Perhaps it is not dangerous, but I, for one, care not to swim in this harbor.

January 22

Had planned running out to Papeari to visit with "Doreen" Smith (Harrison ?), James Norman Hall and Tribbe, but seeing a steamer off the reef, I decided to remain aboard ship and keep the typewriter busy. An still copying nautical information.

The steamer 'Matanuska' is at the wharf unloading cattle, two of which they have already given a bath in the lagoon. It certainly is interesting to watch these native trying to lead a beef steer,--half a dozen of them on a hawser line ahead, one holding a short line alert the bow and several prodding with long poles. They are careful to keep well beyond the reach of hoof and horns.

More than a dozen myna birds came aboard this morning to enjoy a breakfast on the pig's bananas which hang on the foremast rigging. The pig by getting his forefeet up on the gunwales has helped himself to half the lunch. He may be a pig, but he's no one's fool. They are interesting but unlovable creatures. He sleeps in the gangway of the sailors' quarters where I had expected to quarter my dogs during rainy weather.

Just met our engineer, a very likable fellow, well advanced in years, or at least approaching maturity, and apparently capable. Personally, I am quite well pleased with our crew, from the Captain down to the cook. The sailors all seem to be husky, capable fellows, and I hope they know how to put the whale boat over the reefs.

One of the steers just broke loose and added real comedy (and almost tragedy in the case of one Chinaman) as he tore down the wharf towards the open field beyond the sheds, everyone, including the police sergeant, in pursuit of him. Some of them appear to be bulls, but perhaps this is a good place for them to get rid of third rate beef. A pen of sheep, mostly two year old wethers, looks to be in very good shape. They are of a "Southdown" grade, good blocky mutton stock.

It was excessively sultry and discouragingly hot this afternoon. Ate lunch with the Becks at the Diademe and then walked down to change plant blotters. Read the Christmas Island article and then measured the gray-backed terns from Raiatea. None of them exceeded ten inches except very slightly, and most were nine and a half inch wings (a local variation?).

More than a dozen sperm birds came aboard this morning to enjoy a breakfast on the ship's bananas which hung on the foremast rigging. The ugly gulling sea forefoot up on the gunwales has helped himself to half the lemons. He may be a pig, but he's no one's fool. They are interesting but unlovable creatures. He sleeps in the scupper of the sailors' quarters where I had expected to quarter my dogs during rainy weather.

Just met our engineer, a very likable fellow, well advanced in years, or at least approaching maturity, and apparently capable. Personally, I am quite well pleased with our crew, from the Captain down to the cook. The sailors all seem to be handy, capable fellows, and I hope they know how to put the whale boat over the rocks.

One of the sisters just broke loose and added real comedy (and almost tragedy in the case of one Chinaman) as he tore down the wharf towards the open field beyond the shade, everyone, including the police sergeant, in pursuit of him. Some of them appear to be senile, but perhaps this is a good place for them to get rid of third rate beef. A pen of sheep, mostly two year old wethers, looks to be in very good shape. They are of a "Southdown" grade, good blocky mutton stock.

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January 23

A little typewriting and letters for the 'Waitamata'. Changed plant blotters and walked to and from Beck's house, and the day had ended. How much time it takes to do little and insignificant things! We had mutton at the Tiare Hotel and found it a real treat. Boys of the ship say that the farmers in New Zealand are giving away sheep. What an aftermath of war the world is passing through!

In looking towards the sunset this evening I was struck by the appearance of the reef, which being bare at low tide appeared to be an islet of rather prominent rocks.

January 24

The same effect was pronounced this morning. The illusion is very likely due to the mirage of the quiescent lagoon surface.

The steamer 'Waitamata' left this morning at six instead of last evening at that hour, as she had been booked. I have at last found some hard pencils,--pencils that will scratch the paper enough to leave an impression legible after the graphite washes off.

Found that one booby, two tern and a shearwater egg still needed swabbing out. Fitted some corners to bird box and cut down a case to hold one can. The plants are thoroughly dry and ready for packing, but they are not very good specimens. There is too much of this abominable tropical mould; fumigation helped some.

January 22

A little typewriting and letters for the 'Waitemata'. Changed plant blotters and walked to and from Sam's house, and the day had ended. How much time it takes to do little and insignificant things! We had auction at the Plate Hotel and found it a real treat. Joys of the auld say that the farmers in New Zealand are giving away sheep. What an aftermath of war the world is passing through!

In looking towards the sunset this evening I was struck by the appearance of the reef, which being here at low tide appeared to be an islet or rather promontory rocks.

January 24

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January 25

They failed to get rid of all the cockroaches on the ship by fumigation and molasses trap. There are any number hanging around above deck, and we have also two colonies of ants to get rid of. The Scilly plants, though thoroughly dry, are in rather doubtful condition. Mould and mildew got too much play on them.

January 26

Today after working upon packing cases most of the day I assumed my duties as purser, and converted fifty vouchers from francs into dollars. It has been unbearably hot this week when not in a breeze, ending with showers this evening. Morning and evening sky effects extra beautiful.

January 27

Had to use the dictionary considerably today to convert French vouchers into English for listing. The Frenchmen here are the worst penmen I ever came across. Spent the afternoon on titles of Beck's pictures and copying nautical information for study upon journey. The Raiatea bitch, having escaped yesterday, was a lost dog until late this morning when she returned to the Becks' cottage. When the rains came last night Noha must have been taking in some canine social nearest the Hotel Tiare, for he dropped in there for shelter. He was on the ship in the early morning however.

Very hot again today in spite of the showers during

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Very hot again today in spite of the showers during

the night. A hurricane is reported from Fiji, headed this way, and due about Monday.

January 28

Took the boat around to the foot of Rue de Ramparts and brought back several poles of bamboo for splitting into bird body sticks. The low tide on the flat between the canal and the harbor forced me to keep to the deep lagoon channel and row about a mile or more to get four or five hundred yards. It was easier than bicycle anyway, and I enjoyed the boat ride, especially going out on account of the clearness of the water. Saw no birds on the trip.

The Canadian steamer from New Zealand arrived this morning. It is bound for New York, which will save unnecessary handling of the birds, plants and photograph plates we are shipping on it. Unusually sultry today, but the report is that the thermometer is only at 92° F., with a high humidity no doubt.

January 29

This suffocating heat is accompanied by an increased drowsiness; everyone is complaining of sleepiness, a continual lethargy which certainly carries away one's pep and ambition. Thank God, we'll soon be sailing to a cooler region of the earth, and one that is not too cool either. The latest report is that we sail Tuesday evening; some of the provisions came aboard yesterday. Today is visitors' day, the ship being in fairly good shape for the occasion. There is not the luxurious

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January 18

Took the boat around to the foot of Rue de Bourgarte and brought back several poles or bamboo for splitting into bird body sticks. The low tide on the flat between the canal and the harbor forced me to keep to the deep lagoon channel and row about a mile or more to get four or five hundred yards. It was easier than bicycle anyway, and I enjoyed the boat ride, especially going out on account of the clearness of the water. Saw no birds on the trip.

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January 19

This surrounding heat is accompanied by an increased drowsiness; everyone is complaining of sleepiness, a constant lethargy which certainly carries away one's pep and ambition. Thank God, we'll soon be sailing to a cooler region of the earth, and one that is not too cool either. The latest report is that we sail Tuesday evening; some of the provisions came aboard yesterday. Today is visitors' day, the ship being in fairly good shape for the occasion. There is not the luxurious

appearance of the average yacht, but it certainly looks comfortable in comparison to the loaded down trading schooners on which we have formerly traveled about. It appears to be just about the proper size.

Showers commenced at noon, but they were very light and it was terribly sultry afterwards. Gusts of wind now and then were the only respite. Myna birds are very noisy about the hotel where I lunch. There were several around our basket of pig-feed this morning, but at the ship one hears them only from the starboard side,--half the world is quiet at least. There are many newly raised young about. What thousands there are now, and when will they reach their limit of increase? My opinion of Tahiti is briefly stated: An island stocked with Chinamen, lantana and myna,--the rest doesn't amount to much in comparison. These three invaders, however, without any natural enemies, threaten to completely over-run the entire island. What splendid opportunity an island affords for its own preservation, yet a little neglect and carelessness can start it rapidly along the road of destruction by alien enemies. The Chinaman and myna have reached the Marquesas Isles, the Australs, Tuamotu and Leeward groups. Lantana and wild tobacco fortunately have not yet been carried beyond Tahiti and Moorea; but are they not likely to follow? Man in his endeavor to produce marketable products has more than once allowed dangerous pests to get away from Pandora's box. In his killing of this animal for food and fur, or these birds for food and feathers he has disturbed that nice balance of nature which kept down

appearance of the average yacht, but it certainly looks comfortable in comparison to the loaded down trading schooners on which we have formerly travelled about. It appears to be just about the proper size.

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pestilence and plague.

Today there was a flock of two or three dozen pigeons on and about the copra sheds; they seem to find plenty of food there, as do the myna birds.

Some of the beach-combers, of which we have far too many here, have been after me to sell anything from jack-knives to volumes of Shakespeare. They are an awful bunch, and the worst of them are the filthy--terribly filthy--Australians, probably descendants of the convict colonists.

January 30

This morning I signed on as purser of the 'France' without pay, Curtis being booked as an ordinary seaman. Found Motate working on the port launch, so I took him off the job and he is now with me in the Fan Fan on our way to Beck's cottage after the second load of ammunition. What a convenient means of transportation is a boat! One of the first achievements of the human race was the building of canoes.

A few pairs of white terns about the trees of the village, but this harbor is noticeably quiet as regards sea birds. How different from a harbor within the range of gulls! On the third trip I saw a frigate bird flying along just above the tree tops of the village behind which it disappeared. From the whiteness of its head, and from its calling I conclude it is a young bird. It may be one that some native has raised for eating, escaped to follow his own life. Three pigeons were flying before it in apparent fear.

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January 30

This morning I signed on as purser of the 'Tresse' without pay, Curtis being booked as an ordinary seaman. Round Tipate working on the port launch, so I took him off the job and he is now with me in the fan fan on our way to Sock's cottage after the second load of ammunition. What a convenient means of transportation is a boat! One of the first achievements of the human race was the building of canoes.

A few pairs of white terns about the trees of the village, but this harbor is noticeably quiet as regards sea birds. How different from a harbor within the range of guns! On the third trip I saw a frigate bird flying along just above the tree tops of the village behind which it disappeared. From the whiteness of its head, and from its calling I concluded it is a young bird. It may be one that some native has raised for eating, escaped to follow his own life. Three pigeons were flying before it in apparent fear.

On the second load of ammunition we had considerable fun, after it happened. A heavy shower and slopping bilge water wet the boxes slightly so we had to open several to dry. But the fun occurred when, after having rowed hard to shorten the trip, I was in too great a hurry to wait for the sailors to unload the boat. After making fast the bow, Motate went aboard ship. I picked up a box of ammunition and passed it up to him. He reached over and obtained a feeble finger hold in the slots. I saw an expression of mortification come over his face, and felt the boat slipping out from beneath me. Next, something struck me on the "bean"; then I heard a splash and saw box and boy in the sea between the ship and me (fortunately fallen in the boat, dazed but still conscious). Of course there was foolishness in it,--not making the boat fast and so forth. A native diver was obtained, and in very short order put a line about the box and the boys hoisted it aboard. We broke it open and Mr. Beck spread the cartridges out to dry, water having penetrated several of the cartridge boxes. So after the shells were saved it was a laughable incident, although I carried a bad headache all afternoon and Motate, who disappeared before I got into the ship, never showed up all day.

The Captain seems to have in view a young native lad for a cabin boy who talks English as well as French, so he will probably go along and this will be the end of my boy, Motate. He's getting too independent anyway.

There was a very sinister appearing cloud above the

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There was a very sinister appearing cloud above the

town this afternoon. It extended from the mountain summits around which it hung ominously and whence it spread in a broad, slightly spreading tail, while the rest of the sky seemed dark enough for rain.

A few drops fell, and an hour later the sun was out and but few light clouds remained. Today was spent mostly in loading provisions on the ship.

January 31

Representative of owner of the 'France': Rollo H. Beck.

Captain: Martin Neagle.

Stewardess: Mme. Neagle.

Purser: E. H. Quayle.

Engineer: Louis.

Mate: Charlie Olson.

Cook:

Five sailors: Curtiss, Drollet, Teo, Jimmy, Parau.

Cabin boy: Ralph (Lafe)

We rushed things today, intending to get away at four o'clock; but of course did not succeed, mainly because of a change in the port laws which said that the doctor's inspection is only at eight A. M. The delay is worth while as we were certainly not ready to sail in good order.

Back to p 241

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from p 260

As a general note of the island, the northward is noticeably open-reefed; the east and four or five points either way noticeably closed and covered with "mau niotu". At our arrival on the ridge I heard a tatler, and here is another,-- 850 feet altitude. Here there is moisture and even water. Light sprinkle of rain. There are very few coconuts on this island; several taro beds and a few patches of bananas. Papaya is cultivated, and some coffee and vanilla. The chief reported a sickness that has killed two or three of the people. Might it be typhoid? And the French warship "Aldebaron" is cruising about wasting money! Why isn't she here doctoring these poor, unfortunate savages?

We collected until one-thirty. Curtis, being new at the game, is too thorough in his notes (not for the notes but for our time allotment). I searched a fern-bedded, hibiscus-covered ravine above here for rail, but found nothing. Collected all ferns found in spore and taro. Besides the hibiscus, the ava was present with its leaves perforated by beetles, some of which I dropped into the formalin bottle. No sign of rail. One thing is certain: I, for one, cannot collect botanical specimens hurriedly and collect them thoroughly. They are not like birds which are shot and pocketed, usually without comment until leisure moments.

Some more tropic-birds of both species have been about, but not at all close. Found an egg which looks to me much like a shearwater egg, and one little feather was with it in the tramped out place in the grass amongst the guava

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We collected until one-thirty. Curtis, being new at the game, is too thorough in his notes (not for the notes but for our time allotment). I searched a fern-bedded, bitiaque-covered ravine above here for rail, but found nothing. Collected all ferns found in spore and taro. Besides the bitiaque, the ava was present with its leaves perforated by beetles, some of which I dropped into the formalin bottle. No sign of rail. One thing is certain: I, for one, cannot collect botanical specimens hurriedly and collect them thoroughly. They are not like birds which are shot and pocketed, usually without comment until leisure moments.

Some more tropic-birds of both species have been about, but not at all close. Found an egg which looks to me much like a noddy's egg, and one little feather was with it in the trampled out place in the grass around the guava

bushes. Grass about thirty to forty centimeters high, not entangled. There was evidence of goat browsing, which might have disturbed the birds. Maggots are still finding food in the egg; no remains of young bird in it. On ridge summit at head of ravine leading southeast.

3:30. Just after finishing lunch I saw a white-bellied shearwater come in from the eastward, flying well above range overhead. It flew along the ridge but not over the hills seen from here. May be located somewhere on south slope in grass, like the place where preceding egg was found; or he may possibly have dropped over the cliff to the northward, but I thought it looked as if he had gone in the former direction. There was no doubt about its being a shearwater, and it looked to me about the size of P. rostrata, but I could not detect the limitations of the white underparts which might have included the throat. It was decidedly larger than P. neglecta. I am wholly unprepared, or I would return up the mountain for the night's vigil.

Few tropic-birds in sight this afternoon. I obtained one white tern while lunching. Curtis left for ship with plants at four-thirty. I attempted a descent down south slope, but fern-brake was well over my head, and I could not make it. Returned to ridge and started east along it. Saw three blue ternlets coming in from the southeast. All three were headed for the pass I was leaving. I returned and got the first one, but missed the other two, which then followed cliff to west. Later another came from the east along north face of ridge.

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Did not see it until too late. Got another white tern, very clean. Have decided to camp here until sundown. We found guava quite refreshing up here today. The cuckoo still calls from the timbered glades in the ravine to southward. The calls are plentiful so as to make me think he's no straggler. A dark cloud over higher mountain.

I saw two more of the light underpart shearwaters, and am inclined to judge them as resembling the common bird at Rapa, which we found flying about the cliffs there in the day-time when mating. But we were here a week or so later and saw nothing of them, so there is another set back. Perhaps they are something else. The nest in the grass, though, wasn't like P. rostrata. I hate the idea of leaving without settling the question but-------.

Heavy shower during the night, accompanied by heavy wind which has prevailed since morning.

February 9

Saw eleven frigate birds leaving cliffs this morning to windward, and later six soaring about the cliffs. Lesser and noddies flying seaward but not in any numbers. There were black birds flying about the distant cliffs, but I think they were the noddies. A common booby came over and I winged it just lightly. It flew far around the island.

The first stop at the motu, directly west of the mountainous portion of the island and north by west of west end of main island. Here we found a few little white terns,

did not see it until too late. Got another white tern, very clean. Have decided to camp here until sunsown. We found grass quite refreshing up here today. The sunset still calls from the timbered glades in the ravine to southward. The calls are plaintiful so as to make me think he's no stranger. A dark cloud over higher mountain.

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a couple of noddies, several tatlers, and three herons (two white). Collected a few terns. Gathered plants in bundles and I numbered and noted them during the boat journey to islets southwest of island. Here are two small islets (motu) with white terns very numerous and frigate birds in the tree tops of one.

Motu Itatae: Here the most conspicuous thing was the innumerable white terns. Found but two young birds. Shot four from air. Found one young noddy on ground. Saw no nests of any kind. There was one large tree dominating the islet, more than one meter in diameter and 20.25 meters high.

As we approached these two islets, upwards of fifty frigate birds flew out from trees of the second one and circled above it. Thinking they were nesting, I expected to finish the first motu and then go to the second for lunch. When we arrived at the second, not one frigate bird was to be seen anywhere, less than an hour having elapsed. We have found half a dozen plants here that were not on the first, or northwest, motu. One frigate bird has returned to motu number two, now that we have left the islet. A curlew flushes from a spit of gravel in the lagoon.

We stopped at two other motu and passed near the rest of this group. Had not time to go to the large one south of center of island just east of the shallow pass here. We headed straight for rock point at east end of island. After rowing half the distance I realized that the wind was fair and that we had a bit of canvas,--my old bed cover. We set up an oar in the bow and then attached the fish spear

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As we approached these two islets, upwards of fifty frigate birds flew out from trees of the second one and circled above it. Thinking they were nesting, I expected to finish the first motu and then go to the second for lunch. When we arrived at the second, not one frigate bird was to be seen anywhere, less than an hour having elapsed. We have found half a dozen plants here that were not on the first, or northwest, motu. One frigate bird has returned to motu number two, now that we have left the islet. A curlew flushes from a spit of gravel in the lagoon.

We stopped at two other motu and passed near the rest of this group. Had not time to go to the large one south of center of island just east of the smallow pass here. We headed straight for rock point at east end of island. After rowing half the distance I realized that the wind was fair and that we had a bit of canvas,--my old bed cover. We set up an oar in the bow and then attached the rich cover

to one corner of the sail and tied the other to the boat by my bandana handkerchief. We then made more than three knots an hour, much better than our rowing had been, and succeeded in reaching ship at a little after four o'clock. Mr. Beck greeted us with the information that we could not sail till morning, which answers my "but" of last night. At his suggestion (though it would have been my first idea) I decided to make a strenuous effort to get those shearwaters seen last evening. I don't know what kind of a mountaineer or nighthawk Mr. Beck thinks me, but he seemed surprised when I informed him that I was going to camp up there. I would not have come up just for the evening,--would hardly have had time. So I put a blanket in my jacket and some grub, and got away at four-thirty.

Came up the same trail, which is in rear of a native hut wherein resides a native girl with a winsome smile and not bad looking. "Excelsior!" said I, and passed on up the trail. In the papaya grove there were chickens, but I was not fresh enough to travel quietly. Saw one fly into a tree of dense foliage, so I stopped to rest while looking for her. Failed to detect her amongst the leaves. Proceeded on up the trail to the ridge, where I arrived at five-thirty. Stopped and tapped a can of pineapples, drinking the delicious juice and eating a biscuit. Then on up the ridge.

Of first interest were three little blue ternlets coming up the side ridge to southward, playfully fluttering along. I gave their call (a light tone, nasal trill) and one

to one corner of the sail and tied the other to the boat by my bandana handkerchief. We then made more than three knots an hour, much better than our rowing had been, and succeeded in reaching ship at a little after four o'clock. Mr. Hook treated us with the information that we could not sail till morning, which answers my "but" of last night. At his suggestion (though it would have been my first idea) I decided to make a strenuous effort to get those shoreworters seen last evening. I don't know what kind of a mountaineer or night-hawk Mr. Hook thinks me, but he seemed surprised when I informed him that I was going to camp up there. I would not have come up just for the evening,--would hardly have had time. So I put a blanket in my jacket and made camp, and got away at four-thirty.

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Of first interest were three little blue tanagers coming up the side ridge to southward, playfully flutterting along. I have their call (a light tone, usual trill) and one

came over within range and fell a victim to number ten shot. Then the others started away, but I trilled at length while reloading and held them around. But alas! They came too close for a large shell and I had not time to insert the auxiliary. When they left, they went out around the cliff in safety. Had a hard job finding the one I killed, but at last succeeded. Felt quite elated, for this little bird alone paid for the energy of climbing the ridge.

Lest in my eagerness I forget, I must note once more that I distinctly heard two different cuckoos, one on either side the main ridge down in the forests. I may dally a little in the morning down there, trying to pick one up. But they are here in February, which accounts for one more month of the twelve. What is the life history of this bird? Where does it nest, or does it nest at all? White terns and noddies about.

On up the ridge. I glanced around to the southeast, as I was expecting shearwaters in from that direction. Suddenly a black shadow raised from the hillside below and started over the ridge, about ten meters away. Well, I didn't care. I shot, but I barely touched the shearwater. It acted as if it were going to drop, as Peale would say, "into dense forests thousands of feet below me" (I'm 850 feet high), but it didn't drop. It flew madly eastward along the cliff, and the last I saw of it it was high above the further point. The bird was dark but not Upoa, for distinct white showed under the wings. Well, I had hopes anyway for more, so hiked on up the ridge. Sure enough! along comes one soaring up the ridge behind me.

came over within range and fell a victim to number two shot. Then the others started away, but I trilled at length while relaxing and held them around. But alas! They came too close for a large shell and I had not time to insert the auxiliary. Then they left, they went out around the cliff in safety. Had a hard job finding the one I killed, but at last succeeded. Felt quite elated, for this little bird alone paid for the energy of climbing the ridge.

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On up the ridge. I glanced around to the northeast, as I was expecting sheerwaters in from that direction. Suddenly a large shadow raised from the hillside below and started over the ridge, about ten meters away. Well, I didn't care. I shot, but I merely touched the sheerwater. It acted as if it were going to drop, as Josie would say, "into dense forests thousands of feet below me" (I'm sad feet high), but it didn't drop. It flew rapidly westward along the cliff, and the last I saw of it is was high above the further point. The bird was dark but not large, for distinct white showed under the wings. Well, I had been anxiously for more, so hiked on up the ridge. Suddenly! along comes one coming up the ridge behind me.

I got ready and after the bird had passed to port (they're proper seamen) I fired a broadside into its stern and it dropped--thousands of inches perhaps--down the grassy hillside into some low sedge. I unpacked and went after it. It strikes me as being like the dark Rapa birds.

Hiked on up the ridge until on the point above the ravine where we quenched our thirst and collected plants yesterday. Decided that this was every bit as good as the summit, so stopped for the night where some sedge shelters me from the light gusts of wind from the northwest. At about seven o'clock I heard the identical call to that frequently heard in Tahiti, and called by the native name "Rao". I have never succeeded in finding one of those birds, nor has any native identified the "Rao", although we have suspected it to be the petrel (P. neglecta) taken by Mr. Beck at sea near Papeete.

Heard half a dozen more calls during the evening. The bird I killed was but winged, and when I ended its life by pressure it called "Whang-oo!" like the Rapa birds I shot from the cliffs. It was totally unlike the "Rao" call, which makes me think now that there are at least two shearwaters nesting here.

Am a bit sleepy, and as it looks rainy I had better get what sleep I can before the storm comes.

February 10

A heavy breeze springing up somewhat before midnight made me shift to leeward of the hill top where I slept until about three-thirty. The "Rao" were calling when I awoke.

I got ready and after the bird had passed to port (they're proper seamen) I fired a broadside into its stern and it dropped--thousands of Indian porbeagle--down the grassy hillside into some low scrub. I scrambled and went after it. It strikes me as being like the dark Kaka birds.

Hiked on up the ridge until on the point above the ravine where we quenched our thirst and collected plants yesterday. Decided that tide was every bit as good as the summit, so stopped for the night where some scrub shelters me from the light gusts of wind from the northwest. At about seven o'clock I heard the identical call to that frequently heard in Tahiti, and called by the native name "Sao". I have never succeeded in finding one of those birds, nor has any native identified the "Sao", although we have suspected it to be the petrel (P. neglecta) taken by Dr. Cook at sea near Kapeeta.

Heard half a dozen more calls during the evening.

The bird I killed was but winged, and when I ended its life by pressure it called "Kang-oo!" like the Kaka bird I shot from the cliffs. It was totally unlike the "Sao" call, which makes me think now that there are at least two shearwaters nesting here.

Im a bit sleepy, and as it looks rainy I had better get what sleep I can before the storm comes.

February 10

A heavy breeze springing up somewhat before midnight made me waft to leeward of the hill top where I slept until about three-thirty. The "Sao" were calling when I arrive.

Perhaps their calling awakened me. Not hearing anything about the grassy ridges, I packed up and dressed, wrapping blanket around my shoulders and body in lieu of the shirt which was cold and wet from last evening's sweat. Here a dark shadow circled me, so I took a chance shot at it. Of course I missed, as it was hardly commencing to get daylight. Below me I can hear the "Rao" very plainly, and also the Upoa's unmistakable "woman's cry of intense agony". Four more times I shoot at them before daylight. I will express no opinion concerning the birds because of the unreliability of darkness.

Next came the little blue terns in flocks of two, three and one of half a dozen flying about before the face of the cliffs. I attract one to the ridge and bag him. Then I get bold and descend the steep face of the mountain, for it isn't so awfully steep, and the ledges zigzag back and forth so as to form a means of easy descent. I did have to start the dog down by the nape of his neck for twenty-five feet, though. I should have obtained two ternlets with the auxiliary, but neither shot was effective. Then I got mad and killed them with a number ten. They're somewhere below a twenty or thirty foot cliff.

In trying to get down below it we came to a sloping ledge on which the dog picked up shearwater scent. Sign abundant. I rushed to the rock above and found an open hole along the base of it. Here I found nothing but the feathers enclosed in preceding folded page of notebook. (p. 2864.) But the dog nosed his way up hill to an inconspicuous rock standing out

perhaps their calling awakened me. Not hearing anything about the grassy ridges, I peered up and dressed, wrapping blanket around my shoulders and mudg in lieu of the shirt which was cold and wet from last evening's sweat. Here a dark shadow circled me, so I took a chance shot at it. Of course I missed, as it was hardly commencing to get daylight. Below me I can hear the "Ooo" very plainly, and also the Ooo's unmistakable "woman's cry of intense agony". Four more times I shoot at them before daylight. I will express no opinion concerning the birds because of the unreliability of darkness.

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In trying to get down below it we came to a slopine ledge on which the dog picked up somewater accnt. Sign abundant. I trudged to the rock above and found an open hole above the base of it. Here I found nothing but the features enclosed in preceding folded page of notebook. But the dog moved his way up hill to an inaccessibleone rock standing out

above the grass of the ledge. There he was whining when I called him to help me investigate the open hole. He quit me and returned to his rock.

Then I got wise and went to help him. This is a sketch of the nest. The dotted line shows how it was dug along the base of the rock. Sod

was banked up against it. Therein I found the downy young. I cannot find a feather for identification of species. It may possibly be the Upoa, P. pacificus, which I distinctly heard this morning. As we have downy specimens of that bird from Christmas Island and Bora Bora, a comparison with them may help. Other than that, my guess would be in favor of the bird I killed on the ridge just above here last evening, which is perhaps the "Rao" heard this morning.

Noddy terns overhead, but I fear this downy youngster has delayed me too long to get any more blue ternlets. Went up along talus slope top into the curve whence most of the calls came this morning, but found only an empty hole similar to the two in which I found downy young. Did not describe the second as it was so similar to the first, and there were no feathers in it either. But this empty nest had the feathers in it that are enclosed in preceding sheet of note-

above the grass of the ledge. There he was waiting when I called him to help me investigate the open hole. He quit me and returned to his rock.

Then I got wise and went to help him. This is a sketch of the nest. The dotted line shows how it was dug along the base of the rock. Sod was banked up against it. Therein I found the downy young. I cannot find a feather for identification of species. It may possibly be the Upca, X. pacifica, which I distinctly heard this morning. As we have downy specimens of that bird from Christmas Island and Sore Sore, a comparison with them may help. Other than that, my guess would be in favor of the bird I killed on the ridge just above here last evening, which is perhaps the "Sao" heard this morning.

Daddy terns overhead, but I fear this downy youngster has delayed me too long to get any more blue terrlets. Just up along talua slope top into the cave where most of the calls came this morning, but found only an empty hole similar to the two in which I found downy young. Did not describe the second as it was so similar to the first, and there were no feathers in it either. But this empty nest had the feathers in it that are enclosed in crackling sheet of mate-

(p. 2868.)
book. There is a wooded plateau in yonder cove which I think I'll explore a little in spite of the fact that we are to sail at seven and it is now seven-thirty.

I changed my plans and followed along talus slope to eastward, hoping to chance upon the two blue ternlets I shot this morning. In about the proper place I found a gun wad and a cavern slit in which I found an Upoa, P. pacificus, setting on an egg in one pocket, and far back in the deepest recess was a downy youngster. I fear it is inaccessible, though I'll make an effort to get him. From the woods below comes again the call, or whistle, of the cuckoo. Would like to pick one up on the way to ship. The egg of the Upoa got cracked in the scramble of getting out the bird. There are plenty of these slit caverns along these cliffs, so I doubt if these birds would go to the trouble of digging holes like the ones I found, yet they may.

A guava stick with a crook at the end solved the riddle and I now have the downy young of an Upoa (by all the laws of reason) from this locality. If now the other downy young prove to be different they are in all likelihood birds of the other species. The little fellow I have been carrying alive just did a most gracious act. They are evidently well house-broken. I meant to have noted that all the dung was not in the nest but in the runway. The old birds while nesting evidently come out of the holes to excrete. Their dung gives away the nest. One always finds it about the

(y, 2000.)

room. There is a wooden picture in yonder cove which I think I'll explore a little in spite of the fact that we are to sail at seven and it is now seven-thirty.

