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# LOYALTY ISLANDS SURVEY

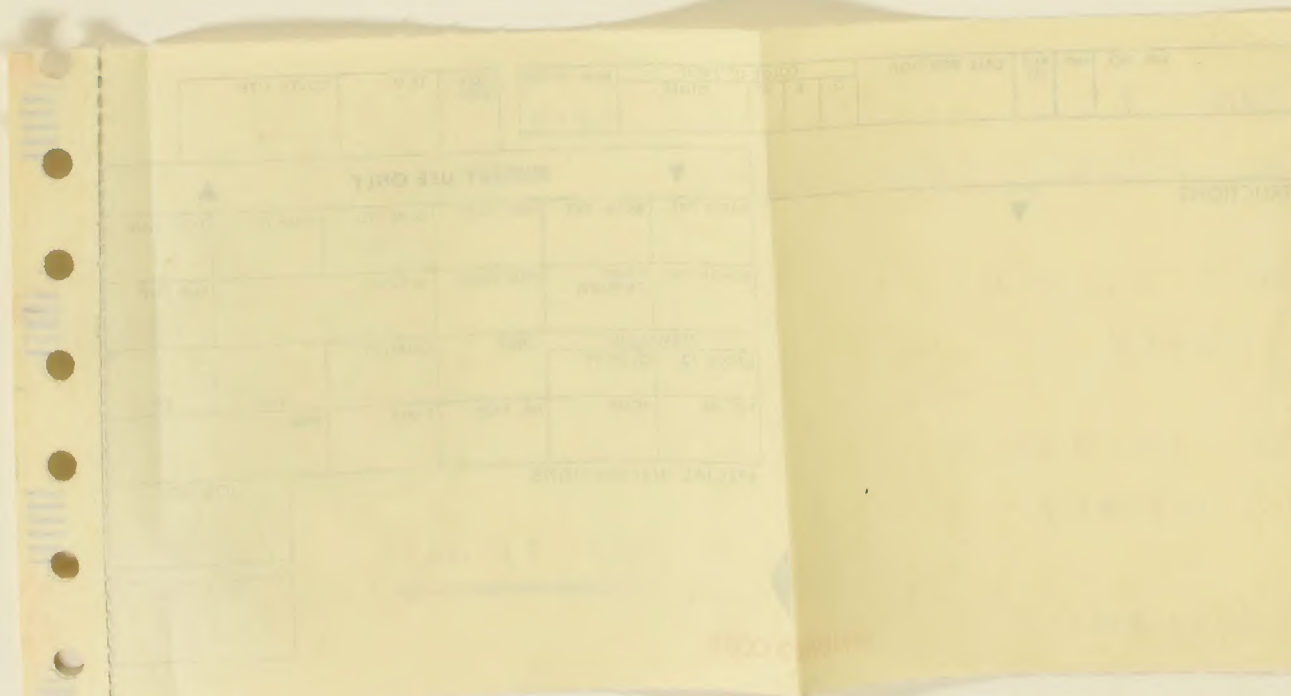
1938

## UVEA ISLAND SUMMARY

*Orig. map in file*

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### UVEA ISLAND SUMMARY

*Orig. map in file*

By L. Macmillan



## LOYALTY ISLANDS SURVEY 1938

BY L. MACMILLAN

## UVEA ISLAND SUMMARY

## LOYALTY GROUP

## W. PACIFIC

## BRIEF GEOLOGICAL DESCRIPTION

Uvea Island, the most westerly inhabited island of the Loyalty Group is a long thin partial formed atoll formation island. The mainland, including the almost joined largest island of the atoll chain of island called Mouli (which being close & identical with the mainland can be treated as part of it) is about 20 miles long by varying widths of from 5 miles to 1 mile in a narrow portion near its centre. Roughly it lies between  $20^{\circ} 24'$  to  $20^{\circ} 41'$  north latitude and  $166^{\circ} 28'$  to  $166^{\circ} 40'$ . East of Greenwich, by no means filling the full area between those positions. It is truly an atoll but the western portion is still in an early stage and not completely formed.

The island lies roughly 53 miles from the NE coast of the New Caledonian mainland at a point a little south of midway along that littoral. It is a French colonial possession, as are all the Loyalty group, and is administered from Noumea, the headquarters of France in the W. Pacific, on the Mainland of New Caledonia, and about 120 miles away by boat. A more or less regular six weekly interisland service being maintained by 100 ton vessel. A local resident policeman of the regular French military police being in residence on the island acting as a Resident Commissioner.

The native residents number a little over two thousand (2048 in 1934) and whites in residence number about 8, including



missionaries and traders. The natives of the Northern half are almost pure Polynesian, having only comparatively recently come by canoe from Wallis or Uea Islands (N.E. of Fiji) a distance of nearly two thousand miles. They still have tales of their crossing and pieces of the original canoes in which the journey was made, about 200 years ago, are still in existence. After having touched at certain Islands, probably the southern New Hebrides, and being driven off, they touched at Mare and Lifu and were driven off. Eventually they reached north Uvea and as that Island was only sparsely settled by a few families from New Caledonia (its infertility not being attractive to natives) they managed to establish themselves in the Northern portion. The natural stone ridges of the narrow central neck of the Island made an easily held and defended frontier which enabled them to hold on and become established. Sporadic warfare was constantly keeping them on the alert but to the end they managed to keep their footing. The chiefs shortly after arrival had all the canoes broken up to make the people fight more desperately to maintain their footing. Intermarriage during the recent peaceful forty or fifty years of mission and government control has caused the purity of the race to diminish somewhat as the light skinned females are very popular with the darker New Caledonian races of the mainland and Southern Uvea and Mouli Island.

The southern part of the Islands shows a somewhat mixed race with New Caledonia preponderance and Mouli Island shows nearly a pure New Caledonia strain.

The Island shows no sign anywhere of the peak on which the coral polps must have built and this has probably never appeared above sea level. It is probably a submerged peak of the



submarine mountain range on which the Loyalty Island group is formed. This range evidently paralleling the central chain of New Caledonia. It is plainly seen that the island has had only one upheaval. Originally it was a series of disconnected islands probably formed by debris on the higher points of reef of a coral chain, much as Beaupre Island is today. These received a lift of 100 feet or so and today present sheer coral faces. A wide level coral foot had formed about the base of these, more especially on the inner or sheltered side of the ring and these today are only a few feet above sea level and more or less flat and level. A similar formation today being present on the floor of the lagoon which for most of its area averages 6 to 10 fathoms in depth.

The largest and main feature of the island is the lagoon which is roughly 20 miles north and south by 18 miles east and west. It is a more or less continuous coral chain like a drawn out O with a break to the west where the drawing out has been greatest. The mainland and Mouli Island form an almost continuous land mass along the east side running N and S and a short distance along the N and S sides. The rest of the coral ring being formed by a chain of islands and rocks above water and a submerged joining reef awash at low tide with here and there definite distinct breaks of varying depths and widths, though all are narrow except the largest one in the west which is about 3 miles wide.

The Mainland. (Which for all intents and purposes may include the Island of Mouli and the small Island of Lecking all of which are only divided by about 100 yards of water). This lies roughly north and south for distance of about 20 miles with a short leg of 2 miles running to the west at the north end and 3 miles SW at



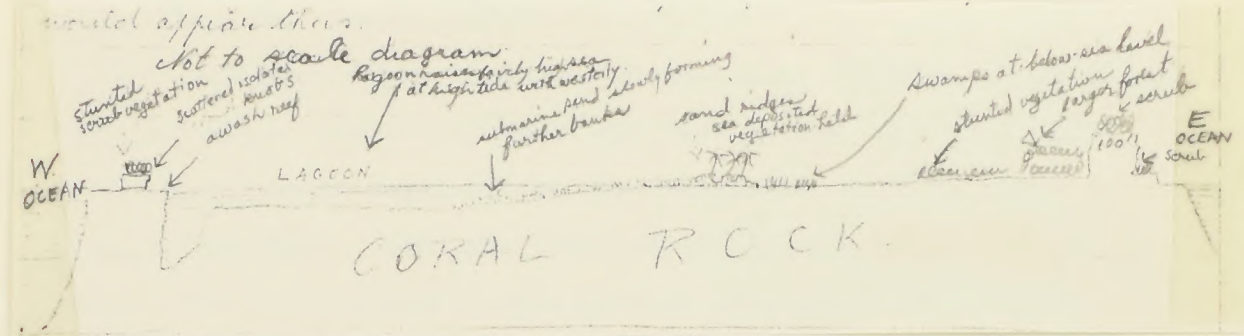
the south end to the end of Mouli Island.

This mainland divides itself into 3 main sections. 1. A more or less level northern part with abrupt disconnected coral knobs or old islands along its Eastern and Northern or ocean margin. This forms a little over  $\frac{1}{3}$  of the Island. 2. A small high narrow neck of coral ridge or old Island with cliff faces along the lagoon side and a very narrow coastal strip of sea deposited sand and pumice along the east coastal margin. 3. This area forms only about  $\frac{1}{10}$  or  $\frac{1}{12}$  of the Island area. The southern portion of the Island which forms the remainder of the Island and includes Mouli Island is mostly a flat plain with a more or less continuous abrupt wall of rock along the east or ocean side. This has precepitous sides and abrupt narrow breaks or gateways in it in 3 or 4 places and a narrow coastal shelf along the ocean side. This shelf being a continuation of the plain on the western side of the barrier.

In both the large north and south sections the level plain is a coral rock with rough 2 and 3 foot dykes of coral rock outcrops here and there and is very rough and potholed as is the nature of all such formations. Great care having to be taken when moving through bush in this type of country as nasty falls into these continuous sources of holes from 2 to 10 and 20 feet in depth are likely, many such holes being only a foot or 2 across the top, others 10 and 20 feet and in some cases many yards. Any which are more than 10 feet deep have fresh or almost fresh water in the porous rock bottoms. In places large holes having formed small lakes. The greater part of this level plain is about 10 feet above sea level in the east at the foot of the abrupt 100 foot outcrops with a gradual fall to the west shore where it actually falls to sea level and below in many places.



There swamps have formed behind high 15 and 20 foot sand dunes which have been thrown up by westerly hurricanes and retained by vegetation, mostly coconuts. This bank is slowly widening and extending westward into the lagoon. A cross section of the greater part of the Island would appear thus.



Owing to irregular coral outcrop dykes and so on, water has formed a more or less continuous chain down the centre of the Island from north to south; swamps behind the deposited sand banks and lakes in the more easterly coral stone areas, except in the South-central part and Mouli Island. If these dry areas had pot holes of sufficient depth they would have permanent water also, during heavy rains lakes form there and slowly drain away. In the rather rough and rugged small central neck, several lakes appear where holes reach sea level and lower. At times of southerly or northerly hurricanes, salt water drives up these low lying arms to as far as Iahnimiha in the south and a little south of St. Joseph in the north making long peninsulars of the deposited sand banks but more or less drain away with low tides after normality is restored in the weather.

There are no true rivers on the island though at times of heavy rains the swamps behind the sand banks form wide sluggishly, moving bodies of water draining to north and south. Surface water is plentiful in many areas in lakes and swamps at



all times and after heavy rain casual water appears in all places but soon drains away in the porous rock.

There is a small tidal lagoon in the north and a large long one in the south which completely dry out during the rise and fall of tides leaving extensive sands and mud flats and mangrove flats for waders to feed on.

Generally speaking the Island has no striking geographical features except the abrupt coral outcrops in the east which have previously been islands. These have extensive caves in their precipitous sides. Here and there on the island caverns of no large extent are present in the more or less level coral plain generally in the form of dry pot holes, with only slightly overhanging edges. Nowhere do collapsed caverns appear. The most constant features are the innumerable potholes of varying size previously mentioned, the greater part being small and shallow. These play a large part in the island vegetation and they have trapped and held soil as it formed from weathering of coral rock and decomposing vegetable matter. Where such have been small and numerous and shallow areas of more or less level soil have formed but even these are broken with larger holes 3 and 4 feet deep at wide or often close intervals.

Generally speaking the island is very infertile except for small soil pockets which reach a certain but low degree of fertility. The most extensive of these being generally on the higher parts of the plain in the east and near the bases of the hundred foot outcrop barrier.

Rainfall is very irregular and probably from 40 to 60 inches a year more often in the forties. The bulk of this falls from Feb. to May or during hurricanes in latitudes to the north and west. Hurricanes visit the island only infrequently (once in



8 or 10 years (but do great damage when they do.) Uvea seemingly being in a pocket fairly free of hurricanes as numbers forming in the new Hebrides and areas west of there pass north and west of Uvea towards the Queensland coast, others passing well to the east between the New Hebrides and the Loyalties and way south easterly. The last hurricane to visit Uvea being in 1932-3 hot season when a great amount of damage was done to building, vegetation, gardens and forests and considerable loss of life both bird, animal and human was suffered.

Climate is equable and more or less high temperatures constant, compatible with its latitude. The expansive shallow sheet of water in the lagoon reaches temperatures some degrees above that of the surrounding ocean and keeps day and night temperatures more nearly even. Cool season temperature ranges from 70 to 85 (N & D) and hot season from 80° - 90°F. (N&D). February and March generally being excessively hot with an almost constant temperature of over 90°F. Average annual temperature would probably be about 80 - 85° this being considerably above that of the rest of the Loyalties.

The island is not healthy. Swarms of mosquitoes (Culex fatigans probably and Aidees??) breed in the swamps and pools to come in clouds at nightfall during the months January - May making life impossible without protection of nets and so on after dark. These being Filiarisis carriers whites and natives show a 100% Filiarisis infection, though only 5-10% show visible signs of elephantiasis. A local mission nurse says many, especially females, show lesser signs of enlargement in smaller areas of the bord. (scrotum, labia major etc.) During these months mosquitoes are bade in the day also, anywhere in sheltered positions.



At other times of the year certain localities have a few mosquitoes but the great bulk of them (98%) disappear. During the long dry spells plagues of fleas appear on the sandy deposit bank along the lagoon margin where 80% of the inhabitants live permanently, though some move further east at this season to temporary homes. At such times plagues of sand flies occur which often make it necessary to work under net protection and so on.

The greater part of the food of the natives (because of infertile soil and lack of suitable areas for domestic animals) necessarily comes from the lagoon which teems with fish, consequently like all fish eating races the greater number have bad teeth.

There are no wild pigs and few pigeons consequently few bush tracks outside roads to gardens and the natives know comparatively little about the bush of their island. They could tell you the nature of the floor of the lagoon and the best fishing areas and so on but could not tell you, nor in most cases find their way about the bush of the island where garden tracks are absent. They are consequently most unreliable observers as regards birds or bushlore though expert in sea or fish lore.

The island could be made very much healthier by allowing the swamps to build up as they rapidly would especially under some legumosa, but owing to lack of food areas these swamps have to be constantly maintained as taru fields and this taru forms 60% or more of the vegetable food of the islanders. Dry taru could be grown in place of the swamp variety if arable land were available but this is not the case and the built up swamps would not be fertile enough for many decades. Yams and sweet potatoes grow very poorly in most areas, one or two small areas growing a medium



low grade quality, bananas do well in isolated pockets. The coconut does well or reasonably well in many areas and a considerable part of the island is given over to them to produce copra for means to meet taxes and increasing wants of European goods, and food. Especially the latter as they have to depend on the latter to supply their wants at times of distress or failure of crops and bad seasons and to balance rations at off seasons. Native wild fruits and foods are almost entirely lacking. Breadfruits only growing passable well on the sand deposit banks and a few other small areas elsewhere. Copper has been tried as a money producer but without success so far.

Because of mission influence and general poverty of natives, a wise system of increasing coconut area cultivation has been followed and today the bulk of Uvea natives are the wealthiest natives of the Loyalties though they are subject to heavy drainage of resources by lack of natural foods, government taxes and large scale mission schemes of church buildings etc.

A decrease is noticeable in the Catholic communities but a large increase in the Protestant communities keeps the population fairly static. The Protestants keep a qualified nurse on the island who runs a first class medical service which is attended by numbers of Catholics also. The community at present is about evenly divided between the two faiths but generally speaking the Protestants appear much more progressive and show more initiative as they appear to be carrying on the policy, (which all were previously compelled by authority to do) of planting a certain area under coconuts each year. The Catholics appear to have mostly dropped back and discontinued this practice since compulsion has ceased. This community division has some influence on bird life as generally speaking, the Catholics are



strongest at the 2 ends of the island the Protestants in the center where the largest types of forests appear.

It is of interest to note the similarity between Mare and Uvea in the areas of altitude. (see Mare Islands summary) and Beaupre Island also. In fact all three islands show considerable similarity though Lifu shows less than the other three. Speaking generally all the Loyalties show four regular stages. Mare, the most advanced to Beaupre, the least, and latest formation. The whole showing that the mountain chain is probably a block rising in the east and falling in the west and as submarine peaks have reached depths suitable for coral polyps to colonise they have built on these peaks and raised coral masses to sea level which have been since raised above sea level by volcanic up thrust or continued raising and tilting of the block forming the earth's crust in that area.

#### Sub-Areas and Variation of Soil and Vegetation

Soil anywhere on Uvea is scanty and generally speaking rather infertile and except for the deposited sand banks is nowhere of any depth.

Roughly speaking it is divided into 3 main types and a sub type and the sand deposit banks which are a 90% calcarous sea deposit sand with vegetable admixture of approximately 10% or less in most places. Much of the surface of the island is pure coral rock outcrop. All soils are calcarous and nowhere does a clay or real loam appear. A kind of clay or clayish matter is present in much of the soil but this is caused purely by a leaching in coral limestone which produced a type of slurry, which if admixed with vegetable matter kept wet, forms a kind of clay soil; but which, if dried, causes a rock like crumbly cake, almost like a sandstone. This slurry may be seen in great



quantities in the tidal lagoons in the formation stage where it is still white and free of vegetable matter.

Roughly the main soil divisions are:

A fairly fertile semi loam like soil. Found mostly about the foot of the abrupt outcrops, or in pockets where it has been trapped by the coral dykes. Generally speaking these areas grow a fairly tall forest of teak, and other trees and form the true forests of the island. These areas are very irregular in size and distribution, but generally speaking, are small except for a long thin more or less continuous strip along the western side of the higher 60-100 ft. coral outcrops along the east coast and an area immediately to the north and south of the higher central connecting neck of the island. The area to the immediate south of this outcrop being by far the most extensive and most fertile on the whole island. Fair depths of soil 4 and 5 feet appear in pockets in this area but most of it is not more than 1' to 18" in depth. Coral rock outcrops appear everywhere irregularly in it and I doubt one could find an area anywhere in it 100 yards square without a pure stone outcrop appearing. As this area is considered the only really worth while place to plant yams on the whole island it is much worked for gardens, natives from the N & S of the Island being granted small plots of land by the owners of the land for annual yam gardens and paying fees in cash or kind (taru, fish, coconuts, etc) for the use of the land.

A rather infertile shallow sandier loam type of soil.

These areas are fairly extensive all over the island in places west of the other types. They form a type between the areas of more fertile soil and swamps. Most of them are merely a thin 2 or 3 inch layer of soil over a soft white sand which is a soft



type of sandstone which has not been subject to pressure and has been semi bound by lime leached from the shells and so on which compose the sand. In many places this chalky, soap sand stone is deep where it has formed in pockets in the coral but for the greater part it is only 2 feet or more deep and is superimposed on solid coral rock. In places the 2 or 3 inches of vegetable loam soil has formed on solid coral rock without the intermediate soft sandy stone layer. Throughout the whole of the area pure coral outcrops and dykes are very prevalent and in few places can one go far without encountering extensive coral outcrop areas. Immediately adjacent to the swamps on their east side these areas are subject to periodical inundation and are really more or less swamps though they do dry out but the water table is very high not more than 6 to 8 inches under the surface at any time and generally only 1 or 2 inches if not actually under water. Fortunately the soil itself generally only a thin layer of a few inches is very porous as in the underlaying coral rock stratum and a constant water movement slight but continuous keeps the soil sufficiently sweet for coconuts and probably 95% of this area is given over to that form of permanent cultivation. It is noticeable the palms do not do as well there as on higher ground and in places even show the effects by yellowing of their leaves and so on. Coconut culture at least enables the soil to drain out more rapidly and allows sunlight to reach the ground and assist general improvement in the fertility of the area. The natural vegetation of this type of land is a low thick tangled scrub of 10 ft. and 15 ft. whip stick like casuarinas, shrubs etc. with masses of rushes and cane vines. The areas behind these not subject to flooding grow a stunted forest of 20 to 25 ft. trees



and shrubs much entangled with vines and creepers. Under these a more or less dense low brush grows and the broad leaved rock fern (a birds nest fern type) covers much of the ground especially in outcrop areas where it forms an almost complete 1 to 2 ft. high ground cover and makes walking amongst the potholes in the rock very difficult. This shallow less fertile area where rock outcrops occur carry a great number of stunted small leaved small fruited banyans which form much of the feeding areas for birds.

Elsewhere in this dryer area where gardening operations are carried on a low scrub grows up to 10 and 15 ft. in height, mostly a species of quick growing hard wood and soft wood shrubs and even grass areas. When these areas are used for gardening they become exhausted in a single year and take a number of years, 10 at least to recover and consequently scrub is slow in returning to such areas. This being the case much of the area is in a stunted poorly scrubbed state. Much of these areas has been put under permanent coconut cultivation also.

A sub area really belonging to the above area has been formed in the swamp areas by the wet cultivation of taru and by the permanent salt pan areas in the north and south, these pans being more or less the extensions of the tidal lagoon arms which are subject to periodical sea flooding. The pan areas grow a stunted and sparse tussocky type of rush and stunted casuarina trees 6 or 7 ft. in height mostly and very scattered, with one or two poor 2 ft. specimens of the hardier shrubs here and there with odd sinuous ropes of cane vine barely existing at wide intervals. Towards the ends of these areas a slightly more robust growth is found with a few pandanus palms at wide intervals. This slowly merges with the areas kept under taru cultivation.



Much of all this areas is more or less bare and exposed ground probably not much more than 40% actually having vegetation on it, thus showing the sparseness of such vegetation as does manage to survive the uncongenial conditions. The swamps under taru cultivation need constant attention to keep them swampy enough for the taru and to keep the soil sweet for the crop. Roughly speaking these cultivation swamps lie at the extreme ends of the arms which reach to South and North thus more or less being towards the central part of the island though a small isolated patches appear elsewhere especially in the northern half of the island where the arm is not so definite or extensive. Natives have to stop the swamps from building up to too great a level to retain water and years of cultivation to a regular depth of about 1 1/2 feet with a top layer of soft seuelchy semi liquid mud. They annually cart in tons of vegetable matter and allow this to rot and form a more or less fertile black mud of humus mould. This prevents the soil becoming exhausted but even so a system of rotation and fallow is necessary to keep the crops up to a sufficient quantity to supply the food and to warrant sufficient return for the great labor entailed. These taru swamps with their abundance of rotting vegetation form ideal breeding grounds for many other types of insects beside mosquitoes and water breeding insects and molluscs, and consequently play a large part in the insectivorous birds and others breeding on the island. Also different forms of legumosa, the main one a flowering kind, which can stand swamp conditions and improve soil have been introduced by the missionaries and the administration to try and combat the mosquitoes and fallow parts of the swamp are always under this. These flowering legumosa naturally play a part in the food of such flower feeding



species of birds as appear on the island. These swamps are also nowadays more or less communal, natives from dryer areas being allowed small blocks for production of taru for themselves, though considerable exchange in this food article is still carried on in the style of areas producing certain articles exchanging with other areas lacking such articles but possessing other necessary products or articles.

All these swamp areas are more or less long narrow strips and are nowhere wide enough to have developed a type of bird life characteristic to the area of definitely swamp type birds though 1 species of rail is entirely confined to the swamps.

The third definite species of soil is the deposited sand bank along the lagoon margin throughout the entire length of the island (a distance of between 3 and 4 miles). This bank in places shows 3 and 4 distinct waves or times of depositing, but is generally just a single wide bank 4 - 5 hundred yards in width with a more or less gradual rise on the lagoon side and a steep rapid drop of from near 40 ft., or even 10 ft. only on places, to the swamp margins. This drop is steep and regular throughout the entire length of the banks and seems to point to the first hurricane having deposited a very large bank throughout the entire length and to its having been an exceptionally severe disturbance. Probably the whole bank at one time showed 3 and 4 regular waves of deposit but during the years the constant house building and other activities of the natives, the bulk of whom live on this ridge, has leveled out the undulations and densest population are the ones where no separate waves are visible, but areas where few villages or people are, show distinct waves up to NW being the direction of the worst and most frequent blows. This



sand shows no rock anywhere except what has been carried by natives for house building. The sand is very deep but probably rests on coral stone as in places where it is shallow near the lagoon edge rock is encountered at no great depth. The vegetation is mostly coconuts with grass in between, a great many being self sown or natural planted, or coconuts with low scrubs of mostly soft wood (pois noir, the french name of a very common shrubby tree) casuarinas and beach type shrubs and in a few places a low 10 ft. fairly dense ti tree and other beach scrubs are found, but the bulk of the area probably 90% or more is under coconuts. The vegetation has formed a thin layer of sandy loam over the sand to a depth of a few inches but the line of demarcation is very distinct, one being pure sand and white and the other a darker vegetable loam and sand mixture. This soil is very poor and quickly exhausted and is used for no gardening except for a few bananas and legumes such as beans (haricot and Mauritious) climbing sword and punch beans). Coconuts apparently do well in this soil and appear to suffer no ill effects. Along the base of this bank near the swamp margin, where doubtless, considerable water born soil has washed down, a few native fruit trees are found, rose apple and bread fruit, but except in a few cases these do very poorly.

A consideration of the vegetation of the whole island falls into 2 main groups with numbers of sub groups. The first natural forest is divisible into 2 main types and a sub type. The second and by far the greater portion of the island falls under this heading, is induced, introduced, or gardening and cultural growths which fall under 2 main heads, permanent culture and garden or rotation culture areas in their various phases.



(a glance at the map of vegetation below will show approximately how these areas stand in relation to each other).

A separate type of vegetation which falls under natural and induced vegetation areas are the mangroves salt and pan areas of the tidal arms and the artificial taru swamps.

## NATURAL GROWTHS

### NATURAL TALL FORESTS

These forests are found in soil pockets between coral dykes, actually on coral dykes where small pockets occur and along the immediate foots of the high abrupt 80-100 ft. coral outcrops. They are mostly teak, island mahogany, banyans, and many large soft wood trees, a few Fiji plums and so on. They range from the larger trees which go to 50 ft. and over in height to a lower type of tree which reaches a height of 30 ft. or so, thus making a very uneven leaf canopy. Under these a fairly considerable growth of lower 10 and 15 ft. shrubs and small trees appear but except in pure rock areas where the sabre leaved birds nest rock fern grows the soil is fairly bare and open. Owing to washed and fallen trees from age and winds and hurricane there are many small patches in these forests where a secondary very dense growth of Penubre, brou (bastard cotton) and other secondary growth have sprung up, half an acre or so in extent. Where such occur on coral outcrop areas where ferns etc. appear an almost impenetrable thicket occurs. There is intermingled with all this forest a strong growth of creepers and vines and cane vines, many of these as well as much of the lower tree and shrub growth bearing seeds or berries. There is also a considerable amount of a type of red flowering acacia (redwood) which bears flowers and seed and forms a food supply for birds of certain species.



Figs are represented only by the small fruited banyan types of figs and a large fig like fruit, (which I do not think is a fig at all) but on which the larger pigeons feed at certain times though they do not seem to relish this food and are only driven to it at times of shortage.

In these areas of taller forest and in these only, signs appear of a larger taller forest of hardwood, teak and casuarinas mostly the latter I believe, stumps and logs 10 and 12 ft. though are still to be found. These are probably the remains of the first and original growths of vegetation on the island and are the parents of the present forest of smaller trees reaching to 6 ft. in diameter at the very most and most of them only 2 and 3 ft. in diameter. There is one other large type of durable tree whose stumps and even logs still exist which I cannot place.

A minor feature of this forest is the presence of trees which normally grow only along beaches and all water margins, (species which depend on their seeds being water borne for propagation). Though generally speaking these trees are doing poorly and slowly vanishing their presence seems to show fairly recent formation of the forest which seems in exact opposition to the occasional large stumps. Actually the explanation is probably that large old and isolated trees appeared on the reef top and here and there long arms of tidal water remained along which sea borne seeds were carried and established and have managed to remain long after the disappearance of these arms because of the salinity of the water at no great depth. It is noticable that all large stumps appear in rock outcrops a foot or two above the general level of the surrounding terrain and



these sea borne types appear in the more or less level areas between these outcrop dykes.

Considerable enroachment on these forest areas is taking place for gardening purposes because of the fertility of the soil. In time these forests will be only strips of various widths forming a network over the area these strips coinciding with the coral outcrops which are too stony for cultivation purposes. Even these may in time disappear because of drying out of surrounding soil and a lower type of forest result or they may be planted up in permanent coconut areas as the palms do reasonably well on them. Also much of the area may have to be used for gardening if the population increases much as between rocks etc. pockets exist which can be cultivated in small 1 and 2 and 3 yard patches. Natives to save long walking to and from gardens are already in the Ianimaha and Wadilla areas making gardens thus in close at hand strips which had been previously left. A poor and bad type of culture especially in dry times and the destruction of forest in increasing the severity and likelihood of such occurring. This is already noticeable.

A factor which may enable these forests to remain for much longer periods than at present looks likely is the indolence of the natives. Large forests take considerably more work to clear and prepare for cultivation than smaller types of scrub. This indolence is the reason for the above mentioned clearing of close in rock dyke areas really of little use for cultivation. Also as more areas of coconuts produce and general wealth is increased natives will begin to depend less on their garden produce and use rice and introduced foods in larger quantities. A certain amount of this tall forest land is bound to disappear but a more or less static stage will be reached which will not



alter till medicine can improve the health conditions and large increases of population become fact. All birds appear in this areas except 1 rail.

#### MEDIUM FORESTS

A subtype of this forest area with smaller trees of the same variety is found in places of slightly less altitude a foot or 2 lower and generally to the westward of the taller forest or in the south and north of the island and on Mouli island. These are generally on very rock areas and have a dense ground cover of ferns. All the lower types of scrub are proportionately stunted. The higher trees reaching 20-30 ft., lesser ones 15 and smaller only 4 to 5 ft. All are densely tangled with ropes and almost impenetrable without knives. This area forms a greater part of the island forest and is a large factor in the bird life such species as prefer this type of habitat being predominant (Pachycephala Myiagra, Gerygone, Myzomela etc.) Much of the vegetation produces seeds and berries and the ground with a heavy leaf fall and rotten food forming a suitable breeding place for insects and beetles. Stunted small leaved and fruiting banyans also are plentiful in the area. This area has been subject to much disease by cultivation for gardens and permanent coconut culture. Being closer to the areas of habitation and easier cleared than forest and promising a fair degree of fertility in pockets and small areas natives have used it much for cultural purposes. Here and there in the area in fairly extensive patches a thin layer of 3 or 4 inch soil has formed over an almost level unpotholed rock area of 3 and 4 acres and on this a low stunted hardwood scrub tree (Mori, the same as Erromanga N.H.) growing rarely above 10 ft. in height and very scattered, manages to exist,



and a short grass covers the ground in between the trees. All birds appear in this except 1 rail.

