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# LONG ISLAND, PAPUA NEW GUINEA — PEOPLE, RESOURCES AND CULTURE

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## CONTENTS

Summary .....	464
Introduction .....	464
Language .....	466
Historical Traditions .....	468
Accounts of the Eruption .....	471
Resettlement .....	474
Population Growth .....	476
Settlement Pattern .....	478
Natural Resources .....	479
Wild Resources — Vegetation .....	481
Wild Animals — Terrestrial .....	483
Aquatic Species .....	485
Agriculture .....	488
Material Culture .....	493
Trade .....	495
Ceremonies .....	497
Social Organization.....	498
Disputes .....	499
Outside Influences .....	500
Evacuation .....	501
Mission Influence .....	501
Cargo Cult .....	502
Wage Labour .....	504
Transport .....	504
Health .....	505
Education .....	507
Radios .....	509
Entertainment .....	509
Retail Stores .....	510
Unplanned Visitors and Opportune Wealth .....	511
Income from Official Visitors .....	512
Regular Employment .....	512
Copra, the Cash Crop .....	512
Other Sources of Cash Income .....	514
Political Change .....	515
Development and Conservation .....	517
Acknowledgements .....	522
References .....	522

## SUMMARY

Long Island provides, in microcosm and on a compressed time scale, an example of the sort of interaction between humans and their environment common to many Pacific islands. The current period of human occupancy of Long Island began sometime during the nineteenth century but until World War II the island remained isolated and population growth remained low. Since that time population growth has accelerated, contacts with the outside world have increased and the islanders are now beginning to enter a cash economy. The effects of these processes on the human society and its interactions with the environment are summarized. Major areas covered include human settlement and population growth, aspects of social organisation, wild resources and their use, outside influences affecting island society, the current status of the Long Island economy and possible future development options.

## INTRODUCTION

This account of the people of Long Island, their resources and their culture is based upon published and unpublished documents and, except where otherwise acknowledged, our own observations and interviews. To the best of our knowledge, all statements herein were accurate as of mid-1979, when this account was completed. Most of the data were collected during nine visits devoted primarily to more specialized biological research and our total time on the island amounts to less than four months. All but three days of this was during October and November, that is, in the late dry season. Nevertheless, visits spread over nine years provided diachronic perspective and opportunities for checking the accuracy of earlier observations. We are impressed by the consistency (between informants, between locations and over time) of informants citing first hand observations and hearsay once removed. The general reliability of oral data in Papua New Guinea and techniques to enhance it are discussed elsewhere by Hughes (1977: 3-7). Our common language was New Guinea Pidgin and even the oldest residents had some command of it.

We italicize foreign words other than names which have been borrowed and published as English (e.g. Arop, Umboi). We are not linguists; we have rendered what we heard in the orthography used for New Guinea Pidgin by Mihalic (1971: 3-8). This is based on the NGP<sub>1</sub> dialect of the Madang area.

In many cases the European names on the old maps have already been replaced by local names but confusion is still possible because of historical lag and the large number of languages and dialects spoken in the area under discussion. Equivalents are:

Early Name	English	New Guinea Pidgin	Long Island
Dampier Is.	Karkar	—	—
Rich's Is.	Bagabag	—	—
Long Is.	Arop, Long Is.	Arop	Pono
Lottin Is.	Tolokiwa	Lokep	Lokep
Tupinier Is.	Sakar	Sakar	Oreng
Rook Is.	Umboi	Biksiasi or Siasi	Kowai (N.W. inland) Siasi (S&E coasts)
Kaiser Wilhelmsland	Siassi Group New Guinea	Siasi Niugini	Siasi Kowalmi

The locations of these and other localities referred to in the text are indicated in

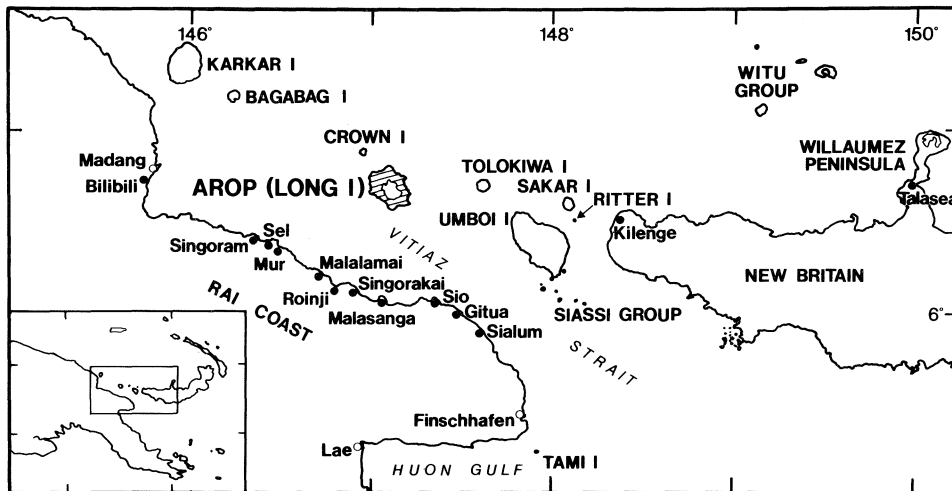


Fig. 1. Map of the area surrounding Long Island showing the position of localities mentioned in the text.

Figure 1. Figure 2 shows the principal geographic features of Long Island as well as present and former sites of human habitation.

Monetary values given in this paper are in the currency which was in use at the time. This was the Australian dollar until 1975 when Papua New Guinea established its own currency in which the *kina* (K) was the equivalent of the \$A and the *toea* (t) was the equivalent of the cA. The *kina* was worth approximately \$A1.25 in December, 1979.

1. Throughout this paper the following abbreviations will be used:

ADC	Assistant District Commissioner
ADO	Assistant District Officer
CSIRO	Commonwealth Scientific and Industrial Research Organization (Australia)
DASF	Department of Agriculture, Stock and Fisheries
DC	District Commissioner
DO	District Officer
F	Father's name is
FF	Father's father's name is . . . (etc)
GNG	German New Guinea
MSL	Mean Sea Level
MTNG	Mandated Territory of New Guinea
NGP	New Guinea Pidgin
PNG	Papua New Guinea
PO	Patrol Officer

The external contacts reviewed in Ball (1982), while exposing the people of Long Island to ideas and goods from outside their culture, were infrequent enough to leave most traditional ways intact. Cash income (from contract plantation labour, other forms of away-from-home employment and from the export of shells and copra) and the exhortations of government and mission had relatively little influence compared with their effect on the more accessible settlements on the mainland. Since the war, the rate of economic and social change has increased under the influence of official policies but Long Island is still isolated and its cash economy remains small.

Examination of a proposal for making Long Island a conservation area as well as a concern with evaluating future economic options for the islanders took Hughes to the island for the first time. The nature of past and present changes and the complex equation to be solved by the Long Islanders and their advisors contemplating policy options are discussed here.

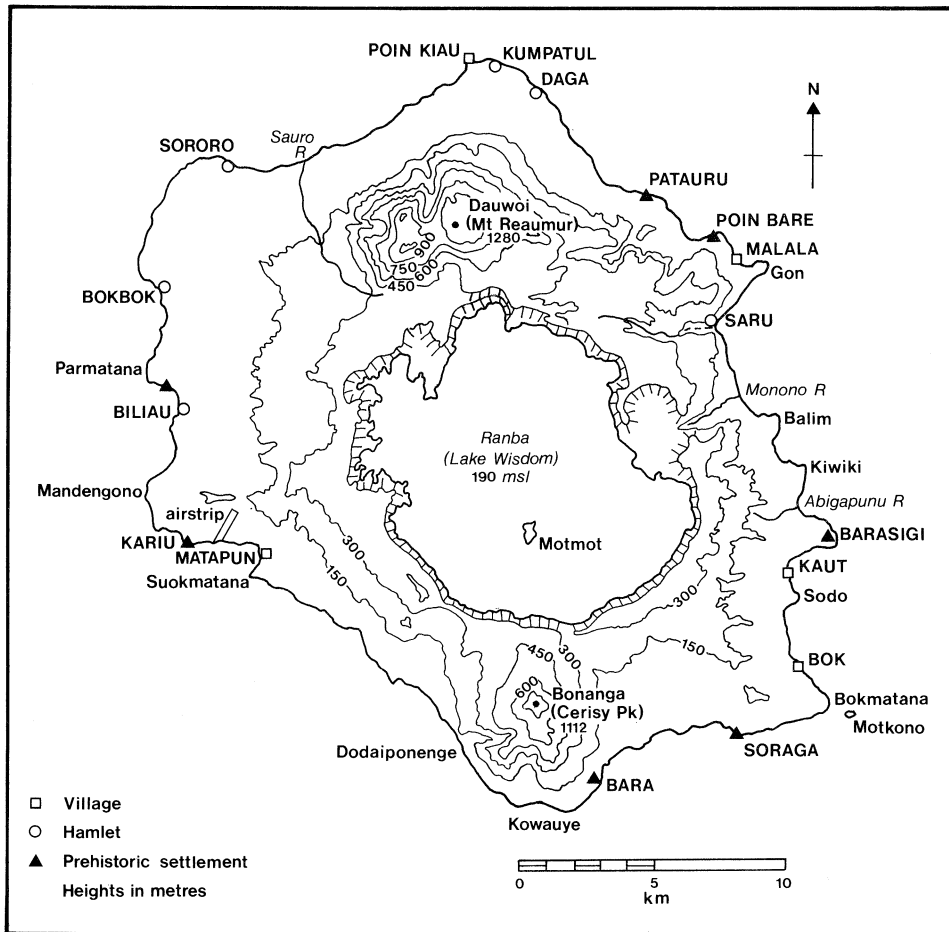


Fig. 2. Map of Long Island showing principal geographic features and the locations of past and present sites of human habitation.

We begin by surveying linguistic relationships and providing historical background largely through the medium of the people's own oral traditions and the observations of earlier visitors. We then give details of natural history and such ethnographic knowledge as we have been able to acquire, as part of a general presentation of resources and their utilization. Finally, we outline the development dilemma as we see it.

#### LANGUAGE

Long Islanders call their language (as well as their island) *Pono* and say that it is identical with that spoken on Tolokiwa and on the north-west tip of Umboi. Hooley (1976: 341) and McElhanon (1978, map II) call the language of Tolokiwa *Lukep*, after the local name for that island and say that it is also spoken on the north-west tip of Umboi. Hooley says nothing of Long Island, since his research area does not extend west of Morobe Province but McElhanon (1978, map II) includes it in the *Lukep* language area. Z'Graggen (1976: 287) does not appear to have visited Long Island and

his research area does not extend east of Madang Province. He calls the language *Arop* (after the common name for Long Island) and says that it is also spoken by some of the villagers in Mur and Sel, southeast of Saidor on the Rai Coast. He classifies it as one of a 'heterogeneous' Vitiazan Subfamily of languages in which he includes two other languages further along the coast to the southeast. The Vitiazan Subfamily is one of three which he distinguishes in a Siasi Family. This extends as far northwest as Karkar Island. The village of Mur exemplifies the complex antecedents of many of these coastal settlements. Ball visited it in 1978 and was told by DO W. R. Wilkinson that linguists of the Summer Institute of Linguistics had identified four separate dialects as being regularly spoken there. One informant at Mur, Ambalis (F: Wantung, FF: Anggei) recounted a legend (below) explaining some of the linguistic and social relationships between Mur and Long Island. His term for the Long Island language was *Pano*.

Linguistic relationships in the area are currently being investigated by P. C. Lincoln, who argues in an unpublished 1976 manuscript that Hooley's Malasanga language from the north coast of the Huon Peninsula is the same as Z'Graggen's *Arop* as spoken at Sel, and cites a Tolokiwan informant's statement that his own speech and that of Long Island and of Barim on Umboi are dialects of the language spoken in these mainland villages. However, McElhanon (1978, 4, map II) says that Malasanga village speaks the *Barim* language, not *Lukep* (*Arop*). Lincoln concludes that all these people 'in fairly recent times were a single speech community' and he proposes grouping them in a *Korap* Subfamily of languages rather than classing them as dialects of one language.

Interestingly for the general settlement history of the area, Lincoln maintains that another member of Z'Graggen's Vitiazan Subfamily forms part of a new Subfamily which includes some languages of the Huon Peninsula north coast, one of the Siassi Islands and some languages of West New Britain. McElhanon (1978: 2) makes the same connection, pointing out that Z'Graggen's Vitiazan Subfamily is the same as Chowning's (1976: 368-9) Bariai Family in West New Britain. Long Islanders themselves regard the speech of a number of settlements on the Rai Coast east of Saidor as closely related but not identical to their own. Nauna of Matapun told Ball that the language of Mur, Sel, Singorakai, Malasanga and Kiari was 'somewhat altered' from his own. Jared Diamond (pers. comm.) was told on Umboi that because of fighting, some of the pre-eruption inhabitants of Long Island had fled to Mantagen on north-west Umboi, and from there to Barim on Umboi's west coast. He was told that they had been on Umboi for at least five generations, for which a genealogy was remembered, and an unknown number of generations before that. At Sio, on the mainland, some villages include an *Arop* refugee among their ancestors, and the genealogies suggest that he arrived during the eighteenth century (T. G. Harding, pers. comm.).

It is clear that much more work is needed and that a linguist must visit Long Island. At present, the linguistic data tell us little more than could be gained from questioning a Long Islander: i.e. that his language is also spoken on Tolokiwa and the north-west tip of Umboi and is closely related to those spoken in a few coastal villages on the mainland.

Long Islanders' own terms for the nearer parts of their universe are as follows. Uninhabited Crown Island is part of their own domain, and is called *Kuru*. Their nearest uninhabited neighbour, Tolokiwa, 40 km to the east, is known as *Lokep* (they explained that its European name is derived from the Tolai term for the island, *Lokewe*, prefixed by the Tolai honorific *To*). Inland Umboi they call *Kowai* and the southern and eastern coasts are included in the term *Siasi*. Sakar is called *Orenge*. The mainland of New Guinea is *Kowalmi*, which includes all that part of the coast to which they normally relate, from east of Sio along the Rai Coast, around Astrolabe Bay

and north beyond Madang.

### HISTORICAL TRADITIONS

Myths and legends concerning the past history of Long Island and its population have been collected by many visitors and we were no exception. Most, like us, communicated through New Guinea Pidgin. Some of our material was tape-recorded and the translation checked but most was taken down in long-hand. As might be expected, different visitors heard different stories and differing versions of the same story and recorded them with varying degrees of care, but in general the discrepancies are small enough for us to discern common outlines of the people's beliefs about their past and about the fate of earlier inhabitants.

Long Island myths that are essentially cosmological and epistemological are held in common with the speakers of Austronesian languages on Karkar and Bagabag Islands, around Astrolabe Bay and along the Rai Coast (Lawrence 1964: 21-24) and, although we have no evidence of it, they are probably shared by Austronesian speakers on the islands to the east and south-east (Tolokiwa, Sakar, Umboi and the Siassi group) and on the north-east coast of the Huon Peninsula. Some coastal people of Astrolabe Bay who speak non-Austronesian languages have the same myths of creation but it seems possible that these have been borrowed since the European voyages of the nineteenth century (see, for example, Lawrence 1964: 21, 63-68). The attachment of cargo-cult beliefs to these myths may have increased their currency. Legends relating to the most recent cataclysmic eruption and possibly to earlier eruptions are told on Long Island but one would expect them to be held more strongly and fully on the mainland, where traditions say that most of the survivors found refuge. Lawrence (1964: 22) reports such a legend originating with the Yabob people near Madang. T. G. Harding heard a similar account at Sio (letter, 1974) and M. Mennis (1978, see below) has recorded stories near Madang that are connected with the Long Island catastrophe, but we ourselves have not been able to interview further on the mainland, nor have we found Long Island traditions recorded by others. There may well be times when migrants, anxious about land rights in their new home, will suppress earlier traditions.

In many of its versions the Kilibob-Manup myth (the spellings vary; it is a central traditional element in most of the cargo beliefs of the area) accounts for the creation of Long Island and its aboriginal inhabitants. The earliest record appears to have been made by Hoffmann, a missionary at Bogadjim, a non-Austronesian area. It was included in the reports of the Rheinische Missionary Society for 1897 as the story of Kelibob and Mandumba and an abbreviated version was published in the same year in the *Deutsche Kolonialzeitung* (10 (38) N.S.: 379-380). The relevant portion translates:

Thereupon it was decided that the young man Mandumba should also have an island. Therefore sand was also thrown out of the boat on the side where the outrigger was. There the island Mereju (Long Island) rose out of the water. But the young man Mandumba did not understand the speech of the people of Mereju. So his uncle took a breadfruit seed, roasted this in the fire, and threw it, red-hot, down the throat of Mandumba. The latter jerked his head back and shouted 'O Tenako' and could now understand and speak the language of Mereju.

A fuller version of the story collected by Hoffmann is given in Hagen (1899:281-283). There are many different versions of the Kilibob-Manup myth and they have been extensively discussed by Bodrogi (1953: 119-127; 1969: 187-188) and by Schmitz (1959: 46-49; 1960: 319-335). The most detailed of these versions from Biliau-Teter, Rai Coast, is given as follows by Bodrogi (1969: 187):

But Manub sails forth to Mindira, Singa, and arrives at the beach of Biliau. He leaves there a man called Aisan who establishes a village in Ran-Tanggom. Manub proceeds to Teterei where he lands Madi. Kaison, the son of Madi, goes later to Malangai, and a generation thereafter Bilei, the son of Kaison, proceeds to Galek. Manub continues his journey to Suit, Jaimas, Wap, Sui Dewang, Mur, Sel, Malamai, Bonga, and Yara. He quits the strand there and proceeds right to the Siassi Islands [which, according to Bodrogi and Schmitz, include Umboi, Long Island, Tolokiwa and Sakar]. It was from there that the other parts of the Rai Coast were subsequently occupied towards the West. While the descendants of Manub became more and more numerous, the line of Kilibob — reduced by him to three men — died out.

Other published versions of the myth have Kilibob himself moving south from Karkar and south-east along the Rai Coast, creating natural features, peopling the coast and equipping the humans with the necessities of life and the knowledge and skill to manage them. According to others, it was Manup (e.g. Bodrogi 1953: 126; Lawrence 1964: 22, 23). The direction of movement is opposite to that followed by migrating Austronesian speakers in general (Z'Graggen 1975: 40) and by speakers of the Siasi Family in particular (Z'Graggen 1976: 286). Lincoln, too, discerns an east to west movement of what he calls the Ngero Subfamily of Austronesian languages from West New Britain via the Siassi Islands to the mainland coast east of Saidor (1976: 3-6).

Riesenfeld (1950: 368-371, 671-673) argues from myths and legends that Long Island was first inhabited by immigrants from the west and southwest followed by a later wave of migrants from Umboi.

Schmitz's view of the migration as commencing rather than concluding at Karkar and proceeding east via Arop and Umboi to Siassi before travelling south and west along the mainland coast conforms only in its final stages with the interpretation of the linguists. Schmitz did not visit Long Island and our evidence shows that those who have lived there since the eruption came from the east, not from Karkar. In our opinion the linguistic evidence suggests that the pre-eruption population also spoke a language with close eastern affinities ('Vitiazan', 'Bariai', 'Korap') and that any earlier migration and diffusion to those areas from Karkar, as suggested by Schmitz and the Kilibob-Manup myth, must have occurred a very long time ago, if at all.

In another variant recounted to Ball in 1978 at the village of Mur by Ambalis (F: Wantung, FF: Anggei) the inhabitants of Long Island descended from Kilibob's mother. According to Ambalis an ancestor whose name had been forgotten, the younger of two brothers (cf. Kilibob and Manup), had left the Mur area (actually a nearby hill called Gila) after a family fight, and created Long Island and everything on it. Wounded by his older brother, and at the instigation of his mother, he built a canoe and loaded it with such things as soil, fire, domestic animals and useful plants of the garden and forest, and prepared to leave with his wife, mother and younger siblings. He took the leaf of a certain tree and held it wrapped around the steering oar, and set sail. The rush of water up the paddle ran over the leaf and took colour from it, turning the previously clear and translucent sea into its present dark green. After some time, he tipped a basket of soil over the side to form a reef and others to form Long Island itself and its mountains. They settled on the west coast, near the site of present day Matapun, and planted the seeds and slips brought with them. They spoke the language of Gila, but when a breadfruit seed on the fire exploded loudly from the heat, the brother created a new language, *Pano*.

