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LONG ISLAND, PAPUA NEW GUINEA: INTRODUCTION

J. SPECHT[1], E. E. BALL[2], R. J. BLONG[3], B. J. EGLOFF[4], I. M. HUGHES[5], C. O. McKEE[6], AND C. F. PAIN[7].

1. The Australian Museum, Sydney.
2. Department of Neurobiology, Research School of Biological Sciences, Australian National University, Canberra.
3. School of Earth Sciences, Macquarie University, Sydney.
4. The Australian Museum, Sydney.
5. Human Studies Programme, School of General Studies, Australian National University, Canberra.
6. Volcanological Observatory, Rabaul, Papua New Guinea.
7. School of Geography, University of New South Wales, Sydney.

DEDICATION

This series of papers is dedicated to the memory of R. J. S. Cooke, who was killed by a volcanic eruption on Karkar Island on 8 March, 1979. Professionally, Rob Cooke was a volcanologist, but even more impressive than his excellent work on volcanoes was the depth and breadth of his interest in Papua New Guinea, for he was also an expert on New Guinea birds and on New Guinea history. His helpfulness and his critical abilities will be sorely missed by all of us who had the pleasure of working with him.

SUMMARY

Long Island, in the Madang Province of Papua New Guinea, forms part of the Bismarck Volcanic Arc. Most life on the island was apparently destroyed in a catastrophic eruption during the 17th or early 18th century, and the island has subsequently been recolonized by plants, animals and humans. The human population of the island is still small enough to make possible significant studies of the relation between the expanding human population and the environment. In addition, creation in 1968 of a volcanic island in the large freshwater lake filling the central caldera of the island has allowed observation of a colonization process essentially from the start. Between 1969 and 1978 the authors were engaged on research into various aspects of the island's eruptive and human history. This paper provides a general introduction to these studies which are more fully described in the following papers.

Long Island, known as Pono to its inhabitants and as Arop or Ahrup to people on the New Guinea mainland, lies about 130 km east of Madang and 65 km north-east from Saidor in the Madang Province of Papua New Guinea (Fig. 1). The island is part of the Bismarck Volcanic Arc, a series of Quaternary volcanic centres running from the Schouten Islands in the west to Rabaul on New Britain in the east. Some 900 people speaking an Austronesian language inhabit the island, most of them in the five main settlements of Bok, Kaut, Malala, Poin Kiau and Matapun.

The island was given its English name by Dampier, who sailed past it in AD 1700. However, it is roughly hexagonal in plan, with a maximum width of about 30 km and a land area of about 328 km^2 (Fig. 2). It has a central caldera lake, Lake Wisdom, (area 86* km^2) at each end of which an extinct volcanic cone rises over 1,000 metres. The island has a variety of habitats which reflect the altitudinal range (Figs. 3—6).

*This figure has been given elsewhere (e.g. Ball & Glucksman 1978) as 95 km^2 based on the 1:63360 U.S. Army Corps of Engineers Provisional Map, Long and Crown Islands B55/6 and 7 (1943). However, on the basis of Papua New Guinea 1:100,000 Topographic Survey Sheet 8387 (1977) the figure should be 86 km^2.

Records of the Australian Museum, 1982, **Volume 34 Number 6,** 407–417, Figures 1–6.

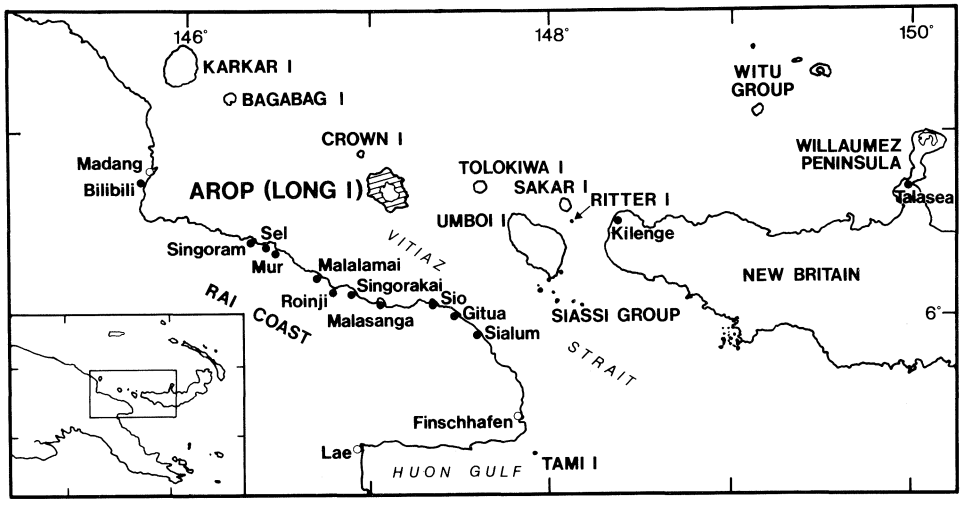

Fig. 1. Map of the area surrounding Long Island showing localities mentioned in the text.