Within this area occur of course all the different stages of garden rotation scrubs but owing to soil exhaustion these range through 10 or more stages or periods of growth. Many such areas have been put under coconuts and, though while young, between 3 to 7 years scrub of a stunted nature grows about them, shortly before they bear this is cleared away and from then on becomes a permanent culture with grass and low shrubs etc. which are generally cleared annually.

#### STUNTED GROWTHS

On the tops of the abrupt coral outcrops in the east and all along their eastern sides, between them and the sea and in portions of the north and south of the island and elsewhere where a pure coral rock much broken (probably by earthquake, etc.) and with little or no pockets and generally with a fall so that such weathered rock as would form soil can be carried away to lower levels, a stunted though often close growing 4 to 15 ft. type of ti tree is found. Along the east coast this is much twisted and gnarled and heavily wind blown, all have a lean away from the S.E. quarter. This varies from a few inches in height near the sea to 4 ft. further in and at most six feet in height along the foot of the coral outcrops except where a deep sheltered cavity or gully appears in the rock when height of 10 ft. and occasionally 15 ft. are found. On top of the high abrupt outcrops the same conditions prevail, low in the south and east to high on the west and north sides looking down on top of this scrub an impression of great density and more or less even level is conveyed, in fact the impression is given that it is almost a



grassland only a foot or so high over level soil. This type of scrub on the west side of the abrupt outcrops (in the few areas it appears in) and in the north and south is more irregular and without such a dense twig and leaf canopy. Even so it is gnarled and close growing and often reaches a height of 15 ft. in individual trees but the great majority do not go above 12 ft. or less in height. The lower dense scrubs of this type all along the coast are much subject to salt spray burning during hurricanes and even in high winds as enormous rollers break from deep water on to a shallow ledge (dry or almost so at low tide) and spray and spume are thrown to tremendous heights and carried inland on the wind. Birds do not seem to favor this vegetation to any large extent. A few Gerygones and Myiagra being found. Halcyon is probably the commonest bird in the area. Accipter spends considerable time playing on the updraft of wind in the area and feeds on numbers of rats which inhabit the rocks or cliff faces. Except where coconuts appear in the lee of the outcrops honey feeders are entirely absent. Numbers of Pachyaphala appear at one or two places in the lee of the outcrops.

#### CULTIVATION TYPES

These are the usual rotation types of secondary growth in garden but have far more stages than usual because of longer rotations practiced seldom less than 10 years and often longer. All are very much less dense and luxuriant than usual for this type of secondary growth and for the first 2 to 3 years are little more than rather barren grasslands with a few weed shrubs in most areas. In one or two of the more fertile spots lantana grows but does not usually appear till well on in the rotation about the 7th or 8th year. Zosterops and Lichmera are about the only birds



which inhabit this type of area in the early stages and very few of them. Later their numbers increase as 2 and 3 foot shrub appear and they are then joined by Aplonis and at later stages by most other kinds of birds present on the island, though a number of species are rare and others not much more than visitors or strays. If the bush is allowed to reach the small forest stage, a period of 25 years at least, all types except the rail appear. When clearing natives nearly always leave teak standing or growing because of its size and hardness and the difficulty of burning and the consequent encumbering of the ground with extremely durable logs and consequently a nucleus of large trees are left. If necessary to destroy the trees or if the teak are too numerous to leave they scorch the bases of them and either kill them or very nearly so and leave them standing. They stand for years and are a good indication as to what areas have been cultivated and are left under fallow, and liable to cultivation again. These dead trees or partially so, form hollows in forks at broken off limbs and so on and play a large part in the nesting life of Aplonis and Halcyon especially the former which on Uvea seldom use the usual Loyalty Aplonis nest site in a beheaded but standing rotting coconut palm stump. The bulk of the area falls under this category as it really belongs to the shorter forest areas. Coconut cultivation is the usual type of native culture of this sort though more regular in planting and of much greater extent than on most islands of the same size and population. Small scattered areas of this type of cultivation occur in all the other types except the stunted low ti tree areas.

Taru cultivation is somewhat different to most islands where streams of running water are available and used. On Uvea



low banks or dykes are used to drain water from one area to the other pits and trenches dug and numerous other devices are used to keep the soil sweet. The soil has been built up so as to keep the soil sweet. The soil has been built up so as to keep a water table just below the surface at a depth of 1 inch or so. When the taru is to do its growing under water the top is taken off and the under quagy mud beaten up with sticks, natives working in lines to do this, when well aireated surface water from elsewhere is run on to a depth of an inch or two and the taru planted, at a depth of about 12 to 18 inches under the surface of the water in the more or less liquid mud. Coconut leaves are then laid between rows and trodden in and allowed to rot. Later the water is slowly allowed to lower its level and during such time much vegetable matter, swamp grass or tussocks, leguminous shrubs (a type of mimosa) coconut leaves etc., are placed as a mulch and slowly rotted, thus forming fertilizer and building up the soil till it becomes more or less a dry area. After some years, all the crop is removed the plot returns to (a bog in wet weather but a more or less firm bog in dry weather on which one may walk without sinking) swamp grasses tussocks and small shrubs and mimosa. Regular rotation being practiced in regulation up and down the swamp according to the village divisions which passed certain areas. These swamps abound in all types of insect life molluses etc. and form ideal areas for Anas (which breed in them in numbers, as well as elsewhere mostly in the areas under fallow). Porphyrion (to a limited extent) three species of rail abound in the swamp. Such birds as Lichmera, Lalage, Halcyon, Zosterops, Aplonis (to a very limited extent), two species of Collocalia, Hirundo (feeding on winged insects) Gerygone (to a limited extent), Myiagra (occasionally and more in the coconut margins), Pachycephala



(very rarely), Accipter, commonly, Circus and Falco rarely, Tyto (at night rarely) all appear in the area at times. Nowhere is the area wider than 400 yards and though several miles in length it is nowhere wide enough to form a definite zone of life of its own, visitors appearing from the areas at the side and being found all over it.

#### NATURAL SWAMP AREAS and SALTPAN AREAS

This area, as previously stated carries a scanty vegetation. Actually the previously described taru swamp areas belongs to this area and was probably the same but not such a saline soil before natives cultivated it. The salt pan area dries out rapidly in the surface one or two inches because of the exposed ground between such vegetation as does grow, but nowhere is the water table less than 1 to 2 inches down and pools of surface water are common all over it at even the driest times. It is more or less under water during the rainy season. Sickly casuerinas and rushes form the bulk of the vegetation on it. Bird life is scanty mostly, except for swifts and swallows many of which hawk over the area at most times. Hirundo is exceedingly common and it is here (and in the tidal lagoon to a less extent) that they get after rains the slurry or clay like soil with which to build their nests. Halcyon is fairly numerous at times of wet weather but not in dry times. A few Lalage appear irregularly in the area. Myiagra appears about the margins and Zosterops appear in and about it in irregular numbers. Gerygone is fairly common along the marginal scrubs but also varies somewhat. A rare Porphyrio visits the area I am told but I saw none. A few Hypotaenidia appear at times, but appear to be rovers and do not stay in the area. In a single small section of it at a slight



elevation cane vines grow densely and here when these are in seed (a large seed nearly as big as maize seed, indian corn) numbers of Columba are said to gather to feed on the red seeds of the vine.

#### TIDAL LAGOONS and MANGROVE SWAMPS

These areas are long and thin but play a large part in the bird life as a feeding ground not only for waders but others also. Towards their sea ends where the rise and fall of tides are still covering and uncovering areas of land or mud flats they are typical tidal arms. More or less clear of bush inlets near their entrances and slowly becoming dotted with mangrove the further up one proceeds. A large body of water (and a big area of land is covered) passes in and out and in the shallower upper reaches deep channels like 2 and three ft. deep trenches spread out like fingers. All wading birds and ducks frequent the margins of these. In about the mangroves especially at low tide, Gerygone, (common) Chacities (rare) Miagra (common) Lichmera (fairly common) Lalage (common) Halcyon (common) gather in numbers and feed a great deal. Swifts and swallows are of course exceedingly common these areas being close to their main breeding grounds.

Beyond the area of the usual tides rise and fall but still more or less subject to sea water unundation areas of other types of close growing mangroves. During the greater part of the time these swamps are more or less fresh water swamps or brackish. They are irregular, in occurrence and are often completely surrounded by narrow strips or fairly wide areas of normal low type forest of teak and other forest trees. Coral outcrops are common in the area and it is on these that forest grow and in the hollows between the mangrove (like a basket willow) grow in dense thickets.



Lakes brackish and almost fresh appear and are often fifty to one hundred yards long and twenty to thirty yards wide, or where occurring in outcrops these are generally roughly circular and about thirty yards across. Nearly all types of birds appear in this type of area and at times a Bittern appears. Ducks are numerous and nest there only one species, Anas, being present to my knowledge.

#### ISLANDS TO THE WEST OF THE MAINLAND ON THE SAME CORAL CHAIN

All these islands are coral rock and only one, Theigh Island, rises more than a few feet above sea level. Theigh Island rises about forty to sixty ft. All are flat topped coral stone with a scanty soil, mostly sea sand, and none of them grow very large trees except to such water born species as beach trees, (Barringtonia etc.) which reach thirty feet or so occasionally but even these are lower and smaller than usual for their species. One island has a considerable growth of New Caledonian pine and all have a fairly large percentage of their vegetation composed of coconut palms. By far the greatest part of the vegetation is the low type of ti tree and other shrub types which grow to 10, 15, and 20 ft. occasionally in the center of the larger islands. Some small ones are bare rock. All show a stunted margin of shrub subject to salt spray burning. Almost all the types of bird life found on the mainland exclusive of ducks, rails and parrots appear on these islands.

Pachycephala being common on the furtheste west island (Amata Is.). Zosterops, Gerygone, Myzomela, Lichmera, Pachyphala, Myiagra are all common. The three kinds of pigeons and Aplonis are rarer, Ptilinopus being the most common. Hawks especially Falco are present though Accipiter is a rather rare visitor. Pandion is a visitor though I doubt it ever remains there any length of time.

...and many of the other birds to  
one hundred feet - and many to thirty feet high, or more  
occasionally to more than the generally usually slender and  
shorter trees. Nearly all types of birds occur in  
this group of trees and in the littoral zone. There are  
numerous and many other only one species, Thalysia, being common  
to the islands.

#### PLANTS OF THE MOUNTAIN AND THE LITTORAL ZONE

All these islands are coral rock and only one, Thalysia,  
island, rises more than a few feet above sea level. Thalysia  
island rises about thirty feet. All are flat except  
coral reefs with a rocky soil, mostly sea sand, and none of  
them grow very large trees except in such sheltered places  
as beach fringes, Thalysia etc. which reach thirty feet or  
so occasionally but even there are few and smaller than usual  
for their species. The island has a considerable growth of grass  
Calamagrostis and all have a fairly large percentage of their  
vegetation composed of coastal species. By far the greatest part  
of the vegetation is the low type of trees and other shrubs  
types which grow to 10, 15, and 20 ft. occasionally in the more  
of the larger islands. Some small trees are here, all are  
a standard series of shrub subject to salt water burning. Almost  
all the trees of this type found on the mainland exclusive of  
shrub, Thalysia and Thalysia occur on these islands.

#### Thalysia being common on the islands and island

Thalysia is Thalysia, Thalysia, Thalysia, Thalysia,  
Thalysia are all common. The large shade of Thalysia and Thalysia  
are common, Thalysia being the most common. Thalysia is especially  
Thalysia are common though Thalysia is a rather rare species.  
Thalysia is a shrub though I doubt if ever reaches more than  
length of 10 ft.

Waders and shore birds are common.

Many sea birds frequent the area, Sterna bergli and S. sumatrana being very common and the latter I know nests and the former probably does on the completely barren islands.

Anous I believe 2 species nest on these islands according to natives in fair numbers. I saw none though I saw a few old nests.

Natives speak of a booby (probably the fleshy footed) which nests in trees in small numbers but is more or less entirely absent during the remainder of the year. I doubt this after seeing the islands. Petrels seem to be entirely unknown, even to roost at night in the area. As the islands are unsuitable for burrows, I doubt they would be attractive to this species.

Gygis alba nest in numbers but I saw none.

Unfortunately during my time on Uvea, I could not get across to these islands as I wished as there was only one small fifteen foot sailing dinghy on the whole island which was even partially sea worthy and this was constantly in requisition for carrying copra etc. to trading stores. I doubt there is anything present in that area outside the species listed hereunder but as many birds keep well away from colonies except during the nesting season which varies in different species unexpected species may occur, but to prove such would mean a twelve months long sojourn on the small islands and constant moving up and down them and I doubt anything there may be to reveal would warrant this expense. Petrels can be ruled right out as can numbers of other species because of the nature of the islands. Sterna's are the only species probably in which any additions might be made and even here these are probably casual visitors and not nesters, from



areas and colonies to the west and N.W. of New Caledonia mainland where large colonies exist.

#### THE BIRDS PRESENT

WADERS     Demigretta nest and present in numbers. Numerous and various kinds of migrant waders are present. Pluvialis, Arenaria, Numenius, Limosa all seen by me, and others are very probably present.

SEA BIRDS     Sterna summatrana nests in great numbers and is common. Sterna bergii very common and may nest (?) Anous stolidus and possibly A. minuta nest in numbers. Sterna dougalli, Sterna aneatheta, S. fuscata are visitors and may nest rarely. Gygis alba is present and nest in numbers. Some species of booby said to nest on the island. Very doubtful but if so may be Sula sula. I saw none though present in the probable nesting season. Larus novaehollandiae appears very very rarely and generally only after very rough weather from or toward the south.

#### GENERAL SUMMARY OF BIRD LIFE









Taking Uvea as a whole bird life is very plentiful, such species as are present being in great numbers. Purely fruit feeders such as pigeons are not really plentiful as a continuous annual cycle of food for such species is lacking. Semi fruit feeders which feed on insects at other seasons are plentiful, insect feeds and honey feeders are very plentiful, in fact except for a strange gap in Porphyrio during my presence on the island and the pigeon gap which is somewhat remedied by Ptilinopus, the whole of the island bird life is prolific and in a flourishing condition and the status is most satisfactory. The observer



ROUGH SKETCH MAP OF UVEA ISLAND (MAINLAND) SHOWING ZONES OF VEGETATION

NB Note garden areas appear sporadically in both coconut areas and short forest areas and are eating into the original tall forest areas. The custom is to plant coconuts after the garden crop is harvested thus extending such areas. Roughly the lines of demarcation shown are as near accurate as possible in such a mixed and irregular vegetation as exists on the island.

(see below also NB)

-  = area of tall original forest
-  = area of shorter original forest  
includes about 10% garden area
-  = area under more or less permanent  
culture coconuts etc. contains  
about 20% garden culture
-  = swamp lands including areas where  
basket mangrove appear shown by  
black crosses and pencil shading  
Taru cultivation covers all the  
inland ends of these and most  
isolated arms.
-  = scanty swam vegetation on salt  
pan lands
-  = abrupt coral outcrops 40-100' A.S.L.
-  = area of sea deposited sand banks  
along lagoon side. Almost 100%  
coconut vegetation with a little sand  
hill shrubs etc. along sea margin, few  
casuarinas etc. near water's edge mostly.
-  = low wind blown ti tree  
scrubs from a few  
inches high near the  
coast to 15 ft. in-  
land and on knolls and  
in hollows.

NB Because in a map of this scale it is impossible to show such one has to bear in mind in looking at this sketch that throughout the whole island especially in the central part long thin arms of low original forest and in a few cases tall original forest growing on coral dykes etc. have been left. (shown slightly in the latter case) and these extend far into the coconut planted areas. Often they are only 20 yds. in width and seldom more than 50 yds. and very often of considerable length (up to one mile). These strips carry heavy population of bird life. In many cases they completely surround cultivations of varying sized areas. In tall forest areas these are generally considerably wider but not as long but in short forest areas are long and narrow.















# ROUGH SKETCH MAP OF UVEA Is (MAINLAND) SHOWING ZONES OF VEGETATION.

**NB** note garden areas appear sporadically in both coconut areas + short forest areas + are eating into the original forest areas. The custom is to plant coconuts after the garden crop is harvested thus extending such areas. Roughly the lines of demarcation shown are as near accurate as possible in such a mixed & irregular vegetation as exists on the island.  
(see also NB.)

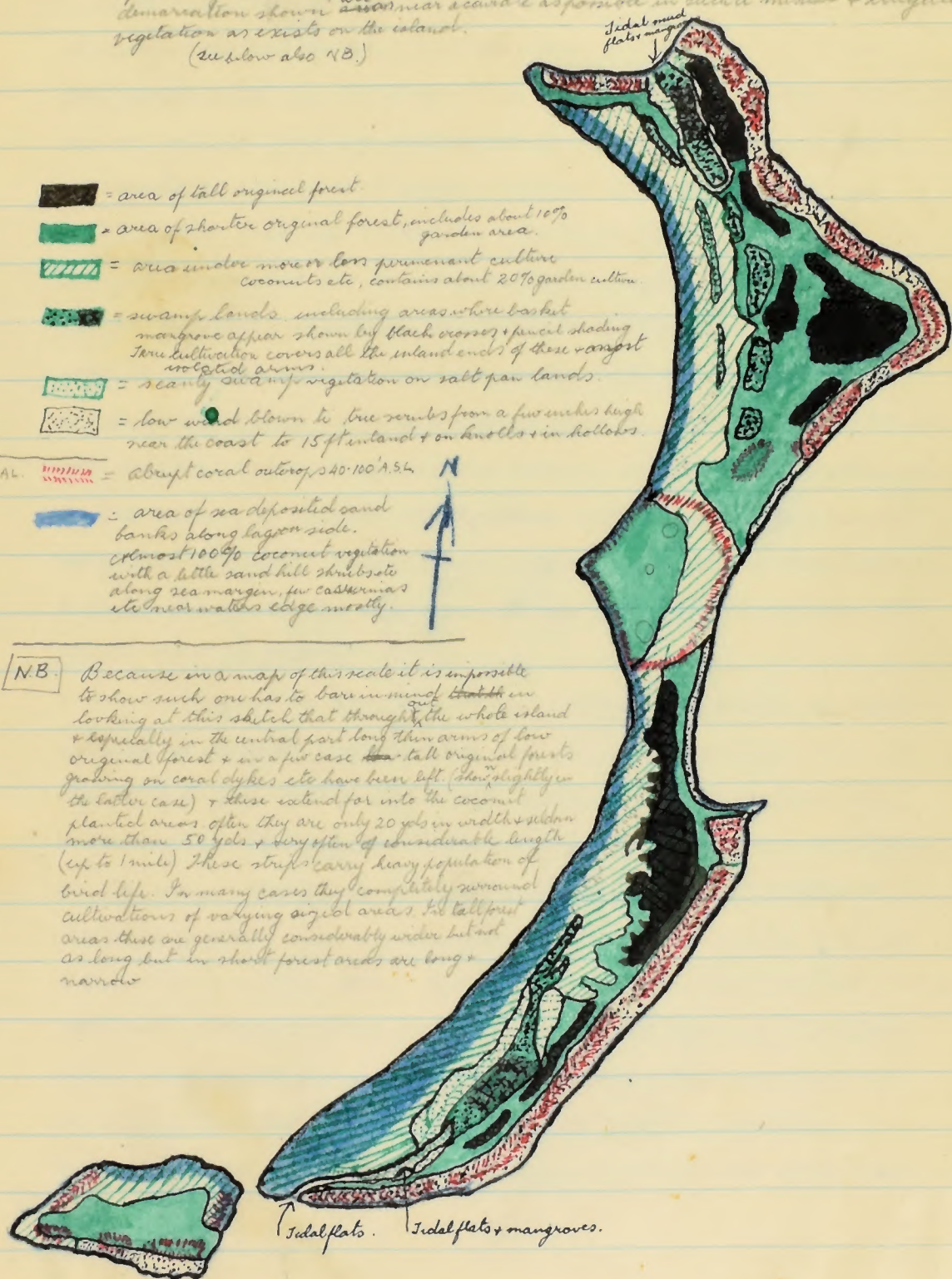
-  = area of tall original forest.
-  = area of shorter original forest, includes about 10% garden area.
-  = area under more or less permanent culture coconuts etc, contains about 20% garden culture.
-  = swamp lands, including areas where basket mangrove appear shown by black crosses + pencil shading. Some cultivation covers all the inland ends of these swampy arms.
-  = scanty swamp vegetation on salt pan lands.
-  = low wind blown tree scrubs from a few inches high near the coast to 15 ft inland + on knolls + in hollows.

**PHYSICAL.**  = abrupt coral outcrop, S 40-100' A. S. L.

 = area of sea deposited sand banks along lagoon side. Almost 100% coconut vegetation with a little sand hill shrubs etc along sea margin, few casuarinas etc near water's edge mostly.



**N.B.** Because in a map of this scale it is impossible to show such one has to bear in mind that in looking at this sketch that throughout the whole island + especially in the central part along thin arms of low original forest + in a few cases ~~the~~ tall original forests growing on coral dykes etc have been left (shown slightly in the latter case) + these extend far into the coconut planted areas often they are only 20 yds in width + seldom more than 50 yds + very often of considerable length (up to 1 mile). These strips carry heavy population of bird life. In many cases they completely surround cultivations of varying sized areas, the tall forest areas these are generally considerably wider but not as long but in short forest areas are long + narrow.





coming direct from Nare Island and its bad position was agreeably surprised and very pleased to be in a so much more congenial and pleasant condition as regards the bird life. Though it must be born in mind that the more prolific bird life of the more fertile volcanic tropical islands further north (in density of numbers per square mile) is not present in the Loyalties one can definitely say as regards Uvea the population is in accordance with the surroundings and in fact seems to be slightly above what one would expect from the infertile nature of the island. This is probably accounted for by comparatively recent decreases of natural habitat, irregular cultivation leaving long strips or arms of natural habitat between garden land and cultivation etc. which enable birds to slowly become used to change of habitat and use marginal areas of unsuitable habitat as feeding grounds, and to the number of species which though much of their habitat is destroyed can still obtain their natural food in the new habitat. A brief glance at the scale map of one small area hereunder will reveal what is meant.

Except in the case of the pigeons and ducks, no enemies outside of natural enemies have any influence on bird life. In the case of the latter the birds' natural vigilance generally protects it. Natives and French residents never shoot at birds on the wing. Their way of hunting is to creep on a covey of ducks on a small lake on the tidal mud flats and blaze into the crowd with a single shot. Consequently one or two birds only are obtained, though numbers may be wounded, but when at rest these birds have become exceedingly shy and wary and a cracking twig or slight movement is sufficient to put them on the wing. In more open areas they never allow approach within gun shot range.



The gun can be ignored as a menace to the bird, another more serious menace (but which is really of little account) is that nesting in swamps etc. and the returning there of adults for the eclipse moult (when the birds are unable to fly) not proven definitely but believe this is the case, natives with their dogs catch young and even well grown and adult birds at certain seasons. Even so I doubt the annual total mortality for ducks on the whole island reaches much above 100 and that in such a wide ranging species is negligible, natural enemies hawks (especially Falco and to a less degree Accipiter) doubtless accounting for as many or more.

In the case of the rarer pigeons especially Columba the only largish pigeon on the island, the case is different and human persecution is a serious matter in this already naturally rare bird though its position is somewhat difficult to understand and numerical fluctuations seem to point to outside area influences.

The position of Porphyrio also seems to point to outside influences and increases from those areas, though this is very open to doubt. This species has an eclipse moult and during such and in the immature to adult phase is subject to capture by dogs in the swamps to which it retires at such time.

In passing as regards dogs and their possible influence on such birds as Anas and Porphyrio and rails it is worth mentioning that though there are no pigs on Uvea to hunt every native has a tribe of dogs. The Uvean native is credited by other natives with eating dogs and this is probably true though 'man Uvea' hotly denies such accusation. Such is quite understandable on an island like Uvea where pigs and even domestic



animals are rare and the people live so largely on fish that a meat hunger exists and is satisfied in this way. Circumstantial evidence certainly points to such being the case as all have tribes of dogs and careful inquiry to avoid arousing suspicion as to the real reason on the questions pointed to each man's number of dogs remaining more or less the same in numbers. As these have to be fed occasionally if not regularly and they are not as a race fond of animals, in fact are very cruel to them like most natives, I cannot imagine the dogs being kept for no useful purpose on an island like this where food is scarce at many times of the year beside being difficult to produce and most of the main crop, taru, unsuited for storage like yams. It is noticeable also that the dogs are in better condition than is usually the case with native owned dogs. Also rice along with fish is commonly fed to them and this rice must be paid for by themselves and probably by the dog later in another way.

These dogs often without their masters join in packs and hunt in the swamps and doubtless kill numbers of rails, though for the energy and time wasted by the dogs in this pursuit the number is exceeding small. Odd natives are said to have well trained bird catching dogs which do not maul the birds but trap them in their paws. This is mostly legend as I tried the owners and their reputedly good dogs but not a single successful capture was made though a few badly mauled flightless young were caught. Probably in time past good dogs did exist but the forty pounds of dog made more appeal to the owners than a half a pound of poultry, and the bird in the hand seemed a better proposition all round. I did see several instances of ducks being caught thus and one of Porphyrion and doubtless numbers of unrecorded instances occur. It



is noticeable that Accipiter is attracted by a dog pack and their yelping and if the dogs are unaccompanied by humans will perch on a coconut near the swamp and watch. I never actually saw one attack or strike but usually they depart on the first sign of humans appear but they are exceedingly vigilant and wary. They possibly gather, to strike unexpectedly at the rails occupied with dodging the dogs but in observer's opinion it is not the rails that are the quarry. Bold and excitable birds such as Lichmera and Zosterops nearly always gather in excited mobs to swear at the dogs from a safe distance and it is these which Accipiter hopes to surprise while their attention is concentrated on the dogs. I once saw Falco at a great height watching a hunt but this I think was accidental, the bird having merely noticed the harried quarry moving from cover ahead of the dogs and this was probably a duck or its young as one later broke cover but Falco broke out of its swoop on sighting humans though I noted it kept high but in the direction the duck took and quickly forced the duck down to cover again. I was rather surprised at this instance as it was I believe the first time I noticed Falco shy off humans. Generally speaking they are very bold and will take game from the near presence of humans with great boldness. Possibly the barking of the dogs unnerved it in this instance.

Severe hurricanes when they come, which generally is at wide, eight to ten year intervals doubtless cause a high mortality in birds especially in certain species (see NYMPHICUS Ibid) but these are at such wide intervals that probably little effect is made on the majority of the species if considered over a period of years. Under natural conditions and ample food and few unusual or outside interference or influences to contend with, the



surviving population quickly reestablishes the old full status of the species.

Taken all round Uvea bird life may safely be considered in a very sound position as regards the status of all the species except the few especially noted in these notes previously (i.e., pigeons, and those are sound in 1 species, Porphyrio and possibly Tyto though I think it is really sound though unseen by me.) Even Nymphicus which was said to have become extinct (??) is in a very sound position and though below what it may once have been is far from extinct and is definitely increasing. My opinion is that actually the status over the whole island is above normal and actually the island is so at this time, and has previously carried considerably more bird life than its infertility warrants especially in the face of the heavy attacks cultivation is making on the natural habitat of many of the species. A definite colonial expansion is shown in the population and repopulation of the islands of the coral chain to the west, often though these appear more or less unsuitable habitat. It is noticeable that the especially large number species (Pachyaphala, Mzomela Lichmera Gerygone, Zosterops) are the greatest colonisers and wide spread and reach the furthest along these chains. Myiagra which is still not as plentiful on the mainland as the other species is less so though not very far behind. Pigeons are more or less absent and probably only go there from the mainland in search of food during non nesting seasons. (Natives say they are not always present and do not stay long). Aplonis which is on a par with Myiagra possibly visits the area only, and as nesting sites are not available it probably does not remain. These islands of the western chain are most of them subject to almost complete vegetation denudation and many of them to complete submergence at time of



hurricanes or when heavy N.W. swells or seas and the salt spray completely kills off all the leaves and vegetation which do not recover for many months. At such times certain species of birds most suffer almost if not 100 per cent mortality. The last serious hurricane or rather sea from a hurricane further north to completely destroy all green vegetation etc. of these islands in the N.W. was in 1936 (Jan.) and normality was not reestablished till 1937. During my stay there (May '38) most species were established and reasonably plentiful possibly as plentiful as food supplies warranted. In fact considering the comparative scarcity of bird life in the eastern ti tree strip on the mainland one would consider these islands in the west carried a population above capacity. Water borne seed trees and so on and coconuts which are almost entirely absent in the ti tree strip of the east are probably responsible for the denser bird life of these islands. It is very noticeable on these islands that Zosterops, which does not visit coconuts on the mainland to any great extent to feed, spends much of its time of the islands closely searching the hessian like fibres of the coconut plam heads. Under this fibre countless insects find shelter and doubtless Zosterops and Lichmera and Pachycephala also, all of which I have seen feeding thus, have long since discovered this fact. Also the eastern mainland coastal strip is subject to salt burning at all seasons of the year and much more frequently, whereas these northwest islands are only subject to such during the hurricane season and that at wider intervals and are more or less protected during the nine months of the prevailing wind (S.E. and N.E. and E). Such N and N W to S W winds as do occur during this season are generally of short duration and the former very light. Hurricane winds or



seas, the latter the more frequent offenders, are of course a different matter. Easterly and a point north of that being the usual gal quarter in the Loyalties and are frequent in occurrence and kick up big seas. Hurricanes vary in direction and severity. Big seas produced by hurricanes elsewhere are mostly N E or northerly swinging but decreasing through N W to W and south.

The Uvea atoll appears to me to have been populated by its birds at a comparatively recent period compared to the rest of the Loyalties. Possibly its vegetation is more recent and the general age of the island much less than the more easterly Islands of the group. I believe species are still just arriving and establishing (Rhipidura) themselves on Uvea, Aplonis is probably more or less recent arrival. Myiagra an arrival slightly before that.

Aplonis with its large breeding (generally 2 families of 4 in a year) should be considerably more numerous than it is, considering the ample supply of nesting sites and food in the form of small banyan figs and fruit (pawpaw etc.) and its habit of living on snails of which there are ample supplies.

As I have no means at hand of comparing material from other adjacent areas with Uvea specimens I have no means to telling from whence the different species are likely to have come to Uvea. Though I have small grounds for saying so I have an idea the bulk of Uvean birds did not come originally from the New Caledonian mainland as this seems to be against prevailing hurrican winds and few if any hurricanes would carry birds in that direction the tendency being I should imagin in the other direction from Uvea to N.C. It is possible it was populated from Lifu, or from the N.H. either direct or via Lifu the latter seemingly the most likely.



Australia may be contributed but if so probably via New Caledonia. The most likely case is that different areas have all contributed and probably Caledonian species are more numerous than others. Any treatment of the subject of bird distribution by hurricanes would necessarily be a great deal of surmise as so many factors would have to be taken into consideration which could so easily alter the completion of the whole subject. (The greatest factor is of course the irregular behaviour of such storms themselves that being the only really regular thing about them).

Actually the distance between land masses either from the east (Lifu) or south (N.C.) is not too great for direct flight migration to have taken place. This is especially true as regards coming from Lifu, especially as birds would be flying down wind on a calm or normal day of prevailing wind of steady direction. Also they are close enough for this to be more or less true for an average hurricane which in such a distance would hardly be likely to curve enough to affect the general more or less straight course between the islands and thus deflect birds to mill the island altogether. The same might be said to be true as regards the S E corner of the New Caledonia mainland as from there the wind curve of a circular storm would tend towards the Loyalties. It is probable the Loyalties have received birds from both north (the N.H.) and south (N.C.) but until comparisons of specimens can be made the amount each has contributed cannot be gauged. Though I have no definite grounds for saying so I believe the actual case is that most species or close species common to all 3 areas have come with hurricanes from the New Hebrides to New Caledonia, and developed their individual characteristics in their new localities. Some species of course having



spread the other way (Philemon) though there may be doubts of that species but others might possibly be quoted) possibly first from Australia, but the greater number are from north to south I believe.

