

ANNUAL REPORT
OF THE
PUBLIC HEALTH COMMISSIONER
WITH THE GOVERNMENT OF INDIA
FOR 1935.



Volume I.
With Appendices.

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ANNUAL REPORT OF THE PUBLIC HEALTH COMMISSIONER WITH THE GOVERNMENT OF INDIA FOR 1935.

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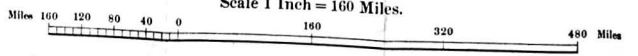
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REFERENCE.
 Boundaries- International demarcated, undemarcated
 Do, Province or State Do, Do
 Do, District and minor State

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Annual Report of the Public Health Commissioner with the Government of India for 1935.

VOLUME I.

SECTION I.

ON THE STATE OF THE PUBLIC HEALTH IN BRITISH INDIA AND SOME INDIAN STATES.

Introduction.

1. The principal statistical data for British India for the year 1935 are given below :—

Mid-year estimated population	278,199,545
Area (square miles)	890,116
Density per square mile	312
Births { Number	9,698,794
{ Rate p. m.	35
Deaths { Number	6,578,711
{ Rate p. m.	24
Infantile death rate per 1,000 live-births	164
Vital Index	147

Since the 1931 census was taken, India has enjoyed five years of comparatively uniform health conditions, by which is meant that no violent epidemics have been experienced. The year under review was, if anything, less unhealthy than usual. This is evidenced by the facts that recorded births numbered 410,000 more than those of 1934 and total deaths were less by 288,000. As the crude birth rate increased by 1 p. m. and the crude death rate diminished by a corresponding unit, the natural increase was 11 p.m. as compared with the average of 12 p. m. for the five-year period 1931-35.

The total mortality from the three principal epidemic diseases,—cholera, plague and small-pox,—decreased by 24,000 as compared with 1934, but this was more than covered by the large reduction in deaths from plague which fell from 80,000 in 1934 to 32,000 in 1935. The cholera mortality curve which had been rising during the previous two years continued to rise during 1935 and the total deaths amounted to 217,000, the highest figure for the past three years. The indications are, however, that the present cholera wave has now passed its peak. In regard to smallpox a further increase was recorded, the number of cases being 281,000 and the total deaths numbering about 91,000 as against 84,000 in 1934. As regards the other large groups of registered deaths, the gross total shows little variation from those of the previous year, although the "fevers" group is lower by over 200,000.

Large as these major epidemic figures are, it must be remembered that there are other diseases which cause much greater havoc, although that is

perhaps of a less dramatic nature. The most important of these is of course malaria. It has been estimated that deaths from malaria during 1935 amounted to 1,680,000 or about 44% of the total recorded 'fevers' deaths. The problems presented by malaria in this country are perhaps the most difficult of the many public health problems demanding solution. Some of these have been discussed in later paragraphs of this report where reference has also been made to the question of quinine. An attempt has been made to indicate in tabular and other statements the amount of quinine consumed per head of the population in different provinces. These amounts are without exception ridiculously small as compared with the needs of the people, but the problem of providing adequate supplies of this drug at cheap rates is by no means easy of solution.

Tuberculosis is another disease whose incidence has increased rapidly during recent years and which is now causing a heavy mortality, particularly in the urbanised and industrialised areas. It is impossible to quote figures which would give an accurate indication of the degree to which this infection has now permeated the general population, but there seems little doubt that pulmonary tuberculosis at least is working havoc, not only in the overcrowded urban centres, but also in various groups of the rural population where there exists a high degree of susceptibility to attack. Further details in regard to tuberculosis will be found in Section II of this report.

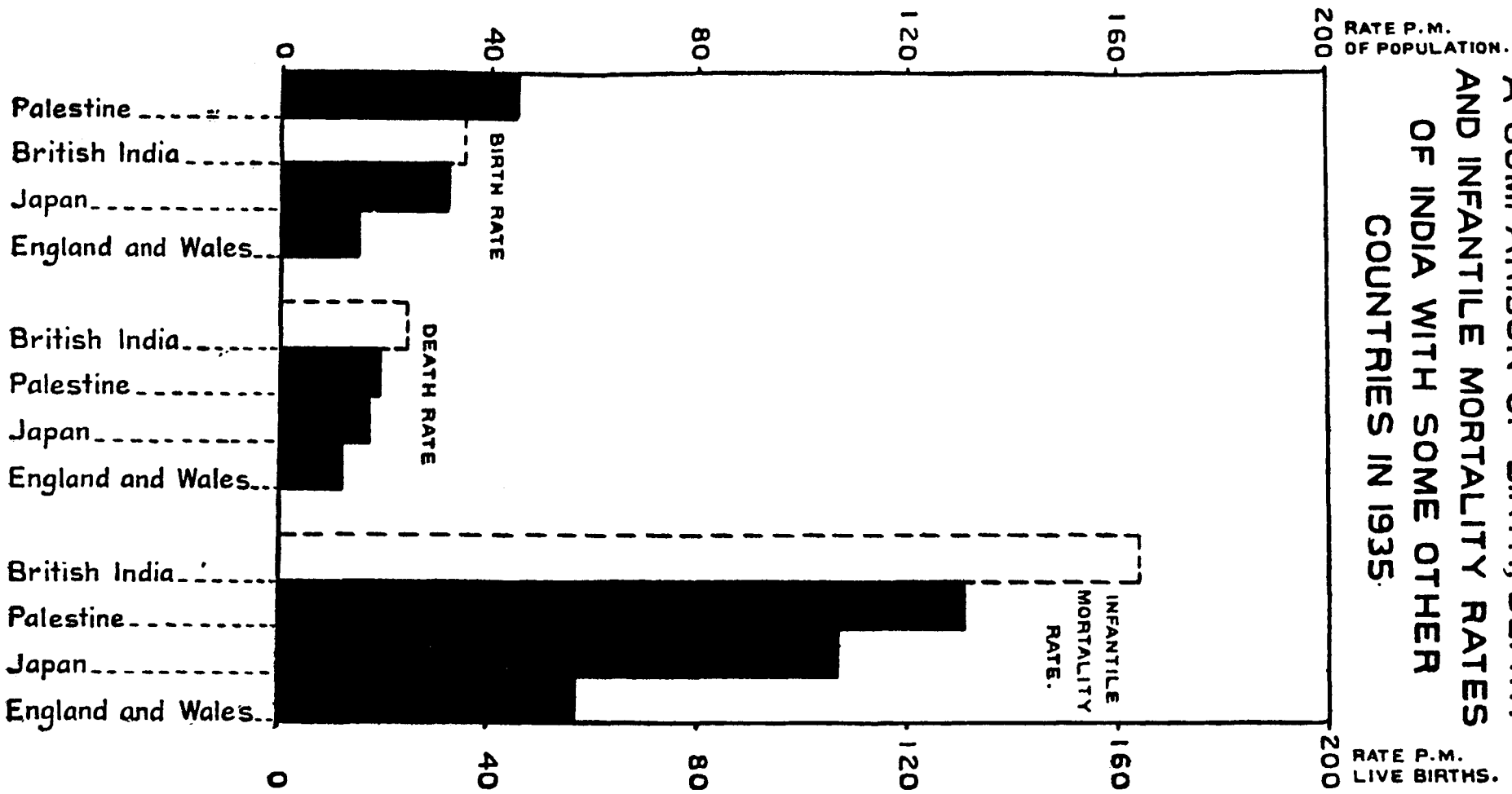
While leprosy may not be the cause in India of such heavy mortality as malaria and tuberculosis, nevertheless the new knowledge gained during recent years as to the incidence of this disease has indicated that it is one of the major health problems of the country. The intensive surveys which have been carried out in different areas have made it clear that leprosy is much more widespread than had previously been recognised. Careful investigation in different groups of villages, for instance, has shown that the incidence of the disease may be as high as 5-7% and, whilst many of the cases seem to be of a relatively mild type, it cannot be doubted that the presence of well over one million leprosy cases scattered throughout the general population constitutes a grave danger to the public health.

Finally, mention must also be made here of two other sections of the population amongst which a heavy mortality occurs. Figures given in this section of the report show that in 1935 about 1½ million infants died before they reached the age of one year, whilst approximately 150,000 women died in childbirth or from causes associated with childbirth.

These five causes of high mortality have not been brought together, merely because each is responsible for a large number of deaths, although at first sight there seems to be no other common feature between malaria, tuberculosis and leprosy and infant and maternal mortality. We know the specific causal agent of the first three and have fairly accurate knowledge of those responsible for a high percentage of infant and maternal deaths, but in all five groups there exists a common predisposing aetiological factor which is of a vital importance. Recent scientific research has in fact indicated that were this factor eliminated, it would without doubt be possible to effect large reductions in the continuous heavy mortality recorded under all of these headings. This predisposing factor is malnutrition. It has long been known that malnutrition produces a lowered resistance to disease; this has frequently been illustrated by the great susceptibility of the people of India to malaria, bowel infections and other diseases during times of scarcity or famine. But, until more recent times, few realised the extent to which malnutrition exists in India, although research workers and public health authorities had fo

No. 1

A COMPARISON OF BIRTH, DEATH AND INFANTILE MORTALITY RATES OF INDIA WITH SOME OTHER COUNTRIES IN 1935.



long inferred that this factor was of importance. Investigations carried out in recent years and months have now proved that considerable percentages of the population of India present many and diverse malnutritional conditions in greater or less degree and that these are due for the most part to qualitative defects in the ordinary diets of the people.

No preventive campaign against malaria, against tuberculosis or against leprosy, no maternity relief or child welfare activities are likely to achieve any great success unless those responsible recognise the vital importance of this factor of defective nutrition and from the very start give it their most serious attention. Abundant supplies of quinine and the multiplication of tuberculosis hospitals, sanatoria, leprosy colonies and maternity and child welfare centres are no doubt desirable, if not essential, but none of these go to the root of the matter. The first essentials for the prevention of disease are a higher standard of health, a better physique and a greater power of resistance to infection. These can only be attained if the food of the people is such as will give all the physiological and nutritional requirements of the human frame. This question is obviously closely correlated with that of population and with the planning of sufficient and suitable food supplies. The question of numbers is the subject of later comment; that of food supplies is one of primary concern to the central and provincial agricultural departments and they may be expected to utilise available information on nutritional needs in planning food crops and food production. To obtain the best results, a close liaison must be maintained between the human nutritional research workers and those who can bring influence to bear on the food producer. Only when that liaison has been able to effect the quantitative and qualitative improvements in food supplies which research has shown to be so urgently necessary, will it be possible to anticipate any great or permanent reduction in the incidence of those diseases which at present take such a pitiful toll of human life in this country.

In the chart facing page 2 and in Table I (i) the principal vital statistics for British India during 1935 are compared with the corresponding figures of a number of other countries.

TABLE I (i).

	Birth rate per mille.	Death rate per mille.	Natural increase per mille.	Infantile death rate- per 1,000 births.
British India	35	24	11	164
England and Wales	15	12	3	57
Federated Malay States	36	20	16	144
Palestine	45	19	26	131
Japan	32	17	15	107
Egypt	42	27	15	161

Population.

2. Tables I (ii) and I (iii) give the estimated mid-year population of British India by provinces and by sex and age. It is to be noted that, of the large provinces, Bengal shows much the smallest percentage increase.

TABLE I (ii).

	Estimated population, 30th June 1934.	Excess of births over deaths.	Estimated population, 30th June 1935.	Percentage increase.	Total from 1931 to June 1935.
British India	275,753,570	2,445,975	278,199,545	0·9	4·7
N.-W. F. P.	2,433,011	25,556	2,458,567	1·1	4·3
Punjab	24,683,408	338,645	25,022,053	1·4	6·6
Delhi	668,160	4,410	672,570	0·7	5·7
U. P.	50,559,397	338,816	50,898,213	0·7	5·1
B. & O.	39,050,029	277,720	39,327,749	0·7	4·3
Bengal	50,837,178	394,255	51,231,433	0·8	2·7
C. P.	16,237,707	122,279	16,359,986	0·8	5·4
Bombay	22,670,283	222,775	22,893,058	1·0	5·0
Madras	47,152,136	516,046	47,668,182	1·1	5·5
Coorg	164,187	603	164,790	0·4	0·9
Assam	8,197,605	79,494	8,277,099	1·0	4·4
Burma	12,525,656	123,460	12,649,116	1·0	4·4
Ajmer-Merwara	574,813	1,916	576,729	0·4	3·0

TABLE I (iii).

	Male.	Female.	Total.
All ages	143,328,624	134,870,921	278,199,545
0—5 years	20,506,816	20,812,050	41,318,866
5—10 „	18,785,564	17,005,966	35,791,530
10—15 „	17,249,464	15,131,099	32,380,563
15—20 „	13,065,202	12,971,782	26,036,984
20—30 „	24,936,345	24,792,225	49,728,570
30—40 „	20,538,128	18,297,654	38,835,782
40—50 „	14,112,837	12,332,181	26,445,018
50—60 „	8,431,158	7,826,964	16,258,122
60 years and upwards	5,703,110	5,701,000	11,404,110

The last census was taken in 1931 so that the year under report covers the middle of the present intercensal period. During these five years little has happened to disturb the customary large additions to numbers. As a result, the annual natural increases in population have been fairly regular and have averaged as high as 12 % over the quinquennium, in spite of a temporary decrease to 9 % in 1934. At no period in the recorded history of Indian vital statistics has the natural increase of population maintained such a high level and, in British India alone, approximately 15 millions have been added to the population since the last census. On the reasonable assumption that the same rate of increase has occurred in the Indian States, the population in India as a whole has increased since 1931 by 5%, bringing the total estimated number to well over 370 millions. The fact that registration of births is defective only means that the actual population is even higher than this estimate would indicate. The percentage of error in Indian vital statistics may make it difficult to draw definite inferences from the recorded figures of a single year. Over a period of years, however, the trend of events becomes obvious even to the amateur statistician and there seems to be no

doubt that, barring violent epidemic outbreaks, the population of India by 1941 will exceed the 400 million mark which was forecast in this report some years ago.

The objection may be made that forecasts of population in India are both dangerous and difficult. In his recent book on population Carr Saunders (1936) has, for instance, pointed out that "it is not possible to forecast the future population of India on lines similar to those employed when dealing with other countries; for there is no question of projecting into the future present birth and death rate trends with appropriate modifications". He also draws attention to the fact that after failure of monsoon rains "the high mortality during the bad seasons has always been due to epidemics which are enabled to spread on account of the enfeebled condition of the population consequent on lack of sufficient food". In addition he pertinently adds that "the future population of India will, therefore, be governed by such expansion of opportunities for subsistence as may take place". These statements, might be taken to deny the possibility of accuracy for such a forecast as has been referred to, but it is to be noted that what Carr Saunders has in mind is "a long term prediction of India's population". Dr. Raja of the All-India Institute of Hygiene and Public Health, Calcutta, has recently published a paper entitled "A forecast of population in India at the census of 1941". His forecast deals with a date only six years ahead so that it completely avoids the errors of a long term prediction. Recognising the violent changes which have characterised population growth since 1872, when the first census was taken, and that Indian vital statistics are too inaccurate to be used with confidence, the author has attempted to arrive at an estimate of the 1941 population by making an assessment of the trend of those events which influence population growth.

Growth of population in any country is determined by four factors, birth rates, death rates and figures for immigration as well as for emigration. As migration during the past decade has ceased to be of any importance to India, this factor has been omitted. The birth rate in British India has been fairly steady from the beginning of the present century, but the death rate has tended to decrease from 1921 onwards. Specific mortality rates were worked out for both males and females for the period 1921-33, using estimated populations for each year, and Dr. Raja found that the trend of mortality was downwards for all age groups except that of "60 years and upwards" in the case of both sexes. The conclusion drawn is that the fall in mortality shown in recent years is real and that the death rate is not likely to show an upward trend at least in the near future. That being so, the application of further statistical analyses was justified and by two separate processes figures of approximately 402 and 400 millions respectively were obtained for the estimated population of India as a whole in 1941. These figures represent an increase of about 13% during the present intercensal period, a rate which is comparable with the actual increase of 12% which has occurred during the years 1931-35. Provided the next five years keep free from abnormal epidemic or famine conditions, the enumerated population of India in 1941 is therefore likely to approximate to 400 millions.

Migration.—Only 13,267 persons from Madras Presidency emigrated to Malaya and 8,795 to Ceylon. Immigrants from the same countries numbered 12,431, excluding those who returned at their own expense and 403 from Fiji, Mauritius and South Africa. Immigrants to and emigrants from Burma by the sea route numbered 273,841 and 234,246 respectively. A total of 21,630 persons emigrated to Assam.

Live-births.

3. *British India*.—Excluding Europeans and Anglo-Indians, 9,698,794 live-births were registered during 1935, this figure being 4% in excess of the figure of 1934 and 6% more than the quinquennial mean, whilst it is also the highest number ever recorded in India. The crude birth rate was 34·9 p. m. of the estimated population. The birth rates for previous years were 33·7 p. m. in 1934, 35·5 p. m. in 1933, 33·7 p. m. in 1932, 34·3 p. m. in 1931, 35·7 p. m. in 1926-30 (average) and 33·4 p. m. in 1921-25 (average). Still births have been excluded and details of these will be found in a later paragraph.

Table I (*iv*) gives numbers of registered births and rates *per mille* for both sexes based on the estimated populations for the various provinces.

TABLE I (*iv*).

	Births.			Rate per mille.			
	M.	F.	Total.	M.	F.	Total.	
						1935.	1934.
BRITISH INDIA	5,041,943	4,656,851	9,698,794	18·1	16·7	34·9	33·6
N.-W. F. P.	43,094	32,898	75,992	18	13	31	30
Punjab	564,858	504,280	1,069,138	23	20	43	38
Delhi	14,833	13,978	28,861	22	21	43	37
U. P.	925,738	819,098	1,744,836	18	16	34	35
B. & O.	671,532	633,998	1,305,580	17	16	33	32
Bengal	848,369	785,760	1,634,129	17	15	32	29
C. P.	356,913	339,891	696,804	22	21	43	43
Bombay	419,470	387,519	806,989	18	17	35	34
Madras	855,779	815,407	1,671,186	18	17	35	35
Coorg	2,226	1,953	4,179	13	12	25	25
Assam	123,668	116,230	239,898	15	14	29	30
Burma	203,885	195,888	399,773	16	16	32	29
Ajmer-Merwara	11,478	9,951	21,429	20	17	37	34

In N.-W. F. P. the number of recorded births was the second highest on record; the figure of 399,773 births in Burma was a record. In Bombay, the figure was the largest during the last quinquennium. Sylhet district was largely responsible for the decreased number of births in Assam, but an investigation carried out in that district did not reveal any specific cause for the continued fall in the birth rate, although the concomitant increase in deaths is suggestive of deterioration in health conditions.

The male rate was higher than the female rate in every province; the number of males born per 100 females was 108 for British India and varied between 131 in N.-W. F. P. and 104 in Burma. Table D in Appendix I on page 214 gives details.

Registered births in rural areas totalled 8,752,220; in urban areas 946,574. The corresponding rates *per mille* were 35 and 34 respectively. In many municipal towns, where M. O. Hs. are employed, the registration of births is carried out more accurately than in other areas and probably urban rates are more reliable than those for rural areas. The rural rate continued to exceed the urban in Delhi, Punjab, B. & O., Bengal, Bombay and Madras; in N.-W. F. P., U. P., C. P., Coorg, Burma and Ajmer-Merwara it was lower. Table C on page 214 gives further particulars for rural and urban areas. The D. P. H., B. & O. makes the following remarks in discussing the

birth rates of that province and these are perhaps equally applicable to other parts of India :—

“ The higher birth rate in the rural areas as compared to the urban birth rate appears to be due to the population of the rural areas (i) being more than that in the urban areas, (ii) being poor illiterate agriculturists among whom early marriage is encouraged and children are regarded as an asset, (iii) any manner of birth control being unknown to them, and (iv) the number of married females being greater in villages whence many married men go to earn their living in towns ”.

Birth rates for the chief communities are again available for ten provinces but under the existing system of registration these figures are of doubtful value. Rates calculated on the basis of the estimated number of women of childbearing age, 15—40 years, have been included in Table I (v).

TABLE I (v).

	Female population, 15—40 years.	Total births.	Rate p.m.
British India	56,048,234	9,698,794	173
N.-W. F. P.	469,814	75,992	162
Punjab	4,425,326	1,069,138	241
Delhi	126,019	28,861	229
U. P.	9,983,988	1,744,836	175
B. & O.	8,124,855	1,305,580	161
Bengal	10,618,238	1,634,129	154
C. P.	3,347,970	696,804	208
Bombay	4,562,919	806,989	177
Madras	10,084,500	1,671,186	166
Coorg	33,402	4,179	125
Assam	1,600,006	239,898	150
Burma	2,559,283	399,773	156
Ajmer-Merwara	111,914	21,429	191

Natural increases accruing from excess of births over deaths for decennial periods from 1871 to 1930 and for individual years from 1931—35 are given in Table I (vi).

TABLE I (vi).

	Annual number of births.	Birth rate p. m.	Annual number of deaths.	Death rate p. m.	Annual excess of births over deaths.
1871—1880	Not available.		3,540,202	20	..
1881—1890	4,565,687	24	5,058,578	26	492,891
1891—1900	7,174,694	34	6,662,417	31	512,277
1901—1910	8,591,136	38	7,657,513	34	933,623
1911—1920	8,810,018	37	8,142,364	34	667,654
1921—1930	8,345,364	35	6,347,063	26	1,995,301
1931	9,135,890	35	6,615,099	25	2,520,791
1932	9,054,506	34	5,805,666	22	3,248,840
1933	9,678,876	36	6,096,787	22	3,582,089
1934	9,288,897	34	6,856,244	25	2,432,653
1935	9,698,794	35	6,578,711	24	3,120,083

Table I, (vii) gives births by quarters of the year. As usual, the largest number was recorded in the fourth and the lowest in the second quarter. The third quarter recorded an increase of 238,498 births or 11% and the fourth quarter an increase of 281,998 or 10% over the figures for 1934.

TABLE I (vii).

	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter
British India	2,256,236	2,088,587	2,511,042	2,842,979
N.-W. F. P.	20,341	16,825	19,115	19,711
Punjab	248,684	203,899	288,686	327,869
Delhi	5,598	5,196	8,662	9,405
U. P.	385,925	344,280	493,075	521,556
B. & O.	305,360	285,469	330,295	384,456
Bengal	446,702	351,880	305,939	529,608
C. P.	154,181	152,105	201,128	189,390
Bombay	192,524	184,327	217,356	212,782
Madras	338,212	395,139	484,248	453,587
Coorg	1,040	1,154	1,092	893
Assam	64,929	47,607	49,073	78,289
Burma	38,006	96,258	106,490	109,019
Ajmer-Merwara	4,734	4,398	5,883	6,414

Births exceeded deaths by 546,850 in Madras Presidency; 545,183 in U. P.; 502,702 in Bengal; 485,299 in Punjab; 358,529 in B. & O.; 249,470 in Bombay Presidency; 164,056 in C. P.; 152,638 in Burma; 70,135 in Assam; 30,196 in N.-W. F. P.; 9,551 in Delhi; 5,023 in Ajmer-Merwara; and 411 in Coorg. As usual the birth rate exceeded the death rate in every province, the largest differences being recorded in the Punjab (+ 20 p. m.), Delhi (+14), N.-W. F. P. (+12), Burma (+12), Bombay (+11) and Madras (+11).

Deaths.

4. *British India*.—Registered deaths totalled 6,578,711 which was a decrease by 4% as compared with 1934 although the figure was still 3% in excess of the quinquennial mean of 6,371,449. The crude death rate was 23·6 p. m. a figure 1·3 p. m. lower than that in 1934 and also lower than the quinquennial mean. Rates for previous years were 24·9 p. m. in 1934, 22·4 p. m. in 1933, 21·6 p. m. in 1932, 24·9 p. m. in 1931, 26 p. m. in 1926—30 (average) and 27·5 p. m. in 1921—25 (average). As registration of deaths is carried out much more accurately than in the case of births, these figures indicate that the year under report was relatively healthy. This was particularly the case in the Punjab and C. P. In Assam, on the other hand, the death rate rose by 2 p. m. owing to greater prevalence of “fevers”. Female exceeded male mortality by 7 p. m. in Delhi, 1 p. m. in Bombay Presidency, 1 p. m. in Assam and 2 p. m. in Coorg. Table I (viii) gives registered deaths and the rates *per mille* according to sex for British India and for the various provinces.

TABLE I (viii)

	Deaths.			Death rate p. m.		
	M.	F.	Total.	M.	F.	Total.
British India	3,433,297	3,145,414	6,578,711	23·9	23·3	23·6
N.-W. F. P.	25,536	20,260	45,796	19	18	19
Punjab	310,665	273,174	583,839	23	24	23
Delhi	9,960	9,350	19,310	26	33	29
U. P.	638,396	561,257	1,199,653	24	23	24
B. & O.	491,978	455,073	947,051	25	23	24
Bengal	589,225	542,202	1,131,427	22	22	22
C. P.	278,400	254,348	532,748	33	31	33
Bombay	288,120	269,399	557,519	24	25	24
Madras	571,842	552,494	1,124,336	24	23	24
Coorg	2,014	1,754	3,768	22	24	23
Assam	88,054	81,669	169,723	20	21	21
Burma	130,446	116,689	247,135	20	19	20
Ajmer-Merwara	8,661	7,745	16,406	28	28	28

Both rural (23·6 p. m.) and urban (23·7 p. m.) death rates were lower than in 1934 and lower than quinquennial means. Urban death rates exceeded those for rural areas in the U. P. (+8 p. m.), Bombay (+2 p. m.), Coorg (+30 p. m.), Burma (+12 p. m.) and Ajmer-Merwara (+11 p. m.).

Rural death rates exceeded the urban in N.-W. F. P. (+1 p. m.), Punjab (+4 p. m.), Delhi (+5 p. m.), B. & O. (+9 p. m.), Bengal (+1 p. m.), C. P. (+2 p. m.), Madras (+8 p. m.) and Assam (+2 p. m.) Tables G and H on pages 216 and 217 give the recorded deaths and rates p. m. for rural and urban areas.

The seasonal incidence of mortality is subject to great fluctuations owing to periodic epidemics. The curve for 1935 showed two distinct peaks, one in May and the other in September. Registered deaths by months are given in Appendix I, Table E on page 215.

Death rates for the age-period 15—40 years were as usual higher among females than among males. Table I (ix) gives details. The subject of maternal mortality has been dealt with in Section III on page 67.

TABLE I (ix).

	Deaths, 15—40 years.		Death rates, 15—40 years.	
	Male.	Female.	Male.	Female.
British India	573,015	634,105	10	11
N.-W. F. P.	5,283	5,213	10	11
Punjab	49,506	50,247	9	11
Delhi	1,863	2,113	10	17
U. P.	98,931	104,898	9	11
B. and O.	104,041	104,361	13	13
Bengal	130,882	153,160	12	14
C. P.	Not available.		Not available.	
Bombay	43,842	49,784	11	11
Madras	92,851	114,985	10	11
Coorg	679	609	15	18
Assam	17,521	21,820	11	14
Burma	26,401	25,550	10	10
Ajmer-Merwara	1,215	1,365	9	12

Infantile mortality.

5. The downward trend in the infantile mortality rate which was the subject of comment in the 1930 report seems still to be in existence in spite of the higher rates registered last year. In contradistinction to the previous year, 1935 was comparatively healthy for the infant population and the recorded death rate of 164 p. m. of live births was the lowest on record. Reduced incidences of plague, malaria, fevers and respiratory diseases may be partly responsible for the large decrease of 12% as compared with 1934, but, on the other hand, smallpox was more widely prevalent and to that infection unvaccinated infants are always peculiarly susceptible. In any case, whatever the reasons for the decreased mortality, these seem to have influenced conditions all over India, as every province recorded a lower infant mortality than in the previous year. The largest decreases occurred in Delhi (—35 p. m.), Burma (—33 p. m.), Punjab (—32 p. m.), Bengal (—30 p. m.), C. P. (—29 p. m.), U. P. (—28 p. m.), Ajmer-Merwara (—27 p. m.) and B. & O. (—21 p. m.).

Although it is satisfactory to be able to record considerable reductions in the provinces, it must not be forgotten that the infant death rates recorded in India are still pitifully high. Previous reports have discussed at length the different causal factors and their influence on infant mortality and have also indicated the measures needed to remove these causes. These remarks are equally applicable today and it is not proposed to reiterate them. The present position of the maternity and child welfare organisations which is discussed in Section III gives a clear conception of what remains to be done before the infant mortality rates of India can be reduced to reasonably satisfactory dimensions.

TABLE I (x).

	Under one month.		One to six months.		6—12 months.		Total deaths under one year.	Death rate per 1,000 live births.	
	Number.	% of total.	Number.	% of total.	Number.	% of total.		1935.	1934.
British India	741,372	47	488,544	30	358,286	23	1,588,202	164	187
N.-W. F. P.	3,787	38	3,312	33	2,943	29	10,042	132	134
Punjab	73,159	44	47,413	29	45,345	27	165,917	155	187
Delhi	1,840	36	1,985	39	1,291	25	5,116	177	212
U. P.	108,865	40	96,416	35	69,008	25	274,289	157	185
B. & O.	84,103	50	52,567	31	32,018	19	168,688	129	150
Bengal	153,640	59	67,529	26	37,867	15	259,036	159	189
C. P.	72,416	46	41,226	26	42,124	27	155,766	224	253
Bombay	50,634	38	45,800	35	35,810	27	132,244	164	167
Madras	153,361	51	74,300	25	70,735	34	298,396	179	193
Coorg	385	54	196	27	134	19	715	171	189
Assam	19,799	50	12,813	33	6,543	17	39,155	163	165
Burma	18,135	24	43,210	58	13,030	18	74,375	186	219
Ajmer-Merwara	1,248	28	1,777	40	1,438	32	4,463	208	235

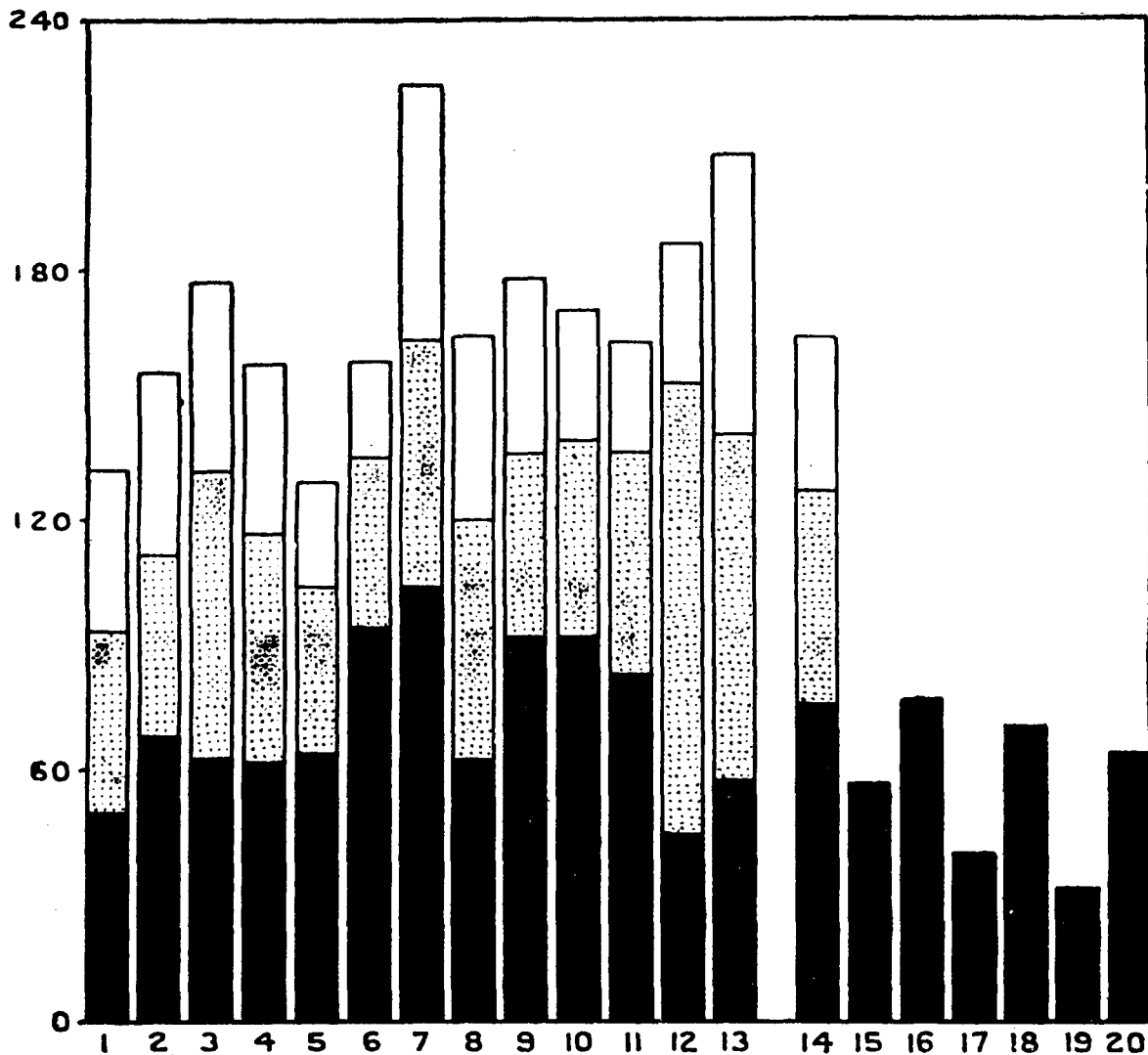
The main feature of Table I (x) which gives details for British India and for individual provinces is that the percentage mortality to total infant deaths has declined in the two age-groups 1—6 months and 6—12 months, whilst that for the group under one month has increased, particularly in the N.-W. F. P., C. P., Delhi, B. & O., Bengal, Burma and Ajmer-Merwara.