I changed my plans and followed along twins slope to eastward, hoping to chance upon the two nine terriers I shot this morning. In about the proper place I found a gnawed and a cavern slit in which I found an Upoa, Z. pacifiona, setting on an egg in one pocket, and far back in the deepest recess was a downy youngster. I fear it is inconsolable, though I'll make an effort to get him. From the woods below comes again the call, or whistle, of the ouzzoo. Would like to pick one up on the way to ship. The egg of the Upoa got crushed in the scramble of getting out the bird. There are plenty of these slit caverns along these cliffs, so I doubt if these birds would go to the trouble of digging holes like the ones I found, yet they may.

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landing place. Well, I'm pretty well satisfied now but I would like to find,--oh, say a nesting Peale's petrel and be done with it.

The bird killed last night is "Hauhea", according to natives at the boat. I conversed at length with the cuckoo but could not get to see him through the leaves. Found one of my little blue ternlets.

There being a dead calm at sea, it was decided not to leave the island today. So at three o'clock, after skinning a bird or two, I again struck for the ridge with Curtis to carry grub to first summit and call for the plants on his return. Mr. Beck came along up the trail a way, parting from us after we had called at length for a cuckoo. Curtis and I enjoyed some sugar-cane and then some green oranges, which were sour but good. Along the ridge to the place where I found the broken egg shell first trip. Park outfit and run down to set four Victor steel traps in holes robbed this morning. Heard some blue ternlets but saw none.

Just before dark, at six-forty, the first shearwater came in. Again I saw the white underparts but this bird looked small enough to be P. obscura, collected by Mr. Beck near Tahiti, and the one we suspect of being the "Rao". The flight certainly was too rapid for the big P. neglecta taken yesterday. Since that first bird I have heard several about the cliffs below me, and have seen three or four at favorable times against sky or cloud.

A rather heavy shower passed over but I managed to

landing place. Well, I'm pretty well satisfied now but I would like to find,--oh, say a meeting Jesus's period and be done with it.

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A rather heavy shower passed over but I managed to

keep somewhat dry with the old tablecloth I have along. The moon is out bright enough to write by. I think I could not only hit but even find birds by it. Hope we have no more squalls. It is about the most marvelous moonlight I have seen in a long time. I can see this writing exceedingly plainly. There is not a sound along the cliff and it is but nine-thirty. I wonder when the Upoa come in, or is it possible that that common bird has two calls, and is, after all, the "Rao" heard so frequently? A noddy tern clackety-clickety-clack-clack-clacks! The crickets are continuously singing in their shrill high tones.

Ravaivai is an island of volcanic rocks piled up in a general direction of east and west in one long ridge. Half its length is composed entirely of such a mountain with abrupt cliffs of a hundred or two hundred feet on the north, and a steep slope of about thirty-five to forty degrees on the south. Densely wooded ravines reach back to the notched ridge,--ravines inhabited so far as we have observed only by the cuckoo, which we have taken in February and April in considerable quantities, and the wild chickens. There are ideal fern-brakes for the rail high up the ravines, but I have heard nothing of them these two nights, although they are reported emphatically as residing in the marshy land on the south.

From about the center of the island westward, the southern slope extends about four miles in a series of grass-covered ridges. A swale or two cuts the island, and then

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From about the center of the island westward, the southern slope extends about four miles in a series of grass-covered ridges. A swale or two cuts the island, and then

another promontory marks the western end, surrounded there by hills with cliffs of lesser height and extent to northward. I can detect no sign of a volcanic crater. The island seems to have been tilted up with a decided dip to the southward. Of very great interest is a series of ledges of coral rock at the altitude of one hundred and fifty feet. There is no mistaking them from the adjoining lavas. The exposure is not perfect and would take a little time to work out; but the fact remains that the island has been elevated that high at least, and I dare say the elevation was recent, although a thorough study of the coral and comparison with the present fringe along the shore would be necessary to prove it.

It is interesting to look down upon the lagoon and see the deep channel along the shore with but a small fringe of shallow lagoon inland, while towards the reef is a wide strip of light green. The motu encircle the east end of the barrier reef and come around four points to north and six points to southward. The pass on the north is very wide indeed and permits a considerable swell to enter even to the moorings. On the south the opening in the barrier reef, though wide, is very shallow and not navigable. This shallowness extends seaward a considerable distance in a light green shoal. West of it are the motu we visited yesterday, collecting six or more plants, and then a stretch of typical reef along the west end to the northwest motu. The furthest west motu of the east group is one of the widest reef islets I

Another promontory marks the western end, surrounded again by hills with cliffs of lesser height and extent to northward. I can detect no sign of a volcanic crater. The island seems to have been tilted up with a decided dip to the northward. Of very great interest is a series of ledges of coral rock at the altitude of one hundred and fifty feet. There is no mistaking them from the adjoining lava. The sequence is not perfect and would take a little time to work out; but the fact remains that the island has been elevated that much at least, and I dare say the elevation was recent, although a thorough study of the coral and comparison with the present fringe along the shore would be necessary to prove it.

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have ever seen. From up here it appears to be well over one half mile across at the east end.

I was greatly surprised at the height of the outer edge of the southwest motu yesterday. Fifteen, or perhaps twenty feet above the tide storms had piled up the coral blocks. These motu were exceptionally well wooded,--ironwood, taro and the poison nut growing to considerable dimensions. I found the lesser noddy nesting in the ironwood trees there. Obtained some young birds from the most accessible nests but found no eggs. Noddy terns were perched, in one instance, in rows of six or eight on the limbs of a dead tree. White terns very abundant about the motu generally, and a few young birds found but no eggs observed. It is worthy of especial note that the yellow-billed, or crested, tern has not been observed on this island at all. Neither has the Onychoprion of either species. I have seen many tatlers but no plover and only one curlew. The reef heron is here, white and dark in about even proportion. Ducks were plentiful in April. I have seen none, though I haven't been near their habitat this trip. This island, like Tubuai, is conspicuously devoid of land birds. How is it that here and there are to be found no kingfishers, swallows, warblers, flycatchers, swifts, or doves? Rimatara alone, of all the Austral group, is an exception. There the warbler and a parakeet were obtained. Why this void in the distribution of these birds?

The plant life of the Austral Islands bears a

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marked similarity to Tahitian and Moorean vegetation, much more so than the Leeward Islands of the Society group.

I have been writing more than an hour by moonlight, and during that time have heard no sound at all from the shearwaters along the cliffs below me. I hope this moonlight holds out until they commence flying about in the morning.

February 11

The "Rao" calls awakened me at three-thirty this morning. I had listened a little while before sitting up. Also had heard the deep moans of the Upoa during intervals of wakefulness prior to getting up. Daylight will hardly arrive ere the moon has set, but still I'm hoping to get in a shot or so. Roosters are now crowing from bush and house.

My vigil proved futile. One bird passed over me and I'll swear it flew like, was the size of, and had the white underparts of P. obscura, the one I suspect of being the "Rao" of Tahiti. Traps held two Upoa, identifying all the downy. Left at eight-forty A. M.

"Peuc" is the name given by the natives aboard ship for P. obscura, two of which Mr. Beck identified in a fishing flock we just passed. Mostly lesser noddy and white terns. Boobies are noticeable by their total absence here. One S. plotus as we left the island came about the ship. Tropicbirds also in this flock. Personally, I'm too sleepy to sit up taking notes.

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I have been writing more than an hour by moonlight, and during that time have heard no sound at all from the shearwaters along the cliffs below me. I hope this moonlight holds out until they commence flying about in the morning.

February 11

The "Rao" calls awakened me at three-thirty this morning. I had listened a little while before sitting up. Also had heard the deep moans of the Upos during intervals of wakefulness prior to getting up. Daylight will hardly arrive are the moon has set, but still I'm hoping to get in a shot or so. Boobies are now crowding from bush and hoops.

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February 12

6:00 A. M. Log, 32 miles.

Temperature of cabin,

" " sea water, 80.1° F.

Wind fair and westerly.

Course SE 1/2 E compass.

No birds in sight this morning. How easily everyone, except the new pigs, settles down to the lazy sea life! Speaking of pigs, it is interesting to see the cook's pet, the Papeete hog, make himself at home in and about the galley and deck house. He is very cleanly in his habits, going as far forward as possible to answer nature's calls. He sleeps when it rains or is otherwise uncomfortable on deck, in the sailors' cabin. He spends most of the day following the cook and seeing to it that the dogs get nothing a pig can eat. Yesterday I saw the cook scratching him, not with a stick or boot, but with his finger-nails. I do not know that he washed his hands afterwards before making our bread, but have my suspicions that he might have forgotten to do so. While the cook was scratching the pig, the latter lay upon his side with upper legs cocked up in the air, eyes closed, and grunting in evident satisfaction.

In the evening the sailors found great sport teasing the pig with my dogs, which latter, being of jealous natures, are only too willing to jump the favored galley pet at any pretext. The play ended, of course, by the dogs going after the pig with malice aforethought. Then the sailors were wont

February 12

4:00 A. M. Log, 22 miles.

Temperature of cabin,

" sea water, 80.1° F.

Wind fair and westerly.

Course 22 1/2 ° compass.

To bride in sight this morning. How easily everyone, except the new pig, settles down to the lazy sea life! Speaking of pigs, it is interesting to see the cook's pet, the Tuesday boy, make himself at home in and about the galley and cook house. He is very cleanly in his habits, going as far forward as possible to answer nature's calls. He sleeps when it rains or is otherwise uncomfortable on deck, in the sailors' cabin. He spends most of the day following the cook and seeing to it that the dogs get nothing a pig can eat. Yesterday I saw the cook scratching him, not with a stick or hoe, but with his finger-nails. I do not know that he washed his hands afterwards before making our bread, but have my suspicions that he might have forgotten to do so. While the cook was scratching the pig, the latter lay upon his side with upper legs hooked up in the air, eyes closed, and grunting in evident satisfaction.

In the evening the sailors found great sport teasing the pig with my dogs, which latter, being of jealous natures, are only too willing to jump the favored galley pet at any pretext. The play ended, of course, by the dogs going after the pig with malice aforethought. When the sailors were most

to punish the dogs. Such is human nature the world over!

Three white terns off at a distance from the ship. It is strange none of the shearwaters have passed us yet, but perhaps they fish in near land where we saw them yesterday. No P. neglecta noticed there. Plenty of wedgetail and the P. obscura mentioned, which accounts for the birds heard during the night and called "Rao" in my notes. At Tahiti I must take time to explore some cliffs for them if I have to use block and tackle.

Was forced to put in the Sabbath on some of our bagged plants, getting them into papers and between blotters. A touch of sea dizziness countered and drove me from the hold in the afternoon. Curtis has along H. G. Wells' "Outline of History", into which I plunged today.

Temperature at six P. M. in cabin, 85°.

" of sea water, 81.1°.

February 13

6:00 A. M. Temperature of cabin, 83°.

" " sea water, 81·1° F.

Tropic-birds were around three or four times this morning disturbing me from work upon plants. They were all red-tailed ones.

12:00 M. Log, 154 miles.

Latitude, 24° 50' S. Longitude, 146° 26' W. Gr.

Temperature of cabin,

" " sea water, 81.7° F.

to punish the dogs. Such is human nature the world over!

These white terns off at a distance from the ship.

It is strange none of the albatrosses have passed us yet, but perhaps they fish in near land where we saw them yesterday. So I. neglecta noticed there. Plenty of wedgetail and the I. obscura mentioned, which accounts for the birds heard during the night and called "Sae" in my notes. At Sabbit I must take time to explore some cliffs for them if I have to use bloom and tackle.

We forced to put in the Sabbath on some of our beaged plants, getting them into papers and between blotters. A touch of sea dizziness counteracted and drove me from the hold in the afternoon. Curtis has alone H. C. Wolle' "Outline of History", into which I plunged today.

Temperature at six P. M. in cabin, 88°.

" of sea water, 81.1°.

February 13

6:00 A. M. Temperature of cabin, 88°.

" " sea water, 81.1° F.

Tropic-birds were around three or four times this morning disturbing us from work upon plants. They were all red-tailed ones.

12:00 M. Log, 164 miles.

Latitude, 44° 20' S. Longitude, 146° 40' E. Br.

Temperature of cabin,

" Sea water, 81.75 F.

A shearwater came around the ship today; the natives called it "Putu", and Mr. Beck identified it as Pt. neglecta,--white breasted plumage. This is the first time that I have heard the name "Putu" since we left Christmas Island, where it was applied to Pt. parvirostris. Late in the afternoon Mr. Beck shot a young red-tailed tropic-bird.

6:00 P. M. Temperature of cabin, 80.2°.

" " sea water, 79°.

Heavy wind from east.

February 14

6:00 A. M. Log, 237 miles.

Temperature of cabin, 79°.

" " sea water, 79.2° F.

A red-tailed tropic-bird came around early this morning. Mr. Beck missed him three times before he finally flew off in disgust. We are traveling along at six knots this morning by the log. The sea is fairly smooth, and a good easterly breeze has continued steadily since yesterday evening about four o'clock. Splendid sailing but rotten luck for the plant collecting. All blotters are full now and no chance to get Ravaivai specimens dried before we start collecting at Rapa. Continuous changing of the few blotters not in press (one for two specimens) may save some of the collection. It certainly is too bad that we could not have been supplied with a thousand driers at least. This handicap is

A shearwater came around the ship today; the native called it "Tutu", and Mr. Beck identified it as Pt. neglecta, white breasted plumage. This is the first time that I have heard the name "Tutu" since we left Christmas Island, where it was applied to Pt. macrorhyncha. Late in the afternoon Mr. Beck shot a young red-tailed tropic-bird.

6:00 P. M. Temperature of cabin, 80.5°.

" " sea water, 79°.

Heavy wind from east.

February 14

6:00 A. M. Lat. 23° miles.

Temperature of cabin, 79°.

" " sea water, 79.5° F.

A red-tailed tropic-bird came around early this morning. Mr. Beck missed him three times before he finally flew off in disgust. We are trawling along at six knots this morning by the log. The sea is fairly smooth, and a good easterly breeze has continued steadily since yesterday evening about four o'clock. Splendid sailing but rotten luck for the plant collecting. All bicktors are full now and no chance to get several specimens dried before we start collecting at Rapa. Continuous changing of the few bicktors not in press (one for two specimens) may save some of the collection. It certainly is too bad that we could not have been supplied with a thousand driers at least. This handicaps is

going to prevent us from collecting even a few specimens from the vegetated islands. We may be able to handle all the plants from the Tuamotu.

12:00 M. Log, 272 miles (true run).

Latitude, 26° 13' S. Longitude, 145° 02' W. Gr.

Temperature of cabin, 81.6°.

" " sea water, 79.1° F.

Another red-tailed tropic-bird came over and Mr. Beck shot him but too far away to reach. We tried to sail over but finally had to revert to the engine. This also is an interesting phase of juvenile plumage; are the young birds more inquisitive than the older ones? Also saw two Pt. neglecta during the day. Tomorrow as we near Rapa they should be more plentiful. Forgot the temperatures while in the hold with plants.

February 15

Rapa is well within sight this morning. I have already seen the Pt. neglecta,--another just crossed our bow. Also saw a small petrel, and now another besides several more neglecta. Noddy terns now enter the scene, half a dozen or so well scattered. Some white terns in the distance. Some more little petrels. Now a large shearwater which Mr. Beck says is the kind we're after. A dive below for a gun and a rush forward! He crossed our bow while I tried to get the cook's pig out of my way. I take up a position in the bow for shooting. Noddies more abundant. Now a little blue ternlet crosses before us,

going to prevent us from collecting even a few specimens from the vegetated islands. We may be able to handle all the plants from the Tuamotu.

12:00 M. lon. 372 miles (true run).

latitude, 22° 13' S. longitude, 142° 02' W. Br.

Temperature of cabin, 81.5°.

" " sea water, 79.10 F.

Another red-tailed tropic-bird came over and Er. Beck shot him but too far away to reach. We tried to sail over but finally had to revert to the engine. This also is an interesting phase of juvenile plumage; are the young birds more impulsive than the older ones? Also saw two Jt. neglecta during the day. Tomorrow as we near Papa they should be more plentiful. Forgot the temperatures while in the hold with plants.

February 15

Papa is well within sight this morning. I have already seen the Jt. neglecta,--another just crossed our bow. Also saw a small petrel, and now another besides several more neglecta. Noddy terns now enter the scene, half a dozen or so well scattered. Some white terns in the distance. Some more little petrels. Now a large shearwater which Er. Beck says is the kind we're after. A dive below for a gun and a rush forward! We crossed our bow while I tried to get the cook's pie out of my way. I take up a position in the bow for shooting. Noddies more abundant. Now a little blue tern(?) crosses ahead,

but too far ahead.

Shouting from the rear. I look in vain for a shearwater coming up alongside. The shouting increases. I look back and see everyone pointing excitedly above me. Upon looking up I see a red-tailed tropic-bird directly overhead, too close to shoot. He raises into an awkward position, and I don't hit him hard enough. Miss a second shot into the sun. The ship is brought around but the bird swims away while I run below after more cartridges. We finally pick him up. His wings are badly shot but body and breast are clean. Another young bird. Since then I have been some time in the bow without seeing a bird.

Falling in lee of the island, we "gassed" along close in and observed the birds. Many tropic-birds, mostly, if not all, the red-tailed. I saw one yellow-bill. Noddy terns in conspicuous numbers about the cliffs. A few white and blue terns along the shore. Shearwaters occasionally. Along this shore the mountains rise very perpendicularly from the sea, not merely a hundred feet or so, but in places several hundred feet. Prominent layers of lava (?), invariably horizontal, make one wonder how the mountains were formed. Nowhere could I observe any signs of folding or uplifting in the enormous amount of exposed rock along the cliffs. On the southeast side of the island are several mountain tops cut off from the mainland by water. Here the birds were unusually abundant.

1:00 P. M. Cast anchor in the harbor of Rapa, and

but too far ahead.

Shooting from the rear. I look in vain for a sheer-water coming up alongside. The shooting increases. I look back and see everyone pointing excitedly above me. Upon looking up I see a red-tailed tropic-bird directly overhead, too close to shoot. He raises into an awkward position, and I don't hit him hard enough. Takes a second shot into the sun. The ship is brought around but the bird swims away while I run below after more cartridges. He finally plucks his up. His wings are badly shot but body and breast are clean. Another young bird. Since then I have been some time in the bow without seeing a bird.

Sailing in lee of the island, we "passed" along close in and observed the birds. Many tropic-birds, mostly, if not all, the red-tailed. I saw one yellow-bill. Noddy terns in conspicuous numbers about the cliffs. A few white and blue terns along the shore. Shearwaters occasionally. Along this shore the mountains rise very perpendicularly from the sea, not merely a hundred feet or so, but in places several hundred feet. Prominent layers of lava (?), invariably horizontal. Once one wonder how the mountains were formed. Nowhere could I observe any slope of foliage or splitting in the enormous amount of exposed rock along the cliffs. On the southeast side of the island are several mountain tops cut off from the mainland by water. Here the birds were unusually abundant.

1:00 P. M. Dead anchor in the harbor of Nagu, and

Mr. Beck and I went ashore soon afterwards. There are two more white men camping here, Johns, the Canadian, having returned by the 'Vahine Tahiti' on which these two came down. The same old gendarme who has been here for twenty years came out to the ship. All the small boys of the island, old enough not to be afraid, were at the end of the wharf. My mountaineer was amongst them. The natives seem to recognize us quickly enough.

Took mountain trail for the habitat of the green doves. Saw two fly up out of the timbered vale and over the ridge above. Went up there and got a long range shot at the next one to fly out. Missed! This is the only place since the Marquesas where I have seen the doves fly out of the valleys and high over the ridges in this manner. They seemed to be flying towards the Morai along the main central ridge, so we proceeded to it. Here we have obtained two birds. When called, one approached up the tree tops below us until within range; the other was flying overhead.

I firmly believe there is some excavation work to be done about these Morai before their story can be understood. It is certainly interesting to visit them, but I am not archeologist enough to tell much about them.

White terns all about the island, but not overly abundant. A dove cooing below me. Those large doves very closely approach the blue pigeon in depth of voice, though they give the succession of calls of the green doves. Along the trail we found the wings of a rail, the boys blaming its

Mr. Moon and I went ashore soon afterwards. There are two more white men carrying guns, Quinn, the Canadian, having returned by the 'Yashine Maruti' on which these two came down. The same old peasants who has been here for twenty years came out to the ship. All the small boys of the island, old enough not to be afraid, were at the end of the wharf. My mountaineer was amongst them. The natives seem to recognize me quickly enough.

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White terns all about the island, but not overly abundant. A dove cooing below me. These large doves very closely approach the blue pigeon in depth of voice, though they give the appearance of calls of the green dove. Along the trail we found the shape of a trail, the boys claimed its

death upon dogs. Most likely it was a cat,--large ones run wild here. How surprising that the rail has held his own so well against this enemy! Well, we seem to be unable to attract any more birds here, so must move on over the Morai and down toward the taro beds to spend evening hunting the rail, "Kotokoto". The dove is "Koko"; the cuckoo, "Koikoi".

We had no luck in the taro beds at all, save that in coming up over one of the dams I saw two ducks in line and close to me. Got both with number ten. At the creek at the upper edge of the village I found the sailors enjoying a bath. So I bummed soap, towel and pareu and plunged in myself, with all the children of the village for an audience. Several of the Vahine were bathing and some men too. Louis handed me two petrels given him by the natives, and later in the evening a lad handed me the third. Apparently they had been out to the island recently and had collected these little petrels because of their novel appearance. Louis had clubbed one along the bay shore as they came off ship earlier in the evening. I found that Mr. Beck had had good success in the taro field, obtaining six rail, but unfortunately only one adult. Altogether, our first day was highly successful. If every day is as much so, we'll be lucky indeed.

After we had bathed and shaken hands with all the natives in the village we were invited to an old Tongo-Tahe's fare to feast upon chicken, taro, popoi, and pineapple, which suited me very well indeed. Besides, there were some fairly nice looking young native girls in the place. Even native

death upon boys. Here finally is one a cat,--large black tom with here. How appropriate that tom tail has held his own so well against this enemy! Well, we seem to be unable to attract any more birds here, so must move on over the coral and down toward the taro beds to spend evening hunting the rail, "kotokoto". The dove is "Moko"; the cuckoo, "Kolkol".

We had no luck in the taro beds at all, save that in coming up over one of the dams I saw two ducks in line and close to me. Got both with number ten. At the creek at the upper edge of the village I found the sailors enjoying a bath. So I dressed rose, towel and perch and plunged in myself, with all the children of the village for an audience. Several of the Yankees were bathing and some men too. Louis handed me two pottels given him by the natives, and later in the evening a lad handed me the third. Apparently they had been out to the island recently and had collected these little pottels because of their novel appearance. Louis had climbed one along the bay shore as they came off ship earlier in the evening. I found that Mr. Beck had had good success in the taro field, obtaining six rail, but unfortunately only one adult. Altogether, our first day was highly successful. If every day is as much so, we'll be lucky indeed.

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girls are somewhat attractive in the total absence of all other feminity.

February 16

The cook failed to awaken me at four this morning, and so I did not get into the field early as I had hoped to. Louis and Curtis went along. We picked up the usual bunch of kids, including my special three guides and an older lad who asked to come along last evening. I rewarded the boys this morning with a coconut each, and a pareu (my old one) to my chief guide and canteen carrier, the same lad who was with me in April. We searched in vain through the taro beds but it was too late in the day. Louis, however, picked up a young rail; Curtis collected plants on his own.

Followed trail up to ridge below Morai. Both Louis and I did rotten tern shooting along trail. The little white terns were rather plentiful above the timbered ravines. At the Morai we parted, Curtis to collect plants while returning. He is spending most of his time changing blotters on the Ravaivai plants. We should have at least a thousand driers on a trip like this. Many a plant will be missed or spoiled from lack of blotters. Sent two white terns back with Curtis. Louis proceeded along trail to patch of timber below the high cliffs where I slept out beneath ferns one night last trip, and I heard him calling at length there later. He left about ten o'clock.

The two lads and I then took up the ridge. We

girls are somewhat attractive in the total absence of all other feminity.

February 15

The cook failed to awaken me at four this morning, and so I did not get into the trail early as I had hoped to. Louie and Curtis went along. We picked up the usual bunch of kids, including my special three guides and an older lad who asked to come along last evening. I rewarded the boys this morning with a coconut each, and a green (by old one) to my older guide and cartoon carrier, the same lad who was with me in April. We searched in vain through the two beds but it was too late in the day. Louie, however, picked up a young trail; Curtis collected plants on his own.

Followed trail up to ridge below forst. Both Louie and I did rotten turn shooting along trail. The little white terns were rather plentiful above the timbered ravines. At the forst we parted, Curtis to collect plants while returning. He is spending most of his time changing blotters on the Swaivai plants. We should have at least a thousand driers on a trip like this. Many a plant will be missed or spoiled from lack of blotters. Sent two white terns back with Curtis. Louie proceeded along trail to patch of timber below the big cliffs where I slept out because rains one night last trip, and I heard him calling at length there later. He left about ten o'clock.

The two lads and I then took up the ridge. We

stopped to catch wind above a small glade, and while resting cooed for doves. At my cooing, three took wing from the wood and flew back towards the Morai. It was some minutes later when two of them returned, flying along the ridge. As they neared us they passed out over the glade, but I dropped them both from the air, and after considerable searching the boys found them. We searched all the ledges we could reach from this slope but found no nesting birds in them. However, after we had succeeded in getting across the face of the cliff and into the notch on the ridge we found the shearwaters flying about and calling. My imitation of their "Whang-ca-ca-ca-cak!" attracted them close enough to shoot at, and two fell near us on the ridge. I'm hoping they are the blue bird, but I fear they are but P. neglecta.

We climbed dangerously high but decided to quit at 1300 feet. While here a red-tailed tropic-bird came over and fell victim to my aim, but he landed in the dense "ieie" and neither the boys nor the dog could find him. Saw but one little blue ternlet, and it passed over the ridge so suddenly that I got no shot at him. White terns all about the cliffs, and several pairs of shearwaters soaring and calling above. Just looked along the ridge with the glasses and saw several pairs flying about. While here we saw no less than five doves arise from the timber on one side the ridge, raise to an even altitude with us and pass over and along the face of the cliff. I am not having very good success calling them, although I have again bagged three, the last coming to a tree

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although I have again heard them. The last coming to a tree

here amongst the tree ferns below the Morai where we shot the two last evening. I shot him with the auxiliary, which fortunately was in the gun. We saw no more shearwaters this morning for some time, so returned down ridge.

We went on past the first Morae to head of trail, crossing over into next valley. Here were a bunch of girls carrying "Auti" leaves and taro wrapped up in them. They rested at length. One had some "tiare" and was standing with a wreath on her head and her pareu draped revealingly about her sturdy form as I arrived. She transferred the wreath to my hat, whereupon I sat down amongst them and enjoyed a little flirtation while eating lunch, a portion of which we distributed amongst them. Unfortunately we forgot to bring biscuits, of which the natives are very fond. I am getting over my race prejudice to a certain extent, and can now enjoy having a bit of sport with these native girls. If there is one thing these people do not appreciate, it is "spooning". They may have no morals, but they certainly cannot be called "mushy". I have never seen them so much as holding hands or arms amongst themselves. Relatives they kiss,--a sensible cheek and cheek kiss.

Two of the girls started down trail with their loads. The third--the one who had wreathed my brow--I prevented from taking her bundle of "auti" leaves and started to muss up her hair a bit. With a clever ruse she escaped from my grasp and started off down trail, leaping like a deer. For the fun of it I tried to catch her, and although I consider myself

here amongst the trees (here below the road) where we met the two last evening. I shot one with the auxiliary, which fortunately was in the gun. We saw no more shearwaters this evening for some time, so returned down ridge.

We went on past the first hotel to head of trail, crossing over into next valley. Here were a bunch of girls carrying "Anti" leaves and taro wrapped up in them. They treated at length. One had some "flare" and was standing with a wreath on her head and her paros draped revealingly about her sturdy form as I arrived. She transferred the wreath to my hat, whereupon I sat down amongst them and enjoyed a little flirtation while eating lunch, a portion of which we distributed amongst them. Unfortunately we forgot to bring biscuits, of which the natives are very fond. I am getting over my race prejudice to a certain extent, and can now enjoy having a bit of sport with these native girls. If there is one thing these people do not appreciate, it is "spooning". They may have no morals, but they certainly cannot be called "mean". I have never seen them so much as holding hands or arms amongst themselves. Relatives they kiss,--a something other and other kiss.

Two of the girls started down trail with their loads. The third--the one who had wreathed my brow--I prevented from taking her bundle of "anti" leaves and started to make up her hair a bit. With a clover from she escaped from my grasp and started off down trail, leaping like a deer. Her too fun of it I tried to catch her, and although I consider myself

fairly capable running downhill I could not overtake her. These well exercised girls certainly have a sinuous and subtle grace as they climb or descend these steep trails. As for hiking costumes; if no men be about, they trim down to the merest garb about their hips. When men appear, however, they are wont to hide their bosoms a little.

We passed on down trail opposite the harbor, calling doves as we went. Hearing some up towards the large Morae, we crossed the ravine and are now ascending the timbered slope towards the Morae. Here the doves seem fairly abundant, but only one has come within range. I have called but have not heard the cuckoo here this trip. However, they were not very abundant last time. The butterfly here is much more magnificent than elsewhere in these parts. It has a dark brown base with blue back and gold markings. The dragon-flies are exceptionally well colored. I hope Mrs. Stokes obtained a good collection while she was here.

"Kaki kaki" apparently is the name of the blue ternlet. "Kea" is name of shearwater killed today, according to my boys.

We had a rather severe trip up through the ferns and brush here, the best traveling being through the tree-fern groves, which fortunately were abundant. Dropped down ridge on opposite side to the taro beds where Mr. Beck was so successful getting rails, and obtained one from the same bed in which he got four. Hunted the other beds and saw three or four more birds. I got one young one in position for two

fairly capable running downhill I could not overtake her.

These well exercised girls certainly have a glorious and

noble grace as they climb or descend these steep trails.