There is little of great note to be said as regards bird life generally on Uvea, (though one or two individual species are worth of note individually) beyond saying that generally speaking the bird life on the island appears at the present time to be in a flourishing and healthy condition and a great contrast to the position on Mare and seems to show a very good chance of survival and even improvement in spite of considerable habitat encroachment and that position should not alter very much for some considerable time or at least till human population greatly increases, such should not be the case for some time to come as humans do not appear in as healthy condition as the birds (introduced diseases being rife amongst them particularly T.B. and venereal according to mission report).

No introductions of birds have been attempted of Uvea. There is no coconut pest and that crop is the only one of consequence in the island.

One exportation of about fifty Nymphicus to Lifu was attempted but all disappeared on that island. These probably returned to Uvea. (For further see zone notes on this species)

SEE MAP IN ZONE AREA (leaf 60) FOR SMALL SCALE SURVEY SHOWING TYPICAL AREA OF ISLAND MENTIONED IN THESE NOTES AS REGARDS DIVISION AND IRREGULARITY OF HABITAT

#### ZONES OF BIRD LIFE

There are no true zones of bird life on Uvea and even individual species do not confine themselves to any definite



single habitat except one rail which confines itself strictly to swamps. Two other species Nymphicus and Lichmera confine themselves to two only or a special type of habitat or close about such specialized habitat. Almost all other species show a tendency to range into unusual or unnatural habitat. This tendency has probably been increased for two reasons, a colonial or expansion or forcing out influence because of large population, and the unusual form cultivation takes over much of the island. This tendency will be dealt with before dealing with the three above mentioned species and a glance at the map on the following page may help to a clearer picture of the conditions. This map was made from an actual rough prismatic and chain survey made of an area inland from the main north south lagoon side road (motor road) at a point a little north of a half way point between Iahnimiha and Wardilla in the south center of the island and is roughly accurate and to scale. This area was chosen because here abouts the swamp had petered out, the coconut area was narrower, garden land was reasonably good and better than the rest of the island, short forest and tall forest could all be got into an a cross section survey of reasonable scale to show all types of above mentioned area in reasonable and nearly equal proportion. Also this was the best area for Nymphicus (and a further map deals with this) and owing to its shape and general layout afforded better chances of checking observations by myself and others. Almost all species were found in the area. Owing to irregular observation from weather, distance from camp and so on the records were not as complete as one would wish but are fairly reliable and constant. The sub maps give more details and dates. It is observable birds venture further into foreign habitat early



and late than at times nearer midday. This rule seems very general. Only species which are inclined to be birds of territory and habitat have been noted carefull which ranges from one small area such as Aplonis, Ptilinopus, Zosterops have been ignored as these cover all types of area more or less in varying degrees. For practical purposes Pachycephala, Nymphicus, Myomela, Gerygone will be dealt with. Myiagra was done but was too indeterminate.

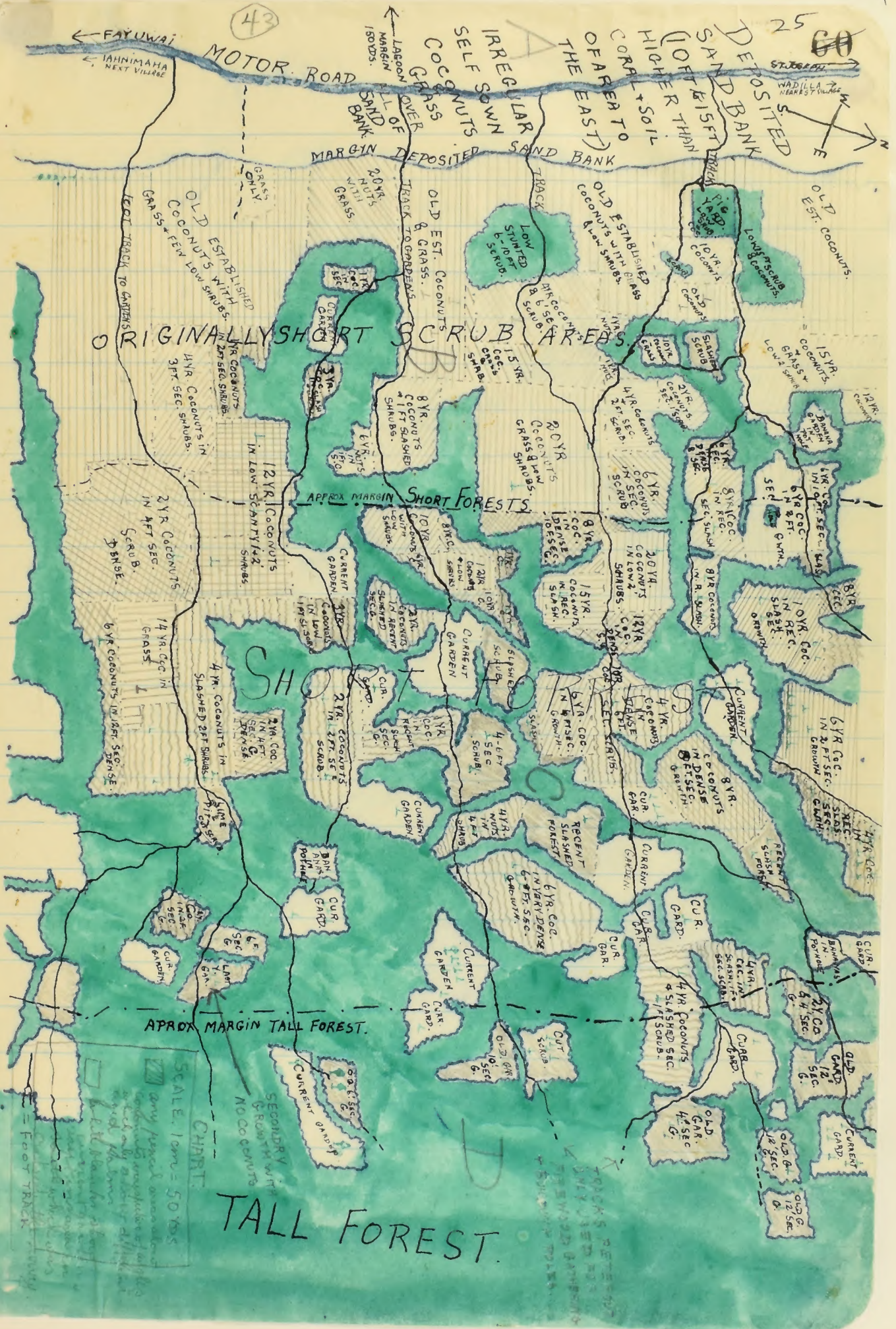
On Uvea the following are birds to territory strictly.  
GERYGONE, LICHMERA, MYZOMELA. These inhabit definite limited areas and resent intrusion by other birds especially those of their own species.

More or less strict but range slightly wider irregularly.  
NYMPHICUS, MYIAGRA, PORZAMA tabuensis, CHALCOPHAPS with a wider territory boundary but can be always found within certain bounds and has favorite spots within its boundary.

More or less birds to territory and to be found generally in a special territory though they range wider at certain seasons.  
HYPOTAENIDA, PORPHYRIO, PACHYCEPHALA? These three really belong to the above category but at one season ranges fairly widely though at others have definite limited area and that not large.  
PORZANA cinerea ranges wide except at nesting.

Wide rangers COLUMBA, CACOMANTIS, COLLOCALIA two spec.,  
HIRUNDO, HALCYON, LALAGE, APLONIS, ZOSTEROPS lat varies at nesting is limited, ANAS, ACCIPITER, CHALCITES, TYTO (?) CIRCUS, FALCO,  
PTILINOPUS, TRICHOGLOSSUS (?) DUCULA? accidental casual visitor.







MAP EXPLANATION of map on preceding page.

As will be seen this map shows three main large divisions and portion of a fourth (the lagoon side sea deposited sandbank).

Briefly these divisions are from left to right.

A.--Sandbank sharply defined margins, the vegetation except immediately along the seashore (outside map) is probably 50 or more years of age. Between the palms except for a very rare patch and a few isolated scattered shrubs which grow to two or three feet only, is purely grassland growing rather rank and tangled with log ground vines etc. never more than 6" or 8" high. Coconuts are not in rows, but very irregularly scattered.

B.--A low stunted scrub not growing above 15 feet in height, rather dense and tangled but varies somewhat in density. Its average height would be 10 feet. Here and there in it taller 20 and 25 foot teak trees appear, but are rare. This area is mostly under coconut palms of varying ages, as shown on map, and planted in regular lines.

C.--Short forests These average 25 feet in height and have a much greater number of teak, banyan and other trees rising slightly higher. The lower types of trees are more polelike in growth and there is considerable underbrush of low shrubs etc. with a very prolific growth of vines and creepers. This also has gardens and generally speaking younger areas of coconuts generally with a secondary scrub which, though fairly dense, is young and sappy soft woods etc. which natives slash down at irregular times to let the coconuts have a chance. Generally speaking, coconuts do not come into bearing till 10 or 12 years old and very short growing, but are planted in regular rows 25-30 feet apart.

D.--Tall forests The forests are on, generally speaking, more fertile soil a foot or two more above seal level than the short forest, and appear considerably older. Soil is generally less rocky, though dykes are very frequent and irregular. The large trees run up to 60 feet in height, teak and other various underbrush except for ferns in stone dykes, in areas is much scantier, many ropes and vines run up into the canopy above, but generally speaking longer distances may be seen between the tree boles. A secondary forest of 15 to 20 foot trees grow under taller trees in much of these areas.



= all vegetation other than grass, coconuts, or secondary growth of ex-garden areas or coconut cultivation areas. Principally natural growth areas.

= all lines thus on areas show that coconuts have been planted in this area irrespective of angle of lines which are only put in to show what different ages nuts are planted. Age and what the nuts are in is shown in each case by black ink.

1 YR. = 1 year and so on /coc., co., c. = coconuts/  
sec.G and so on = secondary growth and height in feet of such growth and often density by density, etc.

slash = mean the secondary growth has been recently slashed and is lying dry on ground, this is often shown by pencil shading also.

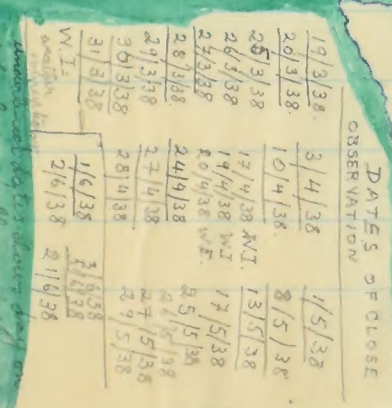
= current years gardens under yams, manioc etc. (except in extreme south where areas appeared outside the area of survey were not carefully recorded).

= native foot tracks to garden area these peter out very quickly in the forest and beyond the gardens are only used for getting a bundle of daily firwood before women return home or for getting poles for house building.

= dead standing teak trees left in cultivations.

= green standing teak trees left in cultivation.















SUMMARY OF MAPS Observer obtained an impression on the island that the whole of the birdlife which was reasonably numerous showed a tidal or movement like a breathing body. On trying to see whether any especial insects or fruit food or flowering was responsible nothing conclusive could be seen and such foods appeared to be influenced similarly in all areas. Nor could weather conditions be taken as a guide, except in one species, (Nymphicus) which showed a tendency to retire to deep forest in unsettled weather, but even this was not invariable or regular. Nor did an attempt to throw light on the subject by keeping records of a flower insect, insect, insect mollusc, and fruit feeder and purely insect (flight) feeder (Myiagra) reveal any further facts.

My first impression was that at certain times all responded to this outwards movement at the same time, but this did not prove regular though at certain times all did move but at others only one species or two showed movement.

INDIVIDUAL MAP NOTES PACHYCEPHALA Generally speaking ♂ ad. showed in unusual habitat and numbered 10 to 1 and more of ♀ or imm. but ♀ increased greatly in numbers in the margins of the forest lands. Though no decrease was noticeable in areas far in in forest, no apparent alteration or increase was noticeable in such areas, the population appearing more or less stationary. An idea that a semi-nomadic population frequented the more or less marginal areas showed neither a positive or negative conclusion from observations made elsewhere. The only real conclusion was that other areas also showed this movement and generally more or less about the same times. It is just possible a number of birds of territory having been dispossessed by encroaching cultivation have an urge to return to their territory and make a more or less



floating or semi-nomadic population along these marginal areas and these along with strak o' make up these tidal movements of the species. Females being shy or more retiring remain in the margins of the more natural habitat. (It was definitely noticeable that femals were often present in the strips of semi-natural habitat left at times when males were in the unnatural areas). If such were the case it would seem to be an indication that the species is fairly long lived.

NYMPHICUS This species shows a definite preference for a certain type of habitat and seldom ventures beyond it. It shows a definite daily early and late outwards movement for no known reason as actually the tall dense forest where in it spends the bulk of its time is where its main foods are most plentiful. I came to the conclusion that this early and late movement was because the bird had a liking for paw paw seeds and fruit at certain times and it was at such times that this shy species visited cleared areas as it is then that the fewest humans are about in their gardens. Young birds definitely show a liking for paw paw but older birds seem only to do so at certain times. This made me wonder whether perhaps this species uses paw paw seeds as a tonic or digestive or possibly they supply some food or property connected with breeding. A similar thing is seen in most other fruit eaters and insect fruit eaters in their feeding on chili peppers at certain seasons. Though I never found chili peppers in the stomach of Nymphicus shot, the bird oes eat them also and I think it is for these mostly that the adult birds visit the cultivation areas. This seemed to be borne out by observations of the distribution of chili peppers and the frequency with which birds were observed in certain areas. The paw paw control also



appeared to influence the bird to a very much less extent in adults and a large extent in young. The above was true in all areas in which I observed the bird.

MYZOMELA This species shows a definite outwards and backwards movement. Food may play some part though very little beyond the fact that for short periods forest may lack nectar flowers, whereas coconuts are always in flower. This species is harried very much by Lichmera and generally driven away from coconuts and confined to well in forest and scrub areas. In such areas it stands up for itself and will attack Lichmera which in such appears the more cowardly species. I have no doubt Myzomela would inhabit coconut lands to a much larger extent if it were allowed to. Its population in forests is very large and dense, possibly it being one of the most numerous species on the island, if not the most numerous. Adult males show the out thrusting tendency most, females and immatures very little. No reason for these wavelike movements were apparent to observer. Like Pachycephala forest margins showed a great increase of numbers at times when birds extended beyond their normal habitat but forests deeper in seemed to remain exactly the same as regards numbers, though at such times birds seemed to be less strict territorily. One could not as usual visit a small area of say 30 yards square and be sure of seeing a bird seen before always in that small area. Disarrangement appeared to last for only a few days, then normality was restored and writer believes individual birds resumed their exact small territory again. This conclusion was arrived at from the results of shooting and keeping observation counts of birds in small specialized areas.

GERYGONE This species also showed this out thrust movement to a marked degree, but at wider intervals than other species.



Also this species inhabits more or less all types of country except current garden cultivation and old coconut cultivations where only grass or few widely scattered low shrubs only are found. When it does appear in such unusual areas its presence is quickly noticeable and it is very noticeable that at such times as it appears in such unusual habitat it is to be found in all other areas also in unusual habitat. Another noticeable thing is that at such times when it is present in unsuitable habitat its behaviour is unusual. In forest to a small degree, in scrubs more so and in unusual areas to a large or complete degree. The birds appear in unusual habitat to have little or no interest in normal ways of searching for food, but behaves in an excited and agitated way, being very restless and flying in short quick dashes here and there, calls much--not its warbling song but a low excited "chip chip". Here and there it pauses to feed but never for long and quickly returns to its restless behaviour. Early and late in the day it appears calmer. When first this behaviour was noticed observer noted birds were hunting singly and having observed that the species generally hunted in pairs or small parties up to six, I thought the bird had only become separated from its mate or party. But closer observation showed it was general in a greater or less degree to the whole species at such times and could not possibly mean that separation alone was responsible. Definitely food could not be responsible for the out thrust in this species, as in normal or forest habitat feed is shown to be plentiful, because it is in such areas that more nearly normal feeding and habits are maintained.

It is noticeable that in areas of densest numbers the out thrust is most prevalent if unusual habitat is present. Generally speaking this species has a regular distribution throughout



tall forest lands. A pair every 50 to 100 yards, in short forest the population is much denser and more irregular and does not appear to be so strict in territory; or rather, territories overlap to a great degree. Lower scrubs carry a scattered, scantier population generally very regular in their territory and in margins of even lower scrubs, old coconuts etc. the population is even more scanty, though wider in area shows definite boundaries to its territory or area which it usually inhabits. In real forest at times of excitement a slight tendency to gathering in small parties is shown, in low forest this is even more apparent and mobs of up to a dozen or more become common except in gardens occurring on such areas, where visitors are generally single or rarely 2 together but in the margins about the gardens numbers increase enormously and much excitement, fluttering and excited calling is noticeable. In other scarcely populated areas birds appear to become more widely scattered and seldom are two seen together even in small patches of scrub where for days past one has observed a pair feeding together within the territory and close about one spot always, and resenting intrusion of other birds in the territory they have established as their own. After normality is restored birds apparently settle down to the old routine and the same pair return to their territory and remain there till the next period of excitement, in a month or so, occurs.

Observer by shooting and observation tried to establish the fact that identical pairs returned to identical areas and though without ringing this could not be definitely proved in every test, both in controls at time of normality and in times of excitement, the evidence seemed to definitely point to such being the case individual birds I believe do return to individual areas and resume normal relations.



Observer could see no reasons such as mating or selection of mates going on, or driving away of last year's young and so on to account for the periodical movements. In fact no reason for the movements could be arrived at and the only conclusion was that such periodical movements were fairly regular and arose from some unknown cause.

#### SUMMARY OF TIDE LIKE MOVEMENTS OF BIRDS

Beyond establishing the fact that tide like movements of birds did take place on Uvea at regular and irregular intervals in many species present on the island, the shortness of my stay prevented me going more deeply into the causes of this movement, and no real proofs were obtained, but observers believe the causes are probably due to two factors.

1. Overpopulation of bird life on the island (and encroachment of natural habitat by cultivation to a limited extent). This seemed to be pointed to by the fact that the commonest species showed the movement most clearly. This has caused a tendency for strictly regular habitat species to try and adapt themselves to unusual habitat and possibly partially succeeding. Uvea being a rather infertile island shows a definite lack in most fruit eating species, a good supply of fruit and insect eaters, and a good supply of flower, nectar-insect eaters and a fair percentage of purely insectivorous birds. The latter probably having arrived at a later date than the other. Pachycephala being a mollusc eater and also possibly the earliest arrival has increased even more rapidly, Myiagra possibly arrived somewhat later and is not yet as well established as the other species (Pacy. and Gerygone). Rhipidura has only just arrived and is not yet established and still exceedingly rare. Aplonis a fruit-snail and insect eater has progressed better than the purely fruit eating pigeons.



2. An as yet unbalanced bird status on the island and, possibly because of comparatively recent arrival, a still strong population increase tendency to fill the available food supplies, which has lately reached a full but unbalanced "between species ration." This is showing a throwing off or balancing tendency by causing a new colonial or spreading tendency along the island chain to the westward of the mainland, an unconscious colonising tendency. This tendency has been encouraged by the form of cultivation in many parts of the island helping the birds to slowly adopt unnatural habitats by causing expansion into them for short periods, because of their irregularity and strip form more or less encouraging birds along narrow lines of natural or semi natural habitat in irregular directions, and later when the urge to return to natural habitat is strong, birds probably make a straight direction for their normal area or small territory of habitation. Thus crossing unnatural habitats and feeding en route they become more or less used to feeding in such unnatural areas. I believe definitely lack of food does not cause the outward movement, but some kind of inner or outside unknown impulse induces them to wander wider.

UNCOLLECTED RAIL In the taru swamps of Uvea a small black rail is present, called by the local natives OIH-NEI-DU, which I can only place as PORZANA tabuensis. It is exceedingly shy and though not rare in the limited area of these swamps is most difficult to collect and only very fleeting glimpses are ever obtained of it. It is just possible it is a new species or subspecies as it does not appear from descriptions to tally very closely with P. tabuensis though actually native descriptions of it are unreliable as they seldom catch more than a glimpse of it and to many it is



unknown except by heresay. Only one or two remarked on its very red eye and none remarked on the rusty plumage of the back. From glimpses I caught of it myself, I believe it is P. tabuensis or closely allied but it appears to me to be darker, smaller, and shorter in the body than that bird. It favours the parts of the swamp which are in fallow, i.e., a dense 2-3 ft. growth of tussocky swamp grass with a cutting edged leaf (sword grass).

I made very strenuous attempts to collect it and failed with dogs, snares and lines of native beaters, and beaters and dogs. Lanes were cut in swamps in places but the birds refused to cross even long after the lanes had been cut and birds had become used to them. Being very small birds they could easily hid in tussocks (a habit of P. tabuensis especially in event of fire) and be passed over. Had I had good dogs I would probably have been successful but the local dogs were useless mad headed brutes and by rushing ahead likely as not turned birds back past beaters. Had I been allowed to use fire in the swamp over a small safe area I might have been successful but the local natives would not agree to this even with twenty yards fire breaks out. They contended that this surface growth represented many tons of valuable rubbish for rotting in their cultivations elsewhere and if burnt would necessitate their carrying other material long distances and that meant too much WORK.

The bird was often heard calling early and very late (almost dark) a thin weak little call and could be called closer and to within a few feet of the observer but never left the densest cover and was never actually seen at such times. I never once saw one fly or in an open place of any sort, the bird evidently preferring to keep some vegetation between it and the sky.



Rare glimpses of it were caught against the bases of turrocks in patchy spots and by lying down amongst tussocks with a very limited range close about some occasional glimpses of the bird were obtained. It has exceedingly sharp eyesight and at the least movement it simple vanishes.

I placed a big price on the bird if any native would bring me one and for many days packs of school children and dogs hunted the swamps unsuccessfully. Many young Hypotaenidia (black fluff ball stage) were brought me as OIH-NEI-DU and called such by many children and natives, but older natives were emphatic that they were not tru OIH-NEI-DU. The older men admitted that only latterly the name was being often used wrongly for the young of Hypotaenidia, and a local missionary verified this for me. The same missionary years ago saw one and remembered the very red eye but was sure the back was not rufous tinged. As well as he could remember "the whole bird was more of a blue black with pale pink legs, rather short legs and a short bill, and a very very red eye." (his own words)

Hence I place the bird as P. tabuensis or a very close relative. In view of the fact that I definitely know P. tabuensis is present on Mare Island and Lifu it is more than likely it is the same on Uvea, but make the observation that the Uvea bird might be a variant, because of descriptive differences and mainly because of very different habits to those known by me elsewhere for this species.



ZONES OF BIRDLIFE  
SPECIAL INDIV. BIRD SPECIES

Lichmera: Notes made on this exceeding common species.

This species is very common and plentiful anywhere on the island where coconuts are and except in mangrove swamps is never found far from coconuts. I found nowhere in forest lands did the bird penetrate more than 150 yds. and generally it was a rare visitor as much as 50 yds. in, only a very few getting much beyond that distance. Up to 50 yds in is fairly plentiful, especially ♀ and imm. which greatly outnumber ♂ in this areas. ♂ outnumber ♀ in coconut areas by about 20 to 1 but in forest and scrub margins ♀ outnumber ♂ considerably. The exact ratio is rather hard to judge because of immatures but I believe is about 4 to 1 approximately. ♀ are definitely very much more plentiful than on Mare Is. and the over all ratio of ♂ to ♀ would probably be about 10 or a little more to one ♀. The greatest numbers of ♀ are found in the first few coconuts or lines of coconuts near scrub and for 10 or 15 and decreasing up to 25 yds. into forest or low scrubs. Almost invariably if a female is found well out amongst coconuts, low brush or shrubs or a single large dark foliaged tree will be found within 25 or 50 yards at the most. At times when in forest I thought I had found Lichmera well in and far from coconuts but invariably found a small isolated patch of coconuts on going a little further, sometimes no more than half a dozen palms with perhaps only 2 or 3 Lichmera inhabitants or larger numbers of palms and Lichmeras. In such small patches ♀ almost invariably outnumber ♂.

An interesting fact is that though Lichmera is almost a purely coconut living and feeding bird, probably 90 per cent



of its time being spent in and about palms (10 per cent in bushes and shrubs growing between palms and near trees) it does not roost for the night in palms. At dusk one may observe birds in purely coconut and grass areas making all hast for the nearest large dense tree or patch of tall scrub, often at considerable distances. It is an early and late caller and leaves in the first grey dawn for areas again well within purely coconut cultivation. I made many efforts to find birds in palms at night even in low dense coconuts a few years old but all showed negative results. The only reasons I could see for this was that palms did not offer sufficient cover from natural enemies, owls and snakes to a small degree. By the excited behaviour of this bird when they see a rat I believe these also possibly are natural enemies, certainly to eggs and young but possibly also to adults at night. Rats frequent the palm tops at night, not to feed on green nuts as do ships' rats, but to feed on flowers and very young nuts and obtain water in some dry areas. Merely their presence would be frightening to birds.

Movement:- It is noticeable that this species also shows a tidelike movement in the other direction (i.e., from coconuts into forest) but to a very sharp boundary line only a short distance within forest areas, but within such areas numbers increase enormously for a day or two. These waves did not coincide with waves of other birds, though occasionally they did so. They definitely did not coincide with Myzomelas outwards movements in a single instance.

When returning across the lagoon from one of the out-lying islands on the western reef on which we had to land and shelter from bad weather, in a small 15 ft. sailing dinghy, I saw an example of the exploring and inquisitive and spreading



propensities of this species. When 2 miles across wind and 3 miles to leeward and 15 miles from the mainland (up wind) from the nearest land and that only 2 small islands at the distances stated, a Lichmera came flying strongly across wind (nearest land 2 miles) circled the boat, and returned across wind towards the land 2 miles away. It circled the boat and did not appear distressed or tired and returned landwards flying strongly at about 15 feet above the sea, and to as great a distance as it was visible was flying strongly and losing no altitude. The sea was fairly calm 3 or 4 foot waves, with a moderate S.E. wind (scale no. 4) weather sunny and showerly, but generally fairly fine, visibility fair to good. In the direction which the bird was traveling when it approached the boat the nearest land would have been a small island 8 to 10 miles further on than the boat, and from the deck of the boat it was still below the horizon though it may have been visible to a bird at 15 feet. I believe it was the sail which attracted the bird, it possibly mistaking it for a tree or vegetation. The bird easily overtook the boat which was making 4-1/2 to 5 knots on the starboard tack at the time though gaining very little to windward.

NYMPHICUS:- This species is far from extinct and the status of the species has improved greatly over the past few years. Before the last big hurricane during 1932-3 hot season (and a less severe one a year later) (N.B.: (Whites say 1932-3 natives 1933-4 but no one locally had a diary record, natives are probably correct) the bird was very plentiful and must have been exceedingly so for poor observers and bushmen like the Uvean natives are to say such was the case. At those times the birds suffered somewhat from persecution as live bird fanciers in Moumea took large numbers of them for local captivity, (they were and still are a favorite cage



bird with local French because able to talk) and for re-export overseas. There actually was and still is a law prohibiting the live export of the bird from Uvea but this was not enforced and at the present date even the local resident (resident gendarme) does not know there is such a law in existence and even government officials in Noumea knew nothing of such a law. On my arrival and request for special permits to shoot a series, officials were amazed on looking up the ordinances to find such a law had been enacted. In the face of the known numbers in captivity in Noumea, some even in the aviaries of prominent officials, authority quickly re-interred the knowledge and to the best of my knowledge nothing further has been done about the law. During my stay on Uvea I knew of 5 young live birds going to Noumea but I know positively these are the first which have left the island since the big hurricane early in the 1930's. I knew of 4 specimens in captivity on Uvea, all having been in captivity all having been long in captivity, and during my year in the Loyalties 4 of these died. Before the big hurricane natives on Uvea were paid 5 and 10 francs and up to 25 francs for each bird which survived a week after arrival in Noumea. The franc was then worth about 4 cents, American). I was told on first arriving in Noumea that prices then offering to natives for a single bird alive ranged from 150 francs to 250 francs and even more (franc worth about between 10 and 12 cents American) but birds were absolutely unobtainable. I was advised that it was probable I wouldn't find the bird, as all Uvean natives declared it was extinct. On arrival in Uvea, passing through that island enroute to Mare, inquiries from white residents and natives seemed to bear this out. On arrival 4 months later to work on the island



I quickly got in touch with natives who admitted its existence in certain areas, but all said it was extremely rare and doubted I could get one, and certainly not a series. On my first real day's shooting I saw one and actually because of close range used a 32 caliber cartridge on it, but failed to kill the bird. It was certainly a good augury for the status of the species and later investigations bore it out fully. Unfortunately my work on the island has reawakened the natives to its increasing numbers and it may suffer some persecution from now on. A factor in its favour is that it is not easily collected and, numbers being not as plentiful as before the cyclone, natives may get discouraged after 1 or 2 attempts proving fruitless. Also a further factor in its favour is that in the area where it is most plentiful the natives have now more money than heretofore, as further areas of coconuts have come into bearing, and their money needs are better supplied. In the northern area there is still considerable poverty, amongst the catholic natives principally, because of lack of coconuts and other causes and doubtless these natives will persecute the species somewhat in their own area. Actually the five specimens sent off Uvea during my stay there all came from that district. Fortunately I was able to get an oar in in both cases of birds (young birds) for sale (3 in one case and 2 in another) and persuade local whites to pay no more than 10 francs (40 cents American) for them. This naturally suited whites as profits were larger for them and both missed seeing my object which was to discourage native catchers by the low figure and as both were native lads of 14 years or so of age neither voiced any protest but doubtless on returning home would air disappointed feelings in their villages sufficient to



discourage others from attempted captures. Unfortunately the method they use to capture them is very wasteful of life unless snares are watched carefully. They merely set a noose in the entrance of an already holed ripe paw paw (papaya) and young birds on thrusting the head into the ripe fruit become snared, generally flutter and hang at the noose and quickly choke. To avoid this natives generally drive a number of short sticks at right angles into the soft trunk of the paw paw (main stem) immediately below the fruit for the bird to settle on to commence feeding and others at lower levels. Even so this is of little value as to prevent birds escaping they are placed at more or less extreme levels and by becoming entangled with the coconut string or vine snare, shorten this and cause choking even more quickly as often as not. A few natives use a leg snare I believe that they have learnt from Lifu, but they seem to think it not as successful in making captures, as the neck noose. The birds are exceedingly shy and very frightened of humans and are very wide awake and avoid humans as much as possible. They have evidently suffered much persecution from them and look on them as great if not their greatest enemies. As far as I could find out from old natives and whites of long residence (and half castes) on the island the bird has never suffered from persecution for its feathers alone, for dancing purposes etc. and only to a very small and limited extent for food purposes, and then only when it was exceedingly common. By all accounts, it suffered little or no persecution from natives themselves in early times. The persecution which it has suffered has been almost 100 per cent due to European bird fanciers resident in New Caledonia mostly and who supply to others overseas. At their instigation natives have attacked



the species and persecuted it and been a considerable factor in its decrease. Even so the decrease they caused might not have assumed a serious menace to the status of the species but the heavy persecution followed by the great mortality from natural sources, hurricanes mostly, was too much for the race and placed it almost on the border line of complete extinction. Natural causes have always been present and the species managed to not only exist in fair numbers but thrive and rapidly increase between seasons of heavy mortality. Thus, in spite of local Uvean and New Caledonia opinion that other causes are to blame, there can be no doubt the major cause and the root of the danger to the species lies entirely at the door of the live bird fanciers. These are loudest in excuses and reasons for the bad position of the species saying that the few birds they got made little or no difference and either ignored or were ignorant of the fact that very live bird they received probably represented one live one only in 8 or 9 captures and even greater numbers and mortality when young were collected in the nest as natives are careless and bad animal or bird attendants and rearers. From what I could gather, the first reason given was that natives persecuted the bird for feathers for dancing masks etc. This was, I believe, entirely a fabrication or shield for their own guilt. Numerous other reasons were added, snakes and rats attacking nests being 2 of the favourites. Even before the cyclone in the early thirties numbers had been greatly decreased and the difficulty of capture was keeping supplies far below the Noumean demand. The advent of the cyclone, which undoubtedly did sadly diminish numbers was hailed as a godsend and now is given 100 per cent of the blame for the



decrease of the species. Actually I do not believe the hurricane decreased the numbers on the island below one to two hundred, if as low as that, but such low numbers undoubtedly made capture by natives such a difficult task that they considered the attendant effort too much for the resultant reward. This has caused the idea prevalent in Noumea that the bird was extinct and efforts to get specimens had ceased and this has allowed the bird to build up its numbers again in six years or so to its present status on the island. A brief but close summary of which along with habits and behaviour is given in the following pages.