Table I (xi) gives details of the deaths of infants under one week. These comprised no less than 61% of the deaths under one month and 28% of the total. Both these percentages remain terribly high and no other argument is needed to stress the urgent necessity for expanding maternity relief and child welfare centres of every province both in urban and rural areas. The questions of ante-natal care and improved midwifery services are discussed at some

No 2

INFANTILE MORTALITY PER MILLE OF BIRTHS IN BRITISH INDIA, ENGLAND AND WALES AND BRITISH DOMINIONS IN 1935

RATE P.M.



INDEX.

Under one month
 One to six months
 Six to twelve months...

TOTAL INFANTILE MORTALITY RATES.

- | | | | |
|------------|-----------|-------------------|--------------------------|
| 1 N.W.F.P. | 6 Bengal. | 11 Assam. | 15 England & Wales. |
| 2 Punjab. | 7 C.P. | 12 Burma. | 16 Scotland. |
| 3 Delhi. | 8 Bombay. | 13 Ajmer-Merwara. | 17 Australia. |
| 4 U.P. | 9 Madras. | 14 British India. | 18 Canada. |
| 5 B. & O. | 10 Coorg. | | 19 New Zealand. |
| | | | 20 Union of S.A. (White) |

length in Section III of this report, so that it is unnecessary here to repeat the arguments there set out in favour of a wide expansion of the necessary preventive services. It is certain that little permanent reduction in maternal and infant mortality rates can be expected until every town and district has a properly equipped and properly staffed centre and a number of maternity beds at least for difficult or abnormal obstetric cases.

TABLE I (xi).

	Deaths under one week.	Rate p. m. live-births.	Percentage of	
			Deaths under one month.	Total infant deaths.
British India*	406,362	45	61	28
N.-W. F. P.	1,918	25	51	19
Punjab	39,327	37	54	24
Delhi	709	25	39	14
U. P.	69,539	40	64	25
B. & O.	58,385	45	69	35
Bengal	86,268	53	56	33
C. P.		Not available.		
Bombay	22,493	28	44	17
Madras	106,586	64	69	36
Coorg	230	55	62	32
Assam	10,057	42	51	25
Burma	10,139	25	56	14
Ajmer-Merwara	711	33	57	16

*Excluding Central Provinces and Berar.

Table I (xii) gives figures of deaths among children up to 10 years of age along with death rates *per cent* of total deaths for British India and for the individual provinces. Of the 6,578,711 registered deaths, 43% occurred among children under 5 years of age. Whilst the percentage of deaths of infants under one year to total deaths has decreased somewhat, that of pre-school children in the 1—5 years group increased, particularly in the U. P. and Delhi.

TABLE I (xii).

	Under one year.		1—5 years.		5—10 years.		Total under 10 years.	
		% of total deaths.		% of total deaths.		% of total deaths.		% of total deaths
British India	1,588,202	24	1,259,897	19	372,555	6	3,220,654	49
N.-W. F. P.	10,042	22	8,097	18	2,683	6	20,822	46
Punjab	165,917	28	105,740	18	32,369	6	304,026	52
Delhi	5,116	26	4,183	22	985	5	10,284	53
U. P.	274,289	23	306,150	25	60,514	5	640,953	53
B. and O.	168,688	18	201,161	21	63,246	7	433,095	46
Bengal	259,036	23	157,022	14	81,685	7	497,748	44
C. P.	155,766	29	117,489	22	26,410	5	299,665	56
Bombay	132,244	24	122,665	22	27,649	5	282,558	51
Madras	298,396	27	174,419	15	52,648	5	525,463	47
Coorg	715	19	383	10	206	5	1,304	34
Assam	39,155	23	29,687	17	12,759	8	81,601	48
Burma	74,375	30	28,792	12	10,734	4	113,901	46
Ajmer-Merwara	4,463	27	4,109	25	667	4	9,239	56

Of the total infant deaths, 862,120 were male and 726,082 female. Provincial details are given in Table I (*xiii*).

TABLE I (*xiii*).

	Deaths.		Rates p. m. live births.	
	Males.	Females.	Males.	Females.
British India	862,120	726,082	171	156
N.-W. F. P.	5,884	4,158	137	126
Punjab	90,192	75,725	160	150
Delhi	2,690	2,426	181	174
U. P.	149,626	124,663	162	152
B. & O.	91,962	76,726	137	121
Bengal	140,449	118,587	166	151
C. P.	84,299	71,467	236	210
Bombay	71,423	60,821	170	157
Madras	161,475	136,921	189	168
Coorg	375	340	168	174
Assam	21,015	18,140	170	156
Burma	40,349	34,026	258	206
Ajmer-Merwara	2,381	2,082	207	209

Provincial rural and urban infantile death rates are given in Appendix I, Table N on page 224. Urban death rates were higher than rural in every province, except C. P., Coorg and Assam.

Table I (*xiv*), gives interesting figures for the chief causes of infantile mortality in Bombay city, which has a census population of 1,161,383. It has been reproduced from the Annual Report of the Health Officer.

TABLE I (*xiv*).

	1931.	1932.	1933.	1934.	1935.	Mean 1931—35.
All causes.	7,401	6,298	8,320	8,253	8,455	7,745
Smallpox	2	69	717	33	306	225
Measles	15	16	18	27	60	27
Malaria	5	4	9	9	9	7
Remittent and undefined fever	198	147	167	186	146	169
Diarrhœa and enteritis	366	280	414	455	425	388
Dysentery	34	27	19	40	41	32
Debility, malformations and premature birth.	2,987	2,685	3,019	3,384	3,280	3,071
Respiratory diseases	2,646	2,217	2,828	2,983	3,039	2,743
Convulsions	620	422	594	562	563	552
Other causes	523	431	535	574	586	531

Still-births.

6. Table I (xv) gives the registered still-births in British India and in different provinces.

TABLE I (xv).

	Male.	Female.	Total.	Rate p. m. live- births.
British India	87,552	69,081	201,764	20.8
N.-W. F. P.	109	61	170	2.2
Punjab	6,016	4,403	10,419	9.7
Delhi	200	180	380	13.2
U. P.	8,590	6,670	15,260	8.7
B. & O.	22,209	17,566	39,775	30.4
Bengal	40,209	32,349	72,558	44.4
C. P.	Not available.		15,950	22.9
Bombay	7,827	5,911	13,738	17.0
Madras	Not available.		20,312	12.0
Coorg	71	75	146	34.9
Assam	Not available.		8,748	36.5
Burma	2,321	1,866	4,187	10.5
Ajmer-Merwara	Not available.		121	5.6

Registration.

7. Sufficient has been said in previous reports in regard to the defects of the existing system of registration of births and deaths in India, but it seems desirable to make brief mention once more of the errors brought to notice and of the attempts made to obtain greater accuracy in these records in the different provinces. In N.-W. F. P., as many as 13,690 births or 18% of the total and 3,620 deaths or 8% of the total were discovered to be unregistered. In B. & O., registration is compulsory in the 58 municipalities, but, of the 18,505 births and deaths checked, 147 omissions were detected. In rural areas, where voluntary registration is practised, verification is possible only in those districts which employ M. O. Hs. In Bengal, registration is compulsory in all urban and rural areas under the Bengal Births and Deaths Registration Act, 1873. In rural areas, however the registration, collection and transmission of vital statistics continued to be carried out in unsatisfactory fashion. 7,200 unregistered births and 3,939 unregistered deaths were detected. A total of 2,200 births and 110 deaths were found to be unregistered in Bombay. Whilst registration is compulsory in all municipal towns in Madras, in rural areas it is compulsory only in those villages to which the Madras Registration of Births and Deaths Act, 1899, has been extended. So far this Act has been extended to about 35% of the villages, most of these having a population of over 2,000. District health staffs detected 38,036 births and 11,763 deaths which had not been registered in rural areas. Registration of vital statistics continued to be compulsory in 26 municipal towns of Assam but not in rural areas. Even in the former areas, 224 unregistered births and 54 deaths were discovered. In the Hill districts registration is only partially carried out. In Burma, registration was in force in 32,559 towns and villages. In the Arakan Hill Tracts, the

Shan States, the Chin Hills and Kachin Hill Tracts, the tally system by means of coloured sticks or notched bamboo splits has been in force since 1922.

Indian States.

8. Only a few Indian States submit vital statistics; summaries of these are given in Table I (*xvi*).

TABLE I (*xvi*).

States.	Population.			Births.			Birth rate p. m.	Total deaths.	Death rate. p. m.
	M.	F.	Total.	M.	F.	Total.			
Jind . . .	176,383	148,293	324,676	7,590	6,718	14,308	44	9,710	30
Suket . . .	29,859	28,549	58,408	678	600	1,278	22	1,035	18
Kalsia . . .	33,306	26,542	59,848	1,234	990	2,224	37	2,053	29
Maler Kotla . . .	45,883	37,189	83,072	1,124	928	2,052	25	1,098	13
Baghat . . .	5,744	3,981	9,725	50	53	103	11	110	11
Jawhar . . .	29,502	27,759	57,261	1,139	1,104	2,243	39	1,478	26
Dhrol . . .	13,614	14,039	27,653	715	637	1,352	49	565	21
Kolhapur . . .	476,105	453,153	929,258	19,238	17,951	37,189	40	21,245	23
Mysore . . .	3,415,114	3,254,006	6,669,120	70,209	66,150	136,359	20	96,974	15

Mysore State.—Birth rates in the districts varied between 25 p. m. in Shimoga and 17 p. m. in Kadur. Still-births numbered 2,110 or 15 p. m. of live-births. The birth rate in urban areas was 31 p. m. and in rural areas 19 p. m.; the death rates were 19 p. m. and 14 p. m., respectively. The male death rate was 14 p. m. and female 15 p. m. District death rates varied between 12 p. m. in Tumkur and 17 p. m. in Shimoga. The infantile death rate was 116 p. m. of live births; urban 121 p. m. and rural 114 p. m.

Rainfall.

9. Taking the year as a whole, rainfall was in slight excess in the Bay Islands, east Rajputana and Berar, in slight defect in Bengal, Orissa, the U. P., Sind, the Konkan, Malabar and the north Madras coast and normal elsewhere. Averaged over the plains of India, the years' total rainfall was in defect by 4%.

During January and February, rainfall was in large excess in the Punjab, the N.-W. F. P., Baluchistan, Sind, Gujarat and South Hyderabad, in slight to moderate excess in Chota Nagpur, Bihar, the U. P., Kashmir, Rajputana, East Central India, North Hyderabad and south-east Madras, normal in Assam, Bengal, Mysore and Malabar, in slight to moderate defect in Upper Burma, west Central India, the C. P. (including Berar) and the Bombay Deccan and in large defect elsewhere.

The total rainfall of the hot weather period, March to May, was in large excess in the Bay Islands; in slight to moderate excess in the east and north Punjab, the N.-W. F. P., and Sind; normal in the southeast Punjab, Kashmir, Berar and Hyderabad; in slight to moderate defect in Burma, Assam, Bengal, Orissa, the west U. P., Baluchistan, Rajputana, the C. P. (outside Berar), Mysore, Malabar, southeast Madras and the Madras Deccan; and in large defect elsewhere.

During the monsoon season, June to September, it was in slight excess in Assam, east Rajputana, Berar, the western C. P., north Hyderabad and the Madras Deccan; in slight to moderate defect in the west U. P., the Punjab, Kashmir, the N.-W. F. P., Sind and Malabar; and in large defect in Baluchistan; it was normal over the rest of the country.

During the retreating southwest monsoon period, October to December, the rainfall was in large defect in north-east India (including Orissa), the

east U. P., Baluchistan, Sind, Gujarat, east Central India and the C. P. (including Berar); in slight to moderate defect in the west U. P., the Punjab, the N.-W. F. P., west Rajputana, the Konkan, South Hyderabad, the Madras, Deccan and north Madras coast; normal in the Bay Islands, southeast Madras, Mysore, north Hyderabad, west Central India and Kashmir and in slight to moderate excess elsewhere.

Table I (*xvii*) gives the figures of actual rainfall, compared with the normal in the various provinces in each quarter of 1935.

TABLE I (*xvii*).
Rainfall in inches.

	January and February.		March to May.		June to September.		October to December.		Total.	Departure from normal.
	Ac-tual.	Nor-mal.	Ac-tual.	Nor-mal.	Ac-tual.	Nor-mal.	Ac-tual.	Nor-mal.		
Mean of India	1·2	1·0	3·6	5·1	36·5	36·7	4·5	5·0	45·8	-2·0
N.-W. F. P.	4·1	2·5	4·8	4·2	6·8	7·9	0·9	1·2	16·6	+0·8
Punjab	3·7	1·9	2·3	2·0	13·2	15·3	0·7	0·8	19·9	-0·1
U. P.	2·0	1·5	0·6	1·3	30·0	33·5	0·9	1·8	33·5	-4·6
B. & O.	1·6	1·5	1·6	4·0	43·3	42·6	0·2	3·8	46·7	-5·2
Bengal	1·2	1·3	7·7	12·8	50·9	54·9	0·7	5·9	60·5	-14·4
C. P.	0·9	1·3	1·1	1·6	44·1	40·5	0·6	2·8	46·7	+0·4
Bombay	0·2	0·2	0·4	0·6	36·4	39·6	3·4	3·4	40·4	-4·4
Madras	1·1	1·2	3·7	6·0	26·4	29·0	15·3	15·8	46·6	-5·4
Assam	2·2	2·2	20·2	25·2	77·1	66·6	2·5	7·0	102·0	+0·9
Burma	0·1	0·3	7·7	10·5	63·3	66·2	12·9	9·2	84·0	+1·7
Sind	1·1	0·5	0·7	0·5	4·0	5·7	...	0·2	5·8	-1·1
Rajputana	0·8	0·6	0·6	0·9	20·5	19·1	0·8	0·9	22·7	+1·5
Central India	0·7	0·8	0·3	0·9	32·6	33·1	1·2	1·6	34·8	-1·6
Hyderabad	0·8	0·5	2·0	2·0	27·6	26·5	3·2	3·7	33·6	+0·9
Mysore	0·3	0·3	4·4	5·4	22·8	22·4	8·2	8·2	35·7	-0·5

Agricultural and economic conditions.

10. Table I (*xviii*) gives the cultivated and uncultivated acreage in British India and different provinces during the years 1934-35 and 1935-36.

TABLE I (*xviii*).

Area cultivated and uncultivated in each province.

		Cultivated.		Uncultivated.	
		Net area actually sown.	Current fallows.	Culturable waste other than fallow.	Not available for cultivation.
British India	{ 1935-36	228,713,412	51,399,765	153,064,332	145,985,090
	{ 1934-35	226,962,527	52,298,737	154,266,722	144,816,630
N.-W. F. P.	{ 1935-36	2,315,034	457,246	2,785,161	2,666,205
	{ 1934-35	2,199,328	578,502	2,741,432	2,693,548
Punjab	{ 1935-36	27,462,134	3,606,988	14,232,802	12,897,757
	{ 1934-35	26,504,016	4,619,933	14,215,656	12,862,386
Delhi	{ 1935-36	212,751	13,451	61,971	80,321
	{ 1934-35	204,696	23,098	60,522	80,214
U. P.	{ 1935-36	35,906,808	2,756,405	10,157,054	9,868,845
	{ 1934-35	35,662,051	2,910,102	10,217,742	9,900,572

		Cultivated.		Uncultivated.	
		Net area actually sown.	Current fallows.	Culturable waste other than fallow.	Not available for cultivation.
B. & O.	{ 1935-36	25,642,142	8,649,193	7,927,104	11,883,192
	{ 1934-35	24,131,800	6,931,605	6,982,180	8,034,792
Bengal	{ 1935-36	22,674,000	5,670,428	6,657,916	9,794,341
	{ 1934-35	23,357,000	5,424,285	6,626,134	9,229,308
C. P.	{ 1935-36	24,801,398	3,958,846	14,052,250	4,914,828
	{ 1934-35	24,668,067	3,988,965	14,209,929	4,949,650
Bombay	{ 1935-36	33,325,994	10,310,495	6,857,693	19,140,920
	{ 1934-35	32,801,971	10,717,834	6,665,962	19,477,464
Madras	{ 1935-36	31,838,922	10,243,865	11,493,106	16,926,256
	{ 1934-35	32,800,795	11,165,710	13,442,650	19,792,886
Coorg	{ 1935-36	140,027	169,313	11,690	334,045
	{ 1934-35	137,421	171,919	11,690	334,045
Assam	{ 1935-36	6,366,992	1,494,457	18,899,650	4,577,400
	{ 1934-35	5,971,697	1,823,513	19,136,779	4,571,030
Burma.	{ 1935-36	18,161,175	3,874,311	59,625,342	52,060,236
	{ 1934-35	18,164,499	3,799,494	59,679,265	51,996,340
Ajmer- Merwara.	{ 1935-36	366,035	164,767	302,593	840,744
	{ 1934-35	359,186	143,777	276,781	894,395

Table I (*xix*) gives the areas in acres under food crops in the major provinces. Figures for minor administrations are not available.

TABLE I (*xix*).

Total	193,851,299
N.-W. F. P.	2,262,815
Punjab	21,945,083
U. P.	37,258,528
B. & O.	23,595,300
Bengal	22,905,700
C. P.	19,396,035
Bombay	20,360,000
Madras	26,762,872
Assam	5,529,737
Burma	13,835,229

Additional information extracted from provincial season and crop reports for 1935-36 is included in the following sub-paragraphs.

N.-W. F. P.—The sown area aggregated 2,711,740 acres or 5% more than in 1934-35 and nearly 3% above normal; that, harvested amounted to 2,242,811 acres which was 5% more than in 1934-35 and 6% above normal; the balance of 468,929 acres or 17% of the sown area failed to mature. The total estimated produce of rice was 17,982 tons or 5% above normal; *juar*

11,706 tons, 11% below normal; maize 187,656 tons, 16% below normal; sugar cane 64,781 tons or 35% above normal. Prices were low. Stocks of food grains and fodder were generally sufficient.

Punjab.—Of the total area of 31,850,814 acres sown, which was 7% more than in 1934 and 3% more than the decennial mean, 26,666,766 acres or 84% were cropped, and included 21,945,083 acres under cereals and pulses—rice 971,981 acres, wheat 9,300,139, barley 665,921, *juar* 821,086, *bajra* 3,018,423, maize 1,091,291, gram 4,707,909 and other crops 1,368,333 acres. The remaining 5,184,048 acres or 16% failed to mature. The total outturns were rice 464,900 tons, 5% above normal; wheat 3,052,000 tons, 3% above normal; barley 175,000 or 19% below normal; *juar* 89,000 or 10% below normal; *bajra* 390,000 or 13% above normal; maize 382,000 or 4% above normal and gram 954,000 tons or 9% less than normal. Prices generally ruled higher than in 1934 but were lower than normal.

U. P.—Of a total area of 60,553,533 acres, 35,278,077 acres were actually cultivated, the remaining 2,860,152 acres being under forests, 2,732,405 acres current fallows, 9,623,845 acres not available for cultivation and 10,059,054 acres culturable waste. Food crops occupied 37,258,528 acres, including areas cropped more than once. The principal food crops were rice 6,626,097 acres, wheat 7,052,683 acres, barley 3,784,435 acres, *juar* 2,236,877 acres, gram 5,679,540 acres, maize 2,120,410 acres and *kodon* 1,287,842 acres. The total outturn of wheat was 2,498,000 tons, *juar* 449,000 tons, *bajra* 457,000 tons, maize 808,000 tons, and gram 1,718,000 tons.

B. & O.—Of a total area of 53,134,598 acres, an aggregate of 23,180,700 acres, excluding 4,894,800 acres sown more than once, was cultivated. In other words the total cultivated area was 28,075,500 acres. The remaining 29,953,898 acres were either under forests, or were current fallows, culturable waste or were not available for cultivation. Food grains and pulses occupied 23,595,300 acres and oil-seeds 1,613,700 acres. Compared with the previous year, the area under winter rice which was 10,015,800 acres diminished by nearly 3% and that under autumn rice, 3,135,200 acres, by 7%. The estimated gross outturn of rice was 3,404,700 tons, of wheat 416,300 tons, barley 367,600, Indian corn 506,800, gram 383,300, jute 355,700 and sugar cane 667,900.

The prices of staple food grains ruled a little higher. Trade depression and economic distress continued to operate adversely. The emigration of labourers from Balasore and Puri to Calcutta, Jamshedpur and Rangoon continued.

Bengal.—Of a total of 49,254,596 acres, 22,674,000 acres or 46% were actually cultivated, but 5,021,300 acres were cropped more than once. Of the combined total of 27,695,300 acres, food crops occupied 22,905,700 acres or about 83%, fibres 1,770,800 acres, oil-seeds 1,016,300 acres, 510,600 acres under drugs and narcotics, including 2,600 acres under cinchona, 380,400 under sugar and 1,111,500 acres under other crops. About 7% of the total net cultivated area was irrigated.

The winter rice crop was 68% of the normal as against 85% in 1934-35; autumn rice 72% and 75% and gram 81% and 62%. Owing to an unsatisfactory harvest, prices of staple food-grains and of jute ruled generally a little higher than in 1934-35. Wages of agricultural labourers were generally the same.

Central Provinces and Berar.—The total area was 37,986,368 acres in the C. P. proper and 11,378,001 acres in Berar. In the C. P. 23,551,097 acres

and in Berar 8,324,020 acres were cultivated, but the area actually under crops was only 17,711,735 acres in the C. P. proper and 6,589,663 acres in Berar, the remaining acreages failing to yield crops for various reasons. Persistent and excessive rainfall during the early monsoon period proved unfavourable to *kharif* crops except rice, while the abrupt cessation of the monsoon after the last week of September and inadequate winter showers combined with frost, hail and cloudy weather in the last month of 1935 and the first two months of 1936 reduced the *rabi* outturn. Of the autumn crops, rice yielded an outturn of 1,467,800 tons or 88% of the normal, cotton 652,571 bales or 62%, *juar* 69% of the normal, *tur* 73% and *kodon kutki* 77%, whilst of the spring crops wheat yielded an outturn of 641,000 tons or 78% of the normal, gram 80% of the normal and linseed 73%.

The total estimated value of crops, which were 73% of the normal, fell by 3½ crores of rupees as compared with the previous year, the fall being mainly due to unfavourable conditions for cotton, the principal commercial crop.

Bombay Presidency.—In the Presidency proper, gross and net cropped areas increased from 29,039,000 and 28,147,000 acres respectively in 1934-35 to 29,373,000 and 28,540,000 acres during 1935-36. The most noticeable increases occurred in the Deccan and Karnatak divisions, these reflecting the favourable nature of the sowing rains. The area under food crops (20,360,000 acres), such as cereals, pulses, sugarcane, fruits and vegetables decreased by 304,000 acres, or 1.5%, below the figure for the previous year, but these showed an expansion of 638,000 acres or 3.2% as compared with the average. The area under non-food crops, comprising cotton, tobacco and oil seeds, increased by 638,000 acres or 7.6% as compared with 1934-35 and by 455,000 acres or 5.3% as compared with the average. Estimated yields of the principal food crops were rice 842,544 tons; wheat 314,332 tons; *jowari* 1,573,478 tons; *bajri* 536,577 tons; *ragi* 224,004 tons; other cereals 296,093 tons; and pulses 528,246 tons. Little improvement occurred in the prices of agricultural produce except in the case of rice, wheat and groundnut and the slump conditions of 1930-31 continued to prevail.

Madras Presidency.—Of a total area of 83,591,038 acres, only 31,839,022 or 38% acres were cultivated, but including the area cropped more than once the total was 36,628,827 acres. Food crops included cereals 23,827,282 acres and pulses 2,935,590 acres or over 77% of the total. The important rice crop occupied 13,109,418 acres, which was 10% below normal; other important food crops included *cholam* 9,732,056 acres, 6% above normal; *cumbu* 5,094,830 acres; *ragi* 2,660,702 acres; *korra* 1,552,397 acres; and *veragu* 1,050,636 acres. Total Presidency yields were paddy 7,283,840 tons, *cholam* 1,369,730 tons, *cumbu* 715,570 tons, *ragi* 833,860 tons, *korra* 303,640 tons and *veragu* 364,210 tons. Stocks of foodgrains and fodder were generally sufficient. Prices continued to rise.

Assam.—The area sown aggregated 6,366,992 acres; this included 5,529,737 acres or 87% under food crops; 391,621 acres under oilseeds; 447,487 acres under drugs and narcotics and the remainder under sugar, fibres, fodder crops, fruit and vegetables. Yields of the principal crops were rice 1,610,100 tons, jute 312,600 bales, tea 101,100 tons, rape and mustard 45,400 tons and sugarcane 39,300 tons. Wholesale prices were on the whole higher than in 1934-35.

Burma.—The total provincial acreage of 96,279,056 acres comprised 19,877,801 acres under forests, 19,287,985 acres "culturable waste other than fallow", 3,874,311 acres fallow, whilst 17,142,175 acres were actually cultivated and 36,096,784 acres were not available for cultivation. The area sown more than once aggregated 1,188,211 acres. Of the total cultivated

area 13,835,229 acres were under cereals and pulses including 11,874,455 acres under rice and 1,010,551 acres under fruit and vegetables. The total harvests yield per acre was 93% of the normal and 83% of that of the previous year. Prices fluctuated. Deterioration of soil in parts of Pegu, Henzada, Kyaukse and Myingyan districts was reported.

Famine conditions and their relief.

11. On relief measures in the famine stricken parts of Anantapur and Bellary districts of Madras Presidency Government expended Rs. 17,23,452 and the I. P. F. Trust Rs. 25,000. Seasonal conditions were unfavourable in parts of Ganjam district and partial failure of crops owing to inadequate rainfall occurred in Guntur district. Owing to the partial failure of the monsoon in 1934 and renewed failure in 1935 in Murshidabad, Bankura and Birbhum, the rice harvest in the uplands of five districts, was barely 25% of the normal and over a considerable area it failed entirely. In Burdwan and Hooghly further havoc was caused by two floods in 1935. The first flood caused much damage to life and property but came at a time when it was possible to replace the damaged crop by fresh transplantations. A second flood followed carrying away this crop as well and a later drought made cultivation of the *rabbi* crops impossible. To relieve distress due to drought in 1934, test works were opened in Murshidabad, Birbhum and Bankura in October, 1934, and were continued till June, August and November, 1935. Agricultural loans and land improvement loans were also freely given. Test works were opened or reopened on a much larger scale in Bankura, Birbhum, Burdwan, Hooghly and Murshidabad in January, 1936, and subsequently in Khulna and 24-Parganas. Expenditure on relief operations in 1935-36 included Government agricultural and land improvement loans Rs. 9,26,927; Government test relief Rs. 2,36,578; Government of Bengal gratuitous relief Rs. 22,762; and I. P. F. Trust Fund gratuitous relief Rs. 24,500.

Some damage by frost was caused to crops in January, 1935, in parts of C. P., Delhi, Ajmer-Merwara, U. P., Punjab, Bombay and Sind and to fruit trees in Baluchistan. Where necessary, Local Governments granted remissions and suspensions of revenue. During 1935-36 crops were destroyed by floods or excessive rain in parts of Bihar and Orissa, Assam, N.-W. F. P., Western India States, Bengal, Punjab, Central India and Eastern States, Bombay, U. P., and Burma. In 1935 special grants aggregating Rs. 30,000, Rs. 25,000 and Rs. 50,000, respectively, were distributed for relief of distress in Bengal, Madras and Baluchistan. For Baluchistan the grant was given to relieve earthquake refugees in Quetta.

SECTION II.

HISTORY OF CHIEF DISEASES.

Chief causes of mortality.

12. The methods of registration practised in India make it difficult to assess with any degree of accuracy the state of the public health. Sickness statistics are of course unobtainable even for industrial communities, so that recorded mortality figures, admittedly defective, must be used in order to reach such conclusions as the epidemiologist may be bold enough to make. In these circumstances it is ordinarily unsafe to make definite inferences from the statistics of any one year although, on the assumption that the percentage of error is fairly constant, statistics over a period of years may reasonably be expected to give not unduly distorted epidemiological pictures.

Owing to the lesser prevalence of plague, malaria and "fevers", 1935 was a moderately healthy year especially in N.-W. F. P., Punjab, U. P., B. & O., Bengal and C. P. The general death rate fell from 24·9 to 23·6 p. m. In view of the widespread epidemics of cholera, especially in Madras Presidency, Assam and Burma, as well as in B. & O. and Bengal, this reduction in mortality gives cause for some satisfaction. Except in regard to plague, the incidence of which fell by 80% as compared with the previous year, the mortality under other recorded headings was much the same as in 1934.

"Fevers" with a death rate of 14 p. m. continued to be the chief recorded cause of mortality; "other causes" gave a death rate of 6 p. m.; respiratory diseases 2 p. m.; dysentery and diarrhoea 1 p.m., whilst for the three major epidemic diseases taken together the death rate was just 1 p. m.

