PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

Geographical, Historical and Social Background of the Peoples Studied in the I. B. P.

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Geographical, historical and social background of the peoples studied in the I.B.P.

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Since the end of the Second World War Papuans and New Guineans have been rapidly adopting the pattern of European civilization. Striking socio-economic changes have been accompanied by changes in diet, a significant reduction in infant mortality and, most importantly, an expansion in the population. The changes are not uniform in all parts of the Territory and it is possible to find and study people in all stages of development.

The United Kingdom/Australian project involved multi-disciplinary studies of two contrasting populations. The first, on Karkar Island, lives in a hot, humid climate and consists of indigenes who provide most of the labour for the coconut and coffee plantations; they have had access to European food and goods for nearly 50 years but the diet and housing is still primitive. Labourers have also been imported from the highlands of New Guinea and have been subjected to the hazards of malaria and tuberculosis for the first time. The second population, at Lufa in the eastern highlands, is largely a subsistence population in a more primitive state. It has more recently been introduced to European food and goods and is less affected by European habits. The climate is less rigorous at an altitude of approximately 1700 m and malaria, hookworm and tuberculosis are not serious problems.

The principal contribution of Australia to the Human Adaptability section of the International Biological Programme has been participation in the multidisciplinary New Guinea Project. The Australian Academy of Science was pleased when the United Kingdom Committee agreed to join the project because it realized that Australia and New Guinea could not provide all the technological and organizational expertise which was required. It also hoped that United Kingdom workers might be interested in observing some of the rapidly occurring changes that were affecting, not only the socio-economic conditions, but the way of life, the nutrition, the disease pattern and the general biology of the inhabitants of the Territory.

General organization

It was agreed that the Institute of Human Biology and the Department of Public Health of Papua New Guinea should also participate so that there might be a continuing benefit to the inhabitants from the study. The project was based on the Institute and, subject to the general overview of the United Kingdom and Australian Committees, was directed by Dr R. W. Hornabrook, Director of the Institute. The Australian Government contributed to the general costs of the project, the United Kingdom to the costs of its special interests and the New Guinea organizations by secondment of personnel and by the provision of facilities.

At an early stage it was agreed that the work should be divided between the participants as follows:

(1) *Institute of Human Biology*. Medical examination, socio-demographic survey (in collaboration with Dr D. I. van de Kaa of the Australian National University); growth and development study and fertility survey.

(2) *United Kingdom H.A. Committee*. Nutrition and energy expenditure studies, work capacity and physiology and respiratory physiology investigations.

(3) *Australian H.A. Committee*. Genetics, anthropometry, thermal tolerance, parasitology and salt and water metabolism.

(4) *Department of Public Health*. Provision of personnel to assist the nutrition and physiology studies and generally to provide administrative assistance.

The thermal tolerance studies were later made the joint responsibility of the Australian and United Kingdom Committees in collaboration with the Medical Research Council of the United Kingdom and the School of Public Health and Tropical Medicine of the University of Sydney. Biochemical analyses were performed by the Kanematsu Institute of Sydney Hospital and by the United Kingdom Medical Research Council. Dr G. H. Beaven of the National Institute for Medical Research tested haemolysates with interesting results and various laboratories in the United Kingdom and in Australia have assisted individual workers.

It has been agreed that individual workers will analyse and may publish their primary results in any journal they may choose. The National Committees have, however, agreed that the Institute of Human Biology will receive appropriate recognition in all publications. The most important aspect of the project, the integrative correlative analysis, is a more difficult undertaking and requires the cooperation of all participants. Arrangements have been made for this phase to be completed, under a contract, by the Department of Clinical Science at the Australian National University.

The New Guinea scene

The part of New Guinea under Australian administration, known as Papua New Guinea, has a population of approximately 2 500 000 and, apart from the non-indigenous inhabitants, most are still living basically with a subsistence agriculture culture. Socio-economic changes leading to national independence in the near future have, however, affected most of the population to a greater or lesser extent. Urban centres with educational institutes, administrative agencies and some light industry are within short distances of villages with primitive hygiene, overcrowded houses and underclothed and poorly nourished people. Although there is no known indigenous alcoholic drink, locally manufactured beer and imported wines and spirits have become available to sections of the population and, as might be expected, there has been some abuse by individuals.

Energetic public health measures have reduced the mortality and morbidity of diseases, such as malaria, yaws, typhoid fever, leprosy, gastro-enteritis and respiratory infections. In some areas population pressure is evident and European diseases have been introduced. Vascular degenerative disease, with its complications, is now occurring in low incidence in the urban areas and syphilis, once absent, presumably because of cross-antigenicity with yaws, is prevalent along some highways.

