



LEPROSY IN FIJI AND THE SOUTH SEAS¹

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The origin and duration of leprosy in the South Seas have long been a matter of debate. Blame has frequently been attached to the Chinese for its introduction into several of the island groups, although this idea has been disputed. For example, Hillibrand is said (Rogers and Muir) to have reported its rapid spread in Hawaii subsequent to its introduction there by Chinese about 1848. It is also said that Grall concluded that the disease was brought to New Caledonia by a Chinese who died about 1865, after a sojourn of two years. Because of its reputed introduction by Chinese into Samoa it has, I am told, been suggested as an act of poetic justice, and a fitting use for the £6,000 balance in the Welfare Fund built up by Chinese contributions, that it should be applied to a much needed leprosy survey in Samoa, now that there are no more Chinese in the territory to call on the fund.

My inquiries when preparing a genealogical tree to indicate the spread of leprosy in a number of family groups connected by marriage in the Cook Islands, have failed to trace any occurrence of the disease further back than six generations, but whether this is due to actual absence of cases or to failure of record cannot be said. Owing to the prevalence of early marriages, these generations should probably not be regarded as the 30-year periods to which we are accustomed; but even with due allowance for this fact, six generations must certainly take us back beyond the forties of the last century.

So far as Fiji is concerned, evidence regarding the time that leprosy has been in the group is also scanty. Lyth, of the Methodist Mission, the first doctor to settle in Fiji, recorded in 1837 that cases of it were being treated by him and his ministerial colleagues. There are, moreover, distinctively Fijian names for the disease and even for its various forms. One of the Fijian gods was a reputed sufferer from leprosy; and, as recorded by Corney, there were scattered throughout Vitilevu a number of so-called "leprosy-stones," the property of certain infected fami-

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lies, by the aid of which the heads of those families were supposedly able to infect others. The probability is that they were gravestones of members of the family who had died of leprosy, and the horror associated with their disease attached itself to their burial places until the fear of infection associated with them became clothed in legend.

A tale is also told of the small island of Kia, lying just off the north coast of Vanualevu, and its still smaller neighbor—now almost worn away—known as *De ni Kia* to indicate its function as a dumping ground for the refuse from Kia. A local chief is said to have isolated all leprosy persons of his district on this unhealthy spot so as to ensure a readily accessible and plentiful supply of “*bokola*” (bodies prepared for the oven) with which to entertain unexpected—and probably unsuspecting—guests. A disease must surely be of very long standing before it can become so thoroughly embedded in native language and legend, and the advent of leprosy in Fiji must therefore have been much earlier than has generally been accepted.

From the Middle Ages up to quite recent times, interest in the subject of leprosy and the care of its victims has been mainly confined to the Christian Church and its foreign missions. The Government of Fiji is to be congratulated on having realized its duty in this matter at least fifty years ago, when it established a leprosy settlement on the island of Beqa, about twenty miles to the southwest of Suva, capital of the Colony. Associated in this tribute should be mentioned the name of Dr. B. G. Corney, who as chief medical officer was influential in reaching that decision and was also largely responsible for the inauguration of the Assistant Medical Practitioner Service, which has proved so valuable an auxiliary to our medical service in Fiji. He pointed out, among other things, that the chiefs were complaining that the incidence of leprosy was increasing owing to the government's prohibition of the killing of the sufferers. On this point, however, it would seem that only the extreme cases and those so crippled as to be helpless had formerly been killed, and that that measure was carried out more as a form of “mercy killing,” to put them out of their misery, than with the idea of preventing the spread of infection. It apparently was customary to deal similarly with extreme cases of any disease.

After ten years' experience at Beqa it was felt that, because the whole island could not be acquired, the settlement suffered from many of the disadvantages and few of the advantages of its island situation. The government therefore acquired the reef-

encircled island of Makogai, one of the most typically beautiful in the South Seas, and the forty patients at Beqa were transferred there at the end of 1911. Situated in the middle of the Fiji group, within 15 miles of Levuka, the former capital of the Colony, Makogai was ideally situated for the purpose, and the passage of time has only served to emphasize the wisdom of its choice.

