*THE RECORD OF A LEPROUS VILLAGE

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Before conducting a carefully planned and controlled statistical survey of the endemiology of a disease, it is necessary to make a preliminary enquiry in a carefully chosen and limited area, so as to arrive at a rough idea of the factors influencing the spread of the disease. This preliminary enquiry should furnish the data upon which the larger statistical survey may be based.

The village of Debipur Hir in the Bankura District of Bengal was founded about 74 years ago. It consists entirely of Mussalman families, most of which are inter-related. The records cover five generations. The first two generations were free from leprosy. The disease was apparently introduced by cases 26, 34 and 120 (see tables I and II), the first two of whom were infected by their maternal uncle in a neighbouring village, and the latter by the same individual, her husband's maternal uncle. Her husband (no. 21) probably escaped infection by being past the very susceptible age; he was 6 years older than his brother (no. 26). Case no. 120 was separated from her husband after leprosy developed, but she infected her daughter (no. 22). The latter (no. 22) however did not become infectious till her daughter (no. 15) had been married and left the village, thus escaping infection.

During the last 40 years the number of infectious cases present in the village varied as shown in the following list :—

No. of infectious cases.				No. of infectious cases.			
1894-1898	...	...	1	1912-1919	...	...	1
1898-1899	...	...	0	1919-1922	...	...	3
1899-1905	...	...	1	1922-1926	...	...	7
1905-1909	...	...	3	1926-1932	...	...	9
1909-1912	...	...	2	1932-1934	...	...	10

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MAP OF DEBIPUR HIR

The disease began in the third generation, and within the last 46 years 23 cases have developed in the village. Of these, 4 are dead. The remaining 19 cases may be classified as follows :—

N-1	...	3	9—Non-infectious.
N-2	...	6	
C-1, N-2	...	1	3—Slightly infectious
C-1, N-3	...	2	
C-2	...	4	7—Highly infectious
C-2, N-2	...	2	
C-3	...	1	10—all isolated now.

At the present time there are 77 people in the village divided into 15 Mussalman families (see map), so that the present incidence of the disease is 24.6 per cent.

The village is a compact one and the houses are closely set together. The people are mostly day labourers, but a few cultivate their own land. The economic condition of the village is poor. There is a scarcity of drinking water and malaria is rife.

Two of the important factors in the spread of the disease are apparently family relationship and closeness of residence, both of these determining to a certain extent the degree of contact. To show the former a family tree of the two principal families has been prepared, while the latter is shown in the map of the village. The numbers in the tree and map correspond to the serial number in the general list of inhabitants (table I). This general list also gives various particulars regarding the villagers.

A second list (table II) deals with the leprosy cases, and gives further details as to how and when the disease was acquired and the type of the disease at the time of examination.

Much of the historical information recorded is only approximate, as it was ascertained by cross examination of the villagers. This is particularly so with regard to the dates when cases of leprosy reached the infectious stage of the disease.

DISCUSSION.

In looking down the *source-of-infection* column in table II, one is struck by the number of cases infected by case no. 67, no less than 15 in all, though in two of these (nos. 53 and 71) case 34 was possibly a previous source of infection.

Of the 13 cases who were in continuous infectious contact from birth onwards, 6 have already become infectious cases, the estimated average age of their becoming infectious being $17\frac{1}{2}$ years. The remaining 7 cases are still non-infectious, but their average age at present is only $12\frac{1}{2}$; so that, giving them the same period of time

to become infectious, they have still 5 years. For the 6 infectious cases there was on an average a 6-year period between the first noticed lesions and their becoming infectious; but the 7 non-infectious cases only showed their lesions less than 5 years ago on an average; or leaving out case 93, $3\frac{1}{2}$ years ago. There is thus a distinct tendency for those having infectious contact from birth to become infectious cases.

Cases 40, 53 and 71 apparently had their first infectious contacts after the age of 10, and yet they developed into infectious cases; but these 3 senior cases may quite possibly have come in contact with other sources of infection at earlier ages.

Of the non-infectious cases, no. 93 is exceptional in that he was in infectious contact from birth, but is still only an N-2 case at the age of 20.

There are, of course, other factors which determine the degree of infection which takes place, viz. the length, frequency and closeness of contact, and the degree of infectiousness of the source at the time of contact.