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on opposite side to the taro beds where Mr. Book was so

successful getting rails, and obtained one from the same bed

in which he got two. Hunted the water beds and saw three or

four more birds. I got one young one in position for the

shots, and should have obtained him with the auxiliary, but could only estimate his presence and estimated erroneously. I find their tracks exceedingly abundant along the edge of the beds where the mud is thick enough to retain tracks. When disturbed they dart instantly for the dense growth of "Maapape", or cane, along the banks of the beds. Open beds of young taro they evidently do not visit much, save perhaps when very dark. By lying down and peering through the leaf stalks of the taro I obtained my bird by covering the row ahead of him and pulling as he crossed it. Could plainly see his jerky long steps as he walked about among the taro hunting food. It is interesting to find that the young birds are far less cautious than the older ones, as evidenced by our collection this trip. If it were the proper season I would do some brush clearing for nests.

We hunted until dark without further results, save that we saw tatlers along the beach, and duck flying about the taro beds. Saw two sets alight, but upon reaching the beds failed to find them. Met Louis in the beds behind the village. We were again invited to stop and feast with the natives,--a very tempting invitation as presented by the handsome daughter of the priest, one of the most slender Polynesians I ever saw, artistically wrapped in her pareu. They were having some religious ceremony tonight. Louis, the Captain, Mr. Beck and I are alone on ship. The natives raided an islet and brought Mr. Beck some two dozen petrels. Shearwaters Pt. neglecta.

shots, and should have obtained him with the auxiliary, but could only estimate his presence and estimated erroneously. I find their traces exceedingly abundant along the edge of the bank where the sand is thick enough to retain traces. When disturbed they dart instantly for the dense growth of "maquis", or cane, along the banks of the beds. Open beds of young taro they evidently do not visit much, save perhaps when very dark. By lying down and peering through the leaf stalks of the taro I obtained my bird by covering the row ahead of him and pulling as he crossed it. Donald plainly saw his large long steps as he walked about among the taro hunting food. It is interesting to find that the young birds are far less cautious than the older ones, as evidenced by our collection this trip. If it were the proper season I would do some brush clearing for moorhen.

We hunted until dark without further results, save that we saw tattlers along the beach, and duck flying about the taro beds. Saw two rats alight, but upon reaching the beds failed to find them. Met Louis in the beds behind the village. We were again invited to stop and feast with the native,--a very tempting invitation as presented by the handsome daughter of the priest, one of the most elegant polynesians I ever saw, artistically wrapped in her pareo. They were having some religious ceremony tonight. Louis, the captain, Mr. Cook and I are alone on shore. The natives failed an idol and burned it. Cook some two dozen petrels. Somewhere it. <u>Louisiana</u>.

February 17

I went to trail beyond tree fern morae, and Curtis to the same to collect in the forenoon on plants. Louis went to hills opposite the inmost end of the bay, where natives claim that doves are most abundant. I am going to proceed towards the highest mountain from this morae. Not a dove seen yet. A few were heard on this ridge while descending, but not many. Where the stream in the valley below empties into a shallow bay I flushed some ducks. I hit one but did not kill it, and it escaped into the rushes.

A stream comes down from the left of the ridge at left end of bay (facing seaward). Beside it but a few meters above sea level is a burial cave, slabs on edge surrounding the excavated portions, some of which have fallen in. Slabs on edge and fern tree trunks trimmed on edge around graves, and flat above them. There are no inscriptions and no relics noticeable. Excavation would pay here, no doubt. It is quite a natural cave of considerable width, and about half as high and deep as wide; the base is walled against the encroachments of the stream by the cave of stream-bed boulders. It is too bad some efficient expedition isn't looking into this island. Stokes evidently didn't find this, or else had not influence to get natives to excavate, which would be impossible. (The Rutledges are going about heavily armed so the natives will not do them any favors.) Foreigners would have to do the excavating, for the natives would never consent to working at it themselves. Is it worth while to ransack the burial

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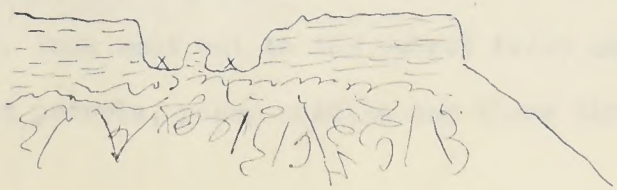
grounds of existing races? Why not wait a few years until these last remnants die off, and then excavate? Their dead are perhaps as sacred to them as ours, and look at the fuss we stirred up when the Germans needed lead and zinc!

On up the ridge after stopping in the last trees for half the lunch. Elevation 650 feet. Killed one of three or four Pt. neglecta flying about ridge. This is not the ridge that faces seaward with a sheer drop as I thought, but just a narrow knife of rock a hundred feet or so along the summit, with talus at about the critical angle of coarse rock. Elevation 1150 feet. From this vantage point one can see a possible resemblance to volcano craters in the large, steep-walled valley basins. The upper end of the harbor valley is basin-like, and so is this.

A herd of goats is on the steep seaward slope of this mountain. Here are twelve or fifteen red-tailed tropic-birds soaring about, mostly with but short tails; they scold vociferously. There were a few more "Kea" that flew about us, two of which I shot. One fell where we could find it, but the other fell into dense brush. It is interesting to see man-made walls of rock all along these ridges, helping God to keep the mountains precipitous, here where cliffs are common indeed.

We remained at the base of these cliffs (x x) in a double crotch through which the shearwaters were continually swooping until past four o'clock. I shot every bird that came



within range properly, selecting especially light phases which were in the minority, and getting one very dark bird. No blue-faced shearwaters seen, nor any kind save the neglected. We saw the tropic-birds, red-tailed, perching on several ledges, and could hear young birds chattering from inaccessible ledges. I boosted one boy up to a ledge where we had seen a bird alight, and he caught two full-grown birds, which proved to be male and female. The male evidently was well past breeding, his organs being dark and small; the female, however, was swelling, one egg being as large as a pea ○ , and others not much smaller. The boy reported neither egg nor young bird. Had the nest been robbed and the laying instinct of the female responded to the deprivation?

Although we scrambled and climbed along every possible ledge, and the side of the cliffs were honey-combed with them, we found not a single shearwater nest. I did, however, come across two skeletons of birds near a place that looked like a former nesting place. Several vacated tropic-birds' nests were also seen, the white feathers identifying them. At one place I came upon some circular holes about two feet in diameter, and two or three meters deep into the cliff. In them were most of the bones of two men; the skulls, however, were gone. Jaw bones present with good sets of teeth.

February 18

Spent the day skinning birds, but did not show any speed. Mr. Beck went out to the petrel islet and back with eggs, clean petrels, young noddies and three blue ternlets.

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February 18

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February 19

Charlie has rigged up the sail and made a new rudder for the Fan Fan, after many requests from me. With a few heavy rocks as ballast it sails very nicely. Louis, Bijo and I took Charlie and Mr. Beck down the bay. They went up hill to the moara cleared by Stokes for pictures, and intend to walk back.

We tacked the Fan Fan back to the ship after first sailing down to the little rocky islet in the further end of the harbor. From the appearance of the channel as we entered (I was in the rigging where I could see into the water to better advantage) I can say with considerable authority that this harbor once was a good deep bay, or drowned valley. Now, however, it is a very intricate labyrinth of dangerous reefs, soft corals and coralline algae having filled it in such a manner as to make it extremely unsafe for ships to be blown about as the 'Pro Patria' was last April. The bottom not holding, anchorage is therefore bad, and wind blasts are variable and treacherous. Even now when little wind prevails at sea the ship is occasionally whipped about with surprising force. Algae form a great portion of the filling element, and not all coralline either. Then, too, there is considerable sedimentary deposit, especially in the upper end of the harbor. Holothurians are present but not so noticeable as in atoll lagoons. Lobsters here are plentiful, large and luscious; fishing is fairly good, and I find beds of shells showing that the natives eat shell-fish, evidently a clam.

February 15

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Around the outside of the island there is decidedly no reef, not so much as a foot or two out from the steep rocky shore which prevails at nearly all the landheads. I have watched especially for any signs of other than volcanic formation, but have as yet observed nothing. The soil where rocks are not exposed is either heavy gray clay or the red gumbo so frequently found on volcanic islands. Sedimentary deposits I certainly have not seen yet, although it is reported that there is lignite present somewhere. They tell me it is in a valley south of here, near where we go tomorrow. A two day botany trip is planned for Monday and Tuesday up the highest mountain, after which I shall know a little more concerning the general geology of the place. There is quite a suggestion of a kidney-shaped crater in this harbor valley, and the walls of the mountains somewhat confirm the suspicion.

The little rocky islet is a strange phenomenon, very suggestive in its location of some of the buttes of northwestern United States, in the Columbia basin. If opportunity affords I'll land there for plants, lizards and a close-up study of its formation.

We made a grievous error upon arriving here by offering the natives five francs each for the blue shearwater, and, as we tried to make evident, but one franc each for the common birds. It put the idea into the natives' heads, and the day

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after our arrival they went out to one of the islets and gathered in all the petrels. These we obtained for twenty coconuts and some biscuits. Next day the natives went out to another island and gathered in all the nestling shearwaters and some old birds, and demanded fifteen francs each for them. We took none. Yesterday we presented the village with one hundred coconuts, and today the Chief gives a Sunday dinner to Mr. Beck, the Captain and the engineer. A good quiet day aboard ship with everyone else ashore.

1:00 P. M. Temperature in cabin, 80.1°.

" " harbor, 80.5°.

The Captain and his wife came aboard well laden with fruit, a rare style of bananas, fairly good peaches, and some really good figs. How splendid after a year and a half on the acid fruits of the tropics!

In the late afternoon the Chief sent a boat out for me and I went ashore. Dined first at the Priest's, the home of the fairest women of Rapa, and next at the Chief's, the home of the wildest. The food was but the fat sucking pigs, and taro with "miti" sauce, minus the coconut and the "popoi" which is the typical Rapa dish and the staple article of diet. All the village was feasting today. Mr. Beck had five full meals.

It is said that the men here formerly had the lazy habit of reclining while the women fed them "popoi". It is common information, supplemented by the nature of the race, that the men are living with four or five women each. Undoubtedly

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from my observations here with the crew, the older women actually show jealousy of the younger and more attractive ones, and even prevent girls in their teens from "keeping company" with men. Rapa, being one of the least visited islands in these seas, is very free from all prevalent diseases. Elephantiasis, leprosy, skin sores, and even venereal diseases (with slight exceptions in the latter case) are unknown. The children here seem very healthy and numerous. Population is not noticeably on the decrease here.

February 20

Awoke early this morning and changed blotters on the still moist Ravaivai plants, and thinned out yesterday's collection. Curtis has done fairly well, though of course he is no scientist and knows little of the technique of collecting, and it's little that I can teach him.

We are off this morning with an empty pen, and three sailors in the heavy whale boat, making perhaps two miles at the most. To the right from harbor mouth. White terns above the timbered hillside. Nothing but noddies observed at first motu off the first land head. And steep, too, with not the slightest sign.

We left Charlie to go goat hunting beyond the second spithead, and sailed on to islets. The second island is a long, grassy, sloped hill with small ledges of rock exposed. The native with us said the Noha nested on the steep islet between the above and the very high vertical-walled one. So, instead

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of landing at the latter, we stopped at the Noha, or central, of the three islets on the south side of Rapa island. This island is difficult in appearance, but not at all bad to climb about, since there are slopes betwixt ledges and the cliffs are not all vertical any distance. On the grassy slopes, mostly in the grass or in slightly excavated holes beneath clumps of grass or rocks or weeds, we found the petrel, P. grallaria, nesting in abundance. One pair was taken from one nest; several nests were empty; but most contained fresh eggs. Noddy terns in abundance nesting; downy and feathered young on open ledges and flats above grass bunches. The petrels I observed coming from their nests and struggling, all but helplessly, through the grass, until once above it and with wings outspread, a sturdy hop from their long legs cleared them off the thirty degrees.

Found a well feathered red-tailed tropic-bird in a cave, and P. pacificus downy young,--an odd little fellow with a short under mandible. After searching two hours or more for the Noha, P. rostrata, the native told me that July was their nesting season. Returned to boat, stuffing pocket with grasses and succulent herbs which cover the slopes. There are a few shrubs with red berries about the size of my thumb, but I could not afford the risk of carrying too much back down the trail.

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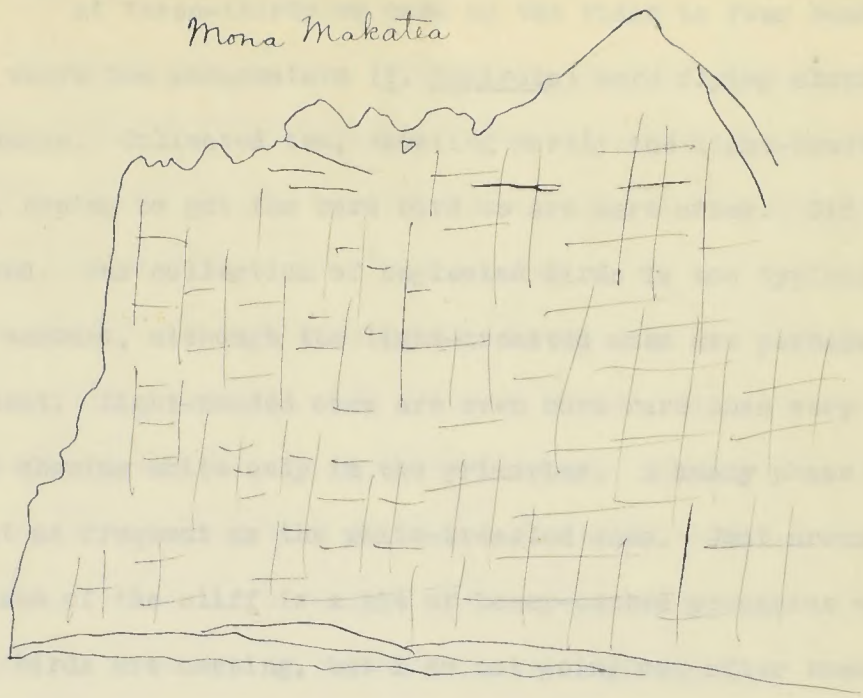
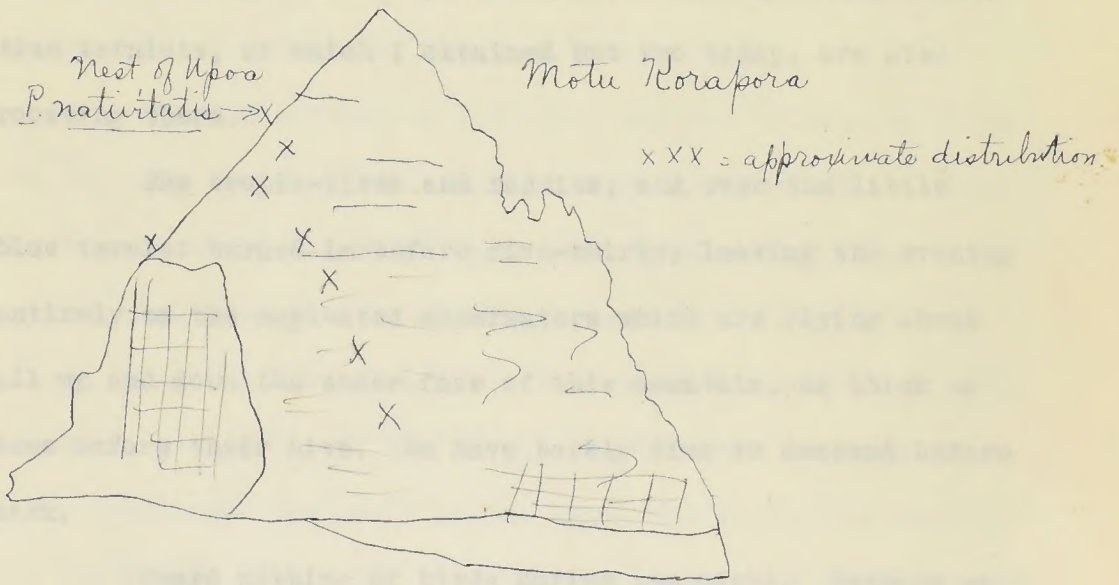
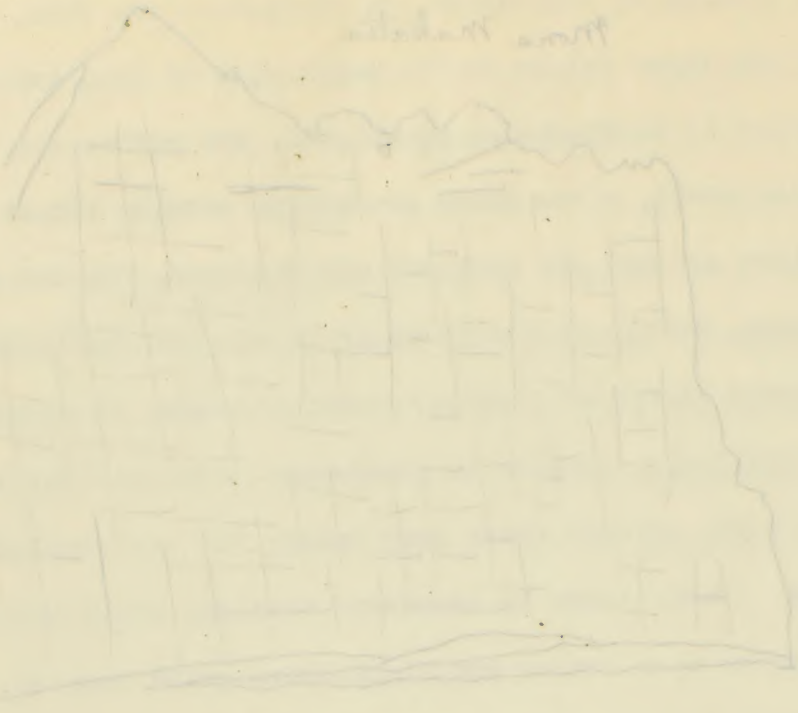




Opposite the Rabbit Islet and a smaller one nearer shore there are two wave-washed caves, into the eastern one of which we rowed and camped for water. The natives ate some Popoi, wasting a whole mess of it (Vahine labor, so they should worry). Curtis and I landed at two small higher and dry caves around the point. We ate our lunch and pressed plants.



At three-thirty we came up the ridge to four hundred feet where the shearwaters (P. neglecta) were flying about in abundance. Collected ten, shooting mostly the light-headed ones, hoping to get the rare bird we are here after. Did not succeed. Our collection of neglected birds is not typical on that account, although the light-breasted ones are perhaps most frequent. Light-headed ones are even more rare than very dark birds showing white only in the primaries. A smoky phase is almost as frequent as the white-breasted ones. Just around the face of the cliff is a bit of honey-combed precipice where these birds are nesting, but I am not going out after them because the drop is exactly four hundred feet into the ocean. Blue ternlets, of which I obtained but two today, are also roosting there.

The tropic-birds and noddies, and even the little blue ternlet turned in before five-thirty, leaving the evening entirely to the neglected shearwaters which are flying about all up and down the sheer face of this mountain, as thick as bees before their hive. We have barely time to descend before dark.

Heard nothing of birds during the night. Perhaps we should have slept up the ridge but did not feel like carrying anything up so steep a slope. Slept comfortably enough on the grass-covered floor of the cave where natives have slept, perhaps while fishing.

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February 21

Breakfast kept us from making the hillside early enough to get the blue ternlets. Saw the neglected shearwaters about quite plentifully again this morning, but nothing that looked like the rare bird. We ascended to the base of the cliff which faces this side of the mountain at one thousand feet altitude, then followed along to right ridge. Saw a flock of twenty goats here, in which were several Billies. Looked over top of mountain with glasses, and seeing nothing that looked promising in the way of ledges for nesting birds, nor anything different in the way of vegetation, we descended into the wooded ravine below. There the dog jumped two goats and drove them towards me. I got one of them,--a young Billy.

Finding nothing of interest, and not wishing to spend the day idly awaiting the arrival of the boat, we left a sign for them to carry the stuff back, and we struck overland. Saw several neglected shearwater wings about an old native fire-place. The only birds that we saw were two doves too far away to shoot, at the top of the ridge. In the next valley I heard a hen cackling. Saw ducks in the taro, and winged one which the dog found. Heard the rail and saw many tracks in taro beds. As we were getting into the boat a neglected shearwater came over me at my calling, but I missed him. Saw little blue terns in cliff opposite boat.

February 22

In the Fan Fan this morning with Charlie at the helm.

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February 22

In the tan tan this morning with Charlie at the helm.

We left Bijoe and Louis on the opposite wharf from village and Ralph at the point of same ridge to catch lizards. We just returned and found him sound asleep in the shade of a ledge. He had left his lizard bottle and canteen up the hill, so we had to await his finding of them. On the Wasp Islet we found plenty of little gray ternlets but I could only get about eight of them. Neglected to get the half dozen noddies that Mr. Beck asked for. Found a little downy petrel but he got killed in my scrambles and is now a mass of oil. Several downy noddies. Half a dozen petrel eggs and some petrels. The main thing we found was wasps. Charlie first struck some. Then I dropped a blue ternlet into deep grass and started for it. My hat and the ternlet are still there with the wasps.

We got away at ten and have sailed direct to the "Lafe" point, and then to the ship without getting into shallow water,--perhaps because the tide is up. Rapa could not be classed as an island of the fringing reef type (one more style of island must be recognized), whereas here the harbors or bays are choked considerably with sub-tropical corals and coralline. Around the more exposed points are small terraces of a similar nature, but there is no "fringe" around the island as at Rurutu and Rimatara. And as for the rocks, they look to me to be entirely volcanic in nature. On the south mountain at its base there is a bluish, muddy looking hill which may have been deposited below the sea, and some gravelly appearing strata might also have had a subaqueous origin, but I was unable to find anything in the line of a fossil to verify the suspicion. Along the ridges back to the village there was nothing but

We left Mijoo and landed on the coporite where from village and halfway at the point of some ridge to catch lizards. We just returned and found his young maiden in the shade of a lodge. He had left his lizard bottle and canteen up the hill, so we had to await his finding of them. On the way later we found plenty of little gray terrapins but I could only get about eight of them. Neglected to get the half dozen modifies that Mr. Beck asked for. Found a little downy petrel but he got killed in my scrambles and is now a mass of oil. Several downy modifies. Half a dozen petrel eggs and some petrels. The main thing we found was wasps. Charlie first struck some. Then I dropped a nine terrapin into deep grass and started for it. My hat and the terrapin are still there with the wasps.

We got away at ten and have sailed direct to the "lake" point, and then to the ship without getting into shallow water.--perhaps because the tide is up. Tape could not be classed as an island of the fringing reef type (one more style of island must be recognized), whereas here the harbors or bays are choked considerably with sub-tropical corals and coralline. Around the more exposed points are small terraces of a similar nature, but there is no "fringe" around the island as at Curtin and Rimatara. And as for the rocks, they look to me to be entirely volcanic in nature. On the south mountain at its base there is a plateau, mainly looking hill which may have been deposited below the sea, and some gravelly appearing strata might also have had a subaqueous origin, but I was unable to find anything in the line of a fossil to verify the supposition. Along the ridges back to the village there was nothing but

typical red ridge soil.

Back for lunch. Off at two with the long sailor and traps to again determine the species of the downy young obtained two days ago. The natives call them Upoa, which is P. pacificus or any similar all black shearwater. After piloting the Fan Fan out the harbor and between the right hand islet and shore, I must say that Rapa certainly is not devoid of harbor corals. We would be sailing along in dark water, when suddenly ahead of us would appear a "knoll" of coral so near the surface that it would not even appear green.

We had little help from wind, but succeeded in reaching Motu Karapora by four o'clock. It took me one hour to ascend the four hundred feet to the ledge whence I took the downy shearwater last trip. Only a few minutes were required to set the traps at the other ledge near the boat landing where Louis and the long sailor found their bird. The climb up this mountain is exceedingly interesting. It is steep all around and the water is deep blue where it hits the rock wall of the island. But storms have washed out ledges above the general level of the water. One man rows the boat stern towards the land until very close that the other may step ashore when the swell raises him to the ledge. When I came down, the swells were varying more than four meters between high crest and low trough. We had some difficulty in getting back into the boat too, but made it all right.

I was obliged to follow the storm ledge from the

typical red ridge soil.

Back for lunch. Off at two with the long sailor and trays to again determine the species of the downy young obtained two days ago. The natives call them Upoa, which is X. [illegible] or any similar all black observer. After piloting the Kea out the harbor and between the right hand islet and shore, I must say that maps certainly is not devoid of harbor corals. We would be sailing along in dark water, when suddenly ahead of us would appear a "knoll" of coral so near the surface that it would not even appear green.

We had little help from wind, but succeeded in reaching Moto Karapota by four o'clock. It took no one hour to ascend the four hundred feet to the lodge whence I took the downy observer last trip. Only a few minutes were required to set the trays at the other lodge near the boat landing where Louis and the long sailor found their bird. The climb up this mountain is exceedingly interesting. It is steep all around and the water is deep blue where it hits the rock wall of the island. But storms have washed out lodges above the general level of the water. One man rows the boat stern towards the land until very close that the other may step ashore when the swell raises him to the lodge. When I came down, the swells were varying more than four meters between high crest and low trough. We had some difficulty in getting back into the boat too, but made it all right.

I was obliged to follow the storm lodge from the

sheltered northwest of the islet around to the east before ascending. On the east side the swells run along perpendicular to the wall and surge along it viciously, to say the least. There I had to await my opportunity and rush along the ledge just not covered at normal sea level. I saw several swells surging along there so savagely that a man would have had little chance of holding to the rocks if hit by one. But I wasn't.

The climb here is not difficult, but throughout the four hundred feet one must forever watch his footing. Dirt, weeds and grass were very loose, and rocks themselves were none too firm. After rushing up to the ledge in forty minutes, what should I meet as a climax for the day's work but a nest of wasps just above the place at which I intended to set traps. Yes, at least two sat down heavily on the side of my head. I burned the whole swarm, and then set the traps in perfect peace.

Shot some shearwaters and blue ternlets from the ledge above the boat and let the sailor pick them up. I found two neglected shearwaters on empty nests in which was just the skimpiest sort of lining. They were scooped out a little on an open ledge. Noddy eggs and nestlings everywhere, and while I was shooting this evening, noddy terns flew out in considerable numbers. Several little blue ternlets here. Saw many of the little petrel and a few tropic-birds. Thick flock of circling shearwaters about face of main mountain again this evening.

We had variable winds along base of the mountain and so the long sailor rowed most of the way to bay beyond caves. At the end of the bay we anchored the boat and walked to caves.

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shearwaters about face of main mountain again this evening.

We had variable winds along base of the mountain and
so the long sailor rowed most of the way to bay beyond cove.
At the end of the day we anchored the boat and sailed to cove.

February 23

Awoke just before five to see the little blue ternlets flying overhead to windward in small flocks of five to thirty each. Hastened dressing and rushed up hill for shooting, but five-thirty was too late to be on the spot. Only three ternlets seen since then. One should rise early to hunt birds. Oddly enough there are no neglected shearwaters flying about here where they were so plentiful before. Still quite a few about the precipitous face of the mountain, but none here where one could shoot them. The old collection and the goat are of course smelling rather strong. Heavy wind today from the north. Unless it dies down later we'll have to tack and pull against it. Squall coming.

2156 ♂ Puffinus nativitatis downy.

2193 ♂ " " "

2200 ♂ Puffinus nativitatis

2201 ♀ " "

So our journey was not in vain. After descending and eating breakfast I sent the sailor for the boat while I packed things for the trip. We had a difficult time getting loaded, for the swells were enough to worry a fellow, and the current pulled the boat about at will. After getting loaded we sailed with a fair wind to the Motu Karaporo and came up around on the leeward side. The swells were even higher than yesterday evening, and it was with considerable difficulty that I effected a landing. Also the surging swell along the east shelf made me pause and wait long before running across it.

February 12

Awoke just before five to see the little blue terrelets flying overhead to wintered in small flocks of five to thirty each. Breakfast dressing and packed up all for shooting, but five-thirty was too late to be on the spot. Only three terrelets seen since then. One should rise early to hunt birds. Oddly enough there are no neglected sheep-waters flying about here where they were so plentiful before. Still quite a few about the precipitous face of the mountain, but none here where one could shoot them. The old collocolon and the goat are of course smelling rather strong. Heavy wind today from the north. Unless it dies down later we'll have to hack and pull against it. Small soaring.

Blue ♂ Turtlina restivlatis young.

Blue ♂ " " "

Lady ♂ Turtlina restivlatis

Adul ♀ " "

So our journey was not in vain. After breakfasting and packing breakfast I sent the sailor for the boat while I packed things for the trip. We had a difficult time getting loaded, for the swells were enough to worry a fellow, and the current pulled the boat about at will. After getting loaded we sailed with a fair wind to the Sota Sarapore and came up around on the leeward side. The swells were even higher than yesterday evening, and it was with considerable difficulty that I effected a landing. Also the surging swell along the coast made me plunge and wait long before running across it.

Nothing occurred to add excitement to the ascent and descent of the cliffs, except that once or twice a rock or grass clump rolled out from beneath my feet; but I was expecting such things and held safely to the hillside.

Collected in paper some of the grasshoppers which I have not yet noticed elsewhere about the island, but which are very prevalent on this motu. I put them in alcohol upon arriving at the ship. Picked up two downy noddy terns and shot one old bird. Also collected six petrels and eggs. Observed them crawling out of grass and taking off into air from steep slope or precipice. They descend sharply, but little more than the general slope of the mountain until almost down at sea level, when they commence swooping about. Also observed several flying about the face of the slopes. One appeared to be attempting a landing but did not make it. Found them in small holes in the rocks, with but little room for landing or flying except at the mouth of the hole. Also in recesses of caves, under grass, and in small burrows. Nests collected from all were lined with dry grass which is abundant in the vicinity of the nests. I forgot to look at the ones in holes to note that point in particular.

At the ledge where I had found the black downy shearwater my traps had caught an old bird which I saw at once was not the common wedge-tailed. After descending and hailing the boat, I went up to the nest of the bird the sailor found, and there also was an old bird caught in the trap. Certainly that is the way to get shearwaters when one does not find them upon

Nothing occurred to add excitement to the ascent and descent of the cliffs, except that once or twice a rock or stone slipped out from beneath my feet; but I was expecting such things and held safely to the hillside.