It becomes more and more clear that some attempt should be made to analyse the large numbers of deaths recorded under "other fevers", respiratory diseases and "other causes". Even a partial exposition of these omnibus groups would almost certainly reveal problems demanding urgent attention. Such analyses would, for example, give public health departments much needed information as to the real incidence of pulmonary tuberculosis and would indicate whether the tuberculosis problem presented different aspects among the rural and the urban populations of this country. It is just because the health officer cannot obtain such epidemiological facts that he is so severely handicapped in his efforts to apply preventive methods. A few spasmodic and local efforts have been made during recent years to improve registration and to verify the causes of death, but until more general effort in those directions is practised, the epidemiologist using existing statistics will be accused with some degree of truth of mere speculation.

Cholera.

(a) *General.*

13. The rise in the mortality curve evidenced during 1933 and 1934 continued during 1935, but the peak did not approach those commonly in evidence prior to 1921. It is worth noting, too, that the rise in the wave seems to have been arrested during the first half of 1936.

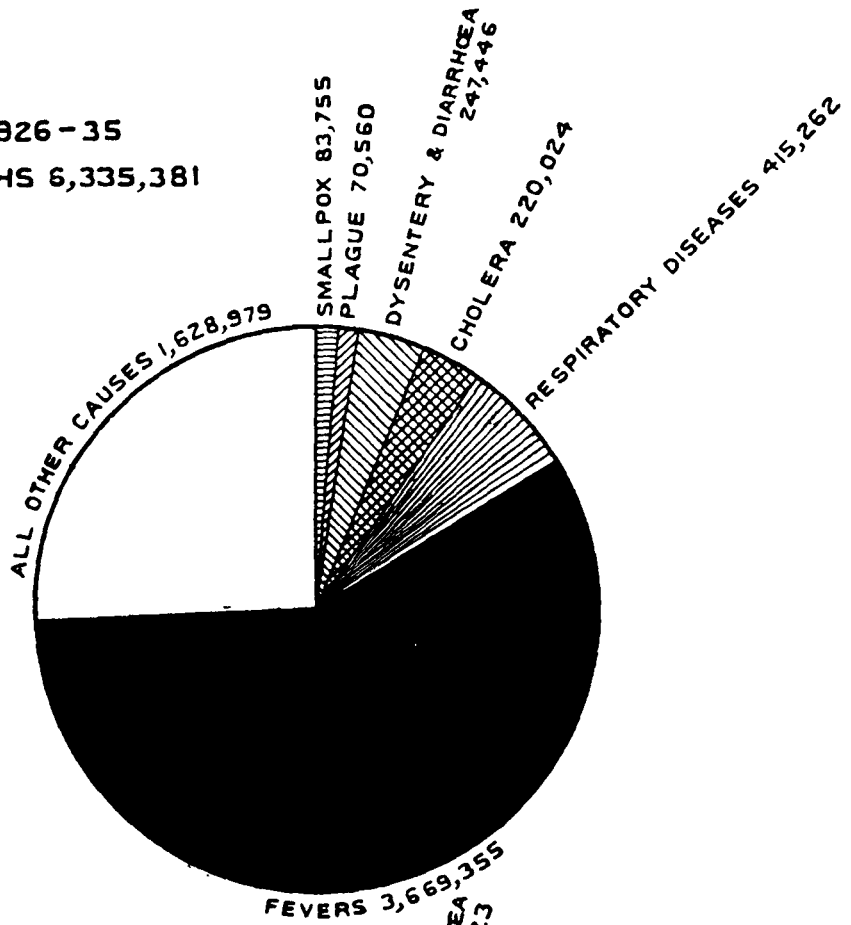
Recorded deaths in British India totalled 217,162, an increase of 18,000 over the figure for 1934 and about 7,000 over the decennial mean. These figures give a death rate of 0·8 p. m. as against 0·7 p.m. in 1934 and 0·8 p.m.

Abbreviations:—

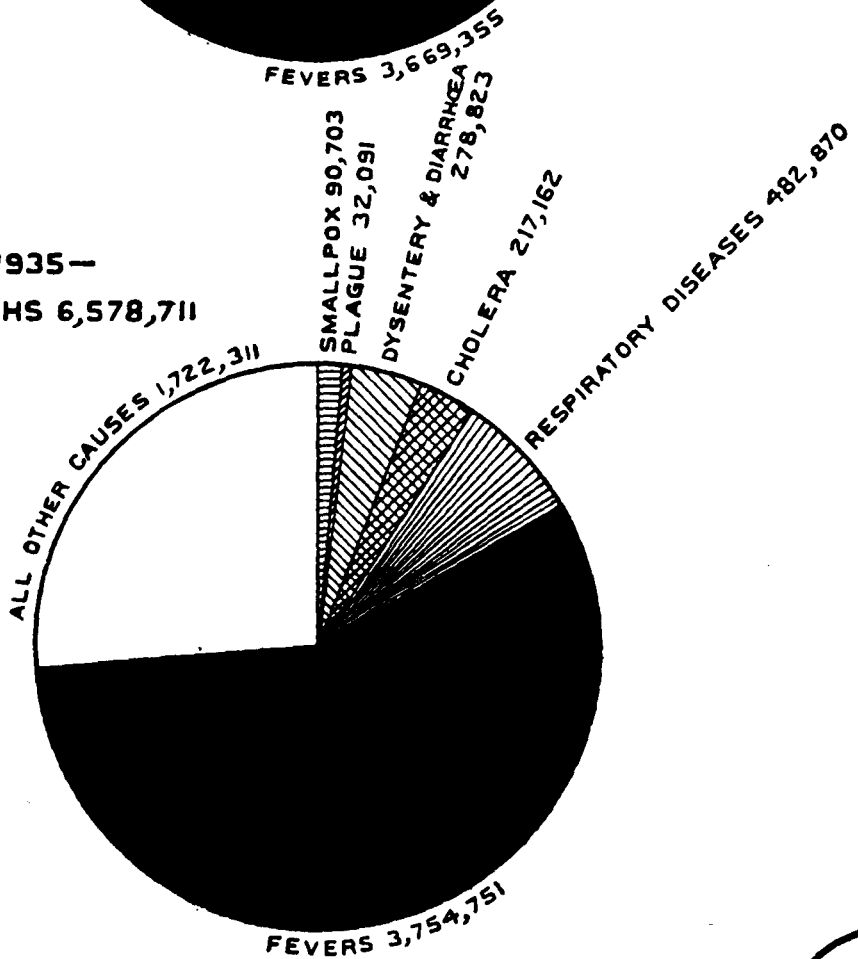
N.-W. F. P.	.	.	.	.	North-West Frontier Province.
U. P.	.	.	.	.	United Provinces of Agra and Oudh.
B. and O.	.	.	.	.	Bihar and Orissa.
C. P.	.	.	.	.	Central Provinces.
P. M.	.	.	.	.	<i>Per mille.</i>

No 3
BRITISH INDIA
COMPARATIVE DIAGRAMS OF DEATHS BY CAUSES

MEAN 1926 - 35
 TOTAL DEATHS 6,335,381

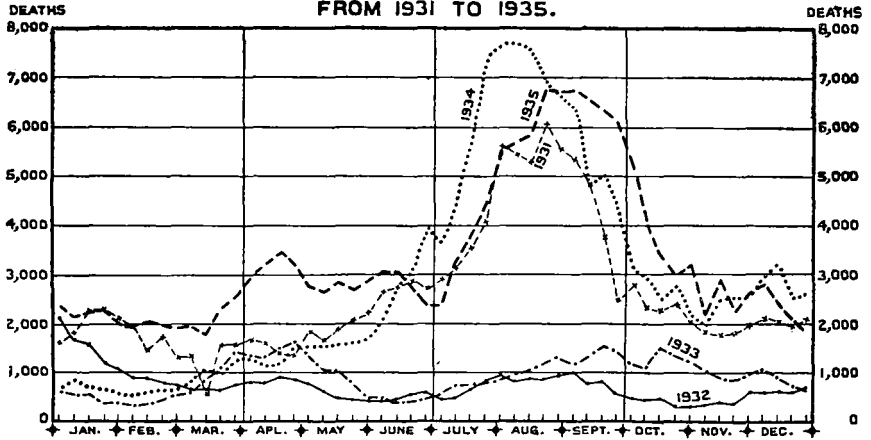


YEAR 1935—
 TOTAL DEATHS 6,578,711

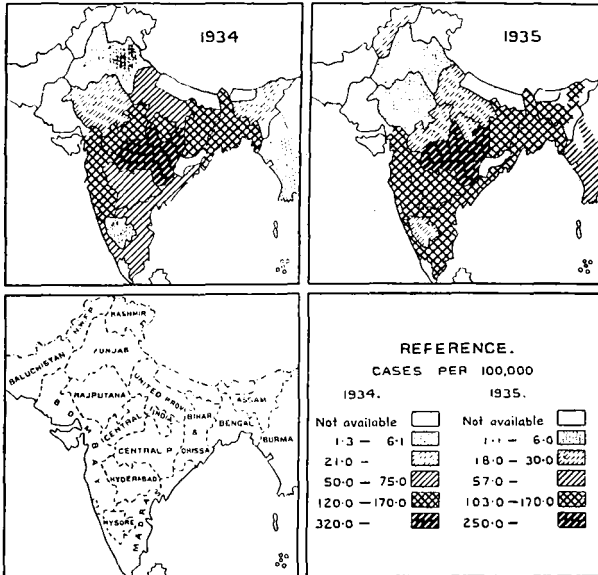


№ 4

WEEKLY NUMBER OF DEATHS FROM CHOLERA IN INDIA FROM 1931 TO 1935.

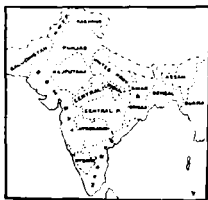
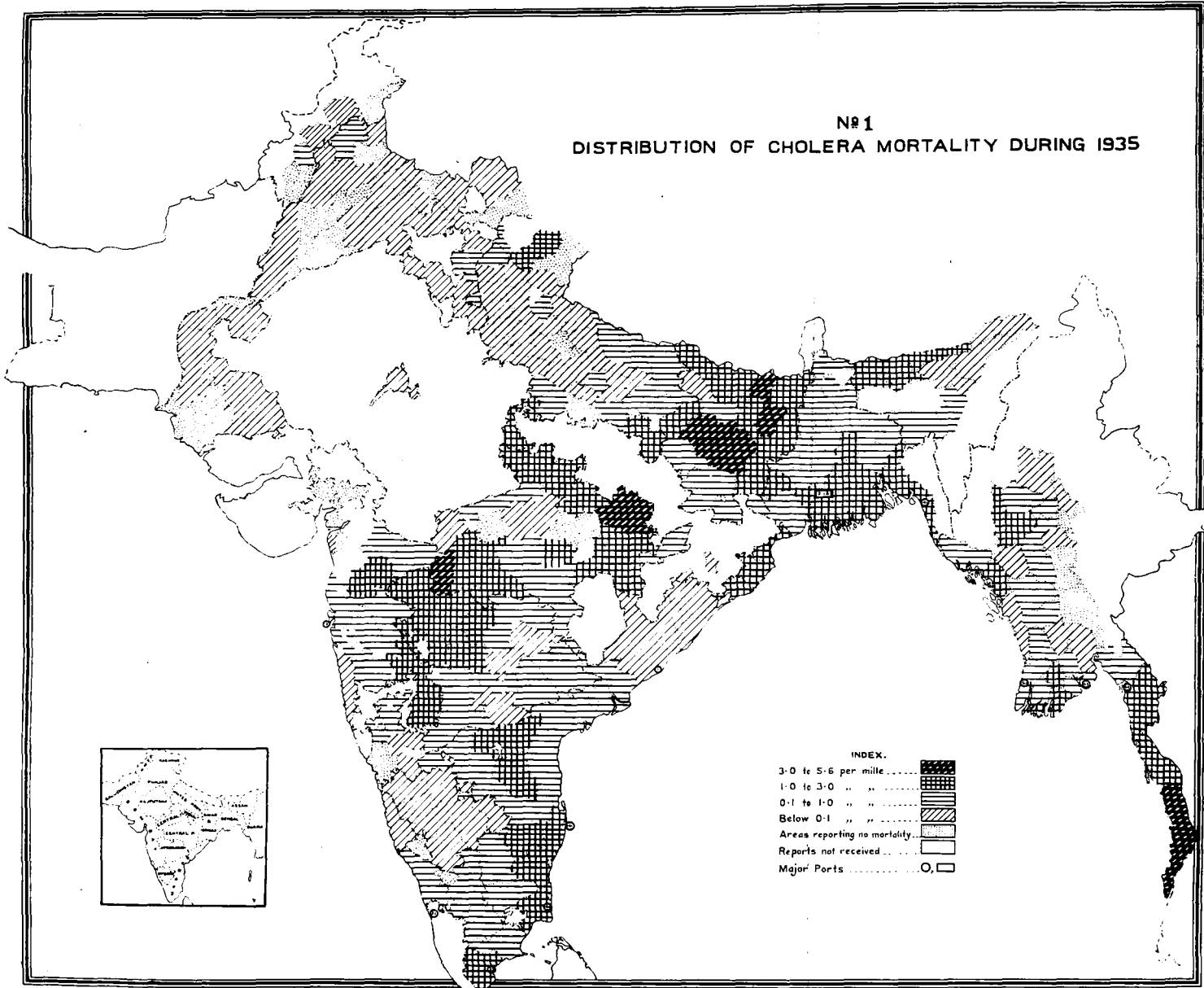


CHANGES IN THE GEOGRAPHICAL DISTRIBUTION OF CHOLERA IN INDIA DURING 1934 & 1935 (CASES REPORTED PER 100,000 INHABITANTS IN EACH PROVINCE.)










Note: Based on data published in the *Lancet*.

N^o 1
 DISTRIBUTION OF CHOLERA MORTALITY DURING 1935



INDEX.

3.0 to 5.6 per mille	
1.0 to 3.0	
0.1 to 1.0	
Below 0.1	
Areas reporting no mortality	
Reports not received	
Major Ports	

the decennial mean. Every province except the U. P. and the C. P. recorded increased mortality. In the former, the epidemic was localised and quickly suppressed; in the latter, Chattisgarh division with its unsatisfactory water supplies was the chief focus of infection. In the C. P., Punjab, N.-W. F. P. and Madras Presidency infection imported from fairs and festivals was responsible for sharp outbreaks; in Assam and in several other areas belated reporting of outbreaks permitted undue spread of the disease. It should be clearly understood that until district boards and municipal councils provide themselves with qualified health officers and adequate health staffs and those bodies are prepared to spend money on efficient water supplies and sanitation, any campaign devised against cholera will almost inevitably prove abortive. Methods for the prevention of cholera are no longer a matter of doubt. The application of these methods lies entirely in the hands of local authorities; but until those authorities adopt the necessary methods, cholera will continue to be a scourge.

For the most part, rural areas suffered much more severely than urban, the respective death rates being 0·8 p. m. and 0·5 p. m., but Delhi, Madras and Bengal were exceptions to this rule. It may be said generally that the same causes were at work in both rural and urban areas although a number of municipal towns now possess protected water supplies and are to that extent insured against water-borne epidemics of cholera.

In British India, out of a total of 461,144 villages, 42,233 or 9% were infected. As regards individual provinces, 38% of all villages were infected, 35% in Delhi Province, 17% in Bengal, 15% in B. & O., 15% in Burma, 7% in C. P., 6% in Bombay, 5% each in the Punjab and Assam, 3% each in N.-W. F. P. and Ajmer-Merwara and 2% in the U. P.

The maximum number of deaths was recorded in September (30,068) and the minimum in February (10,848), but the peak months of course varied from province to province. The U. P., B. & O., Bengal, C. P., Bombay, Madras, Assam and Burma remained infected throughout the year.

The incidence of cholera at the various ports in India is shown in Map No :1.

(b) *Provincial.*

N. W. F. P.—In the settled areas, 3 districts recorded 478 cases with 245 deaths, or a case of mortality of 51%. The epidemic started in Bannu and Peshawar districts towards the end of August and subsided in October. Kohat district became infected in September but this outbreak was mild and quickly brought under control. Bannu district recorded 14 deaths; only one case occurred in Chitral. Infection in all three districts was imported through fairs attended by pilgrims from adjoining infected districts of the Punjab. In order to prevent importation of infection from Kashmir, Campbellpore and Hasan Abdal, three inspection posts were established in Hazara district.

Punjab.—Although 24 districts were infected, recorded cases and deaths numbered only 1,293 and 714, as against 279 and 178 in 1934. Attock, Lahore and Karnal districts contributed about half the total for the province; of the total, 354 deaths occurred in 29 towns and 360 in 158 villages. It is believed that the disease was imported from Hardwar and other parts of the U. P., from Delhi, Bengal and Bombay. Infection in rural areas was usually carried from towns. In this connection the D. P. H. remarks :—

“The defective system of conservancy in the towns with its consequent spread of fly-borne disease is mostly responsible for persistence of infection for longer periods and is a standing menace to the health of the rural population in constant communication with them. In spite of our most serious endeavours there is little prospect of controlling the spread of infection to the rural areas until the conservancy system in towns is put in order.”

Delhi Province.—There were 311 cases and 181 deaths as against 21 and 19 in 1934, the highest incidence being recorded in July. One hundred deaths were recorded in Delhi city, 37 in the notified area civil lines, 27 in New Delhi and 17 in rural areas.

U. P.—The death rate was only 25% of that for 1934, nor was the disease widespread for only 1,799 out of 105,640 villages were infected. In order to prevent importation of infection from Nepal State, the “barrier scheme” introduced last year was continued in Gorakhpur and Basti districts.

B. & O.—This province again suffered severely, the total number of deaths increasing to 64,876 with a death rate of 1·7 p. m.

The districts of Balasore, Cuttack and Puri reported sporadic infection from the beginning of the year; Muzaffarpur, Darbhanga, Purnea, North Bhagalpur and Manbhum districts reported deaths from the beginning of April and Champaran, Monghyr, Shahabad and Singhbhum were infected by early May. By July the disease had spread to nearly every district and it assumed a definitely epidemic character in August in Gaya, Santal Parganas and Hazaribagh. The epidemic reached its peak in August and thereafter declined slowly until by the middle of October the disease had practically subsided.

The D. P. H. summarises the epidemiological position thus:—

“A comparative study of mortality figures from cholera, district by district, from 1929 to 1935 further shows that cholera generally begins late in the summer in the districts of South Bihar and remains present till the advent of the winter months; but the disease begins early in the summer months in the districts of North Bihar and dies out by the end of the monsoon period, while it is found more or less present almost throughout the year in the districts of Orissa. A bad year generally recurs every five or six years and the highest intensity of the epidemics in the districts of South Bihar and in those of North Bihar occurs in two different but consecutive years. Cholera was widely prevalent in seven districts of South Bihar, Orissa and Chota Nagpur in 1930. The year 1934 proved again a bad cholera year for the same districts while the districts of North Bihar were comparatively worse affected in 1935.”

Bengal.—A total of 59,605 deaths gave a death rate of 1 p. m.; these exceeded the figures for 1934 and the quinquennial mean by 20%. The seasonal curve of mortality fluctuated. The number of deaths rose from 5,785 in January to the peak of 9,500 in April, fell to 2,412 in June, again rose steadily during July and August, but declined to 2,485 in October and rose for the third time to 6,043 in December. The districts of 24-Parganas, Howrah and Noakhali returned the highest death rates, these being double the figures for 1934. Urban death rates were 55% higher than those for 1934 and rural rates 20% higher. Recorded deaths totalled 4,770 in towns and 54,835 in rural areas.

C. P.—A virulent epidemic caused 39,374 cases and 20,140 deaths, the death rate being 1·3 p. m.; of the total, 1,237 deaths occurred in urban and 18,903 in rural areas. The epidemic originated during February at the Bhandakpur fair in Saugor district where infection was introduced by pilgrims from Allahabad and infection was spread to neighbouring and other districts by dispersing pilgrims. The districts of Bilaspur, Drug and Raipur in Chattisgarh division suffered most; the disease spread to Berar in April but was soon stamped out. A second invasion of Berar occurred in September, this time the infection originating from the Pandharpur fair in Bombay Presidency. During September and October, practically the whole province was in the grip of the disease but it began to subside in the last week of October and practically disappeared by December.

Bombay.—Recorded deaths numbered 11,235, with a case mortality rate of 46%, as against 11,362 in 1934 and 10,860 the quinquennial mean.

The heaviest incidence occurred in the Southern Registration District with 5,178 deaths; the Central Registration District had 4,904 deaths, the Northern 1,096 and Sind Registration district only 44.

Madras.—A severe epidemic which spread to every district except the Nilgiris followed the usual trend and caused the largest numbers of attacks and deaths during the winter months. Deaths totalled 35,456, giving a death rate of 0·8 p. m. this being double the figure for 1934 and the highest since 1928. The districts of North & South Arcot, Tanjore, Chingleput and Tinnevely suffered worst and were responsible for 60% of the total deaths. Early in the year, infection was fairly severe in the central districts of the province, but by April only sporadic cases were reported. The epidemic again flared up during a festival at Conjeeveram in May and was disseminated by the returning pilgrims. Three distinct peaks were observed, the first in January, the second in July and August and the third in November.

Coorg.—The disease was absent.

Assam.—Total deaths rose from 1,904 in 1934 to 7,436 and the death rate was 0·9 p. m. The disease was for the most part confined to the districts of Sylhet, Goalpara, Darrang and Kamrup. The out-break in Kamrup was severe and although at first the outbreak was sporadic in nature it later assumed an epidemic form which resulted in 2,851 deaths. Infection in the Surma Valley and in the remaining districts was sporadic. Practically all the deaths occurred in rural villages of which 1,509 were infected. Deaths in tea gardens totalled 137. The disease was said to have been imported by emigrants from Bengal.

Burma.—The death rate was the highest since 1930. At the beginning of the year the epidemic was severe in the Irrawaddy division, whilst later on Pegu and Tenasserim divisions became infected, the latter area suffering severely. The seasonal prevalence was most unusual; whilst hitherto epidemics have usually occurred between April and July, the present epidemic increased in intensity between January and April, subsided in May and June, again rose in July and August and declined steadily towards the end of the year. The disease prevailed mainly in rural areas. The districts of Mergui, Tavoy, Maubin, Pyapon, Kyaukpyu and Amherst, which all recorded a high mortality, offer favourable opportunities for the widespread extension of the disease once a focus of infection has been established, because they are intersected with creeks and a large part of the population live in boats or on the banks of the creeks.

Ajmer-Merwara.—Only 4 deaths were recorded.

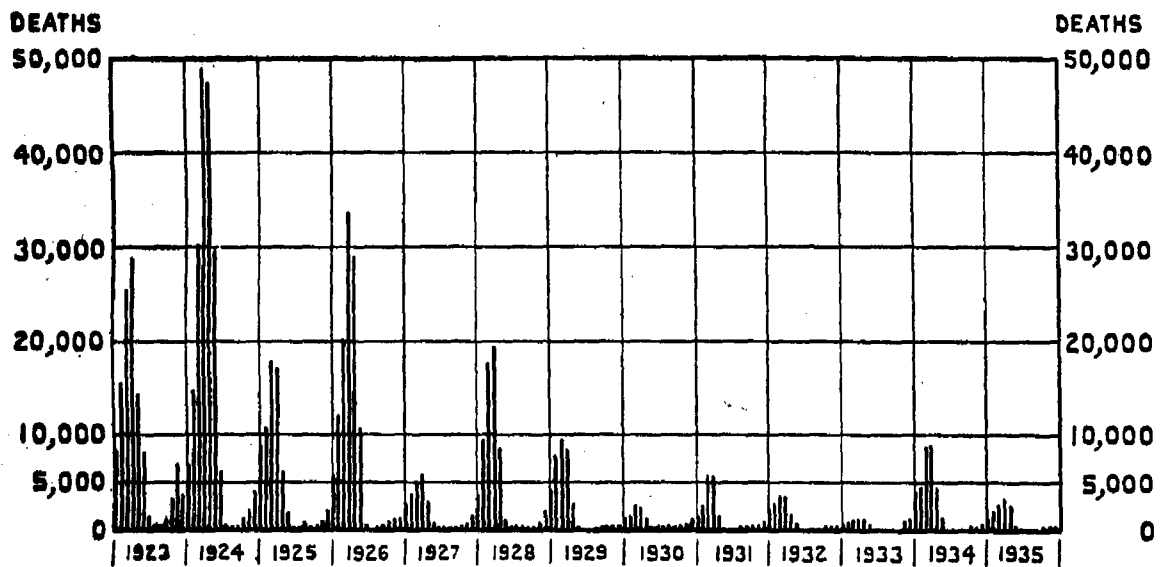
(c) *Anti-Cholera measures.*

Routine sanitary measures, such as improvement and disinfection of water-supplies in villages and at *melas*, improvement of conservancy, medical inspection of pilgrims at railway stations, enforcement of temporary regulations under the Epidemic Diseases Act, employment of epidemic staffs and propaganda were adopted in various centres as and when necessary. Inoculation with cholera vaccine remains the most effective method of personal prophylaxis. Details of anti-cholera inoculations performed during 1935 in different provinces will be found in Appendix II, Table C, page 228.

In the *U. P.*, the cases imported from Nepal state were treated at the barrier posts in the districts of Gorakhpur and Basti. The anti-cholera scheme was continued in 23 districts and 44,106 lbs. of potash permanganate, 8,987 lbs. of Kaolin and 2,154 lbs. of essential oil mixture were issued. The scheme

№ 5

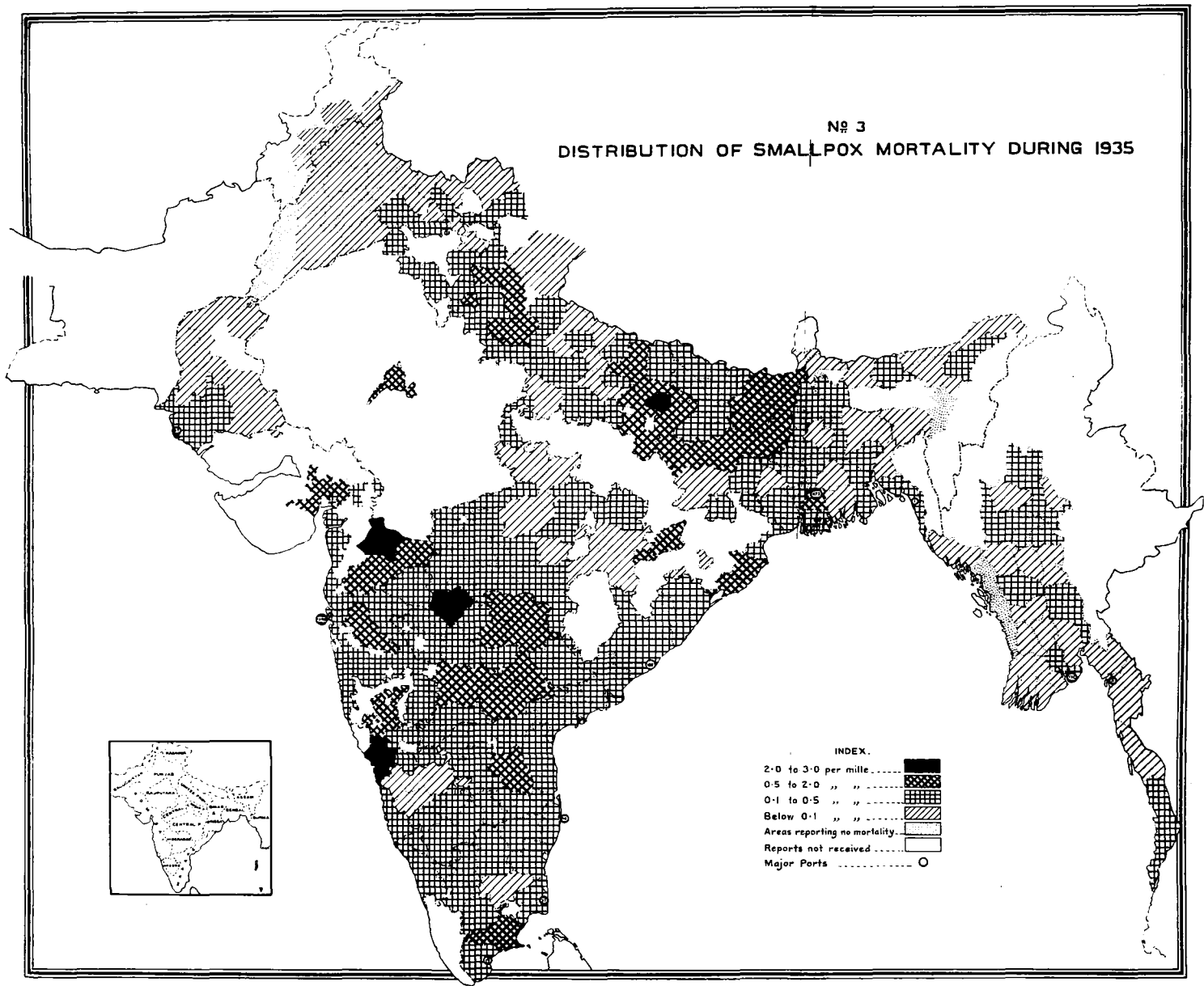
PLAGUE DEATHS REPORTED IN NORTHERN INDIA,*
BY FOUR-WEEK PERIODS, FROM JANUARY 1923 TO
DECEMBER 1935.



* N. W. F. P., Punjab, Punjab States, U.P., B. & O., and Kashmir.

NOTE:-Supplied by League of Nations.

No 3
DISTRIBUTION OF SMALLPOX MORTALITY DURING 1935



INDEX.

- 2.0 to 3.0 per mille [Solid Black Box]
- 0.5 to 2.0 " " [Cross-hatch Box]
- 0.1 to 0.5 " " [Diagonal Lines Box]
- Below 0.1 " " [Dotted Box]
- Areas reporting no mortality [White Box]
- Reports not received [Dotted Box]
- Major Ports [Circle]

Compared with 1934, the number of deaths and the death rate fell from 80,131 and 0·3 p. m. to 32,091 and 0·1 p. m., respectively. This decrease occurred in all provinces; details are given in Table E in appendix II, page 229. Madras and Bombay Presidencies recorded the lowest figures since the introduction of the disease. In the U. P. the epidemic was confined largely to the western districts.

The reasons for the gradual but steady decline in the incidence of plague in India might form the subject of an interesting speculative essay, although history indicates that on several previous occasions pandemics of infectious disease have died out just as plague now seems to be dying out in this country. One thing is certain; the decrease cannot be attributed, at least in rural areas, to permanent improvement in sanitary standards. Housing and other conditions inherently favourable to the rat populations are to a large extent essentially the same as when plague first made its appearance in Bombay forty years ago. Experimental work carried out during the past few years suggests a possible factor favouring reduction of plague incidence. In the course of testing the relative susceptibility to the plague bacillus of rats from different parts of India, it has been found that they present a degree of immunity roughly proportionate to the prevalence of plague in past years in the areas from which they have been obtained. For instance, rats from places like Madras City which have remained entirely free from plague are highly susceptible, whilst those from areas which have experienced frequent and severe epidemics are able to resist considerable doses of *B. pestis*. The inference is that this increased immunity has played some part in reducing the incidence of the disease among rats and consequently in lowering the level of the incidence in man.

