

A LEPROSY SURVEY IN THE ISLAND OF MALAITA, BRITISH SOLOMON ISLANDS¹

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INTRODUCTION

In a leprosy survey of the British Solomon Islands, made in 1937, other work than that now to be reported was done, but as the Malaita work is the biggest and most representative sample so far the author has thought it advisable to summarize the data and observations and present the deductions pertaining to the survey of that island. This is a little known corner of the world and the work has turned out to be on almost virgin territory, and of absorbing interest.²

Procedure.—Our two main aims were to do a scientific survey and to obtain a good sample of the population. Both of these aims were very largely attained. A microscope and laboratory materials were carried and constantly used in the field, and over one-quarter of the population was examined medically in a careful and systematic way.

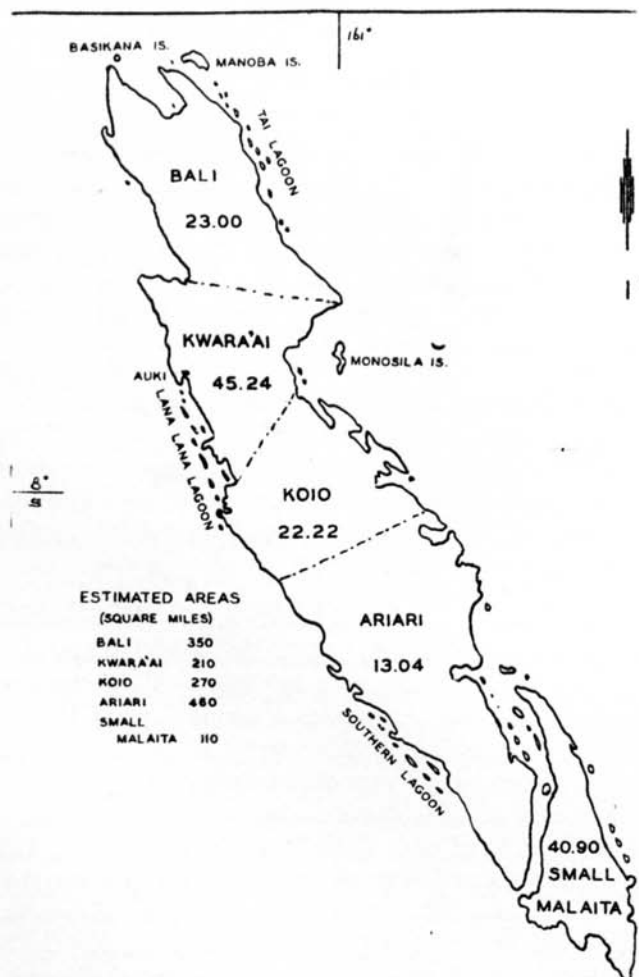
The author arrived at Auki, Malaita, on September 22, 1937, and left on December 6, 1937; the work summarized here was carried on between those two dates. The medical staff included, besides the author, a native medical practitioner and a medical orderly. In addition, the survey had the company and guidance of the district officer of Malaita, and occasionally of a cadet. Essential to the survey also were the police assigned to it, and the crew of our little vessel. For our many journeys we had but two methods of crawling over the surface of sea and land. On sea the party was carried on the 10-ton auxiliary vessel "Auki," and in native canoes where called for. On land we travelled on foot. Whether on sea or land, much hardship was experienced.

¹Published by kind permission of His Honor the Resident Commissioner, and of Dr. H. B. Hetherington, Senior Medical Officer.

²For a summary account of the author's survey of seven islands of the Solomon group, see *Leprosy Review* 9 (1938) 122-128.

DESCRIPTION OF THE ISLANDS OF MALAITA

Geography and topography.—Malaita runs roughly N.N.W. and S.S.E. It is intersected by latitude 8° S., and by longitude 161° E. Its length is approximately 117 miles and width from 8 to 20 miles, the area being about 1,400 square miles. The island is mountain-spined and rugged, the highest point being a peak of



TEXT-FIG. 1. Map of the District of Malaita. The figures denote the estimated density of population of the districts; the mean density on the mainland is 24.32 per square mile.