Collected in paper sacks of the grasshoppers which I have not yet noticed elsewhere about the island, but which are very prevalent on this moth. I put them in alcohol upon arriving at the ship. Picked up two downy young terns and one old bird. Also collected six petrels and eggs. Observed them crawling out of grass and taking off into air from steep slope or precipice. They descend sharply, but little more than the general slope of the mountain until almost down at sea level when they commence swooping about. Also observed several flying about the face of the slopes. One appeared to be attempting a landing but did not make it. Found them in small holes in the rocks, with but little room for landing or flying except at the mouth of the hole. Also in recesses of caves, under grass, and in small burrows. Nests collected from all were lined with dry grass which is abundant in the vicinity of the nests. I forgot to look at the ones in holes to note that point in particular.

At the lodge where I had found the black downy sheet-water by trap had caught an old bird which I saw at once was not the common wedge-tailed. After dissecting and building the boat, I went up to the nest of the bird the native found, and there also was an old bird caught in the trap. Certainly that is the way to get observations when one does not find them upon

the nest. Mr. Beck identifies them as the Christmas Island shearwater, Puffinus nativitatis. My nest was a slight cave-ledge with overhanging rocks (where wasps build hives) and grass and shrubs of low stature growing at a short distance from the rocks on the floor. The sailor's nest was along a sloping shelf about ten or fifteen degrees steep, where a slight side pocket with level bottom afforded the necessary conditions. This had no vegetation about it and no lining in the nest; while in the near vicinity of my bird an old nest appeared to be lined with grass; but where the downy young and the trapped bird were located no foreign rubbish was found.

We had still greater trouble getting back into the boat. The swells lifted it at the least three meters above the trough level. The sheerness of the wall of course helped considerably because it raised the boat vertically without endangering it. I stepped aboard and shoved her away after twice failing to take the opportunity before the wind carried it away. To the southwest of the islet the swells boil until the foam surges blue and light for a hundred meters off shore. Here were many conflicting currents, which we evaded by taking a long tack to the SSE.

It was nine-thirty when we left the island. Few shearwaters but lots of noddy terns about it then. I shot four shearwaters from the boat as we came in. Once a little petrel, perhaps smelling the other birds in the boat, came up

the mat. Mr. Hook identifies them as the Gavialoidea Indica observator, Gavialoidea multiplicata. My mount was a slight cave-ledge with overhanging rocks (where snake build their nests) and trees and shrubs of low stature growing at a short distance from the rocks on the floor. The sailor's nest was alongside a sloping shelf about ten or fifteen degrees steep, where a slight side pocket with level bottom afforded the necessary conditions. This had no vegetation about it and no lining in the nest; while in the near vicinity of my bird an old nest appeared to be lined with grass; but where the downy young and the trapped bird were located no foreign nestlin was found.

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It was nine-thirty when we left the island. Few observators but lots of noddy terns about it too. I shot four observators from the boat as we came in. Once a little petrel, perhaps smelling the other birds in the boat, came up

astern and followed us for several minutes. I was able to observe with considerable accuracy the strange habit they have of taking a kick at the water with their "leeward" foot. He turned about many times, and so I was well able to observe the strange performance. After the kick he cleared more than half a meter high and fully a meter ahead into the wind. He remained astern for several minutes, swerving about, swooping down, kicking off, and swerving around.

It was one o'clock ere we made the right hand (facing seaward) pass motu. Then, after a little careful sailing through the coral knolls beyond it, we gained the deep open water of the pass and had a fair wind, and later a wind astern which carried us thence to the ship in half an hour. Heard and, for a minute, saw a turtle rise and blow for breath. Took gun forward but he did not show up again.

After lunch I attempted bird skinning but acquired no speed. Our crew hunters are not proving to be overly expert, so we still are wanting some doves and rail. My trip tomorrow may prove interesting in these lines. Very tired and sleepy tonight. Half the crew sleeps ashore, and the other half has plenty of female companionship.

Mr. Beck purchased a live dove from the natives and we are attempting to keep it in a cage.

February 24

Rained early this morning but looked clear enough after breakfast for Curtis and me to tackle a botany trip up

astern and followed me for several minutes. I was able to observe with considerable accuracy the strange habit they have of taking a kick at the water with their "learned" foot. We turned about many times, and so I was well able to observe the strange performance. After the kick he cleared more than half a meter high and fully a meter ahead into the wind. He remained astern for several minutes, swerving about, swooping down, kicking off, and swerving around.

It was one o'clock are we made the right hand (starboard) pass mole. Then, after a little careful sailing through the coral knolls beyond it, we gained the deep open water of the pass and had a fair wind, and later a wind astern which carried us thence to the ship in half an hour. Heard and, for a minute, saw a turtle rise and blow for breath. Took gun forward but he did not blow up again.

After lunch I attempted bird shooting but acquired no speed. Our crew masters are not proving to be overly expert, so we still are wanting some doves and rail. My trip tomorrow may prove interesting in these lines. Very tired and sleepy tonight. Hail the crew sleeps ashore, and the other half has plenty of female companionship.

Mr. Hook purchased a live dove from the natives and we are attempting to keep it in a cage.

January 24

Sailed early this morning but looked clear enough after breakfast for Gerria and so to take a botany trip up

the high mountain at end of the bay. The first four hundred feet of rolling hills and ravines were prominently covered with low ferns, which only became impassible in the most favored localities on this island. The dog flushed a rail from the ferns beside a marsh, but too distant from me for a shot. White terns about the trees in beds of ravines. Doves cooing from the woods above. The sun is shining now, but an ominous looking cloud is to the eastward. The tall stalky grass occupies the prominent position from here to the timbered hillsides and up the ridges considerably above them.

Just above 650 feet elevation the fern-brake ceased. Then we passed through a belt of "ieie" and tree ferns with other shrubs and small trees. Here doves were heard and I obtained one, which the dog retrieved splendidly from the face of a very steep rock. What a help the dog is, and how fortunate to have picked up so intelligent a pup from the native stock! Also heard a cuckoo here but could not coax it towards me. I find that the straw-colored eyebrow on my upper lip prevents my sucking to imitate bird calling.

We are now well up a heavily grassed ridge at eleven hundred feet, from whence a splendid view is obtained of this fascinating island with its many drowned valleys, morae prominences, waving ridges, rolling hills, timbered ravines, mountain slopes and rugged peaks. Entered another thicket of "ieie" and chopped our way on up to where a dove is calling. Saw a shearwater across ravine. A little petrel just flew over us

the high mountain at end of the bay. The first four hundred feet of rolling hills and ravines were pleasantly covered with low ferns, which only become impassible in the most favored localities on this island. The dog flushed a rail from the ferns beside a marsh, but too distant from me for a shot. White terns about the green in back of ravines. Doves cooing from the woods above. The sun is shining now, but an ominous looking cloud is to the southward. The tall stalky green cocoplum the prominent position from here to the timbered hillsides and up the ridges considerably above them.

Just above 600 feet elevation the fern-brake ceased. Then we passed through a belt of "hole" and tree ferns with other shrubs and small trees. Here doves were heard and I obtained one, which the dog retrieved splendidly from the face of a very steep rock. What a help the dog is, and how fortunate to have picked up so intelligent a pup from the native stock! Also heard a cuckoo here but could not coax it towards me. I find that the straw-colored sparrow on my upper lip prevents my succeeding to imitate bird calling.

We are now well up a heavily grassed ridge at eleven hundred feet, from whence a splendid view is obtained of this fascinating island with its many drowned valleys, morne promenonce, waving ridges, rolling hills, timbered ravines, mountain slopes and rugged peaks. Entered another thicket of "hole" and dropped our way on up to where a dove is calling. Saw a sharpshooter across ravine. A little pewee just flew over us

and around the mountain at our altitude. Saw the dove come down the hillside, a poor place for shooting. Certainly there are no grasshoppers on this portion of the island.

After lunch I went on up to first peak of the high ridge, but did not climb the last fifty feet or so. Collected an armful of plants as I returned. At about nineteen hundred feet elevation I saw some very promising looking places to search for the Noha, P. rostrata. If it is the same bird as that on the Society Islands it would nest here in preference to a low islet. A pair of neglected shearwaters flying about below us, but would not place above the ridge. Lost myself in descending and started down main ridge which leads northwestward. The heavy fog made me lose my bearings. We have dropped down again to eleven hundred feet, where I have paused to call doves. Curtis is going on with plant specimens, though he has not yet come out of the trees below me.

Better hunting down at 650 feet. Better calling but no birds would come within range. At five I rushed on down trail, overtaking Curtis at the taro beds, through which I searched for rail and duck. Saw one rail and got one duck. Our boat had been left high and dry by the tide, but a native man and woman helped us to drag it into deep water. There was very little wind so we had to row most of the way.

Skinned petrels after dinner. We are enjoying to the limit the native "Auti" syrup at all our meals.

February 25

We are not sailing until four, so Curtis and I are

and around the mountain at our altitude. Saw tip dove down the pillaiba, a good place for shooting. Certainly there are no grasshoppers on this portion of the island.

After lunch I went on up to first peak of the high ridge, but did not climb the last fifty feet or so. Collected an assrtmt of plants as I returned. At about ninetean hundred feet elevation I saw some very promising looking places to search for the Moms, T. trachiata. If it is the same bird as that on the Society Islands it would seem here in preference to a low islet. A pair of negisotted sharmsters flying above below us, but would not place above the ridge. Lost myself in descending and started down main ridge which leads northwest-ward. The heavy fog made me lose my bearings. We have dropped down again to eleven hundred feet, where I have ceased to call doves. Curtis is going on with plant specimens, though he has not yet come out of the trees below me.

Better hunting down at 680 feet. Better calling but no birds would come within range. At five I rushed on down trail, overtaking Curtis at the taro beds, through which I searched for rail and duck. Saw one rail and got one duck. Our boat had been left high and dry by the tide, but a native man and woman helped us to draw it into deep water. There was very little wind so we had to row most of the way.

Enjoyed poteria after dinner. We are enjoying to the limit the native "Kuti" syrup at all our meals.

February 28

We are not sailing until four, so Curtis and I are

off this morning for a last collection. Up the trail behind the taro beds to the morae and over against the long cliff in the woods, where we expect to find something new to our plant collection. White terns are very common above tree tops of ravine and several are perched on branches. Heard a few doves and saw one. They are extremely quiet today, perhaps on account of cloudy weather. These birds do not call as often, nor are their calls as varied as the smaller dove of the Society Isles. Have heard males give a trilling note or two before cooing. Have not heard the three-noted coo in Rapa.

We passed over Morae ridge and on over to sugar-cane swamp in plateau below the rocky peaks. Could hear a few doves beyond in the dense forest, but could find no trail to them. Also heard several rail in heavy fern-brake and cane. They are safe there, more safe than their fellows at Vaihiria, for here there is no stream. We were unable to find the "Auti" in bloom,--perhaps due to the fact that the natives use the leaves so much for table spread and popoi baskets. We are now more than enjoying the syrup made from the roots of it. It is not as nice as maple sap but better than the cane syrup. It makes the popoi quite edible when poured over it.

We found a vine without flower or fruit, although I searched myself after Curtis had spent half an hour or more amongst it. Heard a few shearwaters about the cliffs up in the fog. Returned to Morae ridge to call doves. Am going to try descending through the trees and see if I cannot find

off this morning for a last collection. By the trail making the turn back to the motor road over against the long cliff in the woods, where we expect to find something new to our plant collection. White terns are very common above treetops or ravine and several are perched on branches. Heard a few doves and saw one. They are extremely quiet today, perhaps on account of cloudy weather. These birds do not call as often, nor are their calls as varied as the smaller dove of the Society Islands. Have heard males give a trilling note or two before cooing. Have not heard the three-noted coo in Tahiti.

We passed over Torea ridge and on over to sugar-cane swamp in plateau below the rocky peaks. Could hear a few doves beyond in the dense forest, but could find no trail to them. Also heard several rail in heavy fern-brake and cane. They are safe there, more safe than their fellows at Vaihiria, for here there is no stream. We were unable to find the "Anti" in bloom,--perhaps due to the fact that the natives use the leaves so much for table spread and poppi baskets. We are now more than enjoying the syrup made from the roots of it. It is not as nice as maple sap but better than the cane syrup. It makes the poppi quite edible when poured over it.

We found a vine without flower or fruit, although I searched myself after Curtis had spent half an hour or more amongst it. Heard a few wheatears about the cliffs up in the fog. Returned to Torea ridge to call doves. Am going to try descending through the trees and see if I cannot find

doves that way. Have been looking over the woods below with field glasses and saw a dove. It is steep and rocky here but I guess I can make it in the three hours left before I'm due at the ship. Can hear the reverberations of the popoi pounders, perhaps because of favorable wind.

Petrel--Korae.

Blue ternlet--Paraki.

Tatler--Tiate.

White tern--Taki taki.

Although a dove was near me and called a few times, the brush was so thick that I could not get a shot at him. Going down the trail I saw one fly into the trees beyond. Climbed up towards it, when two doves flew out and over me. Used shot barrel on the further one but got only the nearest one.

February 26

We decided that we would arrive at Bass Rocks too early had we sailed at four yesterday, so remained in the harbor for the night. Went ashore this morning to wash up clothes. The two best girls of the village did the work for me while I sat and enjoyed studying their types of beauty.

Everyone aboard at eight-thirty with a last barrel of water, except the Chief who remained ashore with his camera until ten-thirty. A real mob of jovial maidens and women and children were down at the wharf to see us off,--

dove that way. Have been looking over the woods below with field glasses and saw a dove. It is steep and rocky here and I guess I can make it in the three hours left before I'm due at the ship. Can hear the reverberations of the pogal (?) here, perhaps because of favorable wind.

Petrel--Herre.

Gue torplot--Petrel.

Tailor--Tiate.

Bolie tore--Red tail.

Although a dove was near me and called a few times, the brush was so thick that I could not get a shot at him. Going down the trail I saw one fly into the trees beyond. Climbed up towards it, when two doves flew out and over me. Had shot barrel on the further one but got only the nearest one.

February 24

We decided that we would arrive at Base Roses too early had we sailed at four yesterday, so remained in the harbor for the night. Had another this morning to wash up clothes. The two best girls of the village, did the work for us while I sat and enjoyed studying their types of beauty.

Everyone showed at eight-thirty with a last barrel of water, except the chief who remained ashore with his camera until ten-thirty. A real mob of joyful maidens and women and children were down at the wharf to see us off,--

and not only to see us off, but to kiss us goodbye. They're not at all particular whom they kiss, treating all ships the same, but as we have been here before and have remained so long this trip, we received an exceptional farewell. In return for the coconuts we presented to the village last week-end we now have the hold full of bananas and the whale boat full of popoi, not to mention the "feeds" and social entertainment we have had.

10:00 A. M. Rapa Harbor.

Temperature of cabin, 80° F.

" " Captain's cabin, 80.8° F.

" " bay water, 78.2° F.

Cloudy and windy. Wind NNW in here. Our pet dove seems to be accommodating himself very well to cage life. He eats banana, figs and all fruits given him. I just now filled his water can and he did not hesitate even until I left the neighborhood of the cage before he started to hop down to drink. He has two good sized perches and enjoys hopping from one to the other. Our other birds lasted but a short while, the young duck dying first. The rail got so sick looking that Mr. Beck killed it. We should have given the rail a flat car full of taro bed muck and kept it full for him, that along with meat and other foods which he ate readily enough.

Our wind is strong and fair which will send us to our destination far too rapidly. The pilot book reports the Bass Rocks as four or five prominent high ones, 365, 290, 135 etc.

and not only to see us off, but to give us goodbye. They're not at all particular when they kiss, treating all alike the same, but as we have been here before and have remained so long this trip, we received an exceptional farewell. In return for the moonats we presented to the village last week-end we now have the hold full of bananas and the whole boat full of people, not to mention the "leads" and social entertainment we have had.

10:00 A. M. Saga Harbor.

Temperature of cabin, 80° F.

" " Captain's cabin, 80.8° F.

" " Bay water, 78.8° F.

Cloudy and windy. Wind NNE in bore. Our pet dove seems to be accommodating himself very well to cage life. He eats manna, figs and all fruits given him. I just now filled his water can and he did not hesitate even until I left the neighborhood of the cage before he started to hop down to drink. He has two good sized perches and enjoys hopping from one to the other. Our other birds landed but a short while, the young duck dying first. The tail got so sick looking that he back killed it. We should have given the tail a flat car full of taro and mana and kept it full for him, that along with meat and other foods which he ate readily enough.

Our wind is strong and fair which will send us to our destination far too rapidly. The pilot soon reports the land looks as four or five prominent high cones, 500, 750, 1000 etc.

and several smaller rocks within the larger ones which spread out about two miles in diameter, with many rocky points inside. The rocks are steep too, but can be no steeper than Motu Karapora where we landed upon a vertical wall. Swells should not be any worse there than on the islet, so we should be able to effect landings on most of the islets.

Left the island at twelve with a fair wind. Chief piloted us out of harbor. From the rigging the shallows of the harbor can be observed to advantage. The channel seems to follow what was the old valley before the sinking of the island, or rise of the ocean. Shallow off the mainland for half a mile off the points adjoining the harbor. The pilot book says this is undoubtedly an old volcano with the inner end of Anhurei Bay the crater. Why they suppose there was but one crater I do not know. The west bay looks a great deal like one, and Anhurei looks to me like a double one. The sheer wall of South Mountain, 1650 feet high and not receding one hundred feet from base to summit, strikes me as being more the inner wall of another crater than a fault line. The islands off it seem to indicate such. In all my travels I failed to find any rock or deposit that looked to be other than of volcanic origin. Some muddy looking layers and gravel-like deposits might have had a subaqueous origin but no fossils were noticed during my brief search on Motu Karaporo.

and several smaller rocks within the larger ones which spread out about two miles in diameter, with many rocky islets inside. The rocks are steep too, but can be no steeper than those where we landed upon a vertical wall. Shells should not be any worse there than on the islet, so we should be able to effect landings on most of the islets.

Left the island at twelve with a fair wind. Chief piloted us out of harbor. From the rigging the shallows of the harbor can be observed to advantage. The channel seems to follow what was the old valley before the sinking of the island or rise of the ocean. Shallow off the mainland for half a mile off the points adjoining the harbor. The pilot book says this is undoubtedly an old volcano with the inner and of Ammrel Bay the crater. Why they suppose there was but one crater I do not know. The west bay looks a great deal like one, and Ammrel looks to me like a double one. The sheer wall of South Mountain, 1680 feet high and not receding one hundred feet from base to summit, strikes me as being more the inner wall of another crater than a fault line. The islands off it seem to indicate such. In all my travels I failed to find any rock or deposit that looked to be other than of volcanic origin. Some muddy looking layers and gravel-like deposits might have had a subaqueous origin but no fossils were noticed during my brief search on Nota Kaepore.

BOOK XXIV

Voyage of the 'France'

from

Rapa Island

to

Bass Island

Pitcairn, Henderson and Ducie Islands.

February 26-March 31, 1922.

February 26

Leaving Rapa, the neglected shearwater is the commonest bird observed. White terns, noddies and red-tailed tropic-birds also present.

Twenty-five miles east by the log we observe a flock of perhaps fifty black shearwaters (Mr. Beck thinks them the sooty shearwater). One or two black ones and the neglected are closer to ship. It is hard enough to distinguish species with a micrometer and specimens, so all I know is that they are black and about the size of the Christmas Island shearwater, noticeably smaller than the neglected. Saw but one

BOOK XXIV

Voyage of the 'Franco'

from

Cape Island

to

Bass Island

Pitcairn, Henderson and Ducie Islands.

February 24-March 31, 1923.

February 24

Leaving Cape, the neglected shearwater is the commonest bird observed. White terns, noddies and red-tailed tropic-birds also present.

Twenty-five miles east by the log we observe a flock of perhaps fifty black shearwaters (M. Beck thinks them the sooty shearwater). One or two black noddies and the neglected are given to mate. It is hard enough to distinguish species with a microscopic and eyeglass, so all I know is that they are black and about the size of the Christmas Island shearwater, noticeably smaller than the neglected. Saw but one

petrel during the afternoon, but there's the second!

Towards evening the black shearwater greatly predominated and we thought we saw a few of the blue shearwaters, the bird we especially desired this trip but found nothing of at Rapa.

February 27

Latitude, 27° 55' S. Longitude, 147° 23' W. Gr.

Boat ashore and found the blue shearwater very plentiful; also several black and a small white-breasted bluish one. Also got one sooty tern and two juvenile plumage noddies. Blue ternlets and white terns abundant. Did not attempt a landing after a close survey of the various rocks and many sharks below and about us.

The foot of the blue shearwater (Pterodroma ?).

Tarsus: invariably white.

First toe: usually black outside and inside except proximal phalanx.

Second toe: proximal phalanx usually white; middle phalanx variable; distal phalanx nearly always black.

Third toe: proximal and middle phalanges usually white; distal phalanx black. Claws always black.

Webs: upper third usually white; white between second and third toes down to distal joint of middle phalanx of third toe when that is white.

One specimen has upper two thirds of whole foot white, including outside of first toe; slight darkness on

petrel during the afternoon, but there's the second;

Towards evening the blue sheerwater greatly predominated and we thought we saw a few of the blue sheerwaters, too. Thus we especially desired this trip but found nothing of it then.

February 27

Latitude, 27° 38' S. Longitude, 147° 23' W. Gr.

Dual anchore and found the blue sheerwater very plentiful; also several black and a small white-breasted bluish one. Also got one sooty tern and two juvenile plumage noddies. Blue terrulus and white terns abundant. Did not attempt a landing after a close survey of the various rocks and many sharks below and about us.

The feet of the blue sheerwater (Puffinus ?).

Tarsus: invariably white.

First toe: usually black outside and inside except proximal phalanx.

Second toe: proximal phalanx usually white; middle phalanx variable; distal phalanx nearly always black.

Third toe: proximal and middle phalanges usually white; distal phalanx black. Claws always black.

Webs: upper third usually white; white between second and third toes down to distal joint of middle phalanx of third toe when that is white.

One specimen has upper two thirds of whole foot white, including outside of first toe, slight darkness on

joints. First toe and second toe are white between joints to distal extremity; third toe completely white, and web dark from claw of third toe diagonally to distal joint of proximal phalanx of first toe; claws black, including vestigial toe-claw.

One specimen has regular upper third and tarsus with third toe light between joints of middle phalanx; throughout this whitish portion are flecks of black, oddly distributed.

The P. navitatis were, with few exceptions, pure black.

It was a very pleasing surprise to find the blue shearwater very abundant about these rocks, and we obtained a good series of forty-five birds. They were flying about the rocks (on which it seemed they were nesting) in pairs and single order, along with noddy terns which were equally abundant. This shearwater does not make the noise the neglected makes while flying about cliffs. I heard the latter call once or twice, but did not see a single neglected near enough to recognize.

What an odd little point in geographical distribution is here portrayed! Forty miles apart we find two fairly large colonies of birds, in either of which but a few stragglers of the other colony are found. The conditions on these rocks (which do carry some low herbs and grasses) are not materially different from the conditions of the islands south of Rapa and the steep sea-walled South Mountain there. Why, then, are not these birds found there and those here, at least in noticeable

joints. First toe and second toe are white between joints to distal extremity; third toe completely white, and web dark from claw of third toe diagonally to distal joint of proximal phalanx of first toe; claws black, including vestigial toe-claw.

One specimen has regular upper third and tarsus with third toe light between joints of middle phalanx; throughout this white portion are clusters of black, oddly distributed.

The 2. nuptialis were, with few exceptions, pure black.

It was a very pleasant surprise to find the blue sheerwater very abundant about these rocks, and we obtained a good series of forty-five birds. They were flying about the rocks (on which it seemed they were nesting) in pairs and single order, along with noddy terns which were equally abundant. This sheerwater does not make the noise the nesting species makes while flying about nights. I heard the latter call once or twice, but did not see a single nesting-hole near enough to recognize.

That an odd little point in geographical distribution is here portrayed! Forty miles apart we find two fairly large colonies of birds, in either of which but a few strayers of the other colony are found. The conditions on these rocks (which do carry some low herbs and grasses) are not materially different from the conditions of the islands south of Maui and the steep sea-walled South Mountain there. Why, then, are not these birds found there and those here, at least in noticeable

proportions? Is it that the birds are rather strictly tribal, or is it merely a coincidence of natural selection? If young birds generally, or very nearly always, return to their land of birth, one can readily see how the neglected would soon cover the Rapa islets and cliffs with nesting birds. But they are a very widely distributed bird, which seems to signify a wandering nature, or less homing instinct. Is it not probable that these blue birds were first well established here, and the neglected have excluded them from Rapa; while they, in turn, have maintained the supremacy at Bass Rocks? Another interesting thing is the abundance of the Fregetta grallaria at Rapa and the paucity of them here. Of course, they might have been on the nests, a landing being necessary to give an adequate estimation of their occurrence.

This old style of collecting a vast number of specimens doesn't suit my nature. To me the few hours spent on the nesting islets of the birds are by far the most interesting; and if there is anything beneficial in this work, studies of life habits certainly are worth more than a few skins more or less. We did have a rather rough sea, but a day's delay might have brought (as it did) calm enough weather to permit a landing. It certainly is a pity that we couldn't get ashore, for the southeast island looked accessible to several promising ledges. I do not believe we could have made the vegetated upper stopes without ropes to assist in the descent, but I should have enjoyed what little we could have found lower down.

The black shearwater (very likely P. nativitatis)

proportions? Is it that the birds are rather strictly bright, or is it merely a coincidence of natural selection? If young birds generally, or very nearly always, return to their land of birth, one can readily see how the neglected would soon cover the bare islets and cliffs with nesting birds. But they are a very widely distributed bird, which seems to signify a wandering nature, or less homing instinct. Is it not probable that these blue birds were first well established here, and the neglected have coaxed them from here; while they, in turn, have maintained the supremacy at Lake Hooker? Another interesting thing is the abundance of the Kermadec Kingfisher at Raoul and the paucity of them here. Of course, they might have been on the moats, a landing being necessary to give an adequate estimation of their occurrence.

This old style of collecting a vast number of specimens doesn't suit my nature. So as the few notes about on the nesting islets of the birds are by far the most interesting; and if there is anything beneficial in this work, studies of life habits certainly are worth more than a few skins more or less. We did have a rather rough sea, but a day's delay might have brought (as it did) calm enough weather to permit a landing. It certainly is a pity that we couldn't get ashore, for the northeast island looked accessible to several remaining ledges. I do not believe we could have made the vegetated upper slopes without rope to assist in the descent, but I should have enjoyed what little we could have found lower down.

The black shearwater (very likely L. nativitatis)

also is interesting here where we saw several about. Since we shot all we could hit and let some blue pass by, their abundance is not quite in proportion to our collection of seven to forty-five blues. At and about Rapa we saw very few of them, but were fortunate enough with two extra days and two climbs over bad cliffs to obtain two birds. The little white-breasted Pterodroma (2236, 2237, 2238) we obtained whenever possible and had the whole crew on the lookout for them. It would have been worth while to have landed for them alone. No doubt more would have been found nesting. Other than tubinares we found only terns. Noddies were very abundant and flew out in considerable numbers at our shooting. The sooty tern was observed three or four times, single birds. The two juvenile specimens (2234, 2235) were obtained after they had hovered above our boat at length. We had to wait considerably for them to get far enough away to shoot. White terns were fairly abundant and passed us at times in flocks of half a dozen. Only one obtained. The little blue ternlet was here in abundance, flitting along near the surface of the water in flocks of a few dozen, fishing for the very small fish less than a centimeter long. These little fellows are so light colored that they appear almost white, and when fluttering above a school of fish they look like large flakes of hoarfrost drifting before a blizzard. I heard a tatler while we were nearest the high southeast rock.

One outstanding feature of this place was the enormous number of sharks in the water. Before we could reach many of

also is interesting were those we saw several about. Those we shot all we could hit and let some line pass by. Their abundance is not quite in proportion to our collection of seven to forty-five pines. It and about Cape we saw very few of them, but were fortunate enough with two extra days and two climbs over bad cliffs to obtain two birds. The little white-breasted Tetraglaucus (2230, ♂♂, 2229) we obtained whenever possible and had the whole crew on the lookout for them. It would have been worth while to have landed for them alone. No doubt more would have been found nesting. Other than tinkerers we found only terns. Noddy we were very abundant and flew out in considerable numbers at our shooting. The sooty tern was observed three or four times, single birds. The two juvenile specimens (2224, ♂♂) were obtained after they had hovered above our boat at length. We had to wait considerably for them to get far enough away to shoot. White terns were fairly abundant and passed us at times in flocks of half a dozen. Only one obtained. The little blue tern(?) was here in abundance, flitting along near the surface of the water in flocks of a few dozen, fishing for the very small fish less than a centimeter long. These little fellows are so light colored that they appear almost white, and when fluttering above a school of fish they look like large flakes of snowfront drifting before a blizzard. I heard a tailor while we were nearest the high moccasset rock.

One outstanding feature of this place was the enormous number of sharks in the water. Before we could reach many of

our birds they disappeared beneath the surface. Often half a bird reappeared, or sometimes a whole bird, badly greased by being swallowed and vomited again. Some of the sharks evidently did not like feathers. Once we saw two after one bird. They created quite a commotion in the water. The largest I observed was no more than two meters in length, most of them being but slightly over one meter. At one time a dozen at least were noticeable in the water near our boat. What they lacked in size they made up for by numbers. A man who slipped off the rocks would not have much chance to regain the shore. Evidently this is a breeding place, or at least the habitat, of sharks. The Rapa natives claim it is a splendid place for fishing.

We returned to the ship after an hour's row against the wind. The Captain stood out four miles to be safe from any possible shoals, and they failed to see us.

February 28

Latitude 28° 14' S. Longitude, 142° W. Gr.

The high sea yesterday prevented us from working steadily upon the birds. Fortunately I was not bothered much and so succeeded in getting the terns finished and making up the shearwaters that Louis skinned. Worked late into the night and printed labels for rest of the birds. A series of forty birds makes it feasible to print nearly everything concerning them except the number and sex.

This morning and all day we worked steadily. I made

our birds they disappeared beneath the surface. Often half a bird reappeared, or sometimes a whole bird, badly crushed by being swallowed and vomited again. Some of the albatrosses evidently did not like feathers. Once we saw two after one bird. They created quite a commotion in the water. The largest I observed was no more than two meters in length, most of them being but slightly over one meter. At one time a dozen at least were noticeable in the water near our boat. What they lacked in size they made up for by numbers. A man who slipped off the yards would not have much chance to regain the shore. Evidently this is a breeding place, or at least the habitat, of albatrs. The Tahs natives claim it is a splendid place for fishing.