In India plague has been almost entirely bubonic in type, the pneumonic form of the disease being of rare occurrence and then only in very restricted fashion. During 1935, the deaths numbered 27,198 in rural areas and 4,893 in urban areas, but as might be anticipated the urban rate 0·2 p. m. was double the rural rate. The disease has always shown a definite seasonal incidence which varies somewhat with the varying climatic conditions of different parts of the country. Climatic factors probably exert an influence chiefly through their effect on (a) total flea prevalence, (b) length of life of the flea and (c) the production of Bacot's "blocking" phenomenon in relation to (a) and (b). During the year under review the highest mortality was recorded in April and the lowest in July, during which month the epidemic in the U. P. reached its peak. Seasonal variations in the different provinces are indicated by the figures given in Appendix II (page 229). Some of the Indian States also experienced mild epidemics. The number of deaths in the Deccan States Agency decreased from 4,547 to 547; in Mysore from 5,296 to 1,822; in Hyderabad from 11,465 to 3,421; in Jammu only 8 deaths were recorded as against 1,043 in 1934.

Map No. 2 gives the distribution of deaths by districts, during 1935.

(b) *Provincial.*

N.-W. F. P.—Plague was again absent.

Punjab.—The incidence was almost the lowest on record; on this fact the D. P. H. makes the following remarks :—

“ A very intensive campaign of off-season deratting operations and cleansing of the infected and suspected villages had been carried out last year and no effort was spared to suppress the very first manifestation of infection with inoculations on an intensive scale, reduction in rat infestation and disinfection to destroy fleas. It appears that the rising wave of recrudescence aborted.”

Of the 1,085 deaths, 976 occurred in British districts and 109 in Indian States (Patiala 91 and Kapurthala 18), whilst nearly 80% of the total was recorded in the districts of Hoshiarpur (493 deaths) and Ambala (276). Deaths in urban areas totalled 240 in 14 towns; those in rural areas 786 in 155 villages. The disease was ordinarily bubonic in type but a pneumonic outbreak occurred in Gurdaspur district.

Delhi.—Only one non-fatal case was recorded.

U. P.—The death rate was only one half that of 1935. Except for Gorakhpur, infection was confined to the Meerut and Agra divisions. Muzaffargarh district with a death rate of 6 p. m. was worst affected.

B. & O.—In certain isolated tracts in the districts of Saran, Muzaffarpur, Darbhanga and North Monghyr plague starts almost every year with the approach of the winter season and reaches its maximum during February and March. During 1935, nearly all the 2,861 deaths occurred in these 4 districts, Saran district alone recording half the total. The death rate was 0·1 p. m.

Bengal.—Only two deaths occurred in Burdwan rural district.

C. P.—The epidemic was of a mild type, 7,966 cases with 796 deaths being recorded and the death rate 0·05 p. m. Deaths were reported throughout the whole year, with the exception of June, but only 8 districts were affected. Of the total 109 deaths occurred in urban and 689 in rural areas.

Bombay.—Total cases numbered 4,070 and deaths 2,453, the last figure being the lowest recorded since 1896. Only 248 villages were reported as infected. The death rate was 0·1 p. m. and 501 deaths (0·1 p. m.) were recorded in urban and 1,952 (0·1 p. m.) in rural areas. The D. P. H.'s remarks regarding the low incidence may be quoted:—

“... in spite of occasional epidemic waves the incidence of the disease has maintained a progressive decline during recent years. A tendency of the peaks to become lower and the epidemic curves shorter is also noticeable. However, systematic and sustained anti-plague measures are necessary to bring the disease under complete control by its extermination from the epidemic centres.”

Of the total, 1,779 or 73% occurred in the Southern Registration district, chiefly in rural areas. An enquiry made into 1,971 cases in this area showed that 80 attacks and 28 deaths occurred among the inoculated, the case mortality rate among the inoculated and the uninoculated being 35% and 63% respectively.

Madras.—Only 645 deaths were recorded, the mortality being the lowest since the disease was introduced some 37 years ago. The disease was as usual mainly confined to the endemic areas bordering on the Mysore Plateau and in the Cumbum Valley in Madura district. For the first time since 1920 the Cumbum Valley was entirely free for over three months and the epidemic was confined entirely to the northern half of the valley.

Coorg.—The disease existed only in sporadic form, only 25 deaths with a rate of 0·5 p. m. were recorded, 14 in rural and 11 in urban areas.

Assam.—As usual plague was absent.

Burma.—The death rate was the second lowest since the appearance of the disease in 1905. The seaboard districts of Arakan, Tavoy and Mergui were as usual free and only in Meiktila district was the disease a serious problem. In the township of Mahlaing in this district the main trade is cotton, whilst juggery is produced on a large scale from the *hlanbin palm*. The leaf of this palm is used for roofing and for walls and the spaces between the palm leaves provide suitable nesting places for rats. Although pneumonic plague is very rare, 31 deaths from this cause were recorded in Tharrawaddy district.

Ajmer-Merwara.—The disease was absent.

(c) *Anti-plague measures.*

Inoculations with anti-plague vaccine are carried out as a routine in all infected areas and their number usually depend on the severity of the epidemic. Details of inoculations done in different provinces will be found in Appendix II, Table E, page 229.

Rat destruction—Punjab.—An intensive deratting campaign by baiting, trapping and smoking operations was successfully carried out during the off-season especially in those areas which were infected at the end of the season or which threatened to form recrudescence foci during the ensuing cold weather.

Delhi.—Rats killed in urban areas totalled 381,977 and in rural areas 364,319 at a total cost of Rs. 21,102 and Rs. 13,295, respectively.

U. P.—The anti-rat campaign was continued in 22 districts, 36 municipalities and 6 notified areas and a total of 2,167,087 rats were destroyed. 4,220 lbs. of barium carbonate were issued free and grants-in-aid aggregating Rs. 6,785 were given to district magistrates and local bodies for preventive measures. Fumigation by Cyanogas was started in 5 districts and 3 municipalities.

C. P.—An anti-rat campaign was carried out in a number of towns; 606,415 rats were killed at a cost of Rs. 40,628.

Bombay.—Ratting operations were carried out in a number of towns and villages in all three Registration districts. Excluding Bombay city, a total of 989,629 rats were caught and destroyed; of 90,771 examined 62 were found infected. In Sind the number destroyed was 150,326.

A special grant of Rs. 6,100 was sanctioned by Government for cyanogas fumigation work in selected villages in Karnatak districts. These operations were placed in charge of a specially trained medical officer.

Madras.—Fumigation of rat burrows with cyanogas was carried out extensively, particularly in the endemic areas. In order to encourage local bodies to adopt this measure Government sanctioned Rs. 8,000 to meet half the cost. A few more rat-proof godowns were constructed in Cumbum Valley.

The main lines on which investigations were continued in the Cumbum Valley were (i) the factors responsible directly or indirectly for recrudescence of plague; (ii) the relative preventive value of cyanogas fumigation of rat burrows and houses under different conditions; (iii) the value of cyanogas fumigation for grain consignments; and (iv) a survey of rat fleas and seasonal variations of the different species. The testing of fleas and rats from a given locality was found to be helpful in detecting latent or smouldering infection.

A total of 3,039 house rat (*R. rattus*), 2,775 house mice (*m. urbanus*) and 448 bandicoots (*b. malabarica*) were examined both by group animal tests and by smears. Six positive groups and 8 positive smears were obtained. Two of the positive groups were from already infected villages, three from Cumbum town and one from an apparently uninfected village which reported plague two weeks later. The blocks in Cumbum town which gave positive group tests were immediately fumigated with cyanogas and no outbreak of plague occurred. 2,194 fleas were also examined by group tests, six groups being positive. Three of these were from infected rats, one from a village which reported plague soon after and the other two were from Cumbum town. Eleven of the individually tested fleas were positive and included 6 *X. astia*, 4 *X. cheopis* and 1 *Ctnocephalus canis*. Eight of these fleas were positive obtained from an infected village and the other three from a house which had reported a rat fall. Saturation deficiency in the rat burrows was at its maximum in May and June and was at a minimum in November and December. Fourteen of the 93 villages treated with cyanogas later became infected. Infection was moderately severe in the four bigger villages but comparatively mild in the other smaller villages. Nine villages have mild plague outbreaks within an interval of 3 to 12 months after fumigation. In another group, the disease broke out only in one untreated village, whilst all those fumigated remained free.

Experimental fumigation of grain consignments was carried out in the fumigation chamber at Kumili on the Travancore frontier. The chamber has a capacity of 3,000 cubic feet and can deal with 40 to 50 cart loads at a time. When the chamber is filled, its door is covered with an oiled tarpaulin. Three hours' exposure of a concentration of 3 oz. of HCN gas per 1,000 cubic feet was found to be sufficient to kill all fleas buried in bags of rice, cholam, black gram, Bengal gram, horsegram, corriander, onions, etc. Smaller grains like *ragi* and articles like bran and coffee husk do not permit the gas to penetrate sufficiently so that even a dose of 6 oz. of HCN per 1,000 cubic feet does not kill all the fleas.

In December, the cheopis index was only one, the lowest during the past five years and an index of 1.08 was obtained during April, May and June. Other conditions being favourable, a cheopis index of 1 is said to be high enough to start and maintain an epidemic. A few *ceratophyllus* fleas were caught at Chellarkoil Mettu situated on the border of Cum-bum Valley at an altitude of 3,500 feet. A few *X. brazilensis* were also found in the same place.

Burma.—Of the 840,576 rats destroyed, 769,632 were caught in Rangoon town. Cyanogas was used as a fumigant in 49 towns and 20 districts.

Smallpox.

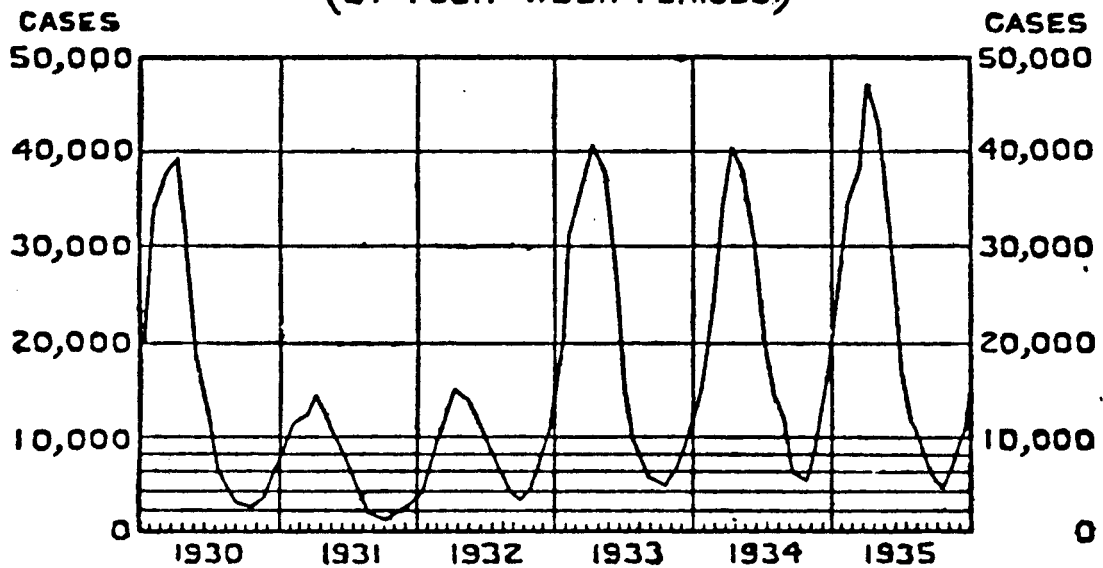
(a) General.

15. Graphs illustrating annual smallpox mortality for individual provinces still show periodic high peaks and in most areas another peak occurred during 1935, after a 4 years' interval. The number of cases rose to 280,881 as against 261,242 in 1934, whilst the deaths from smallpox totalled 90,703 as against 83,928 in the previous year. Nearly 80% of the cases and over 73% of the deaths occurred during the first half of the year, this being a common feature of the disease. The Deccan and the Gangetic Plain suffered worst. In Bombay Presidency the incidence was the highest since 1930, whilst the U. P. and B. & O. together were responsible for more than 50% of the total mortality and Madras and Bombay Presidencies for over 25%. High death rates were recorded in Ajmer-Merwara (1.5 p. m.), B. & O. (0.6 p. m.), Bombay (0.6 p. m.), Delhi (0.6 p. m.), and the U. P. (0.5 p. m.). Map. No. 3 illustrates the variations in mortality by districts.

The general urban death rate 0.6 p. m. was double that in rural areas. Urban rates were higher than rural in the Punjab, Delhi, U. P., Bengal, C. P., Madras, Coorg and Burma.

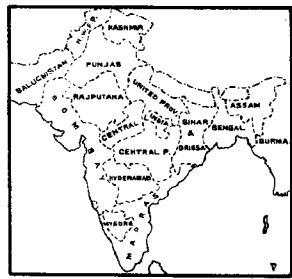
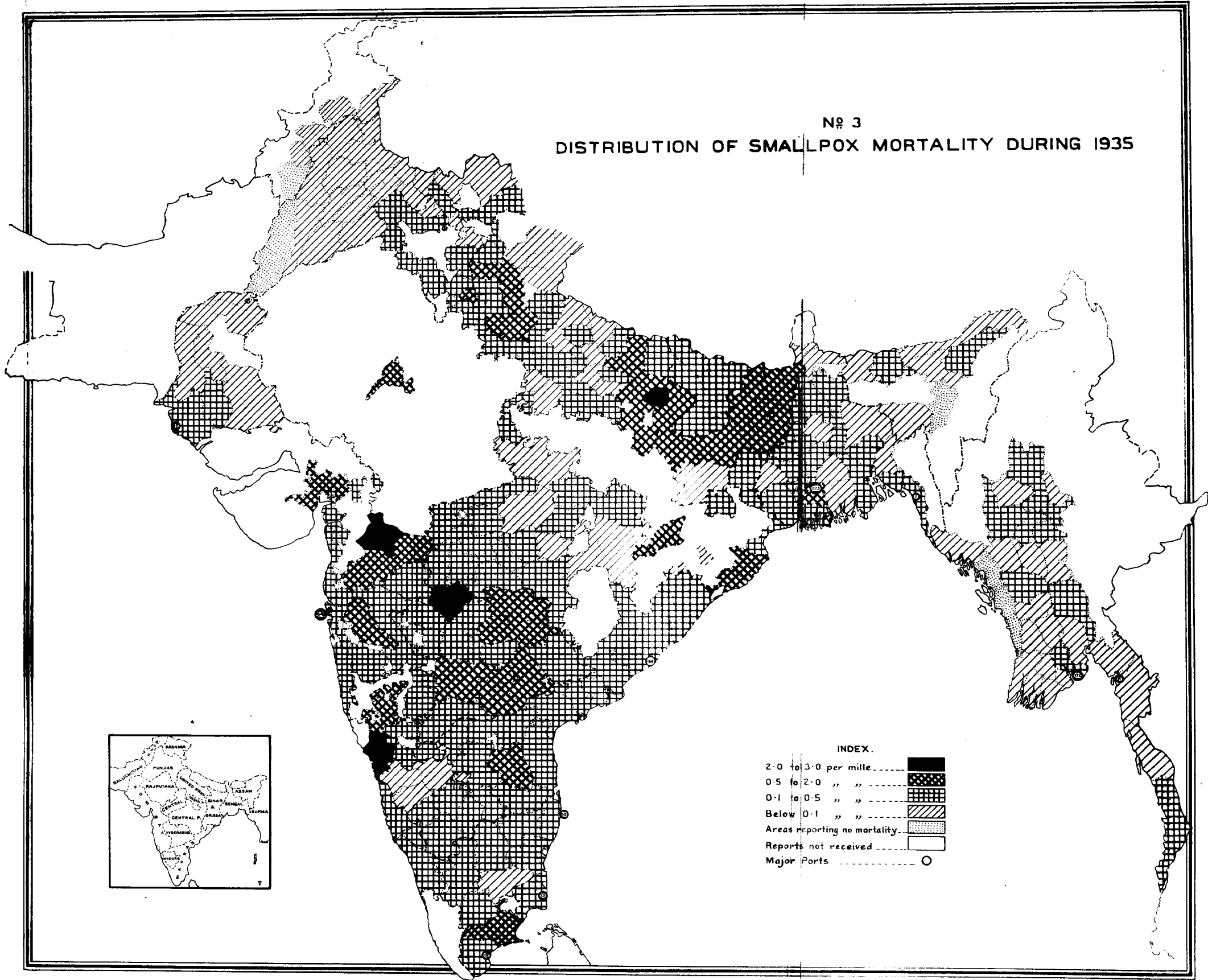
The periodic occurrence in India of widespread epidemics of smallpox has been the subject of adverse comment on numerous occasions and prejudiced persons have used the figures given in these reports in attempts to prove that vaccination is of no value as a preventive against smallpox. The facts are that each year 8 to 10 million persons submit to primary vaccination, an additional 12—15 millions are revaccinated and many thousands acquire a natural immunity after passing through an attack of smallpox. These three groups give the total number of persons protected each year, but when compared with the total population they comprise a small percentage only. Another outstanding fact is that only very rarely do attacks of smallpox occur among the vaccinated, a fact which speaks well for the potency of the lymph. On the other hand, there are several factors which handicap vaccination work. In many of the provinces, the health organisations are very defective and supervision of vaccinators, particularly in rural areas, is either non-existent or is performed in a perfunctory manner. For the same reason outbreaks of the disease are not reported promptly to the health authorities and infection becomes widespread before information is available and necessary action can be taken. Where satisfactory health organisations exist,—and these are now to be met with in various parts of the country,—satisfactory results have generally been obtained. Again, the system of registration of births is such that

No 6
**CASES REPORTED DURING THE
 YEARS 1930 - 1935**
 (BY FOUR-WEEK PERIODS.)



NOTE - Reproduced from the League's Weekly Epidemiological Record for
 December 23 rd 1936 R.H.565.

№ 3
DISTRIBUTION OF SMALLPOX MORTALITY DURING 1935



INDEX.

2.0 to 3.0 per mille	
0.5 to 2.0 " "	
0.1 to 0.5 " "	
Below 0.1 " "	
Areas reporting no mortality	
Reports not received	
Major Ports	

a considerable proportion of the infants does not appear in the birth registers and as a result these escape notice by the vaccination staffs. In at least one province, it has long been the custom to employ the vaccinators during the non-vaccination season in detecting unregistered births and many thousands annually have been so discovered. If this practice were made more general, there is little doubt that a much larger proportion of the child population of the country would benefit by the protection conferred by vaccination and the percentage of smallpox cases in the child population would decrease. A further handicap lies in the fact that vaccination Acts making primary vaccination compulsory have not yet been universally applied even to urban and municipal centres. Existing legislation needs to be revised in order that both primary vaccination and revaccination should be made compulsory both in urban and rural areas.

According to the recorded statistics, the case mortality rate was 32 % the same figure as last year, but as the registration of cases is much less satisfactory than that of deaths, it is certain that the mortality rate was considerably less than this figure would indicate. It may be added here that a number of experienced health officers believe that the disease now prevalent in India is less virulent than it previously was. Of the total deaths, 20% occurred among infants under one year and 30% among children aged 1—10 years. In other words, half of the total mortality occurred among young children. In India, therefore, smallpox continues to be largely a disease of infancy and this fact makes it only too evident that further efforts to raise the numbers and percentage of protected infants are urgently necessary. Some of the handicaps under which provincial health authorities work have been mentioned, but whilst these are serious obstacles in the way of advance the figures quoted in Section VI giving average numbers of vaccination operations performed by each vaccinator indicate clearly that much more might be done by existing staffs if only the provincial health services were so developed as to ensure suitable supervision of the vaccinators' work. In one direction, at least, additional staff is required. For vaccination work among women and children, female vaccinators are much to be preferred and both municipal councils and local boards would be well advised to appoint women vaccinators to their health staffs in order to promote this branch of preventive work.

Graph No. 6 shows the periodicity of smallpox in India during the last 5 years; in 1935 the highest mortality was recorded in May and the lowest in October.

(b) *Provincial.*

N.-W. F. P.—209 cases with 86 deaths were recorded in the Settled districts, of which 69 deaths occurred in the districts of Hazara and Peshawar and 28 and 22 respectively in the Agencies.

Punjab.—Total deaths numbered 1,822. Of these 531 occurred among infants and 887 among children aged 1—10 years. The urban death rate increased slightly and the rural rate decreased.

Delhi.—Cases and deaths totalled 737 and 427 respectively as against 51 and 22 in 1934 and the death rate rose to 1 p.m. Of the total, 192 cases and 139 deaths were infants; 296 and 204 were children aged 1—4 years; 71 and 37 were in the age-group 5—9 years; 27 and 6 among those between 10 and 14 years; 70 and 19 between 15—19 years; 70 and 18 between 20—29 years and 11 and 4 between 40 and 60 years. Fifty per cent of the total occurred in April and May. 383 deaths were recorded in Delhi City, 27 in the Notified Area Civil Lines, 11 in New Delhi and only 6 in rural areas.

U. P.—The death rate was almost double that for 1934 and three times the quinquennial mean. High mortality was registered in the districts of Ghazipur (3·0 p.m.), Azamgarh (2·0 p.m.) and Budaun (2·0). Several small towns recorded death rates lying between 17 p.m. and 34 p.m.; these suggest that vaccination work had been seriously neglected for years and it is to be hoped that stringent steps have been taken to improve matters.

B. & O.—Deaths totalled 22,976 with a death rate of 0·6 p.m. as against 0·8 p.m. in 1934. This decrease is attributed to the high immunity conferred by extensive vaccinations and revaccinations carried out in 1933 when a severe smallpox epidemic raised the death rate to 1·1 p.m. As usual, rural areas suffered more than urban; the highest rates were recorded in the districts of Purnea 2 p.m. and Sambalpur 1·5 p.m.

Bengal—Compared with 1934 and the quinquennial mean, there was a 50% reduction in the mortality. After 327 deaths in January, the figures rose steadily to 1,211 in April and then declined to a minimum in October. As in the previous year, Calcutta reported the highest mortality (1 p.m.). Of the total, 2,269 deaths (0·6 p.m.) occurred in towns and 5,279 (0·1 p.m.) in rural areas. The deaths included 400 infants under 1 year or 5% of the total and 910 children between 1—10 years or 12% of the total.

C. P.—There were 15,479 cases and 2,802 deaths, giving a death rate of 0·2 p.m. Of the total, 958 deaths occurred among infants under 1 year and 1,177 among children between ages 1—10 years. Deaths in rural areas numbered 2,165 and in urban areas 637.

Bombay.—The 1935 epidemic was the worst since 1930. Cases totalled 62,088 and deaths 13,976, giving a death rate of 0·6 p.m., as against 7,834 (0·4 p.m.) the quinquennial mean and 21,341 in 1930. Every district was more or less affected, but the death rate was highest in the collectorates of West Khandesh (3 p.m.), Kanara (3 p.m.), East Khandesh (2 p.m.) and Nasik (2 p.m.). The D. P. H. makes the following observation :—

“ From the statistics of smallpox epidemics in this presidency it seems that the type of smallpox is less virulent than it is generally supposed to be. A fatality rate in the neighbourhood of 40 is often quoted in support of the malignant type of smallpox in Eastern countries. A writer in the United States has calculated 42·3 as the case fatality rate for British India for the years 1926—30. In Bombay Presidency the fatality rate for the same period was 20·2 and for 1931—35 it was 22·4. Registration of vital statistics has improved considerably in recent years but cannot be claimed to be perfect. Apart from births the error, however, now and before has been greater in morbidity than in mortality and if this fact is kept in mind the case fatality rates would presumably be even lower than those quoted above. It is reasonable therefore to deduce that the dreaded classical or malignant type of smallpox with a very high fatality rate has undergone a change during the last 10 years. It may be rash to forecast that this decrease of virulence may take the form of variola minor in the near future in India but there is clear evidence to show that the increase of vaccination has a decided effect in lowering the virulence of the disease.”

“ The other effect of vaccination, *i.e.* prevention of smallpox is also equally evident in this Presidency. During the 5 year period 1926—30 the total number of primary vaccinations and revaccinations was 821,666 and during the subsequent 5 years the number was 1,082,585. The increase of 33% may naturally be expected to show some decrease in the attack rates which work out at 223·58 per 100,000 population for the first period and 124·51 for the second period, a decrease of 45 %.”

“ Although there is considerable reduction in the second of the two periods of all years for which statistics are available, the attack rate in the Presidency is very high as compared to the rates of other countries. In countries like Bulgaria, Germany, where social and economic conditions vary widely but vaccination is compulsory, the attack rate is 0·15 per 100,000 population whereas it is 124·51 in Bombay Presidency. At the present stage it may be said that the majority of children are vaccinated during the first year of life, but, in spite of some increase in revaccinations, a very small percentage of the adult and adolescent population is revaccinated. Smallpox which was supposed to be

entirely a disease of children has shifted the age period and many adolescents and adults now contract the disease. The need of revaccination is thus apparent."

Of the total, 4,114 deaths were infants and 6,839 children between 1—10 years of age; in other words, 78% of the deaths were among children.

Madras.—Smallpox was widely prevalent and 12,330 deaths with a death rate of 0·3 p.m., were recorded. Of the total, 1,530 deaths were reported in municipalities. Mortality was at its maximum during the first quarter, but in Ramnad which was worst affected, the maximum occurred during the third and fourth quarters. Infants under one year accounted for 27 % of the total mortality, children between 1 and 10 years for 30% and adults for 43%. Vigorous campaigns in connection with infant vaccination carried out in recent years are said to have resulted in the reduction of infant mortality from smallpox from 45% of the total smallpox deaths in 1926 to 27% during the year under review.

Coorg.—Forty-two deaths were registered, 28 in rural and 14 in urban areas.

Assam.—The number of deaths increased from 206 to 529, the death rate being 0·07 p.m. as compared with the decennial average of 0·3 p.m. Only 240 villages out of 28,333 were affected.

Burma.—All districts but two were infected. Eight per cent of the deaths were among infants, 22% among children aged 1—10 years and 70% among others.

The D. P. H. remarks :—

"The Vaccination Act which enforces primary vaccination in children who have attained the age of six months has been in force in Burma since 1883 in the towns and since 1923 in the rural areas. The vast majority of the people get vaccinated as children and the value of primary vaccination is recognised generally. Until the necessity for re-vaccination is similarly appreciated, the annual mortality among people over ten years of age will be difficult to avert."

Ajmer-Merwara.—Deaths totalled 880 against 438 in 1934. The death rate was 1·5 p.m.

(c) Isolation hospitals.

In British India no hospitals are exclusively reserved for the isolation of smallpox patients nor is accommodation provided for contacts. Such information as is available of the vaccinal history of smallpox cases treated in hospital is given in Table II (i).

TABLE II (i).

	Smallpox patients.	One or more vaccination scars.	Stated to have been successfully vaccinated but no vaccination scar present.	Stated to have been unvaccinated or vaccinated unsuccessfully but no vaccination scar present.	Previously unvaccinated but vaccinated during incubation period of smallpox.	Stated to have been successfully re-vaccinated.
U. P.	513	245	3	187	3	16
Bengal	765*	328	34	340	24	32
C. P	194	97	5	84	8	..
Bombay	258	113	12	120	6	7
Madras	844	606	96	134	..	8
Assam	11	7	..	3	..	1
Burma	607	355	..	252	..	..

* Particulars of the 7 cases were not recorded.

Fevers.

(a) General.

16. Compared with the last year and the decennial mean, the number of deaths recorded during 1935 under 'fevers' show a small decrease at 3,754,751, but the variation is no greater than might occur by chance. It is illuminating to note that of this total 2,744,000 or 73% were recorded in the cold northern areas of India stretching from the N.-W. F. P. to Bengal, whilst 805,000 or 22% occurred in the milder climates of South India and the Deccan. 3,542,096 deaths were registered in rural and 212,655 in urban areas but the proportion between these totals is much the same as that between the total rural and urban populations so that this variation does not seem to exert any influence on the incidence of the 'fevers' of India.

As usual rural rates much exceeded urban in all provinces.

Tables H and I in Appendix II on page 231 give further details as well as an analysis of the "fevers" figures for certain provinces.

(b) Provincial.

N.-W. F. P.—Fever deaths numbered 36,939 which gives a death rate of 15 p.m. Of these, 33,940 deaths occurred in rural and 2,999 in urban areas, the death rate being 17 p.m. and 9 p.m., respectively.

Punjab.—The total of 396,321 deaths gave a death rate of 16 p.m. Maximum mortality was recorded in January (42,076) and the minimum in March (27,199). The urban death rate was 10 p.m. and the rural 18 p.m.

Delhi.—Deaths numbered 11,965 with a rate of 19 p.m. Fifty per cent of the total deaths occurred during May, June, September and October. The female death rate of 23 p.m. exceeded the male 16 p.m. The urban death rate was 15 p.m. and the rural 24 p.m.

U. P.—This group was responsible for 929,298 deaths with a death rate of 19 p.m. Maximum mortality occurred in June (101,557 deaths) and the minimum in December (64,167). The urban death rate was 13 p.m. and the rural 20 p.m.

B. & O.—No less than 663,964 deaths or 68% of the total were recorded as due to fevers. The death rate was 18 p.m. 10,177 deaths occurred in urban and 653,787 in rural areas. The highest death rates were recorded in the districts of Angul (27 p.m.), Palamau (25 p.m.) and Gaya (23 p.m.).

Bengal.—705,628 deaths, or 65% of the total, were recorded as due to fevers. The death rate was 14 p.m., a figure considerably lower than that of 1934. The maximum number was recorded in December (82,078) and the minimum in June (44,429). Of the total, 691,624 deaths were in rural and 14,004 in urban areas. The rates for rural and urban areas were 14 p.m. and 4 p.m. respectively.

C. P.—Deaths from fevers numbered 281,367 giving a death rate of 18 p.m. Of these 19,748 occurred in urban and 261,619 in rural areas. The rates for rural and urban areas were 18 p.m. and 11 p.m. respectively. Maximum mortality was reported in October (31,559) and the minimum in February (14,500).

Bombay.—The number of deaths registered as due to 'fevers' was 204,752, giving a death rate of 9 p.m. The rates for rural and urban areas were 10 p.m. and 6 p.m. respectively. Death rates varied between 17 p.m. in the Collectorate of East Khandesh and 9 p.m. in Dharwar.

Madras.—A total of 315,998 deaths were recorded as due to fevers, the death rate being 7 p.m. Districts recording high fevers mortality included East Godavari Agency, Vizagapatam, Ganjam and Kurnool. The mortality was at its maximum in August, September and December. An investigation made in certain villages of Vizagapatam district which has recorded high "fever" death rates showed that only 41% of those deaths were actually due to that cause. The urban death rate was 3 p.m. and the rural 6 p.m.

Coorg.—Deaths numbered 2,804 and the death rate was 17 p.m. Of the total, 2,759 deaths occurred in the rural district and only 45 in towns, the death rates being 18 p.m. and 5 p.m.

Assam.—"Fevers" were said to be the cause of 106,719 deaths or 63% of the total. The largest number of deaths was recorded in June (11,823) and the smallest in March (5,883). Goalpara district reported the very high death rate of 24 p.m. whilst the lowest rate was in Sibsagar (9 p.m.).

Burma.—Fevers were the cause of 88,426 deaths or 36% of the total mortality. The death rate was 7 p.m. and the rural and urban rates were 8 p.m. and 3 p.m. respectively. The D. P. H. says:—

"Mortality from this group of fevers is mainly reported from the rural areas where the village headmen are the registrars. The vast majority of cases with a rise in temperature are classified under this heading. In spite of this unsatisfactory diagnosis, there is no doubt that malaria causes a considerable portion of these deaths."

Ajmer-Merwara.—Fever deaths totalled 10,569, equivalent to a rate of 18 p.m. 9,193 deaths occurred in rural and 1,376 in urban areas.

Malaria.

(a) General.