According to both geologists (Blong, Pain and McKee 1982) and local legends (Ball and Hughes 1982) the last major eruption of Long Island devastated most or all life there. The exact date of this eruption is problematical, for there was no evidence of recent devastation when Dampier sighted the island in AD 1700 or when Dumont D'Urville sailed past in AD 1827. Ball and Johnson (1976) concluded, on the basis of evidence available to them in 1975, that the eruption most likely occurred sometime during the first half of the eighteenth century. But an earlier date is possible. Blong (Appendix 1 of Blong, Pain and McKee 1982) concludes that the eruption took place sometime between 1630 and 1670. Until more evidence is obtained it seems safe to assume that the eruption occurred between 1630 and 1800 which is quite recent as far as the colonization processes considered below are concerned. Thus, if the island was as completely devastated as appears to have been the case this should be reflected by abnormalities in the flora and fauna due to the short time available for colonization. Diamond (1974) has found just such an abnormality in the avifauna which is drawn disproportionately from 'supertramp' species which are specialists in rapid reproduction and over-water colonization. In addition, the colonists are drawn disproportionately from species which have successfully colonized New Britain and the surrounding islands rather than from the New Guinea mainland.

Krakatoa, in Indonesia, and Surtsey, off Iceland, are probably the best-known studies of colonization of a new volcanic island. However, in the case of Krakatoa detailed studies of the colonization process were not undertaken until twenty-five years after the event, during which period many significant happenings would have gone unrecorded. Surtsey, in contrast, was carefully monitored from its beginnings and had the advantage that the species pool of potential colonists was well-known. However, biologically the colonization of Surtsey is of less interest because it is a temperate island with a limited species pool from which colonists could be drawn. Long Island, too, presents advantages and disadvantages to the student of colonization. The main disadvantages are: (1) the exact date of the eruption is not known, (2) the completeness of sterilization is not known, and (3) the species pools of New Guinea, New Britain and the surrounding islands, from which colonists could be drawn, are poorly known. The principal advantage appears to be that the diversity of potential colonists makes the process of colonization of great interest so that as more