4,275 feet altitude. There are few littoral flats of any size, except for one strip of 12 miles. There are a number of small

rivers, many good harbors, and four main lagoons, viz.: Tai, Langa Langa, Southern, and a fourth off the east coast of Small Malaita in the south (Text-fig. 1).

Climate.—The prevailing winds are S.E. from April to November, and N.W. from December to March. The annual rainfall is from 120 to 130 inches. The climate is warm and humid. The mean air temperature must be deduced from that recorded in Tulagi, which is from 76.4 to 97.6° F. The relative humidity is recorded in Tulagi as 83 (saturation 100). There is little variation throughout the year, but the heat is tempered by the prevailing winds, and by breezes from the mountains. There is a liability to gales in the N.W. season, which may immobilize everybody for a week.

Population and its distribution.—Malaita is the most heavily populated of all the islands of the Protectorate, with a total population of about 40,000. With the exception of 5,000 or 6,000 inhabitants of the littoral and artificial islands, the people live away from the coast; that is, about 34,000 of them are bushmen or hillmen, who dominate the picture by their numbers but not by their intelligence. Further, the largest population is in the north of the island, decreasing gradually to the south, as indicated by the figures in Text-fig. 1. The people do not live in large villages, but for the most part in small scattered groups of houses. Missionized natives are apt to be gathered into coastal village centers, and the artificial islands are occupied by compact villages, but such exceptions do not bulk large. These islands are peculiar to the lagoons. People driven long ago out of the bush gathered coral blocks and laboriously built up little islands one-quarter to one acre in extent, on which they now live in thickly clustered houses.

Estimated density of population.—For each administrative zone of the island, taking the estimated bush population and bush area as the basis, the density per square mile works out as in Table 1; the mean for the mainland is 24.32 per square mile. Left out of account in the table are the saltwater people that have been mentioned, who do not occupy much of the area of Malaita, and often rise to a surprising density of population, as, for instance, 250 people on an artificial island with an area of only one-half acre. Yet it is not among these folk that leprosy is found.

The people.—The people of Malaita are frizzy-haired Melanesians, with a social order which is primitive but good in many ways. For the most part they are savage or semisavage, being in

a state of transition from savagery to the dawn of civilization, and thereby vulnerable to leprosy. They are missionized only in small part; in some places they are resistant to that influence and for the most part are still heathen. They are not very cleanly of body, except the few instructed ones and those on the artificial islands. They are moral by their own codes, upstanding and hard working, rather morose of aspect and temperament, were given to murder and assassination in the past and even now are still inclined that way.

TABLE 1.—*Estimated density of population.*

Zone	Estimated bush population	Estimated area, sq. mile	Density per sq. mile
Bali.....	8,050	350	23.00
Kwara'ai.....	9,500	210	45.24
Koio.....	6,000	270	22.22
Ariari.....	6,000	460	13.04
Small Malaita.....	4,500	110	40.90

These people do not possess tribal chiefs who might serve as *points d'appui* in leprosy control, for their social order is in essence based on loose patrilineal family groups where a chief is the head only of a "line." Their religion is in essence a worship of ancestral family spirits, and propitiation of them by the priests through sacrifices of pig or first-fruits. The status of woman is low in their estimation, and they *tabu* women at menstruation and childbirth. They live in palm-thatched houses, not very high off the ground and usually well-spaced; overcrowding is not a feature of their life. Their domestic animals are pigs, dogs, and sometimes poultry; cattle and other milch animals are rare and they are not good herdsmen, even of pigs. Their diet is very largely root vegetarian, a taro-yam basis eked out by odd animals by bushmen and by fish by salt-water people. Both groups use pig when they can get it, and there is a modern liking for and use of trade tinned meats, biscuits, and rice. Their occupation is mainly the production of food in gardens or fishing and hunting, though some 2,000 are always away on plantation or steamer work. They are not very artistic, or musical. Their main social amusements are their feasts, tobacco-smoking and betel chewing; and the common topics of conversation are pigs, taro, and copulation. They are standing up to the impact of new things well in the north and on the artificial islands, but in the south there is a tendency to upset of their social orderliness and to decrease of population.