SKETCH MAP OF UVEA IS. SHOWING HABITAT AND DENSITY  
OF POPULATION OF NYMPHICUS CORNUTUS UVEAENSIS

From notes made between Feb. 8th and June 24th, 1938 status and distribution of Nymphicus on Uvea Is., Loyalty Is., W. Pacific (sub-species confined to the area shown)

Approx. Estimate: Reasonably accurate but subject to some + or - of 10-15% error

Natural habitat entirely suitable for the species and inhabited at present date by the species. (Numbers given are approx. and include the birds of surrounding areas of shorter forest.) These areas may be considered as areas of dense population for the species and are areas not likely to be great encroached on or diminished to any great extent for many years to come under present conditions on the island. Only exceptional unforeseen or unusual happenings are likely to alienate any extent of the area to the birds or decrease their numbers providing adequate protection from live bird fancier and native catcher persecution is granted to the species.

Areas of shorter forest at present inhabited by small numbers of the species (sparse bird population) but capable of carrying a very much larger population as numbers increase. This area is at present much visited by birds from more densely populated tall forest areas and carry a fair number of permanent birds which nest in the area. This area is subject to gradual diminution by increase of cultivation but only to a small extent unless the native population makes a very large and sudden increase; a more or less static position or saturation point having already been reached as regards cultivation and native ratio with the present population.

Areas which are at present under cultivation but are still being visited by the species (heavy shading much, light shading, occasionally) but which will in time become entirely alienated to the species probably, unless it can adapt itself to the altered habitat. These areas may in course of time disappear and be quite unsuited to the species.





Areas which are at present alienated but which a few of the species might inhabit if its numbers greatly increased but such areas in course of time may disappear.



Areas at present uninhabited by the species but capable of carrying a considerable number of the species. These areas for various reasons are not liable to be decreased to any great extent and will probably remain as permanent areas of possible habitat to the species as numbers increase.



Areas entirely and permanently alienated from the species and never likely to be inhabited by the race because of lack of food and cover and too wide a difference to enable the species to adapt itself to such unsuitable surroundings.

Areas in red: Even should the species so increase in numbers as to be forced out into such areas I doubt the few birds which could find food in the area would long survive natural enemies (hawks, etc.) because of lack of cover, etc. in which to escape as it is a slow flying rather clumsy species in the open and appears very unhappy in such surroundings.







SKETCH MAP OF UVEA IS. SHOWING HABITAT &  
DENSITY OF POPULATION OF  
NYPHICUS CORNUTUS UVEAENSIS

(65)

39


1938


From Notes made between Feb. 8<sup>th</sup> + June 24<sup>th</sup> 1938


1938. STATUS & DISTRIBUTION OF NYPHICUS ON UVEA IS. LOYALTY IS. W. PACIFIC


(SUB-SPECIES CONFINED TO THE AREA SHOWN.)


APPROX. ESTIMATE: Reasonably accurate but subject to some + or - of 10-15% of error.


 = Natural habitat entirely suitable for the species and inhabited at present date by the species. (Numbers given are approx. + include the birds of surrounding areas of shorter forest) These areas may be considered as areas of dense population for the species + are areas not likely to be greatly encroached on or diminished to any great extent for many years to come under present conditions on the island. Only exceptional unforeseen or unusual happenings are likely to alienate any extent of the area to the birds or decrease their numbers providing adequate protection from live bird-native cathe<sup>persecution</sup> is granted to the species.

 = Areas of shorter forest at present inhabited by small numbers of the species (sparse bird population) but capable of carrying a very much larger population as numbers increase. This area is at present much visited by birds from more densely populated large tall forest areas + carry a fair number of permanent birds which nest in the area. This area is subject to gradual diminution by increase of cultivation but only to a small extent unless the native population makes a very large + sudden increase; a more or less static position or saturation point having already been reached as regards cultivation + native ratio with the present population.

 = areas which are at present under cultivation but are still being visited by the species, (heavy shading, much light shading, occasionally) but which will in time become entirely alienated to the species probably, unless it can adapt itself to the altered habitat. These areas may in time disappear or be quite unsuitable to the species.

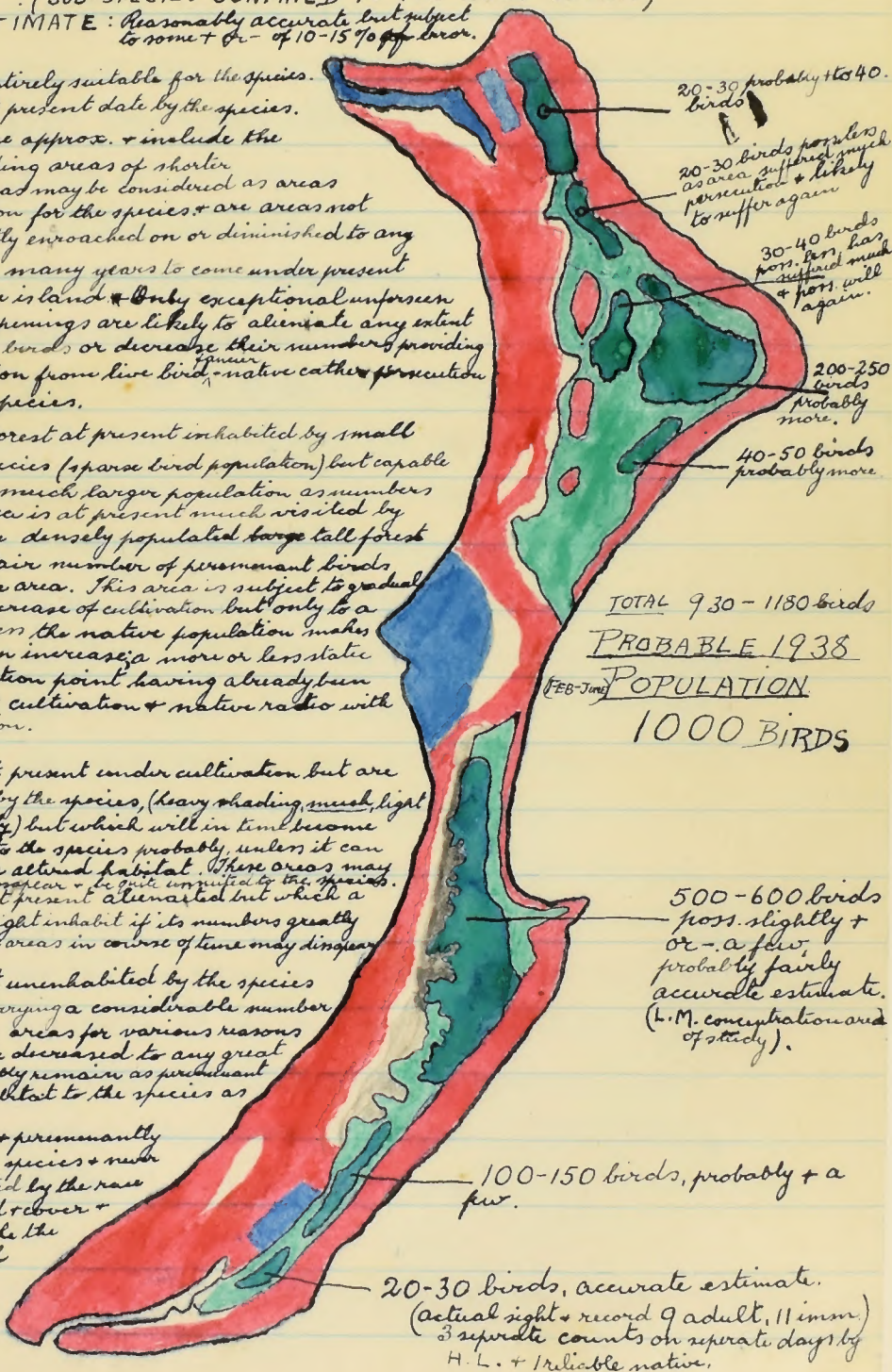
 = Areas which are at present alienated but which a few of the species might inhabit if its numbers greatly increased but such areas in course of time may disappear.

 = Areas at present uninhabited by the species but capable of carrying a considerable number of the species. These areas for various reasons are not likely to be decreased to any great extent + will probably remain as permanent areas of possible habitat to the species as numbers increase.

 = areas entirely + presumably alienated from the species + never likely to be inhabited by the race because of lack of food + cover + too wide a difference to enable the species to adapt itself to such unsuitable surroundings.

unsuitable

Is. MOULI



20-30 probably to 40 birds

20-30 birds possible as area suffered much persecution + likely to suffer again

30-40 birds poss. but has suffered much + poss. will again.

200-250 birds probably more.

40-50 birds probably more.

TOTAL 930 - 1180 birds

PROBABLE 1938

POPULATION FEB-June

1000 BIRDS

500-600 birds poss. slightly + or - a few, probably fairly accurate estimate. (L.M. concentration and of study).

100-150 birds, probably + a few.

20-30 birds, accurate estimate. (actual sight + record 9 adult, 11 imm.) 3 separate counts on separate days by H.L. + 1 reliable native.

Areas in red: Even should the species increase in numbers as to be forced out into such areas I doubt the few birds which could find food in the area would long survive natural enemies (hawks, etc) because of lack of cover etc. in which to escape as it is a slow flying rather clumsy species in the open + appears very unhappy in such surroundings.



HABITS OF NYMPHICUS:- This exceedingly shy and rather silent species is difficult to observe and is very easily overlooked or missed until one has had some acquaintance with the bird and knows something of its peculiarities. Numbers may be heard in forests when a sudden noise such as a gun shot is made, but such birds will never be seen or heard after their alarm calls given immediately after the noise, and though present will elude all attempts to sight them and will not call again. Once they have seen humans or know of observers' presence or the presence of danger (hawks, etc.) they become very shy and wary and it becomes impossible to do any further watching of those birds as they avoid danger in a rather unusual manner. They seldom if ever fly more than 40 to 50 yards and generally only 20 yards from the danger and hide by freezing in a well hidden spot, among leaves behind a large tree bole or such and from safety one or more keep watch on the observer with their exceedingly keen eyesight, and at his least attempt at closer approach silently move further off, generally keeping some screen (leaves to tree trunks) between observer and themselves, seldom giving observer more than a very fleeting glimpse of them and generally observer only hears a faint "feather-on-air" noise or no more than feels a sense of movement (almost shadow-like). The coloration of the species, an admixture of blue and deep green, blends perfectly with the somewhat sombre gloomy surroundings they generally frequent in the dense forest and their skill in picking the even darker shades in those deep, dull green surroundings shows an exceedingly acute sense of colour protection. An observer may be



within a very few feet of a bird and fail to pick it out unless it moves and generally speaking, they are somewhat slow movers and spend much of their time perfectly motionless. The small red poll or crest is more or less invisible in life at all times and is purely a mating colouration, I believe. This appears to be borne out in the birds' habits of bowing to each other in play or courtship, bending the head and plainly showing the patch to the other watching bird, and at such times were the only occasions when this touch of red in the plumage was noticed by me in live birds and one almost gained an impression that the bird actually enlarged the area. The whole top of the head certainly made a pretty contrasting red and black rosette and though the long crest feathers appeared to be incapable of much movement they are so thin and delicate that they nod and tremble and arch over forwards almost like the anthers (?central pollen rods) of a flower, in fact the whole effect is not unlike a flower when thus seen. The birds' habit of remaining stationary and silent for long periods and the fact that even its very loudest calls are low pitched and not at all loud, gives one an impression that the bird is much rarer than it actually is. This along with the fact that Uvean natives are poor bushmen and seldom visit forest areas, except the margins close to gardens to collect small bundles of fire wood or poles for house building and there being no wild pigs on the island to hunt or any forest game other than a few pigeons and flying foxes which can be and usually are collected in other more accessible areas which they visit and the absolute lack of bush tracks (other than main coast to coast or



village to village or direct to garden routes) on the whole island and the fact that they look more to the lagoon for food than to the forest has created the impression that the bird has long been extinct or almost so. Such is not the case and actually with no heavy mortality from hurricanes and a freedom from live bird fancier cum native persecution within a year or two the bird will become very plentiful again and re-occupy areas where it only at present visits. This it is already commencing to do and very soon it will begin by its more frequent appearance in such areas to attract the unwelcome notice of natives and whites.

When observing this species one needs to use great caution and as the bulk of observation has to be done in dense tall forests it is difficult to move silently in such surroundings and a good plan whenever making any movements is to imitate the calls of some noisy species of bird. Pachyaphala or Aplonis being easy and inclined to be noisy are probably the best ones to imitate. Observer's success after adopting this plan and his comparative failure before seem to point to the efficiency of such a ruse. After adopting this plan my results were good and I several times had birds under observation for an hour and even up to four hours at a stretch and was able to follow them if they moved from one small area, providing I took care and they did not move too far. To re-establish contact at such times was slow as once lost sight of it is advisable to wait for calls and move only immediately after or during them so that one does not stumble on them unawares when they will invariably see observer first, give an alarm or silently disappear and successfully avoid any



further efforts at observation as regards those particular birds. Any other efforts within 100 or 150 yards and sometimes 200 yards of such birds will prove futile and as they observe the observer and follow him and warn other birds in some unknown but silent way. The best plan is to move rapidly for a quarter of a mile then recommence moving carefully between long still pauses of listening till another bird or birds are located by their rare calls.

The birds are generally seen in pairs, occasionally three or four and sometimes larger numbers appear to flock together to feed or rather feed close together, as on alarm these larger parties invariably break up into twos and go off in different directions. Parties of three or four invariably are family parties, some being juveniles, and such parties are usually composed of 2 adults and 2 juveniles, but in one case I saw 3 adults and 1 juvenile but believe the presence of 1 adult was accidental, and it is uncommon to see 2 adults and 1 juvenile or 1 adult and 2 juveniles. Though I have no actual grounds for saying so I believe this species does not breed till the end of its second year. The immatures after being driven away by the parents, probably shortly before the following mating season, stay together for a time, but later split up and live singly. These single silent birds are often seen and appear absolutely silent and keep strictly to themselves, apparently taking no interest beyond feeding in the world around them, actually appearing to avoid their own species. They spend the greater part of their time perched motionless in a clump or immediately below a thick clump of leaves high (40-60 ft.) in the top of a teak



tree, or in a dense clump of leaves, creepers or thicket within 15 feet of the ground in the tall dense forests. Their behaviour is in wide contrast with that of a pair of birds, either juveniles or adults. Juvenile pairs play a great deal in various levels in the forests but generally low down, but when in the teak tops will hop and play along the bare limbs of the teak, a thing adults seldom do. An adult pair (see field notes, dated 31/3/38) and family parties also behave differently to the above. All birds have the tall forest where they roost in a dark clump of leaves high in a teak (by bent tails observed in early morning) for the feeding places before daylight, actually at the first signs of dawn. They are exceedingly early movers and callers and call occasionally at night, (very softly, not much more than a chuckle) but an hour or so before the first faint streaks of dawn begin to appear, calls become more frequent and birds become restless. Generally while it is still actually dark, the first few stray calls of Lichmera beginning to sound here and there, Nymphius commences to move and flies a short distance 20 yards or so and generally downwards to about the 15 or 20 ft. levels of the forest. Often one bird flies first, arrives and perches, gives a low call but more often is silent, then the second bird flies and perches near it and when perched generally gives a very low call, the first bird then flies on 20 yards or so and perches again and very often this mode of progression is continued till the feeding ground is reached at this early hour as often as not in the native garden areas. Often birds in pairs do not wait for the first one to settle but fly 5 to 10 feet behind the first bird but as far as I could see it was invariably the one bird flew first from each



new perch. This mode of progression was much more rapid than the other and was generally used when returning to forest areas from garden lands, such return generally commencing very soon after sunrise. In the case of families of 4, one bird went first almost invariably and the 3 others came in a bunch after the first had perched. Single birds often flew high and direct or nearly so to feeding grounds, but also often flew in 30 yds, short flights, flights generally of longer distances than a pair or more birds. Single birds generally fed later in wider field areas than pairs and parties and almost invariably returned high and direct to forest from half to 1 hour after sunrise (very rarely later than that) and generally flew well into the forest 100 to 150 yards from the margins. They then perched high or low in forests, more often high and appeared to regurgitate seeds and shell them, ejecting the husk or shell as a faint patter could be heard on the leaves immediately below the birds. These single birds generally an hour or so later fly down into the lower forest levels 15 ft. or 20 from the ground, (in the secondary forest trees and shrubs under the taller forest trees) invariably keeping a leaf canopy between themselves and the sky and commence to feed again in these lower levels, very silent and invariably alone never calling unless a single alarm call on being disturbed on sighting danger or a human. They occasionally remain motionless in some secluded spot in such places but more often return to a high position in a teak and remain motionless there, well hidden till about 4 o'clock in the afternoon when they return to the lower forest levels to feed, and occasionally from there return to



garden areas just before dusk to feed for a short while, then return direct to their forest roost, flying high and direct when it is almost completely dark. They appear to shell seeds after dark as the patter on leaves is audible for 10 minutes or so after they perch. During the day when perched high in a teak (observe believes they perch in a teak for colour protection as such foliage suits admirably to blend into) they generally have a fairly wide field of vision and if a hawk passes over sometimes give an alarm call or if another Nymphicus they make a low chattering call. They often carry on this low chattering on sighting any bird in flight or for no apparent reason, but more often than not remain perfectly silent, and in all cases only low calls are made except an occasionally loud alarm call on seeing a human or hawk, or immediately before flying if frightened by a person below them. At such times they dive into the forest at some distance from the tree and apparently down to lower levels and are never seen again or heard. Generally speaking these birds are rather silent and very wary. Pair of birds and family parties behave entirely differently to these lone birds, but except for minor differences family parties and pairs behave in the same way as each other such differences as do exist being much as one would expect the birds to adopt with young birds except that they make considerably more noise and call more frequently than do pairs which is hardly what one would expect from such a shy and wary species at a time when they are most vulnerable to attack. Generally speaking the behaviour of pairs is as follows. Very early they leave for wider field areas,



gardens, etc., or in forest areas (families' gardens almost invariably to feed on paw paws generally) and commence feeding, during feeding, occasional rare loud calls are given, but more frequently a low murmur or chatter is made for 5 or 10 seconds at wide intervals. Shortly after sunrise all these birds return to the forest margins rapidly as previously described and almost always low down 15 or 20 feet up at most. If a pair are alarmed they will fly high and rapidly to well within the forest margin and plunge steeply into the forest, probably to lower levels if seriously alarmed. But if not seriously alarmed they occasionally perch high but well screened in a teak well within the forest and keep a careful watch all around for danger. Later they dive into the forest and commence feeding there at lower levels. If not disturbed, they return to the forest margin and half an hour or so after sunrise, numbers are often to be found in such areas. A good deal of low talking or chattering and occasional loud excited cachinnation especially on sighting another bird or pair of birds. If one of a pair fly a short distance 4 or 5 feet, other birds in sight seem to invariably call, seldom very loudly but with a subdued but rather excited or almost pleased and surprised cachinnation. Often others out of sight answering such calls. After a few minutes birds move off separately, deeper into the forest, some remaining low but the majority going high into a teak or other tree occasionally (families with juveniles generally stay within 20 feet of the ground). They then perch and apparently shell the seeds in the crop as do single specimens but a low murmuring barely audible at the foot of



the tree is often kept up for long periods, one singly or sometimes both together. When together they occasionally break into a duet of low pleased cachinnation and end up with their "ko-kot" call repeated several times, occasionally loudly but generally rather softly and low. Later generally about 2 to 3 to 4 hours after sunrise they fly down to the lower forest levels and commence feeding or playing, generally if within 2 hours some play is indulged in for some time before feeding is commenced. They feed on seeds and berries in the lower forest levels (vinefruits penubre, soft wood, berries and seeds, etc.) from 5 to 20 feet (generally between 6 to 14 feet up) and continue feeding with interruptions for pay off and on till 11 o'clock when the sun begins to get really hot. They then perch and remain silent and motionless till 3 or 4 o'clock, either high in a teak or in a dark shady clump of vines or trees in the lower forest levels 15 or 20 feet up generally, though sometimes as low as 8 feet. The following instance from my sub notebook copied into log was a typical example of the behaviour of these birds and because one of the specimens was shot and sexed, probably the most valuable note made. I take it that the unshot one was a male though this may not be so as last year's juveniles behave similarly and if as I believe the species do not breed till the end of its second year they might have been a pair of ♀ 2nd year specimens not yet having bred or mated.

31/3/38 - NYMPHICUS 2 under observation for nearly 1-1/2 hours then one was shot. The pair under observation were probably a mated pair and were first heard calling about



8:30 A.M. (sunrise about 6:00 A.M.) A careful stalk located them resting about 30 feet up in a tree almost smothered in vines. Later they appeared to be playing about in the vines, hopping and making one and two foot flights as if chasing each other and playing a game like the child's game of tiggy or touching. They were not feeding. They then rested more or less motionless for ten or twelve minutes preening themselves, occasionally making a low murmuring to each other like low chuckles. A third solitary, flew over high above the tree and both birds looked up and made a loud hoarse excited cachinnation call and kept it up for half a minute or so. The other bird did not stop but passed on over deeper into the forest. The pair then settled down into a low murmuring to each other for a few minutes then flew down to within 5 feet of the ground and commenced feeding on berries of vines and on the seeds of several trees and shrubs growing at these lower levels, principally the seeds or fruits of the penubre tree (soft wood small leaved trees grows much in old gardens etc.) a fruit much favored by Macropygia elsewhere. They fed on these for 20 minutes or so, only very occasionally making a low murmuring to each other, but almost invariably answering the others murmuring call. One then approached the other (at first this was thought to be the ♂ but on shooting proved to be a ♀) and made several bows ruffled her feathers and called "Ko-Kot" several times and was similarly answered by the other which also made several bows. They raised themselves up to full height on their legs with neck stretched fully upwards then suddenly slumped down giving a bowing or bobbing effect (true bows showing the



rosette crown were observed at later dates). After several bows (or bobs) and calls one I presumed the ♂ (later proved ♀) approached and murmured and was answered almost immediately and constantly by murmurs from the other. The ♂ then appeared to mouth the ♀ all the way down its body to its leg then lifted the foot a short way off the branch when the ♀ let out a hoarse low shriek and appeared to softly peck the other, ♂, (actually ♀) whereupon both went off in cachinnation calls and ended up with "Ko-Kot" repeated rapidly several times in unison or irregularly. The ♂ (later ♀) then flew a short distance (five feet) and appeared to encourage the ♀ to chase it, a game then commenced of chasing each other in short flights for 3 or 4 minutes (keeping in and about the same spot) murmurs and occasional calls being given. They then fell to feeding again on vine berries exclusively till an attempt to line them up for shooting resulted in only one being killed. Though another hour was spent trying to get the mate which had returned within 10 minutes and called repeatedly the bird was thoroughly alarmed and on the qui vive and did not even allow a single glimpse of itself to be caught, though it would occasionally answer mimic calls but would not come nearer.

The above observations were the first really successful notes made and further much long observation did not reveal much more of its habits except the true bowing and showing the rosette on the crown habit as regards feeding and playing behaviour though the knowledge gained this day (the first on which Aplonis and Pachycephala mock calls were made to cover small movement noises) enabled observer from then on to ap-



proach birds and watch them closely for long periods. They show at times a tendency to pick at wood though except round nest entrances no sign of bark stripping is shown and it is purely a beak exercise, I think, as generally hard wood is selected. But it is a very minor habit, seldom indulged in, and probably only to trim the beak when overgrowing or to keep a sharp edge on the lower mandible which is used like a paring knife on seeds while the seed is held and rotated by the tongue against the upper mandible. At such times the beak is invariably held in the notch with a gap between the mandibles at the side and it is through this gap that the husk of the seed is ejected as it is peeled off. When clean the kernel of the seed is swallowed. About nesting hollow entrances the bark is pecked and in every nest I saw a teak tree with green or live bark was used and I believe this habit is practised to protect the young from ant attack as the green bark exuded a sticky sap which would probably deter insects and it is noticeable such peck marks are not so much stripping as wounds marks to stimulate bleeding. It is noticeable the greatest area of pecks is always on the lower side of the nest and a much narrower margin of pecks is seen on the sides and upper side. Marks appear to be made at various times and not all at one time. Such pecking about nests is not invariable, many nests showing no signs of it, but it was noticeable that where peck marks were present there were invariably ants passing up and down the tree and apparently giving the pecked area a wide berth. Other habits noticed were the more or less daily regular movements between roosting places and different feeding and resting areas during



the heat of the day. It was not invariable but one could generally bank on finding a pair of birds during the heat of the day perched in or about the one small area often near a nest site but as often as not as far as was known to observer, nowhere near a nest site. They returned regularly to the one place each night to roost also. Another point possibly worth mentioning is the difficulty of collecting the species from the damage point of view. The greatest number of birds one sees are at ranges too close for ordinary 410 or 20 bore cartridges and shooting with 32 calibre dust shot was only tried once and as it was at close range and failed observer did not attempt it again in case it only wounded or badly damaged a bird which might die later elsewhere and no unnecessary taking of life amongst this rare species was ever indulged in nor advisable. Also this species loses feathers very easily and in falling from a branch only 10 or 15 feet up would lose feathers on every branch it hit in falling and a small cloud of them would fly up when the specimen hit the ground. This characteristic was so marked that observer believes this species has a form of escape feathers and if attacked by a hawk, might escape by the feathers coming out and baffling the grip of a bird of prey to a certain extent. Certainly if a strike by a bird of prey were made anywhere over the rump, feathers would come out in a handful. The bird itself may have some slight power of release of these feathers by control on the skin at their bases, but that would be difficult to prove one way or the other. They certainly never seem to lose any feathers when playing and at such times they take considerable knocks from twigs and each other, but when shot, lose feathers from the impact of the bullet onwards and even to pick up a badly wounded still bird is to



lose feathers for sure, which will stick to and come out on only a moist hand. Once the bird is dead this is not the case and once the body is cold it may be handled fairly roughly without losing feathers, though in skinning a few are bound to be lose. This difficulty of damage in shooting made me collect most of my specimens as high as possible in the teak trees when they perched high up during the middle of the day. I collected a few at lower levels and found ♀ predominated at all levels and believe this is true for the whole race on the island, possibly nature's way of increasing them again, rapidly as a single male could serve several females. Actually I saw no true proof of such happening, but several times I saw a single adult with 2 or one juvenile and in the only case of shooting such it proved to be a ♀ adult. The pair of well grown orphans stayed about the area and were often observed but never once had another adult with them and as I only collected 1 adult ♂ and that far from that area, either the female parent never had a full time mate or it had died from natural cause. Actually I doubt hawks or natural enemies effect this species very much and probably capture very few of these wide awake, cautious birds. I saw no evidences of a single capture or feathers etc. about to point to such incidences occurring. If they do they must be few and far between. Doubtless when the young birds are more or less helpless in the nests a few may be destroyed by such natural enemies as snakes and rats, and to a greater extent eggs would suffer but I very much doubt losses from such causes are very great. The greatest danger is from cyclones accompanied by heavy rains which would drown young in their nests. Natives say snakes often occupy hollows in which birds nest, but found no one single instance



of such being the case and believe such instances are few but that natives have come to believe it through this this excuse to impatient white men demanding why they haven't captured them the specimens promised last trip of the steamer or last year. Such an excuse is commonly given to a trader who has given 5 or 10 francs credit on the strength of a native knowing where a nest is with "three fellar picannini, me wait no more long he big enough belong taken em he come long you." One trader told me in all faith that the natives nowadays would not collect birds because not only were they rare but in almost every hollow they found snakes and being terrified of them had become too afraid to look for nests. My own experience was thus. One day I had a native boy with me, when I examined 3 nest sites. I made no remarks about them being nests, merely climbed to them and examined them and passed on. A day or so later I was surprised when wandering through this almost trackless forest to observe carefully camouflaged blazes on the trees. On following these up I found the trail led from within 15 feet of a short track extending a few chains into the forest from a garden (for collecting firewood, etc.) right to the 3 nests examined by me and stopped at the last. On questioning the native he admitted his intention of returning the following nesting season to try and make capturers of well advanced nestlings. So much for their fear of snakes in hollows. Actually snakes are not so exceedingly plentiful, though common enough, and I saw no large ones, the bulk of them being only to 2 ft. or 2 ft. 6 or less, and a few about 3 ft. 6 in. length. I think the majority of these would be keener on smaller and easier caught birds, such as Zosterops Gerygone etc. and would much



prefer tackling them to a bird like Nymphicus. Judging by the care and watchfulness of the birds especially towards their young, I believe unguarded nests would be the exception and opportunity to rob such unmolested would be few and far between. Besides snakes have been present and plentiful since time immemorial and had no effect on numbers in the old days. Rats may be a pest but this I doubt. Undoubtedly the large grey ship's rat (Rattus rattus?) would attack even adult birds in a hollow or elsewhere at night, but to the best of my knowledge this species is entirely absent. Natives declare it is entirely absent and I am inclined to think they are correct as nowhere on the island did I see coconuts rat holed in the manner common to all other islands where ship's rats are present. The only rat present is the native indigenous rat (specimens sent to Mammal Dept. name unknown to me) which also has been present from time immemorial on Uvea and did not influence numbers in past times. Also this rat is in no way plentiful enough to cause it to attack birds for lack of food and it appears to be a purely vegetable feeder. In fact it is not even common and was difficult to obtain for collections (the mouse is common) and its usual habitat is not forest but in and about gardens and coconut areas where natives are cutting nuts to make copra. A further proof of its small numbers and the absence of the large grey ship's rat is the fact that natives all over the island make copra by merely splitting the nuts open and turning them face up in rows on the ground or hanging them on fronds of young palms, along sloping trunks of palms, logs, or anywhere close handy to where they were picked up and split, here, there and every-



where, yet these are not eaten by rats and in hundreds of examinations of such I found only 1 or 2 rat marks. Natives never complain of rat losses and as far as I could see rats and mice confined themselves to the small chips of copra meat left on the ground by the axe cutting or to the sponge-like kernel of growth found in sprouting nuts. If rats were anyway common this copra would suffer, as for days sometimes it is left unattended. At night natives often turn the nuts over to keep off showers or dew and such places would be ideal for rats to crawl underneath and take their fill safely protected from owls and enemies. As far as I know this never happens and all natives I asked said it was exceedingly rare and said rats much preferred the sweet spongelike growths in sprouting nuts. Copra, yam, banana, all failed as baits in traps but this sponge growth was successful). As regards Nymphicus suffering from rats if at all it must be to a very minute degree and a factor of no real account.