In studying the family tree one is at once struck with the frequency of infectious leprosy in the fourth generation in the families in which the infectious form of the disease was common in the third generation. In the fifth generation the children were still too young at the time of examination to show signs of the disease to any great extent.

Not only are the children of direct descent affected but also nephews and nieces who have come in contact.

The importance of early marriage both in spreading the disease and in preventing the spread is brought out by this survey. The former is shown in the case of no. 120 already remarked on. The latter is shown in nos. 63 and 92 who probably escaped infection by leaving the village at an early age to go to their husbands' homes.

In studying the map, the effect of close contact within the confined space of a small house is well shown.

There is reason to believe that the absence of sanitation, poor economic conditions, the frequency of such weakening diseases as malaria, dysentery and syphilis, and the general ignorance of the villagers have much to do with high incidence of leprosy in this village.

It should be added that a few weeks of intensive propaganda have been sufficient to secure voluntary effective isolation of the 10 infectious cases still alive in the village. Whether such isolation will be effectively maintained, and the extent to which the infection will be controlled thereby in future, must be a subject for future record. But the fact that a single infectious case, such as no. 67,

FAMILY TREE OF DEBIPUR HIR

can broadcast the disease throughout the community, shows the all-importance of a careful survey followed by persistent special propaganda with a view to securing the effective isolation of all infectious cases.

Above all, considering the frequency with which those in contact from birth or in early age develop the infectious form of the disease, we would emphasise the importance of separating young children from all chance of infection.

TABLE I
General List of Inhabitants of Debipur Hir.

Serial No.	Name	Sex	Born	Married	Died	Remarks
1	Momin ...	M.	...	...	?	Was one of the 2 founders of the village.
2	Wife of Momin ...	F.	...	...	?	
3	Pachai ...	M.	...	...	?	
4	W. of 3 ...	F.	?	...	?	
5	Sadulla ...	M.	1850	1862	1916	
6	Kahiton ...	F.	1855	1862	1897	Was the 1st wife.
7	Khenti ...	F.	1876	1900	...	Was the 2nd wife. Came at 24 years of age.
8	Harmuj ...	M.	1880	?	1931	No. 79 is his widow.
9	Lehara ...	F.	1930	...	...	Her mother is a leper but is separate from her.
10	Etimon ...	F.	1883	1894	...	Left the village after marriage.
11	Rohm ...	M.	1886	...	1896	
12	Letumon ...	F.	1889	1905	1928	Was the wife of Rastom no. 22 but left him when he became an infectious leper, in 1920.
13	Khasemon	F.	1901	1914	1915	
14	Aslemon ...	F.	1906	1918	...	Left the village after marriage.
15	Salemon ...	F.	1906	1918	...	Ditto.
16	Muslemon	F.	1909	1922	...	Wife of Samed no. 116.
17	Serajaddi ...	M.	1911	1928	...	
18	Mahijan ...	F.	1916	1928	...	Came to the village after marriage.
19	Mianur ...	M.	1912	1931	...	Married to no. 127.
20	Rahatulla	M.	1853	...	1894	
21	Khairat ...	M.	1860	1874	1914	He abandoned his wife no. 120 when she became infectious.
22	Rastom*	M.	1887	1905	...	Leprosy case.
23	Liash ...	F.	1916	1927	...	Was taken away by her mother no. 12 in 1920.
24	Malika ...	F.	1890	1902	...	Left village after marriage.
25	Totabibi ...	F.	1864	1878	1928	Ditto.
26	Earuddi*	M.	1866	1886	1912	Leprosy case.
27	Hableshe ...	F.	1870	1886	...	Came to village after marriage. Her husband used to remain separate from her and her son
28	Shishu ...	M.	1899	1919	...	Was separate from father.
29	Alebjan ...	F.	1903	1919	...	Came to village after marriage.
30	Fati† ...	F.	1926	...	...	Leprosy case. Pet of Rastom (22).
31	Isak ...	M.	1928	...	...	
32	Guleshi ...	F.	1930	...	...	
33	Aleshi ...	F.	1933	...	...	
34	Jiaruddi*	M.	1868	...	1898	First leper in village.
35	Ruta ...	F.	1870	...	...	Wife of Abid no. 77.
36	Uta ...	F.	1874	...	...	Wife of Misir no. 99.
37	Abbas ...	M.	...	...	?	
38	Ugan ...	F.	...	...	1914	