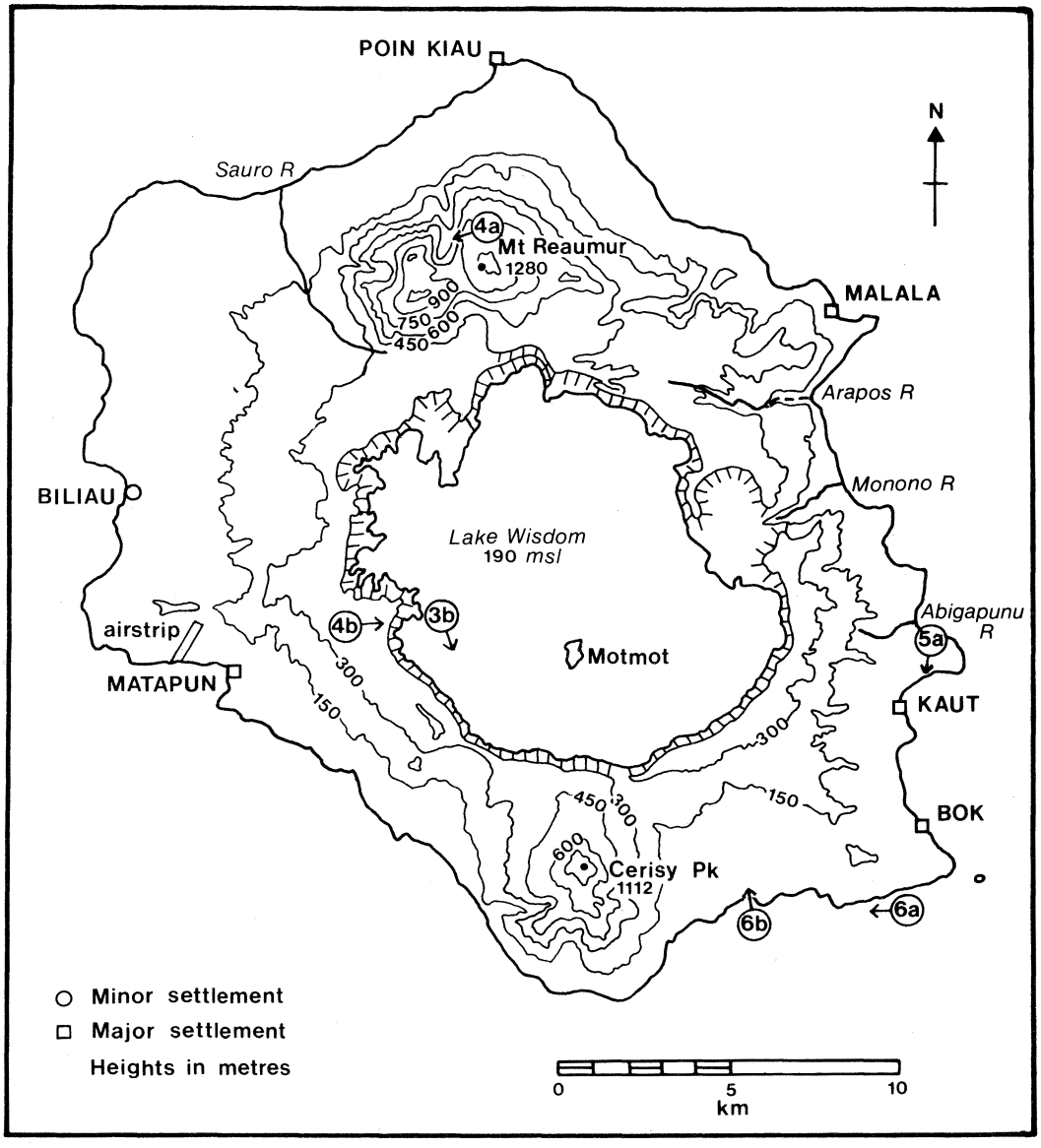

Fig. 2. Map of the major geographic features and settlements of Long Island. Numbered arrows show location and direction of view of corresponding figure.