We returned to the ship after an hour's row against the wind. The captain stood out four miles to be safe from any possible sharks, and they failed to see us.

February 29

Latitude 34° 11' S. Longitude, 144° W. qt.

The high sea yesterday prevented us from working steadily upon the birds. Fortunately I was not bothered much and so succeeded in getting the tarsa finished and adding up the measurements that Jorik maintained. Worked late into the night and prepared labels for feet of the birds. A series of forty birds makes it feasible to point nearly everything concerning them except the number and sex.

This morning and all day we worked steadily. I made

up the birds that Louis skinned again, which relieves Mr. Beck of that worry and allows him to turn out his two birds, or more, every hour. We were able to finish the last bird just before dinner time. Louis is getting along splendidly with the skinning, though he opens up some enormous holes at times. No observations today because we were down in the hold most of the time.

March 1

Latitude 27° 51' S. Longitude, 140° 21' W. Gr.

Four nestling noddies, carried from Rapa and put up today by Mr. Beck, made three hundred birds for the month. Mr. Beck blew the petrel eggs, of which we had nine fresh ones. Louis, a gunsmith today, made a firing pin for the union and fixed my ejector so it works splendidly.

The plants are very unsatisfactory, due mostly to lack of sufficient driers, and also to the inexperience of the assistant collector. I turned the work over entirely to Curtis, and although he endeavored to do well his inexperience was against him. Spent the day trying to save mildewy plants. In the afternoon, while blotters were sunning, I painted bills, eyes and feet of green dove, rail and white tern, a little detail that it would be well to continue whenever opportunity arrives.

March 2

Latitude, 28° S. Longitude, 139° 28' W. Gr.

Last evening and this morning there has been a very

ng the birds that Louis enjoyed again, which relieves Mr. Bour of that worry and allows him to turn out his two nets, or more every hour. We were able to finish the last bird just before dinner time. Louis is getting along splendidly with the exercise, though he spent up some mosquito holes at times. No observations today because we were down in the bush most of the time.

Series I

Latitude 27° 21' S. Longitude, 140° 21' W. Gr.

Four mantling noddies, carried from nests and put up today by Mr. Bock, made three hundred circle for the south. Mr. Bock blew the petrel eggs, of which we had nine fresh ones. Louis, a grumpity body, made a fitting job for the union and flied up a jector so it works splendidly.

The plants are very unsatisfactory, due mostly to lack of sufficient driers, and also to the inexperience of the assistant collector. I turned the work over entirely to Curtis, and although he endeavored to do well his inexperience was against him. Spent the day trying to save midday plants. In the afternoon, while blotters were changing, I painted brain, eye and feet of green dove, tail and white tern, a little detail that it would be well to continue whenever opportunity arrives.

Series 2

Latitude, 27° S. Longitude, 139° 12' W. Gr.

Last evening and this morning there has been a very

large white-breasted shearwater about. It is larger than anything we have as yet collected. The past three days have been rather calm, but we are moving along slowly,--about thirty-three miles per day. Mr. Beck helped change blotters today, doing most of the work. The hot dry blotters had a beneficial effect upon the plants, some of which are moulding badly. If this calm, sunshiny weather prevails a week we'll be able to save them, for the most part at least.

Killed one of two red-tailed tropic-birds early this afternoon. I painted head and foot, getting a very natural color on the bill, but was unable to get the light bluish white fleshy appearance in the upper portions of the foot. In the evening we were visited by a large black shearwater, larger than the wedgetail. Mr. Beck got a hurried shot but missed. He does not recognize the bird.

I do not remember having recorded that at Rapa we added half a dozen goats to our menagerie. The mate says the only place for animals on a ship is in the salt barrel; he has to see that the decks are scrubbed down twice daily. Goats, pigs and dogs certainly keep the fo'castle in a barnyard condition, which isn't exactly pleasant for the sailors when they have to shift tackle.

Plants occupied are looking much better after a little forced drying. Sea exceedingly calm with hardly any breeze blowing at all during the day. The nights are marvelously starlit. We have been out of the typical trade belt and consequently sunsets are not overly inspiring.

large white-breasted sheerwater about. It is larger than anything we have as yet collected. The past three days have been rather calm, but we are moving along slowly,--about thirty-three miles per day. Mr. Cook helped change blisters today, doing most of the work. The hot dry blisters had a beneficial effect upon the plants, some of which are sprouting badly. If this calm, sweltering weather prevails a week we'll be able to save them, for the most part at least.

Killed one of two red-tailed tropic-birds early this afternoon. I painted head and foot, putting a very natural color on the bill, but was unable to get the light bluish white fleshy appearance in the upper portions of the foot. In the evening we were visited by a large black sheerwater, larger than the wedgetail. Mr. Cook got a martlon shot but missed. He does not recognize the bird.

I do not remember having recorded that at Apia we added half a dozen goats to our menagerie. The main rear the only place for animals on a ship is in the bait barrel; he has to see that the decks are scrubbed down twice daily. Goats, pigs and dogs certainly keep the forecastle in a begrimed condition, which isn't exactly pleasant for the sailors when they have to shift tackle.

Birds occupied are looking much better after a little forced drying. Has exceedingly calm with hardly any breeze blowing at all during the day. The nights are marvelously starlit. We have been out of the typical trade belt and consequently moonrise are not overly inspiring.

March 3

Latitude, 28° 20' S. Longitude, 139° 03' W. Gr.

During the night an easterly breeze came up and the sun revealed the floating schooners of the trades, gloriously empurpled everywhere and brilliantly glowing in the east. The breeze dwindled during the day and left calm weather with a broiling sun which is splendid for drying blotters. Two hours in the press and two in the sunshine is accomplishing marvelous results, even with the specimens that had commenced to mould. But we will not always have such calm weather and so many days between islands. What to do I know not. Will perhaps have to cut down to one miserable specimen from each island.

Again this evening we were visited by a shearwater which might possibly have been the neglected, but we were all too busy rushing about for guns to take a close look at it. Another was seen in the distance.

A trade belt sunset, but only the slightest vestige of a breeze. We are creeping along ever so slowly, making more of a southerly than easterly direction. It seems to me that we would have made better progress had we gone south until reaching the horse-westerlies and then sailed eastward as far as Ducie. The Captain, however, has held strong for creeping along here at this latitude. Well, it has given us splendid blotter drying weather at any rate and has saved most of the plant specimens. Had we been troubled with a heavy wind I fear the results would have been disastrous.

March 2

Latitude, 16° 20'. Longitude, 129° 2'. Sr.

During the night an easterly breeze came up and the sun revealed the rocky coastline of the island, picturesquely magnified everywhere and brilliantly glowing in the east. The breeze vanished during the day and left calm weather with a broiling sun which is suitable for drying blotters. One hours in the press and two in the sunshine is accomplishing marvelous results, even with the specimens that had commenced to mould. But we will not always have such calm weather and so many days between islands. What to do I know not. Will perhaps have to cut down to one miscellaneous specimen from each island.

Again this evening we were visited by a squall for which might possibly have been the designated, but we were all too busy running about for guns to have a close look at it. Another one came in the distance.

A fresh bath answer, but only the slightest ruffle of a breeze. We are creeping along ever so slowly, making more of a southerly than easterly direction. It seems to me that we would have made better progress had we gone south entirely rounding the Torres-Westerlies and then sailed eastward as far as Dacie. The Captain, however, has held strong for creeping along here at this latitude. Well, it has given us splendid bright shining weather at any rate and has saved most of the plant specimens. Had we been troubled with a heavy wind I fear the results would have been disastrous.

Laying the blotters out on the hot deck soon dries them; but what are we to do when new islands are reached every morning?

March 4

Latitude, 28° 59' S. Longitude, 138° 44' W. Gr.

Mr. Beck saw a neglected shearwater this morning. Calmness prevailed until in the early afternoon, when a light southeasterly breeze came up. It permitted us to hold an east by north course and gain a little proper distance from the southerly position we were at at noon. A small whale was spouting a few hundred meters to port, but he did not come up close nor reveal much of himself. Tropic-birds about this morning and again in the late afternoon, but we did not get any.

Very late in the evening came a neglected shearwater. Darkness spoiled the shooting. Why is it that we see these birds only in the morning and evening? Is it that we can detect them better in the twilight, or do they only approach us then?

March 5

Latitude, 28° 47' S. Longitude, 137° 43' W. Gr.

Awakened early this morning and enjoyed a pleasant sunrise. The sea is very tranquil, slightly rippled by the light breeze, but strangely devoid of its customary swells. Louis reports a black shearwater early; I did not see it.

We made light but steady progress during the night.

Leaving the distance out to the Not does some drive them but what are we to do when two islands are reached every morning?

Watch 4

Latitude, 24° 32'. Longitude, 134° 44' W. Gr.

Mr. Cook saw a neglected observation this morning. Calmness prevailed until in the early afternoon, when a light southwesterly breeze came up. It permitted us to hold on east by north course and make a little proper distance from the southerly position we were at at noon. A small whale was spouting a few hundred meters to port, but he did not come up close nor reveal much of himself. Tropic-birds about this morning and again in the late afternoon, but we did not get any.

Very late in the evening came a neglected observation. Darkness spoiled the shooting. Why is it that we see these birds only in the morning and evening? Is it that we can detect them better in the twilight, or do they only approach us then?

Watch 8

Latitude, 23° 47' S. Longitude, 117° 28' W. Gr.

Awakened early this morning and enjoyed a pleasant sunrise. The sea is very tranquil, slightly rippled by the light breeze, but strangely devoid of its customary swells. Louie reports a black shearwater early; I did not see it.

We made light but steady progress during the night.

Just a few light clouds around the horizon this morning,--that typical trade belt scenery which forms the background or canvas for those marvelous sunset and sunrise effects.

The breeze held steadily most of the day, increasing towards the end of the afternoon, until from four-thirty to six-thirty we made fifteen miles by the log. Twice during the day shearwaters were seen,--one blue one.

March 6

Latitude 28° 33' S. Longitude, 135° 34' W. Gr.

The trade continued well through the night, giving us eighty-four miles from four-thirty P. M. until six-thirty A. M. This morning clouds are well banked over the sky and the breeze has fallen off and more to the eastward. A flying fish came aboard during the night. We had two light squalls yesterday, one of them barely enough to let me soap down; had to rinse with salt water. I left my white "pareu" (if a white loin cloth could be so called) hanging to the rigging. Later the Captain hinted to Charlie that his pareu was dry. I didn't bite or get suspicious; but Charlie came to the hatch and closed it, shouting "Rain coming! Better take in your wash!" Then I bit, and coming upon deck found my "pareu" gone. Looking upward with the crowd, I saw it flying at the masthead, a sign to all passing birds that it was the Sabbath and a day of peace and truce betwixt them and us, their mortal enemies; but their most deadly ones are the natives who live every season upon the fattest nestlings. Is it any wonder that those birds

Just a few light clouds around the horizon this morning,--that typical trade belt scenery which forms the background or canvas for those marvelous sunset and sunrise effects.

The breeze held steadily most of the day, increasing towards the end of the afternoon, until from four-thirty to six-thirty we made fifteen miles by the log. Twice during the day albatrosses were seen,--one blue one.

March 8

Latitude 28° 55' S. Longitude, 152° 26' W. Dr.

The trade continued well throughout the night, giving us eighty-four miles from four-thirty P. M. until six-thirty A. M. This morning clouds are well banked over the sky and the breeze has fallen off and more to the eastward. A flying fish came aboard during the night. We had two light squalls yesterday, one of them merely enough to let me scud down; had to rinse with salt water. I left my white "paren" (if a white lois cloth could be so called) hanging to the rigging. Later the Captain hinted to Charlie that his paren was dry. I didn't bite or get suspicious; but Charlie came to the hatch and closed it, shouting "Rain coming! Better take in your wash!" Then I bit, and coming upon deck found my "paren" gone. Looking upward with the crowd, I saw it flying at the masthead, a sign to all passing birds that it was the Sabbath and a day of peace and truce between them and us, their mortal enemies; but their most deadly ones are the natives who live every season upon the fattest menfolks. Is it any wonder that these birds

which now survive are the ones which nest upon the inaccessible ledges of the most precipitous cliffs like the face of South Mountain or the vertical walled motu? Undoubtedly these natives have raided the nesting sites annually, taking all old birds and well grown young obtainable. One of these raids, or two of them, they pulled off following our arrival. Perhaps they feared we would take all their well grown nestlings, as we would have done to a certain extent. They demanded the outlandish price of fifteen francs each for the birds. We did not buy, thinking we would find some ourselves; but they had certainly made a clean sweep and all we got were the two P. nativitatis downy and two neglecta presented to the Captain by the natives.

We have been making good progress lately, but the present course alters our plans and runs us into Pitcairn or Oeno before we strike the farther islands of Henderson and Ducie. It has been quite cool on deck the last few evenings, which brings to mind my neglecting to take temperatures this trip, due not entirely, but mostly, to sea laziness.

March 7

Latitude, 27° 47' S. Longitude, 134° 05' W. Gr.

This morning we were visited by a small blue ternlet. I watched at length for a shot, but he did not approach, or it might have been last evening. Quite a distance from land for a tern, for we are at least two hundred and fifty miles out today at noon. A pair of tropic-birds about but failed

which our arrival was the cause which met upon the inaccessible ledges of the most precipitous cliffs like the face of South Georgia or the vertical walls which Dodgeteilly times, recieves have raided the nesting sites annually, taking all old birds and well grown young obtainable. One of these raids, or two or three, they pulled off following our arrival. Perhaps they feared we would take all their well grown nestlings, as we would have done to a certain extent. They demanded the customaish price of fifteen francs each for the birds. We did not buy, thinking we would find some ourselves; but they had certainly made a clean sweep and all we got were the two E. metallicia downy and two podiceps presented to the Captain by the natives.

We have been meeting good weather lately, but the present course alters our plans and runs us into Kitchener or Cove before we strike the farther islands of Goodenough and Doole. It has been quite cool on deck the last few evenings, which brings to mind my neglecting to take temperatures this trip, due not entirely, but mostly, to sea laziness.

March 7

Latitude, 27° 47' S. Longitude, 124° 08' W. Dr.

This morning we were visited by a small blue terapin. I watched at length for a shot, but he did not approach, or it might have been last evening. Quite a distance from land for a turn, for we are at least two hundred and fifty miles out today at noon. A pair of stercolo-birds about but failed

to place. At noon a white-breasted shearwater about the size of neglected. This evening a black one about same size at a distance.

Pitcairn is evidently our objective now with about three days more to run. This is the longest spell of sailing we will have on this voyage, and I for one have wasted much of my time. But have certainly enjoyed reading Wells' "Outline of History", which I consider the book of the age and one that everyone should read.

It probably is worth noting that at Rapa we observed no specimen of the reef heron, nor any boobies whatsoever; nor did we see frigate birds there, nor the yellow-billed, lunatis, nor fuscatis terns. Of shore birds I personally heard but the wandering tatler, neither hearing nor seeing anything of plovers or curlews. One of the strangest occurrences yet met with is the absolute lack of the two most reliable birds thus far encountered, the green dove and the kingfisher, in the Austral Islands and the recurrence of the dove at Rapa. At Rimatara we found, oddly enough, the red-breasted lory and the warbler, but it is possible that human agencies of transportation account for that. In all these islands the little black rail was reported. Our success in obtaining this bird at Rapa must not be construed as indicative of their abundance, yet per equal area I judge they are several times more plentiful than anywhere else thus far visited. At Lake Vaihiria, Tahiti; at Mount Temae, Moorea; and in the upper fern regions of Raiatea and the swamps of Tubuai they were very plentiful, but conditions were adverse to taking them. Taro beds in Rapa are constructed

to place. At noon a white-breasted sheathbill about the size of meglestod. This evening a blue one about same size at a distance.

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It probably is worth noting that at Saga we observed no species of the reef heron, nor any boobies whatsoever; nor did we see frigate birds there, nor the yellow-billed, lunatic, nor Tuamotu terns. Of shore birds I personally heard but the wandering tattler, neither hearing nor seeing anything of plovers or curlews. One of the strangest coincidences yet met with is the absolute lack of the two most reliable birds thus far encountered, the green dove and the ground-lark, in the central islands and the recurrence of the dove at Saga. At Kimatara we found, oddly enough, the red-breasted lory and the warbler, but it is possible that human agencies of transportation account for that. In all these islands the little black rail was reported. Our success in obtaining this bird at Saga must not be construed as indicative of their abundance, yet per equal area I judge they are several times more plentiful than anywhere else thus far visited. At Lata Vanikia, Sabiti; at Mount Tamao, Ruotea; and in the upper Tera regions of Kaiaea and the swamp of Tonui they were very plentiful, but conditions were adverse to taking them. Two bats in Saga are constructed

differently from those of any other of these native islands. There the beds are within a surrounding embankment and are kept flooded ever so slightly, affording ideal feeding conditions for this bird. The birds, as is evidenced by their tracks, venture out into the more open beds only occasionally and then mostly in the evening and morning, although we obtained many at such hours as nine A. M. and three P. M.

The young birds are more venturesome than the old ones, as our collection reveals. The preponderance of evidence is along the edge of the beds but a foot or two from the dense water weed which inevitably adjoins them and furnishes ideal shelter for rail. There tracks are many times more numerous than elsewhere throughout the bed. Here in these well cultivated beds one had some chances of shooting the birds. Elsewhere the taro beds are slightly elevated with trenches of standing water around them, and consequently the rail does not inhabit them nor even feed in them. I am hoping to find conditions favorable at Henderson where Porzana atra is found. We won't have the taro beds but hope the birds are curious enough to show themselves.

March 8

Latitude 26° 58' S. Longitude 133° 15' W. Gr.

Our spell of wind did not last long and so today we are lolling about on a very calm ocean. A pair of red-tailed tropic-birds and some shearwaters (Pt. neglecta) observed. Mr. Beck killed one from the ship this morning. Long Jim and

differently from those of any other of these entire islands. Here the beds are within a wonderfully compact and are kept flooded over so slightly, affording ideal feeding conditions for this bird. The birds, as is evidenced by their tracks venture out into the more open beds only occasionally and then mostly in the evening and morning, although we obtained many at such hours as nine A. M. and three P. M.

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March 2

Latitude 26° 22' S. Longitude 122° 12' W. Or.

Our spell of wind did not last long and so today we are lolling about on a very calm ocean. A pair of red-tailed tropic-birds and some shearwaters (Pt. Nesiotis) observed. Sam shifted one from the ship late morning. Long Jim and

I went after it in the boat, foolishly not taking a gun and of course another bird came twice within easy range of us. After lunch Mr. Beck went ahead in the boat and obtained another bird, seeing three or four,--two dark ones.

It is surprising how rapidly our environment effects us. Just the minute the ship is becalmed everyone gets lazy and sleepy. When a gale is blowing one has lots of energy but cannot use it on account of the rolling of the ship. Life aboard the 'France' on these prolonged journeys dwindles down to ample sleep, plenty of reading, three good meals and an observation. We are well stocked with books and magazines, but I enjoy best of all H. ~~B~~. Wells' "Outline of History", which has kept me absorbed whenever I have taken the time to read.

March 9

Latitude, 26° 47' S. Longitude 132° 57' W. Gr.

In writing up egg data I am reminded of the oddest nesting site found at Rapa, of the petrel F. Grallaria. I describe it as a "small pocket in face of vertical rock, twenty centimeters in diameter, thirty centimeters in depth, and lined with a little dead grass". It may be of interest to record that the bird must have landed from flight into that hole, as there was no possibility of its climbing from the ledge below up to the hole.

No birds obtained today, although we were visited by red-tailed tropics and shearwaters. Spent the day, when not

I went after it in the boat, fortunately not taking a gun and of course another bird came taking within easy range of us. After lunch Mr. Beck went aboard in the boat and obtained another bird, making three or four,--two duck cons.

It is surprising how rapidly our environment effects us. Just the minute the ship is secured everyone gets lazy and sleepy. When a sale is slowing one has lots of energy but cannot use it on account of the rolling of the ship. Life aboard the 'Pequod' on these prolonged journeys resolves down to ample sleep, plenty of reading, three good meals and an observation. We are well stocked with books and magazines, but I enjoy best of all H. R. Haggard 'Rulling of History', which has kept me absorbed whenever I have taken the time to read.

March 9

Latitude, 34° 47' S. Longitude 142° 47' E. Or.

In writing up our data I am reminded of the odious nesting site found at Cape, of the petrel E. Gradlaria. I describe it as a "small rocket in face of vertical rock, twenty centimeters in diameter, thirty centimeters in depth, and lined with a little dead grass". It may be of interest to record that the bird must have landed from flight into that hole, as there was no possibility of its climbing from the ledge below up to the hole.

So birds obtained today, although we were visited by red-billed tropic and albatrosses. About the day, when we

asleep, in the hold working upon plants. Turned in early, but sleep does no good when one gets too much of it.

March 10

Latitude, 25° 54' S. Longitude, 132° 43' W. Gr.

Louis shot a red-tailed tropic-bird today shortly after a yellow-billed had passed over ship. Two or three shearwaters about during day but no one got any. We didn't gain much ground (or water) today. The wind is too light for successful tacking. Had a terribly sleepy spell this afternoon, but this evening was able to work on plants and write letters. Have put off numbering of plants until it is now too late if we cut up to Pitcairn. One of our pigs jumped overboard, and no one saw it, or at least no one called the ship's attention to it if they did see it. Good sunshiny day as it has been nearly all this trip.

March 11

Latitude, 26° 34' S. Longitude, 131° 59' W. Gr.

At two A. M. this morning a steamer passed us. She was heading straight for us and was not very distant when she seemingly saw us and then, strangely , cut across our bow. We were not making much time, however, so it didn't matter. Bijoe very foolishly went forward with a flash light and signalled that we were French, so he says. She replied by blinking twice at wide intervals. Then, when he failed to reply, she flickered distractedly at length. She made a half

sailor, in the mold working on plants. Turned in early, but slept done no good when one gets too much of it.

March 10

Latitude, 33° 34' S. Longitude, 152° 42' W. Gr.

Looks what a red-tailed tropic-bird today another after a yellow-billed had passed over only. Two or three albatrosses about during day but no one got any. The ship's rain much ground (or water) today. The wind is too light for successful tacking. Had a terribly sleepy spell this afternoon, but this evening was able to work on plants and write letters. Have got off numbering of plants until it is now too late if we get up to Pitcairn. One of our pigs jumped overboard, and no one saw it, or at least no one called the ship's attention to it if they did see it. Good sunsetting day as it has been nearly all this trip.

March 11

Latitude, 24° 24' S. Longitude, 131° 22' W. Gr.

At two A. M. this morning a steamer passed us. The one boasting sufficient for us and was not very distant when she accordingly saw us and took, strangely, not across our bow. We were not making much time, however, so it didn't matter. Alice very foolishly went forward with a flame light and signalled that we were present, so to speak. She replied by blinking twice at wide intervals. Then, when he failed to reply, she flickered distractedly at length. She made a half

circle detour around us before resuming her course.

At noon today we discovered that our net gain eastward was but twenty miles. It has been figured out that so long as we sail forty miles a day we cannot afford to use the engine. In ten days we have averaged fifty miles daily. I figure that it would have been better to have used the engine sufficiently to have averaged one hundred and ten miles daily. The difference in cost would have been only forty-four dollars per day. Certainly a day at an island is worth that much, even if we get but ten birds and ten plants each day. At twelve we started the engine and have been traveling six miles per hour steadily since then. Pitcairn should be very close by daylight. We should reach it about eight o'clock. There is considerable interest in visiting this land of the 'Bounty' mutineers.

March 12

No land in sight yet, but squally weather may prevent our seeing it afar off. The Captain says we should see it at seven, when we will be twenty-five miles away.

Following are a few facts concerning the island as found in Rosalind Amelia Young's "Story of Pitcairn Island".

Discovered in 1767 by Captain Cartaret. H. B. M. Sloop 'Swallow'.

Mutiny of the 'Bounty'.

Dec. 29, 1787, small sloop of war, 'Bounty', Lt. W. Bligh commander, sent by King George III to transport

atole deluar around us before resuming our course.

At noon today we discovered that our net gain westward was but twenty miles. It has been figured out that so long as we sail forty miles a day we cannot afford to use the engine. In ten days we have averaged fifty miles daily. I figure that it would have been better to have used the engine sufficiently to have averaged one hundred and ten miles daily. The difference in cost would have been only forty-four dollars per day. Certainly a day at an island is worth that much, even if we got but ten birds and ten plants each day. At twelve we started the engine and have been traveling six miles per hour steadily since then. Kitesirn should be very close by daylight. We should reach it about eight o'clock. There is considerable interest in visiting this land of the 'County' mariners.

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Discovered in 1767 by Captain Garland. H. M. Sloop 'Swallow'.

Sailing of the 'County'.

Dec. 29, 1767, small sloop of war, 'County', lt. G. Gilch commander, sent by King George III to transport

breadfruit from Tahiti to West Indies.

October, 1788. Arrives at Tahiti.

April 1789. Left Tahiti.

April 26, 1789. Left Anamooka.

" 28, 1789. Mutiny of crew under Fletcher Christian (master's mate). Bligh and eighteen men, though more desired to leave, were put in open boat and left to their own luck and pluck. Boat landed at Tefoa where natives proved hostile. Thereafter they avoided land except in direst necessity. They suffered terribly. John Norton killed by natives at Tefoa.

Twelve hundred leagues to Timor, Dutch East Indies. To Batavia where Bligh and some of his officers took passage home.

'Pandora', Captain Edwards (under officer on the 'Bounty') "...a man devoid of the humane feelings of kindness and pity" was sent to search for the mutineers.

The 'Bounty', under Fletcher Christian, returned to Tahiti and thence proceeded to Tubuai. Returned to Tahiti for pigs and goats. Repulsed by Tubuai natives upon return; they had fought during previous sojourn over women. Returned to Tahiti.

September 20, 1789. Sixteen of the crew landed with share of articles and arms of 'Bounty'. Christian and eight shipmates (John Mills, William McCoy, Matthew Quintall, Edward Young, John Adams, John Williams who was French, Isaac Martin who was an American, and W. Brown) set sail in the 'Bounty' to hide from justice. Of the sixteen at Tahiti two were killed by natives in brawls; fourteen were found by the

transfer: from Tahiti to East Indies.

October, 1789. Arrive at Tahiti.

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'Pandora'. "These poor men were conveyed in irons on board the 'Pandora', where they were placed in a close room, with one small opening to admit light and air. Chained to the floor, exposed to the most cruel treatment that the mind of the inhuman Edwards could conceive, enduring the heaviest privations, and compelled to live in their noisome den from day to day without any means of having it cleansed, the condition of these sufferers can more readily be imagined than described."

(Especially by a prejudiced party years later! But what of Bligh's open boat party? An eye for an eye and far better than hanging!)

'Pandora' wrecked on coral reef. Edwards left them chained; sailor liberated all but four who perished. Of ten survivors "four were acquitted; one was discharged on account of an informality in the indictment; the other five were found guilty and were condemned to death. Of these two received a pardon, and the three others were executed at Spithead", from which place they had sailed on their eventful voyage four years before.

'Bounty' mutineers had taken with them six native men, ten women, and a girl of fifteen as wives and servants (they should have realized that the Tahitian women were servants enough and capable of performing any task.) "It is said that Christian having seen an account of the discovery of a lone island in the Pacific Ocean, by Captain Cartaret, in the year 1767, directed the course of the ship to that place. It was named Pitcairn Island, after the young man who descried it,

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he being, as the story goes, a son of the Major Pitcairn who fell in the battle of Bunker Hill."

January 23, 1790. 'Bounty' arrived at Pitcairn Island. Later wrecked by intent in Bounty Bay.

1792. Wife of Williams fell from rocks while searching for birds and eggs. His taking one of the native men's wives caused an uprising amongst the Tahitians which resulted in the killing of Christian, Mills, Martin, Brown, and Williams; Adams was wounded; McCoy and Quintall escaped into woods; Young, a favorite amongst the women, was secreted by them.

The native men next quarreled amongst themselves, the common trait of all victors in war. The remaining men, with the help of the women, killed the native men.

Quintall and McCoy set up a still and drank heavily. McCoy committed suicide by drowning with the aid of a stone while in drunken delirium.

1799. Quintall caused trouble and threatened lives of other two survivors; so they anticipated his design by tomahawking him.

1800. Young died of the asthma. Adams now turns to religion and sets to work to teach the colony from a Bible saved from the 'Bounty'.

1808. Captain Mayhew Folger, Whaler 'Topaz' discovered mutineers.

1814. H. M. S. 'Briton' and 'Tagus', Captains

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1814. H. M. S. 'Briton' and 'Tagus', Captains

Staines and Pipon, Valparaiso to Marquesas. Met by canoe, George Young and Thursday October Christian. Adams advised not to go down to beach.

1819. E. I. Co. S. 'Hercules', Captain Henderson.

1823. English whaler, 'Cyrus', Captain Hall. John Buffet volunteered to remain and help Adams, now an aging man. John Evans, for love of Buffet, jumped ship and stowed away in a hollow tree until ship had sailed.

1825. 'Blossom', Captain Beachy, visited the island. Found sixty-one people, twenty-six adults, Adams, Buffet, Evans, and five Tahitian women.

1828. George Hun Nobbs and an American named Bunker from Valparaiso. Nobbs married. Bunker repulsed, committed suicide from a cliff,--the fourth to die on the island in that manner. Nobbs took school away from Buffet who had sinned. Nobbs also assumed duty as pastor.

1829, March 29. John Adams died, aged sixty-five years.

1831. Exodus to Tahiti. Fever killed fourteen. Buffet and family and four young men returned in nine weeks. The rest returned on chartered schooner five months later. Traded copper of the 'Bounty' for passage.

1832-33. Arrival of Joshua Hill, seventy years old, who came to teach and preach. Old still still at it. Visit to Tahiti lowered their morals as it does most peoples'. Hill destroyed the still. (Earliest recorded prohibition.) Buffet, Nobbs and Evans forced by animosity to leave the island to the tyrant Hill. Sailed on schooner. Returned for families, Nobbs

Staines and Pipon, Valparaiso to Marquesas. Not by sense, George Young and Thursday October Christian. Adams advises not to go down to beach.