Serial No.	Name	Sex	Born	Married	Died	Remarks
39	Rohiton	... F.	1858	1872	?	Left village after marriage.
40	Madhu*	... M.	1864	1889	...	Leprosy case.
41	Koiton	... F.	1872	1889	...	Came to village after marriage.
42	Surmail*	... M.	1894	1914	...	Leprosy case. Wife left him when in infectious stage.
43	Mali*	... F.	1899	...	...	Leprosy case.
44	Ismail*	... M.	1901	1921	...	Leprosy case. His wife (122) left him.
45	Osman	... M.	1904	1922	...	After birth he was reared at his maternal uncle's village till his marriage. Has returned and living in a separate house
46	Kasemon	... F.	1908	1922	...	Came to village after marriage.
47	Nurjan	... F.	1927	...	...	Lives separately from lepers.
48	Moharjan	... F.	1933	...	...	Ditto.
49	Rupi*	... F.	1907	1919	...	Leprosy case. Was married but husband divorced her at her infectious stage.
50	Nekjan	... F.	1929	...	...	Living separate from mother (49).
51	Samsuddi	... M.	1912	...	...	Born and brought up at maternal uncle's village and still there.
52	Nuniton	... F.	1870	1884	1926	Left village after marriage.
53	Ali*	... M.	1880	1898	1926	Leprosy case.
54	Khurison	... F.	1886	1898	...	Came to the village after marriage. Had no intimate contact with any infectious leper.
55	Asijaddi	... M.	1905	1925	...	
56	Karimon	... F.	1910	1925	...	Came to village after marriage.
57	Taimur*	... M.	1910	...	...	Leprosy case.
58	Hamed	... M.	1912	...	...	Was at another village from his infancy.
59	Aharan	... F.	1882	1894	...	Wife of Ataulla no. 71.
60	Sadaraddi	... M.	1884	1908	...	
61	Khusmon	... F.	1893	1908	...	Came to village after marriage.
62	Hatem	... M.	1912	...	1919	
63	Sabura	... F.	1916	1928	...	Left the village after marriage.
64	Nebura†	... F.	1920	...	...	Leprosy case.
65	Abjura	... F.	1924	...	1927	
66	Guljura	... F.	1928	...	...	Lives separately from uncle no. 67.
67	Badaraddi†	... M.	1891	...	...	Leprosy case.
68	Saifu	... M.	...	...	?	
69	Tarifan	... F.	...	...	?	1st wife of 68.
70	Sairfan	... F.	...	...	?	2nd wife of 68.
71	Ataulla*	... M.	1865	...	...	Leprosy case. Wife is no. 59.
72	Abul	... M.	1904	1920	...	
73	Aklimon	... F.	1909	..	...	Came to village after marriage.
74	Ayesha	... F.	1923	...	...	
75	Mahamed†	... M.	1926	...	...	Leprosy case.
76	Ramesha	... F.	1931	...	...	
77	Abid	... M.	1870	...	1934	Wife is no. 35.
78	Abson	... F.	1909	...	1922	
79	Hati*	... F.	1912	1924	...	Leprosy case. Widow of no. 8. Has a daughter, age 4 years, separated from mother.
80	Jati†	... F.	1918	...	...	Leprosy case.
81	Mati	... F.	1918	1929	...	Left village after marriage.
82	Nazimuddi	... M.	1880	1898	...	
83	Afruja	... F.	1886	1898	...	Came to village after marriage.
84	Khalil	... M.	1917	...	...	Born and brought up at maternal uncle's house and still there.
85	Marufa	... F.	1920	1934	...	Do. and came to village after marriage. Husband no. 126.
86	Jalil	... M.	1923	..	...	As no. 84.