17. Judging from attendances at hospitals and dispensaries and from deaths recorded as due to malaria, this disease was somewhat less severe in 1935. Table H on page 231 shows that 1,632,083 deaths, or about 44 % of the total "fevers" deaths, were ascribed to this disease.

Improvements in registration would no doubt give a more accurate picture; in some areas the malaria mortality might be higher, in others it would almost certainly be lower. Meantime it is unfortunately impossible to obtain closer relationship to accuracy. According to the recorded figures 1,560,646 deaths, or 96 % of the total, occurred in rural areas. Assuming for the moment that approximately one third of all deaths recorded as due to "fevers" were caused by malaria, we reach an estimate of 1,251,584 deaths in British India during 1935. Remembering the defects in registration, the difference between this figure and that of recorded deaths is not a matter for great astonishment. It may perhaps be safely assumed that the recorded total is an exaggerated figure and that the actual truth lies somewhere round the estimate of $1\frac{1}{4}$ million deaths. Even at this lower level, the fact remains that malaria is the most prevalent and most fatal disease in India causing immeasurable misery and acting as a powerful deterrent to economic progress.

Table II (ii) gives total hospital attendances for malaria by provinces for 1935.

TABLE II (ii).

	Cases.	Percent of total cases treated.
Total	11,014,137	14
N.-W. F. P.	455,715	20
Punjab	1,846,147	12
Delhi	163,478	15
U. P.	1,174,475	13
B. & O.	918,917	13
Bengal.	2,877,825	28
C. P.	470,066	13
Bombay	629,826	16
Madras	1,069,669	6
Coorg	125,349	10
Assam	766,896	30
Burma	385,284	14
Baluchistan	130,490	18

(b) Provincial.

N.-W. F. P.—Although malaria continued to be the most prevalent disease in the province, its incidence was lower than in 1934. Parts of the rural areas were heavily infected and the splenic index there was high. In Chaudhwan in D. I. Khan, for instance, out of a population of 4,500 about 2,296 were infected.

Punjab.—The final forecast issued in September did not predict severe or widespread autumnal epidemics in the major part of the province. Moderately severe epidemic conditions were, however, expected to appear in the districts of Karnal, Sialkot, Hissar, Jullundur and Gurdaspur, whilst localised epidemic foci were forecast as probable in a considerable number of areas. The forecast proved to be reliable and it seems that a considerable degree of accuracy has now been attained in this piece of scientific prophecy. Of the 170,305 recorded deaths from malaria, 159,529 occurred in rural areas and 10,776 in towns, the death rates being 8 p.m. and 4 p.m.

Delhi.—As many as 117,451 cases of malaria, or 14 % of the total attendances were treated in hospitals and dispensaries. Deaths numbered 57; of these 11 were in rural areas. These figures do not give an accurate picture of actual facts; in many rural tracts malaria exists in severe form and the splenic index may be as high as 90 %. The worst affected areas lie to the east near the Jumna river and to the north where the land is irrigated by the Western Jumna Canal.

U. P.—Malaria in epidemic form existed in parts of 18 or 19 districts, but the outbreak was not widespread and in most areas was an accentuation of the usual autumnal wave. In all 5,272 villages were affected. An investigation carried out in regard to the reputed high malaria mortality in 35 municipalities showed that the reported figures were exaggerated, the percentage of error being over 36 %. Percentages of error as high as 57 % were discovered by similar investigations made in 30 districts. In the Sarda Canal "sample areas" and allied tracts, spleen rates of 100 % were found in the villages under canal irrigation in Shahjahanpur district. By contrast, the maximum spleen rate was 7.2 % in Unao district which is not irrigated by canals. Another investigation was carried out to ascertain the epidemiological features of malaria,

in villages along the Hardoi Branch of the Sarada Canal in the districts of Pilibhit and Shahjahanpur around Khanaut river. A spleen census was taken twice in the 30 districts under the district health scheme. Averages for the spring and autumn malaria seasons were only 3·3 % and 5·6 %. Nainital, Saharanpur and Mirzapur districts recorded high rates.

B. & O.—It is probably correct to say that malaria accounted directly or indirectly for most of the fever deaths. Whilst sporadic cases were reported from every part of the province, large portions of Orrisa and the districts of Singhbhum, Purnea, Muzaffarpur and North Bhagalpur are known to be intensely malarious. During 1935, a severe epidemic occurred in Madhipura and Supaul sub-divisions of Bhagalpur district, the numbers of cases reported being 14,108 and 33,548. This epidemic which started in September, reached its maximum in November and began to decline by the end of December, was confined to a low lying tract through which flows the Kosi river. Of the 11,247 children examined in 771 villages in the districts of Ranchi, Sambalpur, Angul, Cuttack, Singhbhum and Manbhum, 1,448 or 13 % were found with enlarged spleens; the spleen rates for these six districts were 7 %, 11 %, 27 %, 12 %, 14 % and 9 % respectively.

Bengal.—Recorded deaths totalled 342,955 giving a malaria death rate of 7 p.m. District death rates varied between 0·5 p.m. in Calcutta and 16 p.m. in Rajshahi. Other high rates were reported in Nadia (14 p.m.), Malda (12 p.m.), Rangpur (13 p.m.) and Dinajpur (12 p.m.) Rural areas returned 340,637 deaths and towns 2,318, the death rates being 7 p.m. and 1 p.m.

C. P.—No less than 269,249 deaths, or 50 % of the total provincial mortality, were ascribed to malaria; the death rate being as high as 17 p.m. The districts of Raipur, Bilaspur, Drug, Chhindwara, Hoshangabad, Saugor and Bhandara suffered most severely.

Bombay.—During the year, 31,221 malaria deaths were registered, giving a death rate of 1 p.m. The Central Registration District recorded 17,382; the Southern 6,821; the Northern 4,747 and Sind 2,175. 96 deaths from malaria were registered in Bombay city. The highest mortality was recorded in November and the lowest in June. Rural and urban death rates were 2 p.m. and 1 p.m.

Madras.—Malaria is more or less endemic in certain parts of East Godavari Agency, Vizagapatam, Ganjam and Kurnool districts. A preliminary survey of Bellary district revealed in 3 *taluks* a malaria mortality as high as in the "regional epidemics" of the Punjab and Sind and in the recent epidemic in Ceylon.

Assam.—Malarial fevers are the greatest scourge of this province. The disease was prevalent throughout and almost constantly in epidemic form. A total of 733,408 cases were treated in hospitals and dispensaries in the plains districts. Although deaths from malaria are not recorded separately, a very large percentage of the fever deaths are certainly attributable to malaria.

Burma.—The urban malaria death rate has shown a progressive improvement since 1928, the rate for 1935 being 0·03 p.m. less than that for 1934 and 0·21 p.m. below the 5-year mean. Towns recording high mortality include Lashio 19 p.m., Mawlaik 10 p.m. and Kawkareik 9 p.m. By comparing recorded "fevers" mortality in malarious districts with that in districts known to be practically free, it has been found that nearly 50% of the fever deaths may be ascribed to malaria. Generally speaking the wide open plains are free, but where the country gets broken up by low-lying hills malaria becomes prevalent and in those areas the highest morbidity and mortality are

found. Malaria broke out in epidemic form in Kyaukse district in November as a result of floods; in Toungoo district the outbreak was mild; whilst in the districts of Hanthawaddy and Insein malaria was constantly present. Severe malaria was reported from the Upper Chindwin district where in the narrow valleys the perennial hill streams provide favourable conditions for its development. As in previous years, the disease was very prevalent in the Shan States.

(c) *Anti-Malarial measures.*

N.-W. F. P.—The military medical authorities carried out extensive anti-malarial measures within and adjacent to cantonment areas. In the absence of properly trained staffs and anti-malarial organisations in municipal and notified areas, grants were made by Government and municipal councils to the military authorities in Peshawar and Kohat for anti-malarial measures to be carried out in the vicinity of the municipal areas and in villages near cantonments. Some municipalities carried out their anti-malarial measures within their own limits by draining pools, oiling water collections and so on. In rural areas, apart from treatment at local dispensaries and the distribution of quinine, no anti-malarial work of importance was attempted.

Delhi Province.—Measures included systematic weeding of water channels and flooded areas, spraying with paris-green and crude oil, use of oil mops, balls and bags in suitable places and drainage of stagnant water. Adult mosquitoes caught and identified included *A. stephensi*, *A. subpictus* and *A. culicifacies*. Of the local Government contribution of Rs. 5,000 for anti-malaria measures, Rs. 3,300 was utilised on oiling water collections during the malaria season.

U. P.—The Malaria Bureau under an A. D. P. H. continued to be maintained. Advanced courses of instruction in malariology including field work were given to 19 officers. A theoretical and practical course in malariology was given to 10 candidates for the License in Public Health, whilst 16 candidates went through a short training course designed for sanitary inspectors.

In the Banbassa headworks of the Sarda Canal, fortnightly examination of blood films from fever cases were made in order to provide suitable treatment of chronic carriers. The usual "blanket" treatment was continued during the spring and autumn. In the Terai and Bhabar estates, 50 villages were paris-greened and 285 persons trained in antilarval work. Anti-malaria works, including clearing of drains, provision of suitable culverts, filling of depressions, etc., were carried out at a cost of Rs. 10,634. 10,874 boys were given a simple training in the causation and the principles of prevention of malaria at 33 urban and 127 rural centres; their services were utilised for carrying out minor anti-mosquito measures. Anti-malarial byelaws were in force in 32 municipalities, cantonments and notified areas.

B. & O.—In the affected areas in Bhagalpur district, 8 doctors were temporarily employed and put in charge of field dispensaries. A field experiment to demonstrate the effect of paris-green on paddy crops was repeated in Puri district. The results were not conclusive and it was proposed to repeat the experiment.

Bengal.—The breeding of *A. ludlowii* in the neighbourhood of Calcutta was profuse as a result of the suspension of control operations in February when the Calcutta Corporation discontinued their contribution towards the cost of the control scheme in the Salt lake area.

C. P.—A travelling dispensary worked in the Melghat forest area and the adjoining *ryotwari* tract in Amraoti district. Anti-malarial operations were continued in Pachmari, Nagpur, Jubbulpore, Khandwa and Burhanpur.

Bombay.—The special staff of 54 subordinate medical service officers appointed during the malaria season visited 5,274 villages in the most malarious parts of the Presidency and treated 95,932 cases. Of the 125,954 children examined, 44,714 or 35 % were found to have enlarged spleens.

Madras.—Out of the Government of India grant for rural amelioration, a sum of Rs. 50,000 was sanctioned for anti-malaria operations in the districts of Vizagapatam Agency (Rs. 13,000), Nilgiris (Rs. 13,000), Chingleput and Nellore (Rs. 18,000) and in Ramesvaram Island (Rs. 6,000). General anti-mosquito campaigns were instituted in a number of municipal towns.

Coorg.—In addition to the anti-malarial officer, dispensary medical officers carried out anti-malarial measures within their respective areas. The co-operative societies, village *panchayats* and a number of planters also assisted with similar measures in rural areas.

Assam.—The Assam Government gave a grant of Rs. 25,000 to the Assam Medical Research Society for purposes of research and Rs. 24,500 for anti-malarial measures. Twenty candidates, including 9 officers of the Public Health Department, 4 of the Medical Department and 7 others, passed the eight weeks training course in malariology. Entomological investigations included the identification of 152,075 anophelines larvae and 22,997 adult specimens and dissections of 9,348 mosquitoes.

Specimens of *A. culifacies*, which has not been previously reported as a carrier, were found infected. 41% of all blood slides examined, which came principally from hyper-endemic areas, showed malaria parasites. Data of 69,563 blood examinations from healthy, moderately endemic and hyper-endemic areas were being studied. Breeding experiments in the most northern and coldest parts have shown that under the coldest winter conditions as the *A. minimus*, the principle vector of malaria, continues to breed. Malaria researches with special reference to cold weather and pre-monsoon anti-larval control have shown that the suitability of breeding conditions of *A. minimus* during the period January to June is the responsible factor for the increase in the malaria case incidence in moderately endemic areas and that, in the hyperendemic areas, breeding during this period is conducive to rapid geometric progression in numbers of adults so that, when rains breeding places are made available, breeding is transferred to these places and continues till November. Anti-malarial measures were carried out in nearly all districts.

Burma.—Anti-malarial measures comprised reclamation of borrow pits and tanks, filling of depressions, grading of drains, paris-greening and oiling. Byelaws regulating the collection and storage of water and prevention of the breeding of mosquitoes were sanctioned by Government for Maymyo. A staff of 14 inspectors was employed by Rangoon Corporation in order to carry out an intensive campaign against mosquito breeding.

From the Government of India grant of Rs. 5 lakhs for rural uplift, a sum of Rs. 1,15,000 was allotted for an anti-malaria scheme. This included Rs. 25,000 for the breeding and distribution of larvivorous fish. Rural water supplies which are derived mainly from tanks offer opportunities for prolific breeding.

(d) *Quinine.*

Botanical Survey of India.—Burma plantations yielded 81,772 lbs. of bark as against 64,429 lbs. in 1934-35. Of this 75,569 lbs. were sent to the Mungpoo factory and the plantations stock at the end of 1935-36 amounted to 92,511 lbs. The Mungpoo factory treated a total of 73,078 lbs. of bark (Java 23,341 lbs. and Burma 49,737 lbs.), yielding 2,820 lbs. of quinine sulphate and 1,379 lbs. of cinchona febrifuge. The recrystallisation of crude quinine to trade quinine of B. P. standard was continued and 17,230 lbs. were produced.

Quinine amounting to 45,000 lbs. was distributed free to various provinces and administrations, in pursuance of the Government of India's policy to liquidate part of their surplus stocks. The balance of stocks at the end of the year amounted to 157,870 lbs. ..

Sales included quinine sulphate (all forms) 30,148 lbs. ; quinine sulphate tablets 1,222 lbs. ; quinine reinforced cinchona tablets 1,764 lbs. ; cinchona febrifuge tablets 155 lbs.; and cinchona febrifuge powder 4,533 lbs.

Table II (iii) gives in lbs. total quantities in stock, manufactured and issued during 1935-36.

TABLE II (iii).

	In stock on 1-4-35.	Manufac- tured.	Total.	Sold or issued otherwise.	Balance.
	lbs.	lbs.	lbs.	lbs.	lbs.
Quinine Sulphate	235,866	22,900	258,766	100,896	157,870
„ Sulphate tablets	899	1,194	2,093	1,225	868
„ reinforced cinchona tablets	319	1,484	1,803	1,764	39
Cinchona febrifuge tablets . . . . .	..	383	383	155	228
Cinchona febrifuge	19,687	1,800	21,487	6,250	15,237

Government Cinchona Plantations and Factory in Bengal.—The dry bark harvest at Mungpoo was 457,507 lbs. ; ledgeriana 386,428 lbs., succirubra 22,928 lbs. and hybrid 48,151 lbs. That at Mungsong was 871,795 lbs., including ledgeriana 797,848 lbs.; officinalis 14,662 lbs. ; succirubra 10,601 lbs.; and hybrid 48,648 lbs. Of this total, 200,000 lbs. were sold to the Madras Government and 3,360 lbs. to a Calcutta firm for experimental purposes, leaving a balance of 683,133 lbs. in the factory. Altogether 1,361,941 lbs. were utilised in the factory. Table II (iv) gives details of the manufacture and disposal of factory products.

TABLE II (iv).

	Balance on 1-4-35.	Manufac- tured.	Returned to stock.	Total.†	Issued or sold. •	Converted to other products.	Balance on 31-3-36.
Quinine sulphate powder (purified)	5,659	29,144	41	34,844	15,012	13,362	6,470
Quinine sulphate crude	153,339	21,597	..	174,936	25,812	..	149,124
Other quinine salts	181	972	1	1,154	905	..	249
Quinidine sulphate tablets	1,322	4,200	2	5,524	4,283	..	1,241
Cinchonine salts	37	5	..	42	6	..	36
Cinchonidine salts	39	17	..	56	12	..	44
Quinidine	53	130	..	183	128	..	55
Cinchona febrifuge powder	609	23,343	18	23,970	16,896	5,177	1,897
Cinchona febrifuge tablets	599	4,360	103	5,062	4,471	..	591
Quinine sulphate tablets (in treatments)	17,538	82,527	4,019	104,084	85,895	..	18,188
Quinine alkaloid	48	465	..	513	416	..	97
Totaquina	559	1,354	54	1,967	1,427	..	540

Madras Government Cinchona Department.—A total of 495,098 lbs. of cinchona bark costing Rs. 2,06,880 was used in the manufacture of quinine products ; 4,46,820 lbs. of bark remained in the factory on 31st March, 1936. The limit of stock of quinine sulphate fixed by Government was raised to 25,000 lbs. The Naduvatam factory produced 9,760 lbs. of quinine sulphate, 3,749·5 lbs. of quinine sulphate tablets, 1,254 lbs. of quinine hydrochloride, 1,308 lbs. of quinine bi-hydrochloride, 3,345 lbs. of cinchona febrifuge, 2·5 lbs. of cinchona febrifuge tablets and 5,982·5 lbs. of totaquina.

The total quantities in lbs. of quinine and cinchona febrifuge issued are given in Table II (v) on page 40.

Table II (vi) gives the amounts in lbs. of quinine, cinchona febrifuge and totaquina issued free or sold from all sources during 1935.

TABLE II (vi).

	Free.			Sold.		
	Quinine. lbs.	Cinchona. lbs.	Tota- quina. lbs.	Quinine. lbs.	Cinchona. lbs.	Tota- quina. lbs.
Total	25,535	21,839	552	10,725	3,906	2,613
N.-W. F. P.	1,617	737	..	..	..	..
Punjab	944	416	..	2,084*	..	..
Delhi	361	179	..	..	..	..
U. P.	2,588	3,140	..	1,105	1,034	..
B. & O.	..	..	..	317	..	..
Bengal	13,409	13,606	..	..	..	..
C. P.	1,049	655	7 ozs.	466	21	..
Bombay	2,518	7	..	2,277	..	..
Madras	944	310	510	4,398	433	2,613
Coorg	460	279	42	28	..	..
Assam	1,558	2,222	..	50	231	..
Burma	..	257	..	..	2,187	..
Ajmer-Merwara	87	31	..	..	..	..

*For the year 1935-36.

Although these figures are taken from official returns, they do not give a correct representation of the quantities of quinine consumed in the country. One thing is certain ; the people of India do not consume more than a fraction of the quinine which they require. At the same time, it is by no means easy to give even a rough approximation of the potential demand. More than one authority has estimated that at least 100,000,000 persons suffer from malaria every year. For the purpose of mass treatment the amount of quinine should be the minimum effective dose which will relieve symptoms. Taking this at 45 grains, a rough estimate of the annual quinine requirements for India would be $100,000,000 \times 45$ grains or approximately 600,000 lbs. Again, if we accept the estimate that 30 % of the population in India suffers from malaria, then this country requires yearly some 24 million ounces of quinine or 1,250,000 lbs. The potential annual demand probably lies somewhere between these two figures, but, whichever is accepted, it makes a remarkable contrast with the present annual consumption in India which for several years past has remained remarkably steady at about 200,000 lbs. The present consumption is therefore only about one-third of the lower figure for estimated requirements and it is less than one-sixth of the higher figure.

TABLE II (v).

Quinine Salts issued during the year, 1935-36.

	Quinine sulphate.	Cinchona febrifuge.	Cinchona febrifuge. tablets.	Quinine sulphate tablets.	Quinine hydro-chloride.	Quinine bi-hydro-chloride.	Quinine bisulphate and tablets.	Totaquina and tablets.	Cinchona bark.
Total	17,503	8,723	638	1,547	460	1,222	135	4,158	1,424
Government hospitals	1,049	125	..	947	4	5	..	1,184	..
Local fund medl. institutions	1,223	231	3	156	..	..	1	1,103	..
Municipal medical institutions	375	27	..	..	..	..	..	175	..
Medical Store Depots—									
Madras	1,050	..	..	..	24	592	..	220	800
Bombay	4,560	..	..	..	390	550	..	600	400
Burma	2,500	2,450	..	..	2	75	..	..	..
Central Provinces	2,580	800	..	..	40	..	..	..	..
Coorg	189	146	133	286	..	..	..	42	..
M. & S. M. Railway	110	30	230	..	..	..	..	..	..
Public	310	2,053	147	..	..	..	..	15	..
Local sales	17	1,711	20	8	..	..	134	819	..
Indian States—									
Hyderabad	130	200	100	25	..	..	..	..	..
Mysore	118	600	..	..	..	..	..	..	..
Baroda	1,407	50	..	..	..	..	..	..	..
Travancore	1,825	..	..	100	..	..	..	..	..
Central India	60	300	5	25	..	..	..	..	224

The question of increasing the popularity of quinine has engaged the attention of the Government of India and a number of Provincial Governments at different times, but these attempts have at no time been particularly successful. In considering the question of popularising the use of this drug, it must be remembered that it is necessary not only to educate the people in regard to its value but to evolve cheap and effective methods for its distribution. The first thing that is required is a properly organised advertising and selling campaign extended to the remotest parts of the country and this might well be associated with a plan for the general quininisation of school children with one of the cheaper forms of the drug. One of the main obstacles to effecting a wide dissemination of anti-malarial drugs is in organising a suitable agency for distribution. Existing agencies include post offices, public health departments and voluntary organisations, but at all times effective distribution is an expensive procedure and in any attempt to popularise the use of quinine every effort must be directed to the formulation of means whereby cheaper methods of distribution can be effected. Apart from distribution, however, the greatest difficulty has been to place the drug at the disposal of the villager at a price which he can afford to pay. Propaganda, although ordinarily of value, must largely fail if the advertised drug is beyond the villager's financial resources. The question of price is therefore intimately associated with that of propaganda campaigns and the two cannot be considered separately.

During the year the Government of India made a free gift of 45,000 lbs. of quinine to the provinces. This was distributed as follows :—U. P. 6,000 lbs. ; B. & O. 6,000 lbs. ; Burma 5,000 lbs. ; Assam 4,500 lbs. ; Bombay 4,000 lbs. ; Madras 4,000 lbs. ; C. P. 3,500 lbs. ; N.-W. F. P., Delhi and Baluchistan 1,250 lbs. each ; Coorg 750 lbs. ; Ajmer-Merwara 250 lbs. and the Andamans 250 lbs.

N.-W. F. P.—Special compounders distributed quinine in the villages of Peshawar district.

Punjab.—In addition to a small amount issued free, 943 lbs. of quinine and 416 lbs. of cinchona febrifuge were distributed in rural areas by the public health staff through the agency of 606 depots and 3,689 sub-depots.

Delhi.—Of the local Government grant of Rs. 5,000 for anti-malarial measures, Rs. 1,700 was utilised for the distribution of quinine through members of the district board, school staffs and dispensary medical officers. 361 lbs. of quinine and 179 lbs. of cinchona were used in Government hospitals, dispensaries, jails, etc.

U. P.—Altogether 1,105 lbs. of quinine and 1,034 lbs. of cinchona were sold and 117 lbs. of quinine powder from the D. P. H.'s reserve stock, etc., were converted into tablets at the Government Quinine Factory. Twenty-one lbs. of quinine and 152 lbs. of cinchona tablets were issued to replenish reserve stocks in ten districts for distribution during malaria epidemics. In addition, a scheme for the distribution of the Government of India's gift of 6,000 lbs. in the rural areas was under consideration.

The usual "blanket" treatment was given to the whole population as well as to all newcomers in spring and autumn in the Banbassa-headworks of the Sarda Canal. 125 lbs. of quinine, 132 lbs. of cinchona and 4,985 tablets of plasmquine were distributed free during the malarious season in certain villages not served by dispensaries in the Terai and Bhabar Estates. Encouraging results were obtained from intensive mass treatment in 36 villages through the agency of two travelling compounders. In rural areas suffering from epidemic malaria, 488 lbs. of quinine and cinchona were distributed free by the

P. H. Department. 1,146 lbs. of quinine and 1,769 lbs. of cinchona were used in hospitals and dispensaries and mass treatment with cinchona and plasmoquine was continued in parts of Lucknow, Hardoi, and Unao districts. Five lbs. of cinchona and 4,378 tablets of plasmoquine were given free to scholars in Kosi, 3 lbs. and 2,773 tablets in Brindaban, 8 lbs. of cinchona in Budaun and 3 lbs. in Khurja. The Shahjahanpur Rural Uplift Association distributed 22 lbs. of cinchona ; and the *Taraqi Sabha*, Pilibhit, 8 lbs. of cinchona. With all this activity, the total annual distribution of quinine and cinchona per head of the population in some districts was as low as 0.02 grains and the maximum was only 16.34 grains per head. These figures throw a lurid light on the inadequacy of the quinine campaign against malaria as it exists at present.

B. & O.—Quinine requirements are obtained through the Presidency jail at Calcutta. "Treatments" each consisting of 20 tablets of 4 grains and packed in small tubes are sold at post offices at five annas three pies. By this means 316.9 lbs. of quinine sulphate were sold in six districts.

Bengal.—Sales of quinine through post offices aggregated 7,781 lbs., but this amounted only to one grain per head of the population. The scheme of giving 80 grains of quinine and 3 tablets of 0.02 grammes of plasmochin to the whole population of 21,400 in 100 villages in a hyperendemic part of Burdwan district was continued. In addition to six doctors in charge of 30 treatment centres, 88 volunteers were entrusted with distribution of the drugs. A reduction of 61 % in the malarial incidence was recorded as against 34 % in the control area. Similarly the spleen index of children under 12 years was 31 % as compared with 65 % in the control area.

C. P.—During the year, 2,580 lbs. of quinine sulphate, 800 lbs. of cinchona febrifuge and 40 lbs. of quinine hydrochloride were purchased at a cost of Rs. 59,641 and were manufactured into tablets in the Nagpur jail factory. Sales amounted to lbs. 3,572. Free distribution of quinine was continued in the hyperendemic areas of four districts. The Public Health Department distributed free about 31 lbs. of the drug, whilst arrangements were made for the free distribution of the Government of India gift of 3,500 lbs. in hyperendemic areas.

Bombay.—Government sanctioned the free distribution of quinine sulphate costing Rs. 26,000 ; an equal amount for sale in post offices ; and quinine hydrochloride costing Rs. 8,719 for sale in treatment packets. Quinine costing Rs. 42,360, was distributed through revenue and other officials and administrative officers of district board schools. The Yeravda jail sold quinine to the value of Rs. 37,060. The amounts of quinine distributed included 662,800 five-grain and 1,124,980 two-grain tablets in Sind ; 340,050 five-grain and 326,550 two-grain tablets in the Southern Registration District ; 157,996 and 135,006 in the Central Registration District ; and 243,480 and 329,425 in the Northern Registration District.

Madras.—Free distribution of quinine was continued in 13 districts and was further practised in parts of Madura and Trichinopoly districts. About 1,500 lbs. of quinine were used for the treatment of 115,000 persons out of a total of over 1½ million included in the scheme. In addition, 1,500 lbs. were sold at reduced rates.

Coorg.—In addition to the usual public health grant for free distribution of quinine, one-third of the Government of India gift of 750 lbs. was utilised. School children found with enlarged spleens were regularly treated with quinine

during the malarial season. The "blanket" prophylactic and curative treatment with atabrin and plasmoquine was carried out at Fraserpet.

Assam.—Re-inforced cinchona febrifuge continued to be used as a preventive and curative agent and was sold at the cost price of $3\frac{3}{4}$ annas per treatment. Experience has shown that the present treatment of 80 grains (three parts cinchona febrifuge and 1 part quinine sulphate) is insufficient to effect a complete cure, *i.e.*, to bring about the complete disappearance of parasites, although the amount of quinine is more than ample for the subsidence of fever. In order to popularise the use of this preparation, Government have approved the issue of similar treatments containing 10 tablets of 4 grains each at 2 annas. Of the 10,579 treatment parcels sold, the district of Sylhet took 2,599, Kamrup 1,490, Nowgong 1,058 and Lushai Hills 1,152. In addition, 184 lbs. of quinine sulphate and 466 lbs. of cinchona were obtained for free distribution and 4,500 lbs. of quinine were received as a free gift from the Government of India.

Burma.—Cinchona febrifuge tablets continued to be manufactured in the Rangoon jail. A total of 3,826,980 tablets were sold and 448,560 tablets were distributed free in 16 districts. Of the Government of India grant for rural reconstruction, Rs. 1,15,000 was earmarked for anti-malarial measures. A free gift of lbs. 5,000 was received from the Government of India. The average annual consumption of cinchona febrifuge per head of population rose from 0.87 grain in 1933 to 1 grain in 1934 and 1.2 in 1935.

Dysentery and diarrhoea.

18. Compared with 1934, total deaths decreased slightly to 279,223 giving a death rate of 1 p. m. As the recorded figures indicate, in every province these diseases continued to be much more prevalent among towns people than among villagers; for instance, the urban death rate in Madras Presidency was 2.6 times the rural rate; in Bengal it was twice as high; and in Ajmer-Merwara $3\frac{1}{2}$ times as high. The higher prevalence in urban areas, many of which have protected water supplies and comparatively satisfactory marketing arrangements, offers a problem for serious investigation. In this connection, the D. P. H., Punjab, remarks:—

"It emphasises once again the fact that unless appreciable improvements are effected in the conservancy system of towns and the people begin to feel keen on keeping themselves and their surroundings clean and live in healthier environments, the prevalence of the disease cannot be mitigated."

The fact that nearly 88,000 deaths were recorded in the months of August to September suggest that the monsoon rainfall and the consequent contamination of water supplies have considerable influence on the incidence of these diseases.

Tables J and K in Appendix II on page 232 give details of recorded deaths and death rates.

In *Assam* the death rate was 1 p. m. The maximum mortality was recorded in May and the minimum in February. Bacteriophage had been largely used in Nowgong district since December, 1929, but the results were not very striking. In the *U. P.*, the highest mortality occurred in May and June and the lowest in January; the death rate was 0.4 p. m. In *B. & O.* the death rate (0.5 p. m.) was lower, but Orissa division again recorded 78 % of the total recorded deaths. It is stated that the high prevalence of these diseases in *Orissa* is associated with climatic conditions, bad water supplies and defective sanitation. In *Bengal*, the hill district of Darjeeling recorded

the high death rate of 4 p. m. ; in Howrah it was 3·5 p. m. ; in Calcutta 2·3 p. m. ; and in Hooghly 1·9 p. m. In the *Punjab*, high death rates continued to be recorded in the districts of Kangra (3·4 p. m.), Rawalpindi (3 p. m.) and Simla (1·2 p. m.). In the *C. P.* and *Berar*, the prevalence of these diseases is attributed to bad conservancy, ineffective disposal of night-soil, the prevalence of flies and bad water supplies. Their incidence is greatest in areas where water supplies are obtained from wells. In the *Bombay and Madras Presidencies*, the highest mortality occurred in August and the lowest in February.

Enteric Fever.

19. In regard to this disease, the D. P. H., Burma, writes :—

“ As the diagnosis of this disease is so often dependent on accurate bacteriological examination it is believed that the total of 315 deaths recorded during the year falls short of the true mortality. Blood specimens for culture are taken by medical practitioners in only the minority of fever cases and for that reason many enteric infections are probably missed. Other factors against the detection of enteric cases are the remote chances of isolating the organism from the blood after the first week of the disease and the fact that patients frequently wait for an appreciable time before calling in a medical man.”

The D. P. H., Bombay also remarks that :—

“ Enteric fever is increasing in the Presidency, the increase is due partially to better diagnosis of the disease but sharp outbreaks in several localities show the need of systematic investigation.”