1819. H. I. Co. S. 'Hertford', Captain Henderson.

1820. English whaler, 'Syrene', Captain Hall. John Buffet volunteered to remain and help Adams, now an aging man. John Evans, for love of Buffet, jumped ship and stowed away in a hollow tree until ship had sailed.

1822. 'Hassom', Captain Beasley, visited the island. Found sixty-one people, twenty-six adults, Adams, Buffet, Evans, and five Tahitian women.

1823. George Tom Bobbs and an American named Bunker from Valparaiso. Bobbs married. Bunker remained, committed suicide from a cliff,--the fourth to die on the island in that manner. Bobbs took school away from Buffet who had planned. Bobbs also assumed duty as pastor.

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and Evans to Gambier, and Buffet to Tahiti. All returned shortly after.

1837. Hill removed after decision of Lord Russell in 1836, Actaeon.

1838. H. M. S. 'Fly', Captain Elliott, raised British flag.

1841. Christian's widow died at an advanced age. Used to relate stories of Captain Cook's visit to Tahiti. He was afflicted with rheumatism which was cured by application of a native preparation from the a'pi (arum gigantum), a painful sting more severe than the nettle.

1853. Removal to Norfolk Island, north of New Zealand.

1858. Families of Young and McCoy returned to Pitcairn. 'Wild Wave', Captain Knowles, wrecked at Oeno. The party of eight made Pitcairn in boat--carried. Three or four birds taken as news carriers. Boat wrecked at Pitcairn. Built boat with ax and nails taken from houses, and named 'John Adams'. Sailed to Tahiti, making a brief call at Nukahiva (?). Adverse winds prevented reaching Oeno.

'Vandalia' from Tahiti rescued thirty at Oeno and two at Pitcairn.

February 2, 1861. Second party returns from Norfolk.

We steamed until three P. M. When within twenty miles of the island the engine was shut off and the sails raised. Commenced tacking against headwind but later in evening the

and Evans to Gambier, and Buffet to Tahiti. Bill returned shortly after.

1857. Bill removed after declaration of Lord Russell in 1856, Johnson.

1858. H. M. S. 'Sly', Captain Hillyer, raised British flag.

1861. Charlotte's widow died at an advanced age. Used to relate stories of Captain Cook's visit to Tahiti. He was afflicted with rheumatism which was cured by application of a native preparation from the e'pi (arum esculentum), a painful ailing more severe than the malady.

1863. Removal to Norfolk Island, north of New Zealand.

1865. Families of Young and Mooney returned to Pitcairn. 'Wild Wave', Captain Bowlen, wrecked at Oeno. The party of eight made Pitcairn in boat--carried. Three or four days taken at Rowa carrier. Boat wrecked at Pitcairn. Built boat with ax and nails taken from houses, and named 'John Adams'. Sailed to Tahiti, making a brief call at Rakahiva (?). Adverse winds prevented reaching Oeno.

'Vandalia' from Tahiti rescued Entity at Oeno and two at Pitcairn.

February 2, 1881. Second party returns from Norfolk.

Re-visited until three P. M. Then within twenty miles of the island the engine was shut off and the main raised. Commenced taking regular bearings but later in evening the

breeze swung around to the northward and our present course is almost directly towards the island. Will probably have to steam in in the morning.

It has been very interesting today watching the dog Noha with his nose to windward. He scents the land I think and is restless. We tried him out with a little boat drill, and he was more eager than ever to go. We saw one or two shear-waters during the day, but evening brought no increase to signify abundance here.

March 13

We steamed into Pitcairn this morning in opposition to H. M. S., 'Dorset'. Three boat-loads of men were out trading with the steamer when we arrived. After an hour the steamer left and we picked up one of the boats. Landed and met all the boys seen in Tahiti in November and December, 1920.

Ascended road to summit of the hill in an hour and a half, obtaining fifteen warblers along the route and one white tern at the summit. More white terns, including two young, from the branches of the trees. Also some more warblers. Saw some black terns too far off to identify, but they looked more like noddies than the lesser. A yellow-billed tropic-bird passed over us high up. We have been out three hours now and have at least six terns and twenty-five or more warblers. Saw one warbler eating the blossom of a banana. Picked up a few more warblers on way back to the village. Also took along a warbler nest,--birds flown from tree top.

breeze sweep around to the northward and our present course is almost directly towards the island. We will probably have to steam in in the morning.

It has been very interesting today watching the sugar cane with his rods to windward. We sounds the land I think and is rewarded. We tried him out with a little boat drill, and he was more sober than ever to go. We saw one or two alligators during the day, but evening brought no increase to alligator summons here.

March 15

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Ascended road to summit of the hill in an hour and a half, obtaining fifteen warblers along the route and one white tern at the summit. More white terns, including two young, from the branches of the trees. Also some more warblers. Saw some black terns too far off to identify, but they looked more like noddies than the lesser. A yellow-billed tropic-bird passed over us high up. We have been out three hours now and have at least six terns and twenty-five or more warblers. One warbler eating the blossom of a banana. Placed up a few more warblers on way back to the village. Also took along a warbler nest,---birds flown from tree top.

The boys tell me that they have seen and heard the cuckoo, but know nothing whatever about their nests or nesting habits. I have endeavored to impress them with the importance of discovering this mystery, and hope they will help solve it for the benefit of science. They should be well rewarded if they make the find. They haven't many assets here. The population now is about one hundred and eighty-five,--very interesting people. There are here large cliffs of a decidedly stratified formation which may be volcanic ash and gravel deposited in layers. I am not geologist enough to say whether or not the deposits were made in the sea.

Sent birds and Curtis' plants aboard. Returned to village and later went out for the night with two men to sleep above cliffs. These people have developed a dialect of their own which is as difficult to understand as Scotch Gaelic. We reached the cliff just before sundown, after stopping at one of the upper plantations for a bath. At the cliffs we saw noddy, white and blue terns far below us. Later heard young noddies. Throughout the night we heard nothing of shearwaters. The boys tell me there is another colony at the other end of the island,--black shearwaters which live in holes in the ground, but say this is not the season for them. They also assert that the season for their "sparrow hawk" (the cuckoo) is in June, July and August. The little warbler they call sparrows; they do not sing. I am inclined to the belief that there is almost a generic difference in these birds, Rimatara, Christmas Island; and the Tahitian, Moorean, Raiatean and

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Boat birds and Dovrie' plants abound. Returned to village and later went out for the night with two men to place above cliffs. These people have developed a dialect of their own which is as difficult to understand as Scotch Gaelic. We reached the cliff just before sundown, after stopping at one of the upper plantations for a bath. At the cliffs we saw noddy, white and blue terns far below us. Later heard young noddies. Throughout the night we heard cooing of shearwaters. The boys tell me there is another colony at the other end of the island,--black shearwaters which live in holes in the ground, but say this is not the season for them. They also assert that the season for their "departure bark" (the cuckoo) is in June, July and August. The little warbler they call Sparrows; they do not sing. I am inclined to the belief that there is almost a specific difference in these birds. Minahs, Durkiness Island; and the Redbill, Scoresby, Heliotes and

and Marquesan birds, which four latter have considerable song to their whistle. These are peeping warblers.

March 14

Left before five this morning for the burrowing colony. Warblers peeping all along the route. The boys say that these warblers have a distinct call for cats and dogs and that they use the same call when chasing the "sparrow-hawk", which latter are here most abundant in winter. The only time these people see them is when the "sparrow" is chasing the "hawk"!

Descended ridge to right and found white terns very abundant above lower valley. Got three of those which passed over the ridge. Here is the yellow tuff very prominent and practically the general formation. Layers horizontal above but sloping with the hillside towards the sea. Two prominent rocks of lava off shore, but no birds upon them. We descended ridge to point just opposite these two rocks. Several holes in cliffs out of reach. The only signs of birds about them is a small blue ternlet. The shearwater holes were three or four crevices from which birds were taken,--evidently a small colony.

Climbed about the limited shelves but found nothing. The shore line looked too steep and the birds along it too scarce to spend time and efforts returning along it, so we returned up the ridge. The boys claim to have heard a tatler, or "snipe" as they call them. Three boys on ridge across ravine are rolling boulders down the slope. Have met Curtis and he

and Sargassum birds, which your letter have considerably more to their reality. These are peculiar warblers.

March 14

Left before five this morning for the burrowing owls. Warblers peeping all along the route. The boys say that these warblers have a distinct call for owls and dogs and that they use the same call when chasing the "sparrow-hawk", which latter are here most abundant in winter. The only time these people see them is when the "sparrow" is chasing the "hawk"!

Descended ridge to right and found white terns very abundant above lower valley. Not three or three which passed over the ridge. Here is the yellow bird very prominent and practically the general formation. Sparrow horizontal above but sloping with the hillside towards the sea. Two prominent rocks or lava off shore, but no birds upon them. We descended ridge to point just opposite these two rocks. Several noies in cliffs out of reach. The only signs of birds about them is a small blue tourist. The shearwater noies were three or four crevices from which birds were taken,—evidently a small colony.

Climbed about the limited seaview but found nothing. The shore line looked too steep and the surf along it too coarse to spend time and efforts returning along it, so we returned up the ridge. The boys claim to have heard a letter, or "pulse" as they call them. There boys on ridge above twice are rolling bunkers down the slope. Have not certain was so

is going on over to collect banyan trees, tree ferns, etc.

Stopped for breakfast, then went on down to dock with presents of shell strings and baskets. We went out to ship and had lunch, returning at twelve-thirty for chickens and other supplies. Let two boys hunt warblers while I rounded up provisions, crew, etc. After setting two-thirty as the hour to leave we were on the ship by that time, evidence that we are out of Polynesia and in British territory. The boys put off in one of their boats; they have three, and one new one, long one-ton row boats rigged for dory sail. The new boat is about two tons. They have a crosslog runway, or skidway, leading down into Bounty Bay where the surf beats with considerable violence and furnishes as much amusement for boating as the motu.

When we reached our boat some dozen kids were in the bay swimming. All these people are good swimmers and marvelous boatsmen. They put out one of their boats and Curtis and I went out in it, along with a load of women and children and a host of men all crazy for ammunition which was the best kind of money here. It was interesting to see the residents striking out on a rat hunt with twenty-two rifles which had long been out of use on account of lack of ammunition.

An interesting note concerning this island is that no wasps exist upon it. Flies were here, though not so plentiful as at Rapa. Saw no grasshoppers or snails, though I think the latter were present from the appearance of the "Burau" leaves.

These people, the lineal descendants of the mutineers of the 'Bounty' and Tahitian women, with a few infusions of

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Stopped for breakfast, then went on down to deep water reasons of small stinging and bacteria. We went out to ship and had lunch, returning at twelve-thirty for quinoxens and other supplies. Let two boys load warblers while I rounded up provisions, crew, etc. After resting two-thirty as the hour to leave we were on the ship by that time, evidence that we are out of Polynesia and in British territory. The boys put off in one of their boats; they have three, and one new one, long one-too row boats rigged for duty small. The new boat is about two tons. They have a crossing runway, or skidway, leading down into bounty bay where the surf beats with considerable violence and furnishes as much amusement for boating as the sea.

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later white blood, are a very interesting study in Mendelism. All of the F-1 (1790-1815) generation must of necessity be dead. Allowing twenty-five years for a generation, the very youngest of the F-2 would be at least fifty-eight years old (parents F-1 at forty-five to fifty years of age). There are several grandchildren of the mutineers still alive, but most of the older people are of the F-3 generation. A hurried estimate would place them at three fourths appearing entirely or mostly white, one eighth slightly Polynesian, and one eighth evidently Polynesian. Here is the very best example that could be found concerning the intermingling of the Caucasian and the Polynesian races. A Mendelist-ethnologist should visit Pitcairn and get the full history of each individual since the 'Bounty' arrived. Thursday October Christian, for instance, the first born on the island, married back a full Polynesian girl. There is that test. The rest of that generation married either F-1 or the white additions to the colony. There are the other experiments. In later generations more whites were crossed in. I do not believe any dark blood has ever been back-crossed since the first instance. The boys I met in Tahiti went there ostensibly to procure themselves wives, but were not so easily satisfied as their rebellious ancestors. At present there are more men than women on the island. It would have been interesting if the men had brought back one or two black girls. Some of these men of the F-4 and 5 are swarthy dark-skinned fellows, but one of them is a red-headed blond. An ethnologist could easily afford to spend a month

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or so with these people to study these things. He would find them, as we did, a very interesting and pleasing people. Like our last hosts at Rapa, where sex might have had its influence, our reception was no more hearty nor as sincere as here.

During our brief delay of two days (really little more than one) we obtained some valuable additions to our provisions, especially chickens, arrow-root and syrup; a few plants and thirty-three of the indigenous warbler; eight white terns; a bottle of skinks, half a dozen gekkoes and one rat.

We set sail with a fair wind shortly after three o'clock and soon left the island upon the horizon. This evening just at dusk the boys called me up to see a large black bird. This time it was the long expected albatross (?), the dark-winged one, but it was too dark to tell just what bird it was. This is doubly interesting because the Pitcairn boys insisted that an albatross nests upon Oeno. Let us hope so!

March 15

Latitude, 24° 55' S. Longitude by Aut. 128° 46' W. Gr.

We traveled fairly well during the night, and this noon we find ourselves but thirty miles away from Henderson to the southward, and becalmed. Red-footed boobies are with us again, and white ones are evident, so it is possible that the big bird last night was one of them, although Mr. Beck

or so with these people to study them closer. We would find them, as we did, a very interesting and pleasing people. Like our last hosts at Zaza, where we might have had its influence, our reception was no more hearty nor as sincere as here.

During our brief delay of two days (really little more than one) we obtained some valuable additions to our provisions, especially chickens, straw-hat and straw; a few plants and thirty-three of the indigenous warbler; eight white terns; a bottle of anises, half a dozen cocoons and one rat.

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March 15

Latitude, 14° 30' S. Longitude 47 Ant. 124° 40'.

We traveled fairly well during the night, and this noon we find ourselves but thirty miles away from Manahoron to the southward, and becalmed. Red-footed boobies are with us again, and white terns are evident, so it is probable that the big bird last night was one of them, although it seemed

still says it was the flight of an albatross. Also white-breasted and dark shearwaters of neglected type are about. White terns and red-tailed tropic. This afternoon Mr. Beck put out in the boat and obtained nine shearwaters, eight of which do not appear to be the neglected, three red-footed boobies, two white terns and one frigate bird. The white terns surprised us by possessing pure white feet. Elsewhere they have always been light blue along the toes and tarsus with but the web white. These had the web a creamy white with toes but slightly bluish. I painted them, and also the young booby obtained early in the afternoon. The exact tint of the latter was very difficult to obtain, but with the help of the engineer I got fair results.

Plans are now altered to suit calm weather by steaming for Henderson Island during early morning. It necessitates considerable rushing with the plants but we will save all we can. Have ceased endeavoring to get plants separated into five equal numbers and have also ceased to catalogue full data concerning them. I do not care to write up notes while aboard ship. If I have not time to make full notes in the field I do not care to have my name below any guess-work. We can keep the locality separate, and the date we'll know. Going up through these coral atolls that is all we'll be able to do because we will be at new islands every day or so and time will press heavily upon our hands.

Tonight I stamped Pitcairn on all the papers of plants collected. That is about all we'll be able to do if things run like this; on atolls it should be sufficient, for

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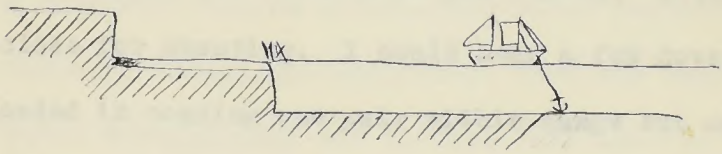
Tonight I stayed fifteen on all the papers of plants collected. That is about all we'll be able to do if things run like this; on atolls it should be auxiliaries, for

there is really little difference in the data except regarding exposure to sunshine and wind. I anticipate Henderson Island with its warblers, rails, parakeets, doves and sea birds, which even now threaten to be unusual.

March 16

Steamed in to Henderson this morning. Off eastern side of island the bottom is plainly visible. Boys catching all manner of fish and sharks. Sea perfectly calm all day but that did not prevent the great swells from combing in over the shore reef which is cut some two hundred meters from the beach of coral sand, which stretches along here at the base of the fifty foot cliff of elevated coral. The perfectly



level surface of the island is evidence that the uplift was even and not convulsive. Erosion has cut the coral rock into a very jagged surfaced abomination. Shoes are ground to pieces and tough native soles cut up.

I penetrated the bush which carpets the flat surface some two hundred meters without the knife, but obtained it to get in farther. There is quite a variety of plant life and many fruity berries are evident. The warbler was found in abundance throughout the low bush, where I was able to obtain

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many fruity berries are evident. The warbler was found in
abundance throughout the low bush, where I was able to obtain

ten during three hours. Also obtained one dove and three parakeets, both of which I found upon reaching the pandanus and other low trees. At my farthest advance I also heard the fourth land bird, the rail. Had intended to sleep out, but the probability of the ship's going around to the further side didn't sound tempting enough. I also obtained two white-footed white terns. Their entire foot, except the black claws, is a rich creamy white; while all birds of that genus heretofore collected have had the toes blue and only the web white.

The warbler shows a decided difference to the Pitcairn bird in general appearance, though it resembles it in plumage. They fill the low bush and are very gentle and innocent. While I was calling parakeets no less than half a dozen were within range of the auxiliary. They hop around amongst the brush searching for insects on the leaves. Often they come too close for shooting. I could hear a few doves calling and succeeded in coaxing one pair within range but missed one of them. They, too, show decided differences from other birds of the same genus. Evidently they have young birds being fed, so I must bend every effort to find a nest.

The parakeets stay pretty well among the pandanus and tatler shrubs. They have the same shrill croak that the Rimatara birds have. The boys obtained some red-tailed tropics, young birds and eggs, which Mr. Beck photographed. He shot two neglected shearwaters, several of which were flying along the cliff and over the island. Many frigate birds about, a few boobies, not many noddies, several pairs of white terns,

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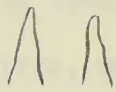
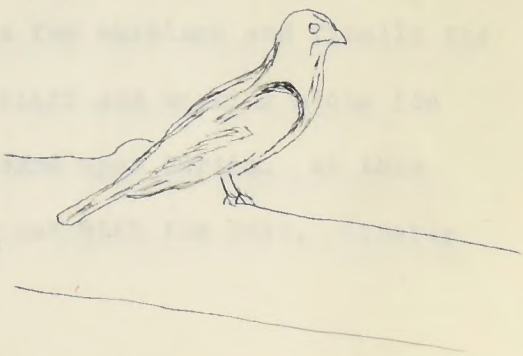
a few tatlers and some curlews, two of which Mr. Beck shot; in full plumage and excessively fat. I shot a young white tern from a tree branch, and oddly enough it had blue toes! We are not very capable boatmen for reef running yet, lacking power and experience and centrifugal authority. All sailors went off and left boat stranded. She leaked badly and had to be calked up. On board the ship they have several five gallon cans of salted fish, and were still dragging them in all afternoon.

Saw some sharks with considerable diameter, and one savage looking fellow with small pointed teeth.  We are getting several pounds of fins dried for the Chinamen. For supper we had some excellent fish. After eating, Mr. Beck put out in the little boat and obtained ten of the Henderson Island shearwater, which certainly differs considerably, though not decidedly, from the neglected. We were quite disappointed not to find them nesting along the cliff here. This island has a greater number of interesting birds living on it than Rapa. We should spend most of next week here.

March 17

Here is a dove in answer to my call, perched on a large log not two meters away from me. I have attempted to sketch roughly the attitude he assumes. Poor innocent little cuss! If he does not



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fly far away when he leaves, his death is sure. He is much nearer now, and evidently a young bird from the appearance of his plumage. If I just had the camera! But there he goes now! There are times when my sentiment almost gets the best of my dutifulness.

Upon landing on the northeast side of the island opposite coconut trees (how good a fresh drink of pape hare is!) and house skeletons we found a much more promising beach than on the east. Between the sandy beach and the cliffs, which latter are not very prominent, we found rather tall trees with entangled branches, beneath which was considerable shade, ferns and rubbish. We were all enjoying the coconut drinks, when upon turning around I saw something move into a pile of rubbish. Watching closely, I soon discovered a little black head peeping out from beneath the dead branches. It was the rail, much larger than the Rapa bird. What a splendid encouragement for the beginning of the day's hunt! The shot scared two parakeets and they lit closely together on the frond of the tall coconut tree. Both fell to a long shot, but only one was findable.

I proceeded down the beach woods watching for rail in every probable place. Obtained a few warblers and finally the dove. Returned by climbing the cliff and working along its rugged and brushy verge until I came upon Curtis. At this point we saw the sailors putting out with the boat. Greatly

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worried, we hastened down only to see them two-thirds the way to the ship. Was considerably angered about being deserted, but should have realized that the whistles heard from the boat meant something. While we were commencing to eat lunch the boat came back for us; the anchor had not held and there were not enough hands aboard to raise it. They moved the ship over to less depth and sandy bottom. Sent birds obtained aboard, and Curtis to take care of plants. Rotten luck or poor management that we haven't drying equipment to handle the plants properly.

Parakeets about while I was eating. On way up to cliff after lunch I obtained two warblers and four parakeets by calling. On the ridge I obtained a neglected shearwater. Saw a blue ternlet but missed him. Cannot find any sign of trail or anything resembling nesting places of shearwaters. Am working my way into interior but it is a hopeless task. The bush here is all entangled by a vine armed with worse hooks than those on lantana. Fortunately it doesn't grow quite as densely as that.

There is a thunder shower on the other end of the island. The dog is suffering terribly from heat. I am wringing wet with sweat and have been seated here calling birds for about an hour. Sucking one's hand works doubly here, both parakeets and warblers approaching at the sound. At one time, four parakeets were all too near me to shoot at with the auxiliary. They always warn me of their approach; but the little warblers come hopping along through the brush without

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little warblers come hopping along through the grass without

the least hint of their approach. Doves are very indifferent to calling. Two just flew over my head. Lizards are abundant, but the loose coral rocks afford them ample shelter. Will probably have to shoot some. Found some gekkoes at the old house frames. Saw a rat but could not get him and forgot to bring traps ashore.

The thunder storm spread over us. We rushed into some pandanus trees and piled up the leaves which lie two or three feet deep below the trees, over some sticks to form a wickiup. Managed to keep the birds good and dry and the dog enjoyed the shelter. I stripped and rinsed off, for our only chance for a real bath is during rainstorms until we make Mangareva. Also obtained a good drink by running two or three tips of drooping pandanus leaves into my mouth, and later by cutting into the underside of tree trunk down which a considerable stream was flowing and diverting it into my mouth with the knife.

During a lull in the storm we beat a retreat and made an overhanging rock on the face of the cliff. Brush very wet, so I am leaving birds here. Shot a neglected shearwater as it came in above me but only winged it slightly so it soared off into dense brush. I hear the curlew very frequently and see their tracks often along the beach. I intend to do most of my hunting on this island along the beach, unless necessity makes me cut my way into the interior. No one can imagine the impenetrability of the bush on the flat top, where it is neither high enough to go under nor low enough to go over, and

the least idea of their approach. Doves are very indifferent to omitting. They just fly over my head. Herons are abundant, but the locals social roost afford them ample shelter. Will probably have to shoot more. Found some wedges at the old house frame. Saw a rat but could not get him and forgot to bring trap before.

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During a lull in the storm we lost a forest and made an overhanging roof on the face of the cliff. Brush very wet, so I am leaving birds here. Lost a medicated shoelace as it came in above me but only wiped it slightly so it roosted off into dense brush. I hear the curlew very frequently and see their tracks often along the beach. I intend to do most of my hunting on this island along the beach, unless necessity makes me put my way into the interior. No one can imagine the impenetrability of the bush on the flat top, where it is neither high enough to go under nor low enough to go over, and

too thick to go through. Also it is composed of a tough shrub in many places, well entangled with the briar vine. Two Neglecta shearwaters passing over. Still raining.

I was quite surprised to find the rock just below the sand of the beach hard and apparently metamorphosed into marble. Was it a great welling up of hot basic lavas that elevated this coral block, and in so doing metamorphosed the underlying strata? The landing here is not at all bad and here we will land most of the time hereafter. No let up in the rain so I'm going on down to the old shacks and hunt rail under the tall trees.

The rain quit for an hour or so in the late afternoon. I had little or no encouragement from the rail, so proceeded along the beach and made side excursions up to various caverns along face of cliff. Found no nesting birds, though conditions were very favorable. Shot ten neglected shearwaters and one Henderson Island, four small blue ternlets, a tatler and two white terns and also two curlews.

Returned to the shacks just slightly before dusk and again spent half an hour patiently waiting for rail. No sound or sign of them. Stripped off wet clothing and got well dried by working at digging a trench into sand dune above beach and roofing it over with flooring from the shacks. The result is a dry and warm bed place in spite of its grittiness. Slept very soundly, hearing nothing of interest in the bird line.

What strikes me as of most human interest regarding this island is how the two shipwrecked sailors of the 'Essex'

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grass in many places, well entangled with the brier vine.
Two Tagalogs observators passing over. Still raining.

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a dry and warm bed place in spite of the drizzlings. Sleep
very soundly, hearing nothing or interest in the bird life.

Had strange as of most human interest regarding
this island is now the two enlightened sailors of the 'Ocean'

(1820) survived here until "eventually rescued". They are reported as having found pools of rainwater. What a job they must have had to find it where one must cut nearly every yard of one's way inland!

March 18

Awakened early and misjudged the time by the moon. Waited until it was on the meridian and then sallied forth in tennis shoes, pareu and hunting blouse to search for turtle. Walked the entire beach in both directions. Saw many frigate birds perched on low trees along beach, mostly young birds. The dog caught eight or nine rats, only one of which was a female. They were out beach-combing and so were both easily spotted and also run down. Found three or four old turtle trails but nothing new. Along the west half of the beach I obtained several white terns, including two more young birds from the tree branches with their light purplish blue toes, resembling the other species taken elsewhere, and in vivid contrast to the rich creamy white of the adult birds. They have in place of the common black orbital ring a very prominent black spot in front of the eye at the corner of the lid. The bill, if anything, is less blue than that of the other birds taken elsewhere. It certainly is a distinct bird in those three respects from even the one at Pitcairn. I found them roosting on pandanus tree limbs until almost sunrise.

At the further end of the beach I shot a tatler above the surf. He washed ashore and while I was endeavoring to

(1820) survived here until "eventually rescued". They are reported as having found pools of rainwater. What a job they must have had to find it where one went out nearly every yard of one's way inland!

Entry 16

Awakened early and discovered the tide up the moor. Waited until it was on the ascension and then sailed forth in trusty shoes, jersey and mounting gloves to search for turtle. Walked the entire beach in both directions. Saw many frigate birds perched on low trees along beach, mostly young birds. The dog caught eight or nine rats, only one of which was a female. They were out beach-combing and so were both easily spotted and also run down. Found three or four old turtle trails but nothing new. Along the west half of the beach I obtained several white terns, including two more young birds from the tree branches with their light purplish blue toes, resembling the other species taken elsewhere, and in vivid contrast to the rich creamy white of the adult birds. They have in place of the common black orbital ring a very prominent black spot in front of the eye at the corner of the lid. The bill, if anything, is less blue than that of the other birds taken elsewhere. It certainly is a distinct bird in there, terns requisite from the one at Titiaina. I found them roosting on pandanus tree limbs until almost sunrise.

At the further end of the beach I shot a tailor above the surf. He swamed ashore and while I was endeavoring to

extract the empty cartridge a high comber brought him well up the beach. I made a rush for him, stooped and picked him up, and then rushed back for dry land, only to realize that I had lost the auxiliary barrel into the shifting sand of the beach. Another wave then closed that tragedy. I hunted until daylight but in vain, though I stripped down and rooted about in the shingle where waves were hip deep.

Returned down beach to see two shore birds along the beach less than half the size of the tatler and mostly white below. Were they sanderlings? I shot once sitting and once in air but missed both times. The vessel was tacking back and forth across this end of the island ere this. A northerly breeze forewarned me that we would likely run down to Ducie. So I searched for rail along the woody patches and ascended to some caves, the most prominent ones along this end, in the largest of which rail tracks were very numerous, and some seemingly entered a hole which I could not dig out. Smoothed out old tracks to enable better reading of new ones later.

Proceeded aloft and found a tropic-bird with two full length center-tail feathers, nesting and clean breasted, so took her along. Could see doves flying about bushes inland, but had no success in calling them. Shot a tatler flying overhead and landed it just right on the edge of the cliff. The dog objected very seriously to ascending this morning. Last evening he found it much more comfortable to remain on the soft sandy beach than to follow me along the cliffs.

against the empty cartridge a high-power Sergeant did well up the beach. I took a rest for him, stopped and placed him up, and then rushed back for our load, only to realize that I had left the auxiliary barrel into the shifting sand of the beach. Another wave came closed that tragedy. I hunted until daylight but in vain, though I stripped down and rooted about in the shingle where waves were big deep.

Returned home beach to see two shore birds along the beach less than half the size of the latter and mostly white below. Were they sandpipers? I shot once sitting and once in air but missed both times. The vessel was tacking back and forth across this end of the island are this. A northerly breeze forewarned us that we would likely run down to Dunie. So I searched for trail along the mossy pasture and searched to some cover, the most prominent cross along this end, in the largest of which trail tracks were very numerous, and some seemingly entered a hole which I could not dig out. Searched out old trenches to enable better reading of how cover later.

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His feet are evidently very tender and sore from the cutting sharpness of these rocks.

Erosion carves out innumerable keen edged pinnacles and spikes on this old coral rock. The pilot book thinks this island has been elevated "by some subterraneous convulsion", but there certainly is no evidence of any such disturbance, for the island is practically level across the top, while the coral cliffs show decidedly well marked shore lines denoting the previous stages of sea level during the uplifting of fifty to one hundred feet, an even tranquil uplift, not a convulsive upheaval at all. From the beach outward some two hundred meters extends the fringing reef, a much younger reef than either the one at Rurutu or the one at Rimatara. We stopped about one-quarter of a mile off shore here, one quarter off the east side and found anchorage for calm weather; but here the bottom is too irregular and rocky, hence the drifting. Saw a few noddy terns flying above trees, as were the neglected shearwaters in a few instances. Saw none of the Henderson Island birds, so conclude that they left before daylight.