Serial No.	Name	Sex	Born	Married	Died	Remarks
87	Khalek	...	M.	1926	...	...
88	Kudbani	...	F.	1929	...	...
89	Puti	...	F.	1932	...	...
90	Kadu	...	F.	1896	1908	...
91	Anus	...	M.	1884	1908	...
92	Kamini	...	F.	1909	1924	...
93	Elijaddi*	...	M.	1914	...	...
94	Delera	...	F.	1920	...	...
95	Amin	...	M.	...	...	?
						Was one of 2 founders of the village.
96	W. of 95	...	F.	...	...	?
97	Dhiron	...	M.	...	...	?
98	Moyna	...	F.	...	...	?
99	Misir†	...	M.	1879	...	...
100	Khusmon	...	F.	1908	1924	...
						Leprosy case. 1st wife is no. 36. 2nd wife of no. 99. Came to village after marriage.
101	Nathi*	...	F.	1914	...	...
102	Ashman	...	F.	1926	...	...
103	Ajeda	...	F.	1929	...	...
104	Sobhan	...	M.	1932	...	...
105	Jigru	...	M.	...	...	?
106	Lutfan	...	F.	...	...	?
107	Duli	...	F.	1862	...	...
108	Damu	...	M.	...	...	1928
109	Risol	...	M.	1900	1918	1926
110	Khusmon	...	F.	1906	1918	...
						Came to village after marriage and left it with younger son after death of husband.
111	Nursad†	...	M.	1920	...	...
112	Irsad	...	M.	1925	...	...
113	Sabed	...	M.	1904	1923	...
114	Sakemon	...	F.	1926	...	...
115	Nahura	...	F.	1929	...	...
116	Samed	...	M.	1908	1922	...
117	Mursad†	...	M.	1927	...	...
118	Jabed	...	M.	1912	1930	...
119	Aslemon	...	F.	1916	1930	...
120	Durpadi*	...	F.	1872	...	1904
121	Bidu	...	F.	1882	1894	...
122	Hadi	...	F.	1905	1921	...
						Came to the village after marriage and was married to no. 44 but left him at his infectious stage.
123	Udi	...	F.	1910	1923	...
124	Hauji	...	M.	1892	1915	...
125	Nishada	...	F.	1902	1915	...
126	Johaue	...	M.	1916	...	...
127	Koimon	...	F.	1920	1930	...
128	Mialal	...	M.	1922	...	...
129	Sadiman	...	M.	1927	...	...

* Infectious case.

† Non-infectious case.

[This same village of Debipur Hir has been re-surveyed five years later, and we abstract from *Leprosy in India*, July, 1939, an article by Dr. Dharmendra in which the results found are described. While it is still too soon to determine the effects of the survey, the educational campaign and the resulting partial segregation which resulted, the results are, at least, promising. —Editor].

TABLE II
List of Lepers in Debipur Hir.

Serial No.	Name	Sex	Source of infectious case number	Probable age first infectious contact year	Age and year when 1st lesion noticed	Age and year be- came infectious	Died	Present type	Remarks	
22	Rastom*	...	...	M. 34	7	27—1914	33—1920	...	C-3	Syphilis.
26	Earuddi*	...	...	M. Uncle	?	32—1898	41—1907	1912	...	Syphilis.
30	Fati†	...	...	F. 67	birth	6—1932	...	...	N-2	
34	Jiaruddi*	...	...	M. Uncle	?	20—1888	26—1894	1898	...	
40	Madhu*	...	...	M. 67	41	50—1914	58—1922	...	C-1, N-3	Dysentery
42	Surmail*	...	...	M. 34	30	20—1914	25—1919	...	C-2, N-2	Syphilis.
43	Mali*	...	...	F. 67	5	11—1910	28—1927	...	C-2, N-2	Malaria.
44	Ismail*	...	...	M. 120	6	13—1914	22—1923	...	C-2	
49	Rupi*	...	...	F. 67	4	8—1920	12—1924	...	C-2	
53	Ali*	...	...	M. 34	14	42—1922	44—1924	1926	...	Syph. and Gonhr.
57	Taimur*	...	...	M. 67	25	11—1921	16—1926	...	C-1, N-2	
64	Nebura†	...	...	F. 67	birth	9—1929	...	...	N-2	
67	Badaraddi*	...	...	M. 34	3	7—1898	14—1905	...	C-1, N-3	
71	Ataulla*	...	...	M. 34	29	50—1915	...	...	N-2	
75	Mahamed†	...	...	M. 67	40	5—1931	...	...	N-1	
79	Hati*	...	...	F. 67	birth	8—1920	12—1924	...	C-2	
80	Jati†	...	...	F. 67	birth	10—1928	...	...	N-2	
93	Elijaddi†	...	...	M. 67	birth	8—1922	...	...	N-2	
99	Misir†	...	...	M. 34	16	49—1928	...	...	N-2	
101	Nathi*	...	...	F. 120	21	10—1924	18—1932	...	C-2	
111	Nursad†	...	...	M. 67	birth	10—1930	...	...	N-1	
117	Mursad†	...	...	M. 67	birth	6—1933	...	...	N-1	
120	Durpadi*	...	...	F. Uncle of husband	?	22—1894	27—1899	1904	...	