It is possible to find in New Guinea population groups in every stage of change, from the most primitive tillers of soil to the administrative executive elite. The selection of populations to be studied during the International Biological Programme was difficult. Two contrasting groups were chosen, one representative of the coastal populations living at sea-level and subjected to European influences for at least fifty years, and the other representative of highland people living under more primitive conditions who had been contacted much more recently by Europeans. The selection of Karkar Island and of Lufa was made after two visits to New Guinea by representatives of the National Committees, of the Institute of Human Biology and of the Department of Public Health.

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Karkar Island

Karkar Island is a semi-active volcano island situated at 4° 30′ S and 145° 58′ E and 54 km NNE of Madang. It is approximately 370 km² in area, 25 km long and 19 km wide and its coast is fringed with coral. The conical shape of the island is indicative of its volcanic origin, and its highest point, Mount Kunugoi, is about 1850 m above sea-level. The last major eruption, which caused the temporary disbandment of Lutheran missionary activities, was in 1895, but it has been reported that one minor eruption occurred during the recent I.B.P. studies. The rainfall, averaging 416 cm/year, occurs mainly between November and April, but there is insignificant seasonal fluctuation in temperature. The soil has been described as 'probably the most fertile in the territory' and there are 14 large coconut/cocoa plantations on the island.

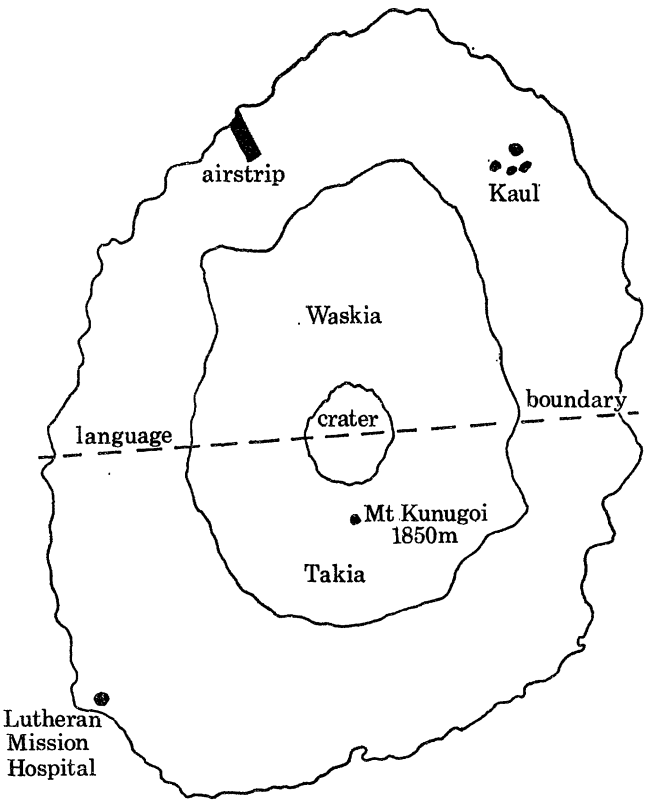

Figure 1

Karkar Island was first mentioned by Dampier in 1695 and he described smoke emerging from its volcano but did not land. Lutheran missionaries arrived in 1890, built a house with timber delivered from Java, and lived principally on native yams and taro. After being forced to evacuate in 1895, the mission was re-established in 1911 and, except for a short period during the Japanese occupation, it has been active in health, welfare and religious fields ever since. At present, it operates the only hospital on the island.

A census of the island, conducted by I.B.P. personnel early in 1969, showed the population to number approximately 18000 distributed through 59 villages. The four villages chosen for intensive study, Kaul I, II, III and IV, had a total population of 1286.

Two distinct languages are spoken on the island and are geographically delineated. Waskia is a non-Austronesian language also spoken on the mainland opposite Karkar. Takia is more closely related to the Melanesian language and shares 80 % cognates with a narrow area of the mainland coast.

The male indigenes of Karkar Island frequently migrate to the mainland to seek employment and some indented labourers are recruited from the highlands for the plantations. Both males and females wear European clothing although, at times, it is rather old and inadequate. The basic diet consists of yams, taro, fruit and tinned meats (purchased from trade stores). There are schools, a Roman Catholic Mission, in addition to the Lutheran Mission, an air-strip, an administration centre and a council chamber. The council is rapidly gaining control of local administration.