One might almost say of Nymphicus that it is a bird of 2 zones or layers of altitude in the forest and spends ninety per cent of its time in those 2 layers. Resting in high forests very high up, generally in teak trees, or feeding in the secondary or lower leaf canopy of the forest between six and twenty feet above the ground, and mostly between 8 ft. and 15 feet or a little less in such areas. Generally going to 15 and 20 feet to perch and rest, though occasionally higher or lower when it decides to rest low in forests instead of returning to the tree tops. I noted that except for single birds, generally speaking, on a hot day with a light breeze blowing, birds perched high to get the cooler breeze, but on very hot still days they preferred the deep cool shades of the



forest, but individual birds or pairs seemed at times for no reason at all to go quite against this general rule, though on the same day the bulk of the birds conformed to it.

During my stay on Uvea, I found no birds breeding (eggs) but the birds had just finished breeding and juveniles were quite numerous in varying stages. I have no doubt that during the first week or two of my stay, odd rare birds were brooding late in the season (February) as the age of certain young ones I saw later, seemed to point to this. Ninety per cent of the birds breed during November-December, and a hurricane coming in January would cause a heavy mortality in young. It is just possible a few birds breed twice in the year, but to do so naturally, is, I believe rare and unusual. If something were to destroy or rob them of the first or ordinary brood the birds would breed again and this fact was known and exploited by native capturers in days gone by. The late breeding birds I noticed, had not I believe been robbed in some way, of a previous clutch or family, but were ♀'s which had no full time mate and had had to wait till properly mated females were brooding and attached males could go on the loose and attend to their wants. Because of the great female preponderance, I fully expected to find infertile addled eggs in hollows somewhere in old nest sites, but strangely did not find any. It would seem probable with the status of the species the way it is that such would be the case, and I can only conclude that either after giving up brooding when eggs fail to hatch, crabs, lizards, snakes or rats do away with the eggs and ants clean up the mess, or the greater part of the females manage to be served and have fertile eggs and the few which do not (if any) do not lay or have the nesting impulse.



Though actual families, including presumably a ♂, of four are to be seen, they are considerably rarer than parties of 1 adult and 2 juveniles, or even than 2 adults and 1 juvenile (though the latter is rare also and probably only occurs towards the end of the breeding season.) Observe believes that what actually happens is that mates have several mates in a season and consequently breeding birds are found late in the season. From what natives tell me and my own observations I believe this to be so at present, and even in the days when numbers were more plentiful there was a ♀ preponderance-to a very much less numerous extent one male had more than one mate a season, though each ♀ or family consisted of a completely separate circle or group and makes never practiced actually polygamy till the first female had commenced to brood. The actual rearing of young thus devolved on the ♀ parent, except in the case of the last brood of the season when the ♂ remained with the mate and assisted in rearing the young. From what natives told me of numbers of young etc. when the bird was plentiful and they were watching it closely to make captures, and from what I myself noted, numbers of young in one family towards the end of the season are more numerous than earlier in the season, seemingly pointing to more food being available for young to be reared on or more food procurers on the jobs. Even so, I believe a male returns to the same bird or birds to breed in the following season. The community is as it were, one male at the head or with one, two or three (and at present possibly more than three) separate individual families one after the other or even slightly overlapping during the breeding season, from November to



January and possibly later in rare cases, to serve or fertilize and the male remaining with the last family till the next breeding season when one of his old mates being an early breeder seeks him out and lures him away till he is in turn lured from her soon after by some other of his previous year's mates or possibly even a younger first breeding season (probably a 2 year old bird) female which would add to the numbers of the families he became the head of. Only a close study of the ratios of ♂ and ♀ in eggs and young during one complete breeding season could definitely establish what actually does take place and whether the apparent position at present is natural or only an exaggerated natural position or merely a phase of nature to re-establish the race. Personally I believe it is the second of these in combination with the third. Certainly the breeding and sex relations of the race at present are most complex and appear very involved and from what I can gather have always shown a certain degree of involvedness. From what owners of cage birds have told me when a female lays eggs in captivity, other females enter the nest hollow and destroy the eggs. If such occurred in the wild state it would account for the absence of infertile eggs, but from my own observations (necessarily somewhat incomplete) and that of natives, who in the old days watched nests from eggs to young, suitable for capture, there appeared to be no signs of other birds entering nesting hollows. In numbers of cases, natives mentioned that for several days male and female were seen perched about the nest and together but shortly after the ♀ began to brood the ♂ entirely disappeared, or as they said "one bird no more he



stop." Some on questioning said perhaps hawks had got the other (though I found only rare cases of natives having seen or known of actual cases of capture by hawks, about 4 cases spread over many years) and others frankly said they thought the male was a sensible bird which when the missus was busy went seeking his pleasures elsewhere, as they put it, "all same me fellar time missus got picinniny, me go long Noumea come back time picinniny he born six months finish." (Rather crude but a neat simile and I might remark the majority dont even go as far as Noumea which is fortunate for government finances in the resultant fines. "Must be something in the Uvean air".)

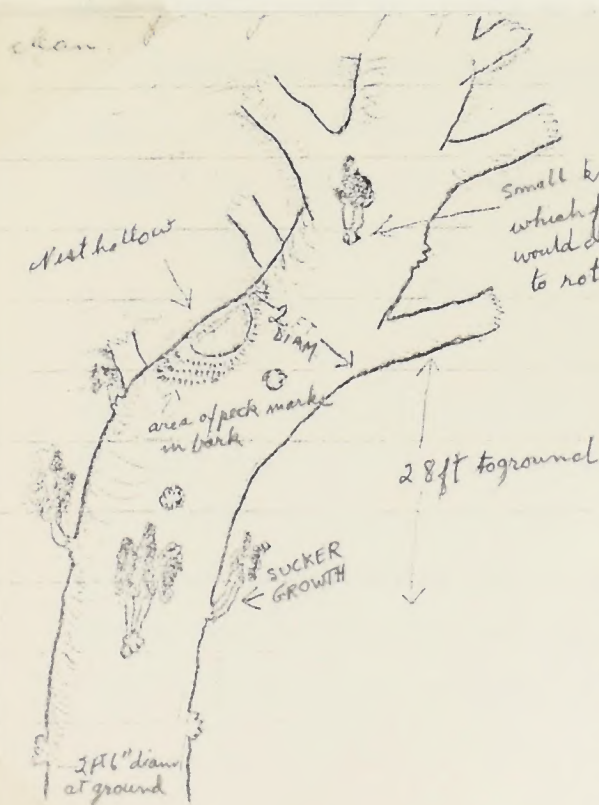
From what I could gather from natives and saw myself, I believe that Nymphicus lays 3 eggs, sometimes only 2 and rarely four. Eggs are pure white and round from all accounts and from bits of egg shells seen by me. A rather thickish pearly shell. Eggs are laid on rotten wood at the bottom of a hole in the main trunk of a tree, almost invariably a teak (all nests seen by me were in teaks natives say very rarely other trees are used but there are few other suitable kinds of trees on the island as far as I could see). Natives say they occasionally use a hollow spout limb, but I saw no such nests nor could natives tell me of any old ones which they had known to be used as nest sites, but used their "I think might Ko-Kot he make egg long that one" and point to a likely looking limb. Old natives who had taken numbers of birds could not remember any actual instances of having taken young ones from such spout limbs. All nests seen by me answered more or less to the following diagram and were found at varying heights. This







diagram is taken from an actual nest found in a teak about 28 ft. above the ground. Almost invariably nest appears on a slightly or well sloped portion of the tree. This is probably necessary as natural hollows are used and it is necessary for such to form to have a knot hole in the trunk broken limb or some such to catch and hold water and slowly rot out the cavity. The birds merely clean out rotting wood and projections to shape the cavity to their own uses. Generally there is a slight depression in the rotting wood and a few Nymphicus feathers and all around the nest against the solid wood margin largish lumps of rotting wood which have not been thrown out are placed. Hollows vary in depth and size according to age and size of the tree. Nests appear to be kept scrupulously clean.



Small knob-like sucker growths which form on teak trees & which would damage, rot off & hold water to rot out cavities

### Nest dimensions

Entrance about 12" by 6 inches elliptical thus with peck marks shown.

Depth of hollow 2 ft 3 1/2 inches on upper side 18" on bottom side below entrance at a slight slope along the direction of the trunk though not conforming to the true slope

Cavity widened out all the way down till at bottom it was roughly a circle of about 10 or 12" diameter. Depth of rotting wood (by driving knife into it till hard wood was reached) roughly something over 18" & very wet at the bottom. Apparently cavities in it going deeper.



I had no opportunity to find out how long incubation takes but from questioning natives I got replies that indicated between 14 and 21 days and a few said longer, but such information was too undecided and uncertain to place any reliance on.

I never saw young being fed in the nest, but I once caught a fleeting sight of an adult feeding a flying young one. The adult when first seen appeared to be shelling a seed or berry, then appeared to place its head alongside the youngster and pass the shelled seed to it sideways out of the beak. The bird was seen to swallow but just then the adult sighted observer, gave the alarm and both birds departed in haste. From what I saw, I believe in most cases only one parent feeds the young and though 3 may be hatched out, seldom more than 2 survive and often only one survives. What natives told me seemed to bear this out and numbers mentioned having found four young hatched, but seldom after the first week, were more than 2 alive. Natives also spoke of only one bird feeding the young or entering the nesting hollow. Young birds are fed by adults on paw paw and minced up seed kernels. In captivity young can be kept alive and well entirely on paw paw as long as the seeds of the fruit are left in so it is evidently a suitable diet. After leaving the nest they quickly learn to feed themselves and can fend for themselves at an early age and very quickly adopt the habits of adults though for a little time they are noisier and not so wary and careful but appear to inherit a great shyness right from the start of life.



### SUMMARY OF STATUS OF SPECIES

In this observer's opinion the species is in a sound position though far from safe from danger of extinction, but if the bird is properly protected and does not suffer any further setbacks within the next few years from hurricanes during the breeding season, it will not only hang on but will rapidly increase in numbers over the next few years.

If the New Caledonia administration will totally prohibit the export of live birds from Uvea and prohibit the capture or keeping of the species in captivity by either whites or natives on the island and see the law is enforced, the bird will be saved. All birds in captivity at present in New Caledonia and Uvea be registered and not replaced as they died and heavy penalties imposed on anyone with birds or ships found carrying the birds (penalties to be imposed on both the ship company and master of the vessel), and on the owner of the birds. This would discourage native capture of the species and its attendant large mortality. Any birds at present in captivity which breed registration of the young to be compulsory and regular track kept of birds. If possible on an island which later may need further gardening areas, a sanctuary or reserve established of the main areas of original forest left and prohibition of all expansion of cultivation further into such areas. This latter measure would need careful considering as the natives must be considered and their food sources guarded, but by allowing gardens but no permanent coconut cultivation in such areas, natives would be guarded and I believe the bird stimulated by increases in food in secondary old garden growths.



Cyclones are outside of control but would not be such a serious factor if the above protections were granted the species.

COLLOCALIA SPODIOPYGIA LEUCOPYGIA (WALLACE):- This is the commonest species of Collocalia on Uvea and I couldn't understand any previous observer overlooking it, but later observations drew my attention to a peculiarity about the species which seemed definitely to point to a fact I had previously suspected. This was that this species shows a slight north and south movement each year. E.g., roughly birds from sothern N.H. move south to the Loyalties. Loyalty birds move south to N.C. all moving back for the breeding season. Actually the movement may only be from one island to another, perhaps 60 miles or so and may not necessarily be N. and S., but I believe that the birds definitely move away and back to breeding colonies. Tanna Island in the N.H. where they are rare except in the north, where coralline cliffs form suitable breeding colonies for a small population, receives a big influx from Erromanga or elsewhere, making the bird common where they were almost or actually entirely absent before. Similar conditions occur in other parts of the group. In and about breeding islands the species is always common, but on shooting it will be seen 90 per cent or more of birds are immatures, yet this species only lays one egg and has a definite breeding season. Actually I do not think the skull of this species completely ossifies till the end of the second year, but a large area of it does and even allowing for this the preponderance of immatures is not accounted for. Sex ratio seems to be about normal with a slight preponderance of ♂ except at breeding time when ♀ seem



to increase a little in numbers. Yet at non-breeding season on breeding islands the percentage of immatures increases enormously and adults or nearly adults are almost unprocureable. Only a close study over some time in two areas - a breeding and a non-breeding area at the same time by separate observers - would show any definite results or enable one to arrive at definite conclusions with any degree of certainty. But I have an idea something such as the following is the case.

Adult and second year birds (probably skull  $3/4$  or more ossified) arrive in a breeding area about October. Mating and nesting takes place. Probably one strong male may mate with several females and there may be no definite selection of mates and this is most likely the case. Juveniles of the previous year have to be ejected and driven away and this causes great stirs in the colony. One egg is laid, most birds laying in November but some earlier possibly and a number later. (Infertile eggs and addled eggs from previous year which are very common are ejected on to the floor of the cave.) As soon as the young which is attended by only one parent is able to fly adults all leave the area and do not return till the following year to breed again. This movement away takes place about April or May. A missionary on Lifu told me that early in June at the mission station at Chepenebe on Lifu great crowds of Collocalia gathered about the mission (even settling on a large tree a most unusual thing for Collocalia and after a day or two of much noise and calling seemed to disappear and he thought there were much fewer about later. I only got immature there



during my stay though many were examined. On Uvea the hordes of mosquitoes during the rainy months doubtless influence Collocalia to a considerable extent but there are no mosquitoes to speak of on Lifu or Mare Is. I examined breeding colonies on all 3 islands (all very similar to the description given of a colony in my Mare Is. notes) and the following were my findings briefly.

COLLOCALIA SPODIOPYGIA LEUCOPYGIA (WALLACE):- CONTINUED

On Mare. Colony examined just after height of breeding season (21st Dec. '37) Many immatures and very many cold and infertile eggs about. Few adults still brooding. See Mare Notes (no close detailed sexing done).

Uvea Is. 4th May, 1938. Notes on a colony examined including work on the night of the 4th and early morning of the 5th.

The colony is in a cave in the sheer 100 ft. cliff of one of the abrupt coral uplift outcrops in the south of the island immediately above the tidal lagoon arm about 25 ft. above the water, well into the cave where it was dark, nests on ledges at varying heights right up to the roof (about 25 ft. above the water, well into the cave where it was dark, nests on ledges at varying heights right up to the roof (about 25 ft.) ledges were easily accessible and nests easily examined (90 per cent being easily reached.) Examined about 180 counted nests and there were more unexamined (probably a little over half the total being counted at all levels making say 300 nests in the colony at full capacity. Of the 180 counted nests 49 had birds on them, 14 of which were captured and examined, all were immatures with skulls up to 1/5 or 1/4



ossified sexes were exactly even. 34 nests had addled or infertile or abandoned eggs in them. The balance were empty. All immature birds were able to fly well and all had full stomachs of insects self captured as no feeding by other birds was going on. From time to time birds arrived and rested on nests and later on numbers were noted departing to recommence feeding. Bird guano on floor mixed with bad eggs and dead young nestlings etc. showed the colony was long established).

From shortly before dusk to half an hour after dark even birds appeared and settled to roost on nest. Further captures 1 hour after sundown all revealed the same results. 28 immatures up to 1/4 ossified skulls most 1/10 to 1/5 (at least 80 per cent) ossified. Male 15, female 13, stomachs all full. As nearly as possible the same places or close to were used to make captures. Birds did not all leave the colony till nearly 1 hour after sunrise, only a few left before quarter of an hour after sunrise then many began to come out. All had left by 1-1/2 hours after and the first began to return about 2-1/2 to 3 hours after sunrise.

Observations made at a later date (7/6/38) in cave about 150 yards from the other colony and results were identical (colony smaller only about 100 nests). 12 captures in cave, 2 shot outside close to cave and 2 shot 400 yards from cave. All immatures up to 1/4 ossified skulls, 80 per cent of them 1/5 ossified or less, 9 males, 7 females.

On Lifu Island. 1 colony examined on 3/7/38. Surrounding identical cave in sea cliff face (60 feet above



H W mark entrance to cave) cave rather more difficult to make captures, 4 only made, all females, skulls 1/5 to 1/4 ossified.

Another colony examined on east side of island only small colony in coral cave in cliff face (about 400 yards from coast across coastal flat) Cliff only 30 feet high and cave entrance about 15 feet up the face. Nest well in in dark, colony of about 20 nests examined on 4/9/38. Birds present only numbered 6. 4 were caught, 2 males, 2 females, all skulls 1/4 or a little more ossified.

Apart from these specimens examined in and about breeding colonies, specimens for collection (3 on Mare, 7 on Uvea and 6 on Lifu) were collected and skinned all at great distances from any known breeding colonies in an attempt to get adults only (Mare 2 miles, Uvea 4 miles possibly 5, Lifu 2 miles). Results as regard adults were disappointing and were as follows:-

MARE IS. 3 immediately after or during breeding season.

December 7th, 1938. ♂ 1/3 ossified, ♀ 1/2 ossified, ♀ 1/2 ossified. Two of these may possibly have bred but probably have not though they may be 12 months old.

UVEA IS. 7 specimens, as follows

1 ♂ 1/3 ossified on 23/2/38 (February adults probably still attending young.)

1 on 25/4/38. 1 ♀ o.c.e. skull 1/2 ossified. (Adults ready to de-  
(part or soon going,)

1 on 2/5/38. ♀ repose. skull 1/2 ossified. (young feeding for )  
(themselves by this )  
(date )

2 on 8/5/38 ♀ immature gonads, skull 1/3 ossified (Possibly both first)  
(or second year im- )  
♂ slightly enlarged, skull (matures. ♀ possibly)  
1/3 ossified (1st yr., ♂ 2nd yr. )

2 on 9/5/38. 2 ♂ repose and repose +, skull  
1/3 ossified.



Up to this date probably juveniles of this year may not be ranging far from nesting colonies and shooting at distances captured only birds bred the previous season (possibly have bred or not bred according to whether they breed at 12 months or 24 months) or possibly adults though none were taken truly adult.

Flying altitude has no bearing on sex or age. Samples were taken at all heights. Height of flying insect blanket of greatest density controls all birds irrespective of age or sex.

LIFU IS. 6 specimens as follows

8/8/38 ♂ repose. skull damaged probably 1/4 ossified.

♂ repose +. skull 1/4 ossified.

12/8/38 ♂ repose. skull 1/4 ossified

♂ repose. skull 1/3 ossified.

♀ repose. skull 1/2 ossified. (possibly 2nd year lived)

13/8/38 ♂ advancing skull 1/3 ossified (seems to show breeding)  
(at 12 months for males)

E.M.: (One thing shown definitely by the above is the utter futility of collecting in or near breeding colonies. Whether or not my conclusions are correct and as the available data is very scanty they quite likely are, at least some unusual form of movement or ossification and possibly breeding is shown. Maybe you can get some valuable steers from the above dope).

It at least looks from the above data as if my surmises may be correct but considerably more detailed data and study is necessary.

Another factor observed on Uvea which seems to point to a movement from that island, at least to other areas is as follows:-



When I arrived on Uvea in February the island was suffering its annual plagues of mosquitoes. They made life uncomfortable in the day and necessitated all skinning or writing being done under nets, but at night simply became impossible, thick clouds of them simply making the night one long hideous 'ping'. Walking about one could feel them bumping into ones face in scores, and to wave ones arm was to strike dozens. In and about the swamps they were thick day and night but not in the clouds such as they were from dusk (5:30 P.M.) onwards till after daylight. In February and March it was very noticeable how plentiful Collocalia leucopygia spodiopygia was over the swamps and from 5:30 onwards the birds were to be seen in hundreds and even thousands hawking over the swamps. When the mosquitoes disappeared or rather the clouds of them, some always being present, Collocalia simply vanished nor did they appear in other areas of the island, in fact they became scarce all over the island. The following notes on dates were made at the time. Up to and before 17th of April numerous notes speak of the abundance of the species everywhere and especially in the swamps. During the week from the 17th to 23rd they still seemed common, but decreasing slightly especially over the swamps and during this time the mosquitoes began to decrease. (Collocalia feeds on them as I have found them in the beaks of shot birds.) I began to take closer note and recorded these in my casual log and on the 30th the facts had assumed sufficient significance to warrant close noting in the field book and notes were kept daily closely after that.



- 25/4/38. something over 100 seen. (In all types of areas )  
(where the bird was common)
- 26/4/38. between 50 and 60 seen (before. )  
(Coll. esculenta urop. was)
- 27/4/38. 18 only seen (Just as common as usual )  
(about 100 being seen each)
- 28/4/38. 14 only seen. (day. )  
( )
- 29/4/38. 8 or 10 only seen ( )  
( )
- 30/4/38. 5 or 6 only seen. ( )  
( )
- 2/5/38. Between 50 and 60 seen but most of these were seen  
very close to cliff which contain suitable breeding  
areas. Birds still rare elsewhere.
- 3/5/38 6 only seen where birds were plentiful before.
- 4/5/38 30 seen and nesting colony examined. Nearly all  
seen were close to the colony.
- 5/5/38 6 only seen above 1/2 mile from nesting colony.
- 6/5/38 8 seen in short distance and in 1 hour. Species  
evidently more numerous this day.
- 7/5/38 1 only seen. Bad weather and showers probably  
responsible.
- 9/5/38 50-60 seen mostly over swamps and near breeding  
colonies, though further from those than usual.
- 10/5/38 50-100 seen in similar areas to previous day  
3 specimens shot and examined ♀ 3/4 - (All wing)  
skull 1/4 ossified ♂ 1/2 ( 114 )  
skull 1/4 ossified  
U.S. 1/3 ossified.
- 11/5/38 100 seen mostly near tidal lagoon colonies, rare  
elsewhere.
- 12/5/38 None seen. Bad area in forest.



- 13/5/38 2 seen. Bad areas
- 14/5/38 Collocalia rare 4 only seen in good areas, swamps, etc.
- 16/5/38 Numbers of both species Coll. feeding in bad rough weather. 30-40 seen.
- 17/5/38 4 seen in good areas, none in bad areas
- 18/5/38 None seen in fair areas where it was once very plentiful.
- 19-21/5/38 Only odd ones seen.
- 22-28/5/38 C. still rare only old ones seen in good areas, none in poor areas.
- 1/6/38 C. more numerous fairly common again 20-30 seen.
- 3/6/38 C. again rare Few being seen even in good areas (4 only).
- 6/6/38 C. again disappeared, none seen.

During missed dates and from there on the birds were very rare except near breeding colonies. Sometime none being seen in a day sometime as many as 6 or 10 in good areas, some days even good areas showed 1 or none. Bad areas all showed nil or an occasional stray. Entries were almost monotonous in the regularity of the reports of the lack of birds. Through it all Collocalia escul. remained normal and unchanged.

NOTOPHOYX NOVAE HOLLANDIAE:- Natives on Uvea do not know this species though from some vague descriptions given it is just possible it may appear there very very rarely after very stormy weather (being carried or blown from New Caledonia) but evidently never remains long. This species prefers rivers



and such surface waters as exists on Uvea is quite unsuitable habitat for it being too deep, too brackish, or too much frequented by natives in their daily taru culture. (Other Loyalty Is. areas are entirely unsuitable habitat having no surface water anywhere for more than a day or so after rain.) Should it appear on any of the Loyalty Islands it would almost certainly return to its normal habitat on New Caledonia the hills of which are visible on most days of the year except when visibility is bad. (Just medium to fair visibility the hills are plainly seen.) This species should definitely be deleted from lists of Loyalty birds and at very most if it has been collected there classed only as a very rare accidental visitor.

DEMIGRETTA SACRA:- This species is very common on Uvea and breeds there in numbers. Breeds on the islands of the westward chain of the island also, and is very plentiful there. Breeds and is always numerous in the tidal lagoon arms in the north and south of the island. It is noticeable that along the large lagoon forshore it is almost entirely absent where long stretches of sand occur with no coral rock outcrops, but anywhere in the vicinity of rocks it is found. Thus from the pass at Lecking island in the south, right to Iahnimaha in the south centre of the island where a long unbroken stretch of sand occurs, birds are never seen settled but only fly past out to sea, between these 2 places. Along the ocean coast and in the rock central coast on the lagoon side from Iahnimaha to about 4 miles north of there (where the sand beach recommences and sweeps on unbroken to the extreme north) about Mouli island and



anywhere else where rock occurs, the bird is plentiful. It is alert and difficult to shoot as cover is lacking under which one might approach the bird in most localities.

Natives are very fond of it for eating and shoot quite a number (island meat lack and hunger) they also capture and rear young birds as pets destined for the pot.

White phase birds are almost entirely unknown to the natives and I saw none and only saw blue birds. Speckled seemed also unknown.

Much of my time was spent away from places where records of any value could be taken as most of my time was spent away from beaches and except when I went to the lagoons or back beaches, any I did see were odd ones flying past out to sea between rock areas. In an afternoon's run between Fayuwai and St. Joseph in the north I kept the following counts (see map for main N and S road) all appearing in and about the 4 miles of road where rocks appeared on the lagoon side and the ocean beach on the west.

Going north 5 adult and 2 juvenile blue Demigretta, going south 2 adult and 1 juvenile blue Demigretta date 27/2/38.

Other records were as follows.

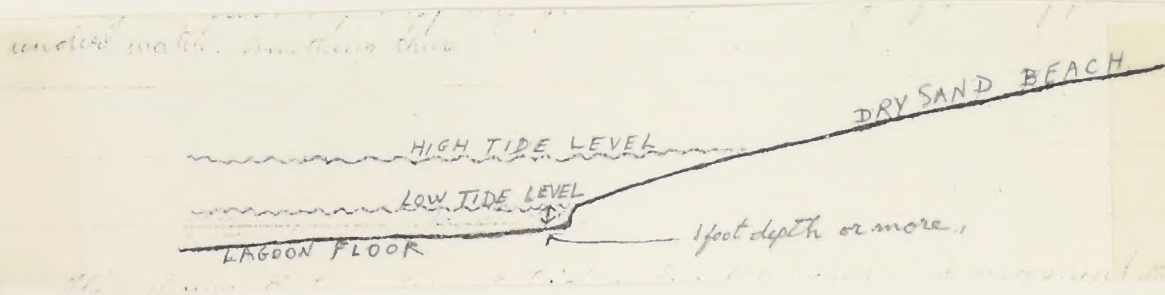
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|---------|--|
| 14/2/38 | 1 Blue, at Lecking Pass.   |
| 17/2/38 | 1 Blue, on wing following lagoon edge a little out to sea, <u>Fayuwai</u> .                                      |
| 27/2/38 | 7 adult blue, 3 juv. blue on rocks central island. <u>To and from St. Joseph in north from Fayuwai in south.</u> |
| 29/3/38 | 1 blue adult, on rock north of <u>lahnimaha</u> .  |
| 3/5/38  | 2 blue (1 adult and imm.) seen both shot on rocks near <u>lahnimaha</u> .  |



- 4/5/38 28 blue Demigretta seen in tidal lagoon at south of island Lecking.
- 3/6/38 2 blue Demigretta seen, 1 shot on rock lahnimaha and in flight out to sea.
- 9/6/38 2 blue seen while at sea (within lagoon) on way to Beaupre Is. in small boat.
- 11/6/38 3 blue Demigretta. Beaupre Island.
- 13/6/38 8 blue Demigretta, at sea off and on island chain to N.W. of lagoon.
- 17/6/38 28 blue Demigretta on and about islands chain to N.W. of lagoon.

From the above it will be seen that the species is common anwhere that surroundings are suitable, tidal lagoon and rocky places.

The probable reason for species association with only rock areas on Uvea (and tidal lagoons) is that where rock areas occur these are more or less level ledges becoming dry at low tide and leaving rock pools etc. which have trapped small fish, or when covered with water offer a considerable area of more or less even depth of water. The same applies to tidal lagoon arms. Along the sand beach areas seas have thrown a more or less quickly sloping bank of sand to a point a foot or so below low tide level which makes too great a depth of water for Demigretta. From this point the lagoon floor slopes off very gradually at the angle or stability for sand under water. Something thus





This shows that neither at high or low tide would such areas suit the species. Demigretta much prefers pool left by the tide as in such places small fish etc. on which it feeds are more or less confined and much easier to capture. On the extensive mud and sand (slurry) flats in the tidal lagoon arms in the north and south of the island inequalities in the banks hold and retain water for long periods. Such inequalities are often made by stingarees (sting ray) and by colonies of mud dwelling bi-valves ("Tohoeroa" of New Zealand) which make mounds above themselves and by natural inequalities. Even at high tide there are extensive shallow areas over the more or less level floor of these silted up lagoons. Also in and about the mangrove roots there are great numbers of the small jumping and climbing fish (which have gills in the tail) on which Demigretta feed a great deal, suddenly dashing into a crowd of such fish basking in the sun and driving its beak with a wide sweeping snap into the small cloud of leaping fish in the air as they hop for safety into cavities or under roots or into water. Even so it is noticeable that even in these tidal lagoon arm areas Demigretta does very little feeding at high tide. From half tide falling to 1/4 tide rising being their principal feeding time, though they generally commence fishing shortly after the tide turns and commences to fall, but only in a rather half hearted manner. Between these times they travel to other areas or stand about on rocks etc. above high tide mark or fish along the water's edge on small sand beaches between rocks but only if they are hungry I think.



ANAS SUPERCILIOSA PELEWENSIS (HARTLAUB):- As far as is known to observer this is the only species of fresh-water bird found in the Loyalty Islands and is confined to Uvea Is. only in that group (Casual, very rare passing through birds may occasionally rest for an hour or two or even a day on other islands of the group, but never stay and do not breed as there is no surface water anywhere on other islands of the group and rivers are non-existent in the Loyalties). It breeds on Uvea in numbers in the fallow taru swamps, uncultivated swamps and about the small lakes on the island. It is plentiful on the island but very shy and wary and is much persecuted by natives who only shoot it when at rest, consequently at such times it is very difficult to approach though it will fly close past a person and offers at such times an easy way of collecting. It appears identical with birds of the southern New Hebrides except in one habit which it has been probably forced into for lack of food on Uvea to support its large numbers. This is the habit of feeding as well as roosting on the sand banks of the tidal lagoon arms in the north and south of the island. Nowhere in the southern New Hebrides did I see birds feeding in salt water areas too. They feed close to them and perch and rest in and about such places. After sundown large numbers of ducks fly up the swam areas to feed in the taru cultivation areas on prawns, snails, etc., found in these places and return to areas of less human occupation before sunrise.

There is evidence that birds pass to and from New Caledonia in the fluctuating numbers on the island and I myself saw a flock arrive in the south of the islands. From



native accounts it is possible they occasionally pass between Uvea and the New Hebrides as flights arrive and depart in that direction in the north of the island and as they never appear on Lifu must pass on to the New Hebrides or circle back after long flight.