They have a word for leprosy, and folk-lore about it in which leprosy is ascribed to smiting by spirits, and the germ of the idea of contagion. In spite of this there is little tendency to segregate their lepers, except under government influence. Leprosy seems to have been indigenous among them for several hundred years.

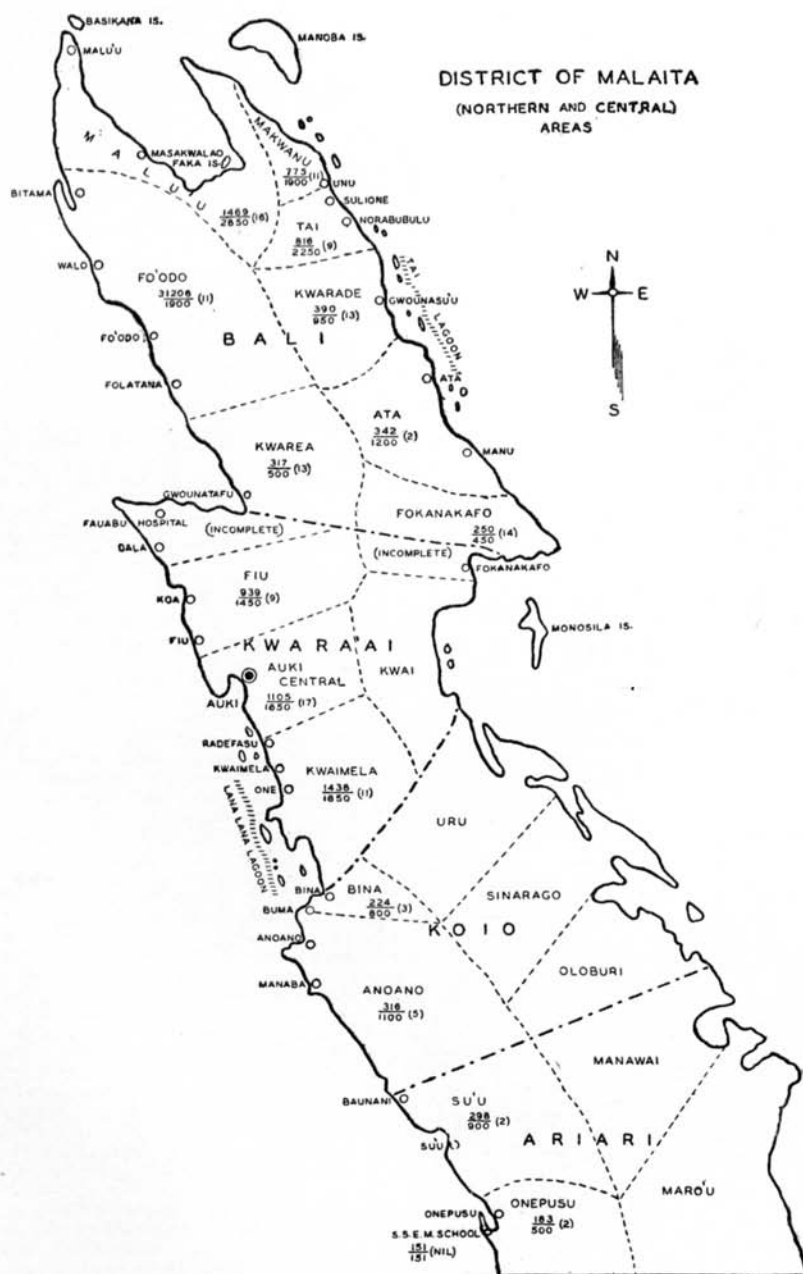
RESULTS OF THE LEPROSY SURVEY

The results of the survey are given in the tables to follow. In Table 2 are summarized the figures for the numbers of people examined and of lepers found in the various subdistricts and administrative zones. For better appreciation of these figures a map is given (Text-fig. 2) bearing the main figures, and also most of the places visited as centers for work or as starting points for bush expeditions.