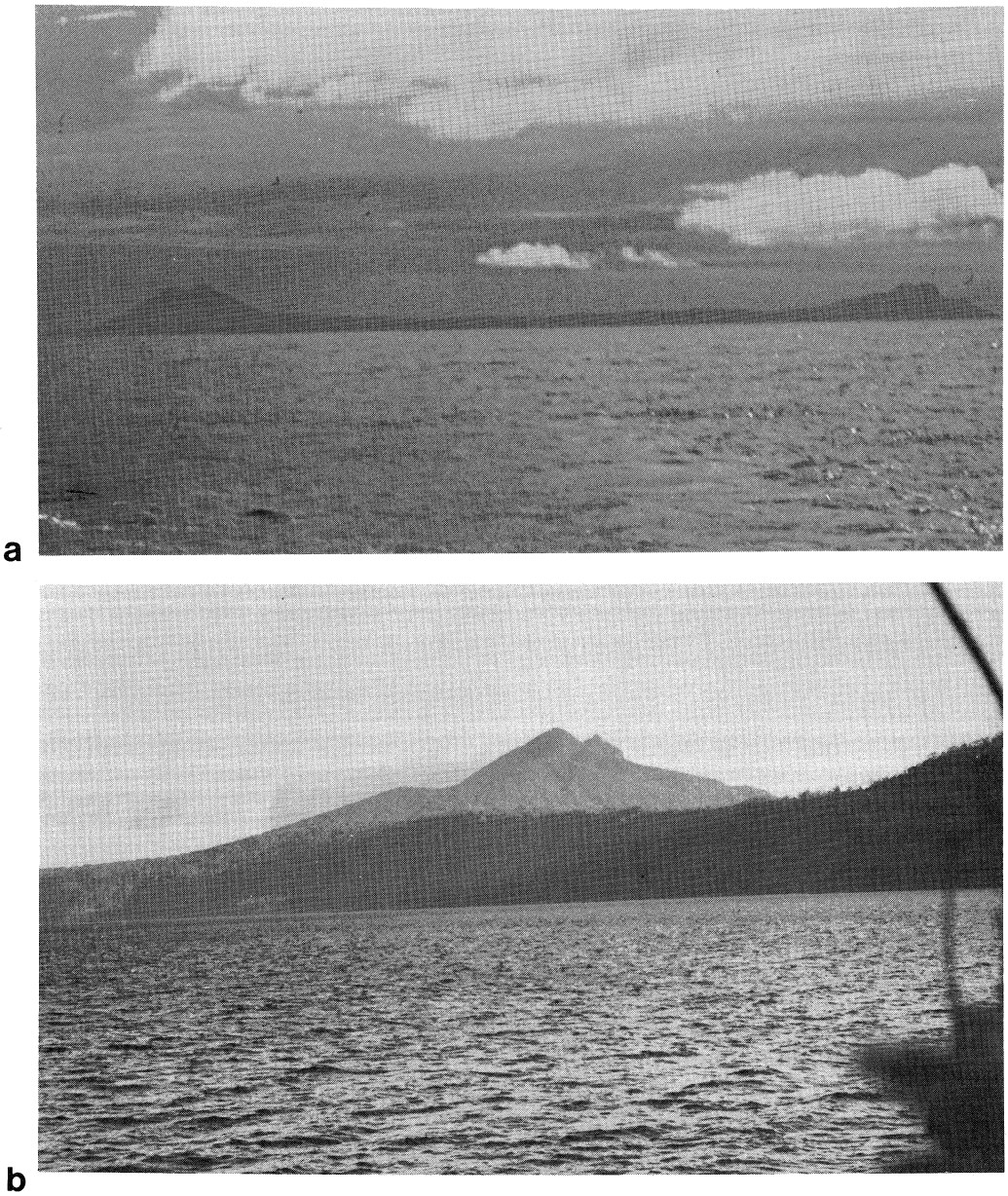

Fig. 3. The general setting. A. From the sea a 'long' island. Mt. Reaumur to left, Cerisy Peak to right. B. Lake Wisdom and Cerisy Peak, as viewed from the northwest.

a

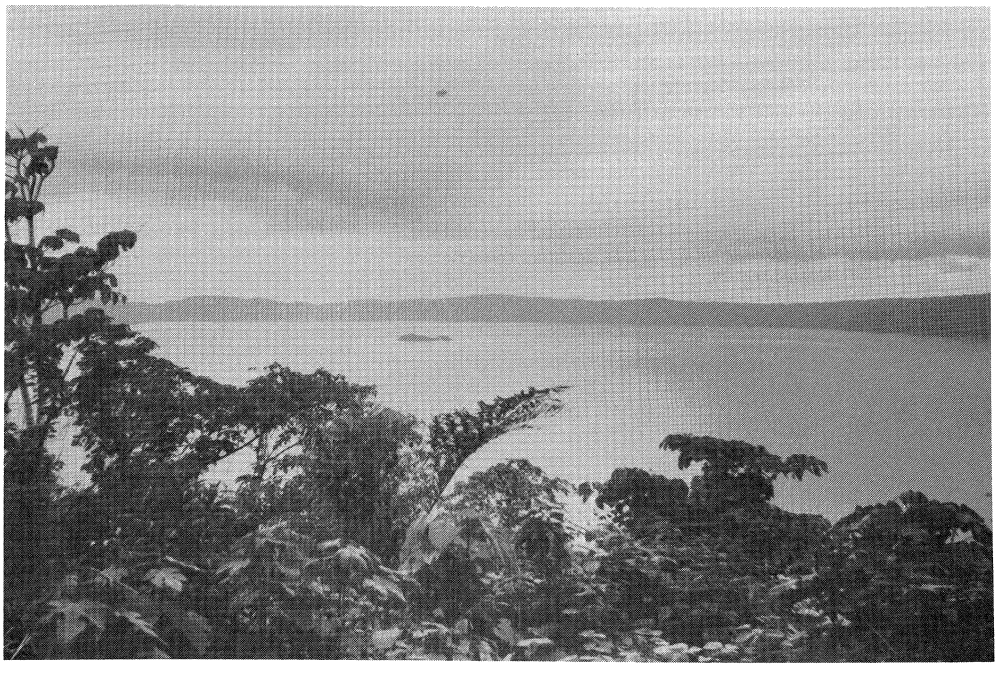

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Fig. 4. The top of Long Island. A. Cloud forest near the summit of Mt. Reaumur. B. Motmot and Lake Wisdom , as viewed from the west rim of the caldera.