These remarks apply equally to the other provinces of India. There seems little reason to doubt that the enteric fevers have a high incidence both in the urban and rural areas of this country and it is probably correct to say that a considerable percentage of those below 18 years of age have already passed through an attack, whilst many of the recorded ‘ fevers ’ deaths are caused by those infections. Under present circumstances, it is impossible to differentiate deaths caused by enteric from other fevers except in the few cases which may be treated in hospitals or are seen by qualified practitioners. The recorded statistics in most provinces, therefore, give a very incomplete picture of actual facts and most of the figures which follow should be considered in the light of these remarks.

In Delhi city, a severe epidemic of enteric caused no less than 588 deaths out of a total of 599 recorded in Delhi Province. It is probable that similar figures will be returned by Delhi, until existing insanitary conditions in that city are abolished. Whilst in the U.P. recorded enteric deaths numbered 8,578, the verification of deaths in certain areas suggested that no less than 24,686 persons died of this disease. Other recorded provincial figures are :—N.-W. F. P. 186 deaths ; Punjab 7,318 ; Bengal 8,709 ; C. P. 6,014 ; Bombay 7,041 and Madras 1,612.

Respiratory Diseases.

20. *N.-W. F. P.*—Recorded deaths numbered 2,822 (1 p. m.). In the districts of Kohat and Peshawar, the rate was 1·5 p. m. The largest mortality occurred in January.

Punjab.—The mortality increased from 55,570 to 58,800 owing to a more severe winter. The death rate was 2 p. m., whilst the urban death rate was 5 p. m. as compared with a rural rate of 2 p. m.

Delhi.—The rural and urban death rates were very similar *viz.* 5·6 and 5·3 p. m. Deaths totalled 2,311 in towns and 1,109 in rural areas.

U. P.—A total of 46,270 deaths (0·9 p. m.) was recorded. The maximum mortality was recorded in May and the minimum in July. The death rate

was high in the districts of Hamirpur (5 p. m.) and Lucknow (5 p. m.). Bhowali town (Nainital) reported the high death rate of 24 p. m. ; Cawnpore 22 p. m. and Hathras 17 p. m. Some investigation of registration methods in these towns seems called for, as the recorded rates are incredibly high.

B. & O.—Of the 7,148 recorded deaths, (0·2 p. m.), 869 were recorded in urban and 6,279 in rural areas with death rates of 0·6 p. m. and 0·2 p. m.

Bengal.—Recorded deaths totalled 84,868, giving a death rate of 2 p. m. The highest mortality was recorded in December and the lowest in June. Compared with 1934, this death rate in towns decreased by 6% and in rural areas by 12%. Calcutta city alone recorded 9,514 deaths from this cause.

C. P.—Deaths numbered 39,462 with a death rate of 3 p. m., 34,106 in rural and 5,356 in urban areas. The death rate was highest in September and lowest in July.

Bombay.—Recorded deaths again increased to 115,262, males 62,796 and females 52,466. The death rate was 5·3 p. m. The urban rate of 8·6 p. m. greatly exceeded the rural rate of 4·5 p. m.

Madras.—Although the number of deaths decreased to 102,843, the death rate being 2·3 p. m., the recorded mortality from this cause was still 9% of the provincial total. The death rate was highest in December and lowest in April. The urban mortality (4 p. m.) was double the rural (2 p. m.). Madras city recorded the high rate of 12 p. m. The conclusions reached in the "High mortality" Report written several years ago seem to be still applicable.

Assam.—The death rate was 0·9 p. m. Lakhimpur district recorded the high rate of 2·3 p. m. The highest and lowest incidences were recorded, in November and February.

Burma.—Deaths totalled 11,954, giving a death rate of 1 p. m. The city of Rangoon recorded a death rate of 8 p. m. ; other high rates were Mandalay district (3 p. m.) and Lower Chindwin (3 p. m.). There were 146 male deaths for every 100 female. The urban death rate was 6 p. m. and rural rate 0·3 p. m.

Pneumonia.

21. *N.-W. F. P.*—Deaths totalled 604 in 7 municipalities with an average death rate of 2 p. m.

Punjab.—A total of 21,941 deaths were reported, 5,752 in towns and 16,189 in rural areas. The death rate was 0·9 p. m., urban 2 p. m., rural 0·8 p. m.

Delhi.—There were 1,248 deaths giving a death rate of 2 p. m. Of the total 961 occurred in towns and 287 in rural areas, the rates being 2 p. m. and 1 p. m. respectively.

U. P.—A total of 16,454 deaths gave a death rate of 0·3 p. m. The urban rate was 3 p. m. and the rural 0·01 p. m.

B. & O.—Only 49 deaths were recorded in municipalities, of which 26 were in Patna city.

Bengal.—The incidence of pneumonia has been on the increase since 1923, mainly in rural areas. Deaths totalled 41,938 with a rate of 0·8 p. m. Rural areas reported 36,163 deaths and towns 5,775. Of the latter, 2,375 occurred in Calcutta alone.

Bombay.—A total of 26,292 deaths was recorded, giving a death rate of 1·2 p. m. The rural rate was 0·6 p. m. and the urban 4 p. m.

Madras.—Deaths in municipalities numbered 6,164.

Assam.—266 deaths were registered in 13 larger towns.

Burma.—Urban areas reported 3,880 deaths, with a death rate of 3 p. m.

Tuberculosis.

(a) General.

22. The distribution and incidence of infectious disease in India always present complex epidemiological problems because of the variations in the etiological factors which are to be met with in different parts of the country and in different groups of the population. In no instance is this more true than in the case of infection with the tubercle bacillus. Tuberculosis, particularly in its pulmonary form, has markedly increased during the last three decades especially in the large urban and industrial areas. Only within recent years, however, has the infection begun to spread to the rural villages, this extension of infection being partly caused by the return of infected industrial workers, students, etc., to their ancestral homes and partly to the great development of rapid transport facilities. Some hold that the present degree of tuberculisation of the people of India lies midway between that of the virgin African races and the highly urbanised and industrialised European peoples, but whatever may be the extent of infection in that part of the Indian population which lives in towns and industrial areas, there seems little doubt that the reaction of the ordinary rural population to infection with the tubercle bacillus is such as is usually associated with primitive races.

In other words, once infection is introduced into the rural villages, it is almost certain to spread rapidly and to cause a heavy morbidity and mortality. This fact has recently been illustrated in striking degree. The Gurkhas who come from the remote state of Nepal show in comparison with other men of the Indian army a much higher susceptibility to and mortality from tuberculosis. These gallant little soldiers, in other words, are from the tuberculisation point of view members of a primitive race and being completely non-immunised are unable to resist an infection which often proves rapidly fatal. This is to a large extent the position of the great mass of the rural populations of India at the present time and as there are ominous signs that infection is spreading to and through these rural areas, the time has come when preventive campaigns should be extended to include these areas.

It is difficult to estimate with any degree of exactitude morbidity and mortality rates of tuberculosis in rural areas, as few cases are ever seen by a medical officer and registration lies in the hands of petty village officials who are not competent to arrive at the correct cause of death. The only possible method of making an estimate is to take a proportion of the deaths recorded under such headings as 'fevers' and respiratory diseases. It has been variously calculated that from 10-20 % of the former group and 20 % of the latter are actually due to pulmonary tuberculosis and, in some such unsatisfactory fashion, tentative figures may be prepared.

In respect of the rural population, little information of a more exact nature is available, although a few small surveys have been carried out during recent years in certain urban areas. Similar surveys for sample rural areas will have to be made before preventive campaigns in any province can be suitably planned. One example may be cited; it has been reported that the district of Darjeeling, which is mainly rural and is by no means industrialised, has a tuberculosis death rate second only to Calcutta city in the whole province of Bengal. If this be correct, the position is serious and demands immediate attention. But until verification has been made by careful survey and until

similar sample surveys are made in every district it will be difficult to plan effective preventive work. Although in the ordinary village, houses may be reasonably spaced out, overcrowding in individual houses often exists to a marked degree, while other factors such as the joint family system, early marriage, the *purdah* system, etc., are common to both urban and rural population and tend to favour dissemination of infection once it is introduced within the household. Investigations have already shown that in 50 % of the cases there is a history of contact with another case in the family and, when a system of home visiting of patients is developed, a much higher percentage of contact cases will almost certainly be made evident.

It is worth noting that infection with the bovine bacillus is still a rare occurrence in India. This is no doubt partly due to the fact that very few of the cattle are infected with bovine tuberculosis and partly because milk is almost invariably boiled before it is used. Investigations made in Bombay and Calcutta in regard to the typing of tubercle bacilli obtained from non-pulmonary sources have corroborated the belief that bovine tuberculosis is uncommon.

Although India has not yet planned a national campaign against tuberculosis and few special tuberculosis workers are to be found either in urban or rural areas, there are in existence a number of Tuberculosis Associations in various parts of the country. The King George Thanksgiving (Anti-Tuberculosis) Fund, affiliated to the Red Cross Society, has for some years carried on an active educative campaign and has done what it could with the small funds at its disposal to co-ordinate anti-tuberculosis activities in the different provinces and to assist with grants different forms of preventive work. In some instances, voluntary Tuberculosis Associations have opened tuberculosis clinics to which medical officers, nurses and home visitors are attached and these have done and are doing very valuable pioneer work. But in order to meet the situation, much larger financial resources are essential, a large number of specially trained medical officers, nurses and home visitors are required and the object should be to have at least one special tuberculosis clinic in every municipality and rural town where skilled treatment and advice would be available to all. Like all other public health activities, this requires ample funds, but the danger to the population is so great that the financial side of the question should not be allowed to act as a deterrent but should rather be an incentive to overcome the difficulties.

Once the country is equipped with a chain of tuberculosis clinics it will be possible to arrive at a more accurate estimate of the incidence of the disease and of the needs of the sufferers. The work of the clinics will also indicate the extent to which hospital and sanatoria beds are required. At the present moment, the total beds reserved for tuberculosis patients number only a few hundreds. It will never perhaps be possible to provide a sufficient number of beds to accommodate the hundreds of thousands of tuberculosis patients in the country, but this is not a difficulty which need daunt those interested in the prevention of the disease because other methods can be successfully practised. That is not to deny that additional hospital and other beds are necessary; all that it is intended to imply is that these are not the first requirements for an anti-tuberculosis campaign.

The 13th Conference of Medical Research Workers held at Calcutta in November/December, 1935, passed the following resolution :—

“ This Conference reaffirms Resolution No. 16 of 1934 and notes with regret that so little work has been done in the domain of tuberculosis research in India. It further recommends that provincial authorities be urged to carry out accurate tuberculosis surveys in their respective areas and, if possible, to communicate such results as may be obtained for discussion at the Conference.”

Tuberculosis surveys have not been attempted in any province, except in restricted areas in a number of towns. These include Ranchi in B. & O. 1929-30 ; Ahmedabad, Ahmednagar and Panchgani in Bombay Presidency in 1930, 1931 and 1936 ; Nagpur city in Central Provinces in 1932 ; and Lahore in the Punjab in 1932-34.

The survey of Ranchi town was carried out by means of house to house visits and 360 cases of phthisis were discovered after clinical examination. The disease was found to be prevalent more or less throughout the town but the more overcrowded insanitary, dusty and poorer localities were chiefly affected. The disease was found more prevalent among the poor than among the well-to-do, but the fact that Ranchi is a health resort probably had something to do with the high incidence. Many cases were found among the aborigines who were previously believed to be practically un-infected. Infection was traced to extraneous sources such as coal miners and tea garden workers. A high incidence was found among Muhammadan females holding to the *purdah* system and in the villages lying around Ranchi the infection was also found to be spreading.

As regards Panchgani, its climate makes it a resort for tuberculous persons. The investigation included the study of morbidity and mortality among children of consumptive mothers, consorts of consumptives and those whose work lay amongst consumptives. Infection in the first group was found almost universal ; in the second group the incidence was slightly higher than normal and in the third group the incidence was not higher than in the general population.

In Nagpur city the survey covered 1,490 houses with a population of 2,939 adult males, 2,827 adult females and 2,521 children under 12 years. 83 cases of active tuberculosis and 68 " doubtful " cases were discovered. The former group comprised 48 pulmonary cases, 6 abdominal cases, 6 cases of bones and joints, and 23 others. Of the pulmonary group, 40 were males and 9 females and of the non-pulmonary group 22 and 12 respectively.

The survey of Lahore town which was carried out under the auspices of the Anti-tuberculosis Fund of the I. R. C. S., was discussed in last year's report.

(b) *Provincial.*

N.-W. F. P.—The numbers of cases treated in hospitals and dispensaries have increased as follows :—3,110 in 1930, 5,707 in 1933, 6,429 in 1934 and 8,438 in 1935. These figures are alarming and indicate the necessity for a well-planned anti-tuberculosis campaign. Registered deaths from pulmonary tuberculosis numbered 315 in six municipal towns with rates varying from 0·2 to 1·7 p. m. An anti-tuberculosis committee has been formed and T. B. clinics have been established at 27 hospitals : 3 in Hazara district, 6 in Peshawar, 5 in Mardan sub-division, 3 each in Bannu and D. I. Khan, 2 each in North and South Waziristan, and one each in Kohat, Malakand and Chitral.

Punjab.—During the year 10,170 deaths from phthisis were recorded, 8,269 in rural and 1,901 in urban areas. Steps were taken to enforce certification of deaths in the area surveyed in Mozang in order to assess the death rate from tuberculosis and the degree to which notification of the disease was practised. A sanatorium providing for 46 beds has been opened at Samli in Rawalpindi district under the auspices of the Indian Red Cross Society.

Delhi.—A total of 1,013 deaths, giving a death rate of 1·6 p. m. were ascribed to pulmonary tuberculosis. Of these, 925 occurred in urban areas

and 88 in rural areas. The female death rate was double that for males. Mortality by sex and community is tabulated below :—

	Deaths.			Rate <i>per mille</i> .		
	M.	F.	Total.	M.	F.	Total.
All classes	383	630	1,013	1·0	2·2	1·5
Hindus	243	386	629	1·0	2·0	1·5
Muhammedans	138	241	379	1·0	2·6	1·7
Christians	2	3	5	0·2	0·4	0·3

Delhi city has now been provided with a tuberculosis clinic and dispensary and a hospital with 68 beds.

U. P.—Phthisis was the cause of 7,325 deaths, or nearly 23% more than in 1934, the increase being recorded entirely in urban areas. Bhowali town returned a death rate of 24 p. m., but this does not necessarily mean that the incidence of tuberculosis in this town is high because a sanatorium exists within its limits which houses tuberculosis patients from all over the province. Other high urban death rates were 5·6 p. m. in Sikandra Rao, 4·6 p. m. in Cawnpore and 4·1 p. m. each in Dankar and Moradabad.

B. & O.—The problem of tuberculosis in Orissa is said to be less acute than that of leprosy, malaria, cholera and smallpox. This may be so because of the lack of industrial development in this part of the province.

Bengal.—Phthisis was the cause of 16,524 (0·3 p. m.) deaths including 12,373 (0·3 p. m.) in rural and 4,151 (1·2 p. m.) in urban areas. Calcutta alone recorded 2,856 deaths (2·5 p. m.). Darjeeling (1·5 p. m.) recorded the highest district rate.

C. P.—It has been recognised for some time that tuberculosis is a serious menace. With funds provided by the provincial Government and the Silver Jubilee Fund, tuberculosis clinics have recently been established at Nagpur, Jubbulpore, Amraoti and Raipur.

Bombay.—Deaths ascribed to phthisis totalled 24,778, giving a death rate of 1 p. m. Measures for combating the increasing prevalence of this disease were under consideration. These included notification at least in the larger towns. The urban death rate (2 p. m.) was as usual higher than the rural (1 p. m.). In rural areas, the incidence continued to be high in the Konkan.

A total of 909 tuberculous cases were treated in the Karachi Municipal tuberculosis dispensary. The two health visitors attached to the dispensary visited 23,790 houses and detected 541 cases. In Hyderabad town, 1,261 cases were treated in the K. T. tuberculosis dispensary. The health visitor in charge of the anti-tuberculosis centre in Shikarpur town gave lectures and demonstrations in schools and other institutions.

Madras.—A total of 77,412 cases, of which 1,413 died, were treated in hospitals and dispensaries. No statistics are available of the deaths from pulmonary tuberculosis in rural towns and villages, but a careful analysis of the recorded deaths in 15 municipalities disclosed that 2,436 deaths, or 6·5% of the total, were due to tuberculosis of lungs. Observation of the employees of the Government Press was continued at the Madras Tuberculosis Institute. That Institute now serves as a centre for the after-treatment of cases discharged from hospitals and sanatoria.

Assam.—It is reported that tuberculosis is on the increase.

Burma.—Insanitary and overcrowded housing conditions and the low standard of environmental sanitation which characterise urban life militate against any improvement in the tuberculosis position. The recorded death rate from pulmonary tuberculosis was 15 times higher than that of 1934 but this sudden great increase has no doubt resulted from improved registration. The general urban death rate was 2 p. m., the range of variation in individual towns being 4 p. m. in Thamaing and 2 p. m. in Rangoon. A tuberculosis dispensary under a trained medical officer was opened in Rangoon. The need for a sanatorium in the province is said to be acute.

Ajmer-Merwara.—Deaths from tuberculosis in Ajmer city and its suburbs numbered 678 as against 352 in 1934.

Beri-beri and Epidemic Dropsy.

23. Cases of beri-beri treated in hospitals and dispensaries in the various provinces totalled 57,276. Of these, 35,000 were recorded in Madras; 15,000 in Bengal, mostly in the districts of 24-Parganas, Bakarganj, Khulna, Howrah and Jessore; 4,200 in B. & O., 2,100 in Burma; and 700 in the U. P. Over 96% of the cases in Madras occurred in the five districts lying in the north-east of the Presidency. In other provinces the numbers were negligible.

In the U. P. 304 of the 380 recorded deaths from epidemic dropsy occurred in Benares, where the disease was said to have been imported from Bengal and Bihar. The infection was practically confined to the Bengali community living in over-crowded, damp and ill-ventilated localities near the river, but later a few cases occurred amongst other communities. The outbreak of epidemic dropsy which began in Manbhum district in Bihar towards the end of 1935 became widespread early in 1936 in Purulia town and in the *sadr* sub-division of that district. No less than 43,253 cases were recorded, of which 782 ended fatally. The disease was most common among the middle and upper classes whose diet usually consists of parboiled rice, whilst the labouring classes who eat coarse freshly husked rice escaped. Epidemic doctors were deputed to carry out house to house treatment in the affected villages. A field unit from the Calcutta School of Tropical Medicine investigated the outbreak, but no definite conclusion as regards its cause was reached. In Assam similar outbreaks occurred in the towns of Patharkandi, Sylhet, Silchar and Karimganj, but here also no definite causal factor could be traced.

In the Pyapon district of Burma the disease was confined to Indian coolies whose diet is usually ill-balanced. Consumption of damp and deteriorated rice was stated to be frequently associated with the disease. In Mergui, both Telegus and Siamese developed the disease, the diet of the latter class being described as low and deficient. In Upper Chindwin district the disease appeared among labourers in the timber camps. Beri-beri also occurred among the Telegu coolies in Mergui and the Chinese labourers and among the Kachins in Myitkyina and the Bengalees in Rangoon. In Burma, 153 deaths from beri-beri and epidemic dropsy were recorded in 24 out of 75 towns; of these, 81 occurred in Rangoon alone.

The Health Officer, Rangoon made the following remarks in his annual report.

“ The explosive nature of the outbreak of epidemic dropsy suggested that the disease was brought about suddenly by some toxin and did not result from any deficiency of diet. There were a number of persons affected during the last epidemic who, as far as could be ascertained, suffered from no vitamin deficiency in their diets. The Bengalis as a race appeared to be particularly susceptible to this disease, 72% of the cases occurring amongst that community. During the year under report there was an epidemic of epidemic dropsy not only amongst the Bengalis of Calcutta but amongst Bengalis domiciled in such

places as Benares and in some parts of Bihar. The disease showed a seasonal prevalence, being well marked in the first half of the rainy season towards the close of June and during the months of July and August. Towards the end of the wet weather it declined. Epidemic dropsy seemed to be more widely prevalent in large towns like Calcutta and Rangoon, situated in the delta area of big rivers not very far from the sea. The consumption of rice was in some way connected with the causation of epidemic dropsy. Whether rice and mustard oil predispose to this disease is a matter for further investigation. The effectiveness of a rice-free diet in the control of epidemic dropsy is well known and the Bengali community of Rangoon were advised by means of advertisements in the local press and by handbills to cut off as much rice from their diet as possible, if its use could not be stopped altogether. Quite a number of them took this advice seriously and the condition of the sufferers not only became better but it prevented a good many from falling ill. Epidemic dropsy was associated with the consumption of both locally milled rice and the parboiled rice of Calcutta. There was no evidence to suggest that epidemic dropsy was of the nature of an infection lurking in a house or any particular locality as has been suggested. The occurrence of cases in whole families or in localities where the Bengali Community predominated was explained by the peculiarity of their diet or racial predisposition. Members of other communities who were immediate neighbours and whose diet was different invariably escaped. The great majority of the sufferers were those engaged in sedentary occupations and belonging to the middle classes. The constant rainfall during June, July and August deprived such people of whatever little opportunities they had for an active outdoor life. The consumption of infected or deteriorated rice owing to storage under moist and hot conditions could not be the only factor in the production of this disease, as such rice was consumed by members of the other communities without any harmful effects. Bengali Hindus were nearly as much affected as the Bengali Mohammedans. Whether an excess of carbohydrate in their diet accounted for their predisposition would appear to be a matter for investigation. The most frequent age of incidence was between 20 and 40 years. Males were far more affected than females. Mortality was on the whole low (0.20 p.m.)."

Ankylostomiasis.

24. Table II (vii) gives the numbers of cases treated in British India and in the different provinces. Much the highest number was as usual recorded in the Madras Presidency.

TABLE II (vii).

	1934.		1935.	
	Cases.	Rate per 10,000 of total.	Cases.	Rate per 10,000 of total.
Total	210,744	28	233,708	30
N.-W. F. P.	947	4	861	4
Punjab	3,424	2	3,866	3
Delhi	43	..	69	1
U. P.	3,354	4	3,066	3
B. & O.	21,966	31	28,847	40
Bengal	6,062	6	15,664	15
C. P.	1,794	5	3,908	11
Bombay	411	1	7,114	18
Madras	166,438	90	162,956	91
Coorg	2,965	96	2,928	91
Assam	1,848	8	2,790	11
Burma	1,492	4	1,615	5
Baluchistan . . . . .	..	..	24	..

In the Punjab the anti-hookworm campaign in Gurdaspur district was continued. The Shakargarh *tehsil* investigation unit was replaced by a

propaganda unit whose activities included the construction of 792 borehole village latrines in Shakargarh and Pathankot *tehsils* and the delivery of 311 lectures. The 4 treatment units dealt with 72,571 cases in Shakargarh, Pathankot and Gurdaspur *tehsils*. In order to test the efficacy of the dose of carbon tetrachloride and chenopodium oil given in a saturated solution of magnesium sulphate, a successful experiment was carried out. The stools of 200 selected persons were examined before and after a fortnight's treatment; reductions of 33% in incidence and 65% in intensity of the disease were noted. The stools of the same persons again were examined towards the close of the year and it was found that one course of treatment removed about one-third of the total eggs and that the improvement thus affected was maintained for at least a year. The provincial investigation unit continued to map out the incidence and intensity of hookworm infection and surveyed seven districts. The laboratory unit examined 9,922 stools, 7,717 by Clayton Lane's direct centrifugal flotation method and 2,205 by Stoll's method. In the C.P., examination for the treatment of hookworm was carried out in a number of jails; of 355 cases treated, 333 were cured. As in previous years the activities of the Madras rural sanitation campaign were directed mainly towards the control of hookworm infection and the prevention of soil pollution. The six units were engaged on survey work, propaganda, mass treatment and the construction of bore hole and trench latrines in rural areas.

Leprosy.

(a) General.

25. When considering leprosy as a health problem, in addition to the numerous difficulties inherent to a densely populated tropical country, two important factors must be kept in mind. The first is religious sentiment which regards leprosy not as an infectious disease but as a visitation of the gods, a fate which cannot be avoided. This sentiment encourages the giving of alms as a religious duty and results in leper beggars congregating in the large cities and at centres of pilgrimage. The second factor is the "joint-family system" under which a father and mother, their married sons and their families and all unmarried children share one household. If any member of the family gets leprosy in an infectious form, all other members are exposed to infection and many children contract the disease in this way.

Leprosy is most commonly met with in certain parts of southern and eastern India, where as many as 2 to 3% of the population may be infected and where the incidence in groups of villages may be 5 to 7%, or even higher. In certain of the Himalayan valleys, also, leprosy is very common. In Central India, its incidence is lower and in the north-west lower still. These variations may have some association with dietary conditions; the virile races of the north-west ordinarily use a well-balanced diet and show less leprosy than the less virile races of the south and east whose diet is relatively poor. It has been noted that a dry climate, hot in summer and cold in winter, is associated in India with a low leprosy incidence, but such areas are inhabited mainly by the more virile and well-nourished races. Leprosy is more common in the more equable climate of the south and east but these areas are inhabited by the less virile races. Leprosy is a disease frequently associated with bad social and hygienic conditions and poverty, but these conditions are not always present. In parts of Madras Presidency which is probably the most advanced province in respect of social and hygienic conditions, the incidence of leprosy is very high. Until recent years leprosy has been in many ways a rural problem, but the development of rapid road transport and the establishment of large

industrial communities recruited mainly from the rural villages have introduced new factors which assist in the dissemination of infection.

Many of the cases seen in India are of a relatively mild neural or neuro-macular type in which the disease does not progress to the more severe forms. As most workers regard the macular or neuro-macular types as non-infectious, out of the estimated total of one million cases in India, at any one time, only about 3-400,000 are infectious. Although isolation of infectious cases is the most useful preventive measure, it is obviously impracticable to attempt the isolation of such large numbers. In any case, the lack of public opinion, quite apart from limited financial resources, makes it impossible to attempt to deal with the problem by legislation making isolation compulsory. Under the existing Leper Act, it is possible to secure the compulsory removal of indigent lepers to institutions and provisions also exist for the prevention of lepers following certain occupations, but for different reasons most of the provisions of this Act have been found difficult to apply.

Various provincial Governments and district authorities are engaged in anti-leprosy work but the only agency working on an all-India basis is the Indian Council of the British Empire Leprosy Relief Association which now has branches in most provinces. The Council maintains a leprosy research department, a training centre in Calcutta and a propaganda officer who tours all over India. Suitable propaganda material is prepared in different languages and a quarterly journal in English is also published. In addition, grants are made to provincial branches for leprosy work carried out in collaboration with or in addition to that done by Provincial Governments and local authorities. Anti-leprosy activities in the provinces include surveys, propaganda, leprosy clinics, isolation camps and leprosaria.

Sample surveys were carried out during the year in the Khulna and Malda districts in Bengal, whilst the work in Bankura district in the same Presidency was extended and modified in order to provide a clinic for every 3 or 4 Union Boards. In the last named district, out of 30,000 persons examined, 878 or 3% were found to suffer from leprosy. Whilst no fresh surveys were carried out in the C. P., systematic re-surveys have been made in the Chhattisgarh division, Berar and Nimar. As a result 591 new cases were discovered during the year. In Madras Presidency during a survey of 87 villages in the Tirrutani *taluk* a total of 955 cases or 1.5% of the population were detected. In the Punjab survey work was extended to the districts of Sialkot, Dera Ghazi Khan, Jhelum, Simla and Hoshiarpur. Of the 664 villages surveyed, 124 were found to have 326 cases (males 254 and females 72). In the U. P., 407 cases were found during the survey of 428 villages in Gorakhpur district. In Cochin State 686 cases of leprosy were detected in a population of 183,705.

During the last ten years several hundred clinics have been established for diagnosis and treatment. It is usually impossible and often unnecessary to maintain a special staff and most of the clinics are held in existing hospitals and dispensaries once or twice a week at hours when other out-patients are not present. A considerable net-work of asylums, colonies, wards, clinics now exists all over the country. There were 202 clinics in Assam, 1 in Bangalore, 5 in Mysore, 2 in Hyderabad (Deccan), 200 in Bengal, 56 in B. & O., 34 in Bombay, 18 in Central India, 30 in the C. P., 441 in Madras, 2 in N. W. F. P. and 57 in the Punjab; these were all well attended.

Little success has been attained by attempts to encourage isolation of infectious cases. In a few places, houses for infectious cases have been built outside the village, the lepers maintaining themselves partly by the cultivation of plots of land and partly by means of voluntary gifts from the villagers.

In one or two centres an isolation camp serves a group of villages. It is sometimes possible to secure a certain degree of isolation inside the village by building for the infectious case a small shed separate from the joint family house.

The leprosaria now in existence only have accommodation for about 10,000 cases. A few of these institutions are organised and staffed by Government and local authorities, but most are maintained by Christian Missions with the aid of Government grants. Some could accommodate as many as 800 patients, but the majority are much smaller having room for not more than 50 to 100 persons. One practical difficulty in the management of leprosaria is that of dealing with the chronic cases of nerve leprosy generally regarded as non-infectious. Such cases with trophic ulcers and deformities are often definitely in need of hospitalisation and, because of deformities and disabilities, they are unable to return home and support themselves. Experience has shown the need for two kinds of institution, hospitals for patients in the infectious stages and asylums for the chronic, crippled, deformed and non-infectious cases. The two classes of patients cannot be suitably housed in the same institution. Until recently no attempt had been made to organise agricultural colonies for lepers on a self supporting basis. In one centre such a colony, however, is now under experiment and, in another, one is being planned.

The Mission to Lepers maintained 35 leper asylums and homes,—Madras 6, Punjab 3, U. P. 3, Travancore 2, Bombay 7, C. P. 5, B. & O. 4, Bengal 2, Burma 2 and Central India 1, —whilst financial aid was given to 15 institutions. These institutions had a total population of 9,870, including males 5,032, females 3,092, children 742 and untainted children 994.

The knowledge of leprosy acquired by the average medical student during his college course has been found to be too superficial to enable him to diagnose and treat cases. Special short post-graduate courses of instruction are therefore of great value. In the School of Tropical Medicine, Calcutta, Indian Council B.E.L.R.A., has organised a short two weeks' course in diagnosis and treatment intended for doctors who are to be in charge of leprosy clinics. For doctors engaged in full time anti-leprosy work longer periods of instruction are arranged. The 1935 course was attended by 17 doctors from various parts of India, bringing the total number trained to 765. Two courses attended by 24 students and doctors were also held at the Leper Hospital, Dichpalle.

Workers in India are becoming more and more convinced that the most important method for the control of leprosy is the prevention of infection in children. Epidemiological studies have shown that children and young people are much more susceptible than adults and it is generally believed that serious infections are most frequently contracted in childhood. Infections contracted in later life tend to produce milder and often non-infectious forms of the disease.

(b) *Provincial.*

N. W. F. P.—The question of extending the Leper Act was under consideration. In the absence of a leper asylum, patients are sent to the American Mission Asylum, Rawalpindi. It has now been arranged to follow up lepers on release from this asylum. Cases treated in civil hospitals and dispensaries numbered 115. Propaganda by means of posters and leaflets was continued.

Punjab.—The Leper Act has not yet been applied to this province. Five leper homes, managed by Missionary Societies, accommodate over 2,000

lepers at a cost to Government of nearly Rs. 60,000 per annum in grants. Only a minority of the inmates belong to this province, the majority having come from Indian States.