TABLE 2.—*The districts examined, population, persons examined and lepers found.*

Zone	Sub-district	Estimated population	Number examined	Number of lepers
Bali.....	Malu'u.....	2,850	1,469	16
	Fo'odo.....	1,900	1,206	11
	Makwanu.....	1,900	775	11
	Tai.....	2,250	816	9
	Kwarade.....	950	390	13
	Ata.....	1,200	342	2
	TOTALS.....	11,050	4,998	62
Kwara'ai.....	Kwarea.....	1,250	317	13
	Fokanakafu.....	1,000	250	14
	Fiu and Koa.....	1,450	939	9
	Auki Central.....	1,850	1,105	17
	Kwaimela.....	1,850	1,438	11
	TOTALS.....	7,400	4,049	64
Koio.....	Anoano.....	1,100	316	5
	Bina.....	800	224	3
	TOTALS.....	1,900	540	8
Ariari.....	Onepusu.....	500	183	2
	S.S.E.M. School....	151	151	—
	Su'u.....	900	298	2
	Sundry.....	26	26	—
	TOTALS.....	1,577	658	4
GRAND TOTALS....		21,927	10,245	138

Computation of the number of lepers on Malaita.—Among the 10,245 people examined, 138 lepers were found, 13.4 per thousand.



TEXT-FIG. 2. Map of the northern and central areas of Malaita Island, showing the numbers of persons examined (figures above lines), estimated population (figures below lines) and the numbers of lepers found (figures in parenthesis).

On this basis one can compute that the approximate number of existing lepers on Malaita is 600.

Reputed lepers, diagnosis not confirmed.—During the examination 41 persons were seen who were reputed to be lepers but in whom we could not confirm the presence of the disease. This confusion in the minds of the people was evidently due to the great prevalence of yaws and ringworm, which often simulate leprosy.

Domicile of the lepers.—Of the 138 lepers found, 117 (85 per cent) live inland, in the "bush," and only 21 are domiciled on the coast—17 of them on the littoral and 4 on the artificial islands. The bush, then, is the domicile and reservoir of leprosy on Malaita. Also, our findings show, the bush has the more infectious cases. Here is a danger. If ever the bush folk come in great numbers to reside on the coast, and come to mix freely with each other and with salt-water folk, then there may be a great increase of leprosy. It is desirable that the bushmen stay where they are, at least until they can be reached and permeated by education and constructive civilizing influences.

Age and sex.—The age and sex grouping of the people examined and of the lepers found are shown in Table 3. Among the people examined there were fair samples of each age group, and the sexes were not disproportionately represented. The preponderance of male lepers over females is in line with experience in other parts of the world. The author does not consider that the proportion of young lepers hints at any immoderate increase, or any explosive spread of the disease.

TABLE 3. *Age and sex groups of the people examined and of the lepers found.*

Group	Nonlepers (10,245)	Lepers (138)
1—5 years.....	1,569	—
6—15 years.....	2,379	13
16—29 years.....	1,697	27
30—45 years.....		94
	4,600	
Older.....		4
Males.....	5,305	89
Females.....	4,940	49

Infectivity of the cases.—Some idea of the degree of infectivity of the lepers found may be obtained from the results of nasal

smear examination, and from the number of cutaneous cases. (a) Nasal smears were made of 118 cases, and 71 of them (66 percent) were found positive. (b) The 138 cases were classified as follows:

Predominantly or primarily cutaneous.....	19 (14 percent)
Secondarily cutaneous.....	25 (18 percent)
Mainly neural, or mixed.....	94 (68 percent)

From these figures it seems safe to assess well over one-half of the cases as infectious. It was noted that the great majority of cases of cutaneous leprosy are bushmen. This is probably to be correlated with the colder climate of the hills.