The boat came ashore at about nine, saying we would very likely leave for Ducie. They gathered a sack or two of the small coconuts which contain very little drinking water. Tao planted a few of the sprouting ones and cut off a stick or two of sandal-wood which grows along the beach in considerable quantities. We'll take a few souvenirs along with us. There are also some splendid beams of drift lumber cast up on the beach along with any number of railroad ties. Saw one old

The feet are splashing very tender and sore from the cutting sharpness of these rocks.

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The boat came ashore at about nine, saying we would very likely leave for home. They gathered a mess or two of the small coconuts which contain very little drinking water. Two climbed a few of the expounding ones and cut off a stick or two of hard-wood which grows along the beach in considerable quantities. We'll take a few souvenirs along with us. There are also some splendid beams of dark harbor coat up on the beach along with any number of railroad ties. See one old

mast and wondered if it came from the shipwrecked 'Essex'. In the large cave I found the skeleton of a turtle. Who had carried those bones up there? God pity the poor men shipwrecked here, although there could be worse places than this.

We made a good get-away although the waves were choppy and high. The boys almost spilled coming in, the steersman being thrown out of the boat. We have one capable boatman and one fair oarsman, but the rest of us are no good. It will surprise me if we land at all the Tuamotu without capsizing. I always tie my valuables to the boat nowadays in anticipation of the inevitable. We were followed by young boobies and one audacious frigate bird. The latter was finally struck by the helmsman heaving a line at it. Once knocked into the water it was helpless.

On board at nine o'clock and away for Ducie at seven knots an hour. Ship heaving and other doing likewise. Difficult to put up birds under such circumstances. We obtained ninety specimens here in three days.

March 19

Still making good at seven knots in spite of reefed mainsail. We had a little work this morning, but I spent most of the day enjoying myself with the oil paints and Henderson Island birds. It is amateurish art but a much better method of conveying the exact color of delicate parts than vague words on a label. The doves had already faded considerably but we'll be able to check up the color of them at our return.

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March 15

Still working good at seven knots in spite of reduced

maintenail. We had a little work this morning, but I spent

most of the day enjoying myself with the oil paints and

Southerner Island birds. It is amazing art but a much better

method of conveying the exact color or delicate parts than

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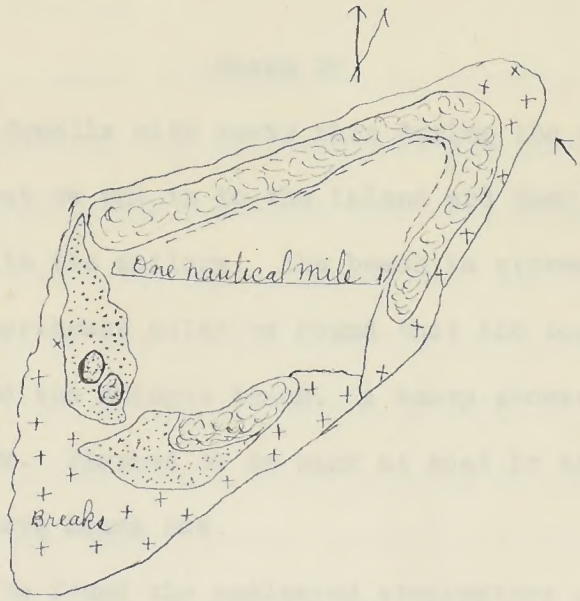
but we'll be able to check up the color of them at our return.

As we neared Ducie Island the neglected shearwaters became proportionately more numerous, until at the island we could see many thousands of them flying above the tree tops. On the chart the strip of wooded or brushed land is two and one half nautical miles in extent and would average well over one eighth of a mile in width. That makes just 11,552,000 square feet of land for nesting purposes. If the nests occupy nine square feet, or one to every yard, then there must be 1,283,555 nests, with two birds to each nest, or 2,567,112 birds. Well, it is possible but the figures are astounding, to say the least. If we effect a landing here I shall certainly measure off an average section and count the nests upon it.



What torture it will be if we cannot get ashore with the camera! On the east side of the northeast point the coral seems to slope gradually enough to permit a boat to get safely upon it, but then it will be necessary to wade ashore.

This island, according to the pilot book, was discovered by the 'Pandora' in 1791. How near to the refuge of the mutineers they did come! How strange that they did not visit Pitcairn which was well known to the world then! Thankfully they did not and we have that colony of amusing people to interest humanity and for the benefit of science.

We saw two blue-faced boobies flying about here and Beck saw one pair on the beach. A few white terns (white-footed apparently) and noddies also present. Saw but one frigate this evening. We should get a good series of neglected shearwaters here. The predominant phase is the white-breasted, dark-headed one. Very few white heads and less all dark.

March 20

Squalls with heavy rain during the night. Rainy morning but we put in to the island and Beck and I came ashore with the sailors. The beach is strewn with wreckage. On this northeast point we found that the boat could come clear into the shingle beach. A heavy shower as we commenced field work. Planned to be back at boat in an hour, but it is nearer three hours now.

We found the neglected shearwaters and a very similar, though noticeably lighter weight Pterodroma; also a few Upoa. The two Pterodroma are well distributed throughout the low shrubs which sparsely cover the motu. I saw one of the smaller birds alight in the midst of the trees. Those I disturbed, however, did not succeed in taking wing in there. These birds

This island, according to the pilot book, was discovered by the 'Zandvoort' in 1721. Now near to the refuge of the mutineers they did come! How strange that they did not visit Pitcairn which was well known to the world then! Theoretically they did not and we have that feeling of amazing people to interest humanity and for the benefit of science.

We saw two tiger-tail cockies flying about here and Jack saw one pair on the beach. A few white terns (white-footed apparently) and noddies also present. Saw but one frigate this evening. We should get a good series of neglected shearwaters here. The predominant phase is the white-breasted, dark-headed one. Very few white heads and less all dark.

March 30

Equalis with heavy rain during the night. Rainy morning but we put in to the island and Jack and I came ashore with the sailors. The beach is strewn with wreckage. On this northeast point we found that the boat could come clear into the shingle beach. A heavy shower as we commenced field work. Planned to be back at boat in an hour, but it is nearer three hours now.

We found the neglected shearwaters and a very similar, though noticeably lighter weight Pterodroma; also a few Gyes. The two Pterodromas are well distributed throughout the low shrubs which sparsely cover the atoll. I saw one of the smaller birds alight in the midst of the trees. These I distributed, however, did not succeed in taking wing in there. These birds

are no more than a pair every ten feet, occupying on a average perhaps one hundred square feet, since there are considerable stretches without birds. This would reduce last evening's estimate to 115,520 pair, or 231,040 birds, which is much nearer correct I think. Several pairs of blue-faced boobies are standing like geese upon the beach to the southeast. White terns are rather plentiful; a few noddies and a few frigates are about. I also saw one or two lesser noddies. The smaller bird, Pterodroma, has little variation in color and is predominantly white-breasted and white-throated, with black across the front neck. The calls of the two birds are also different, the smaller one giving a series of sharp staccato clacks; while the larger (neglecta?) gives the whang-kea-kea-kea.

On board we sorted out the birds by weight, the difference being very noticeable as we held one of each kind in our hands. Then I checked them over by comparing the middle toe and claw and tarsus of each set. The result gave us fourteen of the smaller bird and twenty-seven of the neglecta. But one of the latter (# 2508) Mr. Beck thinks is something different and likely a phase of the blue shearwater taken at Bass Rock. A very noticeable feature of these birds at Ducie is their decidedly light color. The neglected are much lighter colored on the average than those I saw at Rapa. Then I passed up dark birds looking for light ones; here we pass up light birds looking for dark ones. The smaller bird, if it be the same as the Henderson bird is vastly predominant in the white-breasted phase. Only one of the fourteen was dark.

are no more than a pair every ten feet, occupying on a average perhaps one hundred square feet, since there are considerable stretches without birds. This would reduce last evening's estimate to 112,320 pair, or 224,640 birds, which is more nearer correct I think. Several pairs of blue-faced boobies are standing like geese upon the beach to the northeast. White terns are rather plentiful; a few noddies and a few frigates are about. I also saw one or two lesser noddies. The smaller bird, Pterodroma, has little variation in color and is predominantly white-breasted and white-throated, with black across the front neck. The calls of the two birds are also different, the smaller one giving a series of sharp staccato clucks; while the larger (noddies?) gives the wang-ran-ran-ran.

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At Henderson it was predominantly black. Mr. Beck being out amongst a flock of a hundred or more obtained but three or four white-breasted ones. The Upoa proved to be P. nativitatis, the Christmas Island shearwater, which evidently has a considerable range south of the equator.

March 21

Spent the day making up birds collected yesterday. It was well that we had plenty, for not until late evening did we sight the island, so far away had we drifted. Strong current here setting to westward.

March 22

Blew tropic-bird eggs from Henderson as we steamed in towards island. Came ashore at nine o'clock to make observations, notes and more systematic collecting, especially of eggs and parents and paired birds. I measured off a strip of territory fifty meters long by ten meters wide, and then counted forty-one birds within it. About twenty of them were in pairs, making thirty nesting sites in five hundred square meters. But this is along the favorable ridge twenty-five meters inland from the shore, about an average place, but only three-fourths of total area is inhabited.

The sketch on the following page is of a tree with very coarsely checked bark up which I have watched five birds climb by using curved beak and claws with wings flapping. They take wing from the upper branches, the first three

At Sandarson, was predominantly black. Mr. Beck being out
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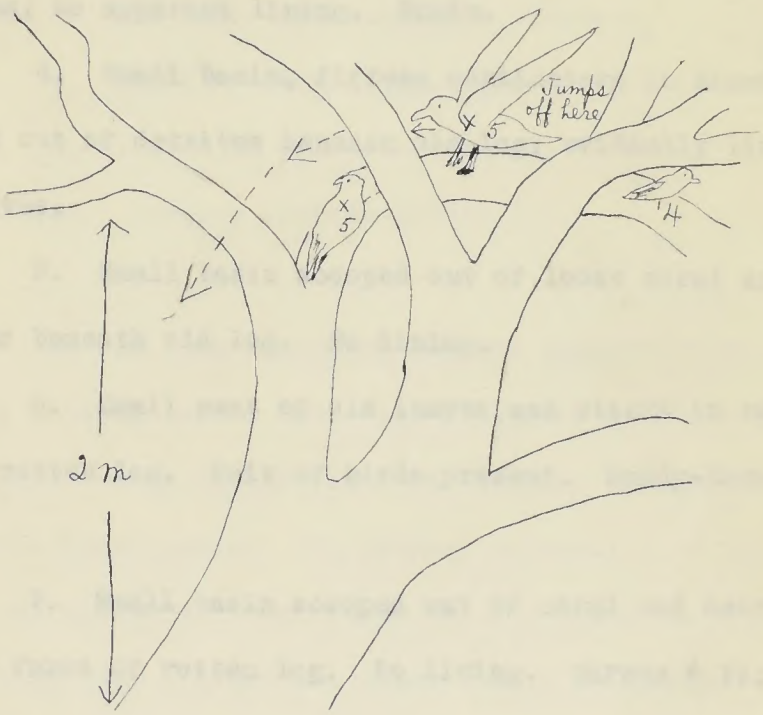
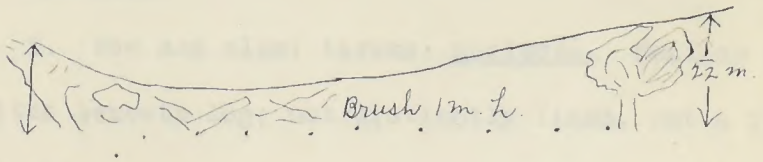
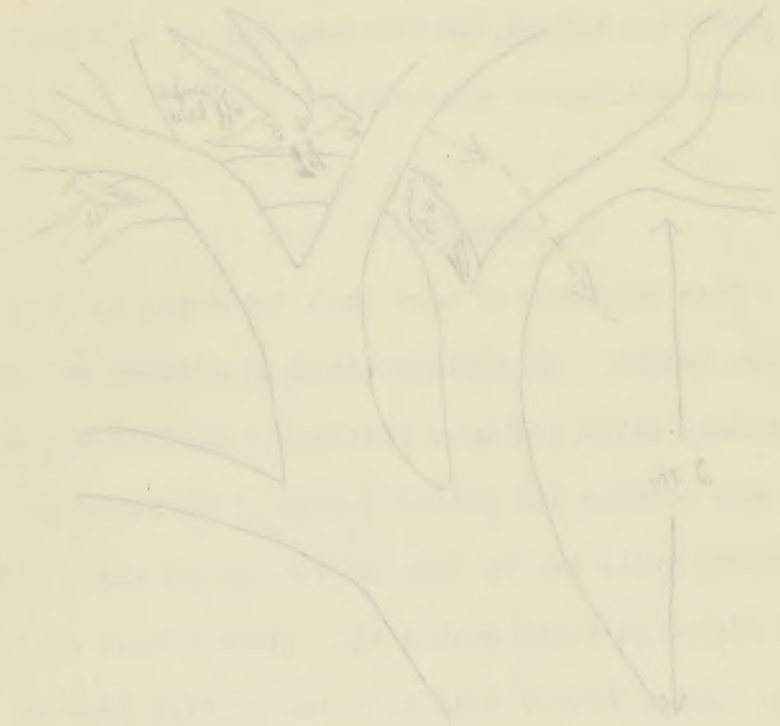
metres inland from the shore, about an average place, but
only three-fourths of total area is inhabited.

The season on the following page is of a tree with
very coarsely chagrined bark by which I have watched five birds
alike by using curved beak and claws with wings flapping.
They take wing from the upper branches, the first taken

attempts coming to grief against distant tree branches. The fourth bird made a clear get-away. The birds here are mostly neglecta. The fifth bird (X 5) takes wing by jumping off beneath another branch and comes along the cleared spaces, directly towards me. The tree I am beneath is as high as his jump-off, but he cleared it well. In the ten meters he fell but once, the curve of flight being represented about as follows.







Birds are flying about in pairs and singles, and upon the ground we find them single and in pairs.

Left Leg.

Eggs.

1. One loose coral gravel and dead twigs.

2. Small basin scooped out of old rotten twigs and detritus. No lining. Ducie.

3. Small basin scooped out of loose coral and detritus; no apparent lining. Ducie.

4. Small basin, fifteen centimeters in diameter, scooped out of detritus beneath old log; evidently lined with old leaves.

5. Small basin scooped out of loose coral and detritus beneath old log. No lining.

6. Small nest of old leaves and sticks in hollow of old rotten log. Pair of birds present. Muddy-breasted on egg.

7. Small basin scooped out of coral and detritus between forks of rotten log. No lining. Tarsus # 81; toes and claws.

8. Nest below low shrub, detritus, lined with leaves. Neglecta.

9. Toe and claw; tarsus; neglecta. Shallow scoop of detritus beneath log; not distinctly lined, but a few old leaves in it.

10. Small scooped basin at base of tree stump. No

Marks are flying about in pairs and singles, and
soon the ground we find them single and in pairs.

Left leg.

Toes

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3. Small basin scooped out of loose coral and detritus; no apparent lining. Dwole.

4. Small basin, fifteen centimeters in diameter, scooped out of detritus beneath old log; evidently lined with old leaves.

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7. Small basin scooped out of coral and detritus between force of rotten log. No lining. Larvae & dl; toes and claws.

8. Just below low arch, detritus, lined with leaves. Dwelerts.

9. Toe and claw; larvae; dwelerts. Shallow scoop of detritus beneath log; not distinctly lined, but a few old leaves in it.

10. Small scooped basin at base of tree stump. No

lining. Neglecta.

11. Between logs. Lined. Ducie.

Right Leg.

Pairs.

1. Beneath fallen tree trunk.

2. Alongside fallen tree trunk. (N)

3. Alongside fallen tree trunk. (D)

4. Beneath tree stump. (N)

Two legs together; note blueness.

5. Beside rotten stump. (N)

6, 7, 8, 9 in one neighborhood.

10. Nesting beneath fallen log.

So far I have noticed but one species of plant, the heavily hirsute leaved tree with a cluster of small green berry-like fruit. Some of the birds in climbing the trees use their wings flattened against the trunks, especially in this tree where the trunks are very steep but not quite vertical, at which time they flutter the wings. Here was another bird upon a tree branch. I saw him looking around at length before he eventually took wing and made a clear get-away. The little birds are clattering very noisily and the neglecta are "Whang-ooooooh-ing". I notice that these birds never walk very far of their own accord at a time. They go about five, or sometimes ten meters, then sit down for a prolonged rest before proceeding further. Often they use their wings a great deal

Hinlay. Neglecta.

11. Between logs. Blood. Socia.

Right Lar.

Tales.

2. Beneath fallen tree trunk.

3. Alongside fallen tree trunk. (W)

5. Alongside fallen tree trunk. (D)

4. Beneath tree stump. (Z)

Two logs together; note bluenose.

6. Beside rotten stump. (X)

8, 7, 9, In one neighborhood.

10. Resting beneath fallen log.

So far I have noticed but one species of plant, the heavily hirsute leaved tree with a cluster of small green berry like fruit. Some of the birds in climbing the trees use their wings flattened against the trunks, especially in this tree where the trunks are very steep but not quite vertical, at which time they flutter the wings. Here was another bird upon a tree branch. I saw him looking around at length before he eventually took wing and made a clear get-away. The little birds are chattering very noisily and the neglecta are "chaw-cooooool-ing". I notice that these birds never walk very far of their own accord at a time. They go about five, or sometimes ten meters, then sit down for a prolonged rest before proceeding farther. Often they use their wings a great deal

to help get over rough ground or dead branches. It seems odd indeed to see shearwaters perched upon tree branches and fallen logs. But here one needs but look around a little to see such a sight, and a few minutes will show one how they climb trees. Have found nothing this morning resembling the blue bird of Bass Rocks. The little bird shows a remarkable blueness at times. I find the pairs frequently billing one another and saw one pair mating, but my approach disturbed them. We are occasionally finding dark neglecta with feet and tarsus entirely black, though they are rather rare. There is a species of fruit fly here, very active. Also some moths. White terns hover amongst the tree tops.

Chased a rat into an old hollow log and found therein a pair of birds; one appears to be the small kind and one the large. The dog is too independent to take my tips and catch the rat. Also saw one lizard today but could not catch it. These birds do not worry about branches in the trees they climb. One took off here in splendid form from a well branched tree. I notice that many of them are scooping out nests. It is probably too hot at present for work but they have recently been at it. The log nest was built up with leaves and sticks which must have been carried inside it.

It is now three P. M. and the birds in hordes are above the trees and beneath one's feet on the island. The count made this morning is far too conservative. There are many more birds about now than there were then. From the commotion that comes from the end of the island Mr. Beck must

to rely not over rough ground or dead branches. It seems odd instead to see something resembling open tree branches and fallen logs. But here one needs not look around a little to see such a sight, and a few minutes will show one how they climb trees. Have found nothing this morning resembling the blue bird of Lake Mokoa. The little bird shows a remarkable bluenness at times. I find the pairs frequently sitting one another and saw one pair mating, but my opposum disturbed them. We are occasionally finding dark pelagic with feet and tarsus entirely black, though they are rather rare. There is a species of fruit fly here, very active. Also some moths. White terns hover amongst the tree tops.

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It is now three P. M. and the birds in Jordan are above the trees and beneath one's feet on the island. The count made this morning is far too conservative. There are many more birds about now than there were then. From the connection that comes from the end of the island it. Seem sure

be amongst the tropic-birds. A small moth is very bothersome here. I have found a nest with two eggs in it but the bird was leaving when I noticed it; so to be positive of the identity I am giving it a chance to return.

Shot a blue ternlet while lunching. Am getting a few white terns and gathering more eggs now.

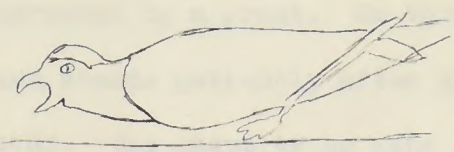
Eggs.

12. Small scooped basin. No lining. Shade of branches of tree.

13. Shallow scoop beneath fallen branch in coral and detritus. Slightly lined with dead leaves and twigs.

What an opportunity this is to study the neglected shearwaters! I am sorry we have neither phonograph nor cinematograph, inventions which scientist should take advantage of.

Some birds in alighting strike the tree tops and come down very ungracefully. Others wind down into the brush very cleverly. These birds when coming in, upon seeing another bird, get down into a position about like the following sketch and give their "Whang-kea-kea-kea-kea".



Here is one that called so to the first bird passed, hesitated but that moment and then came on to the next, beside which it called three times. Now it has seen me and departed a few meters. Now it comes up the slope again, resting every two or three meters. (Hermit crabs are very thick here and pull feathers from birds if one leaves them lying about long.)

We were returning along the beach to the boat (I had gone down to meet Mr. Beck), when the dog came up behind us carrying another young Upoa, P. nativitatis, with considerable down still on the abdomen. Brought off fifty some odd birds and a few dozen eggs. Going aboard about four o'clock.

March 23

The other night Charlie caught a fish near this island and indulged excessively upon it, the while deriding the birds which Mr. Beck was thoroughly enjoying. The result was that Charlie has been deucedly sick, as well as all the rest of us who ate but lightly of the fish along with a taste of birds being poisoned to some extent. There is one thing I have wanted to record before, and that is about our pig. He learned wherefrom bird bodies come and now throughout the day and late of night while we are skinning birds we are frequently interrupted by a grunt. He thrusts his snout over the hatch rail and stands patiently after grunting until we throw him a bird body. The quantity he eats is astounding.

Everyone aboard today is under the weather; some are taking Epsom salts, others castor oil, and a few are continuing

Here is one that called to be the first bird passed, hesitated but that moment and then came on to the east, beside which it called three times. Now it has moved on and perched a few meters. Now it comes up the slope again, resting every two or three meters. Herald's crake are very shy; they have and pull feathers from birds if one leaves them lying about long.

We were returning along the beach to the boat (I had gone down to meet Dr. Beck), when the dog came up behind me carrying another young Ibis, P. rubiviteia, with considerable down still on the abdomen. Brought off fifty some odd birds and a few dozen eggs. Going aboard about four o'clock.

March 23

The other night Charlie caught a fish near this island and indulged excessively upon it, the while darkness the birds watch Dr. Beck was thoroughly enjoying. The result was that Charlie has been decidedly sick, as well as all the rest of us who ate but sparingly of the fish along with a taste of birds being relished to some extent. There is one thing I have wished to record before, and that is about our pig. We learned waterfowl bird locates home and now throughout the day and late or night while we are skinning birds we are frequently interrupted by a grunt. The tiresome his sound over the hatch rail and stands patiently after grunting until we throw him a bird body. The quantity he eats is astounding.

Everyone aboard today is under the weather; some are taking epsom salts, others castor oil, and a few are vomiting

their favorite fruit salts. We have undoubtedly been eating a poisonous fish. The natives call him "Ruhi", one that we found very good at Henderson, where we salted down several pounds. We have anchored off Ducie again this morning, but no one has any fish line out. Charlie got an extra heavy dose and is really very sick. The rest of us are rather lackadaisical. Pains in the stomach like a mild cramp accompany the sickness. This must be the cause of our being unable to sleep during the night.

March 24

Our birds held over until today in excellent shape. Curtis and I went ashore at nine A. M. to get some blue-faced boobies for Mr. Beck. We were unable to approach within running down distance along the beach where they had been frequently disturbed, but along the lagoon beach we succeeded in getting three. As we returned to the boat a young fellow came flying low over me, so I hit him with the gun barrel, breaking his wing. What enormous beaks and sharp ones Curtis affirms these fellows have. I avoided them myself. Had another siege of cramps while ashore which kept me from making a raid on red-footed boobies.

Aboard ship after lunch (more excellent scrambled shearwater eggs) I painted a female blue-faced booby. The face and feet colors were difficult to attain. The male bill was more yellow than female. Louis and Tao went ashore in the afternoon after more eggs and copper off the old shipwreck.

their favorite fruit nuts. We have accordingly been eating a poisonous fish. The natives call him "Tuni", one that we found very good at Tanjungan, where we sailed down several miles. We have anchored off Menia again this morning, but no one has any fish like that. Charlie got an extra heavy dose and is really very sick. The rest of us are rather lackadaisical. Pains in the stomach like a mild orange accompany the sickness. This must be the cause of our being unable to sleep during the night.

Baron 24

Our birds held over until today in excellent shape. Curtis and I went ashore at nine A. M. to get some blue-faced boobies for Dr. Snow. We were unable to approach within running gun distance along the coast where they had been previously disturbed, but along the lagoon beach we succeeded in getting three. As we returned to the boat a young fellow came flying low over us, so I hit him with the gun barrel, breaking his wing. What enormous beaks and sharp claws Curtis affirms these fellows have. I provided them speedily. Had another slice of orange while ashore which kept me from making a face as red-footed boobies.

About sixty miles from Lemon (more excellent scrambled observation eggs) I painted a female blue-faced booby. The face and feet colors were difficult to attain. The male bird was more yellow than female. Louis and Jo went ashore in the afternoon after more eggs and copper off the old schooner.

The bottom of the old hulk rests upon the lagoon shore, keel uppermost. There is little left to it and that little is very rotten. There are many copper spikes in the ship.

In the very late evening I came ashore to sleep. The birds were very noisy and numerous, flying above the island. Towards nine or ten o'clock most of the noise had died down. Rain in squalls prevented night hunting of P. nativitatis, Upoa.

March 25

The noises had advanced to such an extent that further sleeping was impossible by daylight, whereupon I arose. A few pairs of the little blue ternlets fluttered by, but I only succeeded in hitting two of them during the morning. I found P. nativitatis flying about very rarely but bagged three or four from the air and the dog obtained one from the bush. The little white terns were very plentiful about us today, so I shot half a dozen or more. Yes, and last night upon landing I obtained six noddy terns in two shots. Also selected two black-headed frigates this morning.

Am now seated near the blue-faced boobies watching the feeding of the young birds, which is in true pelican style, accompanied by many coarse honks. Also saw a tenacious couple fighting for a favored spot on the beach. They locked jaws and then, without spread wings, pulled with all their might for several seconds before new holds were taken. Finally a third bird arrived to referee the fight, which he did with

the bottom of the old Smith ranch were the lagoon shore, real appearance. There is little left to it and that little is very rotten. There are many copper spikes in the ship.

In the very late evening I came ashore to sleep. The birds were very noisy and numerous, flying above the lagoon towards dusk or ten o'clock most of the noise had died down. Said in squalls prevented night hunting of E. mystacinus, Myot

March 13

The noises had advanced to such an extent that further sleeping was impossible by daylight, whereupon I arose. A few pairs of the little blue terns fluttered by, but I only succeeded in killing two of them during the morning. I found E. mystacinus flying about very rarely but bagged three or four from the air and the dog obtained one from the bush. The little white terns were very plentiful about us today, so I shot half a dozen or more. Yes, and last night upon landing I obtained six sooty terns in two shots. Also selected two black-headed frigates this morning.

As now neared near the blue-faced booby nesting the feeding of the young birds, which is in turn pelican style, accompanied by many coarse noises. Also saw a tenacious mongoose fighting for a favored spot on the beach. They located one and then, without spread wings, pulled with all their might for several seconds before new noils were taken. Finally a third bird arrived to rectrose the fight, which he did with

much gusto and loud commands. The dog is now barking at hermit crabs, which worry the life out of him; and the boobies are staring this way in their wide-eyed amazement. From where I am I count fourteen on the beach and seven flying above. They were more plentiful this morning early, as was everything else. Only a few lesser noddies about.

I then proceeded carefully through the woods watching ahead for white terns upon their precarious nesting sites. I located two with eggs and one downy young hardly two days old. What masters at the game of balance they are to deposit that bluntly obovate egg in a groove in the bark of a large level limb, or in the other case on the very end of a broken limb which had split off! How delicately the incubating bird backs away from the egg; and how necessarily so, for the slightest disturbance would be sufficient to upset it! The little downy is most handily carried perched upon one's shoulder where they cling tenaciously, occasionally taking a harmless peck at one's ear. I failed to find any red-foot booby nests and hesitated too long to shoot them. Later they had gone to sea.

The ship appeared rather late in the morning off the northwest and had to beat her way against a heavy breeze. So it was eleven before the boat came after me. Around on the west shore I found the Tohunu tree in single clusters five to ten meters in diameter. These are the highest trees on the island, being five

much yeeks and loud cackles. The dog is now barking at herrat crows, which worry the life out of him; and the boatmen are sleeping this way in their wide-eyed amazement. From where I am I count fourteen on the beach and seven flying above. They were more cheerful this morning early, as was everything else. Only a few lesser oddies about.

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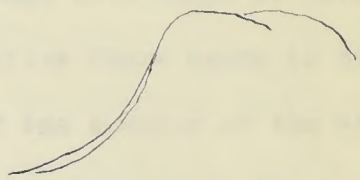
The ship appeared rather late in the morning off the northwest and had to beat her way against a heavy breeze. So it was eleven before the boat came after us. Around on the west shore I found the banian trees in abundance fifty to ten metres in diameter. These are the highest trees on the island, being five

meters in a few instances. Large open areas of hard packed gravel are between them. Along the lagoon shore this coral gravel is cemented into solid conglomerate some meter or more in thickness, beneath which loose gravel again occurs. On the seaward side are dunes of gravel parallel to the shore two or three meters above the coral reef base which fringes the island for a hundred meters or so out to the breakers. These dunes are the steepest beach I have ever seen. High tide washes them rather roughly.

There evidently is the remaining debris of two weeks here, unless storms have dispersed the wreckage of one ship in groups. All the wreckage is copper fastened, denoting the extreme age of the ship. The bottom of the hull rests keel upward on the shore of the lagoon where some high sea must have carried it.



Saw two or three tatlers but they are very wild. Obtained four little blue ternlets of the half dozen pairs and a single or two observed. The pairs were evidently on their way seaward early in the morning, but two singles I found hanging around much later.

I spent at least an hour just wandering through the shearwaters looking for unusual phases of plumage. The neglected certainly has a variety of colors, from the dark brown bird with brown breast and dark legs to the extremely white-breasted and almost white-headed ones with upper one-

water in a few instances. Large open areas of hard packed gravel are between them. Along the lagoon shore this coral gravel is covered into solid conglomerate some parts of more in thickness, beneath which loose gravel again occurs. On the seaward side are dunes of gravel parallel to the shore two or three feet above the normal reef base which fringes the island for a hundred yards or so out to the breakers. These dunes are the steepest beach I have ever seen. High tide reaches them rather roughly.