A survey has been carried out during the last five years by the Punjab Branch of the B.E.L.R.A. The survey has so far been extended to 12 districts and about 1,670 cases have been discovered, of whom over 1,000 were in Kangra district alone. In order to provide treatment for these cases, 52 outdoor clinics, excluding 5 at the leper homes, have been established and a proposal to establish a settlement for burnt-out cases in the Lower Bari Doab Colony is under consideration. If sufficient accommodation is thus made available, the Punjab Government propose to consider the advisability of extending the Leper Act to the larger cities in the first instance.

Of the 1,215 cases treated at the clinics, 159 were reported as "relatively cured", 241 "much improved" and 38 "improved". Survey work was extended to 5 more districts and in the Kulu sub-division of the Kangra district; 664 villages with a population of 109,879 were systematically surveyed by the propaganda treatment survey method. In 124 villages, 326 cases were detected; all school children were examined for early signs. The post of leprosy officer was provincialised from April, 1936.

Delhi.—Recently Delhi municipal committee decided to open a leprosy clinic at the Civil Hospital; it is proposed to depute a medical officer for special training at Calcutta.

U. P.—Treatment continued to be provided at all hospitals and dispensaries.

B. & O.—Of the 56 clinics at work, 3 were maintained by Government, 3 by the Bettiah Raj, 4 by Missions and the rest by municipalities and district boards with grants-in-aid from the B. & O. Leprosy Relief Committee. These clinics were attended by 17,813 patients.

Bengal.—As a result of the survey carried out by the B.E.L.R.A. staff which revealed a high leprosy incidence, more than 200 clinics have been established. Surveys were carried out in the districts of Khulna and Malda. Two charitable leper dispensaries were at work in Calcutta; they treated 573 new cases and gave 27,172 injections.

Medical institutions concerned with the treatment of leprosy cases were the leprosy department of the School of Tropical Medicine, the leprosy hospital at Gobra in Calcutta and the hospitals at Raniganj, Burdwan and Bankura. At these institutions a total of 6,508 leprosy cases were treated. The Gobra hospital was previously a State institution, but its management has now been entrusted to a Board of Trustees constituted under the Albert Victor Leper Hospital Act of 1935. Pauper lepers form only a small proportion of the asylums' inmates in this province. In Mission institutions about 10% are paupers; in the Albert Victor Leper Hospital, which is the only Government institution, pauper lepers number 60 out of a total population of 142. From investigations made in different centres, it has been found that only about 30% of itinerant lepers are infective and that the rest are burnt-out cases. It is considered that although control of the latter would be desirable, they do not actually constitute a serious danger to public health. The control of itinerant lepers indeed forms only a small part of the general problem of leprosy control.

C. P.—The number of clinics increased to 30 and subcentres to 35 whilst attendances totalled 74,246. 1,021 sedimentation and 2,052 Kahn's tests were made with 902 positive results. The numbers of symptom-free and

improved cases were 222 and 1,059, respectively. Systematic re-surveys and active propaganda were carried out; 591 new cases were detected.

Out of a total income of Rs. 16,547, grants to mission workers and civil surgeons for the purchase of specific drugs amounted to Rs. 2,779 whilst Rs. 3,709 were spent on the maintenance of 5 special leprosy centres. Eleven assistant surgeons, 68 assistant medical officers and 15 private medical practitioners have now been trained in modern methods of treatment. Of the 2,481 cases treated in the 7 asylums, 595 were new admissions. Many of the pauper inmates are of the "burnt out" type and are not a source of infection.

Bombay.—Arrangements have been made to give medical officers a special training in leprosy with the object of forming a cadre of officers with these special qualifications. Table II (*viii*) gives a list of institutions concerned with leprosy. In addition, a small number of clinics have been opened at different centres.

Table II (*viii*).

Name of Institution.	Maintained by	Accommodation (beds)	Numbers treated	
			Indoor.	Outdoor.
1 Acworth Leper Home, Matunga.	Local and Municipal fund.	364	420	28
2. Edulgi Frameji Alless Leper Home, Trombay .	Private-aided .	62	34	..
3. Kagrath Leper Asylum, Ahmedabad	State-public	95	134	..
4. Parvati Bai Leper Hospital, Surat	Private-aided	132	Not available.	
5. Leper Home and Hospital, Nasik Town Mission . . . . .	..	100	189	96
6. Lady Polworth Home for untainted children, Nasik . . . . .	..	18	Not available.	
7. Leper Hospital, Miraj	Presbyterian Church . . . . .	..	Not available.	
8. Leper Hospital, Sholapur.	Mission to Lepers	75	90	..
9. Leper Hospital, Hindalgi, Belgaum . . . . .	..	29	56	1
10. Pui Leper Hospital . . . . .	..	66	94	..
11. Po'adpur Leper Hospital.	..	185	246	66
12. Sir Dinsha Manekji Petit Leper Hospital, Ratnagiri	Private-aided	100	110	..
13. Vengurla Leprosarium . . . . .	..	..	..	..
14. Hiranand Leper Hospital, Mangopir, Karachi	Government	60	174	..
15. Leper Hospital, Khondwa	Mission to Lepers	150	188	75

Madras.—Steady progress was maintained in the leprosy campaign. With the opening of 36 new centres, the number was raised to 441. All Government medical institutions, almost every local fund and municipal medical institution and about 50 subsidised rural dispensaries have clinics, at which about 40,000 patients were treated and 809,000 injections were given. The daily average strength of 12 asylums, with accommodation for 2,290 lepers, was 2,100. Of these 11 are government aided and one private and only treatable infectious cases are taken in. District Leprosy Councils continued to do useful work; the Chief Leprosy Officer, in addition to his duties as a group leprosy officer, coordinated work in the clinics and asylums and directed and supervised the work of group leprosy officers, etc.

No detailed leprosy survey has been carried out, except in Saidapet and Salem towns. In Saidapet with a population of 33,000, no less than 460 cases of leprosy were detected. Leprosy surveys are generally carried out in villages with a view to locating clinics in the nearest medical institutions.

The local Government consider that the introduction of any element of compulsory segregation would be likely to induce a greater desire for concealment of the disease than at present and to destroy the confidence which is being gradually established between lepers and medical officers. Compulsory segregation and the provision of accommodation and treatment for all cases of leprosy is considered impossible from the point of view of both finance and expediency.

Coorg.—Leprosy is not a problem in this province.

Assam.—A total of 4,926 lepers were treated in the leper asylums and at other treatment centres. The number of inpatients in the asylums at Sylhet, Gauhati and Kohima, in the leper ward at Dhubri and the leper colony at Tura was 377, whilst 1,244 outpatients attended the medical dispensaries, and 2,305 the dispensaries of the Public Health Department ; the remainder came for treatment at other centres. The number of outdoor clinics under the Public Health Department was 61, and under the Medical Department 138. Nine sub-assistant surgeons of the Public Health Department were trained locally in the technique of leprosy treatment. Assistant surgeons of the Public Health Department carried out the usual propaganda work with the aid of magic lanterns. Leprosy surveys have disclosed the existence of large numbers of unrecognised early cases. At present only towns and certain restricted rural areas have been declared, under Section 3 of the Lepers Act, as areas from which pauper lepers may be sent to the provincial asylum at Sylhet.

Burma.—Conditions in this province are different from those of Indian provinces with contiguous land frontiers, intersected by roads, railway and river communications. Lepers can easily be stopped at the port of entry. The provisions of the Indian Lepers Act having failed in practice the policy of institutional treatment was abandoned in favour of an intensive campaign against the disease in the countryside. An average of only 67 pauper lepers are housed at present in the various leper asylums, but this number is only a fraction of the huge total existing in this province.

Methods for the control of the disease include propaganda treatment and survey, plus segregation under the Burma Village Act. A special leprosy officer has been employed since 1931 and surveys have shown that the true incidence of the disease in the more heavily infected districts is about 16 *per mille*. The treatment and segregation of infective cases of this large leper population is a formidable problem. Its most practical solution is thought to be the establishment of colonies where housing and food are assured to the leper, where conditions of life approximate to those of an ordinary village and where those who are able to work are employed in raising stocks of food for their own consumption, whilst regular treatment can be provided for the cure or early arrest of the disease. Two such colonies are at work and a third has been proposed.

High prevalence of leprosy was reported from Pyawbwe town and Yemethin district. Colonies for the housing, feeding and treatment of lepers were maintained at Monywa and Minbu. The maximum number of lepers in the Monywa colony was 66 as against available accommodation for 48 in six cottages. The maximum number in the colony at Minbu was 38 and several patients had to be refused admission. A third colony was maintained by the Roman

Catholic Mission at Kengtung, the maximum number of inmates being 110. All these three colonies received capitation grants from the Burma Branch of British Empire Leprosy Relief Association. Two more colonies in Meiktila and Thaton were proposed. In regard to the utility of leper colonies the D. P. H. remarks:—

“This Department considers that in the establishment of leper colonies lies the most effective measure for the control of leprosy in Burma. A colony is much cheaper to establish and to maintain than an asylum. It has an advantage over clinics in that in the colony the treatment can be taken to the segregated lepers, instead of expecting the individual lepers, to go for treatment to the nearest hospital clinic which is frequently some miles distant. Were sufficient colonies started throughout the province, they would exercise a marked effect in checking the spread of leprosy among the general population and in addition they would exercise a marked effect on the control of pauper lepers. The class of leper who now leaves his village to go and beg in the towns would have a colony to go where his housing and food would be assured, where the conditions of life would approximate to those of his village and where he would get regular treatment leading to cure or early arrest of his condition. He would be spared the experience of being regarded as an outcast and having to descend to the level of a pauper.”

Leprosy clinics were at work in the districts of Insein, Minbu, Meiktila and Myaungmya ; the results were on the whole discouraging.

Ajmer-Merwara.—The Leper Act is being extended to this province. No leprosy survey has been conducted ; it is therefore impossible to give an accurate estimate of the prevalence of the disease. It may, however be concluded from the small numbers of lepers treated in the Victoria Hospital, Ajmer, that the incidence is low. Indigenous cases numbered only 11 in 1933, 22 in 1934 and 20 in 1935 ; the remainder being from outside. A large number are in fact itinerant lepers from other provinces who visit the town on the occasion of religious gatherings.

Baluchistan.—Cases of leprosy are uncommon.

Rabies and Hydrophobia.

26. Table II (*ix*) gives the numbers of recorded deaths from rabies in rural and urban areas.

TABLE II (*ix*).

	Deaths.		Total.	
	Rural.	Urban.	1935.	1934.
Total	2,284	393	2,677	2,916
N.-W. F. P.	2	..	2	2
Punjab	108	18	126	160
Delhi . . . . .	..	2	2	2
U. P.	391	81	472	660
B. & O.	152	12	164	176
Bengal	728	55	783	830
C. P.	104	20	124	134
Bombay	143	37	180	206
Madras	434	112	546	412
Coorg . . . . .	..	..	..	..
Assam	55	10	65	77
Burma	167	46	213	257

In N.-W. F. P., 405 cases attended district headquarters hospitals and centres in the agencies. In the Punjab, 9,405 patients were treated at the different centres. Deaths from hydrophobia numbered males (95) and females (31). In the C. P., of the cases treated at various centres, 1,086 were dog bites and 216 bites of other animals. Of a total of 1,238 cases treated, 1,041 were cured, 17 died and 180 could not be traced. A total of 2,908 cases were treated at the different centres in Burma. Byelaws for the keeping of dogs and for the destruction of stray dogs within municipal limits were brought into force in five towns.

Venereal Diseases.

27. Table II (x) gives the numbers of cases treated in hospitals and dispensaries during 1935.

TABLE II (x).

	Gono- coccal infection.	Syphilis.	Soft Chancre.	Other Venereal diseases.	Total.	Per 1,000 of total.
Total	349,326	304,211	29,595	29,672	775,804	10
N.-W. F. P.	2,422	7,330	187	346	10,285	5
Punjab	12,878	17,873	472	1,376	32,599	2
Delhi	74,664	7,009	..	..	81,673	7
U. P.	11,172	1,137	168	4,001	6,478	1
B. & O.	25,897	39,055	2,271	5,813	73,036	10
Bengal	47,860	30,605	4,369	17,792	100,626	10
C. P.	12,479	18,076	1,126	2,337	34,018	9
Bombay	22,184	26,786	3,728	2,745	55,443	14
Madras	122,270	124,915	11,895	52,603	311,683	18
Coorg	318	106	7	29	460	1
Assam	4,333	2,172	95	321	6,921	3
Burma	22,694	23,870	5,263	5,307	62,134	18
Baluchistan	155	277	14	2	448	1

Anti-venereal measures were conducted in different directions in different provinces. For example, in B. & O. a campaign was conducted during the *Snan* and *Rathjatra* festivals in Puri. In Bengal and the C. P., treatment was provided in dispensaries, in the latter province the Indian Red Cross Society assisting in the purchase of the necessary drugs. In Bombay, assistants in the civil hospitals were given courses of training in venereology at Poona and Ahmedabad whilst in Madras Presidency the venereal diseases clinic in the Madras General Hospital dealt with 7,150 cases: 9 medical officers were given a course of training; and propaganda was conducted by means of leaflets distributed to patients.

The D. P. H. of Burma remarks:—

“It is impossible to give any accurate estimate regarding the prevalence of venereal disease in the province. The general opinion amongst medical practitioners is that their incidence is very high. As the public health statistics only relate to deaths, they afford no clue, for a death is rarely ascribed to syphilis or gonorrhœa. Public health reports state that the majority of venereal cases are treated by quacks. The information that is being collected by child welfare centres goes to show that a large number of the mothers attending the centres are infected with syphilis which accounts

for a high number of abortions. The Rangoon General Hospital reports that out of 805 post-mortem examinations carried out during the year pathological signs of syphilis were detected in 21 %, the corresponding percentages for 1934 and 1933 being 21 % and 20 % respectively."

Yaws.

28. This disease was reported to be fairly prevalent in Assam where a total of 4,201 cases were treated with satisfactory results. Amongst those who took the trouble to complete treatment, the relapse rate was very low. Goalpara district was worst affected, 1,780 cases being treated in that area but three other districts recorded several hundred cases each. In order to bring all foci of infection under control, an exhaustive survey was being made. In Burma, this disease is prevalent in Mandalay district, along the valley of the Tenasserim river in Tavoy and Mergui districts and also in some other parts of Mergui, Kyaukse, Katha and Lower Chindwin districts. No treatment was available during 1935 for want of funds, but towards the close of the year the Burma Branch of the Indian Red Cross Society sanctioned Rs. 1,000 for the purchase of drugs.

Kala-azar.

29. In the Punjab, the U. P., B. & O., C. P., Bombay and Burma, kala-azar is only rarely met with and is not a disease which gives cause for any anxiety. In Madras Presidency, a total of 2,130 cases were treated and of these 857 were recorded in Madras city, 566 in Ramnad district and 490 in Tinnevely district. These three areas have constituted foci of infection for many years past, but the records would indicate that the disease is not spreading to fresh centres. In Bengal, the situation was much more serious. Cases totalled 138,274 and deaths 17,469. Of the deaths 16,895 occurred in rural areas and 574 in towns including 149 in Calcutta. The largest numbers were registered in the districts of Rangpur (18,255), Bakarganj (12,557) and Rajshahi (10,445). Compared with 1934, phenomenal increases were recorded in the districts of Rangpur, Bogra, Bakarganj, Faridpur, Noakhali and Tippera. A total of 11,100 cases, 2,298 less than in 1934, were treated in Assam. Of these, 845 died, giving a case mortality of 8 %. Over 74 % of the cases occurred in the districts of Sylhet, Goalpara, Kamrup and Nowgong and over 75 % of the deaths in the first three of these districts and in Sibsagar. The kala-azar campaign comprises intensive and detailed surveys for the detection of fresh cases and treatment by means of intravenous injections of urea stibamine. Certain areas in the Hailakandi sub-division in Cachar district beyond the jurisdiction of the existing dispensaries were reported to be heavily infected and are now being surveyed. The Public Health Department continued to maintain treatment dispensaries in infected areas.

Relapsing fever.

30. During the year under report relapsing fever was nowhere present in epidemic form and it is even doubtful whether many of the recorded cases were true relapsing fever. In the Punjab, 142 cases and 121 deaths were reported from six districts; in the U. P. sporadic infection caused 213 deaths; B. & O. reported 17 deaths, of which 15 occurred in one centre; Bengal, in contrast with recent years, reported only 8 deaths; whilst Bombay, Madras and Assam were entirely free. The only province which was apparently seriously infected was the C. P., where the ordinary registration agencies recorded 4,538 deaths. These cases must, however, have been wrongly classified as not a single case was reported by the medical officers.

Influenza.

31. In the Punjab, this disease caused more deaths than in the previous year, 2,317 cases with 439 deaths being recorded as against 6,986 and 17 in 1934. The disease was most common in the central and south west districts. A total of 437 deaths were recorded in the U. P., of which 253 were in urban and 184 in rural areas. In Bengal, the number of deaths decreased from 4,124 in 1934 to 3,616. In the C. P., the disease was responsible for 1,217 deaths the numbers of cases in the severely infected districts being Nagpur 11,839, Jubbulpore 7,178, Akola 5,333, Buldana 4,302, Amraoti 3,688 and Nimar 3,542. In Assam only sporadic incidence was recorded, deaths numbering 42. There were 61 deaths in Burma, 1 in N.-W. F. P. and 187 in Bombay.

Goitre.

32. In the U. P., a total of 114,476 cases were treated in hospitals and dispensaries, the largest numbers being met with in the districts of Dehra Dun 4,813, Gorakhpur 12,504, Gonda 24,207, Garhwal 4,267, Kheri 6,247, Nainital 2,746, Moradabad 1,287, Pilibhit 1,327, Saharanpur 1,702, Bijnor 1,328 and Ballia 2,210. A total of 307 cases sought treatment in Bombay Presidency, 188 in the C. P., 2,773 in N.-W. F. P., 33,564 in the Punjab, 91,838 in B. & O., 27,735 in Bengal, 569 in Madras and 33,684 in Assam. In Burma, the disease was reported from a number of hill areas in Toungoo, Bhamo and Salween districts. Extensive hospital treatment was carried out in the districts of Myitkyina (1,726 cases), Northern Shan States (6,673) and in Mogok and Thabeitkyin hospitals (564).

Guineaworm.

33. Cases treated in hospitals and dispensaries included N.-W. F. P. 965, Punjab 1,729, U. P. 2,129, B. & O. 27,542, Bengal 44,779, C. P. 371, Bombay 7,561, Madras 15,074, Assam 127 and Burma 30.

Diphtheria.

34. The records for this disease were as usual of doubtful accuracy and do not perhaps give much indication of the actual incidence of the infection. In the Punjab, 197 cases and 91 deaths were reported; in the U. P. the deaths numbered 37 in rural and 68 in urban areas. The registrars of the Public Health Department in the C. P. recorded 90 deaths in five centres, but district medical officers reported only 86 cases with 11 deaths. Bombay Presidency registered a total of 67 deaths but in Karachi city 137 cases were treated in hospital, of which 16 died and 4,828 anti-diphtheritic inoculations were performed. The incidence of the disease in Karachi indicates that epidemics of diphtheria do occur in India, but it is not possible under the present system of registration to obtain records of these outbreaks except when they come to the notice of trained medical officers of health.

Typhus Fever.

35. The remarks made in connection with the records for diphtheria apply with equal force in the case of typhus fever. During recent years, medical officers have been on the look out for typhus outbreaks so that, in urban areas at least, future records may be expected to be more in accordance with actual facts. During 1935, 25 typhus deaths were recorded in N.-W. F. P. and 53 deaths in rural and 122 in urban areas in the Punjab. In this province,

deaths were recorded in the districts of Amritsar (337), Gurdaspur (129), D. G. Khan (97) and Multan (60). Of 76 deaths in the U. P., 51 were recorded in urban and 25 in rural areas. In B. & O., 32 deaths were recorded as "thagpus" fever which is apparently identical with typhus fever.

Cancer.

36. Little accurate information is available in regard to the incidence of cancer in India. A certain number of deaths from cancer have been recorded in several provinces, but these have not been included in this report, as they can convey no real indication of the actual position.

Cerebro-spinal Fever.

37. *N.-W. F. P.*—The disease was prevalent in mild form, 52 cases with 17 deaths being recorded. Of the total, 22 cases and 7 deaths occurred in March and 11 and 4 in April. There was nothing unusual in the age distribution.

Punjab.—Totals of 419 cases and 200 deaths were recorded as against 275 and 152 in 1934, the case mortality rates being 48 % and 55 % in these years. Of the total, 79 deaths occurred in rural and 121 in urban areas ; 143 were males and 57 females. Nine districts were infected. Fifteen cases and 12 deaths occurred in the Lahore Borstal Institution and one fatal case in the Lahore Central Jail.

Deaths by months are given below :—

	Deaths.
January	2
February	20
March	42
April	53
May	12
June	20
July	13
August	14
September	7
October	6
November	5
December	6

Strenuous efforts were made to combat the disease on its appearance and preventive measures included isolation of cases, segregation of contacts, examination of post nasal swabs for detection of carriers, disinfection of infected houses, improvements in ventilation and propaganda.

Delhi City recorded 548 out of 618 cases in the whole province ; deaths numbered 216 out of a total of 348. In New Delhi, Notified Area Civil Lines, Delhi Shahdara, and in the rural area there were 49, 13, 2 and 6 attacks with 15, 114, 1 and 2 deaths respectively. In spite of the impracticability of stopping free communication between the three urban areas, the lower incidence of the disease in the Notified area and in New Delhi bear testimony to their comparative lack of congestion, their freer ventilation and their better sanitary conditions. The death rate was very high, being over 50 % in Delhi City and in the Civil Lines.

Cases and deaths due to cerebro-spinal fever during 1935 in different areas of Delhi province by months and by community and sex are detailed below :—

Months.	Delhi City.		New Delhi.		Notified Area Civil Lines, Delhi.		Delhi-Shahdara.		Rural Areas.		Total.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
	January . . .	75	29	14	...	2	14	91	43
February . . .	145	63	3	...	5	30	2	1	...	...	155	94
March . . .	151	51	11	6	3	24	...	...	...	...	165	81
April . . .	71	28	5	3	2	13	...	...	4	1	82	45
May . . .	52	26	2	1	...	11	...	...	1	1	55	39
June . . .	19	8	6	1	...	1	...	...	1	...	26	10
July . . .	6	2	2	1	...	2	...	...	...	...	8	5
August . . .	6	2	2	1	...	4	...	...	...	...	8	7
September . . .	5	1	...	...	...	4	...	...	...	...	5	5
October . . .	3	1	2	1	1	3	...	...	...	...	6	5
November . . .	10	3	2	1	...	5	...	...	...	...	12	9
December . . .	5	2	...	...	...	3	...	...	...	...	5	5
Total . . .	548	16	49	15	13	114	2	1	6	2	618	348

Male cases were more than twice as numerous as female cases and Mohammadans suffered more severely than Hindus.

"Carriers", over-crowding and dust seem to be important factors in the spread of the disease.

Cases and deaths due to cerebro-spinal fever by classes and sex in different areas of the Delhi Province during 1935 are given below :—

Classes and Sex.	Delhi City.		New Delhi.		Notified Area Civil Lines, Delhi.		Delhi-Shahdara.		Rural Areas.		Total.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
	All Classes . . .	548	216	49	15	13	114	2	1	6	2	618	348
Males . . .	409	154	44	14	12	86	...	...	4	1	469	255
Females . . .	139	62	5	1	1	28	2	1	2	1	149	93
Hindus . . .	356	152	29	9	12	92	2	1	4	1	403	255
Males . . .	265	105	25	8	11	68	...	...	2	...	303	181
Females . . .	91	47	4	1	1	24	2	1	2	1	100	74
Mohammadans . . .	190	62	20	6	1	22	...	...	2	1	213	91
Males . . .	143	48	19	6	1	18	...	...	2	1	165	73
Females . . .	47	14	1	...	...	4	...	...	...	...	48	18
Christians . . .	2	2	...	...	...	...	...	...	...	...	2	2
Males . . .	1	1	...	...	...	...	...	...	...	...	1	1
Females . . .	1	1	...	...	...	...	...	...	...	...	1	1

U. P.—Deaths totalled 756, males 511 and females 245. Over 87 % of the total deaths occurred during the first half of the year and over 56 % in May and June.

B. & O.—Fifty-five cases were treated in hospitals and dispensaries. Fifteen cases were between 4—8 years of age, 3 were 14 years and 32 between 20—30 years of age. Of the total, 48 were males and 7 females.

In Orissa nine cases were treated in the General Hospital, Cuttack; 5 were fatal. Their ages varied from 14—42 years. No cases were reported from other parts of the province.

Bengal.—Figures are available in respect of the Campbell Medical Hospital and these are given below :—

Seasonal incidence and mortality.

	Admissions.	Deaths.	Case Mor- tality %.
Total	817	498	61
January	83	60	72
February	116	72	62
March	110	60	55
April	77	44	57
May	56	24	43
June	60	40	67
July	52	38	73
August	60	39	65
September	55	33	60
October	39	23	59
November	55	36	65
December	54	29	54

Incidence and mortality according to age.

	Admissions.	Deaths.	Case Morta- lity %.
1—4 years	17	7	42
5—9 years	40	21	52
10—14 years	62	37	60
15—24 years	277	158	57
25—34 years	246	160	65
35—44 years	124	81	65
45—54 years	36	26	72
55 years and over	15	8	53

Caste and sex incidence.

	Male.	Female.	Total.
Hindus	555	95	650
Mohammedans	142	9	151
Others	13	3	16
Total	710	107	817

In Calcutta city a total of 1,193 cases with 701 deaths were reported. Half of these cases and deaths occurred during the first four months of the year. The maximum number of cases among males occurred during the age-period 20—25 years and among females between 30—35 years. The incidence among coolies and labourers seemed to be higher than among other classes of the population.

No association was demonstrated between attack rate and density of population. The following table gives the numbers of cases and deaths by months :—

	Cases.	Deaths.
Total	1,193	701
January	110	65
February	151	101
March	203	142
April	109	63
May	87	57
June	85	46
July	62	41
August	85	43
September	71	40
October	61	20
November	93	43
December	76	40

C. P. & Berar.—The ordinary registration agency reported 191 deaths ; the civil surgeons' returns however showed 158 cases and 80 deaths. Preventive measures included the temporary creation of two epidemic dispensaries in Buldana district ; the closure of cinemas and schools ; the promulgation of special rules under the Epidemic Diseases Act ; and propaganda work.

Bombay.—Deaths totalled 396 ; 382 in urban and 14 in rural areas. The town of Ahmedabad had a severe epidemic during which 308 cases and 180 deaths were reported ; the height of the epidemic was reached in May. 103 cases were recorded in the age group 21—30 years and 66 cases in the group 1—10 years. Of the total deaths 240 were males and 68 females. The lower castes suffered most, 133 cases or 43 % of the total being reported. The incidence was higher in thickly populated areas where the poor crowd into chawls and where environmental sanitation is of a low standard.

In Bombay city the disease was present throughout the year and 211 cases and 136 deaths were reported. The monthly incidence was irregular and generally not more than one case in a family was reported. The age groups 15—40 years showed the highest incidence and the number of male deaths (112) was nearly 5 times that of females (24). Of the total, Hindu deaths numbered 86, Muhammedans 27, Indian Christians 14, Jains 5, Parsis 2 and Europeans and Anglo-Indians one each. Preventive measures included isolation, disinfection and inoculation. Data was insufficient to estimate the protective value of inoculation. *Madras, Assam, Burma and Coorg* were practically free from this disease during the year under report.

Ajmer-Merwara.—A total of 122 cases was recorded, males 99 and females 23. Fourteen were children aged 5 years or under ; 23 between 6—10 years ; 25 between 11—15 years ; 23 between 16—20 years ; 27 between 21—30 years ; and 10 between 31—40 years. Over 85 % of the total cases were registered from February to June.

Trachoma.

38. In N.-W. F. P. 76,396 cases were treated, including 29,299 in Peshawar, 11,030 in Hazara and 10,447 in D. I. Khan district. In the Punjab a total of 1,391,016 cases attended for treatment ; Jullundur (112,431), Ferozepur

(91,006), Sialkot (79,636) and Amritsar (77,977) recorded the largest numbers. In Delhi province, of a total of 179,597 cases of eye diseases treated, 9,115 or 5 % were trachoma. In the U. P. cases treated totalled 268,340. The districts of Agra (10,482), Allahabad (12,470), Bijnor (23,625), Lucknow (11,998), Moradabad (12,176) and Sitapur (11,058) reported the largest numbers. In the C. P. a total of 26,153 cases were treated, the districts chiefly concerned being Buldana (4,202), Hoshangabad (3,045) and Bilaspur (2,608). In Bombay, 20,279 cases were treated in medical institutions; 5,549 in Sind, 5,466 in Gujarat; 7,940 in the Deccan and 1,324 in the Konkan. Cases treated in other provinces numbered Madras 62,844, B. & O. 44,649, Burma 16,820 and Assam 532.

SECTION III.
MATERNITY AND CHILD WELFARE.

Maternal Mortality.

39. The figures for recorded maternal deaths in India are still far from accurate and some of the rates given in Table III (i) cannot be taken as indicating actual conditions in any of the provinces, although in Madras, Bengal, Bombay and the C. P. the rates are approximately twice as high as those which have caused grave concern to the health authorities in England. Dr. Balfour during her investigations in Assam found maternal death rates among the tea garden populations varying between 40 and 130 per 1,000 births. Reference has been made in previous reports to an investigation made in the Madras Presidency in a number of municipal areas where the rates were found to be three, four and five times as high as the English maternal mortality rate. It will be noted that urban areas almost universally return higher rates than rural areas and this may partly be due to the fact that a considerable number of municipalities now employ medical officers of health who are concerned in the improvement of registration. Year after year attention has been drawn to the faulty registration in rural areas, but it is difficult to see how improvement in this connection can be obtained until the whole system of registration is reorganised and placed in the hands of district health officers. The recorded rates would seem to indicate that the advantage lies with rural areas perhaps because of the better physique and nutrition of the mothers which might counterbalance the lack of skilled attention at child birth, but this factor certainly does not influence the rates in such an overwhelming manner as suggested by the recorded figures.

TABLE III(i).

Maternal Deaths.

	Number.			Rates per 1,000 births.		
	R.	U.	Total.	R.	U.	Total.
N.-W. F. P.				No information available.		
Punjab	840	273	1,113	1.0	2.2	1.0
Delhi	14	112	126	0.1	0.3	0.2
U. P.	655	1,716	2,371	0.4	7.0	1.4
B. & O.				Information not available.		
Bengal	14,961	647	15,608	9.6	8.4	9.5
C. P.	4,291	960	5,251	7.0	11.9	7.9
Bombay	3,849	1,177	5,026	6.0	8.0	6.2
Madras	11,256	3,183	14,439	7.9	13.2	8.6
Coorg	34	1	35	9.1	2.3	8.4
Assam				No information available.		
Burma	1,350	467	1,817	3.8	9.8	4.5
Ajmer-Merwara . . . . .	..	23	23	..	3.1	..