Duration of the disease.—The data obtained on duration of the disease are shown in Table 4. It will be realized that in dealing with an illiterate people absolute accuracy in such matters cannot be expected. In the finding that only 36 cases, or 26 percent of the whole, gave histories of duration under 5 years, and that 62 cases, or 45 percent, had had the disease 10 years or more, we have a hint as to whether the disease is increasing abnormally or not. In the opinion of the author these figures do not hint at any immoderate increase. That there were 16 cases of long duration, 20 to 30 years, serves to remind us that leprosy can be a long drawn out disease.

TABLE 4.—Duration of the disease

1 year.....	5 cases	10 years.....	28 cases
2 years.....	10 cases	12 years.....	4 cases
3 years.....	9 cases	15 years.....	12 cases
4 years.....	12 cases	16 years.....	1 case
(0—4 years, 36 cases, 26%)		18 years.....	2 cases
5 years.....	13 cases	20 years.....	11 cases
6 years.....	11 cases	25 years.....	1 case
7 years.....	6 cases	30 years.....	3 cases
8 years.....	8 cases	(10 or more years, 62 cases, 45%)	
9 years.....	2 cases		
(5—9 years, 40 cases, 29%)			

Age at onset.—The ages of onset of the disease are given in Table 5. With regard to the accuracy of the patients' statements, the earlier ages are likely to be near the truth, but one suspects that old people, in giving the age of onset in retrospect, tended to put the age later than it was. The general trends shown in the table are clear enough: (a) 109 cases, or 79 percent, began to notice the onset of leprosy under the age of 30 years, and only a small proportion, 21 percent, noticed the onset after that time. (b) On the other hand, nearly two-thirds of them (88, or 64

percent) had reached the age of 20 before the disease appeared. (c) There is a definite incidence of onset at puberty. (d) Leprosy can begin in the very young child.

TABLE 5.—*Age at onset of the disease.*

0—4 years.....	1 case	20—24 years.....	29 cases
5—9 years.....	7 cases	25—29 years.....	30 cases
10—14 years.....	21 cases	30—34 years.....	16 cases
15—19 years.....	21 cases	Older.....	13 cases
(Under 20 years, 50 cases, 36%)		(Over 20 years, 88 cases, 64%)	

Sites of first lesions.—The sites of the earliest lesions as reported by the patients were as follows:

Lower limbs: ...	Foot.....	43 cases
	Lower leg.....	39 cases
	Thigh.....	1 case
Body:.....	Back.....	23 cases
	Shoulder.....	5 cases
	Trunk.....	7 cases
Upper limbs: ...	Arm.....	7 cases
	Hand.....	2 cases
Head:.....	Face.....	8 cases
	Brow.....	1 case
	Ears.....	1 case
Buttock.....		1 case

It is striking that in 83 cases, or about 60 percent of the whole, the first signs of the disease appeared on the lower limbs. It may be that this indicates a possible mode of entry of the germ of leprosy into the body. After injury due to the rough roads and travel on foot, or with tropical and other ulcers of the legs and feet, the bacillus, carried by contact or flies or other insects, may secure a portal of entry and a hold.

Civil state of the lepers.—The civil state of the lepers is as follows: single, 51; married, 54; widowed, 33. There is a certain amount of social differentiation against lepers in Malaita, so that if a person is known to be leprosy before the age of marriage he or she is unlikely to attain marriage. There is no fixed social rule, only the tendency.

Associations of the lepers.—A study of the way in which these lepers live as regards association with other people revealed the data given in Table 6.

That so many live alone in separate houses shows the value and effectiveness of the government propaganda and persuasion introduced some years back. It seems an excellent first-line

measure, but it has applied only in the case of those people most directly under the government influence.