On the mainland, the elder brother also decided to leave Gila, and loading a canoe with family, provisions and some of the Gila soil, sailed west to Bilibili, which was already inhabited. On the way, he damaged one of his eyes with a comb, and his descendants at Bilibili and Yabob often have a bad eye. The soil he brought is the clay from which the Bilibili people make pots. Ambalis added:



This story is known on Long Island but we know it better. It is our tradition and it has come back to us, as the Pano language was later brought to Mur, Sel and Singorakai where some speak it. Customs and ceremonies from Gila, such as the Tumbuan dance, were taken to Long Island and later brought back by my grandfather Angegi and his wife, Neo.

At Sel, Tagoga (F: Sania) said that his grandfather, whose name was forgotten, had reached Sel from Long Island on a huge wave, accompanied by a woman, Danyeta. It was she who gave birth to Sania and a younger brother called Lapiu. Long before these events, their ancestors, a group of women with dogs for husbands, had lived at Sel. One of the women was abducted by a man from Singorakai (45 km to the east, and according to the informant and to Lincoln [1976: 2] speaking the same language) but his brother was killed by the dogs in an attempt to steal another woman. With the exception of one of the dog/husbands, the population of Sel was then destroyed in a concerted attack by Singorakai. The survivor seized fire from Tanoknok (a sea cave still to be seen and still sacred) in his mouth, leapt over the attackers and swam away to Long Island. This is why Long Island burns to this day, and has a large population of feral dogs. (The dog-ancestor's name was *Kamia*, founder of a superior breed). Like the village of Mur, Sel now comprises people from different places, including some from Long Island and some from the inland hills.

The only version of the Kilibob-Manup myth known to have been collected on Long Island itself was recorded by Ball in 1978 at Kaut and told by Milau (F: Bara). Hughes translates it as follows:

Once two men lived at Mirku, one called Manup and one Kilibob. Manup was married and Kilibob single. One morning Manup [he meant Kilibob, see below] took his bow and arrows and went into the forest to hunt birds. He saw one and fired at it but the arrow passed over the top and he missed. It fell to the ground near his brother's wife. She picked it up, saw the pattern carved on it and hid it. Later, when her husband went out, she insisted that her brother-in-law tattoo this pattern upon her. He did so, placing it on her left groin. When she was climbing the steps to the house her husband saw the mark and asked how it got there. But she did not mention Kilibob; nevertheless he suspected his younger brother. The two brothers made a new garden and afterwards Manup tried to kill his younger brother, but he dodged the arrow and took shelter with his mother, who hid him, and he slept. The elder brother returned to his wife and said that he had killed his younger brother. But it was not true; he was hiding. Later his wife bore a child and all went to visit the grandparents. But they closed the door of the house so that the visitors wouldn't see the younger brother who was hiding there and tell the other brother who would then come and kill him. Later, when the old mother was away, children saw the young man asleep in the house. They told the elder brother where he was hiding. Manup got his bow and arrows ready and the younger brother also got his ready. They fought all through the forest until they came to Alexishafen. There Manup made a canoe and Kilibob made a ship. Manup sailed off toward the Sepik and Kilibob sailed to the Rai Coast. Everything that the ancestors had was in that ship and Kilibob distributed it there. As a result, all the Rai Coast and island people have these ancestral things and wear bark cloth, make drums, and ornament such things as bows and arrows. The ship continued south where it tied up at a wharf and the man finally disembarked.

After some time, Milau added a small part of the story that he had previously forgotten:

When he tied up and finally disembarked he went to heaven and descended to the wharf in Sydney, and all the cargo descended there. The people there said 'these things are from Papua New Guinea'. But after that whatever became of it? [*Tasol behain i kamaut na i go olsem wanem?*].

According to Bamler (1911: 492) a legendary figure named Panku was blamed for 'the catastrophe which Long Island met in the landslide from Cerisy Peak'.

Another legend collected by Bamler (1911: 524-525) is:

. . . that in earlier days Long Island had a connection with New Guinea and that the land went down in a stormy night. Of course the natives tell this story as a tale that an old woman had cursed the land, but which natural event would not be explained by the native as supernatural interactions by evil spirits! In any case this sinking took place centuries ago.

#### ACCOUNTS OF THE ERUPTION

Folk traditions of ash falls resulting from volcanic eruptions are widespread in New Guinea and have been noted by a number of administrators, missionaries and research workers. Some of them on the mainland, especially in the area of Astrolabe Bay and the Rai Coast, almost certainly relate to the most recent cataclysm on Long Island. In 1887 Finschhafen experienced a rain of ash, which was thought to be from Ritter Island, northeast of Umboi (Hammer 1907: 18) which Chalmers (n.d. [1887]) had seen active in 1885 (not 1887 as given in Hammer). However, no ash falls were noted in Astrolabe Bay that year by either mission or Neu Guinea Compagnie personnel and the folk traditions of that area cannot be explained by the eruption of Ritter.

When Tagoga of Sel told Ball that his grandfather came from Long Island on a large wave he regarded this as happening at the same time as a Long Island woman (whom he called Galeki) is said to have escaped the eruption by fleeing to Tolokiwa. This latter event is a common component of the eruption stories about Long Island. On the other hand, if he had the generations right, his grandfather's arrival is more likely to be associated with the tsunami known to have resulted from the massive eruption of Ritter Island in 1888. On that occasion the Rai Coast was struck by a large wave (9 m high according to Taylor 1953: 1) which was 12 m (Parkinson 1907: 30) to 15 m (*Nachrichten über Kaiser Wilhelms-Land*, 1888: 77) high at the west end of New Britain and approximately 2 m at Blanche Bay (Rabaul) (Parkinson 1907: 29), while the reef at Finschhafen was exposed to a depth of ca. 2 m (*Nachrichten*, 1888: 77).

Destruction by large waves caused by local earth movements and volcanic eruptions is evidently not uncommon on the coast of north-east New Guinea; legends of such events are widespread, and they must refer to more than a single event. Mikloucho-Maclay, returning to Astrolabe Bay in June, 1876, saw the results of one such occurrence that had taken place since he left two and a half years previously. Houses near the beach had been carried away and the associated earthquakes had been felt on the coast and caused much damage inland. He learned that prior to his original visit in 1871 an entire village with all its inhabitants had been washed away by a huge wave which he estimated must have struck in about 1855 (Mikloucho-Maclay 1975: 236-237). Ambalis of Mur when a small boy (c. 1920-25) had himself seen such a wave break over the beach and he was carried up the hill by his mother to avoid it.

Mennis (1978) has carried out numerous interviews with Austronesian speakers from the vicinity of Madang, many of whom trace their ancestry to the island Yomba which supposedly once existed off Madang, perhaps on the site of what is now Hankow Reef. All of those interviewed agreed that Yomba blew up and disappeared before Arop erupted and many of the interviews give details of the latter eruption. A time of darkness associated with the eruption of Arop was reported as lasting for differing periods, the maximum being three days. The ash fall from Arop was heavy enough to ruin the gardens and cause a time of famine. Some reported that earthquakes and tidal waves were associated with the eruption, while others denied this.

A particularly interesting interview obtained by Mennis (1978: 25-28) was with Ber, headman of the Madib clan in Yabob village, and went as follows:

My ancestors came from the Rai Coast — my papa was from there. Before that my ancestors escaped from Arop. Their names were Paspas and Galong. They came from Arop in canoes like the Bilibil *palaguts* and came ashore at Yaimai. They then went to Rewai near Malai. One of their wives was close to give birth.

Paspas and Gaglong [spelling change in Mennis] went inland. The others waited on the beach. They waited and waited and eventually one of them said: "You wait here I'll go and look for them. I think the bush men have killed them". He went up the mountain and found the two brothers — they had made a small house there from where they could see the smoke (of Arop?).

Later Weir was born to this line — he was my ancestor. Weir was brought from the Rai Coast in a *bilum* (string bag) to Yabob.

When Arop fired up the men saw it. The beaches were all filled with stones which we called *tadim*. When I was young there were still stones lying on the beaches. At the time of the eruption my ancestor said there was a time of darkness, earthquakes and tidal waves.

On the basis of the genealogies collected by Mennis the eruption of Arop would appear to have occurred 8-9 generations ago.

At Mur, Ambalis said that his mother had told him of 'dust' like crushed coral [*karanas*] falling from the sky in his ancestors' time in sufficient quantity to break the roofs of houses. His mother had heard that it was pale in colour and that it had covered the gardens and had hardened on the ground 'like cement'.

On Long Island itself, the first to record legends of a big eruption was apparently William Coultas, an ornithologist, who spent November, 1933 on the island. His unpublished journal states (1933-35: 268):

According to native legend, Ahrup was at one time a large active volcano, much higher than Tolokiwa, and with a large population. Eventually an eruption occurred which blew the cone completely out of the centre of the island, throwing out hot stones and lava and killing the people, with the exception of one woman who escaped in a canoe to the mainland of New Guinea where her descendents are supposed to be living now.

Oral information about the eruption collected by a government officer after the Pacific War was cited by the geologist, G. A. Taylor (1953: 4, 5).

Recent investigation by A.D.O. Parish suggests that the eruption was of comparatively recent origin as stories of the escape from Arop are still current among natives of the surrounding islands. It seems evident that some very alarming warning phenomena preceded this eruption as a considerable number of natives appear to have escaped from the island before the catastrophic eruption took place.

Mr Parish believes that the Siassi island people originally come from Long Island, and has found, on the harsher parts of the neighbouring New Guinea coast, settlements of natives who are also evacuees. One group, he believes, settled near Lutheran Anchorage on northern Umboi but were subsequently wiped out by the 1888 eruption of Ritter Island.

In 1972, Hughes interviewed the oldest resident of Malala, an old man named Sili (F: Goreke, FF: Kaipongo, FFF: Korimi) who must have been born well before the turn of the century since his period of labour on German plantations before the first World War was well remembered. According to Sili, there was some warning before the eruption, and many of the inhabitants of Long Island and Crown Island (no prehistoric sites have so far been reported on Crown Island) fled to the mainland; their descendants now live at Graget, Bilibili and Yabob. The people of Siar, Graget, Bilibili and Yabob say that some of their ancestors came from Long Island when it erupted (L. Morauta, pers. comm., Mennis 1978).

There is a widespread tradition that the eruption was caused by sorcery arising from social conflict, a common pattern of causation in New Guinea history (see e.g. Hughes 1977: 204). At Bok, an informant aged about 60 years, Dakis (F: Kaidjip) related how a Rai Coast visitor named Girama had warned the people of Long Island to stop fighting. He himself was struck on the forehead by an arrow, but survived, binding it with a cordyline leaf. It was he who summoned fire and brimstone to punish the people of Long Island. At that time, added Dakis, the language of Long Island was *Karnai*, and there are still speakers of this language living on 'number two' Rai Coast. This refers to the portion each of Saidor (P. Lawrence, pers. comm.).

Glucksman and Ball collected two versions of the eruption legend. The first, said to have originated with the woman who found refuge on Tolokiwa, was from old Sili:

A lone man in a canoe came to Bara [prehistoric site JCC — Egloff and Specht, 1982, Fig. 2] which is a point near Soraga. A big man from Bara was upset over family problems so he shot the stranger in the forehead with his bow and arrow. The stranger withdrew the arrow and told the big man 'you make a *singsing* and I'll come back to see you' The stranger returned with his father. While the father slept in the canoe the stranger put fire on top of the mountain. They then drifted along in the canoe, the son watching the island burn and the father still asleep. When they reached Saru [between Malala and the Arapos River] the father woke up and expressed dismay at the burning but the son said 'let it burn'.

Katip (F: Bara) of Kaut gave this account:

A big man from Kurukuru Island (a real island in the Siassa group which blew up) [Ritter?] came to Bara, which is between Soraga and Matapun. He told the people not to bother making a *singsing* — that he would tell them a story, but they didn't listen to him. So he went back to Kurukuru and then he returned to Arop and shot a bow and arrow. After this he again returned to Kurukuru where he told the people to make a *singsing* following which he returned to Arop and started it on fire. The fire came up and finished Arop but a few people escaped. One woman escaped to Logep [Tolokiwa]

C. McKee and a Papua New Guinean colleague, P. Daimbari, of the Volcanological Observatory in Rabaul also collected this tradition in Bok and, together with Blong and Pain, they recorded versions from Matapun and Poin Kiau. The Bok account went:

A visitor, Gramo [cf. Girama] came to Long Island, landing near Bonanga [Cerisy Peak] Talangi, who lived at Bara, was chased away to the Siassi Islands or nearby parts. All the people from Bara fought Gramo and he was speared through the head from temple to temple. He did not die, and a cordyline leaf was put through the hole. On leaving Long Island he told the people to have feasts and *singsings* now because he was going to return in three days to have his revenge. When he returned, strong winds sprang up and mosquitoes, ants, flies and locusts came in plagues. Tidal waves occurred and one big earthquake destroyed houses. But the people survived all these things, so Gramo went away to get his father. The two of them returned to Bara and Gramo threw a cane spear at Bonanga and an eruption started from a big mountain which existed in the middle of the island. From Bara they sailed around to Poin Kiau and then on to Kaut and during this time the father went to sleep. Gramo was supposed to wake his father to stop the eruption but he did not and everything on the island was destroyed.

They returned home and stayed for three days before coming back to Long Island. On arrival at Long Island they found human bodies burned and stinking. So the father made dust come down to cover them. They then sailed home again.

The version from Matapun recorded by McKee added that Gramo had been accompanied by others and had come to steal women, and that this had led to the fight. His revenge had been accompanied by heavy rain and followed by a devastating bushfire. The mountain was called upon to cover the burned bodies, so the eruption began. It came from a large volcano that occupied the area where the caldera now is and it covered all the bodies, houses and trees with ash. Ash and stones fell on Tolokiwa, but without

causing damage. (Talangi and Bara were not mentioned, nor was the voyage around the island.)

Informants from Poin Kiau told much the same tale but added interesting details. Gramo warned the Long Island people of the coming earthquakes, tidal waves and storms. The eruption was brought about by sorcery performed by Gramo's father. It came from Cerisy Peak and was accompanied by very strong winds. On the voyage around the island, Gramo was supposed to wake his father before the eruption had done too much damage but failed to do so, and all were killed. When the two men returned three days later and called on the ground to cover the corpses dust fell from the sky (not from the mountain). Unlike the dust, the original ground was red-brown in colour. Many people had lived on Crown Island before the eruption but they travelled to the mainland and to Karkar Island to escape from the heat of the eruption. All their houses and gardens were burned but the island was not affected by the dust. Before the eruption there were two mountains about the same size as the present ones in the place now occupied by the caldera.

#### RESETTLEMENT

The eruption legends which conclude with the escape of a sole woman to Tolokiwa introduce the resettlement legends, and provide the new settlers with a legitimate connection with the previous population. In casual conversation about the past, some Long Islanders concur with the mainland traditions about survivors of the eruption travelling southwest to land on the mainland coast, and no-one actually disputes this. But legends told on Long Island by the present settlers record only the tradition of the survivor who travelled east to Tolokiwa.

Sili of Malala told Hughes that a woman escaped the destruction by swimming out to sea supported by a large wooden food vessel, and drifted to Tolokiwa. (Boat-shaped wooden dishes up to one and a half metres long are used on the island today). Her name was Tundun and she had lived at Poin Bare (prehistoric site JAB, Egloff and Specht 1982: Fig. 2) north of Malala. It was she who was claimed to have told Sili's great grandfather Korimi of the events surrounding her escape. Even on the most generous age estimates, that would have the eruption no earlier than 1780.

At Bok, McKee and Daimbari were told (pers. comm.):

One young woman was able to escape from the eruption and paddled a canoe to Tolokiwa. She married there and had five children, two boys and three girls. One of the girls, Tauwalak, made a trip to Long Island landing at Kaut. On her return to Tolokiwa she married a man called Kaitip Kaulouru. They gathered a lot of people together and set out for Long Island to settle there. People from the Siassi and Umboi Islands followed the Tolokiwans in journeying to Long Island. Korimai from Umboi Island was one of these and he settled at Malala.

At Matapun they were told that the first arrival after the eruption was Korimi (they recorded it as Korimai) from Tolokiwa who lived at least three generations before the speaker, Botsai. Steam was still coming from the ground and there were stunted trees. The first settlement was at Malala. At Poin Kiau it was said that when Korimi arrived there was still smoke coming from all over the island and there was no grass. He sailed around the island and to Crown Island and found both uninhabited. So he returned to Tolokiwa to fetch his family, belongings and building materials. A second arrival, Samkoi, settled at Bok. Korimi asked him to meet to discuss ownership of the island. They met at Biliau and made a mark there to divide the island in two. Crown Island was taken by Korimi and the small rocky island Motkono (near Bok) was given to Samkoi.

It was Sili of Malala who maintained that the 'founder' Korimi was his great grandfather, and his account of the resettlement recorded by Hughes included circumstantial detail bearing directly on the question of legitimate rights to the land and its resources and the resources of the sea. Great grandfather Korimi and grandfather Kaiponggo were said to have been born at Sakar 'in the Siassi Islands' and to have moved from there to Tolokiwa. (His grandfather was already dead when Sili was born, so his contributions to Sili's oral tradition were acquired through his father Goreke. Goreke was born at Malala and died there before World War II).

At his birthplace, Sakar, Korimi was reputedly a notorious sorcerer and he was forced to flee to Tolokiwa with his family. Within a year or two he was driven from there, too, and sailed to Long Island with his young son, being the first to land since the eruption. He landed where Malala now stands and established that settlement. A cousin (clan brother) called Samkoi, also a powerful man on Sakar though no sorcerer, concerned about his long absence followed him to Tolokiwa and eventually to Long Island, his being the second canoe to land there since the eruption. He was accompanied by younger brothers. When he came ashore at Malala he was 'sent' south along the coast where he founded the settlement of Bok. All now living in the general area of Bok and Kaut were said to be descended from Samkoi and his brothers.

When Korimi and his party arrived the island was devoid of trees, and they used wood and food brought from Tolokiwa. By sheltering in holes, suggested Sili, a few goannas, bush-turkeys, bats and birds may have survived the eruption but pigs, dogs, cuscus and all other things were brought from Tolokiwa. Korimi revisited Tolokiwa and asked Tundun to name the natural features of Long Island, which she did. She died on Tolokiwa.

All at Malala and Poin Kiau were said to be descended from Korimi, who had two fertile and three barren wives. Genealogical statements from Sili in the presence of many witnesses were consistent and able to be extended laterally to siblings and cousins only as far back as the generation of his own father, Goreke, who was remembered as having had two wives, Patakeri (grandmother ? Takeri; cf. Tagere below) and Auri, the latter being the mother of Sili. Sili had two brothers, Sari and Sulungu. The descendants of Patakeri, too, were easily recited.

It is not unusual for a classificatory father, particularly a father's brother, to come to replace the biological father in a genealogy, and adoption is also a constant possibility, but the main interest here is the consistency of statements about the number of generations since the founding fathers, Korimi and Samkoi. All credited Korimi with the reputation of sorcerer and redoubtable fight leader and his legend is still appealed to as a sanction for political and economic matters. Sili said:

Since Korimi's time, Malala territory extended as far south as Balim Point half way down the coast, but last year we shifted it north to the Monono River because the people of Kaut were short of land. Korimi controlled the west coast as far south as a small point south of Biliau, but now we have only to Paramatana north of Biliau. From there north, east and south around the coast to the Monono River is all controlled by Malala and its descendants.

The continuing relevance of this charter was shown recently when students from the National Fisheries School surveying the resources of Madang Province were told on Long Island that present fishing rights conformed with those established by the first settlers 'after the fire'. 'Orim' of Malala fished Crown Island and its reefs and the north coast of Long Island and down the west coast as far as Biliau, and the east coast as far as 'the Stone Island' (Malcolmson 1975, Section 1,3). To us, 'Stone Island' can only mean Motkono, the stack island lying off the south-east cape. If this is so and if it

was accurately reported, we suspect that the informant must have been a northerner, for Hughes was informed that the eastern boundary of fishing rights was the same as for land-use in general, formerly Balim headland and now the mouth of the Monono River. Furthermore, we have seen the residents of Bok and Kaut utilize the resources of the intertidal zone near their villages.

Franz Moeder, whose association with the island is longer than that of any other 'foreigner' and who has, at times, lived at Biliau, told Ball that he thought it likely that prior to the resettlement, people came from Tolokiwa and Siassi to catch turtles, and after it was seen that the island was revegetating one of them decided to live there.