The gradual increase in the number of patients from 40 to our present average of just under 700 is shown in Table 1, but it must be noted that many of these patients have come from beyond Fiji. Incidentally, in a well known textbook on leprosy

TABLE 1.—*Numbers of inmates at the Makogai settlement, from Fiji and beyond, 1911 to 1948, by years.*

Year	Source		Total	Year	Source		Total
	Fiji	Beyond			Fiji	Beyond	
1911	40	----	40	1930	355	78	433
1912	154	----	154	1931	415	79	494
1913	212	----	212	1932	401	75	476
1914	284	----	284	1933	361	66	427
1915	249	----	249	1934	393	73	466
1916	287	----	287	1935	417	158	575
1917	314	----	314	1936	409	146	555
1918	327	----	327	1937	440	137	577
1919	352	----	352	1938	417	202	619
1920	243	----	243	1939	419	188	607
1921	216	----	216	1940	443	232	675
1922	253	13	266	1941	460	191	651
1923	277	12	289	1942	472	173	645
1924	256	16	272	1943	441	190	631
1925	264	33	297	1944	427	198	625
1926	237	65	302	1945	413	196	609
1927	332	106	438	1946	409	202	611
1928	301	108	409	1947	429	274	703
1929	345	97	442	1948 ¹	429	240	669

¹ To the end of October.

I am quoted as having estimated in 1936 the total number of sufferers in Fiji at 2,775, which would give the absurd rate of 13.9 per mille. Evidently the number of cases then (1936) in isolation, 555, was multiplied by five to allow for supposed infected but undiscovered cases. That assumption may be justifiable in some neglected areas of the globe, but it is certainly not so in the Fiji of today. Thanks to the Assistant Medical Practitioner Service, Fiji is so well served that we feel certain that the number of known cases is very little short of the true number.

This statement may be supported by bringing up-to-date a comparison I have previously used, namely, of the type distribution of cases admitted in 1919 and now. In 1919, no cases were admitted in the early and relatively noninfective N1 stage; in 1947, 20.6 per cent of the Fiji admissions were N1. In 1919, 24 per cent of the admissions were hopelessly crippled or deformed N3 cases, and 32 per cent were in the far advanced and highly infective L3 stage; in 1947, there were none of these very advanced cases among the new admissions. Such figures lend no support to the suggestion that many cases are being missed in Fiji itself.

Regarding the admissions from beyond Fiji, these began in 1922 with 13 patients from Samoa; and in subsequent years New Zealand, the Cook and Niue Islands, Tonga and, more recently, the Gilbert Islands, commenced to send their patients to Makogai. The marked fluctuations in the numbers of admissions from these regions, shown in Table 1, have been due largely to shipping difficulties. The number of patients in Makogai from them in the past decade has ranged from 173 in 1942 to 274 in 1947; that group constituted, on the average, 32.4 per cent of the population during that period.

Of interest to a New Zealand audience is the fact that a total of 403 patients has been admitted to Makogai from New Zealand territories. Of them, 162 (40.2%) have been discharged as disease-arrested, 122 (30.3%) have died during the 26 years, and 119 (29.5%) are still at Makogai. The Dominion itself has had no further cases of its own for the past 20 years. In total it has supplied only 10 cases (3 European, 1 part European, 4 Maori, 1 Niue, and 1 Chinese); 134 came from Samoa, 245 from the Cook group and 14 from Niue.

The figures for Fiji itself are particularly interesting as at least suggesting that leprosy is now coming under control in the Colony. During the first 20 years of Makogai's existence as a leprosy hospital, the number of patients from Fiji increased

fairly steadily (allowance being made for the occasional repatriation, at their own request, of Indians who had improved under treatment to the point where they could qualify for such repatriation), from the initial 40 to 415 in 1931. From that level it rose to a maximum of 472 in 1942, and it has now—without further loss by repatriation—fallen to 429 at the end of October 1948.