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I spent at least an hour just wandering through the innumerable livelies for unusual phases of plumage. The lagoon certainly has a variety of colors, from the dark brown bird with brown breast and dark legs to the extremely white-breasted and almost white-headed ones with upper one-

third and tarsus white. Wherever we have been we have searched thoroughly for the blue shearwater but have found only one suspicious specimen. The smaller bird does not vary so much. Here the predominant type is the white-breasted with dark brown or gray heads. Some of the latter have a bluish tinge to the plumage when observed from certain angles. The all dark phase of this bird, so common at Henderson, is very much in the minority here, though some few have been found. I would judge them to be perhaps one tenth of the whole. Although both kinds of birds are thoroughly intermixed in nesting sites there seems to be a decided tendency towards grouping of one species or the other. The P. nativitatis thus far observed have been along the beach front on the northeast corner of the island near the boat landing, which, by the way, we have found very good.

March 26

Last evening just before dinner we struck a school of bonito and the boys succeeded in landing a few good ones. Then arose the question whether bonito were ever poisonous; Charlie and the cook are still decidedly sick. But for breakfast this morning we had raw fish and baked bonito with tomato sauce. The bonito raised our cook, thank God, for Bijoe is a very poor substitute. We lay-to to leeward of the island this day, Mr. Beck deciding that it was too squally for pictures. At four o'clock we went in close and put the boat out to fill and light the shore lantern which we have kept burning every

tally and various white. Moreover we have seen no have searched thoroughly for the blue sharpshooter but have found only one immature specimen. The smaller vireo does not vary so much. Here the predominant type is the red-breasted with dark brown or gray mantle. Some of the latter have a bluish tinge to the plumage when observed from certain angles. The all gray phase of this bird, so common at Tequesta, is very much in the minority here, though some few have been found. I would judge them to be perhaps one tenth of the whole. Although both kinds of birds are thoroughly intermixed in nesting sites there seems to be a decided tendency towards grouping of one species or the other. The [illegible] thus far observed have been along the beach front on the northeast corner of the island near the boat landing. Which, by the way, we have found very good.

March 22

Last evening just before dinner we struck a school of bonito and the boys succeeded in landing a few good ones. Then arose the question whether bonito were ever poisonous; Charlie and the cook are still decidedly sick. But for breakfast this morning we had raw fish and baked bonito with tomato sauce. The bonito raised our doubts, thank God, for Bijou is a very poor substitute. We lay-to to leeward of the island this day, Mr. Soos deciding that it was too windy for photos. At four o'clock we went in close and let the boat out to fill and light the shore lantern which we have kept burning every

night since the day we lost sight of land. They are also gathering eggs, a rare delicacy after two months of monkey meat and salt horse.

In the evening we lay-to near the island while Tao went ashore to set the light for the night. The shearwaters were at their greatest abundance at this time of the day. We cut down our estimate to the much more reasonable number of 150,000 birds. But what impression can a vague estimate make? There is a strip of brush-covered land about two miles long. Flying above it like disturbed bees above a hive are hundreds of shearwaters. The land is very narrow, barely over one-quarter of a mile in the widest parts and averaging barely an eighth of a mile wide. There are two groves of the one and only tree, Tohunu, on either side the northeast point, and the birds are considerably thicker above them than elsewhere along this portion of the islets. At the southwest end, however, appears to be another dense cloud in the swarm.

At sea there are many birds about us and we have here a splendid opportunity to watch their manoeuvers above the waves. I have never yet observed the wing tips "shearing" the water, so that is somewhat of a misnomer, although they shave it very closely indeed. Saw two blue-faced boobies dive into the sea after fish close in astern. They were but three or four meters high, however, and so had not overly much force. They submerged completely, however, and came up a meter or more from the place of entrance. The wings were very close in to body at diving. Sat on water and ducked at length.

night since the day we left eight or less. They are also gathering eggs, a rare delicacy after two months of monkey meat and salt horse.

In the evening we lay-to near the island while the west sahore to set the lights for the night. The albatrosses were at their greatest abundance at this time of the day. We put down our estimate to the moon were reasonable number of 100,000 birds. But what impression can a vague estimate make? There is a strip of brush-covered land about two miles long. Flying above it like distributed bees above a hive are inumerable of albatrosses. The land is very narrow, barely over one-quarter of a mile in the widest parts and averaging barely an eighth of a mile wide. There are two groves of the one and only tree, Tobuna, on either side the northeast point, and the birds are considerably thicker above these than elsewhere along this portion of the islets. At the southwest end, however, appears to be another dense cloud in the swarm.

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March 27

I went ashore with Tao. Had an interesting ride in on the swells of a choppy sea. Obtained seven or eight red-footed boobies of various plumage phases, from a young dark bird to an old one mostly white. The majority are gray with white tails. Face and pouch colors and feet vary considerably. Dark red feet like # 2611, which I painted, are very noticeable and not infrequent. Was unable to run down the blue-faced boobies although I got very close to start the chase. By swinging off a little to one side they could take wing into the stiff breeze and so escape. Found two eggs on the coarse sand in one place and one in another; and Tao found one, both fresh. Left the two for Beck to photograph. Also found two booby nests (red-foot) in top branches of trees four meters high. Obtained the eggs from them but they were too badly incubated. Obtained half a dozen white terns and found a well feathered "branchling", for they know no nest. Left a small downy the same size and color as one collected last week. Found a nestling lesser noddy and some old birds with him.

The wind being high I did not care to remain ashore much longer so we went off to the ship, where we had considerable difficulty in getting the boat aboard owing to the roughness of the sea. We shipped half the boat full in doing so, but fortunately after I had scrambled up the side of the ship. Broke a few of the cooking eggs but the birds Tao had heaved aboard the time he tipped the boat. After dinner the sailors, Tao and Bijoe, tried to land opposite the light. They capsized in

I went ashore with Joe. Had an interesting ride in on the swells of a choppy sea. Obtained eggs of eight red-footed boobies of various plumage phases, from a young dark bird to an old one mostly white. The majority are gray with white tails. Face and pouch colors and feet vary considerably. Dark red feet like a gull, which I painted, are very noticeable and not infrequent. Was unable to run down the blue-faced boobies although I got very close to start the chase. By swinging off a little to one side they could take wing into the stiff breeze and no escape. Found two eggs in the coarse nest in one plane and one in another; and Joe found one, both fresh. Left the two for Joe to photograph. Also found two booby nests (red-foot) in top branches of trees four meters high. Obtained the eggs from them but they were too badly incubated. Obtained half a dozen white terns and found a well feathered "brancheling", for they move to nest. Left a small downy tern same size and color as one collected last week. Found a nestling lesser noddy and some old birds with him.

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beautiful form. Bijoe swears that a great shark was lurking just off the reef too, but they upset on the rocks. Nothing damaged.

Out here this evening there are not so many birds about. But still there are many more than we usually see. Had no success ashore getting either rats or lizards, which, with hermit crabs, make up the zoology of the island. A moth and caterpillar and fruit flies are present.

March 28

I went ashore again this morning. Not so much wind. Shoved off around island towards the southwest end. Cut in through the large single trees to lagoon shore and proceeded along it. Found half a dozen little blue ternlets, some noddies and one lesser noddy; also two sooty terns. White terns abundant but I kept putting off shooting them until too late. Found the blue-faced boobies in singles and pairs all along, both on the main beach and on the lagoon shore. Some were in by the trees, and two were beneath a small solitary tree. I obtained that pair by the help of the dog. He got ferocious when the booby got hold of his ear. Had the bird's wings pinned down with his feet and was trying to get a neck hold when I came up.

Found no signs of nests or eggs along either beach. There were also a few frigate birds along here, two old males with inflated pouches and younger birds. Noddy terns flew out and about me whenever I shot. The little blue ternlets

beautiful form. Maybe means that a great albatross was lurking just off the reef too, but they usually on the rocks. Nothing damaged.

Out here this evening there are not so many birds about. But still there are many more than we usually see. Had no success ashore getting either rats or lizards, which, with hermit crabs, make up the zoology of the island. A crab and caterpillar and fruit flies are present.

March 28

I went ashore again this morning. Not so much wind. Moved off around island towards the southwest end. Out in through the large single trees to lagoon shore and proceeded along it. Found half a dozen little blue terrlets, some cockies and one lesser noddy; also two sooty terns. White terns abundant but I kept putting off shooting them until too late. Found the blue-faced boobies in singles and pairs all along, both on the main beach and on the lagoon shore. Some were in by the trees, and two were beneath a small solitary tree. I obtained that pair by the help of the dog. He got ferocious when the booby got hold of his ear. Had the bird's wings pinned down with his feet and was trying to get a neck hold when I came up.

Found no birds or nests or eggs along either beach. There were also a few frigate birds along here, two old males with isolated pouches and younger birds. Noddy terns flew out and about as usual I went. The little blue terrlets

I found for the most part along the lagoon side of the trees. Perched upon the grayish coral rock they are very difficult to see while still. The two sooty terns (a pair with swelling organs) were flying along the island. Perhaps they are the vanguard of the winter colony, if any nest here. I imagine we would hear more of them about, however, if this were a nesting site of any sizable colony.

At the farther end of the trees I found the tropic-birds nesting as usual under the outer trees. Here I obtained an old nativitatis from the air; she took wing from a log when she saw me. The dog brought a full grown young one from beneath a tree, and a short distance beyond we found another old bird. Then later on we found two more beneath the same log. Tao brought in two other old ones, which proved to be male and female. So we have about ten old birds of that species now. Found both species of the Pterodroma nesting in this grove, as elsewhere, and about as thick as the average.

Gathered fresh neglecta eggs; four-fifths of those observed here were dark or partially incubated. The dog's barking attracted me to a small downy young. No parent observed nearby, so I left it; unidentified it is worthless. Then the dog located a second one. I blazed the trees near them and marked the locality with a railroad tie. Wreckage is very abundant along here as elsewhere. What stories those ancient copper-spiked timbers could tell! Found but one white tern nest (?) today. The egg was but one meter above the ground, having been deposited in the secure (?)

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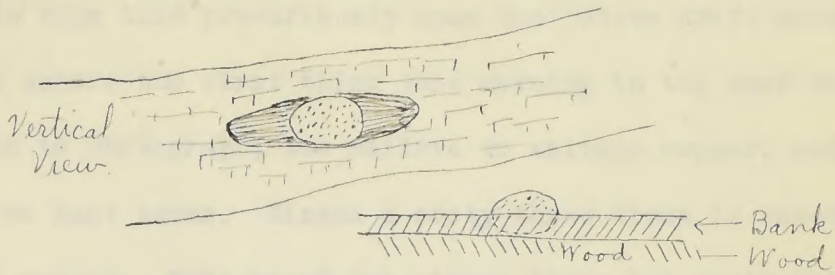
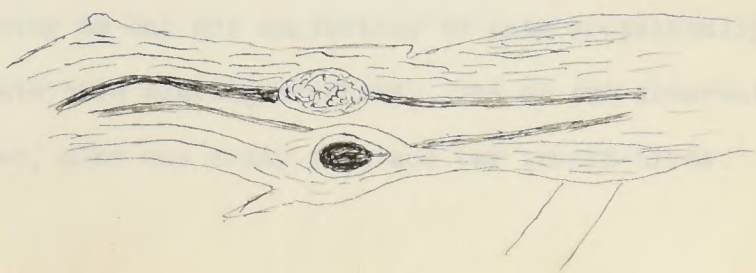
Gathered fresh _nesiotis_ eggs: four-fifths of those observed here were dark or partially incubated. The dog's barking attracted me to a small downy young. No parent observed nearby, so I left it; wildmatified it is worthless. Then the dog located a second one. I placed the trees near them and served the locality with a railroad tie. Breeding is very abundant along here as elsewhere. That stories tame ancient copper-spiked thrasers could tell! Found not one white tern nest (?) today. The dog was not one meter above the ground, having been deposited in the source (?)

cavity of an old knot hole through the thick bark. This was much safer than the other two places where I found eggs yesterday.



Along the flat of coral gravel from the lagoon shore towards the trees I found a few rare clumps of coarse grass, but none in fruit; also one vine of a common Tuamotu shrub. With these rare exceptions the entire vegetation of this islet is the Tohunu tree, which, however, utilizes about all of the available space. I found one trunk of that tree fully fifty centimeters in diameter, breast high, though nowhere do any of the trees exceed five meters in height. At both extremities of the main islet there are groves, as also at the northeast point opposite the boat landing. Between these groves are individual trees and low shrubs. There is a caterpillar and a white-spotted moth, besides a very small fly resembling the fruit flies here.

March 29



cavity of an old moth hole through the thick bark. This was much darker than the other two glands which I have been yesterday.

Along the flat of coral gravel from the lagoon shore towards the trees I found a few rare clumps of coarse grass, but none in fruit; also one vine of a common Tamaota species. With these rare exceptions the native vegetation of this islet is the tomano tree, which, however, utilizes about all of the available space. I found one trunk of that tree fully fifty centimeters in diameter, present size, though nowhere do any of the trees exceed five meters in height. At both extremities of the main islet there are groves, as also at the northeast point opposite the boat landing. Between these groves are individual trees and low bushes. There is a cockroach and a white-spotted moth, besides a very small fly resembling the fruit flies here.

Out on the gravel spit, which can hardly yet be called a motu, since storm waves no doubt sweep clear over it. I found two pair of white terns nesting with their delicate eggs laid precariously upon the rotten drift wood. We went ashore the first thing this morning in the surf boat; Mr. Beck to photograph, two sailors to salvage copper, and myself to hunt terns. Missed a sooty three times in succession, with no excuse. Have heard two others since but could not quite call them close enough to shoot at. Have seen a few young noddy but no old ones. The little blue ternlets are more plentiful today than heretofore.

Crossing over to the gravel spit I found the formation contingent to the lagoon, like that at Scilly on the long reef side where conglomerate was formed on a decided dip towards the lagoon. The warm lagoon water tends to cement the gravel below high tide level into this sloping formation. The successive layers here are evidence of the growth of the land area of an atoll lagoonward, while the large heaps of coral gravel with mollusk (capped) shells in abundance is evidence of the action of conflicting currents and storm waves in heaping up the broken fragments of coral into dry land from the reef or seaward side. Between here and the isolated motu eastward there is water perhaps up to a man's neck but not much deeper. A single blue-faced booby sits upon the gravel here, eyeing me but not neglecting to gaze occasionally at the frigate bird soaring overhead. One or two shearwaters passed over, also one noddy tern and two tropic-birds. This

But on the gravel spit, which can hardly yet be called a cays, since storm waves go dashed among plant over it, I found two pair of white terns nesting with their delicate eggs laid precariously upon the rotten drift wood. We went ashore the first thing this morning in the surf boat; it, back to photograph, the sailors to salvage copper, and myself to hunt terns. Heard a noisy three times in succession with no success. Have heard two others since but could not call them close enough to shoot at. Have seen a few young but no old ones. The little blue tarsalets are more plentiful today than heretofore.

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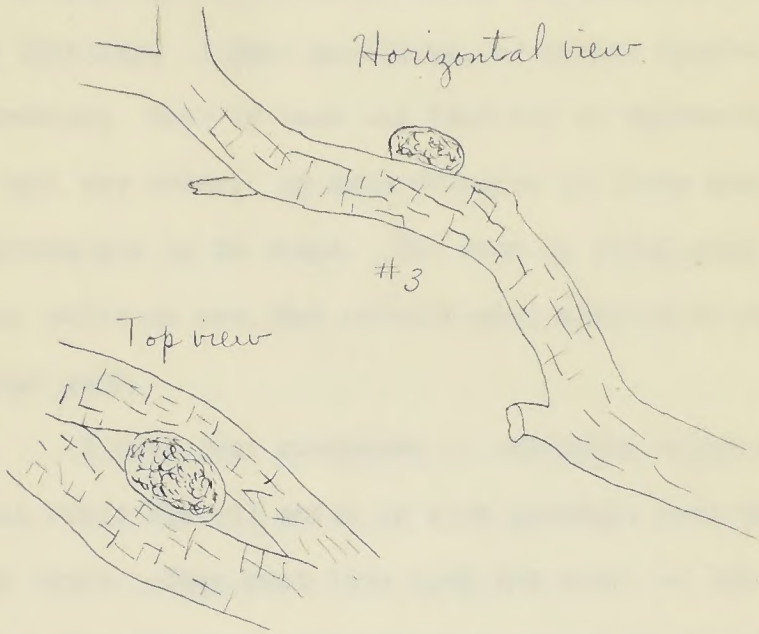
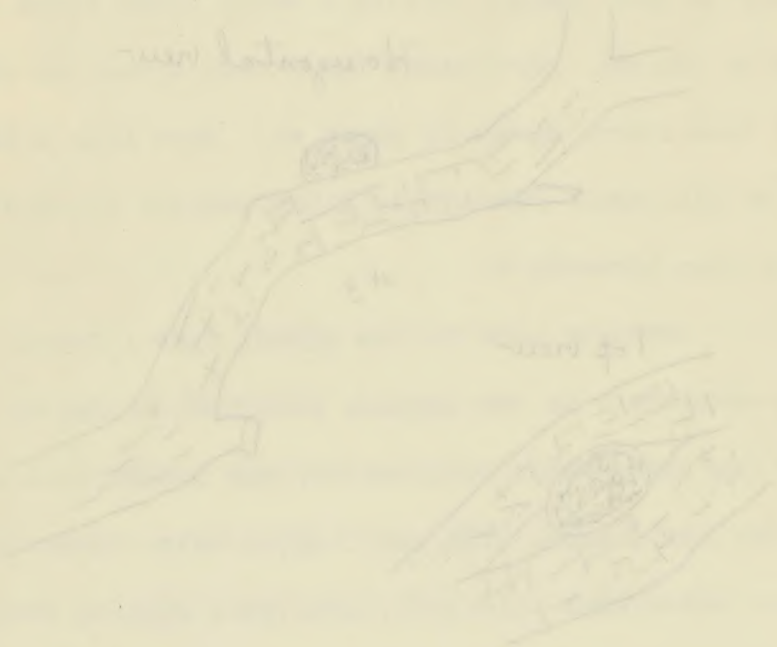
is indeed a barren spot. Hermit crabs alone survive here.

Back to the timbered motu where I obtained some more little blue ternlets. Found a small white tern with pin-feathers just commencing to plume out. Here is another white tern egg in a split in the bark on a branch of a tree, one and a half meters above the ground.



Shot one lizard but have seen only one other and could not even get a shot at him. Why are they so wild here where they never have seen a man? In crossing bits of lagoon the fish were astonishingly tame, especially the little brown jug-faced ones and one gray ferocious looking fellow about two pounds in weight. He came up and nosed my boot twice. There was one school of silvery fish about six to ten inches long at the mouth of an inlet of fresh water, the fish being very close together and filling the inlet one or two meters wide and about ten deep. Also a school of about twenty dark blue



and green fellows, about two pounders.

When we landed this morning at seven we found four old nativitatis near the place of landing. This is the vicinity from which many of the young birds were taken, so it is evident that the old birds are remaining around later than is their custom. We now have a fair series of these birds from this distant point, three thousand (?) miles south of their type locality. I shot an albino, or rather "pinto" Ducie shearwater. Most of back and feathers on upperside of wing and tail are white. In such colonies as these such rare specimens are to be found. The crew is plumb sick of this place, while we are just getting well started in the ornithological work.

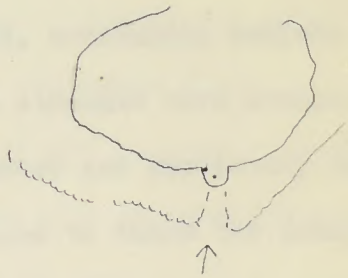
I have just succeeded in capturing eight of the little fruit fly (?) which is very abundant here where there is no fruit. They must live upon the berry of the Tohunu. I find them thickest about the leaves and mould below the trees. My sweating arm proved attractive enough for bait. There is still the moth and caterpillar to collect. That will cover the entomology save for the bird ticks. But no! There's a red and black bug and a Hymenoptera also living upon the blossom and seed of the one tree.

How well one tree can occupy a given area is certainly demonstrated here. Growing outward from one central tree, this Tohunu spreads in every direction until it eventually makes groves where all are of even height. The stem

is very crooked, the wood very brittle, the bark checked and easily rotted away into mould. I believe the seeds to be floated from island to island on the ocean; the leaves are always in small clusters at the ends of coarse twigs; while the fruit is at the apex and leaves surround it. Some trees attain a diameter of a meter, but owing to their lowly nature they do not often measure much over breast high, though I found one sixty centimeters in diameter that high above ground.

March 30

Came ashore early this morning. I left a note in a bottle wired to a prominent tree telling of our visit here and warning against the poisonous fish. Opposite the boat landing is an indentation in the lagoon. It looks to me to have been formerly an open channel seaward. It is now blocked off by gravel some two hundred meters wide. Ten meters from this gravel bank in the center of the cove is a miniature of Poe's Maelstrom, a hole in the coral bottom about one meter in diameter into which the lagoon water enters as a whirlpool. In the center of this gravel bank I found a boulder of pumice larger than my head. I brought it over here and found that it floated half above water. It is now whirling around above the maelstrom.



Terns are the order of the day for me. Noddies are

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Ten meters from this gravel bank in the center of the cove is a miniature of Poe's Maelstrom, a hole in the coral bottom about one meter in diameter into which the lagoon water enters as a whirlpool. In the center of this gravel bank I found a boulder of pumice larger than my head. I brought it over here and found that it floated half above water. It is now sulking around above the maelstrom.

Terns are the order of the day for us. Noddies are

scarce. Eggs for the sailors. Shearwaters this afternoon for Mr. Beck and the Captain.

I spent most of the day getting white terns. It's a dirty shame to have to kill so many to get a few clean specimens. Of all the sea birds of the South Seas they are certainly the most likeable. Their pure white feathers, black rimmed, dark brown eyes, and black blue bills are decidedly attractive here where birds are so scarce. They are seen and appreciated by inhabitants of these islands as much or even more than most of the land birds. I found one more egg balanced en an old knot hole of a limb.

We took off a five gallon tin of eggs on the first boat; the one blessing of Ducie Island outside of bird skins was the omelets we had therefrom. I can hardly imagine a more inhospitable place in the world for a shipwrecked man. Robinson Crusoe's Island was Paradise enow compared to this place. The wreckage of the old whalers, which is strewn about on all sides of the lagoon and island, constantly reminds one that some poor devil might have been stranded here amongst these poisonous fish without fresh water and absolutely no vegetable food. Even the goats refused to touch the Tohunu leaves, and the goats are hungry.

We skinned white terns while daylight lasted and then spent the evening upon black terns and <u>nativitatis</u> shearwaters. So calm is it that we had to steam to a safe distance from the land before night.

scarce. Eggs for the waiters. Shearwaters into afternoon for fir. Rock and the Gentoo.

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March 31

Still becalmed. These calm nights with the sails flapping and the shackles clanking are sleepless night as a rule. Just as we were getting up, the young nanny goat fell overboard. We lost one goat and one small pig on the outward journey when no one knew of their disappearance until too late. Tao and Bijoe were on duty, swabbing down the forward deck. Instead of putting out the little boat whereat they stood arguing, they decided to pick up the goat with the bird net. I rushed to the boat and did two thirds of the work of untying knots while indifferent Bijoe grumbled. He didn't seem to think the goat would drown if he took an hour to rescue it. The goat was badly frightened when finally we pulled her in. I'd hate to fall overboard amongst sharks with Bijoe to man the life boat.

Skinned out more white terns and finished all other terns. It took me all the afternoon to do two frigates and a booby and two terns, but this evening I turned out four shearwaters in two hours. I am still decidedly slow.

Today ends the second month of our journey. We have 752 birds finished, but since those we will do tomorrow are dated in March it will be permissable to count them in too. This is by far more than we ever accomplished in twice the length of time before. As I remember the Christmas Island and Rapa voyage ('Moana' and 'Pro Patria') netted us but seven hundred birds or less. Those voyages required twice as much time, but perhaps considerable less expense. But to have

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Today ends the second month of our journey. We have 152 birds finished, but since those we will do tomorrow are dated in March it will be permissible to count them in too. This is by far more than we ever accomplished in twice the length of time before. As I remember the Christmas Island and Hope voyage ('Hope' and 'Teo Tertia') netted us but seven hundred birds or less. Those voyages required twice as much time, but perhaps considerably less expense. Not to have

chartered a vessel to come out here would have cost much more than our passage did.

If the good breeze this evening continues tomorrow with some wind it will run us into Henderson Sunday in time for work Monday. We certainly have been lucky in our sailing out here. Since leaving Pitcairn we have lost very little time at sea. It was quite a happy surprise to find Ducie so rich in bird life, but when one thinks about the vast expanse of water from here to Easter Island there is no reason to expect anything else. What I should like to do at a place like this is to band a few thousand birds and then watch for them at sea. One cannot learn very much about a large colony of birds by merely visiting them ten days and only once in a lifetime. Some scientist of a sea-roving disposition should be equipped with a vessel like this and supported in fifteen or twenty years of cruising. Upon this first expedition thousands of birds should be banded and records kept of the numbers as to locality, date, age and condition of the bird. Then after five years or so a second excursion should be made for the express purpose of looking up the banded birds. More bands should be applied and a future trip also made. How else can the age and life habits of birds be determined? Some other scientist should select such an island as Christmas or Laysan and spend a few years (no less than two and preferably five or ten) at long intervals upon it, banding and recording life habits. In these days of ingenious devices a real scientific expedition should also carry a recording

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If the good ocean side weather continues tomorrow with some wind it will run us into Tenakeroo Sunday in time for work Monday. We certainly have been lucky in our sailing out here. Since leaving Fitcairn we have lost very little time at sea. It was quite a happy surprise to find Tenakeroo so rich in bird life, but when one thinks about the vast expanse of water from here to Easter Island there is no reason to expect anything else. What I should like to do at a place like this is to spend a few thousand birds and then watch for them at sea. One cannot learn very much about a large colony of birds by merely visiting them ten days and only once in a lifetime. Some scientist of a sea-roving disposition should be equipped with a vessel like this and supported in fifteen or twenty years of cruising. Upon this first expedition thousands of birds should be banded and records kept of the numbers as to locality, date, age and condition of the bird. Then after five years or so a second excursion should be made for the express purpose of looking up the banded birds. More bands should be applied and a future trip also made. Now also can the age and life habits of birds be determined. Some other scientist should select such an island as Christmas or Jarvis and spend a few years (no less than two and preferably five or ten) at long intervals upon it, banding and recording life habits. In these days of imperious cavilers a real scientific equilibrium should also carry a recognized

phonograph and also a cinematograph. The results obtained by the camera man with Captain R. F. Scott in the Antarctic and upon African expeditions is ample proof of the benefits of such work. But of course that would necessitate at least an amateur camera man.

We got some forty miles from the land this evening and it was very surprising to see so very few birds. Not many shearwaters and one or two white terns were all that I noticed.

The sooty terns we heard in very small numbers occasionally during the nights about Ducie. Several days they were heard above the island, but only once did we succeed in getting any. The gray back (Lunatis) tern was not observed, and neither was the yellow-bill. The little blue ternlets were more plentiful the last day but probably that was because we were ashore earlier in the morning and later in the afternoon. The white terns were very abundant, more so than any other birds except shearwaters. The noddies were not very common. Mr. Beck struck one flock of about thirty on the beach the last day. Lesser noddies still less common. They evidently had just finished the nesting season as evidenced by a few nests and the two well advanced nestlings we obtained.

Shore birds were not plentiful. The sanderlings Mr. Beck saw (one obtained) never showed up again. One or two tatlers were seen every day. Mr. Beck heard curlews the first day. No golden plover observed. A very noticeable

photographs are also a chronography. The results obtained by the observers are with Captain S. Z. Ezcit in the ambitious and more arduous expeditions is ample proof of the generous of such work. But of course that would necessitate at least an amateur observer here.

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Snow birds were not plentiful. The sheathbills Mr. Beck saw (one obtained) never showed up again. One or two petrels were seen every day. Mr. Beck heard sundries the first day. No golden plover observed. A very noticeable

negative note is the total absence of the reef heron since leaving Ravaivai. Neither at Rapa, Pitcairn, Henderson nor Ducie were they seen. We will of course note them when next met with. It is rather strange that they are not here.

There were more blue-faced boobies than red-footed ones. Both were commencing to nest, but the red-footed eggs were well incubated. Young birds of both species quite prominent, the young blue-faced being more daring or less cautious than the other species. I doubt if there are ever many more red-footed here; very few old nests were seen. Frigate birds were plentiful but mostly young white or rufus-headed. Several old ones, but a fellow had to watch for them.

The red-tailed tropic-birds were nesting in considerable numbers as is evidenced by the eggs collected and the four or five hundred red-tail feathers the crew collected. Puffinus nativitatis we found in the edges of the groves near the ocean beach. Twenty-four birds, one third of which were young well feathered, one or two with a little down still remaining, were obtained. It is interesting that we obtained only young birds until the night I slept ashore. The next morning I shot old birds between daylight and shortly after sunrise as they were taking wing. Later we found five old birds as late as seven o'clock in the neighborhood of the location of most of the young. But at the farther end of the island I found old birds well on in the morning.

Seventy-one neglected shearwaters should make a good series for this locality. Sixty-four of the smaller bird also

negative note is the total absence of the red-backed shrike leaving Ravenal. Neither at Cape, Pickering, Tandjerem nor Bonis were they seen. We will of course note them when we get out with. It is rather strange that they are not here.

There were more blue-headed bonelas than red-footed ones. Both were commencing to nest, but the red-footed eggs were well incubated. Young birds of both species quite grown, the young blue-faced being into darting or long sailing flies the other species. I doubt if there are over many more red-footed here; very few old males were seen. Females birds were plentiful but mostly young white or rufous-headed. Several old ones, but a fellow had to watch for them.

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Seventy-one migratory shorebirds should make a good series for this locality. Sixty-four of the smaller ones

should prove interesting. We will no doubt get as large a collection at Henderson as possible too, for there, strangely enough, they are mostly dark breasted, while here they are decidedly white breasted. One must search for dark specimens. In these ten days we have never ceased to watch for odd plumage phases of both species. The white feather spots on the heads are very noticeable. Are they scars caused by tick bites? Ticks are as abundant here as their fellows are on a western sheep range. We found them upon all the birds, but especially the frigates. Even the smaller terns, however, are attacked. It is strange that none of us have been bitten. I collected a few.