In 1973, when Glucksman and Ball questioned Sili of Malala about the island's history, they had with them copies of photographs from the visit of the 'Südsee-Expedition' of 1909 (Reche 1954, Tafel 18; see Ball 1982) together with some names recorded during that visit. This created considerable interest and facilitated obtaining information. The Tagere of the German account was immediately recognized by Sili as an important woman of the period. He described her arrival on the island as follows:

A second canoe containing Tagere and her husband Mariop went first to Bok. However, there was some sort of trouble [sorcery] there and they moved on to Soraga [apparently the Sora of the Germans] which was on the south side of the island between the present villages of Bok and Matapun. These first two parties had an agreement that if either was destroyed the other would return to Barim [on western Umboi] to let the people there know what had happened.

Botsai of Matapun informed Ball that Tagere had come from Siassi (Umboi). He thought Yapa was her husband, but after being asked about Mariop he said that the latter had indeed been her husband.

Aiyile, the village chief 'Aijile' in the German reports of 1909, was said to be the oldest son of Mariop and Tagere, so it is likely that Mariop's omission from the German record was because he had died. As Hannemann noted in a closely related culture at Madang (1949: 16) the talented wife of an influential man had prestige, especially after his death.

#### POPULATION GROWTH

Dampier (1729, 1939 edition: 218-219) saw one canoe put out towards him from Crown Island but no sign of smoke from fires on either island and therefore concluded that the islands were not densely inhabited. Dumont D'Urville (1832: 543-544) saw no sign of inhabitants in 1827 although he sailed along the north coast within two miles of shore. However, his course apparently did not take him near Malala (see Ball 1982: Fig. 3). The Morrells (Morrell, B., 1832: 459; Morrell, A. 1833: 77) claim to have seen 'a few scattering huts' and 'a number of natives' on the north coast from a distance of less than a mile. They may have seen the first settlers, although the description does not seem to fit the time or nature of the pioneer settlement described in the oral traditions. Another possibility is that they saw visiting gatherers of turtles and turtle eggs or fowl eggs. Unfortunately, the Morrell's evidence is of dubious value because of the couple's general unreliability, as has been noted by Ball (1982), Hughes (1977: 27) and J. M. Diamond (pers. comm.). Otto Finsch, in contrast, is usually reliable and his observation of people and houses on the east coast in 1884 is the first certain documentation that Long Island once again was inhabited (Finsch 1885: 5).

These observations indicate that resettlement had taken place by 1884 but the oral traditions, if accepted at face value, allow some further deductions. The Germans noted that in 1909 Tagere was grey-haired, her husband was dead and her son was

already a chief, but that she was energetic and influential; she is likely to have been close to 50 years of age. If she were already married when she arrived with Mariop, as recounted by Sili, the earliest date for the 'second' canoe would have been about 1875. But the tradition could mean that she and Mariop arrived together as children and later married; this would allow the date of arrival to be at least ten years earlier.

Either interpretation is congruent with the genealogies of the descendants of the 'first' canoe. Sili's work history (detailed below) indicated that he was born before 1890. Even if he, his father and grandfather were all first-born children, an unlikely circumstance, grandfather Korimi must have been born by 1815. Reputedly a powerful sorcerer before leaving Sakar, he stayed for a time on Tolokiwa before proceeding to Long Island, so he was very probably more than 30 years of age by the time he landed.

Together, these traditions suggest that resettlement took place between about 1850 and 1875, a span of years consistent with the accounts of the division of resources, social events and sequence of village foundation as well as with the well-remembered and partially documented growth of population and spread of settlement which took place largely during the twentieth century.

The few observations surviving from the German colonial period refer to the population as sparse, and no estimate of numbers has been found earlier than 1928. That and subsequent population figures are given in Table 1. The fall between 1928 and 1932 may appear to reflect the demise of Soraga; unfortunately, the earliest figure is undoubtedly the roughest of estimates and all of the figures were probably estimates until after World War II. More detailed census data are available for the most recent period and these are given in Tables 2A and 2B.

Even taking into account the unreliability of earlier figures, the population of Long Island has risen from nothing to nearly a thousand in little more than a century, and in the past forty years it has quadrupled. Furthermore, the rate of growth since

**TABLE 1. Long Island population summary.**

Year	Malala	Bok	Poin Kiau	Kaut	Matapun	Total	Source
1928	—	—	—	—	—	300	1
1932	—	—	—	—	—	230	2
1940	77	—	—	—	—	232	3, 4
1945	100	223	—	—	—	323	4
1949	105	259	—	—	—	364	4
1954	—	—	—	—	—	397	4
1958	—	—	—	—	—	411	4
1972	109	216	88	127	156	696	5
						(excludes absentees)	
1973	214*(231)	245 (266)	—	137 (141)	130 (150)	726 (788)	Table 2A
1974	217*(247)	249 (267)	—	142 (145)	122 (152)	730 (811)	Table 2A
1978						876(964)	Table 2B

1. Australia, Prime Minister's Dept. 1937.

2. Great Britain, Hydrographic Office 1946.

3. Allied Geographical Section 1943.

4. Figures obtained from old patrol reports courtesy ADC R.B. Creagh, Saidor, 1973.

5. Owet 1972.

\* includes Poin Kiau

(Figures in brackets include absentees)



**TABLE 2A. Census 1973 and 1974. Sources: Creagh 1973; Spencer 1974.**

Village	Date of Census	Totals (excluding absentees)				Absentees (resident outside electorate)				Total
		Child		Adult		Child		Adult		
		(under 15 years)				(under 15 years)				
		M	F	M	F	M	F	M	F	
Malala*	21.2.73	52	60	59	43	1	3	11	2	231
	21.2.74	66	64	45	42	5	6	15	4	247
Bok	20.2.73	67	72	49	57	—	—	18	3	266
	20.3.74	73	61	52	63	2	2	14	0	267
Kaut	20.2.73	40	33	32	32	—	—	4	—	141
	20.2.74	48	37	28	29	0	0	3	0	145
Matapun	19.2.73	28	31	38	33	4	4	8	4	150
	19.2.74	34	32	27	29	5	6	14	5	152
Total	1973	187	196	178	165	5	7	41	9	788
Total	1974	221	194	152	163	12	14	46	9	811

\*includes Poin Kiau

**TABLE 2B. Census 1978 (dates 9 to 26 January). Source: Apa 1978**

Age	Resident	Absentee	Total	Resident	Absentee	Total	Total
	M	M	M	F	F	F	
0-5	120	14	134	105	9	114	248
6-17	165	8	173	148	4	152	325
18-45	134	31	165	121	19	140	305
46+	42	3	45	41	0	41	86
Totals	461	56	517	415	32	447	964

the war has increased. Mechanisms of population adjustment that may have existed in precolonial times are unlikely to apply now. These facts raise serious questions about the future of the presently abundant resources of Long Island and the people who depend upon them.

#### SETTLEMENT PATTERN

Like most other speakers of Austronesian languages in Melanesia, the people of Long Island live on the edge of the sea. Most food is produced within a kilometre of the water's edge and the same narrow strip supplies much wood and fibre. Permanent running fresh water did not affect the main choice of settlement sites and most locations drew fresh water from wells in the sandy soil behind the berm at the top on the beach, now largely superseded by deeper wells lined with galvanized iron and further from the sea.

Malala was without doubt the pioneer settlement, as its name recalls. Ball and Glucksman were told that Malala was an abbreviation for Malalagurunu, meaning 'original landing place'. Early in 1972, so Hughes was told, while some of the young men were digging holes for new house-posts at the southern end of the village, they found human bones and concluded to their surprise that they had found an old burial

ground. The old people confirmed that it had been a cemetery when they were young, and they said that it may date back to the time of Korimi.

Bok was founded soon after Malala. Some time later, but certainly by the first few years of the twentieth century, Soraga had begun as an offshoot from Bok, for by the time the German scientists visited it in 1909 it was a large village. Since Mariop and Tagere were believed to be among the earliest settlers and she was grey-haired in 1909, Soraga may well date from the 1880's. When Glucksman and Ball interviewed Sili in regard to the German visit, they were told firmly that at that time there were only these three villages, not five as said by the Germans. They did not recognize the settlement of 'Ow' (Ov) mentioned in the published account, though, since Soraga was reputed to be very large, they speculated that 'Ow' may have been part of it. All the people of Soraga were said to have died as a result of sorcery, and the village was abandoned. Later, the site was largely destroyed by a huge wave. Katip (F: Bara) also told Ball that sorcery had been the cause of the deaths and that they had occurred about the time he was born, which he estimated was in the late 1920's. In recent years, further sea erosion is said to have removed all trace of Soraga.

In 1933, at the time of Coultas' stay on the island, there were only two villages, Malala and Bok (Coultas 1933-35: 264). Kaut appears to have begun as a small hamlet in the late 1930's but in the early 1940's the compilers of the AGS survey thought it had been abandoned (1943: 128). Patrol reports as late as 1949 continued to refer to only two villages. The new village of Matapun on the west coast was begun in about 1950 by people from Bok, and they were joined by a few people with Long Island kinship or affinal connections from the mainland and from Umboi. The hamlet of Kaut appears to have been revived in the late 1950's or early 1960's; it was certainly inhabited by 1969 (Bailey 1969). Poin Kiau had been a site for the seasonal shelters of the people of Malala (mainly for collecting the eggs of brush turkeys and turtles) for some years before the first permanent houses were built there in the mid-1960's. In 1972, there were garden houses at Saru and they have occasionally been built at other isolated east coast garden areas. By 1973, there was a well-made house at Kowauye at the southern end of the island and the remains of another at nearby Bara. By then, too, the north-west coast had one or two scattered houses of varying degrees of permanence. Since 1973, the people of Long Island have continued to spread away from their original villages into hamlets, as will be discussed below.

None of the present settlements, even the isolated hamlets, is on the site of a known settlement of the former inhabitants, though temporary garden houses have been built from time to time not far from Poin Bare north of Malala and Bara on the south coast, and Franz Moeder's establishment is near another prior habitation site.

#### NATURAL RESOURCES

As with all communities of agriculturalists, arable land is the most vital resource of Long Island. It appears to be the only significant mineral resource, since it is said that there is no pottery clay on the island and no visitors have seen any. We have not heard of earth pigments on the island but Ball was told at Mur and Sel on the Rai coast that red earth pigment was received from Long Island in trade. It is possible that some red ochre is associated with lava from an earlier volcanic period or that the Rai coast informants were mistaken. No obsidian has been reported except in prehistoric sites and that is from Talasea, New Britain (Egloff and Specht 1982) and geologists say that the eruptive material is not of a kind to produce volcanic glass. Nothing is known of the stone tool technology that certainly existed prior to the acquisition of iron in early colonial times, but part of a discoid club head (made from a stone type that does not occur on Long Island) was found in 1972 near Kaut.

Lack of water seriously limits agricultural productivity. Rainfall is inadequate and unreliable, and permanent streams are few. The only ones of any length are the Sauro on the northwest and the Abigapunu and the Monono on the east coast (see Specht *et al.* 1982, Fig. 5B). The people say that the latter became a permanent stream only shortly before the war, and Taylor (1953: 3) was told the same in the 1950's. This may have occurred because the lake surface only then reached its present 190 m above sea level or because headward erosion by ephemeral east coast streams finally cut into lake-fed aquifers. The location of the river's headwater springs is recognizable on aerial photographs, and in 1978 McKee and Angus of Matapun visited them. When Hughes visited the mouth of the Monono late in the drought year of 1972 (there was said to have been no rain for eight months) he estimated the discharge as about 90 cusecs (2.5 m<sup>3</sup>/s). A year later, following a year of 'normal' rainfall, Ball and Glucksman (1978: 458) calculated the discharge at 4.4 m<sup>3</sup>/s. To the north, the Arapos River has a much smaller discharge (estimated to be 1.0m<sup>3</sup>/s in November 1973 [Ball and Glucksman 1978: 458]) and fails to reach the sea, emerging from the ground to run for less than a kilometre before again disappearing into the porous soil. In the same size range are the Sauro River which runs for an unknown distance before entering the sea and, on the east coast south of the Monono, the Abigapunu. At several other places on the northern, western and southern coasts, very small creeks emerge from dry river beds close to the sea and flow into it, and at other places seepages are ponded by the sand berm. During the rainy season some of these break through to the sea. There is little doubt that the three main streams of the east coast are lake-fed by percolation through the porous pyroclastic beds and that the lake acts as an enormous reservoir of fresh water which maintains the small seepages even at the end of a prolonged drought.

In 1972, the dry season was so extreme that by October conditions were already serious enough for the district administration to initiate a drought survey by DASF officers. N. Owet (1972: 4) reported that some of the small streams normally used to keep taro planting materials alive in readiness for planting at the onset of the wet season had completely dried up. His observations underscore the importance of these small water-courses in the gardening strategy. While they do not influence patterns of residential settlement, they are important in the management of the scattered food gardens.

Ball and Glucksman (1978: 458) estimated the mean annual rainfall as about 2800 mm on the basis of records maintained on Umboi and on the mainland coast, as well as upon comments made by administration officers. Rainfall is greater on the mountain tops (where considerable moisture is also gained by condensation directly from clouds onto foliage) but the lowland forests receive less than the average and the coastal gardens less again. Several observers support our own impressions that the seasonal variation is greater on Long Island than on the mainland, mainly because the dry season is longer and drier, extending from April to November. The wet season rainfall is also reported to be less than on the mainland (D. Clifton-Bassett, pers. comm.). The AGS (1943) report says that in the dry season, the foliage of the trees had been known to wither and turn brown, 'leaves being stripped from the trees; bush fires would be possible' (1943: 128). In 1972, we observed leaf fall in the late dry season throughout the lowland forest up to the altitude of the crater rim at 400 m MSL, characteristic of deciduous and semi-deciduous trees in a monsoonal climate. However, the climate is not monsoonal: the winds during the wettest months (December to March) are variable, though winds from the north and northwest are said to be most frequent. In that season, thunderstorms are common (AGS 1943: 127). During the dry months, southeasterly winds dominate and are sometimes quite strong.

The soils developed on the young porous tephra are thin, coarse and highly permeable. Humus levels appear to be low, in keeping with the recent development of vegetation. According to the pedologist H. Haantjens (pers. comm.), one can expect soils developed on recent volcanic 'ash' to be excessively drained and low in humus but there is no reason why they should be deficient in mineral nutrients. However, if grain size is large, the availability to plants may be reduced. Our observations suggest that this could be a factor in some of the island's arable areas.

The 'over-drained' soils and low rainfall mean that it is not unusual for a prolonged dry season to become a serious drought, and even in 'normal' years, garden foods are often in short supply before the next rainy season has helped to produce the new season's crops. Fortunately, the island is well endowed with wild food sources. In contrast to much of New Guinea, these are dominated by high protein sources. Gathering, hunting and fishing in that order, contribute much to diet.

#### WILD RESOURCES — VEGETATION

No botanical survey of Long Island has been published, though botanists from the National Herbarium, Lae, have visited the island several times. An early botanical visitor, Evans, spent three days on the north-east coast in the 'autumn' of 1925 and made the following observations on the vegetation (Evans 1939: 43-44):

The vegetation is quite peculiar and ecologically most interesting. Although the rainfall is probably at least 70 inches per annum, judging by the fact that these islands lie in a wet belt, yet owing to the porous nature of the soil, combined probably with the desiccating effect of the constant trade winds, there is very little undergrowth and a marked absence of epiphytes, tree ferns and similar undergrowth. The low plain at the north-east of the island was covered with a growth of trees all approximately of the same age and probably between thirty or forty years old. There was so little undergrowth that one could walk about quite freely between the trees, where, of course, in tropical forests in similar latitudes it is usually necessary to hack one's way through with a cutlass.

. . . The commonest forest tree was *Barringtonia speciosa*, which was everywhere abundant. Another common tree was the false almond (*Terminalia catappa*). The seeds of both these species float readily and the beach was in fact covered with the characteristic fruits. Other common trees, which possibly also originated from water-borne seeds, were *Cassia* sp. (possibly *fistula*), *Thespesia populnea* and, in one spot only, a small group of *Pandanus*.

. . . In addition to these trees which had evidently arrived by water, were certain species that had probably originated from seed conveyed by birds. These included *Ficus*, *Eugenia* and *Canarium*. The island so far as we could judge was uninhabited but it teemed with large purple fruit pigeons, responsible no doubt for the introduction of these species. There were also a few Megapodes: . . . and how they had arrived on the island has always been a puzzle, as they prefer running to flying and do not appear to be strong on the wing or capable of sustained flight.

J. S. Womersley (pers. comm.) has mentioned *Terminalia microcarpa* and *Prosopis insularum* as being common and we have recognised *Calophyllum ?inophyllum*, *Albizia falcataria*, *Albizia ?procera* and the stinging tree *Laportea* sp., the latter being common in garden regrowth. Long Island informants say that they have the wild nut trees which are called in NGP *alia* (*Inocarpus edulis*), *galip* (*Canarium salomonense*) and *talis* (*Terminalia catappa*) and the fruit known as *mon* which Mihalic (1971: 136) identifies as *Dracontomelon mangiferum* but which is not listed under that name by Powell (1976: 108-112). Describing these as 'wild' is reasonable in the sense that they have been indigenous to Melanesia for a very long time, but the presence on Long Island of all or some of these valuable food species may well be due to planting or

transplanting. Such trees are sometimes transplanted from forest to village elsewhere. Species known to be planted are mentioned below.

Evans' characterization of the dominant trees of the north-east plain as an even-aged forest probably between thirty and forty years old brings out a remarkable characteristic of the lowland vegetation which deserves botanical investigation. More than forty years after Evans' estimate, J. S. Womersley (letter) said that when compared with trees of the same species elsewhere in the region, those on Long Island appeared to be no more than 40-50 years old. This cannot be interpreted as a second cycle in a rapid developmental stage but indicates that the same trees continue to look as if they were 40-50 years old. The evidence suggests that soils and climate have combined to produce conditions of very slow growth, with sizes at maturity which are below those of other parts of the New Guinea lowlands. It is likely that some species present at this altitude elsewhere are absent from Long Island, perhaps as a result of conditions hostile to their establishment, and that some that have 'returned' have not become widely established. E. E. Henty of the National Herbarium, Lae, identified the trees *Drypetes* sp. *Saurauia* sp. and *Eurya acuminata* from specimens collected from near the summit of Mt Reamur and the timber used for the radiocarbon date ANU-1125 from the pre-eruption forest was identified as *Neonauclea* sp. by the Forest Products Laboratory of CSIRO's Division of Applied Chemistry (letter, 1973).

In 1933 Coultas saw the forest as 'a thick shambles of secondary soft wood trees and scrub bush' which he attributed to the recency of the eruption (1933-5: 32) and today the dominance of trees like *Albizia* in areas that apparently have never been gardened continues to give the impression of a prolonged seral stage. Their presence some 250-350 years after the eruption casts further doubt on the age estimates and suggests that the effect is due to extreme seasonal aridity and very porous soils, and that most of the lowland forest may already be in a steady state. The strongly seasonal moisture regime, unusual in the humid tropics, suggests that these trees may repay investigation by those interested in establishing tropical dendrochronologies.

The above characteristics of the low altitude forest means that there are probably fewer valuable wood and fibre species than most New Guinean human communities have available. Compared with mainland forest, hardwoods seem to be deficient and palm species few. The suite of wild vegetable foods appears to be small, although Coultas noted the leaves of three kinds of *Ficus* being boiled and eaten with grated coconut (1933-5: 286) and wild yams (*Dioscorea* sp.) are a seasonally important starchy tuber. Hughes was told of a forest tree called locally *didigi* of which the small fruits and pith of the growing shoots are eaten. A tree with red fleshy fruits (NGP= *wail laulau*) thought to be either a *Eugenia* sp. or a *Garcinia* sp. was seen deep in the east-coast forest and there are undoubtedly a number of other trees and shrubs supplying wild fruits, nuts and edible leaves and shoots.

It is possible that some of the coconuts, breadfruit and sago on uninhabited Crown Island could have become established without the aid of humans, the first being cast ashore by waves and the other two being distributed by animals. Breadfruit is widely reported to be distributed by flying fox. In his many voyages in these waters over more than forty years, Franz Moeder has seen mats of vegetation (of the kind often reported off the mouths of the Sepik and Ramu Rivers) floating in the Bismarck Sea well to the southeast of Bagabag Island. Much of the vegetation is still living, and crocodiles, snakes and waterfowl have been seen on the rafts, which appear to be breaking up by the time they near Crown Island where some of the flotsam finally strands. Moeder thinks that this mechanism has played an important part in the recolonization of Crown Island and to a lesser extent Long Island. However, in view of

the short time scale we believe that most if not all of the valuable 'wild' food species on both Crown and Long Islands have been planted or transplanted. Hughes was told that sago was first made on Long Island in the 1960's from transplantings dating from just after the war. Suckers were said to have been brought from the Rai coast as well as from Crown Island and in recent times seedlings of breadfruit have been transferred from Crown to Long Island to supplement those already there. The presence of fruiting coconut palms on the lip of the crater southwest of Malala is evidence that earlier travellers in the forest, probably hunters, planned for future journeys, and relatively casual plantings like this continue today. The coconut trees which were described as standing near the present site of Matapun by a wartime Allied Geographical Section Terrain Study (1943: 128) are likely to have been planted by fishing parties visiting from the east coast or by sheltering canoe travellers, judging by the casual tree planting that we have seen elsewhere on the island.