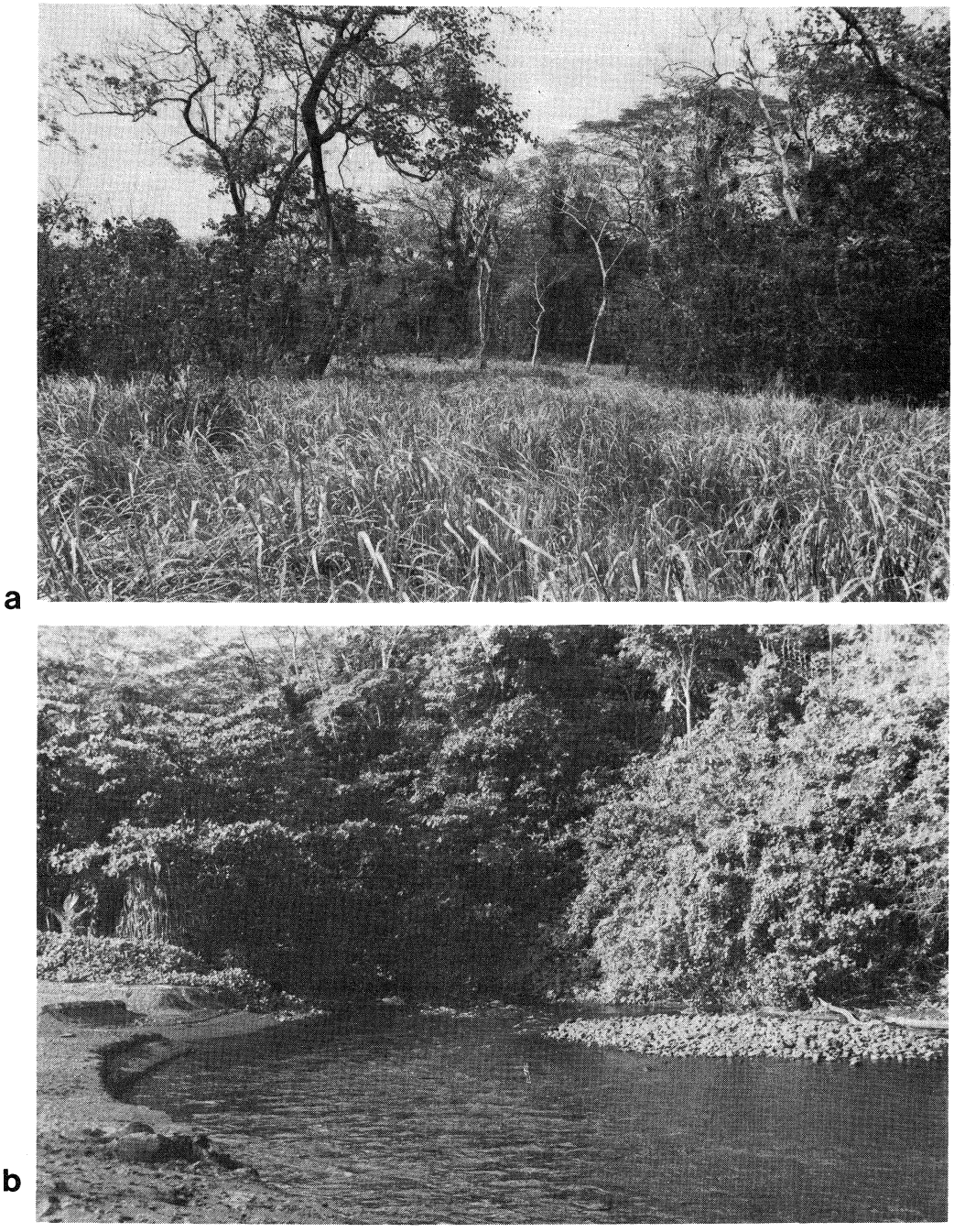
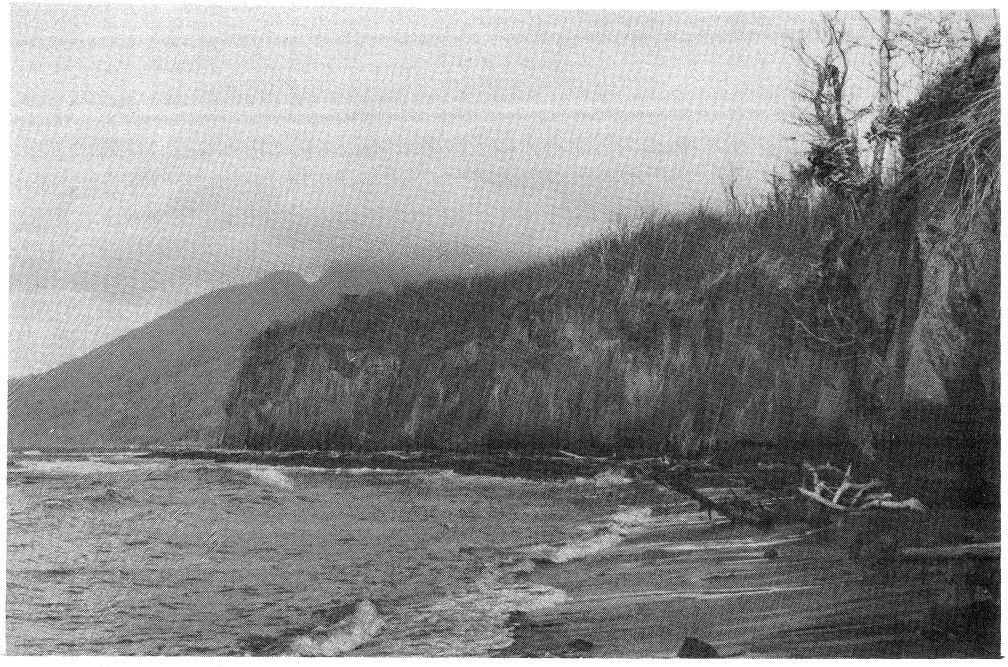


Fig. 5. Habitats of Long Island — the east coast. A. 'Kunai' (*Imperata cylindrica*) north of Kaut. B. Monono River at the sea.