Unless it be accepted that these figures represent all the known cases in Fiji—apart from those discharged on parole and subject to periodical reexamination—they lose much of their value. The increasing interest shown in the leprosy problem by the assistant medical practitioners, and the more enlightened attitude of the general public, together ensure that the number of missed cases is minimal. As I have said elsewhere:

Only a very small proportion of the population of Fiji fails to seek medical aid or advice from time to time, and it is found that comparatively few cases [of leprosy] are allowed to reach an advanced stage of the disease before admission, so that there is much less chance of their having already infected other people. Prejudice, compounded mainly of ignorance and fear, natural in the early stages of a policy of segregation, has largely broken down. Discharged cases, averaging about forty a year over the past ten years, provide the best form of propaganda, both as to the good living conditions at Makogai, and as proof that segregation is not necessarily lifelong. Patients realize that they benefit themselves at least as much as the community, by coming to Makogai and perhaps still more important, understand and inform their relatives of the vital importance of early treatment. Requests are frequently received from patients that their relatives may be examined in case of possible infection.

In a study of leprosy in Fiji to the end of 1933, I tabulated a total of 1,365 patients of all races admitted to Makogai as regards type of disease. A further 1,357 patients have been admitted since that time, giving a group which is usefully comparable with the one previously considered. Deducting 25 who were quickly discharged unconditionally as nonleprosy, there remains a total of 1,332 new cases to be classified.

Unfortunately the nomenclature and classification of leprosy change from time to time, and they have still probably not reached finality. The Cairo Congress, in 1938, recommended the use of the terms "neural" and "lepromatous" for the two types. The Havana Congress, in 1948, substituted "tuberculoid" for "neural" and added a minor "indeterminate" group. However, the existence of the two main types was not challenged, and neither of these changes in terminology is vital, and so in discussing the Makogai admissions from 1911 to 1933 and 1934 to 1948 I shall merely substitute "lepromatous" for the "cutaneous" of the earlier published table.

TABLE 2.—*Type distribution of cases admitted to Makogai, comparing (a) 1365 cases admitted in 1911-1933, and (b) 1332 cases admitted in 1934-1948.*

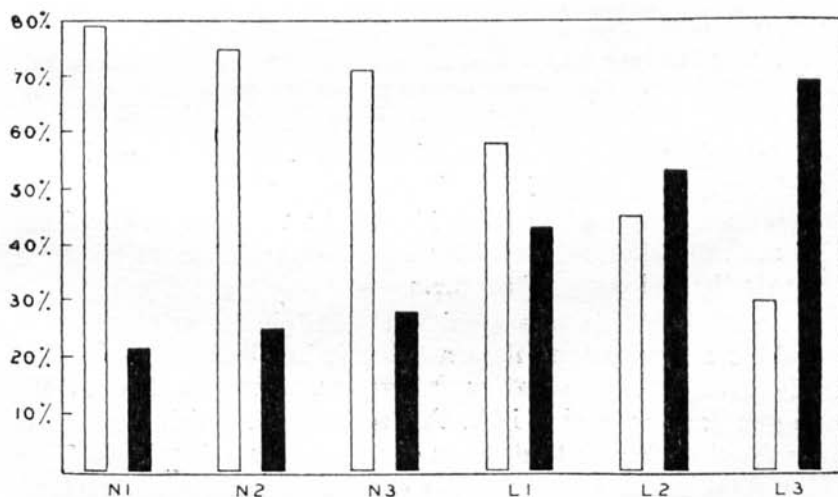
Race	Number of cases	Neural					Lepromatous				
		N1	N2	N3	Total	Per cent	L1	L2	L3	Total	Per cent
Cases admitted 1911-1933 (1,365)											
Fijian	444	44	163	81	288	65.0	11	83	62	156	35.0
Solomon	130	15	39	16	70	53.8	4	31	25	60	46.2
Rotuman	26	.....	7	4	11	(42.3)	.....	6	9	15	(57.7)
Samoa	34	5	5	2	12	(35.3)	4	11	7	22	(64.7)
Tongan	13	1	3	3	7	(53.8)	2	2	2	6	(46.2)
Cook	80	15	28	9	52	65.0	8	14	6	28	35.0
Maori	4	1	.....	1	2	(50.0)	.....	1	1	2	(50.0)
Niue	3	.....	.....	.....	.....	.....	.....	3	.....	3	(100.0)
Indian	595	74	164	53	291	48.9	34	180	90	304	51.1
Chinese	18	.....	3	2	5	(27.8)	1	6	6	13	(72.2)
European	18	3	3	2	8	(44.4)	.....	6	4	10	(55.6)
Total	1,365	158	415	173	746	54.7	64	343	212	619	45.3
Cases admitted 1934-1948 (1,332)											
Fijian	285	55	128	8	191	67.0	16	76	2	94	33.0
Solomon	51	9	19	.....	28	54.9	5	17	1	23	45.1
Rotuman	58	20	18	.....	38	65.5	.....	20	.....	20	34.5
Samoa	70	6	18	.....	24	34.3	11	32	3	46	65.7
Tongan	42	2	20	2	24	57.1	2	14	2	18	42.9
Cook	152	97	24	1	122	80.2	7	16	7	30	19.8
Gilbert	158	25	24	2	51	32.2	10	64	33	107	67.8
Niue	11	3	.....	.....	3	(27.2)	.....	8	.....	8	(72.8)
Indian	472	57	176	1	234	49.6	34	204	.....	238	50.4
Chinese	5	.....	2	.....	2	(40.0)	1	2	.....	3	(60.0)
European	28	4	4	.....	8	(28.6)	4	16	.....	20	(71.4)
Total	1,332	278	433	14	725	54.4	90	469	48	607	45.6