Names of some wild fruits and nuts of economic significance, recorded by Ball, are listed in Table 3.

**TABLE 3. Wild Fruits and Nuts.**

Long Island	NGP	English	Botanical
hip	aila	Polynesian chestnut	<i>Inocarpus edulis</i>
kangar	galip	Canarium almond	<i>Canarium salomonense</i>
taili	talis	tropical almond	<i>Terminalia catappa</i>
anrang	marita	pandanus	<i>Pandanus</i> sp.
unruk	marita	pandanus	<i>Pandanus</i> sp.
rak	mon	—	<i>Dracontomelon mangiferum</i>

#### WILD ANIMALS — TERRESTRIAL

It seems possible that the same conditions that have produced an unusually open forest with relatively simple vertical structure and sparse understorey have permitted a larger population of ground-dwelling animals and birds than in the mainland rain forests. To the observer with some familiarity with Australian forest types in addition to New Guinea rain forest, the density of animal life is more reminiscent of sclerophyll forests than of rain forests (see, e.g. Guiler 1965: 36, 37). This characteristic, combined with a small human population (crude density about 2.7/km<sup>2</sup> land area), has meant that to date the people of Long Island have been very affluent in terms of protein sources. Many of these are in the forest. Long Island has fewer bird species and much higher total numbers than islands which are of comparable size but have a longer history of uninterrupted biotic development (Diamond 1974: 803-6). Other elements of the fauna seem to follow the same pattern, as might be expected on an island recolonized relatively recently.

Here we are primarily concerned with animals of significance to the human population. (For a more comprehensive list see Appendix 4 in Lindgren 1975). Of the terrestrial reptiles, the most important is the goanna *Varanus indicus* whose skin supplies the tympanum for hand drums (NGP = *kundu*), formerly a valuable Long Island item of export. It is also a welcome addition to diet. Constrictor snakes, especially pythons, are popular items of diet in many New Guinean communities but only the boa *Candoia carinata* has so far been reported (from both Long and Crown Islands) and it is not known to be eaten. Of the forest-dwelling mammals only bats, the rats (if native) and the cuscus *Phalanger orientalis* would normally be regarded as wild; however the latter was reportedly introduced by man. *Phalanger* are present in

very large numbers, and children can collect several in an afternoon without difficulty. Captured phalangers are a common sight in villages, especially in the late dry season, bound to poles or in various stages of preparation for the evening meal. They are so plentiful and easy to catch that children will sometimes have private feasts at any time of the day wherever they happen to have roamed along the foreshore. An unfortunate development for forest conservation since the introduction of steel axes is the readiness with which tall trees are felled to capture phalangers when the climb might be difficult, a method never used when axes were made of stone. We have observed the same change of method applied to the gathering of forest fruits elsewhere in Papua New Guinea in areas rarely frequented. The fur, which is highly valued in the highlands of the mainland, is simply burned off the carcass on an open fire.

Both insect-eating and fruit-eating bats have been seen, including the large fruit bat *Pteropus* sp. It is a popular food item in many parts of New Guinea but we do not know if it is eaten on Long Island; other meats can be obtained with less effort.

Feral species include large numbers of pigs, *Sus scrofa*, a large dog population, *Canis familiaris* and some cats *Felis ?sylvestris*. Hughes saw a large ginger feral cat hunting near a megapode egg-ground in 1972 and was told that they were fairly common. There is little doubt that the domestic dog and feral dog populations overlap to some extent in terms of breeding, for young puppies caught in the forest are hand reared from time to time. Yet Moeder believed the feral dogs were of distinctive appearance, with the dark 'blue' tongue and palate said to mark descent from Chow-like breeds. Village dogs in general were nondescript, mostly with flop-ears and highly variable hair colour. When Hughes asked at Poin Kiau about the appearance of the feral dogs a handsome sandy-coloured prick-eared bitch was produced that had been caught in the wild as a pup. It resembled the *C. familiaris hallstromii* of the alpine grasslands of New Guinea.

Feral and domestic pigs form one breeding population, and only recently have some of the people taken to keeping boars. A white boar was said to have been obtained from the European who built the navigation light at Poin Kiau in 1970, and one or two others are said to have been obtained elsewhere. Young piglets captured in the forest are sometimes raised in the village, and in former times, this was a main source of domestic pigs, though the German expedition of 1909 noted a well-prepared farrowing pen (see Ball 1982).

Wild pigs are hunted with dogs, spears and bush-knives and are taken with ease. One or two shotguns were said to have made their appearance on the island during 1973 and 1974 (there were reputedly none in 1972) but it has since been agreed that the islanders will limit their use (PNG Post Courier, Oct. 28, 1977).

Hughes made a two-day journey through the forest in 1972 during which soil freshly overturned by rooting pigs was commonly seen. The party captured two pigs and saw six others. Both captures were made only with the aid of dogs and a bushknife. In the first, a large pig was bailed up by 'Wanlek', a dog of average size (some 40 cm to the shoulders) but with only three legs, helped by two very small dogs. While the pig's attention was held by the dogs, one man dispatched it with a bushknife. The second capture was that of a small boar held down by 'Wanlek' alone. Since there was already a surfeit of meat, one man held the animal while his brother docked its tail, earmarked and castrated it. As it was released (while the dog was held) the men remarked that the event would be told in the village and that whoever took the pig at a later date would be obliged to give them some of the meat. It was said that this was a common practice in exploiting the feral pig population. Coultas (1933-5: 266, 273) noted that bows and arrows and slings were also used in hunting and that some game was taken with rope snares.

Two species of birds are important protein sources; the indigenous wild brush turkey *Megapodius freycinet* and the feral domestic fowl *Gallus gallus*, which has plumage resembling the bantam and game-cock and a build somewhat between the two. Both species are mainly ground-dwelling, though they roost in trees and fly up to a lower limb when disturbed on the ground. Although the crowing of cocks is commonly heard in the forest these birds are seldom eaten. This forest strain is said to have interbred occasionally with the predominantly white domestic poultry. Coultas (1933-5: 282) was told that Leghorn-type fowls had been brought to the island from Umboi by a returning indentured labourer. Domestic fowls are an important food item in many parts of New Guinea but neither megapodes nor either of the fowl varieties appear to fill this role on Long Island, perhaps because of the abundance of other, more readily available, protein sources.

Coultas wrote that 'Gallus and Megapode were both nesting near the village and eggs were hunted every day and brought for sale in addition to those of the domesticated fowl'. (1933-5: 268). We did not see any eggs of the feral fowl but those of the megapode were regularly consumed. Feathers from the feral fowl are an important item of ornament.

In contrast to some parts of New Britain, the megapodes do not use geothermal heat to hatch their eggs, nor do they build vegetation mounds to produce compost heat. In at least ten places around the island (see Fig. 3) usually at the head of the beach or just behind it and where the absence of trees allows sufficient sunlight to reach the ground, the birds lay their eggs in hollows scratched out of the loose sandy soil and bury them before returning to the forest. The *munamgaulok* egg-ground is typical, occupying nearly a hectare mostly in the dry bed of an ephemeral stream where it spreads out and becomes braided behind the beach. Isolated patches of soil have been dug up for laying as much as 100 m on either side of the main cleared area. Incubation is by insolation and the dark grey tephra reaches a high temperature during the day. When not laying, the birds remain in the forest where they are present in large numbers. Hughes made six observations at close quarters in one day, two of them being of pairs of birds. In each case they flew only a short distance to a lower branch and would have been easy to take with bow and arrow. The fact that they are rarely if ever hunted emphasizes their place as egg-layers in the Long Island food strategy.

A useful food item rich in fats was noticed on one journey when a youth in the party extracted and ate a large number of longicorn larvae from a fallen tree. They were rejected by the young boys present.

#### AQUATIC SPECIES

Black Duck *Anas superciliosa* are common on the fresh water of Ranba (Lake Wisdom) and could be taken relatively easily from hides but they are not utilized by the people, who seldom visit the lake. There are no fish in the lake. Salt water crocodiles *Crocodylus porosus* also inhabit the lake but they are few in number (perhaps only one or two) and favour the remote north-western shore. Before World War II the lake itself appears to have been avoided. Coultas wrote (1933-35: 41):

The local populace hold this body of water in great veneration. They believe it to be inhabited by a race of super-humans who will catch and devour any one caught near its edge. Years ago a pig hunter was lost somewhere in the mountains and it is the belief of these people that he was captured and eaten by the lake monsters.

Crocodiles are also sometimes seen on the shores of Long Island, particularly the north coast, although they are both smaller and less numerous than formerly. They



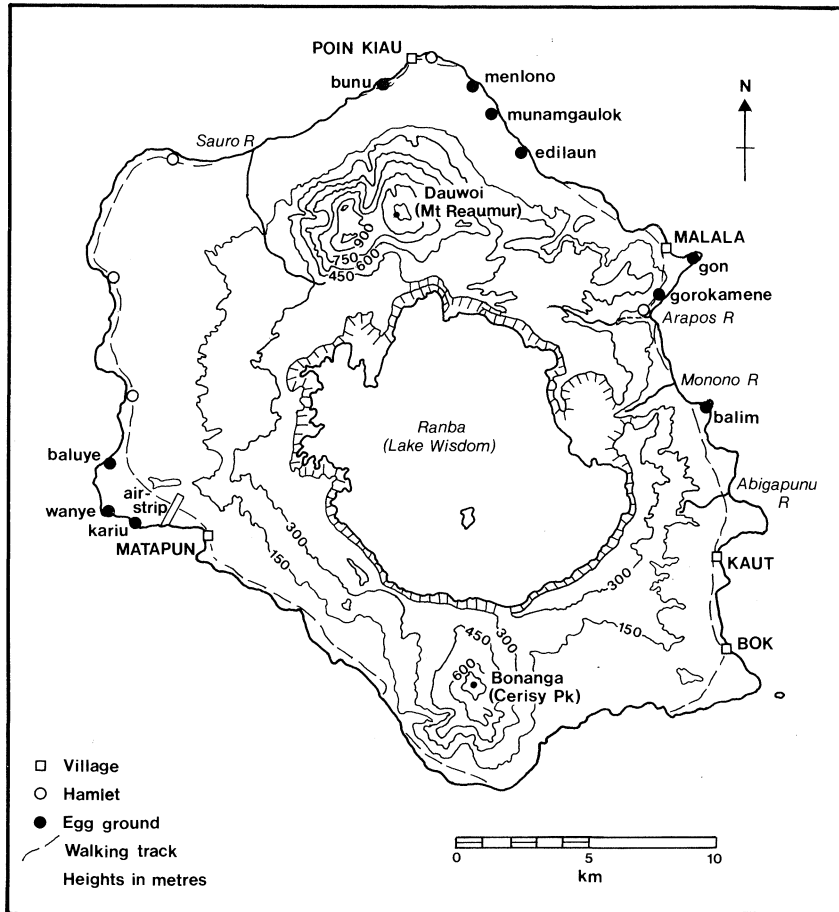


Fig. 3. Location of egg grounds and status of the walking track, November, 1978.

are said to be more common on Crown Island. In the past they have been shot for their skins by professional hunters from the mainland. The Long Islanders do not exploit crocodiles as a source of cash income and, in fact, they have requested Franz Moeder (pers. comm.) and others to shoot those crocodiles living near inhabited areas.

Crown Island has a well-developed barrier reef as well as fringing reefs; Long Island has fringing reefs only, and except on the southeast point, they are not extensive. Nevertheless, the sea is rich in reef fish and invertebrates. Although some of these marine resources are speared, netted or collected they are generally much less important on Long Island than in most New Guinea coastal settlements.

Three species of turtle supply the only important marine component of regular food intake, and that mainly in the form of eggs, of which there may be more than one hundred per nest. Turtles are rarely taken at sea but females are frequently captured on the beach when they come ashore to lay. It is said that formerly the animals were taken only for special occasions but now they can be a source of money

and the estimated number taken in 1973 was 329, all female (Lindgren 1975: 8). It was estimated by R. Wilson of DASF Wildlife Madang (pers. comm.) and Moeder (pers. comm.) that in 1976 about one thousand were killed. The Hawksbill (*Eretmochelys imbricata bissa*), the Green Turtle (*Chelonia mydas*) and the rare Leathery Turtle (*Dermochelys coriacea*) all lay on Long Island's beaches, especially in the north. Nest sites are conspicuous and when dug no eggs are left to hatch. With the dispersed settlement pattern that has developed in recent years together with a great increase in foot traffic around the island's perimeter, fewer and fewer clutches of eggs are being allowed to hatch. Moeder (pers. comm.) stated that since the government school opened at Matapun in the 1950's children from as far away as Malala have been walking home at weekends and on the return trip they have collected quantities of eggs to eat during the week at school. Such a pattern of exploitation means that only occasionally will a nest survive undisturbed.

Territorial boundaries were described in the section entitled 'Resettlement'. Those who wish to collect or hunt on the territory of others must seek permission, but villagers whose beaches are not regularly visited by turtles (and that includes the large settlements of Bok and Matapun) tend to receive eggs by exchange or purchase.

A list of local names for animals of economic significance is given in Table 4.

**TABLE 4. Animals, birds and fish.**

Long Island	NGP	English	Zoological
ga	pik	pig	<i>Sus scrofa</i>
kiroro	kapul	cuscus	<i>Phalanger orientalis</i>
bianga	blakbokis	flying fox	<i>Pteropus</i> sp.
pon	trausel	turtle	Dermochelidae
kawadui		leathery turtle	<i>Dermochelys coriacea</i>
olol		hawksbill turtle	<i>Eretmochelys imbricata</i>
padodo		green turtle	<i>Chelonia mydas</i>
padodo rarasaua		a long variety	<i>Chelonia mydas</i>
padodo bartum		a short variety	<i>Chelonia mydas</i>
pon natun	kiau bilong trausel	turtle eggs	
man	pisin	bird	
tareke	kakaruk	rooster	
tataraga		feral chicken	<i>Gallus</i> sp.
malau		megapode	<i>Megapodius freycinet</i>
poryoi		black duck	<i>Anas superciliosa</i>
bal		grey imperial pigeon	<i>Ducula pistrinaria</i>
hi	pis	fish	
kruke	kindam	crayfish	<i>Panulirus</i> sp.
kese	kuka	crab	
tunu	maleo	marine eel	
adiwi	maleo	fresh water eel	
komobi	lalai	trochus	<i>Trochus niloticus</i>
komosi	talbum	green snail	<i>Turbo marmoratus</i>
gomokoko	kramsel	giant clam	<i>Tridacna gigas</i>

## AGRICULTURE

Plants grown specifically for fibres were not investigated though one, a pandanus (NGP = *karuka*) was seen in a garden. Others, grown for ornament, include crotons and cordylines. In New Guinea tree crops sometimes assume particular significance in times of famine, and on Long Island, breadfruit (*Artocarpus altilis*) is often a very important source of carbohydrate during the late dry season, which on Long Island is a regular *taim hangri*. At that time, too, sago (made from the pith of the palm *Metroxylon sagu*) becomes desirable. Coconuts (*Cocos nucifera*) are plentiful all year round, and apart from being an important item in human diet, the flesh of the unripe nut is fed to dogs. There are mango trees (*Mangifera indica*) in some villages and also present are the malay apple (*Syzygium malaccense*), bananas (*Musa spp.*), a cultivated pandanus, pawpaw (*Carica papaya*) introduced citrus species (orange, lemon and grapefruit), the betel nut palm (*Areca catechu*) and its associated plant, the betel pepper (*Piper betle*). Table 5 summarizes the names of cultivated food trees and stimulants. Tobacco (*Nicotiana tabacum*) has been present in this part of New Guinea long enough to be a traditional crop and it is grown by all families. Angus (F: Botsai) told Ball that it was planted about March and harvested in November. Several informants said that their tobacco was the best in the district and was readily exported, and it seems likely that Long Island's combination of unusual seasonal aridity and porous soils may be as advantageous for this crop as it is disadvantageous for food growing.

TABLE 5. Names of cultivated food trees and stimulants.

Long Island	NGP	English	Botanical
kun	kapiak	breadfruit	<i>Artocarpus altilis</i>
mono	saksak	sago	<i>Metroxylon sagu</i>
piti	morota	sago leaf (for thatch)	
matuk	kokonas	coconut	<i>Cocos nucifera</i>
geng	popo	pawpaw	<i>Carica papaya</i>
pur	banana	banana	<i>Musa spp.</i>
hoi	mango	mango	<i>Mangifera indica</i>
pada	marita	pandanus	<i>Pandanus sp.</i>
bu	buai	betel nut	<i>Areca catechu</i>
ul	daka	betel pepper	<i>Piper betle</i>
kas	brus	tobacco	<i>Nicotiana tabacum</i>

Yams are the garden staple of Long Island, as they are in much of lowland New Guinea where there is a marked dry season. They are said to be of considerable ceremonial importance on Long Island (F. Moeder pers. comm.). If the growing season is a good one they are eaten all year round, the crop being stored in special yam houses. In November of the bad drought year 1972, yams were the most common garden plants, though in very poor condition, and only seed yams were left in most storehouses. There were at least three kind. *Dioscorea alata*, *D. esculenta* and probably *D. nummularia*. Taro (*Colocasia esculenta*) was also present, though not making any growth except where irrigated by running water. Most taro and chinese taro (*Xanthosoma sagittifolium*) seen at the time was held as planting stock beside permanent water (Fig. 5B). Gardens included some cassava (*Manihot esculenta*) usually around the edge, corn, rare sweet potato plants (*Ipomoea batatas*) and pumpkin. Three kinds of bean were present, including the winged bean, *Psophocarpus tetragonolobus*, and leafy green vegetables included *Hibiscus manihot*, *Amaranthus sp.* and others. Sugar cane (*Saccharum officinarum*) was

TABLE 6. Names of vegetables.

Long Island	NGP	English	Botanical
kaning	yam, mami	yam	<i>Dioscorea</i> spp.
mamui	mami	yam	<i>D. ?esculenta</i>
sirim	yam	yam	<i>D. sp.</i> or spp.
bus	taro	taro	<i>Colocasia esculenta</i>
galam	taro kongkong	chinese taro	<i>Xanthosoma sagittifolium</i>
serem bat	kaukau	sweet potato	<i>Ipomoea batatas</i>
kanikai	tapiok	cassava	<i>Manihot esculenta</i>
to	suka	sugarcane	<i>Saccharum officinarum</i>
tatiu	pitpit		<i>S. edule</i>
pongom	kukamba	cucumber	<i>Cucurbita</i> sp.
bede	kumu	leafy green vegetables	
bere	kumu	a leafy green vegetable	
gogo	kumu	a leafy green vegetable	
guru	kumu	a leafy green vegetable	
kios	kumu	a leafy green vegetable	

also present, as was the recently introduced pineapple (*Ananas comosus*). Not seen but described by the people as commonly planted were *Saccharum edule* (NGP = *pitpit*), of which the inflorescence is eaten, peanuts, cucumbers and watermelons. Onions are not grown although in the past they have been. Vegetables grown on Long Island, and their local names, are summarized in Table 6.

Coultas (1933-5: 30) mentioned a food plant called 'pan pan' but our informants did not recognise the term.

Bananas, taro and chinese taro are generally regarded as men's crops and the yams and sweet potatoes are specifically women's crops. Other gardening is a shared task, and Coultas observed how men, women and children all worked in the gardens (1933-5: 267).

A new garden is made largely by using a bushknife and fire, in marked contrast to the prominent use of tomahawks on much of the New Guinea mainland. A bushknife with a particularly heavy blade in Hughes' possession was greatly admired and men enquired about the source of supply. The largest trees are merely ringbarked, not felled, and the cleared trash is burned (Fig. 4A). Preparations are carried out late in the dry season when burning is easy and rains can be expected within two months. Because of feral pigs, gardens are sometimes fenced and then laid out internally often using sticks as markers (Fig. 4B). When it seems the rains are imminent (usually in October-November), planting begins; yams and taro being placed in small mounds (Fig. 4B). Sugarcane, corn and watermelons are also planted. Taro is also grown along running water which is frequently diverted to form irrigated taro gardens; the most extensive being along almost the entire course of the Arapos River.