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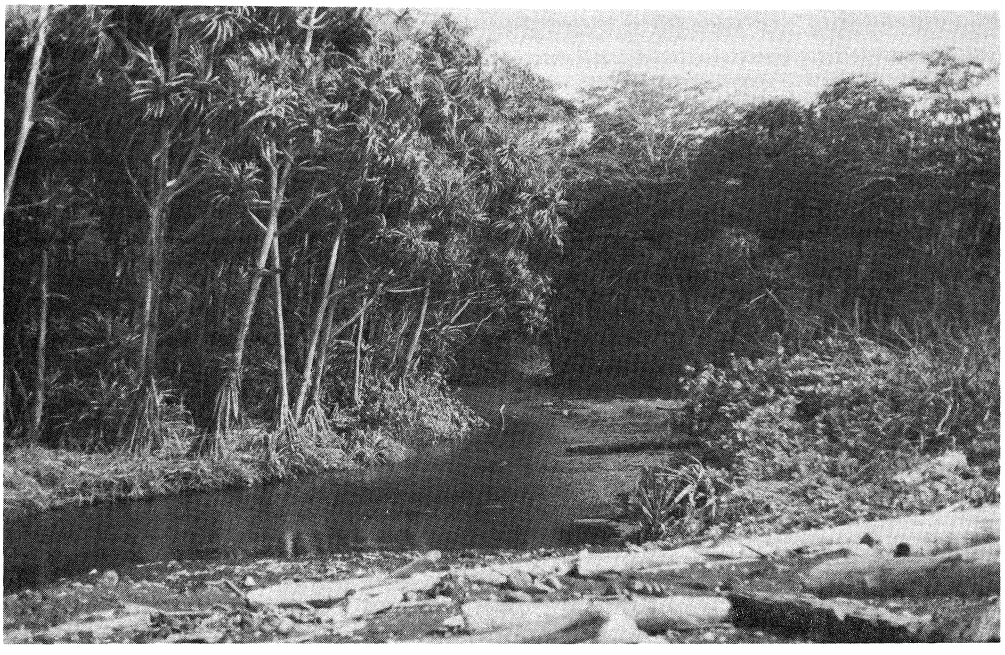

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Fig. 6. Habitats of Long Island — the south coast. A. Ash cliffs near Soraga, Cerisy Peak in background. B. Brackish lagoon and pandanus just behind beach to the west of Soraga.

is learned about the faunas of surrounding islands many interesting features of the successful colonists may be revealed.

Perhaps even more significant is the opportunity for watching the process of human colonization of a new environment. Here, we seem to be in a somewhat better position with regard to our starting point because there is unanimous agreement among the present inhabitants that there was no one on the island when their ancestors came. In addition, the present inhabitants have legends about the first colonists and we have observations of passing explorers as to the level of human population at different times. From this information, combined with government patrol reports since World War II, it has been possible to document human population growth and the increasing pressure on natural resources which this has caused (Ball and Hughes 1982). In addition, Long Island provides an opportunity for students of social change because until World War II the people lived largely in the traditional way, while since that time they have become steadily more involved with the outside world.

The best opportunity for answering several important questions about the early stages of colonization has passed on Long Island. However, Motmot, a secondary cone which has formed an island in Lake Wisdom, has made it possible to study some of these questions on a smaller scale. Motmot was created in an eruption in 1968 and since that time has been studied by Ball and his co-workers (Bassot and Ball 1972; Ball and Glucksman 1975, 1978, Ball 1977). The following groups of organisms has reached Motmot — plants with light seeds and spores and invertebrates capable of aerial rafting, animals capable of surviving in or on floating vegetation and plants with floating seeds, plants eaten by black ducks, seeds eaten by the prey of falcons which, subsequent to capture, have been carried to the island and torn apart, and animals capable of flight. In general those plants which have survived best on Motmot are characteristically found in disturbed areas around the lake while the most successful animals are omnivores or are capable of going for long periods without food. Another interesting feature of Motmot is that a series of volcanic eruptions in 1973-74 created what is almost a replicate recolonization situation with higher plant recolonization starting again from three specimens of a single species. Further details can be obtained from the papers listed above.