Natives know of no other species accompanying birds from New Caledonia but it is very likely odd stray birds do appear at very wide and rare intervals but never remain, probably find the habitat entirely unsuitable.

This species has an eclipse moult I believe all or most of the wing primaries moulting at one time and the bird being unable to fly for a week or so. At such times it hides in swamps and is captured by dogs, being unable to fly, as are numbers of young birds in the flapper stage. I got one such bird on Uvea on the 25th Feb. (all wing prim. in full moult, tail none, body considerable moult) and got several others at later dates.

Breeding and nesting habits seem usual except that to the best of my knowledge it never nests in hollows of trees nor do I know of any such hollows that would be suitable nor the trees large enough in suitable places to provide such nest sites. On Uvea it appears to breed from December to April and early May and odd birds at other times (very rarely) a little outside those months. The bulk of bird breeding in (a few in January) February and March, and early April. Evidently waiting on the rains which begin in February and go through to May. Doubtless cyclones and floods in their breeding areas (swamps) cause heavy mortality in eggs but would assist young in increasing food areas.



ACCIPITER FASCIATUS VIGILAX (WETMORE):- A fairly common species on Uvea and is increasing. Is exactly similar in habits to birds elsewhere on Mare and Lifu. Feeds much on native and domestic poultry, especially during August and September when it has young. Natives say it is useless to have domestic chicken at that time of the year. Its perching first and striking from a long motionless glide from a perched position and never from the wing is the same on Uvea. When on the wing high up it is not hunting but playing and is full and not hungry. When hunting it hunts below tree level slipping silently from perch to perch, amongst coconut palms mostly on Uvea which is an ideal habitat for it, and then striking from a motionless perch often of long duration. It feeds on small birds, lizards, rats, mice, large insects and domestic poultry (chickens and ducks etc.). When on the ground with a kill it has the habit of jumping up and looking around for approach of danger. It seldom appears to eat its kill in a tree but goes to the ground almost invariably. It is a ruthless and savage hunter especially when with nestlings, but is an exceedingly alert and wary bird.

Juvenies do not outnumber adults on Uvea at any time from what I could gather, and certainly not from February to June. In fact I saw very very few juveniles at all. I imagine the observer who made this note did so from the numbers of skins collected. Juveniles, being less wary than adults, would be more easily collected. My experience was the other way and the juveniles were outnumbered considerably. Females hunt more in the open types



of area and males though hunting much there also visit the forests to a greater extent than females, but even so they spend only a very short period of their time in them, more about their margins and a great deal in and about native gardens and shorter coconuts. Females spend the bulk of their time in tall coconuts visit short ones and gardens and seldom go into forests if ever, and never far into them.

This species plays on the wind on updrafts etc. from the prevailing S.E. and E. winds where they strike the east coast of the islands. It also hunts above the low stunted wind blown scrubs of those areas to a limited extent, generally sighting movement, then settling and remaining motionless on a coral rock outcrop. The birds in this area are almost invariably females, males apparently preferring to play and soar over coconuts and the saltpan areas.

I do not believe immatures nest but data seems rather to point to them at least pairing off before the immature plumage is changed. The first specimen collected by me on Uvea was an immature phase with well developed gonads (R ovary visible) and was in the company of and playing with another male adult bird and from their unusual lack of vigilance and interest in their own affairs I believe they were pairing off. This may be wrong however. I do not think the juvenile plumage is retained beyond a year and as the birds probably breed (as yet unproven) at the beginning of their second year it is possible some birds in a late moult would at least have vestiges of juvenile plumage left at mating and in odd rare cases be



in full juvenile plumage. All this species suffer much abrasion to plumage and show considerable individual variation as to times of moult and it is possible that juveniles show a similar variation. The species has, I believe, a faculty of moulting when abrasion reaches a certain stage and not at set regular evenly spaced intervals or seasons (apart from the breeding plumage moult) and it is possible if not badly abraded they might miss a moult and moult at different times of the year in different years. This might mean a bird could and might breed in juvenile plumage. Probably some such is the actual condition in rare cases, but the majority of birds are nearer normal and do not breed in juvenile plumage.

The following are the dates on which Accipiter were seen on Uvea and though a few others seen were not recorded, this constitutes 90 per cent or more of the species seen and where seen (\*specimen collected).

\* 8/2/38 2 seen in coconut plantations behind and close to (200 yards) European dwellings. ♂ ad. and ♀ imm.

11/2/38 1 seen in native gardenlands (♂ in gardenland and 2 year coconuts). 6 A.M. before sunup. Hunting Perched in dry tree.

14/2/38 1 seen soaring over saltpans area (not hunting) believe ♂.

18/2/38 1 seen in tall coconuts appeared like ♂ ad.

\* 2/3/38 1 male adult shot in short coconut groves (10-15 year palms) near native village, perched to prey on chickens. 11 A.M. approximately.

\*26/3/38 1 adult female shot close to camp (left off skinning to chase it, see field note Log book.) In tall coconut plantations in and about villages and European dwelling. Still hunting, though full



when shot drinking water in swamp. Strangely it seemed to be feeding in the mud (dragon fly larva?) and when on the way home a large earthworm appeared and was pulled out of the throat.

- 1/4/38 1 adult male in coconut groves (tall) near coast believe same bird as seen on 11/2/38 near same place.
- 5/4/38 1 adult male over taru swamps. Flying high, playing.
- 8/4/38 2 adults (1 ♂?, 1 ♀) in coconut plantations bordering taru swamps.
- 26/4/38 1 Accipiter ♂ adult. Tall coconut plantation.
- 28/4/38 1 adult ♀. Tall coconut plantations near forest margins.
- 30/4/38 1 adult ♀ on wing hunting through tall coconut plantations.
- 4/5/38 4 adult ♀ seen soaring over and playing on updraft over low scrub areas and cliffs of east coast. 1 later came low to hunt and was shot but lost in low dense scrubs, probably crawled into one of the numerous deep narrow fissures in the coral rock. All definitely females. 2 seen hunting earlier about coconuts on margin of tidal lagoon arm, believe both were females and, certainly both were adults.
- 10/5/38 2 Accipiter seen far away on wing over swamp lands (not together).
- 11/5/38 1 adult ♀ seen hunting in coconuts near tidal lagoon arm in south.
- 14/5/38 1 adult ♂ and 1 adult ♀ (seen hunting?) or flying above taru swamp and swamp areas. (no record in small field book as to whether hunting or soaring.)
- 25/5/38 1 adult ♂ seen hunting in low forest and gardenlands.



- 30/5/38 1 Accipiter believe ♀, certainly adult hunting in tall coconuts (believe same bird as seen on 28/4/38, same area.)
- 4/6/38 2 adult ♀ and 1 adult ♂ Accipiter seen. ♂ hunting through low coconuts.  
1 female perched watching domestic chicken, too quick off mark to shoot.  
1 ♀ ad. seen soaring over tall coconuts groves.
- 7/6/38 2 adult ♀ and ad. ♂ seen, all hunting in tall coconuts or margins of such and swamp land.
- 8/6/38 1 Accipiter seen flying high over coconuts (large, believe ♀).
- 21/6/38 1 ♂ adult seen hunting through tall coconuts (same place as 28/4/38).
- 22/6/38 1 adult ♂ seen hunting through tall coconut groves.

From the above it will be seen that approximately 19 ♀ adults, 14 ♂ adults and 1 ♀ imm. were seen and recorded. The more open southern part of the island (saltpans, tidal lagoon) is more favoured by ♀ and the ♂ favour the more forest areas nearer the central parts of the island. The significance shown of series of ♂ and then series of ♀ at certain periods does not mean any retiring of one sex for periods but merely that at such times I was working areas more favoured by the sex for some consecutive days. Actually I believe the greater numbers per square mile in the species would be found in the more open types of area in the south and elsewhere where similar more open areas occur. Though the bird is found all over the island in reasonable numbers for the species.

It is a solitary kind of bird never hunting in pairs or parties or flocking nor would it do so even if a plague of mice or some such appeared in an area, I believe it would

30/5/58 1 Sooty Tern (adult) 2, certainly both hunting  
in tall coconut (leaves seen) and on  
on 28/5/58, same area.

28/5/58 2 adult 2 and 1 adult 2 Sooty Tern seen, 1 hunting  
through the coconut.  
1 female perched watching female in coconut, too  
much off work to shoot.  
1 2 ad. seen soaring over tall coconut grove.

28/5/58 2 adult 2 and 1 ad. 2 seen, all hunting in tall  
coconut on winging of such and such land.

28/5/58 1 Sooty Tern seen flying high over coconut (large,  
believe 2).

21/5/58 1 2 adult seen hunting through tall coconut  
(same place as 28/5/58).

22/5/58 1 adult 2 seen hunting through tall coconut grove.

From the above it will be seen that approximately  
18 2 adults, 10 2 adults and 1 2 imm. were seen and recorded.  
The more open southern part of the island (beach, etc.)  
is more favoured by 2 and the 2 favour the more forest  
area nearer the central part of the island. The slightly  
more open of series of 2 and then series of 2 on certain  
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size or sex such appeared in an area, I believe it would

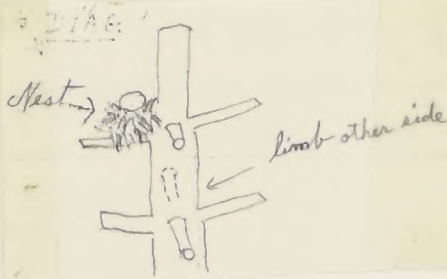
still hunt singly, even though its numbers in such an area would increase considerably. It is a silent, lone hunter and very very seldom makes any call at all, even when wounded. At the mating season it might hunt in pairs but even that I doubt. Birds, though not exactly birds of territory, definitely favour certain areas for hunting and when once seen in an area hunting (not soaring or playing high on the wing above the tree tops) it is always worth remembering when later in that area and keep a good look out and the bird will often be seen there again. Probably it has a more or less regular routing round each day it hunts till it gets its fill, as it is noticeably it is generally seen in the same place about the same time on different days. Of course if it gets a kill early on the round the rest of the round is upset. After a kill it generally makes for a secluded spot near at hand, perches for 10 or 15 minutes, then flies off and commences playing on updrafts of air and soaring about sometimes for 2 hours and more at a stretch and generally over 1 hour, sometimes taking short rests. It then recommences hunting and if successful does the same again.

I have never seen the bird over the sea nor does it hunt very close to the sea, (seldom if ever closer than 150 yards from tide mark) but it will cross inland small sheets of water, tidal lagoon arms etc. and hunts right along the water's edge of such places. Possibly the movement of small waves alarms it, most movement does, and only where waters are calm and still in such places as these lagoon arms will it approach it.

The species breeds on the island but was not breeding during my time on the island. July, August, September are



the breeding months. According to native accounts and by 2 old nests seen by me, the species invariably nests in a tall tree in dense forest, almost always selecting a single barrel type of tree with small side branches on it, of a type like this diagram and the nest placed near the extreme top of the tree where small close rings of branches occur.



Nest of sticks, bark and fibres lined with feathers, and fine materials, deep cup. Eggs said by natives to be only 2 in number and a light brown, much blotched

with reddish brown. Observer has never seen the eggs. The same nest site is used if not disturbed and I have seen an old nest under a newer nest. I believe birds renovate last year's nests and use them again in many instances by nests I have examined which natives have said were in use to their knowledge 2 years previously. When seen by me they were in such good repair that they must have been in use fairly recently and there were no signs of an old nest underneath. Observer does not know and could not get any reliable data from natives about incubation periods. Young birds seldom appear before the latter half of August and mostly in early September and then only as nestlings. None leave the nest before the end of September and early October mostly.

HYPOTAENIDIA PHILIPPENSIS SWINDELLS:- This species is common on the island and very plentiful in the taru cultivation swamps where it suffers a great deal from persecution by dogs and to a less degree from humans. Human



persecution fluctuates somewhat, at certain times gangs of youths with dogs causing a big mortality, then perhaps for months it is left unmolested. Often such persecution of this species is only incidental with persecution of another species (Anas) which is the main object of the drive (generally at time when flappers or flightless young or eclipse moult adults have been seen in the swamps) but Hypotaenidia having a strong scent draws a great deal of unwanted attention of the dogs and numbers are captured, especially juveniles and then are eaten by the meat hungry natives, in fact considered somewhat of a delicacy. It also appears in numbers in gardenlands everywhere on the island, along roads and in short forest in large numbers, amongst any coconuts which have any sort of ground cover, (long grass, weeds, etc.) and in the margins of tall true forest it is plentiful, but well in the centre of true tall forests it is not common though present. At certain season of the year it ranges widely and becomes nomadic more or less, but I believe adults return to the nesting area. It has spread along the islands to the westward, but just how far along them I cannot say. It is not present on the one farthest west nor is it on Beupre Is. further west again, but it is present in the north to at least half way along the chain of islands. It breeds on the island often rearing two broods a year and I believe often more than two, as young quickly learn to fend for themselves and are driven away by adults. varying numbers of eggs are laid, generally 4 to 6, and are the same as usual in the species elsewhere. So are nests and their situations, in fact all habits seem identical with



those of the species elsewhere. The breeding season is very long, from September to May and odd birds may rear a brood even outside these months. The greater number breed from December to March, at such times all birds appearing to be breeding and young very plentiful.

MAYR QUESTION:- "Native gardens, second growth (?) swamps." Answer:- Inhabits them all. Native gardens and second growth equally and a great deal. Almost all kinds of habitat in numbers and only one to a limited extent. See above.

PORZANA (POLIOLIMNAS) CINEREA TANNENSIS:- Is present on the island and breeds but is becoming rare, numbers having greatly decreased lately. Is most numerous in taru cultivation swamps but even there is not really plentiful. It occurs a good deal in the true tall forests and in original short forest where the growth of the bird nests coral rock ground fern is plentiful, and more rarely in and about native cultivation areas, generally such cultivations as are 4 or 5 years old and have fair ground cover. It does not appear in other habitats at present date though it once did and was plentiful. I saw only fleeting glimpses of a few, the white eyebrow being a conspicuous mark but failed to collect any even with vigorous efforts of all kinds, dogs snares, etc. all proving unsuccessful. I shot and lost one in birds nest ferns, a flying snapshot, but once or twice saw others plainly enough to identify them. The population of this species for the whole island is probably well below 500 probably in the vicinity of 300. Even allowing for its



shyness and hiding ability, I do not think the total numbers can be much above if at all above the latter figure. On Uvea, like Mare Is., this species seems to be rapidly decreasing from some unknown cause and might very soon be entirely extinct on the island. Owing to its rarity observer could learn little of its habits or economy but believes it breeds from December to February inclusive and is inclined to range wide at all season except when breeding.

PORZANA TABUENSIS:-?? (See notes "ZONE BIRD LIFE")

A species thought to be this or a very closely allied race is present in swamp areas, but exceedingly difficult to collect. None collected by me.

PORPHYRIO ALBUS CALEDONICUS (SARASIN):- Is present

and breeds on the island is said by natives to be common, but it certainly was not so during my stay on the island. Less than a dozen all told being seen by me even though areas where they were said to be common were very thoroughly worked. Nor during my stay were signs visible of the bird's presence anywhere in numbers, as no reports of damage to gardens were recorded. Sometimes natives do complain of damage to gardens by large numbers of birds but none occurred during my time on the island and on questioning natives who had been reported as having complained and on getting accounts from them personally of damage done, (reports of damage done and numbers of birds estimated to have been responsible) all reports were found to be grossly exaggerated generally by third party report which quickly increased. It is possible, though I think unlikely, that numbers of birds may appear at times from New



Caledonia. Actually I think the real position is the same as that on Mare Island and what occurs is that at certain seasons this species becomes nomadic and joins in bands to tour the country and at such seasons they do some damage to gardens here and there but nowhere is the damage over more than 1 individual garden, or one or two gardens within a very small limited area. Investigations among natives seemed to bear this idea out fully, even to the point of lines along which decreasing damage of other gardens showed along the lines which the parties splitting up and growing smaller had passed, occasionally to form up with other individuals into another lightly destructive band elsewhere in another area. In all cases investigated damage had occurred at the non-breeding season of the bird and at the one period in garden culture (i.e., at about the same period the year just after first plantings, after burning of the vegetation rubbish left on the ground.) The bird is not so extraordinary shy that even if it were only fairly common its presence would not be quickly noticeable, (in fact Uvea birds are by no means shy as they are on Mare Is.) and this species can quickly be located by the damage and signs it leaves about if it is at all numerous apart from whether or not it is shy and retiring.

On Uvea a few are found about the taru cultivation swamps and it breeds in the uncultivated swamp areas. It is also present in and about native gardens even in dry areas, and is to be found in such places all the year round and breeds in such areas. Water apparently plays little part in its distribution providing gardens are present to supply



food to replace the swamp bulbs and roots, etc. on which it feeds. When it is nomadic it may be found in all types of habitat and doubtless stays for a day or two in any area where food may be found sufficiently plentiful. I have no doubt from local reports that the bird was once exceedingly plentiful on the island, even as recently as 20 years ago, but for reasons unknown to observer the bird has since rapidly decreased in numbers. A similar decrease has taken place in many other mollusc eating birds in the Loyalties and it may be that some toxic properites have developed in certain molluscs in the area which are showing an effect in the bird life decrease, especially those species which are mollusc eaters and feed much on the ground, seemingly pointing to the toxic mollusc being some ground form. One might suspect dogs or domestic cats gone wild for these decreases, but the former on Uvea have long been plentiful even in the days when Porphyrio was very numerous and the latter have not gone wild on Uvea and if they did would probably soon fall to the pot demands of these meat hungry natives as doubtless many of their domestic relatives do. In fact, I doubt the domestic variety would ever be allowed to become plentiful enough to want to go bush and on first showing an inclination to wander would be quickly killed while yet easily available as meat. Natural enemies such as rats and snakes have always been present on the island even in the times when Porphyrio was plentiful so cannot be held responsible for the decrease. This species has an eclipse moult and at such times cannot fly and numbers doubtless at that season fall a prey to dogs, but the number so caught is probably



small as the bird at such a season would retire to quiet secluded areas, seldom visited by dogs or humans. Owing to the rarity of the species, observer personally saw little of its habits and economy but gathered some reasonably reliable data from others and puts it hereunder, but does not vouch for the complete accuracy of it. This may be gauged from the following. By local accounts the bird was more plentiful about the northern swamps (St. Joseph) but when observer visited the areas on several occasions not a single specimen was seen nor did signs point to its presence in numbers and on questioning owners of the swamps they admitted seeing only 2 or 3 specimens a year in recent years, though in the past numbers were plentiful. The amount of damage reported and visible seemed to bear out the conclusions that the birds were present in small numbers and rapidly decreasing. Observer saw more birds and signs of the species in the dryer but intensive garden cultivation areas of the higher central portion of the island (where yams and sweet potatoes were much cultivated) than in swamp areas, either in the north or south, the northern swamps showing a slightly greater population than the southern. The above fact seemed to point to the possibility of the big cyclone in the early thirties being somewhat responsible for the decrease in numbers, as the southern swamp areas suffered salt water inundation to a greater degree than the northern. Questioning of locals seemed to reveal that rapid decrease had taken place long before that. I have no doubt great numbers of nests and eggs were flooded and destroyed by the cyclone and possibly numbers of young also perished, and to a less extent adults



suffered decreases and this mortality, added to the previous decreases in numbers, assumed serious proportions. Close questioning of old men seemed to point to a previous great decrease in numbers, then a sudden increase to large numbers, apparently indicating a influx from elsewhere, (?New Caledonia) then a period of years of numbers, but slowly decreasing. This would seem to point to a colonising movement from some outside area into an area of unsuitable habitat, but such is not the case at least as far as can be seen, as Uvea appears to be an ideal habitat and visible food supplies are not more than 5 per cent in use, and probably not 1 per cent of available food is consumed per annum. Nor are there long periods when at certain seasons food might be scarce as the swamps carry food all the year round and not 1 per cent of that available in such areas is ever used. Observer knows of no reason at all which could account for the status of this species other than some unknow disease or food poison.

COLLECTED DATA: The species is said to nest in uncultivated swamps and to a less degree in cultivated ones and in bush scrub, ferns, tussocks, etc., patches of cane grass, in and about gardens. Eggs 6 to 14 in number generally 8, (? probably 4-6). light brown colour with large brown dark blotches or smaller dark brown speckles in numbers. Incubation 3 weeks. Food, swamps bulbs and herbs, but mainly at present garden products, bananas plantains, sugar cane, yams, swee potatoes especially favoured, taru molluscs and and insects. Probable population for whole island considerably under 1000, probably even below 500. (writer's opinion



250-350 birds in 1938). Writer offered natives considerable amounts to capture specimens for him either by snaring or shooting, yet natives were all of the opinion that they might be so long making a single capture and so many days might be spent in fruitless search that the eventual pay per day of work expended would not be worth while and might even be total loss as the chances were that complete failure would result. I paid numbers of natives full days to work in conjunction with me to collect specimens, but on 8 out of 11 days no birds were seen nor reports of them heard 1 day reports were heard, 1 day 1 was seen and 1 day 2 were seen. This work covered the greater part of the island suitable for the birds and a large portion of the unsuitable and gives a fair idea of the true status of the species if allowance is made for birds unseen. Dogs were used in numbers rather unsuccessfully but by the visible signs the birds simply were not present except in very small numbers. Two specimens were collected casually when not especially after species, more or less accidental, and most of the few sight records of the birds were made at similar times but the total of even sight records was very small considering the amount of territory covered and the constant almost daily work in all types of country over a long period (February-June).

MAYR QUESTION:- Habitats, woodland (?) swamps, second growth? ANSWER:- Yes to both questions, add gardens as main Uvean habitat.

PTILINOPUS GREYI (GRAY):- The commonest species of pigeon on the island and is fairly numerous, but numbers



per square mile are far below even Mare Is. which is below the usual for this species in other groups. Inhabits the tall forests, short forest and garden lands very much as in these areas small fruited banyans on which it mainly feeds are most plentiful, short scrubs to a very limited degree and mixed coconut and scrub areas to a slight degree at certain seasons. It has spread to some of the islands of the western chain but is nowhere plentiful on them, in fact, rather scarce. Feeds on a number of fruits and berries, it does not eat on other islands at certain seasons of the year. All other habits and economy identical with other islands (Mare Is. and the New Hebrides) but status considerably below usual in this species. The lack of food for this species is very plainly shown on the island. In a small area perhaps only 1 or 2 small fruited banyans will be found in ripe fruit and Ptilinopus greyi will be swarming about them; a few days and the fruit is finished and the moment it is every bird disappears and one might have to travel a mile and more before a single bird will be seen or heard. Thus for weeks one will find a small area absolutely devoid of the species, then for a few days simply overrun with them. When no banyans are in fruit the species becomes widely scattered in twos and threes and singles living on unusual fruits and berries mostly. There is seldom a very long period without banyans in fruit somewhere but during March and I believe August-September there are fairly long intervals. The natives profit by the congregating habit of the bird around fruiting trees to capture them, generally by shooting, getting several in one shot more often than not.



MAYR QUESTION: - Habitat mangrove (?) Woodland.

ANSWER: - The former to a very small degree most of the year greatly increasing in numbers at lean seasons. Really a habitat of necessity on Uvea, except for a very very scanty apparently permanent population, these few generally appearing to be strays or lone birds.

MIGRATION: - Possibly migrating between islands?

ANSWER: - Yes definitely, but all movements as regards Uvea would probably be to Lifu at lean seasons and back later. Natives speak of seeing them arrive from seaward (Lifu direction) in calm weather in singles and numbers and in small flocks, though the Lifu natives have noted no similar movements their end. At wide intervals of years great numbers appear on Uvea but never stay long, the greater number quickening passing on, probably to Caledonia, though I could find no records of what direction they went in, and only one record of their arrival in great numbers from Lifu direction, and once during stormy weather from the north or New Hebrides direction. In this case they arrived very tired and weak and natives collected great numbers for eating by catching by hand or knocking over with sticks. This happened at least before the seventies of last century gauged by known ages of old men and mission records, probably about 1861.

DUCULA PACIFICA TARRALI (BONAPARTE): - Is only an accidental visitor from Lifu Island after rough weather. Either departs or quickly falls a prey to natives who make a dead set at the bird once it is reported, till it is shot numbers of



natives spending all day after it, and it generally falls a victim to the pot very soon after arrival. Has never bred on the island. The total number of appearances over many years has only numbered at the most a couple of dozen. I saw one high in flight after rough boisterous weather from a hurricane elsewhere during my stay. In spite of native efforts this one was not shot and either returned to Lifu or went elsewhere or died a natural death, as it was only once sighted again within a day or so of my recording sight. It has no definite local name, is sometimes called the "Lifu Motu," or even its Lifu name "Paum" is used.

COLUMBA VITIENSIS HYPOENOCROA: (GOULD):- This species is not at any time plentiful on the island but its numbers fluctuated to such an enormous extent between February and June that observer was forced to the conclusion that it moves to other areas, probably Lifu island and investigation along that line seemed to point to the possibility of such being the case. When observer first arrived in February, though the species were no ways common, enough were seen (and several shot but because of moult observer decided to wait before skinning the series wanted) to make me consider the bird as plentiful enough to leave it more or less alone till other rarer more important series were finished. Even so observer noted that the species was not plentiful though the numbers seen seemed to be only very slightly below what one would expect the food available on the rather infertile island to support. At the time the following brief memory notes were made.



- 10/2/38 No Columba seen, natives say not common in this area (the area was that in which the small maps for Pachycephala, Nymphicus, etc. were made).
- 12/2/38 Saw and shot 1 Columba. First seen on Uvea, appears similar to Mare Is. ♂ ad. wing the same as smallest Mare specimen. Moults too bad for skin. Put in pot.
- 23/2/38 Several Columba seen not very numerous, appear similar to Mare. This area said to be best in island for Columba (i.e., southern small lakes and tall and short forests there about. Mr. T. (Ubon) a local trader gets boys, Hosea, Paul, and Obed to get birds for him here about Xmas time because they are fattest at that season. N.B. Hosea good boy.
- 31/3/38 1 Columba seen on edge of forest clearing. This bird seems extraordinarily rare (keep notes of sight records from now on N.B.)
- 12/5/38 Getting serious, not a single Columba seen since March. All day today in good area for them and in places where natives reported their very recent presence and none seen at all. Is the species like Ptilinopus and moves about from small area to area or does it go to other island? N.B. see east coast and northeast coast natives, also chiefs of villages all over island for reports of presence of Columba. (touch through native pastor and missionary with chiefs, reward information leading successful capture).
- 25/5/38 1 week since reward offered in all village through chiefs, no reports of Columba yet to hand.
- 30/5/38 No Columba seen, though most of the southern island covered. Natives cannot account for its absence as there are usually a few about, though it is never very common.
- 31/5/38 No Columba seen, though ideal areas covered and areas where in early May native reports of its presence I was told of.



- 2/6/38 1 Columba seen in flight, appeared smaller than Mare Island.
- 5/6/38 Native report of Columba near St. Paul to hand, seen early morning 4/6/38.
- 6/6/38 1 very juvenile Columba shot, St. Paul area (N.T.V.)  
1 other seen, appeared smaller than Mare Is.
- 8/6/38 All day in territory where saw a number Columba on 23/2/38. None Seen. Saw 3 native boys who shoot for Mr. T. and all repeated their previous statement that it was useless looking for Columba at this time as they were too difficult to find and were never fat when found. "All he got no grease now, plenty he too small, picininy no more belong kai kai he too small."
- 17/6/38 On small islands of westward chain, 1 Columba seen flying high between island, appeared adult and fully as large as Mare Island. Iodine unders and white chin patch very conspicuous. Flying very fast and strongly about 40-50 feet up, passed almost directly overhead. Natives say, and I believe it true because of lack of food, that pigeons are rare on these islands to the west and probably are entirely absent on the farthest out ones and those along the southern chain or arm as they lack food trees.
- 20/6/38 Uvea mainland. Afternoon. Went through low forest where Columba reported during my absence. Saw two, 1 shot, very small ♂, skull ossified, had greyish wash chin. Other bird appeared smaller than Mare Is. failed to see chin but gathered an impression it was a juvenile. What date did Sarasin collect his skins? He possibly collected well advanced juveniles as his type specimens. Certainly so if chins are greyish washed in ♂ as adults in ♂ invariably have clear white well feathered chin, ♀ less feathering and suggestion of greyish washed chin. Local natives classify sexes by this though ♀ do sometimes have clear white chins with slight suggestion greyish washed margin to the area.  
(Notes from Hosea on sex identification.)



From the above it may be seen that definitely the bird disappears at certain seasons and the fact is well known to local natives. It is certainly true that the bird is never really plentiful on the island but around about December-February local whites can give a native cartridges and send him out shooting for the pot and can be reasonably certain of the boy coming back about midday with 2 or 3 birds if he leaves very early and goes to a good food area for the species. Whereas at other seasons of the year, full days of hunting might be spent and not a single specimen even seen, as was done in my case. Also I had an island wide watch being kept for the bird, and allowing a large percentage for native laziness in not sending in reports, even so this leaves no possible doubt of an almost total absence of adult birds as only 2 reports came to hand in 4 weeks and investigation in both cases revealed juveniles only. As 4 Sundays were included in this period when natives even if lazy would have little to do to gain the reward and even from the most outlying places came in to the 2 main centres to attend church and merely had to tell at that time when and where birds were seen and I myself with other employed natives was covering all areas which natives did not frequently visit, one can consider it definitely proven that the species had moved off the island in great numbers. Even had 25 per cent of the estimated population present in February remained, I should have had reports numbering at least 4 or 5 a week of its presence even allowing for failures to report sight records and should have seen at least 1 a day average myself. It is also worth recording that though the officers and engineers on the small interisland vessel which calls at all islands regularly,



every 6 weeks, are keen shooters and invariably go shooting pigeons on Mare and Lifu, they definitely declare it is useless going on Uvea because pigeons are too scarce to make it worthwhile and having tried a few times refuse to go now. Occasionally they go after ducks on Uvea, but are inclined to think these too difficult to shoot and only go very occasionally when reports of the presence of great numbers of ducks are told them by local traders.

Investigation along the lines that the bird must go elsewhere, and reports (and later personal confirmation by visiting the areas) that the islands to the west had very few pigeons at any time, left two possible likely areas to which birds might go, Lifu and New Caledonia. Along the south, I could find no definite indication of a movement of birds towards New Caledonia, other than that on Mouli Is. where at most times considerable numbers would appear for 1 or 2 days and then disappear again. This I think was probably when food shortages elsewhere drove them wider afield and in their searches they visited Mouli, probably only shortly before they left for other areas. As regards movements toward Lifu Island, I obtained two native records of having seen birds come from a seaward direction on the east coast but both reports were of only single birds and could possibly have been cases of birds having left Uvea elsewhere and returned. A far more significant fact was that for several days points along the east coast had large numbers of birds about them, then suddenly all disappeared. These congregations were annual and appeared to occur about the one season (though informants varied somewhat in the



times they thought these gatherings occurred). One native reported that on one occasion very early, he saw about 30 Columba rise in a flock and climb to a great altitude, then turn seaward, sweep far out to sea but wheel in a big circle and return to the coast and alight. Questions as regards visibility etc. were fruitless and brought valueless answers. The most significant fact of all was collected at a later date from the native captain of a small 45 foot cutter which trades generally between Lifu and Noumea, but makes occasional trips between Lifu and Uvea. Fortunately I was able to definitely place the date of this record by looking up the log of the cutter which they have to keep for police records, and by looking up the date of their previous Lifu-Uvea trip. This cutter was chartered by me to come from Lifu and collect myself and my gear on Uvea in June, 1938. When about half way between Uvea and Lifu, slightly north of a line drawn between the centre of the two islands, the native captain, who spoke good English, quite unasked volunteered the following information, telling it more as a remarkable occurrence. Early on the morning of November 15th, 1937 (date defined from ship's log) while on his way between Lifu and Uvea and just about the spot we then were (i.e., about half-way possibly a shade nearer Uvea than Lifu) three large Columba and a minute later four more passed rapidly over the ship, flying strongly and fast and fairly high up (?40-60 feet or higher) coming from the direction of Lifu and going towards Uvea. Others of the crew verified the incident, all having been able to remember it well because of the unusualness of



seeing these birds so far at sea. At Lifu where meterological records are kept at the wireless station and radioed in each day to Noumea, I was able to get weater data as follows.