There is a pronounced seasonal variation in the food supply. As mid-year approaches there is still considerable soil moisture and the gardens that were planted eight or nine months ago are in full production. The vegetable diet is rich and includes all the foods mentioned above. As the dry season progresses total garden production begins to fall, the variety decreases and yams, cassava and bananas supply most of the carbohydrate food. In late dry season yam supplies may already be low, bananas and sugar cane are bearing, a few families have irrigated taro and some have the introduced pineapple. Wild yams and breadfruit become important sources of carbohydrate and in general there is an increasing dependence on tree crops — starch from sago as well as the cultivated fruits and nuts like coconuts, pawpaw, mango, malay apples and wild fruits and nuts like the



Fig. 4. Shifting agriculture near the coast. **A.** A garden plot is cleared by felling, ring-barking, and burning. **B.** Ready for the planting of yams at the end of the dry season.



Fig. 5. Agriculture toward the end of the dry season. **A.** Last year's garden near the end of its life in October. **B.** Taro planting stock survives the dry season on a lagoon bank.



Fig. 6. Villages. **A.** Matapun, 1973. **B.** Newly constructed men's house at Bok, 1978. **C.** Poin Kiau, 1978.

nut pandanus. By the end of the dry season the wild yams and breadfruit crops are finished (in the drought year of 1972 they were exhausted by late October) and wild foods, especially animal foods, become very important sources of calories. This is the time when purchases of rice from the trade stores are heaviest and since this pattern is becoming usual the earning of cash income itself is becoming increasingly important. This pattern of food consumption continues until after the rains end in the new year, and the new crops begin to produce. Unless the season has been particularly good, there are often complaints of food shortage between December and May and even in good years preferred foods are always in short supply at this time.

Since the war, population growth (apparently aided by a lessening of social isolation in general) has led to a dispersal of gardens which is now being followed by a dispersal of settlement. Gardens have spread rapidly in the past ten years and there is an increasing tendency to form hamlets near the new gardens. The result has been a very rapid destruction of lowland vegetation, especially near the coast, and there will soon be no unaltered vegetation left in this zone, (Fig. 4A, 5A).

#### MATERIAL CULTURE

Houses built directly on the ground but more often raised on posts were noted in 1909 by the German expedition (see Ball 1982) and in 1933 Coultas (1933-5, 44) wrote that people 'build their homes well off the ground and include the storeroom in the house. A firewood storage is made in the roof of the structure . . .' Rectangular houses with gabled roofs, most of them with floors raised on posts, are still the typical house form (Fig. 6A, B, C). Most have a covered verandah protecting the doorway. Although there is no shortage of softwood timber for house construction, much of the planking used on the north and east coast seems to be driftwood. Ships' nameplates reflect the fact that timber from a number of wrecked ships has been incorporated into the walls of houses. Galvanized iron roofs are still in a small minority, most roofs being thatched with coconut fronds. Iron appears mainly on government buildings like the school, Franz Moeder's buildings, some village trade stores, and on copra dryers.

After houses, the largest structures built on Long Island are canoes, although nowadays they are smaller than the canoes formerly built for trading voyages. They have single outriggers with some decking between the booms. Harding (1967, 23) was told by mainland informants that the Long Island people 'constructed enormous dugouts without the addition of side planking' and they 'paddled rather than sailed their canoes across the Vitiav Strait to Sio'. Lacking washstrakes they were 'said to have been easily swamped. If this happened, all but one or two of the dozen crewmen slipped into the water alongside the canoe while the others bailed it out'. According to Harding, sailing canoes were obtained in trade from the Siassi. These, according to Sili (F-Goreke) had sails woven from pandanus leaves. A sailing canoe complete with splash board and washstrakes was seen by Finsch at Long Island in 1885 (1888a: 188, 189). It had eight passengers. The mast head was ornamented with a triangle of carved birds and this is illustrated in Finsch 1888b (Plate VIII). Ball recently was shown a well-made model of a sailing canoe said to represent a style formerly known on Long Island. It had large washstrakes and splashboards. Hughes was told that five different tree species were used for canoe building.

Writing of clothing, Coultas (1933-5: 272) found that by 1933 most men had already abandoned the traditional breechclout made of bark cloth in favour of

ugly calico 'lap laps' but the women still wear the pul-puls, made of the fine fibres of grass and woven onto a twisted rope. These grass skirts are all the uniform light tan color, about ten inches long in front by six inches wide, the thighs are entirely exposed and the skirt reaches to the back of the knees.



**a****b**

Fig. 7. The people and their culture. **A.** Dancers at opening of men's house at Poin Kiau, 1973. **B.** Hand drums (*kundu*) in different stages of construction.

The people of Malala told Ball that traditional women's skirts ceased to be worn by the time of World War II. Now all women wear cloth skirts as do most of the older men, though young men tend to wear short trousers. Even the fibre skirts and bustles made for ceremonial dances are now worn over cloth skirts (Fig. 7A).

Coultas continued his 1933 description of personal appearance:

The hair is shaved off of the head, with exception of a broad V on the crown, and, on festive occasions, the shaved area was painted either red or blue; these powder paints having been brought in by Japanese fishermen are rapidly decreasing the use of lime and betel-nut juice for personal adornment.

Heads are no longer shaved, and store pigments have driven out the traditional mineral pigments, though vegetable dyes are still used.

Large boat-shaped food dishes (*tawiri*) for ceremonial occasions are imported from Siassi but smaller wooden dishes and large ornamented mortars and pestles (*roto bus* and *roto kutini* in the local language) are carved on Long Island, mainly from *Calophyllum*, and small ornamented betel-nut mortars (*roto bu*) are carved both for use and for export. Figures (*toltol*) of men (*tamoto*) and women (*garup*) up to 50 cm high are not uncommon (though they are said to be of no special significance), house tops are often decorated with carved fish or frigate birds and excellent hand-drums are made (Fig. 7B).

The large mortars and pestles are for food preparation, most often for producing taro puddings but also for crushing other farinaceous foods and mixing them with protein foods, fats and greens. Coultas (1933-5, 273) saw that 'puddings of grated tapioca [cassava], cocoanuts and bush-fowl eggs were moulded into huge balls the size of grape-fruit, wrapped in leaves, and baked in hot stones'. He also described 'soup of bananas and cocoanuts in benzine tins'. Since the war enamel bowls, plates and mugs have become common, as have metal spoons.

Coultas (1933-5: 272) noted that in 1933 cassowary plumes acquired by trade were used in ornamental dress and were very highly valued; these no longer appear to be used. When a new men's house was built at Poin Kiau in 1973, the opening was celebrated with a large feast and dance. Every participant wore full ceremonial regalia and the traditional elements in order of prominence were large carved painted head-dresses on the men, long pale fibre skirts and shoulder ornaments on the men, bustles on the women made of the same fibre, white kapok fibre stuck to poles above some head-dresses and in the hair of some of the women, and ornamental green leaves, mainly crotons. (See Fig. 7A.)

#### TRADE

The origins and destinations of Long Island's trade goods reflect the ecological diversity of the region and a considerable degree of product specialization. The only published work containing much information on Long Island trade is Harding's (1967) study of the specialist traders of the Siassi Islands, though Groves (1934: 47) noted that the people of Sio received betel mortars from Long Island. According to Harding (1967: 133, 134) the Siassi traded canoes and wooden bowls to the people of Long Island and received pigs and dogs in return. At the time of his field work in the early 1960's, Long Island drums (see Fig. 7B) purchased for cash (ten shillings to two pounds) and cloth were re-exported to New Britain (where a drum fetched a dog) and to the mainland (where a drum was worth a dogs' teeth headband). Trade with Rai Coast villages was mentioned above, and the people of the Madang area (Siar, Graget, Yabob and Bilibili) speak of trading connections with Long Island (L. Morauta, pers. comm.).

Exports from Long Island in former times included dogs' teeth and boars' tusks as well as the coloured feathers of feral fowl and tobacco. Tobacco continues to be exported to this day. The wooden bowls imported from the Siassi were the large boat-shaped *tawiri* mentioned earlier and some smaller round bowls came from Tolokiwa. Clay pots were imported from Sio, Bilibili and Yabob. Sago, cassowary plumes and bows and arrows were also imported, and although we have no direct statements about it, the general pattern of regional trade suggests that some net bags and supplies of bark cloth were probably imported from the mainland. Also, though it is no longer remembered, it is almost certain that the nineteenth century saw imports of obsidian (via intermediaries) from Talasea, New Britain, and stone axes from unknown sources. Although some iron had been distributed in the general area of the Vitiaz Strait during the nineteenth century (Hughes: 1977: 27-33) and according to Finsch (1888a: 189) glass beads and iron were known on Long Island by 1885, the latter being called 'gari', iron was still rare in early colonial times (e.g. Chalmers 1887: 148) and probably did not become common until the twentieth century.

Pigs are still being exported and in 1979 dogs were still being sent to Umboi (A. Ploeg, person. comm.). Pigs teeth are apparently no longer exported and the pottery imports have been replaced by metal (though an occasional Yabob pot purchased in Madang market can be seen). Sago is still imported. The long Siassi bowls are still received from time to time, and many can be seen in use in the villages. Once worth a pig (with bowl and pig matched in size), they now cost between K20 and K50. With care, such bowls will last five to ten years. New exports for cash (copra, shells and turtle meat) are discussed below. Past and present Long Island trade is summarized in Table 7.

Although they are not specialist traders like the sea-farers of Bilibili and the Siassi Islands (see Mikloucho-Maclay 1975, and Harding 1967), the people of Long Island appear to have carried many of their own exports and imports. Harding (1967: 23, 24) was told that like most of the people of the Rai Coast and Huon Peninsula, the people of Long Island lacked the sailing skills of the specialist traders and had canoes of inferior workmanship. Nevertheless, before the days of regular visits by boats belonging to the government, missions and private traders, Long Islanders made long canoe journeys to maintain the ties of kinship and marriage as well as to trade. Many east coast men are married to Tolokiwans and marriage links since the war have extended in many directions. Traders from Bilibili and Siassi also made voyages to Long Island and occasional visits were made by people of other islands.

**TABLE 7. Items of trade.**

Traditional		Modern	
Exports	Imports	Exports	Imports
pigs	long bowls	pigs	long bowls
dogs	canoes	dogs	sago
boars' tusks	small bowls	tobacco	rice
dogs' teeth	pots	betel mortars	manufactures like—
fowl feathers	bows	turtle meat	cloth
betel mortars	arrows	turtle eggs	clothing
tobacco	sago	copra	utensils
drums	cassowary plumes	trochus shells	bushknives
	? bark cloth	green snail shells	spades
	? net bags	wild fowl eggs	
	? obsidian		
	? stone axe blades		

Under the Australian administration, canoe voyages were discouraged throughout the territory, and Coultas noted in 1933 (274) that the long journeys were feared by the islanders; shortly before his visit a canoe with ten men and two women had been lost on the way to Umboi. Bara (F: Dagas) told Ball that before World War II he and three others had set out for Sio to buy sago, pottery and bows and arrows. The canoe sank and after a two-day swim the four landed at Gitua. Nevertheless, large canoes were used regularly up to the outbreak of the war, and according to Botsai, the last big voyage was just after the war when he and several others sailed to Siassi and Saidor. Since then, such trips have been strongly discouraged by the administration, and the incentive to make them has been reduced by the more frequent visits of administration, mission, and other ships. These frequent visits, combined with the advent of the trade stores, have tended to destroy the traditional trading networks.

#### CEREMONIES

Coultas (1933-35: 31, 270-272) was able to attend a long ceremony 'attended by the whole clan — some 100 strong' and made the following observations:

Festivals or sing-sings in conjunction with the circumcision of the youths and their initiation into the tribe occurred during our visit. The ceremony began about four o'clock Sunday afternoon and ended some time during Wednesday. We were invited to attend and did so Sunday afternoon and twice in the evening.

A platform similar to a small town bandstand had been erected in the circular clearing in the village and here sat eight youths each beating a beautifully carved wooden drum covered with the skin of the iguana. Three old men walked to and fro near the stand also beating drums. The two male dancers were the first to appear and were covered completely in grass capes. Layer upon layer of grass had been woven into a long skirt which reached from the waist to the ground. Another layer encircled the neck concealing the arms and reaching well down over the lower skirt. Long pointed masks, painted with glaring reds, blues and whites, covered the faces and extended well down the chests. The heads were covered with cassowary plumes, and from the crown waved a feather wand. The mounds of grass and feathers moved with remarkable rapidity, circling about the stand while the audience joined in a chant of rather solemn tone.

After a short time the two grass dancers ran off to the bush and two young girls appeared. They had piled 'pul-puls' grass skirts one on top of the other to form huge bustles which moved up and down whenever they took a step. The breasts and upper arms were well covered with white beads and shell money 'tambu' and all wore boar's tusks. The two girls linked arms and kept step as they circled about the stand singing all the while and only pausing to work the knees in a bending up and down motion which caused the grass skirts to fly high in the air. As the evening progressed, the number of female dancers increased to eight, but never more than two men appeared at one time. Whether the same men danced all night, or whether it is customary for only two to appear at one time, I do not know. There was a certain beauty and rhythm about the dancing of the women, they never missed a step and were wonderfully accurate in timing the gyrations of the grass skirts, while the most remarkable part of the men's dancing was the quickness of their movements.

Coultas' description of the long pointed masks of the two male dancers suggests the painted conical bark-cloth-on-wicker *tubuan* masks of east New Britain (illustrated in Parkinson 1907: 573, 575) or the white and red painted carved masks of Tami (shown in Chauvet 1930: 96, Fig. 379). The latter have plumes on top, which according to Chauvet belong to bird of paradise but appear in the photograph to be cassowary. One of those illustrated by Chauvet has a prominent carved tuna tail, a common motif throughout the Siassi area and often seen on Long Island carvings. Coultas' description accords well with two *mundip* style masks photographed at Portne, west New Britain, by Dark (1974: 38, 71, Plate 68), for they are conical, each with a single wand covered with white chicken feathers protruding from the top. Another was

photographed at Birik, in the Mangap language area of south-east Umboi and another at Cape Gloucester (Dark 1974: Plate 73, Plate 75). Spectacular mask head-dresses like this appear to be no longer made on Long Island, for they have not been noted by any of the numerous post-war visitors.

In May 1973, a dance ceremony was held at Poin Kiau to celebrate the completion of a new young-men's house. Like the ceremony observed by Coultas, it was attended by most of the population of Malala and their kin from the hamlets near Poin Kiau. Singing and dancing lasted the better part of two days and continued through the night. Pigs were killed and huge puddings were mixed in the taro mortars and large fires were tended to heat the stones for earth-oven cooking.

However, the clothing and head-dresses were different to those seen by Coultas (Fig. 7A). Cloth skirts and short trousers were worn and these were quite unconcealed by the ornamental 'grass' skirts, bustles and shoulder coverings, which with cordyline and croton leaves, comprised most of the decoration. There were no masks, but the men wore painted boat-shaped head-dresses each crowned with a tall feathered shaft. There were no cassowary plumes. The majority of dancers were male, some drumming as they danced. However, the movements of a few women who took part, all unmarried, were much as described by Coultas, the leg movements being calculated to make the big fibre bustles bounce in sustained rhythm.

The head-dresses of the men (Fig. 7A) were similar to some of those illustrated by Parkinson (1907: Tafel 47) from the south coast of New Ireland, especially those which in his photograph have single tall 'wands' of white feathers crowning them. The Poin Kiau head-dresses resemble even more closely those of the *sia* dance photographed by Dark (1974: Plates 169-178) performed by the Kilenge of west New Britain. In contrast to the rather mysterious pair of concealed male dancers of the 1930's ceremony witnessed by Coultas (and to the *tubuan* 'Duk Duk' dancers), the other dance groups, including that at Poin Kiau, were dominated by men, with a few women participating. This is in contrast to the Rai Coast where women commonly participate in such dances (P. Lawrence, pers. comm.). The *sia* dancers told Dark (1974: 44) that they got the dance from the Siassi people and he thought it possible that it had originated on the Huon Peninsula. Museum collections and early photographs showed that it was known on the mainland in the nineteenth century and was established in west New Britain before World War II. Dark's observations of the Kilenge *sia* dance match ours at Poin Kiau — 'For while in other *singsings* most of the dancing is done by the women, the dancing is rather formalized and limiting to the performer. In *sia* there is great freedom for individual expression in many of the dances whether by the leader of a round . . . a solo dancer . . . or in group performances or duets' (Dark 1974: 44). At Poin Kiau in 1973, the *luluai* of Malala, drum in hand, danced most impressive solos on a number of occasions (Fig. 7A).

Opportune use was made of the occasion by preceding the celebration with a modern meeting concerned with such things as maintenance of the airstrip and school attendance, and it was notable that apart from a speech by a middle-aged *tultul*, the proceedings were dominated by young men, most of them literate in NGP and two of whom spoke English. They prepared a blackboard and chalk agenda, chaired the meeting and did most of the speaking.

#### SOCIAL ORGANIZATION

This has not been studied, though general statements occur in some patrol reports under the headings of anthropological, social and political notes. The group organization is predominantly patrilineal and the villages of Malala and Bok are essentially patrilian settlements, Poin Kiau being an offshoot of the former and Kaut

being settled from Bok. Land is held by the patrician. Tables 1 and 2 (above) give an inflated impression of the size of these settlements, because of the custom of counting the residents of isolated hamlets in with their village relatives. All of the north-coast people are usually counted with Malala to total some 250 persons. In the case of Kaut, the census count of 145 persons also gives a false impression, for this is a relatively un-nucleated settlement lacking the well-developed central places of the founder villages. Matapun, with few more people than Kaut according to the census, has more of the characteristics of a village. It is made up of migrants from Bok and their relatives and friends from elsewhere.

The basic element of economic organization appears to be the nuclear family, with the families of brothers co-operating as an extended family for major social obligations and for interactions outside the village, including those connected with traditional trade and the cash economy. Leadership appears to be connected with such things as status and seniority within the formal kinship group, combined with economic achievement and personal qualities. Patrol officers observed that the *luluais* and *tultuls* appointed by government administrators, while respected locally, were not necessarily the most influential men in the village. One of the results of outside contact has been to produce new allegiances for some individuals which cut across traditional obligations to kin and affines; these are ties to the church or to certain cult leaders influenced by the cargo cult surrounding Yali of the Rai Coast (see especially Lawrence 1964). New economic linkages, as with copra buyers or the trader Moeder, are handled on an individual level when the sums involved are small, or within the traditional family structure when warranted. In the economic area, conflicts that may arise seem to be resolved by traditional mechanisms within the appropriate social group.

#### DISPUTES

Although the settling of disputes has been one of the roles of patrol officers, patrol reports for Long Island record few matters of conflict and those of any consequence have been over rights to land, especially for fishing and hunting. Traditional methods of dispute settlement appear to continue to cope with most of the contentions that arise. One syncretic method combining traditional and modern elements was observed by Coultas in 1933 (1933-35: 39-40):

The two villages, the one we are living in and the one adjoining, assembled in the area behind our house and held a contest of kick cross, as they call it. It appears that a young man from the other village became personal with a young lady from our village. The elders here decided to bring shame to the young man and his people by trouncing them soundly at a game of soccer or kick cross. [NGP=*kik kros* = grudge game of soccer]. The game of kick cross may be translated as follows: A dispute, to a native, is a cross. In other words they are angry or cross with one another. If on the other hand, natives wish to play only and kick the ball back and forth between the goal posts, that is termed kick play. In kick cross there are no restrictions; any and everyone is entitled to kick the daylight out of the other, so long as hands are not used. The goal posts of soccer are set out but barely if ever, used, as the ball gets tromped on in the centre of the ring, kept within a small space, while dozens of legs and feet kick at any and every moving object.

Our warriors kept at their game all day except for intervals of rest. By night time neither side had made a goal so they decided to continue on the morrow. [Next day] The brutal contest was discontinued by mutual consent of all parties. In all my life I have never seen such a fine collection of swollen feet and legs anywhere. The contestants can hardly walk and the Doctor Boy has at least half of his big toe missing from tearing it off on a rock.

The institution of *kik kros* has been widely reported in Papua New Guinea.

Sometime following World War II traditional attitudes toward territorial boundaries were disrupted and traditional mechanisms for avoiding disputes over boundaries, as well as settling such disputes when they arise, were handicapped by the government's arbitrary division of the island into four equal parts and the marking of these divisions with concrete posts. This action was said to have caused confusion and resentment (Creagh 1973: 9).