This volume consists of a collection of papers relating to the history of Long Island and its inhabitants. The various aspects of research described here were not planned as in inter-disciplinary project. The authors began by working in their own fields of expertise, but by mid 1976 the various individual projects were so intertwined that a joint publication was decided upon. By that time it had become apparent that there was a general need for a summary of all that was known about Long Island, especially in the areas of geological and human history.

Ball, a member of the 1969 *Alpha Helix* expedition, began a study of the biological colonization of Motmot in Lake Wisdom, after it had been sterilized by volcanic activity in 1968, and of the apparently simple biota of the lake itself. Initially, this work was in conjunction with J. M. Bassot (Bassot and Ball 1972), but was subsequently continued by Ball and J. Glucksman who visited the island annually from 1971 to 1974 and again in 1976 (Ball and Glucksman 1975, 1978). Ball returned to the island in 1978 with McKee. In an attempt to determine the age of Lake Wisdom and the history of Motmot, Ball reviewed all available sources concerning Long Island's history, and prepared an exhaustive manuscript.

Archaeological interest was aroused by the discovery in 1969 of human bones and potsherds eroding from beneath substantial deposits of volcanic materials on the

coast (J. Womersley, cited in Bassot and Ball 1972:27). Johnson *et al.* (1972:48) in citing Womersley suggested that the bones might represent islanders killed in the cataclysmic eruption that is remembered in Long Island legends. A prospecting geologist, J. Wood, reported further finds of artefacts and human bones in 1970. These finds were investigated by Hughes in 1972 when he visited the island with a party from the Department of Agriculture, Stock and Fisheries of Papua New Guinea (D.A.S.F.) to carry out a preliminary land-use survey. Hughes visited two coastal archaeological sites (JAB and JCB), each of which had sherds and obsidian flakes eroding from levels within the volcanic deposits, and collected samples of carbonised wood for radiocarbon dating from exposures in the north-west coastal cliffs.

In 1972-73 Specht and Egloff independently began archaeological and ethnographic research in the Sio-Gitua and Madang areas respectively. Each was concerned with aspects of recent and prehistoric pottery production and trading activities in their areas. Since Long Island was linked with both areas through trade and mythology, they felt that a joint investigation of the island's archaeological finds would be of mutual benefit.

In May-June 1973 Hughes, Egloff and Specht were joined by scientists from D.A.S.F. and the National Parks Board of Papua New Guinea for a further investigation of the island. Using the M. V. *Koro* out of Madang for transport and a working base, four days were spent visiting three archaeological sites on Long Island. Time did not permit excavation of the deeply-buried deposits but artefacts, shells, bones and further ^{14}C samples were collected.

The age determinations from Hughes' 1972 ^{14}C samples bridged those associated with the Tibito Tephra (formerly 'Z' ash) found in upper levels of prehistoric agricultural systems in the Wahgi Valley of the New Guinea Highlands (later published in Golson 1976). While collaborating on that project in 1973, Hughes suggested that a visit to Long Island by those investigating the ash stratigraphy of the Wahgi might be profitable to both investigations. Subsequently, Blong (1975) proposed Long Island as one of several possible sources for the Tibito Tephra.

In 1976 McKee visited Long Island twice as part of a continuing geological and geophysical study. On the first of these visits he was joined by Blong and Pain, who examined the tephrostratigraphy of the north and west coasts. McKee and Ball in 1978 collected further archaeological materials and information. These various studies have permitted the refining of the stratigraphy outlined by Johnson and his colleagues (1972; *cf.* Ball and Johnson 1976), the collection of additional ^{14}C samples for earlier phases of the island's volcanic activity, and have clarified the stratigraphic positions of the archaeological sites studied by Egloff, Hughes and Specht.

The first paper, by Blong, Pain and McKee, presents an outline of the island's landforms and a brief history of the pyroclastic mantle. Little is known of the island's history prior to about 16,000 years ago, when the first of three major eruptive phases was under way. The second occurred about 4,000 years ago, and the third probably in the first half of the 17th century according to Blong's estimate. The effect of this last phase, in particular, on human settlement is briefly discussed. This is followed by a review of the archaeological data by Egloff and Specht, who describe sites which were occupied before the last eruptive phase, possibly extending over 1,000 years. They relate the archaeological materials to evidences from the mainland of Papua New Guinea, especially in relation to the historically known trading networks of the Madang and Vitiaz Strait areas. The third paper, by Ball, reviews the history of foreign contacts with the island, drawing upon written accounts up to the end of the war in the Pacific (1945). In the fourth paper Ball and Hughes summarise the recent human history of the island as presented in myths and legends, and describe aspects of the

islanders' life style and land use. They describe the dilemmas confronting the islanders as a result of social and economic development. The final paper is an annotated bibliography of the island prepared by Ball.