* Infectious case.

† Non-infectious-case.

The Re-Survey.

The population, change in.—The population recorded at the original survey was seventy-seven. Three persons at that time living in the village were missed. Of these one is still in the village while the other two have gone out in search of employment. During the period between the original survey and the present survey there have been fifteen additions—11 births, 2 migrated into the village, 2 girls came to the village after marriage. On the other hand, there has been a decrease of twelve—5 deaths, 3 girls left the village after marriage, 4 persons gone out in search of employment. Thus the net population of the village was eighty-one on 1st April, 1939.

Number of lepers, change in.—In 1934 there were recorded nineteen lepers. During the period from 1934 to 1939 there has been one addition—a case of leprosy coming to the village after marriage. On the other hand, there have been a decrease of four—2 deaths, one left the village after marriage and one gone out for employment elsewhere.

Fresh cases.—During this period no fresh case has arisen amongst the population examined in 1934. A case has been detected in one of the new comers to the village. Asleman Bibi came to the village after marriage from a neighbouring village (Badulara) which is known to have a high incidence of leprosy. Asleman's aunt was a lepromatous case who died about twelve years ago. Asleman's brother is a neural case with drop-foot and claw-hands. There are also two lepromatous cases in the neighbourhood—one on each side of her father's house at Badulara. Asleman is a lepromatous case.

Incidence of leprosy.—In 1934 there were 19 cases in a population of 77 giving an incidence of 24.6%. In 1939 there are 16 cases in a population of 81 giving an incidence of 19.7%.

Type distribution. In 1934 the nineteen cases were classified as follows:—

N1	...	3	Non-infectious.
N2	...	6	
C1N2	...	1	Slightly infectious.
C1N3	...	2	
C2	...	4	Highly infectious.
C2N2	...	2	
C3	...	1	

Of the nine non-infectious cases one has since died, one has left the village after marriage, one is away on some employment and one has become infectious (a L2 case). The remaining five are still non-infectious.

Of the three cases recorded as slightly infectious one has since died and two show no signs of any lepromatous change. Slit smears from ears, forehead and back in these two cases were negative for leprosy bacilli, smears were taken on a second occasion but they were still negative. All the seven cases recorded as highly infectious are still in that condition. A fresh lepromatous case (Asleman Bibi) has come to the village. The sixteen cases found in the village at the re-survey can be classified as under:

Nm1	...	...	...	5	
Na2	...	...	...	1	7 non-infectious.
Na3	...	...	...	1	
L1	...	...	...	1	
L2	...	...	...	3	9 infectious.
L2Na2	...	...	...	4	
L3	...	...	...	1	

The accompanying table gives a comparative statement of the condition of the lepers in 1934 and in 1939. Only one of the cases (case No. 99) recorded as non-infectious in 1934 has become infectious. All the other neural cases reported improvement some of them quite a marked one. In all the neuromacular cases the macules were flat and showed no sign of activity. In some cases it was definitely stated that the patches had faded a good deal and in one case (117) there was no definite anæsthesia in the patch. The lepromatous cases also reported improvement in their condition since they were last examined.

In the original survey report it was recorded that of the thirteen cases who were in continuous contact from birth onwards six had already become infectious cases, the remaining seven being still non-infectious. At the re-survey after a period of five years those seven were still found to be non-infectious. One of the six cases reported to be infectious in 1934 was found to be non-infectious at the re-survey. So that of the thirteen cases who had infectious contact since birth only five have so far become infectious. One of the neural cases (case No. 99) has in the meantime become infectious, this case probably had his first infectious contact at the age of 16. This brings the number of cases who had their first infectious contact after the age of 10 and yet developed into infectious cases to four.