Land rights for residence, gardening, hunting and fishing are all recognized by custom and are inherited patrilineally (Creagh 1973: 9; Apa 1978). Difficulties that have sometimes arisen have occurred mainly in regard to cash-earning activities, as when Moeder employed divers from one village to work right around the island collecting shellfish. This was seen as violating traditional fishing rights, and villagers said that Moeder should employ only those with traditional rights to fish areas adjacent to their own villages (Malcolmson 1975, Section 1,5).

Rights to the resources of the reefs around Crown Island and possibly the coconuts on the strand of that island were said to have been a source of friction at one time between Malala and Matapun (Somers 1969: 1) and an earlier patrol had noted minor disputes over traditional economic obligations and affinal relationships (Bailey 1969:1) but in general this latter kind of disagreement did not appear to be brought to the notice of visiting patrol officers.

More recently there has been some minor conflict over church allegiance 'between the Malala/Poin Kiau group and the other villages' (Somers 1969: 2) which affected the location of the new mission school (Bailey 1969: 2). Malala residents were said to ridicule the people of Kaut and Bok for their cargo cult beliefs (Creagh 1973: 15).

#### OUTSIDE INFLUENCES

Until the advent of the Europeans, these were all within the traditional framework of social and economic connections and obligations, contacts being maintained with kin, affines and trading partners on other islands. Change began with the first trading contacts with European vessels, mainly exchanging foodstuffs for iron, and later with government and company ships, exchanging food, artifacts and eventually labour, for iron, cloth and other manufactures.

In early colonial times, the only profound new influences on individual Long Islanders were those experienced by indentured labourers, and until the time of World War II, periods spent off the island by a few individuals were probably the most important mechanism for broadening the islanders' views of the outside world. Several youths were recruited for work on German coconut plantations during the early years of this century, and possibly earlier. Sili of Malala said that the first time the Germans came to the island they sailed right around it, stopping at all three villages (Soraga, Bok and Malala) but that the people hid in the forest. Later, the ship returned to recruit labour and took people away, some by force. Angus (F: Botsai) of Matapun told Ball that one of the reasons why the Matapun area had not been used for a settlement earlier was because it was the island's only all-weather anchorage and people did not wish to settle where large ships could anchor.

Sili (F: Goreke), Bara (F: Dagas) and his brother, together with some others (including two men, one called Katip, who were accompanied by their wives) were placed aboard the vessel 'Mewa' ('Moewe'-photograph in Parkinson 1907: Plate 56). They were first taken to Madang (then Friedrich Wilhelmshafen) and later distributed to various plantations. Bara, who it was suggested was about 10 years at the time, was taken to Wuvulu Island where he remained for three years, and then to Maron in the

Hermit Group for two years, and from there to Witu for four years. From there, he said, the Germans returned him to Long Island. Sili said that he first worked at Maron Island, and tried to run away after three years. He hid on the island but was caught, flogged and gaoled. He escaped from the gaol, and a small pinnace took him to a steamship which took him to Kondambu near Kokopo, the German administrative centre in east New Britain. Another German vessel, the 'Siari' (the Neu Guinea Compagnie's ship 'Siar', see Rowley 1958: 8) took him to 'Arawe' where he worked on another plantation for a further three years. (Sili was probably referring to the Arawe Islands off the southern coast of west New Britain, rather than Arawa on Bougainville). After that, the steamer 'Kalili' took him to Umboi for a year after which he went to Rabaul. There he worked for 'Kiap Muli' handling native-grown copra. Some four years later there was talk of a big war and he was asked where he wanted to go. A warship took him to Umboi from where a Chinese trader returned him to Long Island.

We did not hear of labour recruitment under the Australian administration, but in the 1930's Lincoln Bell began to establish a plantation on Long Island near Bokbok and he employed four labourers to plant the coconuts. These included the experienced Sili and Bara, as well as Botsai, the father of informant Angus. After the plantation was laid out and planted, it was abandoned and most of the young palms died. During his stay at Malala in 1933, Coultas (1933-35: 31) was told that the only person from that village to have been away from the island in recent years was the medical orderly.

#### EVACUATION

Without doubt, the most dramatic event in the lives of the present generation was the total and prolonged evacuation of the island that took place in 1953. In May an eruption began in Lake Wisdom near the site that was active during World War II. Clouds of smoke were observed from as far away as Umboi and volcanologists thought that a very large eruption was possible, yet the inhabitants of Long Island were unaware that an eruption was taking place until visited by administration officers (Best 1956: 185).

The administration organized three vessels to shift the entire population in one day (Angus (F: Botsai) pers. comm.). Domestic animals that could be collected at short notice, mainly dogs and pigs, were also taken but many were left behind. Most of these joined the already large feral population inhabiting the forests.

The people were taken to Singoram on the Rai Coast and housed in a hospital building built during World War II. Food was provided by the government in conjunction with nearby villages. Whether it was because they expected the stay to be short or for other reasons, the refugees made no gardens at Singoram. Volcanic activity continued until January 1954 (Taylor 1956: 30) creating an island consisting of two craters joined by a ridge (Best 1956: 186). The evacuees spent nearly a year on the mainland before being returned to Long Island on the MV 'Koro' and a mission vessel; the last of them reached Long Island on 15 March, 1954 (R. B. Creagh, pers. comm.).

For many Long Islanders, the prolonged absence from their own small circumscribed island and the long suspension of the normal seasonal round of gardening and gathering must have been traumatic.

In 1968, 1973 and 1974 Motmot again erupted (D'Addario in Johnson, Taylor and Davies 172; Cooke *et al.* 1976), but on these occasions evacuation was not thought necessary.

#### MISSION INFLUENCE

The earliest known missionary contact was in 1925 when two Lutheran evangelists from Sio went to live on Long Island (T. G. Harding, pers. comm.). They lived at Bok



for many years, according to informant Samwel (F: Or). One of them, Moriu, erected a cement cross in that village, and it was only after he died that 'God's word was taken to Malala'. In the early 1940's two helpers from the Lutheran Mission on Umboi lived at Bok (AGS 1943: 6), presumably replacing the earlier Sio men, and after the war mission boats began to visit the island regularly.

By 1969 the Lutherans were still the only mission represented on Long Island, with a native pastor at Kaut and visits from a European missionary about four times a year. All village groups were then said to support the mission, especially Malala and Kaut (Bailey 1969: 3). But by 1972 the pastor or his successor had moved to Malala and that village was regarded as a mission stronghold, the weaker position of the mission in the other villages being due, it was thought, to a growth in support for cargo cult beliefs (Creagh 1973: 15). It appears to have been this polarization of opinion that led to the new bible school being located at Malala in 1972 and it may be significant in this context that when a rival mission, the Seventh Day Adventists, decided to commence activities on Long Island, they too selected a site (at Poin Kiau) within the general hegemony of Malala. A visiting patrol officer in early 1973 thought that each of the villages had a few residents loyal to the mission, even if only in single families, but that Malala people generally ridiculed the people of Kaut and Bok for their allegiance to the cargo cult. The pastor at Malala was said to speak out against the cult at every opportunity, an action which the officer thought in the long run would be counter-productive. However, he did not think that the situation would generate any serious conflict in village life (Creagh 1973: 15,16).

In 1972 Pastor Ulam of Malala accompanied Hughes on a journey to the lake. He said that almost all Bok and Kaut residents were adherents of the cargo cult associated with the Rai Coast leader Yali. They believed, said the pastor, that the day of judgement was so close that there was no time to do anything in the way of village improvement. Even worse, he added with contempt, they thought that when the last trumpet sounded 'piss and shit would turn into valuables'. His Malala companion, Tangi, was equally scathing, adding that in his village only one man and his wife subscribed to cargo cult beliefs.

#### CARGO CULT

Although documented evidence of cargo cult beliefs among the inhabitants of Long Island is all recent, it can be inferred from Lawrence's 1964 study of the cargo movement in the southern Madang Province that, because of their trading connections with the mainland, beliefs about the magical relationship between deities, the Europeans, and material wealth may well have been held by some Long Islanders since early colonial times (see e.g., Lawrence 1964: 63-85).

The latest large-scale manifestation of cargo cult beliefs in the area was centred around Yali of the Rai Coast between 1945 and his death in 1975. Some mainland people thought that the 1953 volcanic eruption on Long Island was caused by Yali invoking local deities to express his hatred of Europeans (Lawrence 1964: 268), although according to P. Lawrence (pers. comm.) this was not an accurate reflection of Yali's feelings towards them. Yali himself visited Long Island in 1968 (P. Lawrence pers. comm.).

The patrol officer who visited the island in mid-1969 (Bailey 1969: 2) reported:

A rumour has been prevalent in the SAIDOR Sub-District since Good Friday that Independence (and, or) Self Government would be granted on either August 1st or 13th. During the June part of the patrol it came to the patrol's attention that this prophecy had reached Long Island via Madang, the source allegedly being YALI. The villagers of BOK are supposed to have built a 'HOUSE TAMBARAN' with effigies of their

old heathern deities therein. The building was located in the bush and the people are supposed to have prayed to their gods for cargo to eventuate. The villagers vehemently denied such activities but I consider nevertheless that they were, and still are engaged in them. The people of this area freely admitted that they had heard the Independence talk. The Long Island version was basically the same as the one prevalent around the WARAI area in the MOT Census division but with the added refinement that YALI and his son KAMINA would first have to be crucified before anything was achieved. This refinement is not Long Island original thought but appears to have its origins in the BONGU area, as it could not be found in the SAIDOR believers credo.

Overall the Long Islanders do not devote their lives to cultism but if such a rumour reached them, to use their own words "mipela itraim tasol, sapos samting ikamap gutpela, sapos nogat, maski". Such rumours brighten their normally dull lives.

Later that year another officer clearly thought that the cult had lost influence:

There are still some adherents of Cargo Cultism, principally in the villages of Bok and Koet [Kaut]. The prime mover on Long Island appears to be one Salung of Matafuna [Matapun], who makes periodic forays to the Rai Coast to liaise with Yali Singina of Sor. He has little or no influence on the island, and the cult's followers would seem to adhere to it more from a form of insurance than from any real belief in its efficacy.

He added that although most of the people on the island claimed to be Lutherans, mission influence was weak, the people's attitude to the mission being lukewarm (Somers 1969: 3). Cargo beliefs were so common in the sub-district and district that the patrol officer's observations about their presence on Long Island went quite unremarked in the ensuing correspondence between his superior at Saidor and the District Commissioner in Madang.

One of Yali's campaign assistants, Dui, visited Long Island in July, 1972 accompanied by some of Yali's 'flower girls' and performed cult rituals (P. Lawrence, pers. comm.).

Late that year, the agricultural officer studying the drought criticised the people's small gardens, saying 'the people here don't plant big gardens as they expect more cargo from the sums of money they paid to some unauthorized persons (Cargo Cult)' (Owet 1972: 2).

By 1973 the cult was said to be strong in Bok and Kaut, with Matapun equally divided between those who favoured the official administration and the mission as against those who favoured the cargo cult. Malala and Poin Kiau were said to be strongly pro-administration (Creagh 1973: 2, 3). It is notable that the patrol officer saw the administration and mission as sharing similar aims and interests, a view apparently shared by the local people. The officer thought that those who supported the cult did so in the hope that it could bring benefits which the government could not bring. Nevertheless he thought that on the whole it was losing adherents, especially among the younger men, and that the solution to the cult 'problem' was to ignore it and attend to economic development (Creagh 1973: 3).

Yali died in September 1975, but in January 1978 PO Apa (1978, Situation Report 3) wrote that the cultist Dui was continuing to visit Long Island each year and that during his visit in 1977 he had been presented with two pigs. However, support for the cult was gradually decreasing and a cult house built at Matapun was rotting away together with the carvings and other cult symbols in it. The officer made a speech about the futility of expecting wealth from magical practices and extolled the virtues of hard work. Late that year the DO at Saidor also thought that cult activities were dying away (W. R. Wilkinson, pers. comm.), but on 12 March 1979 Luke Goreka, believed to be the Lutheran pastor of Bok village, alleged on the NBC programme "Contact" that the Yali cult was again active and that this activity was centred on Bok village (DO W. R. Wilkinson, letter 13.6.79).

## WAGE LABOUR

Since World War II many absentees from Long Island have been employed as boats crew, and others have learned trades. In 1969, of the 19 adult males reported as working away from home, ten were employed on ships (three of them held 15 ton coxswain certificates) and four others were studying carpentry at Lae or Rabaul (Bailey 1969: 1, 3).

In 1972 a Malala man, Aluisa Gaima, was bosun of the government vessel 'Koro', and in 1976 had been promoted to captain of the MV 'Barena'. An Area Study in 1973 said that plantation labour was not recruited from Long Island but the patrol officer felt that absenteeism was nevertheless high (Creagh 1973, 4). Occupations of 41 skilled workers recorded at that time are given in Table 8. Few migrate permanently from Long Island, and Moeder could think of only six who had done so, but the growing list of tradesmen and professional workers in Table 8 suggests that more will do so in future.

**TABLE 8. Trades of Long Island people in 1973 and 1974.**

Village	Trade	1973	1974
Matapun	Boat Crew	5	8
	Clerk	1	1
	Storeman	2	2
Bok	Apprentice	2	2
	Boat Crew	8	5
	Carpenter		2
	Mechanic		1
	Ship's Master (20 tons)	1	1
	Storeman	1	1
	Trainee Patrol Officer	1	1
Kaut	Boat Crew	1	1
	Driver	1	1
	Heavy Equipment Operator	1	1
	Plantation Manager		1
Malala	Aid Post Orderly		1
	Baker		6
	Boat Crew		2
	Bosun	1	1
	Bricklayer	1	
	DASF Assistant	1	1
	Mechanic		1
	Teacher		1

Sources: Creagh 1973; Spencer 1974.

## TRANSPORT

Between the wars, visits from administration and mission vessels were irregular, and the ships of traders like Bell and Moeder and the occasional visits of scientists like Coultas provided welcome additional contact with the wider world. Desire for a little more access to some of the benefits of the cash economy was expressed to Coultas when he prepared to leave the island in 1933. Those who had worked for him

regretted his departure and the end of their small income of goods and cash pointing out that Long Island was a good place to live and saying that they wanted 'someone to come and start a station so they could have a place to buy trade goods' (Coultas 1933-35: 274).

There were certainly outside contacts that went unrecorded during those years, and some of these were with commercial fishermen. Moeder (pers. comm.) recalled that during the 1930's a Japanese company brought Manus Islanders to Long Island to capture turtles, taking hundreds for oil and discarding the meat. Coultas, too, noted likely evidence of such contacts in the shape of a small girl with light yellow skin colour and Mongolian features (1933-35: 270).

The wartime visits of Australian, Japanese and American vessels are described by Ball (1982).

The government trawler, 'Koro', which provided the most important contact with the administrative centre of Madang for the past 30 years, first visited the island as the military vessel 'Nania' (Botsai, pers. comm.). The first official postwar patrol of the island was apparently carried out in 1947 by PO I. Griffin (R. B. Creagh, letter, 13.6.73). The monthly visits of the 'Koro' (replaced in the mid-1970's by the 'Barena') provided direct linkages with Madang and Saidor throughout the post-war period and visits of Lutheran mission ships (the 'Simbang' during the 1950's and since then, the 'Umboi') provided reliable connections with Umboi. Since 1978, the official administration link has been via the government work boat MV 'Kundiawa' stationed at Saidor. In 1979 the 'Kundiawa' was spending two weeks out of every four at Long Island (DO W. R. Wilkinson, letter 13.6.79). Moeder's 'Spray' (making frequent circumnavigations of the island during the peak copra season) and occasional visits from workboats owned by mainland villages have also been important connections for personal travel and for goods. The mobile trade-store of the 'Spray' was, for a number of years, the most important single source of manufactured goods for the villagers of Long Island, cash paid out in return for copra (and in earlier years, shells) often being spent before the recipient left the ship. Moeder is said to have now moved his commercial interests from the Long Island area to the Hermit and Ninigo Islands (M. Mennis, pers. comm.). In 1976 the people of Long Island and the Rai Coast Local Government Council purchased the MV 'Arop' to be based at Long Island and to be used for passengers and freight. Total control was handed over to the islanders in February 1978.

Most of the increasing traffic of official visitors (administrative and scientific) has been carried on government ships. However, in 1971, a small grassed airstrip (Category C) was built two kilometres west of Matapun and maintained adequately until 1975. A major factor in its construction was the desire to be able to evacuate sick or injured people quickly without the additional stress of a long sea journey. This enabled short-term visits from such officials as the government volcanologists and even brought a few tourist flights from Madang. Failure of the islanders to reach agreement about its maintenance led to its closure until 1978, when Bromley & Manton Pty. Ltd., of Mt. Hagen in the Western Highlands Province, employed ten labourers to clear it. Now re-opened as a private airstrip, they are using it for occasional flights from the highlands, and have built a small tourist lodge nearby (Apa 1978 part (e)).

#### HEALTH

The first relevant observations were made by the German Südsee-Expedition in 1909 in the village of Soraga. Thilenius (1927: 152, trans. V. B. Meyer-Rochow) wrote:

Of the two houses on the ground one was inhabited by men, the other by 2 incurably

ill people who could only move forward by crawling along and pushing forward with their skeleton-like legs and pulling forward their body with their hands while supporting themselves with their hands. Altogether there were 3 of these ill people, one man and two women. We had seen similar cases in several villages in Western Neu Pommern [New Britain]. Fulleborn presumes neuritic reasons. There was also one completely mentally retarded boy with an abnormal head formation and bent legs who we found squatting under a house. In general the population (which consisted of 5 men and 11 women and girls), which was of the New Guinea type, had remarkably good figures.

His colleague, Reche (1954: 90, trans. V. B. Meyer-Rochow) recorded the scene as:

Remarkable were three incurably ill people which we found in one house. They were as thin as skeletons and could move forward only in a sitting position. They did this crawling, pulling with their hands and thus slowly moved themselves forward. One man and 2 women suffered from this disease the nature of which Fulleborn also could not determine since he hadn't seen it. He had remained aboard the ship to work through the results of the cruise. Similar cases we had seen rarely in other villages of West New Britain.

Coultas, who had worked elsewhere in the tropics, noted in 1933 (170) that on Long Island he saw no yaws or elephantiasis [filiariasis]. At that time the village of Malala had a medical orderly [NGP *dokta boi*] whose prime task, according to Coultas (1933-35: 31) did not appear to be the treatment of illness.

The latter is given a number of bandages and a few tins of ointment with which he is supposed to go among his flock and administer treatment.

In nine cases out of ten, the bandages are distributed among the men who wear the white muslin around one leg or an arm, or their head as an ornament. The red salve or ointment always finds its way to the faces and bodies of dancers during a festival. Anything as bright red as this ointment, is most valuable for personal adornment. It is sold by the Doctor Boy, at a profit to him.

Department of Health practice elsewhere in Papua New Guinea suggests that since World War II there must have been a number of visits to Long Island by their personnel, especially medical assistants, but we have found only one reference to them in district administration patrol reports (Creagh 1973: 2) and have not had opportunity to refer to health department records. That report noted only that since 1946 there had been frequent visits by representatives of the departments of the administrator, agriculture, and public health and that in the preceding few years there had been at least eight visits per year. In the early 1970's Ball sailed to Long Island aboard the 'Koro' with a dentist from Madang, who found that the children at the government school had almost perfect teeth. Comments on conditions of broad significance to general health are found in various government reports referring to such things as adequacy of food supply, housing quality and hygiene (especially latrines). The reports also note the existence and location of medical aid posts staffed by local medical orderlies.

A 1969 report noted the existence of aid posts at Matapun and Kaut (Bailey 1969: 1) and the accompanying area study reported a plague of bedbugs sufficiently severe to oblige most villagers to sleep on the beach. The people themselves blamed the DDT spray applied to their houses shortly before by a malaria control team (Bailey 1969: 2). The cure suggested was further insecticides (DC to ADC Saidor, 16.9.69).

A patrol in December of the same year reported that the two aid posts were efficiently maintained and operated and that they received the 'co-operation' of the villagers (Somers 1969: 3) and that health was generally good. The health service facilities at that time were regarded as adequate by the district administration (DC to ADC Saidor, 8.1.70, 2).

Near the end of the 1972 drought, the Rural Development Officer said that during the course of his survey of gardens and food supply, although there were no overt signs of malnutrition, complaints of stomach aches and headaches were received all around the island, mainly from children (Owet 1972: 5).