WEI

LIFU	11/11/37	Fine, clear, sunny, light S.W. to S. airs visibility extremely good. Calm sea. Rain 40.
	12/11/37	Very fine, clear and sunny, light S.W. to S. airs, visibility extremely good. Calm sea.
	13/11/37	Fine, calm, sunny, close still weather. Visibility extremely good. Oily calm sea.
	14/11/37	Fine, sunny, light southernly airs. Visibility excellent. Calm sea.
	15/11/37	Fine, sunny, light S.E. winds. Visibility excellent. Calm seas, slight southeast swell.
	16/11/37	Fine, sunny, light S. to S.W. airs. Visibility excellent. Calm sea, slight S.E. swell
	17/11/37	Fine, clear sunny, light S.E. breeze. Visibility very good. Slight sea, S.E.
	18/11/37	Strengthening S.E. to strong Easternly squalls, rain, rough sea, S.E. to E.S.E. Visibility fair.

(These tally closely with my own records of weather on Mare Is. 30 miles away from Lifu, except that I kept no visibility records regularly nor barometer and therometer records which were available but not taken. The native captain's remembrance of the weather at the time tallied also.)



The above definitely establishes the fact that birds do pass from Lifu to Uvea, but leaves much to be desired as regards the frequency of the occurrence and numbers and regularity of such movements. The date seems to accord with natives' accounts of increases of numbers on Uvea and visibility and weather seem such as birds would choose for passing from island to island. There are no records of birds being seen leaving Uvea or Lifu, but this probably takes place very early in the morning. I had one or two vague reports on Lifu, of birds arriving at Lifu from a seawards direction and one very reliable report from Thocking village in the north of Lifu, of a day when during the morning, small parties of Columba continued to arrive at intervals (parties of 4 - 8 or 10) for several hours from 8 o'clock or earlier till 10 o'clock, all from seawards. These birds might have arrived from along the coast, but natives seemed to be very definite it was not so, in fact, some said they thought they came from the New Hebrides (not likely). Weather natives remembered was fine, but other points they had forgotten. Considerable difference of opinion about the time of year was expressed, the earliest date given was January and the latest was May but the majority thought it was either January or February or even a little after that.

From the above data, scanty and vague as it is, I think it is certain there is an annual movement of a certain number of birds to and from the 2 islands. My own idea is that birds cross to Uvea and breed there, not in large numbers, and possibly others cross but don't breed.



The majority cross in October or November and return in February, March. Some few may remain, (some if not all young ones certainly do) on Uvea all the year round, young possibly mating and crossing with others in their second year. This movement has been caused I believe by general scantiness of food on the island, this having been reduced by a hurricane which, though destroying food, did not destroy adult birds, who ranged wide in search of food and reached Lifu. Next season they returned to Uvea to breed and later when the lean season arrived, rather than struggle through it they again left for Lifu. The annual movement having been more or less continued to this time. Even so Uvea is a most unsuitable island for more than a few Columba and could never carry a large population under present conditions and it seems strange that there should be any urge for the birds to return there from Lifu. Only a strong urge to return to the place of birth or previous nesting can account for such movement.

It is very noticeable on Uvea that this species eats fruits on that island, which it does not eat elsewhere. Young birds, according to native reports, eating fruits which seem entirely unsuitable and which in other areas I have only rarely heard of the species eating at such times as hurricanes have destroyed all their usual foods and apparently only doing so in desperation from hunger. Food during the seasons when the birds are more plentiful on Uvea is abundant and varied and could at that season carry a much larger population than is present, though such supplies are subject to sudden or total depletion by hurricanes.



As far as is known to me there is a similar abundance of food on Lifu at such seasons. Columba probably came to Uvea, originally from Lifu probably being driven to leave there by lack of food from hurricane destruction, possibly Uvea having missed the blow, had food for a limited number of birds which may have remained and bred. Later their descendants being forced in their turn to recross to Lifu from food shortage also. Ptilinopus will range wide after hurricanes in search of food and strong fliers such as Columba could and would doubtless do so more successfully and to a greater extent.

Little could be found out definitely about this species on Uvea but the few observer saw led him to believe the species was identical with Mare Is., showing considerable variation in size as on that Island also, with just possibly a tendency to a general average slightly smaller than Mare Is. but with individuals definitely reaching as large a size as on Mare (wing proven). The number of juveniles which remain all the year may have led to the impression of smallness, though actually so few were seen that only vague impressions were made on observer. Certainly the one seen over the western islands was as large as any seen on Mare in sight record and one or 2 others seen in February were as large. Certainly considering the general lack of the best pigeon food on Uvea one would expect any birds remaining on the island, as some probably do, to be somewhat smaller than those on Mare Is. and these birds even if only few in number if seen with a number of other nearer normal birds or on their own would create an impression of smaller size.



Observer very much doubts the validity of Sarasin's sub-species and in spite of failing to collect a series because of leaving it too late the few facts collected seem definitely to point to the invalidating of the species unless Lifu also is included. A tendency to smaller sizes on Uvea might be acknowledgable because of poor food conditions, but observer doubts a full subspecific difference is warranted. The date of collecting of Sarasin's type specimen if occurring between May and August would seem definitely to point to its being an immature and outside those dates could just as likely as not be one also. Though I do not believe Sarasin did so, I believe a collector could if he wished in the seasons when birds are more numerous by selecting only the smaller adults shot (and especially in females which even elsewhere show a range towards smallness) create a series showing a very much smaller race of birds. Even if all specimens shot were taken, observer believes, and it seems more than likely taking food into consideration, an impression of a smaller race might be created quite accidentally and this is probably what occurred in Sarasin's case. One would expect strong large birds to leave the island first (and I believe they do leave definitely) and this would increase the percentage of smaller birds which is probably why such an impression was made on myself subsequent to February observations.

Habit observations were necessarily few and the following are compiled most from reliable natives. Nesting of the species on the island is little known to natives, probably not because of the rareness of the actual happening but because of the natives seldom visiting the tall forest



areas where it mostly nests. All accounts and records obtained of nests (about 5 reliable cases) seemed to prove the bird was identical in these habits to other areas it frequents. Nests being the usual scanty platform of twigs placed on a horizontal branch, pandanus clumb or some secondary level growth in forest 10 to 20 feet above the ground. Egg 1 (white). Probably invariably one in the face of food shortages. Apparently the bird becomes more plentiful about November, December and commences breeding in those months, all being in full breeding in September. It probably arrives there in October and November. All birds having crossed by the end of November and possibly earlier. The majority leave in March probably only late nesters leaving after that and young ones generally remain. These late birds and young feed on vine seeds (hard like corn and about the same size) and on fruits of unusual food trees, some being fruits a species of trees generally only found growing along seas beach margins, such trees depend on water (sea currents) to carry their seeds and propagate them on other islands in many cases. Also the young of the species becomes somewhat like Chalcophaps in feeding on the ground on fallen hard seeds of fruit etc. I have no doubt mortality especially of young is very high, especially from native pot persecution, as though natives say they are thin and not worth eating, I cannot imagine an Uvean saying no to a feed of Columba poor and thin as it might be. A certain number of adults remain all the year but probably very few and the number probably varies according to seasons, non-hurricane years being years of more



abundant food, more would remain possibly and all probably remain to later dates. Years of early season hurricanes or high winds from hurricanes passing elsewhere during December or January making birds leave earlier and in greater numbers.

The species suffers considerably, and on account of its more or less limited numbers, seriously, from white persecution for table purposes. Traders giving natives cartridges to shoot birds for them and allowing the native an extra cartridge to shoot a bird for himself. The species may suffer especially in juveniles from hawks (Accipiter) and in adults from Falco when passing from island to island.

CHALCOPHAPS INDICA SANDVICENSIS:- Not very plentiful anywhere on the island and identical in habits in every way with the species in the New Hebrides and on Mare Island. Favours forests tall and short and native gardens within such areas. Seldom seen in purely coconut areas.

NYMPHICUS CORNUTUS UVEAENSIS:- See individual species notes.

TRICHOGLOSSUS ORNATUS MASSENA: (BONAPARTE):- This species seems to be a visitor from other areas, probably New Caledonia. Some years it appears in numbers, seldom stays long and again entirely disappears not reappearing for a number of years. The years it appears possibly coincide with years of food shortages elsewhere. When only a small number arrive it generally remains but does not appear to breed and is usually wiped out sooner or later by natives



who consider it quite a food delicacy and are keen on its beautiful plumage for making hair pompons for dances, possibly because of its rarity and as even when large numbers arrive its stay is so short, few chances of collecting are given. During my stay, only one was present in the southern part of the island near Fayewai and was always seen in and about one small area and was collected by me. In the northern half of the island I saw only 3 individuals and during my stay natives got 2 of these, elsewhere I saw odd strays but doubt there were more than a dozen birds on the whole island. Being noisy they are conspicuous and quickly fall prey to natives or natural enemies. The specimen collected by me was one of four which had arrived a couple of years before in that area, three quickly falling to natives, 2 within a week and on the following week, but this lone bird had evaded many attempts on its life and was certainly more alert. Being alone it only called at very wide intervals or when in flight and was thus often unseen till it flew when no native would chance wasting a cartridge and so it escaped. As a matter of fact I collected it on the wing on the second barrel after having fired at another bird and not knowing of its presence. Coconuts, a favourite habitat of this species, being plentiful and many suitable hollows for nesting sites, it seems very strange the birds which arrive do not colonise the area. Possibly coconuts alone form an unbalanced ration and the other necessary foods are lacking on the island and birds quickly realize it and depart.

MAYR QUESTION:- Does this species migrate from island to island? ANSWER: Definitely 'yes' both in the



New Hebrides where I have seen it miles out to sea between islands and in the Loyalties where its movements definitely show it does move about. On Santo in the New Hebrides this species used to fly 40 miles night and morning from Hog Harbour and Port Obey (n.e. Santo) to the Second Channel to feed on the extensive cocoa and corn plantings in that area. Night and morning early vast flocks of these would pass south to the channel to feed, returning at sundown to roost in the trees on Cape Quiros the N.E. tip of Santo. They are fast, strong flyers and appeared to make no difficulties about this daily 80 mile flight. This illustrates the fact that nowhere in the Loyalties or between New Caledonia and that group would any sufficiently wide water breaks occur to hinder the species. I have seen them forty or more miles at sea from the nearest land in the New Hebrides.

CACOMANTIS PYRRHOPHANUS PYRRHOPHANUS (VIEILLOT):-

This species is common on the island, commoner than one might expect with one of its main foster parents absent, but it doubtless finds other species to parasite. It calls much and at night, especially on moonlight nights, and its loud and frequent call may be responsible for creating an impression of its being more numerous than it really is, but even allowing for that it is still a very common species. It frequents tall and short forests and native gardenlands in such areas, but seldom seems to visit more open types of country, such as coconuts unless there is a considerable growth of shrubs and secondary growth between them and the palms are not too high. Its habits in all ways appear iden-



tical with elsewhere, apart from this peculiarity and keeping more to cover. It is seldom seen on Uvea to perch high on a dry bare twig or tree and call as elsewhere, generally selecting a tree, teak or otherwise, with leaves and good cover and perching close in under or in the leaf canopy calls from there. It is difficult to pick out at such times and generally speaking, more is heard than seen of the species, though it is often seen in flight when departing after being alarmed or disturbed by presence of observer. On Uvea this species parasites Pachycephala I believe. At certain times when ♀ Pachycephala gives a call which seems to excite and attract ♂ Pachycephala in numbers Cacomantis almost invariably appear silently and remaining still and silent and watching the goings on of Pachycephala. These are probably ♀ Cacomantis looking for prospective foster parents. If humans mimic this call they can almost always attract Cacomantis if any are anywhere about, though a very sharp lookout has to be kept to see the approaching bird as it comes very carefully and silently and low down and is apparently watchful and wide awake and appears to be peering here and there all the time.

Observer may be wrong but gathered an impression that the Uvea bird showed some plumage differences to Mare Is.

MAYR QUESTION:- Parasitizes which species? A.  
On Uvea Lalage much and though I did not actually see any fostering young I believe Pachycephala much. Myiagra is also parasited to a limited degree. Zosterops lateralis may be parasited but observer believes only to a limited extent. Lalage for certain and Pachycephala I believe are the 2 main



foster parents of the species on the island. Occasionally Myzomela and Lichmera may be parasited, but such cases are very rare and more or less accidental in observer's opinion.

CHALCITIES LUCIDUS LAYARDI (MATHEWS):- When observer first arrived on Uvea he thought this species was almost absent or exceedingly rare, but later observations led him to the conclusion that the birds were only rather silent at that season (February, early March) and not calling much. It never became very plentiful on the island in comparison with numbers on Mare Island, but during April, May and June, numbers were quite in accord with what one would expect on the island taking into consideration food and the numbers of its foster species. It is rather shy and wary. Males generally perch high on an exposed dead twig, often protruding from a clump of green leaves, or a dead tree, and call much from that position, the usual thin, high note, though often somewhat more robust than the calls on Mare, (but in that observer may be wrong and the greater number of immature calls on Mare may be responsible for this impression). Females are generally found low down near the ground and seldom call, mostly passing silently through the scrubs, close to the ground (up to 5 ft. generally within 3 ft.). Both sexes feed generally within 10 feet off the ground and more often within 5 ft. off the ground. When resting in the heat of the day and not calling ♂ generally perch 10 feet or a little more above the ground, ♀ often within 2 and 3 feet and seldom above 4 feet and almost never above 8 feet from the ground. This species is fairly common in and about the mangroves of the tidal lagoon arms,



generally being found all over them at low tide and in the margins at high tide or in scrubs and forests adjacent. Sometimes even at high tide individuals will be heard calling or seen far out in the mangroves at high tide, often in an isolated bush with 3 and 4 feet of water under them. They range much wider and into areas in which their foster parents are never found, often appearing along absolute beaches and on dead trees thrown up by the sea on sand spits etc. considerable distances from vegetation. They range out along the islands of the western chains both in south and north and are said to be even plentiful along the southern islands of the lagoon. I saw them along the northern arms but they were not plentiful, possibly even in smaller ratio than on the mainland. According to local accounts numbers do not vary and during my stay they did not. I think local accounts are reliable as the bird is nowhere common and was unknown to 90 per cent of the natives in all areas except the tidal lagoons where it was better known to native residents. I had great difficulty getting the native name for the species in the Fayuwai district and only old men there had any idea of it but were in doubt. Though the bird is present in the area and quite up to numbers one would expect, many even old natives had never seen it and many had only once seen it before. This was probably not so much due to its scarcity as to the poor quality of Uvean bushmanship; but if the species were subject to sudden increases in numbers as on Mare it would force its presence under the notice of local natives, especially the women working in gardens regularly. Actually women knew more of it than men but few women had seen it more than once before and to many it was entirely unknown,



they claiming never to have seen it, though some had occasionally heard its calls, they said, when I mimicked it. The excited much calling behaviour of Chalcites which occurs on Mare at times of increase of numbers could not possibly pass unobserved if it occurred on Uvea, and such would preclude the obscurity under which I found the species on Uvea as regards native knowledge of it. While skinning specimens, invariably word went round and natives gathered to see the rare bird they hardly knew or knew absolutely nothing of. Strangely those who knew a little of it, (especially in the tidal lagoon arm area) called it a big species of Zosterops and say it is always found with a small party of Zosterops. In that area (tidal lagoon) nine times out of ten it is found near parties of Zosterops and elsewhere it seems to be half its time close to Zosterops. Observer thinks that the real reason is not because it parasites Zosterops but because Zosterops becomes excited at it and is inclined to gather round it and chatter at it.

Gerygone, which is plentiful in the mangroves starts the ball rolling and actually attacks Chalcites, Gerygone becomes very excited and gives agitated calls which excite Zosterops which also gather round giving excited calls, apparently not attacking. When Zosterops moves on Chalcites goes on with them to get away from Gerygone and it is noticeable that when alone Zosterops tolerates its presence and does not seem at all excited providing no Gerygone are about. Observer was given the impression that Chalcites was inclined to use a small flock of Zosterops as a screen to cover its approach and movements as several times Gerygone seemed to overlook



the presence of Chalcites when with parties of Zosterops though the slightest movement on the part of Chalcites when it was travelling alone would draw Gerygones attention and excite it. The general activity all around with a flock of 6 or 8 Zosterops effectively hide such movements as Chalcites might make, (but generally speaking Chalcites moved little) but if Gerygone did stumble on it there would be great excitement, Zosterops joining in but soon tiring and recommencing to feed, and moving on when Chalcites would move on also. Gerygone never quieted down till Chalcites had gone on. I never once saw Zosterops feed Chalcites nor in any way appear to show it any attention or affection and when Chalcites remained behind Zosterops never returned or showed the least interest in the fact that it was longer with the flock.

In observer's opinion Gerygone is the only foster parent on Uvea.

TYTO ALBA LULU (PEALE):- Though I failed to collect this species on Uvea, I several times heard it and had numbers of reports from natives of their having seen it during my stay on the island. Evidently at this season of the year (February-June) it becomes much quieter and more shy and retiring as it was during the same months that I failed to collect it on Erromanga in the New Hebrides. (I believe I have since found a way to collect a few during these off seasons). It seldom calls, even when hunting at this season and is generally much more silent and elusive. I saw wings and feathers of the species during my stay on Uvea and the wings certainly looked similar to Mare Is.



specimens. Natives know of and speak of its habit of being controlled by the moon and say the best time to collect it and when it is most often seen is at the full moon. Though not seen by me alive (I saw a decomposed dead one seen in the bush) during my stay, I believe the species is plentiful on the island and from native accounts it is very common and plentiful in the latter half of the year, becoming active and noticeable in August. From what I could gather it seems identical in habits and economy to elsewhere in the Loyalties. (Only 2 weeks before my arrival, a trader shot one in a tree within 50 yards of my camp). This would be probably one of the last of the ones seen about at the common season before retiring, the bulk of the species having already retired by then, February 1st. On Uvea as elsewhere, this species seems to suffer from some plague at wide intervals, numbers being found dead about the place for no apparent reason. Observer believes if careful note is taken on the weather before and during such times it will be found that not a plague is responsible but rough boisterous, rainy weather coming at the time of the full moon so that birds have bad hunting for 6 weeks instead of only 2 weeks (new moon) and simply die of weakness and starvation. The condition of the birds, amount of fat, increases and decreases with the moon (proved by actual observation) and I think it is very probable the margin of reserve is insufficient to carry the bird through the longer period of poor and bad hunting because of bad weather. This would account for the apparent irregularities in the occurrence of this apparent plague and the times of finding of birds dead for no apparent reason.



COLLOCALIA ESCULENTA UROPYGIALIS (GRAY):- A common species on the island, but by no means common as Collocalia spod. leuc. during the greater part of if not all the year round. Its habits and behaviour are exactly similar here as elsewhere, this species favouring less open places than other Collocalias, and even hawking much below the treetops in absolute forest areas and generally closer to the ground than others, and seldom visiting really open types of habitat. It does hawk occasionally above treetop level but seldom very far above, and never for very long, periods. Along narrow tracks and road, between scrub or forest, between coconut palms, and low near the ground, being favourite hawking areas. In and above native gardens are also favourite places for feeding. It seldom visits open grass paddocks or areas of any expanse. Will hawk amongst coconuts, come to the margin of an open grass area and turn back through the coconuts or along the margin of the grass area, often not going more than 15 feet into the open area. Nest and eggs usual.

MAYR QUESTION: Nest under branches of big trees?

ANSWER: Yes where sheltered from weather and not subject to water drainage around the limb in wet weather.

COLLOCALIA SPODIOPYGIA LEUCOPYGIA (WALLACE):-

See notes under Notes of espec. species Zones of Bird Life.

HALCYON CHLORIS CANACORUM (BRASIL):- A common species on the island being identical in habits to birds of Mare Is., though it is more plentiful on Uvea than Mare Is. per square mile. Is very common in and about the



cultivation swamps, native gardens even in dry areas and well inland, in fact almost everywhere on the island except forest, where though plentiful, its numbers are not so great as elsewhere. Nesting and general habits are usual, nest being in a hollow limb, eggs 4 white. Season very long, from October to April and even some outside those months.

MAYR QUESTION:- Habitat Near the beach (?), forest native gardens (?). ANSWER:- On Uvea in all 3, least plentiful in forest. Is very common in coconuts and iron woods (casuarina) about beaches, on rocks and reef at low tide, on sand beaches etc. Has spread all along the western island chains and appears on Beaupre Is. Inhabits natives' gardens a great deal, often 1 and up to 3 pairs (and for large gardens more) of separate family parties inhabiting one individual garden area, spending most of their time in and about it.

LALAGE LEUCOPYGIA SIMILLIMA (SARASIN:- A very common and plentiful species on the island found in numbers in every type of country except claypan areas, though even in that area it is about the most plentiful bird. Feeds in great numbers in swamps under cultivation or fallow and is fairly plentiful in natural swamps. exceedingly plentiful in gardens and low forest and tall forests and very numerous in coconut, at most times and always a few found about coconuts. This is about the only species fairly numerous in the low wind blown scrub on the east coast where it feeds on top of the leaf



canopy. Breeds on the island from October to February, mostly about December, I believe. Eggs 2, Colour as on Mare, green with blotches. Nest identical with Mare Is. more cup-shaped than on Tanna.

MAYR QUESTION:- Habitat Forest (?).

ANSWER:- Yes and elsewhere as above right down to sea level and margin if vegetation is present and at all altitudes from the ground upwards to above the tree-tops. Often flies in play well above coconuts calling and fanning its tail. Favours banyan trees.

QUESTION:- Food Caterpillars, small fruit (?)

ANSWER:- Yes, fruit and berries, quite a lot, especially the 3 small fruited fig banyans (red, yellow and purplish small fruited and leaved variety of banyan). The bird is almost always to be found in and about these banyans. Observer believes they originally became fruit eating because these banyan fruits and other berries often have a large number of weevils or insects inside them (which have entered generally at the eye nipple on the end) and the bird found swallowing whole fruit the easiest form of capture in bulk. Now it eats fruits without insects inside. It prefers insects and caterpillars but fills up on fruits and berries, probably finds this food more easily obtained at most seasons. Probably why the species is so plentiful is because at hurricane times when all fruit is destroyed, insects increase and it lives then wholly on such, thus not feeling any lack of food on the rather infertile island because of large supplies of insects at such seasons does not have to compete to so



great an extent with other insectivorous species. Generally speaking, dual food (fruit and insect) feeders are plentiful in hurricane areas, Zosterops, Aplonis, Lalage, etc.

RHIPIDURA ? This species has only just arrived on the island and is entirely unknown to natives. I sight recorded it at the one place only and actually once shot it and lost it in the birds nests coral rock ferns on the ground. Observer saw it reasonably plainly enough to be sure it was R. s. verreauxi the same as on Mare Island. A native (one of the best bushmen on the island and one who visits forest areas more than most natives on Uvea) with me also plainly saw the bird and stated it was foreign to the island, though he knew the same bird and had seen it on Lifu and in New Caledonia. I searched much of the island with great thoroughness but only in that one spot was Rhipidura seen, though several natives said they had within the last few years only seen the bird in several places on Uvea, but it was exceedingly rare. (? Uvea observation value) Even so I doubt there are more than 20 pairs on the island if that, and it certainly has only arrived within recent times; knowledge of the bird being entirely unknown to very old and old men. From somewhat vague ideas of times of seeing, I would place the time of its first arrival as not before the big cyclone in the early nineteen thirties. Actually it might be today considered as an accidental visitor as the species may not be becoming established. There are no visible reasons why if both sexes are present it should not become established.



MYIAGRA CALEDONICA VIRIDINITENS (GRAY:-UVEAENSIS (SARASIN):- Observer

did not have the opportunity of actually comparing specimens from Uvea and Lifu side by side, but judging from memory of the amount of variation in the white on the tail tip, doubts whether Uveaensis would stand, and it would be hard to know just where any line of demarcation could be drawn as regards white on the tail. As far as I can remember specimens from both Lifu and Uvea show a wide range of variation in the white on the tail. There may be other differences present though observer doubts they are regular. Observer believes Myiagra is one of the later arrivals on Uvea, probably from Lifu, and is not yet fully established or rather has not yet reached its full numbers on the island. Considering the suitability of the area and the great amount of food supplies of this species which are available, its present numbers do not represent more than 10 to 15 per cent of a normal population for this species. Naturally in such a position of evolution, a new subspecies is possible or may be even only just evolving and the latter may actually be the case at this date and account for the variations, though in the face of variations on Lifu it seems doubtful.

Though a fair series were collected, these took a considerable time to complete, and the species was sufficiently rare to warrant every sight record if it being recorded from day to day. Sometimes several days passing without it being seen.

It seems to be very evenly distributed over tall forest, short forest gardens, and coconut area margins and mangroves and coastal scrubs where such exist, with a slightly



denser population in the tall forest margins where they touch coconuts and garden lands, and to a slightly less degree in mangroves and coastal scrubs. Even so they are by no means common and rare compared to their usual numbers on other islands, in any areas. They are found evenly but widely distributed in all areas except the salt pan areas and a few visit these areas at rare intervals in parts which are not too distant from some form of cover. They are one of the few regularly though wide distributed inhabitants of the close growing pole like 15 feet ti-tree scrubs along the east side of the island and on the top of the coral outcrops. They appear to be a still expanding species, birds ranging widely at non-breeding seasons and inhabiting new areas. This ranging has spread out along the western island chain but only a thin population is present in most cases I believe, though they seem much more at home in this habitat and to be comparatively more plentiful than on the mainland on some of these islands. As regards habits, the race seems very similar to all others of the species on other islands and groups. Feeds generally from 8 to 25 feet seldom going higher, though often lower. Is generally a quieter bird than usual in Myiagra and much slyer, being rather hard to call close to observer generally, though sometimes it will come very close. It will answer a mimic of its "zzz" or scissors grinding call more readily than the "QUIN QUIN" call, in other areas it is generally the other way about.

Nesting habits seem usual. The breeding season seems very long, from September to February probably and numbers even breeding outside those seasons. The absence



of immature ♂ was most noticeable and quite unaccounted for. Only 2 being shot. Observer believes it very likely there is a ♀ preponderance in the young to increase the species and more rapidly populate the area, but a series of nestlings would be necessary to prove this. The bulk of the birds probably breed in November-December and it is more than likely that numbers of birds rear 2 broods a year from what natives say. Natives themselves report increasing numbers over the years and a wider spreading of the species, very gradual and small, almost imperceptible from year to year, but noticeable over a number of years.

GERYGONE FLAVOLATERALIS ROUXI (SARASIN):- Observer very much doubts Sarasin's differences, though the Uvea bird may be different (doubtful) when close comparisons are made, but I don't think the differences stated are correct. This species was confusing on Mare Island, but later I managed to sort it up. Juveniles keep the yellow washed unders in many cases till the end of the first year (skull ossifies at 6 months) but in some case loses the yellow wash very early in the first year. The eyebrow streak is an almost invariable rule as regards age, if this is yellow the bird is in its first year, if white or grey it is in second or later years. On Mare the preponderance of these yellow washed unders in the lower ti-tree scrubs on the plains and their rareness in forest areas was doubtless due to the crow (Corvus) destroying young in forest areas. Had conditions been normal, doubtless yellow washed unders would have been just as plentiful in forest areas also and would not have



so confusing to observer. Only with a good series of specimens from all 3 islands on the table together in this variable species could the real position be arrived at as regards races and their different characteristics as in the field passing from one island to another the impression of all 3 being the same is given because habits and behaviour are so alike and songs are so similar. Probably the only differences would be the amount of white in the tails (size of spots and on which feathers). One gains a slight impression that Uvea birds seem the most robust having a slightly louder and more robust song possibly heavier (? doubtful) and fatter, Mare race next and Lifu the weakest song and less robust bird. Weights of males adult definitely show such a tendency; females probably because of few numbers to a less degree. If Sarasin is correct, evidently the white on tail goes irregularly to weight. On all islands males appeared to greatly outnumber females and especially so on Uvea. Observer believes this is not a true picture of the sex ratio and the reason was that females were much shyer and did not approach so closely to observer and when two birds are seen which know of observer's presence if the furthest away is shot it is generally a female. Results of Lifu bore this out. Also generally speaking, females hunt very close to the ground in thickets and are more generally overlooked or manage to disappear more rapidly in the denser undergrowth, only being visible when at too close range for shooting. Observer believes there is a slight male preponderance, but not excessive, on all islands, though on Mare the position is not normal in many areas and anything is possible in such places.



On Uvea the species is evenly distributed throughout the tall forest, a pair being found every so many yards (50-60 yards) and it feeds at all heights right up to the underside of the leaf canopy of the taller trees, but mostly frequents the smaller trees and shrubs of the secondary sized trees up to 15 and 20 feet. Generally spending most of its time 10 and 25 feet (or 10 and 20 feet even more so) up searching along twigs and under leaves for minute insects. It is inclined especially in forests to be shy and possibly creates an impression of being rarer than it actually is. In low forest it is very much more plentiful and feeds at much lower levels from the ground or close to it (much) to 15 feet or so. In low scrubs and about old gardens in secondary growth it is less plentiful and often rare and feeds at low levels.

It builds the usual Gerygone nest, appears slightly larger than Mare Island, being fatter and more rounded, lays up to 4 eggs (white) and I believe occasionally two birds lay together. Almost invariably selects a dark close leaved tree to place the nest in, from within a few feet off the ground up to 15 feet (one old one seen at 20 feet near a Nymphicus nest in a clump of suckers on trunk of a teak tree). Breeds from October to January mostly in November and December. Is of course parasited by Chalcites but to a very limited extent. (In passing, a native told me a tale. "Often Myiagra will chase Gerygone"- (natives names were used of course for the birds.) You have seen it? It is thus because the man (♂ ad) sometimes sleeps with the female Gerygone and because if it is a female Myiagra she is cross



with the seducer of her husband. This we know because sometimes the female Gerygone gives birth to a black egg quite a new theory on parasitism, though they do not doubt Lalages virtue evidently though it is parasited by Cacomantis but I doubt they know this or often seen Lalages nest. The extent it is parasited by Chalcites is quite normal and not like the absolutely abnormally excessive degree to which it suffers on Mare.