Of the total of 1,332 patients admitted since 1933, 725 (54.4%) were neural in type, as compared with 746 (54.7%) of the original 1,365. These percentages are virtually identical, but it will be noted that with respect to both types there was a material lessening of the degree of advancement.

With regard to the data of the different racial groups, the only noteworthy change is a marked improvement in the patients from the Cook Islands. Of the 80 Cook Islanders admitted up to 1933, 52 (65%) were neural; of the 152 Cook Island admissions in the second period, 122 (80.2%) were neural. In con-

trast are the 158 Gilbert Island patients, all admitted since 1934, of whom only 51 (32.2%) were neural. A similarly small proportion of neural cases is seen in both groups of Samoan patients; in the first group there were 34 admissions with only 12 (35.3%) neurals, and in the second group 70 admissions with only 24 (34.3%) neurals.

The importance of these facts from the point of view of prognosis is indicated by the bar diagram (Text-fig. 1), based on a survey of 669 patients, reproduced from my annual report for 1947. This diagram shows a very regular downward gradation of improvement from 79.2 per cent for the N1 cases (and 75.4% and 71.4% for N2 and N3) to 30.4 per cent for L3 cases (with 58.0% and 45.4% for L1 and L2, respectively). The cases classified as stationary or worse necessarily show the reverse of that trend. As pointed out at the time, nothing could better indicate the extreme importance of early diagnosis; and so emphasis must be laid on the further training of assistant medical practitioners, the follow-up of contacts, and the regular examination of school children.



TEXT-FIG. 1. Progressive decrease in percentages of "improved" cases with advancement and type (open column), and increase in percentages of "stationary" and "worse" cases (black column), in 669 patients surveyed.

The ultimate test of the matter is, of course, fitness for discharge and this is only determined after the fairly rigorous checking of a patient over a period of two years has failed to reveal any clinical or bacteriological sign of activity of the disease. Of a total of 158 Gilbert Islanders, with 32.2 per cent neurals, there have been 25 discharges (15.8%); of 104 Samoans,

with 34.6 per cent neurals, 23 (22.1%) were discharged; whereas of 232 Cook Islanders, with 75 per cent neurals, 124 (53.4%) have been discharged.