Mortality and morbidity figures do not appear to have been calculated, and the 1972 census patrol specifically noted that it was unable to obtain any information even on infant mortality. This patrol observed in passing that 'virtually all' houses had pit latrines and that an infant welfare sister from Umboi [presumably a mission sister] visited Long Island about every three months (Creagh 1973: 4, 13, 16). During the following year, a further census was conducted in the course of preparing an area study and eleven infants were said to have died of whooping cough (Spencer 1974: 2).

In 1978 an administration patrol (Apa 1978) complained that few latrines were actually in use, that the beach was being used instead and that in general hygiene was poor with flies breeding in the rubbish from humans and animals. Pigs should be fenced out of the villages and every household should have a toilet and rubbish pit, thought ADO G. Apa. But in general the health of the people was better than on the mainland. There were still two aid posts, but the one on the east coast had shifted to Bok. Earlier, the people had been told that the aid post orderlies would travel to other settlements from time to time, but they had not done so. They asked for a third aid post to be located near Poin Kiau.

While visiting Kaut during 1978, Ball was impressed by the high incidence of a fungus disease of the skin, thought to be *grile* (NGP for *Tinea imbricata*), not seen elsewhere on the island, but in general our observations on Long Island and elsewhere in Papua New Guinea over more than 10 years indicate that the Long Island communities enjoy a good level of health, at least in the dry season.

#### EDUCATION

Before World War II, Lutheran evangelists from Umboi probably gave some religious instruction on Long Island but the first administration school was not opened until the early 1950's. It was located at Kaut (F. Moeder, pers. comm.) but because it was not adequately supported by the local people it was moved to Matapun in 1965 where it has remained ever since (Bailey 1969: 1).

In 1969 it had 108 pupils drawn from all around the island but support from the local people was still a matter of contention, affecting attendance and building maintenance. It had four teachers teaching all six years of primary school, attendance in each grade being as shown in Table 9.

**TABLE 9. Primary School Pupils, 1969.**

<i>Standard</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>
1	9	3	12
2	8	5	13
3	12	9	21
4	17	3	20
5	12	12	24
6	14	4	18
Totals	72	36	108

Source: Bailey 1969: 2.

In that year 17 percent of the population were said to be literate in NGP and two percent in English. All were said to be fluent speakers of NGP. Six past primary school pupils, all male, had continued to high school, though none at that stage had proceeded beyond year ten.

Early in 1969 the Lutheran mission was planning to open a small school for first year pupils but a dispute over its location had not yet been resolved by the villagers and mission (Bailey 1969: 1). By the end of the year, Malala was chosen as the site of the planned school which was to consist of a preparatory class and Standard 1. Since the government school was capable of accommodating all children on the island, the patrol officer thought that the Lutheran school was being built as a result of friction between the people of the northern settlements and those of the southern settlements.

At the time of the patrol's visit a seasonal shortage of carbohydrate foods for the school children was causing anxiety. The school gardens were nearly exhausted and it was hoped that the government would supply rice until the new gardens came into production in 1970 (Somers 1969: 1, 3).

The mission school commenced at Malala with a preparatory grade in 1970 (Bailey 1970: 1).

During the 1972 drought, school attendance dropped steadily from September onwards because of the food shortage (Owet 1972: 5) and by late February of the following year many of the children had not yet returned to school. Only four grades were being taught, grades three and four being absent. According to that patrol adult literacy rates were unchanged. Malala was the only village without a person literate in English; literacy in NGP was similar in all villages. Six students were absent at high school (five in Madang and one on Umboi) and six others were thought to have received some secondary education since they were employed at various district centres in occupations normally requiring some years at high school. Those literate in NGP were said to be avid readers of any printed material that they could obtain. According to the patrol officer, the mission school at Malala was essentially a bible school (Creagh 1973: 10, 11).

At the time of the next area study in February 1974, five school grades were being taught, standard three being still absent. Attendance, as a percentage of all children on the island, was less than in 1969 (Table 10). Part of the fall in enrolments was thought to be due to late arrival for the school year. Because the people of Matapun were no longer prepared to assist with making the school gardens, families from other villages were coming to help, and this, it was said, had delayed re-enrolments. Seven students were now absent at high school and seven were absent in occupations that normally required some high school education. (Spencer 1974: 9-10).

**TABLE 10. Primary School Pupils, 1974.**

<i>Standard</i>	<i>Male</i>	<i>Female</i>	<i>Total</i>
1	16	11	27
2	23	10	33
4	4	9	13
5	15	5	20
6	13	7	20
Totals	71	42	113

Source: Spencer 1974: 9.

In 1977 the Seventh Day Adventist Mission opened a school at Poin Kiau and attendance at the government school dropped dramatically. The fall was due in part to continued lack of material support from the residents of Matapun, the pupils from Kaut and Bok being said to be the ones mainly affected. The administration considered that if numbers remained low the school would have to be closed in order to better use the limited resources elsewhere (DO W. R. Wilkinson, pers. comm.).

The teachers at the government school have all been Papua New Guineans coming from diverse ethnic backgrounds. No Long Islander has yet received teacher training.

#### RADIOS

For many years radio receivers have been an important element of general education among the illiterate population of Papua New Guinea and they continue to have this role. News of social and political significance is disseminated largely by this means and it is an important medium for publicizing government policy. Radios are the first and main source of information dealing with events in the wider world and they are the islanders' main link with developments in the provincial centre, Madang, and the national capital, Port Moresby.

Radio ownership increased ninefold in the six years from 1969 to 1975; see Table 11. The rapid rise indicates a marked increase in the number of people exposed to outside ideas and information as well as indicating a transition in the place of the cash economy in household and village affairs. Radios are not only the first electrical goods to be bought in significant quantity by the people of Long Island, they are the first durable consumer goods other than axe heads, bushknives and simple cooking utensils. In part, the change reflects changes in the supply market; cheap radios running on ordinary torch batteries became available as part of the mass-market created by transistorization and miniaturization. Isolated Long Island is near the limits of the market area and the innovation reached there only recently. But the change also reflects the general increase in the role of cash within the domestic economy of the outlying areas of Madang Province.

In addition, in about 1970 two-way radio communication with Madang was made possible by locating an administration-owned radio transceiver at the government school near Matapun. When this was visited in 1978, it had been unserviceable for some time because of inability to obtain replacement batteries.

#### ENTERTAINMENT

In former times, the cultural impact of the outside world was mainly through the agency of returning labourers and travellers. Since radios have become popular and common, the Melanesian form of the string-band pop-music of the Pacific has reached Long Island and has been enthusiastically adopted by the young people. By 1978 each village had developed its own band which had come to play an important role in village life. Except for a few conservatives, villagers took pride in their local group, each named in the tradition of such bands throughout Oceania, Matapun with the 'Malangon Drifters', Malala with 'Kamogo Spakers' (*spak* = NGP, to be drunk), Kaut with 'Ragio Strangers' and Bok with 'Ramatin Brothers'. There was competition between the bands and the residents of each village were eager to hear tape recordings of the music of rival bands. The Malangon Drifters had won a competition in Sidor in 1977 and were hoping to participate in a bigger competition in Madang. By 1978 it appeared that membership of a string band was regarded as something worth striving for among the younger people and the old style of music seemed to be dying out.



**TABLE 11. Ownership of radios.**

	<i>Bok</i>	<i>Kaut</i>	<i>Matapun</i>	<i>Malala</i>	<i>Total</i>
1969	1	1	1	1	4
1973	3	5	3	9	20
1974	6	7	9	14	36

Source: Bailey 1969; Creagh 1973; Spencer 1974.

In October of that year Ball attended a dance at Matapun where the guitars were amplified through battery-powered radios or cassette recorders. Some 30 people were dancing with twice as many (of all ages) looking on. Some danced with members of their own sex, some with the opposite sex but there was no physical contact.

Attempts to arrange social activities in the modern style were made by some of the young people in 1976. In addition to sports like basketball and soccer, they organized social evenings. These were criticized by many of the older people as encouraging sexual freedom, and by 1978 most such efforts had collapsed. Some of the young people asked the Division of Social Development to send a representative to explain the importance of community social activity (Apa 1978, Situation Report 4). In October 1978 a large dance hall had just been completed in Bok (Fig. 6B) and was to be opened with a party in November. Many people from all parts of the island said that they planned to attend.

#### RETAIL STORES

In former times manufactures came to the island mainly with labourers and travellers returning from Madang, Saidor and Umboi, and this is still an important means of supplying durable goods. Later the mobile shop on the MV 'Spray' became the main source of factory-made goods and Moeder also maintained a store at his island base of Biliau. In 1969 an Australian named Bill Parkes settled at Matapun and opened a store but he left within a year.

Adequate supplies of store food to supplement garden produce during the period of low garden productivity sometimes becomes a cause for anxiety. Some is brought by returning travellers, but until 1976 most was imported by Moeder. Three items — rice, biscuits and sugar — made up most of his food sales. He sold large quantities of rice between November and February each year, and in drought years food was sold over a much longer period. Dry biscuits were also a popular line. Moeder said that he was surprised by the large amounts of sugar purchased, and when he enquired he was told that it was 'burnt' and added to water to make a drink.

Casual sales from occasional visiting vessels, either from ships stores or by private opportunists on board, also took place. In 1968 the captain of one vessel was said to have been making very profitable unlicensed sales of liquor (a/ADC Saidor to DC Madang 5.8.68). Even the Lutheran Mission vessel 'Umboi' was said to be making unlicensed sales of food and other goods, and in the opinion of the ADC, Saidor, this was to the disadvantage of the village trade stores (letter to DC Madang, 20.10.69).

In recent times, some village entrepreneurs have started small 'trade stores' selling a very small range of food and convenience goods like matches, importing their supplies in case lots directly from Madang and Saidor. By late 1969, there were six but they each had an annual turnover of less than \$200 and were often out of stock (Bailey 1969: 1).

Three years later, towards the end of the severe drought of 1972, their role in the

seasonal food supply was examined by a Rural Development Officer. He reported that all four villages had from two to five licensed stores, depending on village size, and that they played an important role when garden food was short. There were also Moeder's Biliau store and a Parents and Citizens Association store associated with the Matapun school; their stocks were more reliable than those of the village stores which were sometimes exhausted for months at a time. However, three quarters of the island's population lived a day's walk away from the Biliau and Matapun stores and the villagers of the east coast asked the administration to ensure that Moeder's MV 'Spray' call regularly at every village to buy copra and sell rice (Owet 1972: 3).

In January and February 1973, before the new gardens were bearing, there were steady sales of rice and tinned fish from six village stores and from Moeder. The latter's food sales were then at the rate of \$300 per week, most of it from the MV 'Spray' which at that time (at the peak of copra production) was making weekly tours of the island to trade (Creagh 1973: 14, 17).

The gap left by Moeder's subsequent move away from Long Island has now been filled by wholesale food imports on the islanders' own vessel, the 'Arop', for sale through village stores, the main items being rice, tinned fish, tinned meat, sugar, flour and biscuits.

#### UNPLANNED VISITORS AND OPPORTUNE WEALTH

With such a small cash economy, no modern manufacturing processes and no ready access to Madang town, windfalls have made significant contributions to incomes and property. It was noted in the section on material culture that driftwood and shipwrecks contributed materials to the largest Long Island structures, the houses. With no other supply of sawn planks, these chance receipts are highly valued. The large number of glass fishing floats to be seen in east coast villages testifies to the efficacy of the eastern shore as a collector of flotsam and one islander now owns an aluminium dinghy from the same source. In 1978 the people of Malala salvaged a 44 gallon drum of petrol from the sea, but the DO forbade them to sell it. Shipwrecks on the reefs of Long Island and Crown Island have provided substantial amounts of manufactured materials and even cash. Since the war, there have been several, three of which are recorded.

In 1958 the 'Nuguria' went aground south of Malala and became a total wreck, due, it is said, to the crew being drunk. The villagers salvaged 120 bolts of cloth from the hold, unrolled them and dried them in the sun, re-rolled them and built a shelter over them. They were paid 30 pounds for their trouble, a significant sum in the village at that time (letters, Subdistrict Office, Saidor).

In 1972, a sailing ship, the 'Ailana', was wrecked in the same general area, and a year later, the MV 'Matoko' became a total wreck on a reef between Long and Crown Islands. The 'Matoko's' owners heard that the Long Island people were pillaging parts of the vessel (it had been carrying only passengers) and their agent urged government officers to put a stop to this (letters, Subdistrict Office, Saidor).

During May 1973, when Motmot (the small volcanic island in the lake) was erupting, a light aircraft crashed into the lake when the engine failed. The three occupants swam to the shore where they were picked up by Army helicopter. The aircraft was later recovered from 25 m of water (PNG Post Courier, 4.5.73; J. Glucksman, pers. comm.).

Incidents such as this may provide significant wealth either in the form of salvage or in wages.

## INCOME FROM OFFICIAL VISITORS

Labour in the service of visiting officials and scientists, mainly as carriers, but also as guides and collectors, has provided significant amounts of cash, and the frequency of such visits has increased greatly since World War II. Because of continuing volcanic activity from Motmot, volcanologists have been very frequent visitors. Ball estimates that during his seven periods of fieldwork on Long Island he paid out more than K700 in wages. Other income was earned from labouring from the installers of the navigation light on the north coast, and an Australian Army survey team working on the island in 1973 paid wages totalling \$500 (Spencer 1974: 210). Additional significant income is earned from such visitors from the sale of fruit and vegetables.

## REGULAR EMPLOYMENT

The only more regular sources of wage income on the island have been associated with commercial enterprises and with government development projects. None have continued for more than a few years.

Moeder's plantation and trading base at Biliau employed five Long Island men as labourers, largely for clearing and planting in 1973, and the patrol officer who noted the fact thought that when the plantation reached peak production it might employ from 10 to 15 men (Creagh 1973: 17). As small as it was, the employment opportunity provided by Moeder's enterprise was the only one that continued for a significant number of years. It is not known whether he retained some employees to maintain the plantation in his absence when he left in 1977.

During 1972 and 1973, \$2000 was paid out of Rural Development Funds to local labourers, mainly from Matapun, to maintain the airstrip (Creagh 1973: 22), and when the strip was re-opened in January 1978 on the initiative of a private company, 10 labourers were employed, each receiving cash of K7.50 per week, after an initial issue to each man of one bush knife, one *sarip* (NGP = strip of hoop iron for grass cutting) and two files. The company also agreed to pay an annual rent of K100 for a site for a guest house and K12 monthly for its upkeep after it was built (Apa 1978, (e)).

## COPRA, THE CASH CROP

The section above on trade listed all the items known to be exported from Long Island, some cultivated, some gathered from the sea and some manufactured. The traditional export items, tobacco and betel mortars, are still occasionally bartered or they can form part of a delayed gift-exchange, but most traffic is for cash.

Copra is the mainstay of the cash economy, although until very recently it was all sun-dried and did not command the best price. There is no interplanting of cocoa between the coconut palms, though in neighbouring areas, e.g. Karkar Island, this is common.

There have been a number of estimates and counts of palm numbers, that of trees planted before mid-1969 being given in Table 12.

The same study notes that in the succeeding three months further plantings took place, 508 at Matapun, 216 at Malala, 56 at Kaut and 804 at Bok.

The patrol officer estimated the island's potential production at 55 tonnes per annum, but said that much less than this was actually harvested, dried and sold. It was sold loose by weight, brought in to the purchaser by the *bilum* (NGP = traditional net bag) and at that time most was bought by the Lutheran mission vessel 'Umboi'. Marketing facilities were adequate, according to the patrol officer, and plans were in

**TABLE 12. Coconut palms prior to June 1969.**

Village	Immature	Mature	Total
Matapun	2913	1131	4044
Malala	2781	2738	5519
Kaut	2107	2073	4180
Bok	4430	4032	8462
	<u>12231</u>	<u>9974</u>	<u>22205</u>

Source: Bailey 1969: 4.

hand to station an agricultural extension worker on the island and build a series of heated copra driers (Bailey 1969: 5). The increased plantings for that year were attributed to the efforts of two extension workers in mid-year, and the official view was that the lethargy of the local people was the main obstacle to economic development (Bailey 1969: ADC Saidor to DC Madang, 3.9.69). The District Commissioner was of the opinion that without sustained extension work by DASF and constant encouragement by administration staff the ground already cleared for an additional 6000 coconut palms would revert to bush (DC Madang to Administrator, 16.9.69) and he urged the Saidor personnel to organize a new marketing system, each village to register with the Copra Marketing Board and sell directly to it (DC Madang to ADC Saidor, 16.9.69).

A patrol at the end of the year noted that little copra was being produced and that unlicensed copra buying by the mission boat had been stopped. Regular visits were needed to stimulate activity, it was said (Somers 1969: 2).

In 1970 'New Ireland' type copra driers were built in each village and resulted in the export of 'considerable quantities' of copra and a further increase in output was expected with the onset of the wet season (Bailey 1970: 2). During the early 1970's Moeder was the sole buyer of copra, his visits being weekly during the peak production period (Owet 1972: 3). Production was increased each year and Moeder was said to be buying about four tons per week during the 1972-73 wet season, a figure that the patrol officer thought could increase three-fold within 10 years (Creagh 1973:17). Moeder was paying 2.5 cents per pound of loose copra and 3 cents per pound bagged; most copra offered for sale was loose. At \$56 per ton and 208 tons per year, the patrol officer estimated an annual income to the island of more than \$11,000 (Creagh 1973: 21), which was some \$65 to \$70 a year per family. However, average weekly production during the year was probably below the wet-season peak.

Early in 1974 DASF staff counted only 9,380 coconut palms which was less than the figure given in the 1969 census for mature trees alone, and they estimated the production as about a quarter of the figure cited by Moeder. Another copra buyer, Peter Lam of Madang, was competing with Moeder, and both traders were then paying eight cents per pound for loose copra yielding an estimated gross income for the island of some \$8,600. This was estimated to be about \$80 per adult male (Spencer 1974: 20, 23) which is puzzling, since the same patrol officer recorded 152 resident adult males in his census (1974, Appendix 1) which represents less than \$57 per head. There is no count of the number of nuclear families comprising economic units (including aged grandparents and single men not yet independent) but even if the number of families were as low as 100, the income per family on these figures would still be only \$86.

Both the 1973 and 1974 administration patrols had noted the discrepancy between the low price paid for copra at the beach and the high price in Madang. The 1973 figure was said to be little more than half the Madang price and the patrol officer

believed that the islanders would benefit greatly from forming a co-operative and purchasing their own boat (Creagh 1973: 22). His successor shared this view, saying that the 1974 Madang price was more than twice the figure paid on Long Island. The islanders, he said, were talking of buying a boat by raising \$5000 themselves and negotiating a matching grant from the P.N.G. Development Bank. However, the people seemed to aim at a monthly income of about \$10 per 'producer', and thereafter were disinclined to produce more. Hence, as the price rose, production fell (Spencer 1974: 20). The term 'producer' is assumed to equate with 'family', but the figure of some \$120 per year seems high, even allowing for cash sources other than copra (see below).

In 1976 Moeder purchased a smaller vessel, the pinnace 'Tagere', to pick up copra around Long Island for storage at Biliau from where it was to be collected monthly by the 'Spray' but in the same year the islanders had acquired the MV 'Arop' and began shipping their own copra to Madang. By 1978, Moeder was no longer trading on Long Island.

By that year, too, there were five hot-air dryers on the island, two each in Matapun and Bok and one in Malala. According to the government officer who prepared the 1973 survey, Long Island had another 5000 acres of land suitable for coconut palms, an area capable of increasing production many hundreds of times (Creagh 1973: 25). So far there is no evidence that the people of Long Island see the returns of labour as sufficiently high to justify any significant expansion of the area under palms.

#### OTHER SOURCES OF CASH INCOME

No production or sales figures are available for the minor cash crops of tobacco and betel nut, each a traditional agricultural crop now being sold for cash. Tobacco, formerly exchanged for goods in traditional trade, is now sold for cash to buyers from villages elsewhere. Betel nut, formerly grown for home consumption, is now sometimes taken to Madang for sale in the town market, and betel nut, pigs and phalanger are occasionally sent in anticipation of cash return to trade friends in Madang (Creagh 1973: 23). Pigs are also occasionally sold to visiting ships (Somers 1969: 2).

Since early colonial times the villagers of the mainland coast have supplied sea shells used for mother-of-pearl to the world's costume jewellery industry, and both bivalves and gastropods have been collected. Long Island has taken part in this trade at least since the early 1930's and probably earlier, supplying trochus (*Trochus niloticus*) and green snail (*Turbo marmoratus*). Whether their reefs previously had the more valuable pearl oyster (*Pinctada maxima*) is not known, but the population of this species is known to have decreased throughout the district during the years between the wars. Since then, the rise of the plastics industry has greatly reduced the market.