No linguist has yet worked on Long Island, though Lincoln (1976) has studied the languages spoken on the mainland opposite. None of the authors is a linguist, and we have rendered what we heard in the orthography used for New Guinea Pidgin (NGP) by Mihalic (1971: 3-8) for the Madang area dialect. We have italicised foreign words other than names which have already been borrowed into and published as English (e.g. Arop, Umboi). In many cases, the European names given on 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. The following are those most likely to be confused:

Early name	**English**	**New Guinea Pidgin**	**Long Island Arop language**
Long Island	Long Island or Arop	Arop	Pono
Lottin	Tolokiwa	—	Lokep
Tupinier	Sakar	—	Orenge
Rook	Umboi	Biksiasi or Siasi	Kowai (NW inland) and Siasi (SE coasts)
	Siassi Islands	Siasi	Siasi
Kaiser Wilhelms-land	New Guinea	Niugini	Kowalmai
Rich's Island	Bagabag	—	—
Dampier Island	Karkar	—	—

The names of many places, rivers and other features of the landscape have been incorrectly recorded on published maps of the island. The vernacular names used in the papers are those used by the islanders themselves; where variants of a name were recorded, we have chosen the form used by those living closest to the relevant locality.

These papers do not constitute a comprehensive history of the island and its inhabitants, but we believe that they provide a framework for the development of further research on the human utilisation of a unique island. All ecosystems are open systems, but islands have always attracted geographical and biological research workers for reasons discussed by Fosberg (1963:5). Long Island has the additional attraction of providing a starting point for the study of the processes of biological recolonization, including a rare opportunity to examine recolonization by the human species itself.

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was prepared by P. Greer. The photographs were taken by E. Ball, who also holds the original negatives.

REFERENCES

Ball, E. E., 1977. Life among the ashes. *Australian Natural History* 19(1): 12-17.

Ball, E. E., and J. Glucksman, 1975. Biological colonization of Motmot, a recently created tropical island. *Proc. R. Soc. Lond., B.,* 190: 421-42.

——— 1978. Limnological studies of Lake Wisdom, a large New Guinea lake with a simple fauna. *Freshwater Biology* 8: 455-68.

——— in press. Biological colonization of a newly-created tropical volcanic island and Limnological studies on New Guinea Lakes, 1972-1978. *National Geographic Society Research Reports, 1972.* National Geographic Society, Washington, D.C.

Ball, E. E. and I. M. Hughes, 1982. Long Island, Papua New Guinea — People, Resources and Culture. *Rec. Aust. Mus.* 34 (10): 463-525.

Ball, E. E. and R. W. Johnson, 1976. Volcanic history of Long Island, Papua New Guinea. In R. W. Johnson (ed.), *Volcanism in Australia,* 133-47. Elsevier, Amsterdam.

Bassot, J. M. and E. E. Ball, 1972. Biological colonization of recently created islands in Lake Wisdom, Long Island, Papua New Guinea, with observations on the fauna of the lake. *Papua New Guinea Sci. Soc. Proc. 1971,* 23: 26-35.

Blong, R. J., 1975. The Krakatoa myth and the New Guinea Highlands. *J. Polynes. Soc.* 84: 213-17.

Blong, R. J., C. F. Pain and C. O. McKee, 1982. Long Island, Papua New Guinea — Aspects of Land forms and Tephrostratigraphy. *Rec. Aust. Mus.* 34 (7): 419-426.

Diamond, J. M., 1974. Colonization of exploded volcanic islands by birds: the supertramp strategy. *Science* 184: 803-6.

Fosberg, F. R., 1963. The Island Ecosystem. In F. R. Fosberg (ed.), *Man's Place in the Island Ecosystem,* 1-6. B. P. Bishop Museum Press, Honolulu.

Golson, J., 1976. Archaeology and agricultural history in the New Guinea highlands. In G. de G. Sieveking, I. H. Longworth, and K. E. Wilson (eds.), *Problems in economic and social archaeology,* 201-20. Duckworth, London.

Johnson, R. W., G. A. M. Taylor and R. A. Davies, 1972. Geology and petrology of Quaternary volcanic islands off the north coast of New Guinea. (Including an Appendix on 1968 eruption of Long Island, by G. W. D'Addario). *Aust. Bur. Min. Res. Rec.* 1972/21. Bureau of Mineral Resources, Canberra.

Lincoln, P. C., 1976. Rai Coast Survey: First Report. University of Papua New Guinea seminar paper (to appear in University of Hawaii Working Papers in Linguistics).

Mihalic, F., 1971. *The Jacaranda Dictionary and Grammar of Melanesian Pidgin.* Jacaranda Press, Milton (Queensland).

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