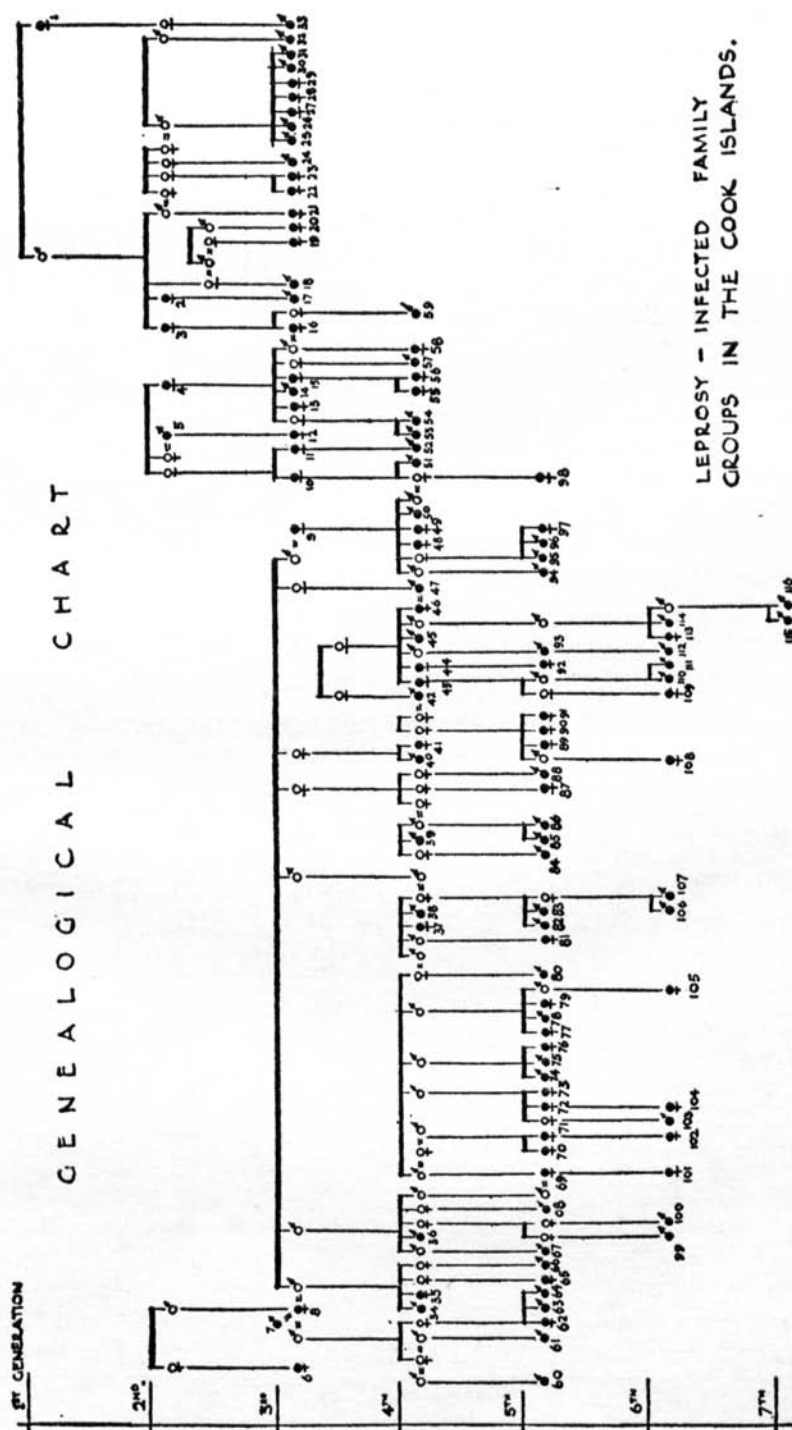
Commenting on admissions during 1947 I remarked in my report for that year:

The fifty-two Gilbert Islanders admissions include the "more than forty" cases referred to in my last Annual Report as still awaiting transport, so that their poor condition on admission is not surprising. Twenty-three were in the fairly advanced and sixteen in the very advanced stages of lepromatous leprosy, and over 80 per cent were infective cases. It is, of course, obvious that the neglect due to the war years has caused further deterioration in what was already, if reliance can be placed on the type of case admitted in the pre-war years, an unsatisfactory leprosy position. It would certainly be over-optimistic to assume, particularly with regard to the advanced cases, and in view of the general lowering of resistance due to war conditions in the Gilberts, that each case represents no more than five other as yet undiagnosed cases.