Moeder purchased shells on the island during the 1930's and took up the trade again after World War II, continuing to encourage the collection of trochus and green snail at least until 1974. In 1974 the price being paid was 3t per pound. We have observed islanders collecting these shells around Crown Island and seen the piles of dried shells ready for collection by the 'Spray' at Moder's Biliau base. When the trade was still fairly profitable, as it was in the 1950's, Moeder would pick up a group of young island men as swimmers and circle both Long and Crown Islands for two to three weeks collecting from the reefs while the older people dried copra for him to buy when he returned the men to their home. Some shell was still being collected at Long Island for sale in Madang in 1978.

While turtles have been utilized as a resource by Long Islanders ever since the

island was resettled and occasionally been taken by visitors, either by agreement or by poaching, the rate of predation has increased markedly during the past ten years. In the early 1970's Madang poachers were taking turtles for the Madang market in an organized way, shooting sometimes up to 30 in a single night for sale at \$20 each (G. E. Bailey, pers. comm.). The problem continued in 1976, the main culprits being mission workboats and other boats moving between Madang, Umboi and Lae (R. Wilson, pers. comm.). Angus (F:Botsai) told Ball that twenty years ago turtles came ashore to lay at Matapun in reasonable numbers but that by the mid 1970's it was a rare event.

The increased rate of exploitation of turtle eggs was discussed above in the section dealing with aquatic species of wild animals. The practice of selling turtle meat as well as live turtles for cash is new and growing, and it is a development which may eventually threaten the place of turtles and turtle eggs in the subsistence economy.

The agricultural officer who carried out the drought survey in 1972 thought that fish, if smoked for sale in Madang, as well as a commercial turtle trade could become a useful means of increasing cash income and that the Administration should help by finding new markets (Owet 1972: 3, 4). The patrol officer who conducted the area study of 1973 also thought that dried and smoked fish for the Madang market might repay investigation as a development option (Creagh 1973: 26).

There has been little commercial fishing around Long Island and none that has benefited the islanders. In 1976 a Taiwanese ship was observed to be long-line fishing between Long and Crown Islands for a week and apparently did some bait fishing off Crown Island (F. Moeder, pers. comm.). There has been some talk of developing a fresh fish supply to Madang (Malcolmson 1975) shipping the fish on ice, but nothing has come of it.

Income from copra is certainly significantly supplemented by cash from these other sources and the 1973 Area Study estimated the average annual total income per adult male as at least \$84. At that time, savings bank deposits totalling \$1842.50 were held by 28 islanders (Creagh 1973: 23) and in the following year the figures were given as 30 savings bank accounts totalling more than \$2,000 (Spencer 1974: 22, 23). The same study estimated total per capita adult male income as \$120 a year and compared with \$80 from copra, both figures which we believe to be over-estimates, possibly by as much as a quarter.

#### POLITICAL CHANGE

Because of its isolation, Long Island remained outside any area of organized local government until 1973. The people became actively involved in the politics of the wider world for the first time when they voted in the House of Assembly elections in 1964, and they voted again in 1968. Both polls were preceded by special political education patrols in the Sidor Sub-district, but in 1969 the Long Islanders were said to have only a limited understanding of the purpose of voting. They asked no questions about the House of Assembly that they had twice helped to elect. In regard to local government, they were said to be quite indifferent (Bailey 1969: 1).

Although two of the candidates for the Assembly had visited Long Island, the purpose of the House of Assembly was not really understood. Every patrol carried out political education but this was thought to be no substitute for practical experience. Tax payments were seen by the patrol officers as a way of increasing the awareness of the cost of administrative and economic services, rather than as a connection with political representation; none had been paid since 1965 and there appeared to be some doubt as to whether they should have been paid. Nevertheless, it was thought that (Bailey 1969: 4, 5):

The people would easily be able to pay four dollars a head tax per year and this would be well justified considering the services provided by the Administration . . . it is worth mentioning here that the people of Matafuna (Matapun) approached me and asked for the Administration to provide them with a new water pump . . . to replace the old pump which was Administration donated and had fallen into disrepair. I informed them that they should collect thirty dollars for the pump and the Administration would arrange for its installation. Since then nothing has been heard. In my opinion it would be beneficial to the people if they were made to pay even a token amount of money towards the services they receive . . .

To them the Administration *is* the central government and they do not appreciate the niceties the House of Assembly plays in the government of the Territory. The people of Long Island overall are contented with their lot and do not appear to wish sudden changes. In fact such issues as self-government and independence are out of their sphere of interests.

Another patrol officer giving political education talks on the island late in 1969 felt that such 'political backwardness' could be overcome only by inducing the people to become more dependent on the cash economy (Somers 1969: 1).

However, a year later the ADC reported that the islanders were interested in wider political events and had expressed a desire to form a local government council on several occasions. He saw the heightened interest as resulting from increased political and economic attention from patrols during the preceding 18 months (Bailey 1970: 1, 2).

Early in 1973 the new ADC noted that the younger men were most keen to have their people join the Rai Coast Council and were impatient with the complacency of the older leaders. Only a minority appeared to have any objection to joining the local government council, the objection being connected with their cargo cult beliefs. A special political education patrol was planned for later in the year specifically to talk to selected leaders. Some of the opposition from older people was based on opposition to council taxes, but they seemed reassured when told that these would not be high. The only outright opposition was from a few cargo cultists (Creagh 1973: 8, 20, 27). The special political education patrol took place in June and was followed up twice later in 1973, and thought to be effective (Spencer 1974: 18, 25).

Also in 1973, a meeting of the Rai Coast Council resolved to incorporate Long Island into the council area, dividing the island into three wards each with its own councillor, and this was put into effect before the year was out. The three wards were identified with Malala, Matapun, and Kaut and Bok together. During the election a high level of understanding of the purpose and processes was shown, and it was readily agreed that the council tax should be two dollars per adult male. There was some apprehension that the mainland majority on the council would impose its will on Long Island but it was thought by the patrol officer that the investment of council funds in Long Island development projects would soon convert the doubters. Initially, the council was to provide wells and pumps for the four main villages using central government rural improvement funds and spend \$1,000 improving the airstrip. It also promised further spending on the school and on an aid post (Spencer 1974: 18, 25-7). (The pumps were duly installed but by October 1978 all were inoperative due to lack of maintenance.) Council-initiated activities have steadily increased the degree of integration of Long Island into the Rai Coast Council hegemony. The council-assisted purchase of the MV Arop has already been noted and the Council has made rules limiting bride-price payments for Long Island (K200 for Bok, K100 for Matapun) and encouraged the construction of a walking track around the island. By 1978 Long Islanders were suggesting that the island should have its own representative in the new Provincial Assembly (Apa mo78).

In the six years since joining the Council in 1973 the Long Islanders have received more cash development grants per capita from the Council than any other Rai Coast electors (DO W. R. Wilkinson, letter 13.6.79). Table 13 shows how the money was spent.

**TABLE 13. Rai Coast Council expenditures on Long Island since Long Island joined the Council in 1973.**

Year	Project	Amount (Kina)
1973-4	Matapun water pump	318
	Bok water pump	300
	Malala water pump	300
	Kaut water pump	318
	Matapun airstrip	823
1974-5	Matapun classroom	2,495
	Bok aidpost	943
	Matapun airstrip	503
1975-6	Work boat — MV 'Arop'	10,562
1976-7	Work boat — MV 'Arop'	1,596
1977-8	Work boat — MV 'Arop'	1,790
1979	Tools — Long Island road	1,200
		<u>21,148</u>
	People's Contribution — work boat — MV 'Arop'	<u>-1,061</u>
		<u>20,087</u>

#### DEVELOPMENT AND CONSERVATION

Patrol reports and correspondence throughout the 1960's and 1970's continually and often despairingly stressed the need for economic development. Typical of many such exchanges were those resulting from a routine patrol in mid-1969. The patrol officer reported 'The economic development of Long Island is virtually nil . . . there are no vehicular roads . . . no airstrips'. He went on:

It is impractical at this stage to envisage the implementation of any other type of economic development bar copra production as this is all that the island is suitable for. A small fishing industry would be feasible as fish are in sufficient numbers to sell to the Madang Freezer but the people do not have the necessary capital.

People of this island if they are going to achieve anything economically will need close and continued attention by the Administration if they are to rouse themselves from their lethargy. To educate them to what for them is a new way of life will take time and patience (Bailey 1969: 1, 3).

In reply, the DC, Madang, proposed 'that one of your officers be made responsible for implementing a Long Island Development Scheme' (letter, 16.9.69) and he reported to secretary of the Department of the Administrator (letter, 16.9.69):

The ADC . . . does not paint a very attractive or hopeful picture of the Long Island scene. Unfortunately the picture painted is only too true to life. The small population, total lack of incentive, remoteness of the island and rough seas for six months of the year, all combine to the end result of a depressed economy and a disinterested people.

The departmental secretary agreed that these factors produced 'quite a difficult problem' (letter to DC, 6.10.69), but the ADC came forward with a plan for 'Long Island Economic Development' based on copra (letter 20.10.69) and was instructed to 'implement as soon as possible' (DC to ADC, 30.10.69). As earlier sections of this study



have shown the results have been limited.

Another approach to Long Island's future, seen by some as complementary and by others as alternative, began to emerge at about this time.

The need to conserve the biological resources upon which the subsistence economy depends, especially the wild protein sources, had been noted by some outsiders such as the trader Moeder. The most conspicuous threat was to the supply of turtle eggs (discussed above) and to the eggs of the brush turkey — the megapode. Poin Kiau, for example, had been named for the abundance of megapode eggs to be found there. The promontory had once been 'black with fowls laying eggs' and ships sailing between Madang and New Britain would stop to fill 4-gallon kerosene tins with eggs (F. Moeder, pers. comm.).

The combined effects of 'development' and human population growth have put an end to this egg-ground. In 1974 a marine navigation light was mounted on steel piles driven deep into the ground on the extremity of the point and the sand-spit has since largely disappeared. At the same time, the growth of Poin Kiau settlement from an isolated garden house to hamlet has made the demand for eggs a constant one and has also led to further habitat destruction. School children moving between Malala and Matapun have added to the depredation and now the growth of a new school community at Poin Kiau has further increased the harvesting of both wildfowl and turtle eggs by permanent settlers.

The people have adapted in part by agreeing to cease egg collection from time to time to allow some population recovery to take place, and there are a number of other megapode laying areas under less constant pressure.

The turtle population is under a greater threat. It has been most seriously affected by the increase in the human population, by permanent settlement on the north coast, by the increased traffic along that coast generated by the growth in importance of Matapun with its government school and by increasing incentives to convert traditional subsistence resources into cash.

In Moeder's opinion, Long Island lacks a good turtle nursery ground, having no fringing reefs, so that most of the young turtles are taken by sharks. By contrast, much of Crown Island has an outer reef enclosing a lagoon some ten metres deep in which small to medium sized turtles abound (F. Moeder, pers. comm.).

The great increase in recent times of the rate of exploitation of turtle eggs and turtles by the people of Long Island and by visitors has been discussed in an earlier section.

A more general approach to the conservation of Long Island's resources as a matter of wider regional and national interest was developing at the same time as the renewed emphasis on economic growth. Some reference to the potential role of Long Island in wildlife conservation must have been made in Saidor-Madang correspondence in late 1969, but the earliest clear statement that we have found was made by the ADC, G. E. Bailey, who concluded his report of a 1970 patrol by saying 'Long Island would be an excellent site for a wildlife sanctuary'. He noted that there were at that time no shot-guns locally owned on Long Island (Bailey 1970: 2). As previously mentioned, one or two shot-guns were said to have reached the island in 1973 and 1974 but now the Long Islanders have supposedly agreed to limit their use (PNG Post Courier, Oct. 28, 1977).

Despite increasing zoological knowledge and the dawning awareness in some quarters of the need for conservation measures for the turtle population, outside pressure to 'develop' Long Island (in keeping with official policy) was such that in 1972

the Rural Development Officer suggested that cash income could be increased by selling more turtles (in addition to copra and shells) and that the administration could help by finding markets (Owet 1972: 4).

At the same time, official interest in the establishment of national parks was growing, and in November 1972 staff from the Wildlife Section, DASF, accompanied by Hughes, then with the New Guinea Research Unit of the ANU, and John Winslow, a geographer of the University of Papua New Guinea, visited Long and Crown Islands to evaluate their potential as conservation areas and to enquire about the inhabitants' attitudes to this approach. (Ball and Glucksman were concurrently working in the caldera). The concept of a conservation area was quite foreign to the people but when the depletion of turtles was discussed all were keen to prevent their exploitation by *outsiders*. A few informants thought that some restriction was also needed on their use by local residents.

The expedition made three recommendations in 1973 (Lindgren 1975: Appendix 1, 4):

1. That Long and Crown Islands and surrounding waters to a depth of 50 m be declared a Conservation Area in particular for the scenic attributes, wildlife and wilderness areas.
  - 1a It is preferable that the area be declared a National Park to allow controlled development when required.
  - 1b Further investigations should be carried out by the National Parks Board to determine attitudes of the permanent inhabitants to this suggestion.
2. That, as shotguns are superfluous to the peoples' current needs, they be banned from both islands.
3. That the Wildlife Section DASF conduct further research into the turtle breeding grounds and develop a management plan to ensure their continuity.

In the following June, Hughes arranged to take the archaeologists Egloff and Specht (1982) to the island's prehistoric sites and the National Parks Board was invited to send a representative to make a first-hand appraisal. For the Parks Board, R. Miniotas noted the value as a national park, but he stressed the potential for tourist development along the lines of national parks in developed countries. He recommended (Miniotas 1973: 4, 6-8):

- (1) the whole of Long Island, its natural resources and the people, be declared as a 'protective area' where nature conservation can be practised and economic development of resource extraction type be prohibited.
- (2) Because of the island's varied resources and the need to maintain the people's rights and wants the following zoning is proposed:
  - (i) A totally protected area where the natural and scientifically important aspects and species can be preserved, as for example turtle egg laying beaches, wildfowl breeding grounds, Motmot crater.
  - (ii) Wilderness areas where passive form [sic] of outdoor recreation is promoted. All man made structures and facilities, except perhaps primitive walking tracks, should be totally excluded.
  - (iii) Outdoor recreation areas where active pursuits are encouraged and where accommodation and other similar facilities are available.
  - (iv) Communal areas where visitors can mingle with the local people and freely inspect villages, artifacts and cultural dancing.
  - (v) Large areas reserved strictly for the use of the local inhabitants where the normal village, gardening and hunting activities can be carried out free of outside interference.

These various proposals appear to have received little attention at the sub-district level, and in 1975 Lindgren of the Wildlife Section, DASF, produced a land-use plan (Lindgren, 1975, 3-13), in which he suggested that, in general, Long and Crown Islands should be maintained as a predominantly wilderness-oriented conservation area, the antithesis of promoted economic development. He proposed the declaration of four zones — residential, game management, wilderness and restricted.

The residential area would contain all villages and most subsistence gardens and would be defined by the coast and the 65 m contour. (Most gardens already lay in that zone). Any tourist development would also have to take place within that zone, together with any associated offices for administration and wildlife management. Should tourist development be decided upon, it should be located on the Monono River on the central east coast and be serviced by a new airstrip on Balim Point. Any such venture should maintain a low profile, be small in scale, specialize in tourists seeking wilderness values and offer accommodation in buildings built of native materials harmonizing with the landscape.

The game management area would extend from sea level to the 165 m contour and act as a buffer zone. While traditional uses could continue at the present level, no increased use would be permitted. Species principally affected were identified as turtles, megapodes, phalangers and feral pigs. Firearms should be prohibited from the island, and if the program was to succeed it was essential that the need for it be fully accepted by the local people. To this end, a public education program would be needed, together with research into the population biology of the phalanger and the effect on it of traditional hunting.

All turtle species were declining in number, said Lindgren, and the leathery turtle was especially threatened. Further research was needed in addition to a public education program in turtle biology and ecology, sections of beach should be fenced off from pigs and people to form protected hatcheries. Crown Island should be a sanctuary, with no harvesting permitted.

Statistics should be collected on megapodes and their breeding, and on the feral pig population.

Land above 165 m MSL, at present rarely visited by anyone, should be declared a wilderness area and managed by the National Parks Board. It should be preserved in as pristine a state as possible, serving the dual purposes of low-impact recreation and protected areas for replenishing animal populations hunted in the game-management area. Access to the crater should be restricted to a small number of walking tracks. Crown Island should be a wilderness area entirely.

Sites of spiritual, archaeological or scientific significance, such as Motkono (the small stack-island off the south-east coast), the prehistoric sites and any others later identified should be declared restricted areas, access being granted only to the people of Long Island and to permit holders.

If the overall concept was acceptable to the people, said Lindgren, an Island Management Committee should be formed representing all settlements. Local participation in planning and management was essential and planning details and management techniques should be worked out jointly with the National Parks Board and Wildlife Section DASF.

Referring to the important role of phalanger in the diet of the people of Long Island, Lindgren observed that even without the introduction of firearms, this species would decline in numbers if the human population was allowed to grow to a level where predation became excessive (1975: 7). His prediction applies equally to all the

other species that now supply protein to the diets of the villagers of Long Island, and is a reminder that elsewhere in Papua New Guinea there are large areas where, even without modern economic development, human numbers have grown to a level where game animals formerly significant both in diet and in cultural life, have virtually disappeared. Recent census data examined by Ball show that there are now many large families in Malala, Kaut and Bok, some with eight or nine surviving children and many with six or seven; human population numbers are now growing rapidly.

Under the provisions of the appropriate legislation (borrowed from similar arrangements in developed countries) National Parks require the transfer of land ownership to the state; this the people refused. As an alternative, in 1976 it was proposed to make Long and Crown Islands a wildlife management area in which the residents could fish and hunt by traditional methods quite freely within traditional limits but where outsiders would need to obtain permission (R. Wilson, pers. comm.). The arrangement finally enacted was a two-part division patterned in part on Lindgren's recommendations, with the outer portion of Long Island a Wildlife Management Area requiring outsiders to have permits to fish or hunt, and the inner portion of Long Island and the whole of Crown Island as Wildlife Sanctuaries requiring outsiders to have permits to enter for any reason (letter, 27.7.78, Administrative Secretary Division of Provincial Affairs, Madang; letter, 14.8.78, Wildlife Division, Department of Lands and Environment, Port Moresby). The suggestion for tourist development has not been taken up.

There is now a management committee on Long Island which includes the three councillors and representatives from each village but there are evident problems in enforcing the provisions of the legislation. R. Wilson of the Wildlife Division, Madang, considers the turtle population to be seriously threatened still, and cited examples of their exploitation for cash by Long Islanders and visitors. While the residents profess concern, he said, they send turtles for cash sale to Madang market. Despite an education program, wildlife officers of the central administration are pessimistic about the future of breeding populations of turtles laying on the beaches of Long Island.

Because of its isolation, Long Island is just beginning to experience the development process that much of Papua New Guinea has been undergoing for many years. To the outside observer, the present trend is clear. The rate of population growth that modern health measures allow, combined with the desire for cash and the goods that money can buy will transform the island's ecology and economy. Missions, commercial interests, development agencies and official policies all encourage 'consumerism'. The community will develop from a self-sufficient one unusually rich in subsistence resources and adequately supplied with the resources for traditional trade, into a community increasingly dependent upon Madang market for sales and for the supplies needed to replace resources made inadequate by their exploitation for cash and by increasing human numbers. No policy exists on the latter problem; it is not yet seen as a problem at home or abroad.

As increased personal wealth and ownership of manufactures becomes the goal of the majority, a tourist industry may become attractive, especially if locally owned and operated. If carefully regulated, it would bring money and provide some employment and it would make less impact on the island's animal populations (either by direct predation or by habitat destruction) than would other forms of commercial exploitation. If appropriately planned and managed, its success would require the preservation of most of the island's wilderness values.

Many of the people of Long Island are now beginning to abandon the leisure characteristic of their traditional culture for the treadmill of the monetized economy, in general without realizing the process in which they are involved. When Hughes

visited Lake Wisdom in 1972, only one of his four Malala companions had ever before visited the crater rim and that only once, and he had never descended to the water's edge. The abundance of game made even travel for hunting strictly parochial; local resources were sufficient for each village and horizons were close. Those familiar with wider horizons and who have studied the development process have a responsibility to provide the people of Long Island with an accurate statement of the costs as well as the benefits of the course upon which they are embarking, together with full information about alternatives that may be available.

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