Lufa

Lufa is situated in the Eastern Highlands at the foot of Mount Michael, which is 3750 m above sea-level. Its map location is 6° 20′ S and 145° 15′ E and all the inhabitants live at altitudes between 1520 and 2130 m above sea-level. There is an annual rainfall of approximately 250 cm/year and, like Karkar Island, seasons are marked only by periods of or absence of rain. Days are pleasantly warm and nights often cool, requiring smokey fires in the houses. The scenery has been described as among the most beautiful in the territory.

Figure 2

Prehistorians state that the earliest date of human habitation is about 9000 B.C. and there is evidence that people lived in caves and rock shelters, existing as hunters and gatherers. The presence of pigs dates to 4000 B.C. The first historical record is in 1953, when an administration patrol post was established in Lufa and the influence of the European administration extended immediately to about 1500 people. Since then another 23 000 in the district have been embraced by the administrative centre. In 1956 a road connecting with the Highlands Highway was opened and Lufa was thereby connected with Goroka. This road has been continually improved and it facilitated the movement of staff and volunteers to and from Goroka during the I.B.P. study. There is no hospital in Lufa but there is a primary school staffed by Administration teachers and at least six medical aid posts are attended by medical orderlies. The

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Lufans speak a highland language, Yagaria, and practise shifting subsistence agriculture, concentrating mainly on sweet potato. The diet is, however, supplemented with some taro, yam, banana and peanuts. Apparently they were cannibalistic, but this ceased about 1957.

Recently cash crops, principally Arabica coffee and green vegetables, have been planted for sale to Goroka residents. Weaving of woollen rugs, blankets and clothing has also been introduced and is proving a popular industry. European clothing is available from trade stores but a large proportion of the population is still dressed in traditional New Guinea fashion.

I.B.P. Facilities

The Institute of Human Biology arranged for the construction on Karkar Island of staff residential houses from native materials, of a laboratory for the medical, genetic and anthropological examinations from a disused Mission building and of an air-conditioned fibro-cement building with galvanized iron roof and concrete floor for the work on thermal tolerance, respiratory physiology and nutrition. The last-mentioned building was equipped with 12 kVA generator to supply constant voltage power. It has since been sold at a greatly depreciated value to the local council, but one of the houses has been retained for used by Institute personnel.

No special buildings were constructed at Lufa. Residential accommodation for some staff was available at Lufa and Goroka and makeshift laboratories were provided by the Territory Administration in both places. The respiratory and thermal tolerance studies were performed on subjects transported to Goroka by road. A building in Goroka provided overnight accommodation for the subjects and their accompanying families transported from Lufa, in addition to an air-conditioned working area for the specialized equipment. The Goroka electrical power supply was utilized in this building. The medical, genetic, anthropometric and nutrition studies were performed in the improvised but crowded laboratory in Lufa.

An ethical aspect

Volunteers were not lacking on either Karkar Island or in Lufa for the many different surveys and experiments conducted. On every occasion those who participated displayed interest in the procedures and a desire to assist the investigators. Rewards were minimal. Especially on the more advanced Karkar Island, the inhabitants appreciated the presence of medical staff in the villages and Kaul became an area of envy for the remainder of the island.

Some resentment has since developed in various areas but especially in Kaul on Karkar Island. This arises from a feeling that the indigenous subjects, who volunteered for the surveys, have received no direct or indirect benefit from having participated. The medical teams have withdrawn and some workers have departed for overseas without having attempted to describe the results they obtained. Many natives feel they have been exploited for the benefit of Europeans, not for their own welfare.

This aspect of human biological surveys has not received sufficient attention in the past. It has the potential of creating international discord. Continuing activities of the Institute of Human Biology have been necessary in both areas to demonstrate sustained interest and prevent resentment – an unscheduled aspect of the I.B.P. Project for which no budgetary provision was made.

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The I.B.P. project in retrospect

A multidisciplinary study of the type undertaken was possible only because of the existence in the country of a biological research institute whose director was willing to be interested in the project. This contribution should be recognized in all publications. The international collaboration added prestige to the study and provided expertise which would have been lacking or been inadequate had it been a local or a regional study. Involvement of medical officers and health personnel from New Guinea has already resulted in continuation of some of the work and it is hoped that it will provide long-term stimulation to local workers.

The resentment which followed the stimulated interest of indigenous volunteer subjects is the most serious complication of the project and it is an aspect deserving of careful study when future surveys are being planned.

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