TABLE 6.—*Associations of the lepers.*

A. Living alone in separate house.....	52 cases
B. Living alone, house close to others.....	2 cases
C. Living with family:	
(a) With parents (13 parents).....	11 cases
(b) With wife or husband.....	33 cases
(c) With brothers and sisters (13).....	4 cases
(d) With children (108 children).....	44 cases
D. Living with nonfamily contacts (50).....	21 cases
E. Living with other lepers (19 lepers).....	14 cases

That there are so many family contacts indicates the lack of widespread understanding of the contagious nature of leprosy. It is to be noted that 44 cases have close family contact with a total of 108 children. Because childhood is the great danger period for the acquisition of leprosy, it is obvious that any control scheme should include some means of separating children from their leprous parents and relatives, and separating them right early, as soon after birth as possible.

Leprosy is a small group or family disease on Malaita, for the people have been found to live in small groups, and there are many indications of numbers of small foci of the disease, often in family groups. There is urgent need for the spread of knowledge of the truth that so long as the people continue to allow children to live in close company with lepers, there will continue to be the danger of an uninterrupted succession of lepers on Malaita.

Family relationships among the lepers.—Among the 138 lepers found there are five instances of family group leprosy.

(a) Filikabu is the sister of Irofitoa, and their father died a leper. Their nasal smears were both positive for acid-fast bacilli. (b) Waki is the father of Demaril, and their nasal smears were both positive. (c) Kili, son of Tambula, nasal smear positive; Tambula, mother of Kili, nasal smear negative; Ramatalau, nephew of Kili, nasal smear positive; Eviti, brother of Ramatalau, nasal smear positive. (d) Bomamema, mother of Tage and Grenaoa; Tage and Grenaoa, daughters of Bomamema. (e) Taude'e, brother of Fafale, nasal smear positive; Fafale, brother of Taude'e, nasal smear positive.

The results of the examination of the nasal smears have been included where possible, as it gives a picture of the nest of leprosy infection that is possible in a Malaita family group. Note that in (c) the mother was probably no longer infectious, but her son and his two nephews keep the infection going. It is significant that

all of the above-named lepers are of bush domicile; in the bush the small group of people is the unvarying unit.

Examination of close contacts of lepers.—Among the 139 close contacts, family and nonfamily, whom it was possible actually to examine no leper was detected. One individual was found to have a positive nasal smear, but no other sign of leprosy. He was a boy of 8, the second son of a leper, and the author considered it advisable that he should not be counted as a leper, but kept under extended observation.

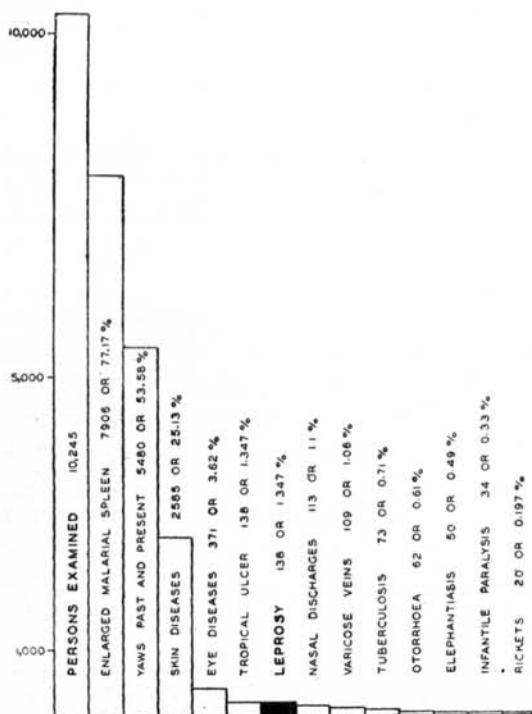
Prevalent diseases on Malaita.—It is useful to know the disease background of leprosy in a people, since diseases with a local or general devitalizing action may predispose to leprosy. The following list shows the prevalence of some of the common diseases which were noted and recorded numerically during the survey; a diagram is also given (Text-fig. 3). The list is not pretended to be inclusive, but it will serve to give the main picture.