PACHYCEPHALA PECTORALIS LITTAYEI (LAYARD:- One of the commonest species on Uvea and has spread even to the farthest island, out on the chain running to the west. It is plentiful but regularly spaced in all the tall forest areas, a pair or party every acre or so, except in the margins where tall forests adjoin garden lands (and in some cases short forest) or short scrubs, in such places its numbers are exceedingly high per acre. In tall forests it feeds up to 30 feet and occasionally higher and spends 90 per cent of its time within 10 or 15 feet off the ground and the greater part of that within 4 to 10 feet off the ground. It will actually feed on the ground, often searching in and about the butts and leaves of the birds nest rock fern for molluscs (small tree molluscs) and insects. In short, in forest behave exactly the same except that it feeds at lower levels generally and seldom goes above 15 feet and never above 20 feet. It penetrates out into low scrubs but does not remain and is generally scarce in such areas, except at times of waves outwards. To a limited extent it inhabits the pole-like ti-tree scrubs of the east



coast but does not seem to find it a congenial habitat except along the landward foots of the coral outcrops of those areas. In such places it probably really belongs to tall or short forests and only penetrates these lower scrubs from there returning to the more normal habitat regularly. It is definitely a forest bird on Uvea only going out to the more unusual habitat probably because of its large numbers. Its greatest densit of population is in a narrow strip in each between the margins of tall and short forest, closely followed by all areas of short forest and somewhat further down the scale, though very regular in number, the tall forests. Odd ones appear in mangroves fairly frequently and in quite unsuitable habitat far from natural habitat at rare and wide intervals. It often appears in unnatural habitat close to natural habitat.

It is a very noisy species calling much, the usual Pachycephala calls and is capable of a small degree of mimicry in his softer lower calls. Some days it is silent or calling very little and other days it simply makes the forest ring with its calls, at times in areas of large numbers almost making one's head ache. It loud call is very loud and can be heard at distances of a quarter of a mile at times.

Females or sub adult males have a peculiar low call suggestive of helplessness which is given for long periods 4 and 5 minutes accompanied with a trembling all over and wing motions which has an extraordinary effect on all Pachycephala in the vicinity. The moment the bird



commences it all birds close to it become extremely excited, father round, and call almost constantly. No attempts being made to mate with the bird or come closer than five feet (occasionally 3 feet) and generally most birds stay in the trees at higher levels than the caller and within a circle of 20 yards or so. Quickly birds at greater distances gather and soon anything up to 40 or more birds are in the small area, males generally predominating, jumping excitedly about, seldom still for more than a few seconds, and all calling loudly and excitedly, almost deafening an observer. The caller remains in the one position giving the one call, other birds often chase each other and apparently savagely fly at any bird they think they can bully, females being especially pugnacious. The moment the caller stops, calls die away and birds begin drifting back to their normal areas and feeding and calling. The caller carries on normally as if nothing had taken place. I could see no meaning to the whole performance, though I several times saw it from start to finish and several times heard it taking place at some distance away.

If no calls are made both sexes are about equally shy, possibly the male adults being slightly more so than female phases, juveniles are generally rather curious and inclined to come close. If low squeaking calls are made females and immatures simply flock around one - even perching on observer if he is very still - the male adults come fairly close and call excitedly and much, but are very



much more standoffish than females. Male adults considerably outnumber females especially if allowance is made for immatures in female plumage. Generally speaking males hunt and feed at higher levels than females, the females feeding more in the denser lower scrubs near the ground, seldom above 8 feet from the ground, thus being less easily seen and creating an even bigger impression of the lack of females. A single squeaky call will bring them with a bounce from all directions within hearing. Both sexes share in the brooding, though males do little actual sitting on eggs, though they do a little covering of young. Generally speaking, males occupy the nest while females are away from it feeding. Males will often perch right alongside a nest with young birds in it and utters a low soothing call, while the female works hard collecting food for the youngsters. The male does feed young a little, but the bulk of the feeding is done by the female, the male more often hopping about in adjacent trees and calling much.

Nest (sample sent) is the usual Pachycephala nest, generally placed in a clump of vines at the top of a small tree (secondary growth) 10 or 15 feet from the ground though often very much lower and even as low as 4 feet. Generally, a thin 3 or 4 cm. sapling with a bunchy top or vine entangled, is selected, a tree generally too thin to support a human climber, though I saw one nest placed against the trunk of a teak where a clump of sucker growth occurred. Eggs, two, said to be warm pinkish brown or chocolate with dark blotches and a distinct zone at the larger end. Nesting season, odd ones almost all the year



round, more than one brood often being reared in a season. It is rare for it to nest during February-March and April but odd ones do breed then I believe. The season of most breeding is from October to December (and very early January a few stragglers may nest, generally having young by then).

AOKIBUS STRIATA ATRONITENS (SARASIN):-

MINOR (SARASIN):- Fairly

numerous in places on the island, though not exceedingly common. Inhabits all areas, or rather visits all areas, but is not as common in coconuts and swamps as elsewhere, unless some trees are in fruit in such areas. It feeds much on the figs of the small leaved banyan and other fruits paw paws etc. and so is common about native gardens and short forests especially, and almost as common in tall forests. The old teak trees often killed and left standing in native cultivations are an added attraction to the birds as they afford many suitable nesting hollows. Unlike Mare and Lifu Aplonis the birds on Uvea never use a rotten broken coconut palm trunk to nest in but nest in hollows in trees of all kinds but generally a teak or banyan (actually there are fewer broken coconuts on Uvea than on other islands, palms generally simply lying down entire before the force of the wind rather than snapping as in most cases their root system is less plentiful or is in sand and has no grip.)

Aplonis is a dual feeder, feeding on fruit, berries, insects and molluscs. It feeds much on the latter in the forest capturing the large indigenous forest snail (2" and 3" long) cracking the shell on adjacent stones and



eating the animal in large chunks. This food and habit being common to all the Loyalty Aplonis, and forming a not inconsiderable percentage of their food.

Both sexes are easily lured by squeaking calls as long as observer remains unobserved, but quickly take fright on seeing humans. The species suffers some persecution by natives for food, youths usually setting noose snare for it at a ripe partly eaten paw paw.

Nests from September to December and January and odd few may nest outside those months. Nests in hollows and cavities, eggs 2 to 4. (Light blue? native hearsay only).

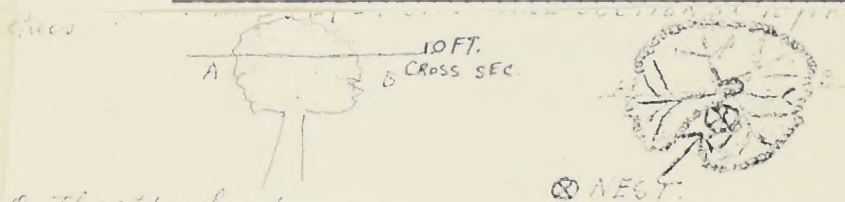
LICHMERA INCANA INCANA (LATHAM):- One of the commonest species on the island. Anywhere where coconut palms are its numbers per acre are enormously high. An exceedingly active pugnacious species, identical in habits with birds of this species in New Hebrides and other Loyalty Islands. It feeds on nectar and small insects, often pursuing a small moth or butterfly or winged insect on the wing and capturing it. It feeds much of nectar attracted insects with the nectar but entirely non nectar insects form a large part of its diet. It must do an enormous amount of good to agriculture in keeping insect pests in check on coconuts. It also frequents the margins of forests and scrub lands for a short distance in, but never very far into such habitats. Mangroves are also a favourite habitat and numbers in such habitat are very high. It will feed across swamps, but not if these have no coconuts about them. A true and regular guide for its



distribution except in tidal mangrove areas is the coconut, if coconuts are present in any type of habitat Lichmera will almost certainly be present.

This species nests more or less all the year round, some birds rearing as many as 3 broods, most year 2 broods, one about July or August and one about December. Nest is a cup-shaped nest of bark and fibres placed invariably in a close dark leaved tree at varying heights from 6-8 feet up to 20 feet, but generally about 6 to 10 feet from the ground, very rarely lower and seldom above 12 feet and very rarely above 15 feet. Generally the site of the nest is close to the outer leaf canopy (amongst the small twigs) but where a cleft or indentation appears in the outer contour of the foliage and thus often well in towards the centre of the tree thus

PLAN: BIRDS EYEVUEW OF TREE SECTION AT 10 FT. ABOVE GROUND.



On the other hand, if the nest is not well in towards the trunk of the tree it will be seen that immediately above it an outwards bulge in the vegetation forms a ledge or cover of some sort. Birds often leave and approach the nest via the centre of the tree and the opposite side of the tree. Nest is well hidden and inconspicuous and considerable camouflage is used to conceal it, it being noticeable bark and fibres blending with the surrounding twigs almost invariably being used. Eggs 2 White with reddish spots and a tendency to and often distinct zone at the larger end. Red



spots generally not plentiful except about zone if one is present. Incubation about 8 to 11 days I believe.

(SEE ALSO NOTES SPEC. SPECIES AND ZONES BIRDLIFE.)

MAYR QUESTION: Habitat. Forest (?)

ANSWER: Only margins unless coconuts are present when it will be found in them and forest close about. An almost invariable rule.

Food "Insects and nectar (?). Both in about a 60-40 per cent ratio on Uvea. Nectar is invariably vomited on shooting and can only be traced in the stomach by tasting with the tongue, though large drops of it often come out on feathers. If shot against the sun a glint of light may be seen on the shower of drops and sometimes even a jet of nectar as it is vomited at the second of shot impact. I have seen birds often vomit when suddenly frightened either by being suddenly attacked by another Lichmera or by a hawk passing overhead or by the sudden impact of an arrow or stone alongside it. I once had a spot of this fall on my hand and several times on my face or clothes, and on tasting it was definitely nectar. (Once it was not nectar, but I didn't taste it that time as it was easily classified). Doubtless insects attracted to the nectar and in it are also eaten, but as stated, the species eats numberless other kinds of insects providing they are small, evidently because of the tiny stomach the species has. I am not sure whether it is an insect eater which has turned to nectar eating, or a nectar eater turned to insect eating, but think it is the latter. Probably another case of "hurricane area" bird economics. Hurricanes destroy all the flowers and vegetation which does



not appear again for months, thus destroying natural food for nectar eaters. Insect life after a hurricane increases enormously, an ideal breeding ground for them having been formed in the masses of rain soaked leaves and vegetation rotting on the ground. Nectar eaters, being starved and not entire unused to small insects eaten along with nectar, should not find great difficulty in turning to an entirely insect diet and be able to exist on such till flowers returned, when it would probably not entirely lose its habit of insect eating. Coconuts flower regularly every 3 or 4 weeks, a more or less regular continuous cycle, continuing unless a hurricane damages them, when flower may not appear for months. As populations in coconuts have increased, the birds have turned more from nectar to insects till the present ratio of 60 per cent insects and 40 per cent nectar is the rule. Naturally when vomiting on shooting (Myzomela also does this) insects also may be carried out of the stomach and in collected specimens' stomachs appear more or less empty, though if tasted reveal nectar, which if put on the tickets might lead to the impression that nectar was in almost all stomachs and insects in only a few. This would be wrong as eye observation of the birds feeding shows definitely that insects form the major part of their food. On the other hand, unless tasted the stomach residue would give an impression that insects only formed their sole diet, quite a wrong impression again which is disapproved by eye witness of bird chasing small moths dislodged from the bark of trees and fluttering and turning in the air for half a minute or more sometimes to make a capture. Their clumsy efforts at



such times point plainly to their not being natural feeders of this sort and their often ungainly antics show in vivid contrast to the ease with which Rhipidura or Myiagra would make the same capture. It is not uncommon to see them feeding thus, in fact almost every day several instances of it may be seen (though often the insect is invisible to observer unless a moth or some such) and some days hundreds of times, if one understands what is happening, may be seen and the persistence of the species in making a capture in spite of many misses is amazing. The species can hover or dart quickly in a straight line, but an erratic insect ties it up and the beak is most unsuitable for capturing insects thus. Very seldom are large insects tackled, even if stationary, the minute stomach probably being unable to accommodate such, and the bird consequently spends most of the day feeding. Even so, comparatively it must eat a much small total weight of food per day in relation to its body weight than most species of birds, the concentrated food value and energy contained in nectar making up the balance lacking in the weight and body ratio.

MYZOMELA CARDINALIS LIFUENSIS (LAYARD):- One of the commonest species on the island in its normal habitat i.e., tall forest and short forest, about the margins of natives' gardens and in low scrubs if coconuts are not close about. This species has been and still is being driven away from coconut areas by Lichmera. Under some strong impulse it visits such areas at times, but leads a terrible life, being constantly chased and harried by Lichmera, till it soon returns to forest areas. It subjects Lichmera to



similar treatment when Lichmera comes into its habitat or near its nest. It is a most pugnacious species and will chase any sized bird from the vicinity of its nest.

It feeds mostly in the upper leaf canopy, though it visits lower levels to an enormous extent also. Males generally feed higher than females or immatures, the two latter generally feeding at levels up to 15 and 20 feet, though female adults go much higher and also feed a great deal in the upper leaf canopy. In lower scrubs of course the general height of all is proportionately reduced, but ratios remain about the same as regards levels of feeding. Male adults outnumber female adults by about 3 or 4 to one only, and immature males number about 2 to 1 of female adults but probably equal female juveniles. Female juveniles breed exceedingly early before complete skull ossification has taken place. Male immatures do not, being driven off by male adults. All sexes and ages may easily be called even from the greatest heights or distances by squeaking calls, some becoming very excited and even making darts at observer if calls are continued, though immediately ignoring observer and becoming normal and resuming feeding if calls are discontinued.

Nests during the greater part of the year, the majority breeding about November to January. More than one brood a year is common. Nest a neat small cup of fine roots and fibres placed in a small fork in a clump of leaves, or amongst suckers on the side of a tree at varying heights from 10 feet to the upper leaf canopy and often actually in the canopy if such is 25 feet only from the ground. Eggs 2



white, may lay more occasionally, but that is open to doubt and is not usual.

Food:- Nectar and insects in a 60 per cent nectar 40 per cent insect ratio, just the reverse to Lichmera. Vomits nectar on shooting. Appears very similar to all other Myzomela known to observer in habits, except that it is more silent than usual, though its song (male only) is pretty but rather weaker than usual; and that the sex ratio is very much nearer normal than usual in this race and the ratio of immatures (of both sexes) to adults is extremely high.

Mare Island is said by natives to have had as plentiful a population of Myzomela as Uvea before importation of the crow, and if so the crow must have killed Myzomela in hundreds of thousands on Mare. Possibly Myzomela's pugnacity was its downfall on Mare. On Uvea Halcyon will not face its attacks.

MAYR QUESTION:- Why is it absent on Uvea and Mare (?).

ANSWER:- KNUTZ (see above) lack of observation of Sarasin as it has always been plentiful on Uvea and was on Mare Island up till about 1924 or 1925. Mr. Rordorf of that island (resident there from 1919) noting its gradual decrease till then and its terrifically accelerated one since then. (1939, Jan. 1) A recent letter from Mr. R. reports a very small increase in the last year, but says it is very slight.)

ZOSTEROPS LATERALIS NIGRESCENS:- A common species on the island but rather nomadic, appearing very plentiful in an area for a time then being almost absent and later appearing again. On first arriving on Uvea, I first thought the



species rather rare then it became very plentiful. Even so it is not as plentiful as usual for Zosterops flavifrons, though it is possibly more plentiful than usual for Zosterops lateralis when such are inhabiting an island with Zosterops flavifrons. This is the only Zosterops on Uvea and natives know of no accidental appearances of any Zosterops flavifrons at any time. It is found in all types of habitat though rare in slat pans, only visiting them rarely. This bird has spread to Beaupre Island and all the islands of the west chain, and is probably the most plentiful bird of those areas, though it has adopted somewhat different food habits in those areas to what it has on the mainland of Uvea. It feeds much on fruit, berries of Lantana being a favourite fruit, also paw paws and the small red, and red and yellow figs of the small leaved banyans. Many other fruits and berries and seeds are eaten and many insects, the ratio varying much during the year, but probably being somewhere about 55 per cent insects 45 per cent fruit, though at certain times and places this would vary to as much as 10 per cent insects and 90 per cent fruit, and at times of hurricanes possibly reaches 100 per cent insects. If fruits are available I believe it very likely the bird would maintain about a 70 per cent fruit 30 per cent insect ratio in its diet. Feeds at all levels with a leaning towards lower levels.

The race shows great individual variation in the amount of colour on the flanks and this is no indication of age, purely one of moult and abrasion, fresh specimens showing more but the bloom quickly wears or fades off. Juveniles outnumber adults to an enormous degree, 1 adult to 9 juveniles being about the average. The species raises 2 broods



a year normally and many raise 3 or more broods. Breeding continues throughout the year though to a less extent during February, March, April. May and June show a fair number breeding and January slightly more. The last six months of the year being the main breeding season with the peak during November-December probably.

The species suffers somewhat from natural enemies, snakes, hawks, etc., and from cyclones. Another persecution it suffers is from natives who hunt it with flaring coconut torches at night. It roosts much in low shrubs and bushes, and one native goes on one side of the bush with a torch and dazzles the bird while another passing behind the bush sees the bird outlined and catches it by hand. Men, women and children all do this. Women to a fair degree, but the smartest catchers and most frequent hunters are youths of 14 or 15. All natives relish a feed of these and consider a nice fat Zosterops a toothsome morsel. Fortunately, the increased capacity of the species protects it from serious depletion.

All habits are similar to Zosterops lateralis elsewhere except that here it inhabits forest and dense scrubs to a larger degree and shows no definite preference for more open types of country. Nesting habits are usual, nests in many places, low bushes, etc. generally below 12 feet. Eggs 2-4, pale blue, incubation, 8-9 days. Usual Zosterops nest.

NOTES ON SPECIES NOT PREVIOUSLY RECORDED FROM THE LOYALTY ISLANDS.

CIRCUS APPROXIMANS WOLFI (GURNEY):- None were collected on Uvea though several were seen. It is not a



very common bird on the island and when seen is generally flying very high, soaring. I doubt it breeds on the island, though odd pairs might. It appears to obtain most of its food on Uvea from amongst the flocks of migrant waders (Pluvialis, etc.) which frequent the mud flats in the tidal lagoon arms in north and south of the island. Very rarely does it attack domestic chickens. I never was within gun shot of one and only saw about a dozen on Uvea and many of these were probably repeat sight records of the same birds. Definitely it does not favour the island as a habitat.

FALCO PEREGRINUS ERNSTI (SHARPE):- None collected on Uvea though it is fairly common and breeds about the cliffs of the abrupt coral outcrops in the east of the island. (One was collected on Beupre Island). It does not seem to feed to any extent on land birds on Uvea, but attacks ducks (Anas) large waders including Demigretta and all species of sea birds. It is common about the islands of the western chain, but probably does not breed there except on High Island, and feeds much on the seabirds which come to the islands to roost for the night. It is also very common on Beupre Island, but I doubt it breeds there, where it lives on the seabirds of the nesting and roosting colonies on the sandbanks to the north. It will kill birds as large as the Blue-faced Booby and manage to carry them off. It is generally exceedingly fat from living on these fat seabirds. It commonly flies from Uvea to the seabird colonies and back in a day, arriving at the seabird colony with the first streaks of dawn. Generally go to Beupre to rest and digest a kill. Generally speaking, it looks on Uvea as a place to breed and roost and



not as a hunting ground, unless seabirds fail it. Not known to attack domestic poultry on Uvea and seldom seen within gunshop, mostly seen playing on updrafts of wind on the east coast, soaring high, or travelling high and very rapidly to the west (Beaupre Island) or returning from there. Nests during August to November in holes in the coral cliffs of the east and south of the island, generally inaccessible places, though sometimes conspicuous with white dropping streaks from them. Probable population of the island 35-50 pairs of birds.

PANDION HALIAETUS CRISTATUS (VIEILLOT):- Only a casual visitor, though it has been known to breed on the western island. Generally only appears for a day or so in clear weather (from New Caledonia) feeds on seasnakes, which swarm in the lagoon, and disappears again. May be a more frequent visitor in the lagoon than is thought, as little observation is done beyond 2 or 3 miles from land within the lagoon and most of this is by fishermen and fishing is done mostly at night. A pair did nest, but were shot by a native (1921) both being killed at nest while feeding young. Young were taken but died in captivity.

HIRUNDO TAHITICAL SUBFUSCA (GOULD):- A common species on the island, exceedingly common in and about the tidal lagoon arms nesting on the coral cliffs and caves there about, on ledges mostly. Is also common about the saltpans and swamps at certain times. Appears identical with birds from New Hebrides and has the usual Hirundo habits, perches much on bare sticks and limbs of trees



sticking up out of water often considerable distances at sea. Hawks much over open sea, and lagoons far from land up to 3 miles and even more, a thing Collocalia does not do (Collocalia spod. leucopygia may go 20 yards out over sea occasionally and never much beyond that, Collocalia esculenta uropygialis never approaches within 20 yards of the sea edge, while hawking for food, though both will cross sea in seasonal movements). Hirundo is on all the Loyalty Islands and on Beaupre Island, but is, except on Uvea and certain small areas on other islands, not plentiful but pairs are found here and there where suitable nesting material is to be found. True clay being scarce in the Loyalties it finds material for nesting scarce, though nesting sites are exceedingly abundant and very suitable, and has used many unusual kinds of soil. Nest and nesting habits are usual, mud nest lined with fibres and feathers on a ledge under an overhang in a cliff or in an open cave (not dark). Eggs 2 to 4, pinkish white with red spots and blotches. Breeding season very long but mostly from September to December. Often 2 broods and possibly more are raised a year I believe.

SEA BIRDS:- Apart from a number of species of Sterna and a very rare visiting Larus no sea birds seem to visit the Uvea lagoon, though numbers of ocean-birds frequent seas close to the Uvean coast outside the lagoon. Actually within the lagoon I only saw two species of Sterna (Sterna bergil and Sterna sumatrana) but others may visit it. Both these species nest on the western islands of the



lagoon, as also does Gygis I believe. In times of hurricanes, numerous ocean-birds Fregata and even Petrels may appear but never stay. As Beaupre Island to the west is much more frequented by sea-birds and has breeding colonies to the north of it on sandbanks, I will leave mention of sea-birds to that area. The two common Sternas of Uvea are exceedingly plentiful and give an impression of a great area for sea-birds, but such is not the case. I saw one pair of Phaethon lepturus over the ocean coast once and it is a fairly frequent visitor, but does not breed. It is possible Gygis and possibly Sterna nereis exsul may visit the lagoon at certain seasons in large numbers, but this is open to doubt, especially in the case of the latter. Non ornithological observers might think Uvea a good place for sea-birds (and it is for two species) but I doubt it ever is from native accounts (reliable as regards the lagoon) and certainly not from February to June. Migrant waders are plentiful, but only the usual sorts one would expect, plus Terekia cineria.

ADDITIONAL NOTES:- It is noticeable on Uvea that numbers of birds show a tendency towards mimicry. A certain amount of this may be purely accidental, the birds really having calls of a similar nature, but certain definite cases of mimicry occur. Naturally the volume of sound may be different, but the notes appear to be the same and the length of call the same. Those noticed and the species mimicked were as follows:

LICHMERA mimicked calls of Pachycephala, Aplonis and Myiagra.

PACHYCEPHALA mimicked calls of Aplonis and Nymphicus.



ZOSTEROPS rather definitely mimicked Myiagra and Aplonis.

Gerygone mimicked (and most of the calls very well), Myzomela, Zosterops, Aplonis, Pachycephala, Lalage, Myiagra and Nymphicus very well, but softly, Lichmera, Hypotaenidia and Halcyon somewhat like them.

LALAGE mimicked Lichmera very well, but appeared to try others and mixed them up badly.

COLUMBA It is also of interest to note the similarity in names for this species on all three islands, possibly pointing to a comparatively recent arrival or a spread from island to island in recent times.

WIND AND COLD ACTIVITIES:- It was very noticeable on mornings after a boisterous windy night, even without rain, that the next morning dawn chorus was not as long as usual and birds appeared to quickly settle down apparently not feeding for as long as usual irrespective of the weather being cold or hot. Observer noting the species most affected concluded that those species which perched well out in the outer smaller twigs of trees and fairly high up and in rather open situations subject to wind movement had experienced such a physical strain keeping their perch and balance that they were tired out and after a little feeding and satisfying of their first hunger quickly retired to sheltered positions to obtain some rest. The rule seemed to hold good over all species, high and wide perchers like Myzomela retiring earliest,



Pachycephala which perch lower and generally close to more or less a rigid trunk or limb later, and such species as Aplonis which roost in hollows or large rigid limbs would be entirely normal and unaffected. Rain without wind damped all their calls and feeding activities alike. Rain with cold snap after or just a cold night made all active and feeding was continued later than usual, even if the day warmed up rapidly.

VEGETATION (IN ADD.):- In mentioning the trees present I left out mention of sandal wood, this grows well and is fairly plentiful on the sea deposited sand bank, and grow fairly well amongst the lower types of scrub here and there. Nowhere is it as plentiful on Uvea as on Mare and Lifu is. and it has been subject to much depletion by unwise cutting in the old days. On Uvea especially was it cut as generally speaking natives were poorer till their new planted areas of coconuts began to yield and they needed more cash to supply food needs etc. because of lack of good gardens. Laterly the administration has brought cutting of sandal wood under control. Shortly before my visit all suitable wood had been cut and sold of the island and only small shrubs of it and seedlings were seen by me. These in course of time will be valuable.

FIRES:- Natives in burning gardens are careful with the use of fire and nowhere does fire damage occur on the island. Fires in forests are almost entirely unknown even in the dryest of times, though they would burn if allowed to escape.



NATIVE NAMES OF BIRDS ON UVEA

<u>SPECIES</u>	<u>NATIVE NAME</u>	<u>PHONETICS AND PRONOUNCIATION</u> <u>REMARKS, ETC.</u>
DEMIGRETTA	<sup>U</sup> Oĩ - Oih	Something like "yo-yo" with an oĩ sound. Only one phase known.
ANAS	<sup>u</sup> Eng or ieng	As in engineer with an indefinite i before it. All ages one name and species even domestic ducks.
ACCIPITER	Ding	As in "Ding-dong". The same name is used for both phases and sexes.
HYPOTAENIDIA	Bang (short)	As Bang in English. Some confusion of names for immatures is present today, but was not always thus.
PORZANA CINEREA	<u>Ban</u> or <u>Pan</u> (long)	Indefinite P or B. Word longer but softer than above. Never confused with Hypotaenidia
PORZANA TABUENSIS	Oih-Nei-Du	OIH like exclamation "oih" of illiterates. NEI as in neither. DU as in duty. Often confused with young of Hypotaenidia now-a-days.
PORPHYRIO	<sup>u</sup> <u>Her-Cher</u> or <sup>u</sup> <u>Hir-Cher</u>	HER OR HIR said fast and rather hard to define. CHER as in "lurcher dog". Rhymes with /urcher.
PTILINOPUS GREYI	Bing Adult <sup>u</sup> Bing-Leur juvenile	BING as in English (Bing Boys). LEUR as in " <u>lure</u> " with an indefinite 'e' prolonging the lur sound. 2 phases recognized with or without crown.
COLUMBA	Me-Ket-Ta	ME-KET to rhyme with Becket. TA short.



NATIVE NAMES OF BIRDS ON UVEA

(Con't.)

<u>SPECIES</u>	<u>NATIVE NAME</u>	<u>PHONETICS AND PRONOUNCIATION</u> <u>REMARKS, ETC.</u>
CHALCOPHAPS	<u>u</u> Mem-Meh-Loh	MEM-MEH short, LOH long Sounds as written MEM as in memorial. MEH as in method. LOH as long low with H sound
MYMPHICUS	Ko-Kot	Said slowly they say it KOH-KOT. Like coconut but a K sound like KO-KO in the 'Mikado' (G. and S.) with definite sharp T ending.
TRICHOGLOSSUS	<u>u u u</u> Sue-Aht or -Art	SUE as in 'Sue' girl's name. AHT or ART like art with the word shortened by muting R. Some natives give an R sound, but majority give an H sound.
CACOMANTIS	<u>Diji-Lan</u>	DIJI or DIGI or DEGI all used by natives, but if said slowly nearly always DI JI. DI as in diet. JI as in Jim. LAN as in land but longer (as in lantana)
CHALCITES	Gothen	GOTH as Gothic EN as in hen. the word is not divided.
TYTO	MUHN	A little like moon, but an H sound. Somewhat like German <u>Munich</u> but OH sound but H very indefinite.
COLLOCALIA ESC. UROP.)	Wah-Ha-Lep or Leb	Same name for both. Said quickly they often say WA-HA-LEP and even WAR-HA-LEP but slowly always say WAH-HA-LEP. WAH as in Wahroongah (Aust.). HA as in hat. LEP as in leapt without a or t. (German LEB poss.)
COLLOCALIA SPOD. LEUC.)	Indefinite P. or B.	
HALCYON	JIJl or DIJl	Both used JI as in Jim, DI as in did. Said slowly a DG sound appears. Rather indefinite word and pronunciation.



NATIVE NAMES OF BIRDS ON UVEA

(Con't.)

<u>SPECIES</u>	<u>NATIVE NAME</u>	<u>PHONETICS AND PRONOUNCIATION</u> <u>REMARKS, ETC.</u>
LALAGE	Goh	GOH as in "go hit him".
MYIAGRA	Whien (♂ and ♀) (the same)	Word said as written but sounded long and every letter sounded.
GERYGONE	Oih-Feti-Gu	OIH short like illiterate exclamation. FETI like in confetti. GU as in good.
PACHYCEPHALA imm. ♂, ♀	Whien-Mat or Whien-Matt	WHIEN short and H barely sounded. MAT as mat but emphasized and lengthened. Same for all phases
APLONIS	Dah-Wowh or (Dah-Wow or WooW)	DAH as written WOWH indefinite but probably Wo <sup>up</sup> wh is nearest it.
LICHMERA	Bai-Ah-Leur or Pai-or almost at times Pbai-Indefinite. P. or B.	BAI as in bait but B indefinite. AH as "ah" exclamation
MYZOMELA ♂	Wah-Susu-Dah <sup>u</sup>	WAH as in Wahroongah (Aust.) SUSU as soo-soo. DAH short and clipped.
♀	<sup>u</sup> Oark	<sup>u</sup> OA RK as one word. OA like in oak RK short.
ZOSTEROPS	Watchen	As in English Watch with "en" added distinctly.
CIRCUS	Bah)	BAH as written and used mostly, BAR as in English bar, often used when speaking fast but never when slowly. OH very short, LAY very long and accented.
FALCO	<sup>u</sup> Eian or Ian	Like Scottish name Ian.



NATIVE NAMES OF BIRDS ON UVEA

(Con't.)

<u>SPECIES</u>	<u>NATIVE NAME</u>	<u>PHONETICS AND PRONOUNCIATION</u> <u>REMARKS, ETC.</u>
HIRUNDO	Wah-Hat-Go ) Wah-Hart-Go) or Waar-Go	All 3 used indiscriminately the last the commonest in conversation, though if asked the bird's name they invariably give one or other of the first two. As written all fully sounded except the R in second one.
FREGATA (both ) (species)	Atuah or Atau or Ahtau	The last the commonest but said quickly, different individuals give different sounds
LIMOSA	Deur or Dewer	The first commonest.
STERNA BERGIL	Maht	Broad and long. This name is like the Indian <u>Mahatma</u> without the A and MA. It is also used for all <u>Sternas</u> and an added word such as small denoting <u>S. sumatrana</u> . All other <u>Sternas</u> being just the one word with the word for foreigner or stranger added, a rather significant fact. One other white seabird has a separate name, this is probably <u>Gygis</u> .

2 Sula's both had separate names (put on labels but only one name generally used.











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