Isolation.—In the report of the original survey it is noted that through propaganda it has been possible to secure voluntary and effective isolation of the infectious cases in the village. One of the purposes of the present survey was to find out whether such isolation has been effectively maintained and if so what has been its effect on the spread of the disease in the village.

The isolation consists in the infectious patients not sharing the

same room with the healthy persons in the family. It was also stated that their food was served in their own rooms. There is no isolation beyond this as the infectious patients were seen moving about freely in the compound of the houses and round about the village. In the centre of the village there is a shady tree. This provides a common meeting place for the villagers including the lepers and the children. The isolation thus appears to be only partial. It is too early to say to what extent will the spread of infection be controlled by this partial isolation but the findings at the re-survey appear to be rather encouraging.

In 1934 there were twenty-three persons of susceptible ages that is of ages below 15 (5 under 3, 13 from 4 to 10, and 5 from 11 to 15) who were free from any signs of leprosy at that time. In 1939 only twenty of these cases could be examined as two girls had left the village after marriage and one boy was away at his maternal uncle's village. None of the twenty persons examined showed any signs of leprosy and the villagers said that the three persons who had left the village had no sign. Eleven children were born in the village after the survey, none of them showed any sign of the disease but that does not mean anything as it is too early to expect anything in them. Two girls have come to the village after marriage, one of these is a case of leprosy. The present age of this girl is about 20 years, she came to the village after the 1934 survey, i.e., after she was 15 years old. She has come from a neighbouring village Badulara by name which has a high incidence of leprosy. In this case there is a definite history of contact, her aunt was a lepromatous case, her brother is a neural case and there were two lepromatous cases in the neighbourhood. It is very probable that this girl was infected in her father's house before she came to Debipur Hir. Thus if this case be excluded there has not been a single fresh case during these five years although persons of susceptible age were present in the village.

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Note.—We are using the symbol L (lepromatous) in place of symbol C (cutaneous) according to the Cairo Leprosy Congress classification.

There are three cases which were classified as N₂ in 1934 but are being classified as N₁ now. According to the Cairo classification a case is not necessarily to be classified as N₂ simply on account of presence of lesions on more than one part of the body. All these three cases had two macules each, the macules being on the different parts of the body. The extent of the lesions, however, does not justify these cases being classified as N₂.

Table showing the condition of patients in 1934 and 1939.

Serial No. according to original survey	Name.	Sex.	Born.	Probable age at first infectious contact (years).	Condition in 1934.	Condition in 1939.	Remarks.
22	Rustom	M	1887	7	C3	L3	
30	Fati ...	F	1926	Birth	N2	NM1	
40	Madhu ...	M	1864	30	C1N3	Dead	Dead.
42	Surmail	M	1894	Birth	C2N2	L2Na2	
43	Mali ...	F	1899	6	C2N2	L2Na2	
44	Ismail ...	M	1901	Birth	C2	L2Na2	
49	Rupi ...	F	1907	Birth	C2	L2Na2	
57	Taimur	M	1910	Birth	C1-Na2	Na2	
64	Nebura	F	1920	Birth	N2	Nm1	Has since been married. The patches faded to a great extent.
67	Badaraddi	M	1891	3	C1N3	Na3	
71	Attaulla	M	1865	29	N2	Dead	Dead.
75	Mahamed	M	1936	Birth	N1	Nm1	Patches faded to some extent.
79	Hati ...	F	1912	Birth	C2	L2	
80	Jati ...	F	1912	Birth	C2	L2	Left the village after marriage. Said to be much improved.
93	Elijadi ...	M	1914	Birth	N2	Nm1	Much improved. The patches which were raised previously are now flat.
99	Misir ...	M	1879	16	N2	L2	
101	Nathi ...	F	1914	Birth	C2	L2	
111	Nursad	M	1920	Birth	N1	...	Away, said to be much improved.
117	Mursad	M	1927	Birth	N1	Nm1	The patch much faded. Anæsthesia on patch not definite.
	Asleman	F	1920	Birth	...	L1	Came from another village after marriage and after the original survey.