Enlarged malarial spleen.....	7,906 cases
Yaws, past and present.....	5,480 cases
Skin diseases.....	2,585 cases
Eye diseases.....	371 cases
Tropical ulcer.....	138 cases
Nasal discharges.....	113 cases
Varicose veins.....	109 cases
Tuberculosis.....	73 cases
Otorrhoea.....	62 cases
Elephantiasis.....	50 cases
Infantile paralysis (late results).....	34 cases
Rickets.....	20 cases

From other sources it is reported that influenza, beri-beri and acute anterior poliomyelitis are common at times. Ancylostomiasis and ascariasis are said to be always present and fairly heavy.

The great trio of malaria, yaws, and skin diseases is the main object for future public health work, based on leprosy as the key disease. A moderate amount of quinine is distributed, and there is a travelling yaws-hookworm campaign, but the skin diseases can only be attacked by education in bodily hygiene. The author was astonished by the great number of cases of tinea imbricata, tinea corporis, tinea cruris, and tinea capitis.

Existing medical aids.—There is a small government hospital in Auki, under the charge of a native medical practitioner, and a good mission hospital under Dr. Clifford James at Fauabu. Beyond these there is nothing much. There is no functioning leper colony.



TEXT-FIG. 3. Graph showing the more important diseases observed during the survey.

Source of leprosy on Malaita.—It has been impossible to obtain with any clarity facts about whence the disease came to Malaita. Most of the opinions point to its being “always with us.” Some think it came from Fiji or another island, or from Queensland. In the case of Queensland, it is much more likely that leprosy was taken there from Malaita in the days of “Kanaka labor.” In any case, there is a distinct history obtainable from the people long steeped in racial tradition that leprosy existed on Malaita a long time before the Queensland episode. It is possible that Malaita laborers going to Queensland were brought into contact with lepers whom they would not normally have met, and hence the idea arose that leprosy came from there.

Intercommunication of the people.—Compared with the peoples of India, who have roads, railways, motor buses and an ingrained habit of pilgrimage, there is ridiculously little coming and going by the inhabitants of Malaita. Bush folk meet salt-water folk at markets for barter of fish and taro, and people move about

to feasts, but the rough hilly nature of this jungle-clad island, the absence of roads and vehicles, the presence of five language groups in 40,000 people, all at present act as a barrier to really intense intercommunication.

The comparative absence of leprosy from coastal people.—Whatever may have been the history of these people, the author has formed the opinion that the coastal people are now more resistant to leprosy, probably by reason of better diet and greater cleanliness, in spite of their more crowded dwellings. There is still, moreover, a certain ever-present animosity between bush and coastal people, which serves as a check to any great intermixture and contact. The author was present at an incident at one place where the bushmen came down armed, ready to begin onslaught on the salt-water men if their grievance was not settled to their satisfaction. The forces of civilization are slowly advancing, but it seems desirable not to follow the policy of bringing the bush folk down to the salt-water, but to try to reach them where they are.

ACKNOWLEDGMENTS

The author wishes to record his gratitude to Dr. Ernest Muir for suggesting that he should undertake this survey, and for advice freely and generously given. To His Honor the Resident Commissioner, and to Dr. H. B. Hetherington, the Senior Medical Officer, warm thanks are due for advice in the field and arrangement of itinerary. To the vision and understanding of Dr. Hetherington is due the fact that the need for such a survey has not been lost sight of. To Mr. Guso Piko, native medical practitioner, and Ariel, medical orderly; to Major G. E. Sandars, District Officer of Malaita, and Mr. A. N. A. Waddell, Cadet; and to Sergeant-major Vutha and others, the author is indebted for help and cooperation.