The finding that seven of the nine Samoan admissions are also moderately advanced lepromatous cases is not so easily explained. Transport is, of course, a problem, but hardly covers the situation. There would appear to be urgent need for further training of one or more Samoan A. M. P.s in the diagnosis of leprosy in its earliest stages, and his (or their) allocation to a travelling diagnostic survey rather than to a localised district. This has been done in the case of the Cook Islands, with the result that most of their admissions are among our earliest cases.

A partial explanation of the more favorable situation in the Cook Islands regarding stage of disease may be found in the genealogical tree to which reference has already been made. This reveals that no less than 116 of the 244 admissions from there are related or connected by marriage, which must certainly facilitate the follow-up of contacts.

In compiling this tree (which, at least in its original form, resembled a vine rather than a tree) it has been assumed that family groups, in case of marriage, have been united at the same generation; and it is in this sense only, which appears to cover the time factor, that seven generations are involved. Thus in the first generation only one case, a woman, was involved, but she serves as a standard for judging the generations involved in the other family groups. In the direct line she had an infected grandson by a healthy daughter. Her healthy brother's line, however, showed cases of leprosy to the fourth generation; and in the third generation his line became linked with another infected family group, which showed fifteen cases in all, including one in the second generation. In the fourth generation this latter family is joined by marriage with the main group, descended from six healthy brothers and sisters who, on the above assump-



TEXT-FIG. 2. Genealogical chart of leprosy-infected family groups in the Cook Islands.

tion, are regarded as belonging to the third generation. Healthy members of these groups have only been included in so far as they serve as links for the infected members.

This tree in no sense lends support to the idea of a hereditary influence in leprosy transmission. The numerous instances of the infection occurring in the children of healthy parents, and the marked tendency to collateral rather than lineal spread, are all opposed to such a theory, and can only be explained by contact infection. Children appear to be much more liable to infection than adults, so that the infection spreads among siblings rather than back to parents, who might otherwise be regarded as at least equally liable to infection. The same factor explains why only two cases occurred in which both husband and wife were infected—the period of maximum susceptibility having already passed before marriage.

To return to the statistics of Makogai, a summary is given in Table 3. In total, 3,032 patients have been admitted since 1911, including 2,417 from Fiji itself and 615 from beyond the Colony. The Indian repatriations (436) reduce the Fiji total from which conclusions can be drawn to 1,981. During the 37 years, 1,717 patients have died; and since 1918, when a Conditional Discharge

TABLE 3.—*Summary statistics for Makogai, 1911-1948.*

Race	Admissions	Repatriations	Discharges	Deaths	Remaining
European	20	1	5	12	2
Part-European	46	--	13	15	18
Solomon Island	207	--	64	122	21
Fijian	816	--	322	364	130
Indian	1243	435	262	284	262
Rotuman	98	--	56	35	7
Chinese	25	--	4	15	6
Samoaan	102	--	23	29	50
Niuean	15	--	2	5	8
Cook Island	244	--	125	68	51
Tongan	55	--	8	15	32
Gilbert Island	157	--	25	50	82
Maori	4	--	1	3	0
Totals	3032	436	910	1017	669

Ordinance was passed, 910 patients have been discharged. There are at present 669 inmates at Makogai, including 429 from Fiji and 240 from other regions. Adding the 429 Fiji patients still at Makogai to the 388 discharged patients still alive and being reported on, the total of 817 cases of leprosy—active and inactive—gives an incidence for Fiji of about 3 per thousand.

In conclusion, it should be pointed out that as the parent of this leprosy work, the Fiji government is initially responsible for all expenditures at Makogai, but the other Administrations concerned contribute according to the proportion of their patients to the total. At present Fiji is spending £45,000 per annum on the leprosy work, and is recovering approximately £18,000 from the other administrations.

The pioneer of Makogai, Dr. F. Hall, is living in retirement in New Zealand. Makogai is built on the foundations he so well and truly laid during his services from 1911 to 1919. His name is still held in honor and affection there. It would be most ungracious to leave the subject of Makogai without paying homage to the Rev. Mother Agnes, M. B. E., and her devoted Sisters. Their untiring ministrations to patients of every race and creed, their infectious optimism, and their marvelous example bring physical and spiritual relief to the sufferers and are a source of inspiration to all.