In the absence of medical certification of death no accurate classification of the causes of death relating to an unselected population are available, but some idea of the relative importance of a number of clinical causes may be gathered from the records of certain women's hospitals which were summarised in the Journal of the Association of Medical Women in India for August, 1936. Of 638 maternal deaths included in this paper, 139 were due

to or were aggravated by diseases associated with pregnancy and child-birth whilst 499 were directly due to child bearing. These deaths were classified under the following headings:—

1. Sepsis (following delivery or abortion)	188	37·68%
2. Anæmia of pregnancy	88	17·64%
3. Accidents of labour (shock, ruptured uterus)	72	14·43%
4. Toxæmias	64	12·83%
5. Hæmorrhage	59	11·82%
6. Embolism	12	2·40%
7. Ectopic	5	1·00%
8. Unclassified	11	2·20%
	499	100·00%

The large proportion of deaths due to sepsis is accounted for by the fact that many of the cases had been examined or mishandled and were infected before admission. Labour was described as normal in only 12 or 7·9% of the septic confinements, a clear indication of the preponderance of exogenous infection in this country. The anæmias are a mixed group including both primary and secondary, but this important cause of maternal deaths in India does not appear at all in the death statistics of western countries. Associated diseases stand second in importance in India and are an indication of widespread ill-health and of the urgent need for better provision of medical and obstetric relief for the female part of the population.

The magnitude of the problem facing the maternity and child welfare movement in India can be gauged from the figures appearing in this report. A total of 2,848,099 or 43% of the deaths registered during 1935 occurred among children under the age of five years. Maternal deaths arising out of pregnancy are estimated to account for a further 150,000 to 180,000 deaths annually. Accurate figures, as already has been stated, are not available, but the maternal mortality rates for the larger towns indicate that large numbers of women die during the child-bearing age-periods. Along with this wastage of life a very serious wastage of health takes place. The percentage of women disabled as a result of pregnancy and labour may perhaps be taken as not less than 30% and in a country where nearly ten million births are registered annually, the percentage of women temporarily or permanently handicapped must be very large. To the physical disabilities from which both mothers and children suffer must be added loss of happiness and the less tangible, though not less important, damage to stability of temperament which follows in the wake of neglect of provision for the education and care of the mother and her family. General environmental measures undoubtedly effect a reduction in the incidence of disease and mortality, but the extent to which environmental hygiene alone can control disease is limited in certain respects. Without doubt education in the use of the services provided must accompany the establishment of these services if the maximum benefit is to be derived. Similarly the best midwifery schemes will be ineffective unless accompanied by widespread improvement in the general health. No service, however efficient, can combat lack of resistance in the individual. The failure of hospitalisation of midwifery to reduce the maternal mortality rate is indicated in the Bombay figures. There the maternal mortality rate in 1933 was 7·5 and in 1934 6·9 per 1,000 births, whilst the percentage of cases admitted to institutions was 70·6 and 68·3, respectively. At the same time, skilled attendance during pregnancy, labour and the early period of child life are an essential

part of any general scheme of control. The present unsatisfactory position of even a minimum basic maternity and child welfare service in India is reviewed in subsequent paragraphs.

Midwifery Services.

40. So far as information is available, beds provided for midwifery cases numbered 41 in Assam, 732 in Bombay Presidency (475 in rural areas and 257 in urban areas), 282 in Burma, 212 in the C. P., 68 in Delhi, 1,557 in Madras Presidency (389 for rural areas and 1,168 for urban areas) and 137 in N.-W. F. P. Table B in Appendix III gives the numbers of maternity and child welfare centres and the staffs employed in those centres in the various provinces.

Ante-natal Care.—The numbers of ante-natal clinics are slowly increasing, but even at the present day many of the hospitals attached to medical colleges, medical schools and training institutions for midwives have no adequate arrangements and the students leave college with a minimum knowledge of the scope and value of ante-natal care. Ante-natal care, of course, should be an activity of every infant welfare centre, but here again the work is handicapped by the scarcity of visiting doctors interested in prevention, by lack of contact with the expectant mothers, by lack of funds for the supply of extra nourishment and by an inadequate provision of hospital accommodation and skilled attendance at child-birth. The number of hospitals in India which have ante-natal clinics is unfortunately not known; the number of welfare centres is approximately 800. Maternity benefit is paid to women workers in Bombay, Sind and the C. P. and a draft bill on this subject is now before the Legislature in Bengal. In these provinces the maternity benefit must be of a value to the woman concerned, but unfortunately it is reported that the amounts paid are often completely absorbed into the family income so that little is left for the special care of the mother and for the expenses of her confinement. This of course can only be amended when the families concerned realise, more fully than they do at present, the importance of spending the amounts paid for maternity benefit on the purposes for which they were intended.

Institutional Midwifery.—The most complete returns are those from the provinces of Bombay and Burma. In Bombay Presidency, where 806,989 births were recorded, 257 beds were available in urban centres and 475 beds in mofussil areas, these figures working out at one bed for every 1,102 confinements instead of 1 for every 100 confinements which may be taken as a reasonable, although not ideal, estimate of the number necessary. Burma has one maternity hospital with 132 beds, 35 hospitals with an aggregate of 150 beds for confinement cases, whilst an additional 145 hospitals admit maternity cases to the general wards. These figures may be compared with the 400,000 births registered during 1935 in that province. Information relating to mission hospitals and to those run by private enterprise is not included in the provincial returns, but it is evident that in every province of India the number of maternity beds requires to be largely augmented. These extensions are all the more urgently called for because of the rapidly increasing demand for admission to maternity hospitals or maternity homes, particularly in western and southern India. Small maternity homes have sprung up in many centres, often as a result of voluntary enterprise, but many of these are staffed by illiterate *dais* who are incapable of keeping records or even of taking temperatures

and who have a very limited knowledge of asepsis and isolation. In England it was found necessary, in order to ensure a reasonable standard of equipment and adequate staffing, to legalise the inspection and supervision of these maternity homes and, should the numbers of these homes increase in India as there is every indication that they will, the question of their supervision must be a matter of considerable urgency and is one which should be taken up without avoidable delay by provincial authorities.

Domiciliary Midwifery.—Registration of midwives has only recently been established in most of the provinces, so that the numbers of trained midwives are not yet known. The employment of midwives by local authorities is not compulsory in this country, but many municipalities and district boards have established domiciliary midwifery services. In Madras, for instance, 252 are known to be employed by municipal committees, 102 by district boards, 40 by voluntary societies and an additional 1,076 are attached to dispensaries or are conducting private practice. This gives a total of 1,559 for 1,671,186 recorded births or 1 for every 1,072 births against the 100 to 150 which is the maximum number any midwife can reasonably be expected to conduct in any one year. It is true to state that the vast majority of confinements are still conducted by untrained attendants; the percentage in the United Provinces is 73 and in Madras 50.

Apart from the scarcity of training schools and of trained midwives, a serious handicap exists in the lack of supervision of the midwives and their practice. No full time inspectress of midwives has yet been appointed in any province and supervision of the midwife in private practice does not exist. The duty of inspection of the salaried midwife meantime devolves on officials of the Medical or Public Health Department according as she is attached to a hospital or dispensary or a welfare centre. Civil surgeons and health officers have little time to devote to these inspections and in any case custom would debar them from being present to witness the midwife at work. Effective supervision can only be made by experienced and well trained midwives, but unfortunately these exist only in very small numbers.

The extent to which the general practitioner is engaged for the conduct of labour cases varies in different provinces according to the customs of the community, but generally it may be said that medical attendance is only secured in abnormal cases and this too for the most part only in urban centres. The cities and a number of the larger municipalities now employ medical women for domiciliary midwifery, but no provision exists outside those areas and, as has already been indicated, hospital accommodation is limited, even although admission and service there are free, whilst the difficulties of transport and communications add another difficulty to the problem.

Facilities for Training.

41. The training of medical students in obstetrics is not yet uniformly organised throughout India. The teaching of midwifery under domiciliary conditions has been introduced in only one training institution, namely, in the Women's Medical School, Ludhiana. Great difficulty is also experienced in obtaining a sufficient number of confinement cases in the teaching hospitals for the satisfactory training of medical students even on the standards now laid down. Moreover, post-graduate courses for the general practitioner are rare, whilst facilities for specialist courses in obstetrics exist only in the cities of Calcutta, Bombay and Madras.

As regards training schools for midwives, these are markedly insufficient for the needs of the country. Legislation regulating the training and registration of midwives has been passed in the eight provinces of B. & O., Bengal, Bombay, Burma, C. P., Madras, Punjab and the U. P. The Bombay Act was passed in 1935 and those in the U. P. and Bengal in 1934. The Nursing Councils established under these Acts are of too recent origin to have made their potential benefits realised, but a beginning has been made and it is to be hoped that in time the number of training schools will be increased and the standards of training improved. The growing emancipation of women seems likely to further the improvement towards better midwifery.

A serious defect in the Nurses, Midwives and Health Visitors Registration Acts, with the exception of that of the Punjab, is that no cognisance is taken of the indigenous *dai*, consequently no provision has been made for the prohibition of practice by unregistered women. In these circumstances, unregistered midwives or those removed from the registers for malpractice or incompetence suffer no disability, because the only services from which they are debarred are those financed from official sources. Moreover, private practice is more lucrative and the work is easier unless subject to interference, so that little is to be gained at present by registration. Apart from improving the control over the practice of the midwife, it is essential in the interests of the expectant mother, particularly in rural areas, to bring the *dai* under supervision and to give her training. Rural authorities have not the financial resources for the provision of midwives in every village, communications are too precarious to permit of a centralised service and private practice would not provide a living wage even if midwives were available. At the same time, a large number of hereditary *dais* have already been trained either under official or voluntary auspices and new and better methods of training have been introduced. Training schools for *dais* have been established in Ajmer, Dera Ismail Khan and Silchar, and since these have obviated many of the drawbacks attendant on the practical training of *dais* attached to infant welfare centres, the present tendency is towards the establishment of additional schools. Voluntary associations, however, may well pause to consider the rôle of the *dai* in future organised midwifery services and her place in relation to the Registration Acts and the supervising authorities before embarking on further expenditure in this connection. The *dai* will no doubt be indispensable for many years to come, so that every attempt should be made to control as far as possible her methods of practice. This is perhaps impossible without registration, but the intentions of legislators in regard to her activities should be made more clear.

Maternity and Child Welfare.

42. Figures relating to the number of centres and the staff employed in these centres are incomplete, but approximately 800 infant welfare centres have been established, whilst some 60 medical women and 250 trained health visitors are employed in the maternity and child welfare services now in existence in this country. It is unfortunately true that a considerable number of the centres are badly organised, their work is un-co-ordinated, their records are not properly kept and the information which is collected is not made available for future planning. On the other hand, many have made satisfactory progress and their work must have had an effect both among women and children attending these centres. The numbers, however, are so small compared with the needs that large developments of the movement will have to take place before any appreciable influence on the maternal and infant mortality rates becomes apparent.

It will be of interest to give a brief summary of the scope and organisation of the work now being done in different provinces. In Assam, Bengal and Bombay, except for a grant-in-aid of *dais* training and health weeks in Bengal, the maternity and child welfare services outside the large cities are undertaken by voluntary organisations aided in a few instances by official grants. In the cities of Calcutta and Bombay voluntary and official schemes exist side by side, but municipal effort is directed to the provision of maternity homes and a midwife service almost to the exclusion of welfare work amongst nursing mothers and their families. Madras enjoys the distinction of being the only province employing a medical woman assistant to the Director of Public Health, but no grants-in-aid of local schemes are provided from provincial revenues and the absence of this stimulus to improvement has slowed down progress. The Madras Government gives an annual grant to the Indian Red Cross Society for the maintenance of the Training School for Health Visitors. The Punjab Government gives grants-in-aid for approved schemes and it also finances and maintains the Health School. The Superintendent of this School is also Inspectress of Health Centres. This is an excellent arrangement as far as it goes, but the better policy would be to place the organisation and administration in the hands of a medical assistant to the Director of Public Health and to limit the duties of the Superintendent to inspection of the work of the health visitors and midwives employed under the scheme. Difficulty is experienced in employing medical women in centres inspected by a health visitor. The Health School in the C. P. is a Government institution in charge of a medical woman who is also Director of Maternity and Child Welfare centres managed by the Indian Red Cross Society. A substantial annual grant is given from Government revenue to the Indian Red Cross Society for distribution. The advisability of this transfer of responsibility and control from the public health department is open to question. In the U. P. and in B. & O. the work is undertaken by voluntary associations which are given a semi-official status by the presence on the managing committees of Government officials and by Government and municipal grants-in-aid. In the U. P. organisation of the work is carried out by a medical woman employed by the Indian Red Cross Society. In B. & O. outside Patna inspection and direction are done by members of the committee. In Burma a qualified health visitor employed by the Indian Red Cross Society acts as Superintendent of the Health School and advisor on maternity and child welfare throughout the province. She works in close co-operation with the public health department, advises on the distribution of Government Grants-in-aid, and stimulates local effort.

Training of Doctors and Health Visitors.

43. Rules regulating the qualifications of medical women and health visitors appointed to maternity and child welfare posts have not yet been promulgated. Sufficient numbers have not been trained perhaps to warrant the universal application of such regulations, but in many areas a beginning could be made, primarily in the municipalities where permissive legislation already exists. A course of training for medical women graduates for a Diploma in Maternity and Child Welfare was inaugurated in the All-India Institute of Hygiene and Public Health in 1933. Only 4 candidates have so far passed out, because the conditions of subsequent employment are not sufficiently lucrative in comparison with private practice to attract any but the very few who are at present preventive minded. Posts carrying adequate salaries are scarce and it is therefore extremely difficult for medical women to gain the administrative and clinical experience necessary to fit them for posts as directors and organisers of larger schemes.

Health Schools for the training of health visitors exist in Bombay, Delhi, Lahore, Madras, Nagpur, Poona and Rangoon and schools are expected to open shortly in Calcutta and Lucknow. Sixty health visitors passed out from these schools in 1935. The numbers trained are insufficient to meet the demand, but the supply of candidates with the necessary education, experience and personality is limited. Qualifications for admissions, the curriculum, the standard of examination and the issue of diplomas is regulated by a voluntary society in Delhi, Madras and Poona and in other cases by official bodies. The drawbacks to the former arrangement become obvious when the question of reciprocal recognition of the diplomas by the Nurses, Midwives and Health Visitors' Councils is raised. Standardisation of training is difficult in a country so large as India, where the general education of women and the special education in nursing vary so widely, but the question must shortly be faced. The establishment of a central authority to inspect and approve of the curricula and standards of the teaching institutions should receive careful consideration.

Except in the schools at Nagpur and Poona the training is at present given in English, but there is a growing demand for vernacular courses and in view of the tendency to restrict the teaching in English in schools, as well as the educational qualifications demanded for admission to the training schools for nurses, the day may not be far distant when each province will find it necessary to admit vernacular students. The Lady Reading Health School, Delhi, continues to be an All-India Institution. The training there lasts 18 months and, in the course of time, when each province can supply locally trained health visitors, it is expected that this school will admit only superior grades of worker and provide training for higher supervisory and administrative posts. The training of workers is a duty which the Governments may reasonably be expected to assume and the maintenance of these schools under voluntary auspices, while allowing freedom for experiment and diversity of training, is not a measure the indefinite continuance of which can be regarded with undiluted satisfaction.

Illiteracy, widespread poverty and malnutrition, prejudice, superstition and adverse social customs, religious fatalism which precludes the taking of precautions and the low status of midwifery as a profession constitute serious obstacles to the spread of maternity and child welfare, but there are signs of hopeful augury even here. The demand for girls' education is growing and new schools are being opened every year. Broadcast talks reach a wide illiterate audience and, although this method lacks the stimulus of demonstration and personal contact, ideas are sown, some of which bear seed. Moreover, interest in the problems of nutrition has become widespread and advances in this direction may also be anticipated. Prejudice, custom and superstition are gradually yielding as education spreads, whilst improved communications and industrial developments widen the contacts between individuals of different habits and beliefs. The Nurses, Midwives and Health Visitors Registration Acts will do something to improve the status of midwifery. The enfranchisement of women and the growth of women's organisations has led to a demand for legislation for the suppression of immoral traffic, children's Acts, the protection of the industrial worker and a more humanitarian outlook which cannot fail to influence the march of events.

On the more technical side, the shortage of public health staffs, doctors, midwives and health visitors delays progress. Schemes are started and staffed with inadequately trained personnel who do not appreciate the aims and objects of maternity and child welfare nor realise their key position in public

health. The appointment of expert technical officers attached to the public health departments, who would supervise the junior staff, guide and direct the enthusiasm of voluntary bodies on scientific lines would to some extent remedy this lack of understanding and co-ordination, but here again the difficulty is that there are few administrative posts in which medical women can acquire the necessary experience.

One enquiry into the causes of maternal mortality will be carried out shortly in Calcutta under the Maternity and Child Welfare Section of the All-India Institute of Hygiene and Public Health but more research is urgently needed. Record keeping is practised in most welfare centres, but little or no use is made of the information collected, mainly because the staffs are insufficiently trained to appreciate the value of statistics and because few centres are under the control of a medical officer who could undertake the necessary analysis of the records. Despite these numerous obstacles, however, development is taking place and the outlook for the future justifies a moderate degree of optimism.

SECTION IV.

PUBLIC HEALTH ADMINISTRATION.

Administration.

44. *N.-W. F. P.*—The I. G., C. H. is *ex-officio* D. P. H. and has one A. D. P. H. The temporary post of second A. D. P. H. was abolished from October 1935. No public health staff for rural sanitation was maintained, but the vaccination staff consisted of 6 superintendents and 49 vaccinators, including 24 vaccinators for rural areas.

In urban areas, Rs. 11,820 was spent on public health staff. Only the towns of Peshawar and Kohat have whole time M. O. Hs. In the former, the Municipality contributes one-third of the cost of the officer who is provided by Government; in the latter the Municipality meets the whole cost. In Bannu, Dera Ismail Khan and Mardan sub-assistant surgeons carry out public health duties in addition to their other work. In 5 other towns, more or less similar arrangements exist, but 9 others have no health officers. A scheme for provincialisation of M. O. Hs. was under consideration, as the present part time arrangements have been found to be unsatisfactory. Only eight sanitary inspectors were employed in urban areas and of these 5 worked in Peshawar city.

Punjab.—The public health staff comprised the D. P. H., four Assistant Directors, Epidemiologist to Government, Superintendent, Punjab Vaccine Institute, 28 district M. O. Hs., 49 sanitary inspectors, including 8 employed by district boards, 10 sub-assistant health officers, 42 plague supervisors and dispensers and 441 vaccinators. Thirteen municipalities employed whole time M. O. Hs.; 30 towns used the dispensary medical officers as *ex-officio* M. O. Hs.; and 6 had part time M. O. Hs. In 7 towns the civil surgeons acted as M. O. Hs. in addition to their duties. 548 sanitary committees have been formed in villages. Other staff included 128 sanitary and health inspectors, 107 vaccinators, 6 inspectors of vaccination and 7 school medical officers.

Delhi.—The P. H. C. with the Government of India continued to act as *ex-officio* D. P. H. and he had an A. D. P. H. who also was M. O. H. of New Delhi Municipality and the Notified Area. The province includes two first class municipalities and 6 notified areas. Delhi city has a qualified M. O. H. In mofussal urban centres, the dispensary medical officers are employed as part time M. O. Hs.

For the rural areas, no M. O. H. was employed but the A. D. P. H. supervised the health work in addition to his other duties. The district board is generally responsible for the application of suitable health measures. The bye-laws applicable to rural areas, issued in 1927, were still in force.

U. P.—The superior staff included the D. P. H., four A. D. P. Hs., a part time public analyst, two deputy and assistant public analysts, and 72 Public Health Service officers. The subordinate public health staff comprised 50 officers of grade I and 43 of grade II.

D. P. H.	.	.	Director of Public Health.
A. D. P. H.	.	.	Assistant Director of Public Health.
I. G. C. H.	.	.	Inspector General of Civil Hospitals.
M. O. H.	.	.	Medical Officer of Health.
P. H. C.	.	.	Public Health Commissioner with the Government of India.
%	.	.	Per cent.
P.M.	.	.	Per mille.

Of the 48 districts in the province, 16 still have no sanitary inspectors or other health staffs and the civil surgeons act as part time M. O. Hs. In most of the remaining districts, one to three assistant or licentiate M. O. Hs. and 2 to 11 sanitary inspectors are employed. There are no school medical officers. The number of vaccinators employed in individual districts varied between 6 and 76.

In urban areas the position was still more unsatisfactory. In 27 districts only were municipal M. O. Hs. employed; in 27 small municipalities and 36 notified areas District M. O. Hs. were *ex-officio* M. O. Hs. Of these 21 held a D. P. H. and 13 were Licentiates. In six districts no sanitary inspector was employed, whilst in others the numbers varied from one to 16. Vaccinators numbered 185; school medical officers were at work in 13 districts.

The village-aid scheme referred to in previous reports continued to work wholly or in part in 7,973 villages. The scheme comprised the opening of dispensaries, training in hygiene, first-aid, anti-epidemic work and the improvement of water supplies. In each district under the district health scheme, one or more villages have been improved on sanitary lines to serve as models. A large number of wells on the pilgrim routes to Allahabad have been improved. The district board of Gorakhpur continued to provide funds for the appointment of resident health officers for groups of villages.

The Health Unit, Partabgarh, was continued with financial assistance from the Rockefeller Foundation. The activities of this Unit were reorganised; the training of indigenous *dais* was pressed forward; registration of vital statistics was improved; trench pattern latrines in place of bore-hole latrines and soakage pit urinals were constructed; other types of sanitary conveniences, *e.g.*, bathing platforms, were introduced and medical relief for minor ailments was given. In addition, the provincial Government were planning a programme of rural development with funds provided from the Government of India grant. The plan comprised (i) a main scheme which aims at the general economic improvement of villagers and village conditions; (ii) departmental schemes of improvement in smaller selected areas in order to demonstrate the value of intensive work in particular directions. The main scheme was put into force in 72 villages in each of the plains districts and the Public Health Department collaborated in respect of public health improvements. Village officials, school teachers and older boys were being trained in hygiene and first-aid; village sites were improved by the storing of rubbish, litter and manure in pits; soakage pits for the reception of waste water and screened latrined trenches for women were constructed; urinals were provided near inhabited areas; villagers were trained in anti-epidemic work; indigenous *dais* trained in aseptic methods and village *chowkidars* in the identification of common diseases, and Junior Red Cross groups have been started.

Nine "modified" Health Units have been set up, each in charge of a district M. O. H. or a reserve officer of the provincial health service, the subordinate staff of each consisting of 3 sanitary inspectors, one health visitor, 6 midwives, 6 indigenous *dais* and 5 apprentice vaccinators. The cost of each unit is Rs. 11,000; its public health activities are mainly those of the main scheme.

B. & O.—In addition to the D. P. H., an A. D. P. H. was in charge of each of the three circles.

For school medical inspection, five officers of the assistant surgeon grade and five of the sub-assistant surgeon class for the civil divisions of the province were at work. A woman school medical officer for girls schools combined

this function with that of a Medical Inspector of Factories. An assistant surgeon was in charge of the Public Health Bureau and another was employed as chemical analyst at the Public Health Laboratory. For epidemic work sub-assistant surgeons were employed temporarily to assist local bodies. In addition 100 reserve vaccinators were placed on epidemic duty as and when required.

The rural health organisation continued to work in 12 of the 21 districts of the province, each of which had at least one qualified M. O. H. The M. O. Hs. of seven districts belonged to the provincial public health cadre and were paid by Government; in four others they were servants of the district boards, Government contributing half the cost of these district health organisations; in one other the board met the entire cost. The other districts maintained a nucleus staff which was expanded as required.

Only seven municipal towns employed M. O. Hs. In five cases these officers belonged to the provincial public health cadre and were paid by Government; the other two were paid from municipal funds.

Bengal Presidency.—Under the D. P. H four A. D. P. Hs. were in charge of circles. The rural health scheme continued to work satisfactorily in 25 districts. Each district was in charge of a M. O. H. with a subordinate staff consisting of trained sanitary inspectors and Assistant Health Officers.

As regards municipal areas, excluding Calcutta, 24 Health Officers and 101 sanitary inspectors, were employed.

C. P. & Berar.—This province still had only the nucleus of a public health organisation. In addition to the D. P. H., the superior staff consisted of the Superintendent of the Vaccine Institute, the Officer-in-Charge of the Public Health Institute, the Lady Superintendent of the Health School, and the leprosy specialist.

Civil Surgeons continued to act as district M. O. Hs. but they were assisted by 35 epidemic assistant medical officers and 237 dispensary assistant medical officers. The latter carried out sanitary duties within a radius of 5 miles of their dispensaries. Six sub-divisional medical officers and 5 assistants to civil surgeons were also given public health work. The posts of the two publicity officers having continued in abeyance, propaganda work was carried on by two dispensary assistant medical officers. In addition to the leprosy specialist, 17 trained assistant medical officers carried out anti-leprosy work. Local bodies employed epidemic staffs numbering 35 persons, 274 vaccinators and 36 assistant superintendents of vaccination. Rural uplift work was continued in four districts and 77 villages had sanitation committees.

Only three towns had qualified M. O. Hs.; in other urban areas only sanitary inspectors were employed. These numbered 56 and vaccinators totalled 81.

Bombay Presidency.—The Public Health Department consisted of the D. P. H., four A. D. P. Hs., the Director of the Vaccine Institute, Belgaum, and two officers in charge of the public health laboratories at Poona and Karachi. Subordinate staff included 31 inspectors of sanitation and vaccination and 420 vaccinators. Qualified M. O. Hs. were employed in eight towns. Four other municipalities employed medical officers holding the sanitary inspector's certificate and the B. Hy. of Bombay. In seven of the smaller towns, the health officers employed possessed minor qualifications of different kinds. 112 qualified sanitary inspectors were employed in 52 towns.

Only three districts employed M. O. Hs. The two sanitary boards at Siddapur and Shahpur Chakar functioned only in limited fashion, but useful work was done by 755 sanitary committees and village *panchayats*.

Madras Presidency.—The Public Health Department under the D. P. H. included 4 A. D. P. Hs., one woman Assistant Director, 58 first class Health Officers, 52 second class Health Officers, 314 health inspectors, 42 government vaccinators, 889 vaccinators employed by local bodies including probationers, one entomological assistant and two compounders. Three of the A. D. P. Hs. besides being in charge of the bureaux dealing with fairs and festivals, vaccination and vital statistics, respectively, were placed each in administrative charge of a group of districts. The woman Assistant Director since 1931 has been responsible for maternity and child welfare work; the need for this branch of public health has become increasingly appreciated by local bodies.

The quinquennial revision course for health and sanitary inspectors remained in suspense. Temporary posts of six assistant District Health Officers, two temporary units in the rural sanitation campaign and two temporary posts of health inspectors for anti-malaria work in the Vizagapatam Agency were sanctioned for another year. A Conference of Health Officers was held in July.

The six rural sanitation units were mainly engaged in controlling hook-worm infection and the prevention of soil pollution. Their activities, as before, embraced surveys, educational propaganda, mass treatment and the construction of bore-hole latrines.

From the Government of India grant for rural amelioration a sum of Rs. 2.65 lakhs was allotted for the construction of latrines in rural areas. It has been planned to construct 200 public latrines in one *taluk* of each district.

The Poonamallee Health Unit was established as an experimental measure for intensive health work. The area embraces 25 villages with a population of 42,000. The staff consists of one first class M. O. H., 4 health inspectors, 4 health visitors and 8 midwives.

Assam.—The superior public health staff comprised, in addition to the D. P. H., two A. D. P. Hs., 7 temporary assistant surgeons, 9 urban M. O. Hs., 104 sub-assistant surgeons, 39 vaccination inspectors, 1 Biochemist, 4 compounders, 30 disinfectant carriers, 15 laboratory assistants and media makers, and 416 vaccinators, of whom 37 were employed by Government in hill districts, 377 by local bodies and municipalities and 2 by the Development Board. The services of the urban Health Officers who have undergone a course of training in sanitary science and who are employed by Government were lent free to municipal boards. Other boards were not bound to employ Government officers and two boards who formerly employed such officers have now appointed their own. Only the Shillong Municipal Board employed a fully qualified Health Officer, whose salary was in part paid by Government.

No rural health staff was employed, though a scheme for using the vaccination inspecting staff for this purpose has been pending for some years through lack of funds. General advisory work was, however, done by the general health staff, and dispensary officers were frequently invested with powers under the Pure Food Act. The Civil or Assistant Surgeon in charge of the sub-division was the Chief Health Officer of the Local Board.

Burma.—The superior staff included two Assistant Directors in addition to the Director of Public Health. Qualified M. O. Hs. were employed in four districts. Five assistant district M. O. Hs. were sanctioned but only 4 were actually employed. In other districts, the civil surgeon was in charge of public health duties in addition to his medical work. Other rural personnel comprised 63 public health inspectors, 303 vaccinators, 27 inspectors of vaccination, 27 epidemic sub-assistant surgeons as against a sanctioned strength of 22, one special leprosy officer and one sub-assistant surgeon on leprosy duty. In five districts no public health inspectors were employed.

Whole time M. O. Hs. were employed in 21 urban areas ; one officer was in part time service. Other urban staff included 20 medical registrars, 125 public health inspectors, 93 vaccinators, 20 persons on epidemic duty and 17 others. Fourteen of 28 towns with a population of over 10,000 and two with a population below 10,000 had wholetime health officers. Four registered medical practitioners obtained the Burma Government License in Hygiene at the Harcourt Butler Institute of Public Health. Five private candidates were under training at the Institute.

As in previous years, the activities of the Hlegu Rural Health Unit included the collection and study of vital statistics, health education, vaccination, school medical inspection, maternity and child welfare work, control of communicable diseases, refuse and sewage disposal, improvement of water supplies and abatement of nuisances. The birth and death rates were 36 p. m. and 20 p. m. as against averages of 17 p. m. and 13 p. m. for the quinquennium preceding the inception of the unit ; the infantile mortality of 125 p. m. of live births was the lowest on record. By the end of the year, nearly 68 % of the population had been vaccinated with the result that only seven smallpox attacks with one death occurred. There was only one non-fatal case of cholera. 247 infant and maternal welfare clinics were held ; the two midwives conducted 419 confinement cases. Of the 36 vernacular schools, 17 were provided with individual drinking water cups and properly protected water receptacles. Medical inspection of school children was carried out regularly. Leprosy clinics were continued and 34 new leprosy cases were registered. Leprosy surveys carried out in 27 villages showed an incidence of over 12 p. m. Chenopodium oil was administered to 2,453 cases for round worm infection ; of those for whom results were known 97% were relieved. Besides the distribution of *Gambusia affinis* as an anti-mosquito measure, 1,883 cinchona febrifuge tablets were distributed. Measures for the improvement of environmental sanitation were continued. Anti-rat measures included fumigation of burrows with cyanogas and trapping and poisoning of rats. 201 new bore-hole latrines were built. The Unit was also continued as a field training centre for students of public health and for M. O. Hs. and other public health staffs.

The Government of India gave a grant of Rs. 5 lakhs for the improvement of rural health conditions. The local Government have prepared a scheme of rural uplift centres in different parts of the province at a cost of Rs. 3,35,000. Under this scheme, each centre will comprise a typical group of villages and will have a staff of one M. O. H., one health visitor, one public health inspector and one midwife.

Medical Inspection of Schools.

45. *N.-W. F. P.*—Medical inspection of school children was carried out in 5 municipal towns by a Medical Inspector.

From July 1934 to June 1935, 46,369 examinations were made of 15,914 boys and of the 14,449 cases recommended for treatment, 10,604 or 73% actually received treatment. Thirteen per cent. of the children examined were found unclean; 9% had external eye diseases; 7% dental disease; 2% ear, nose and throat affections; 7% enlarged tonsils and adenoids; 3% defective vision; 1% malaria; 3% enlarged spleen; 2% anæmia; 2% glandular affections; 2% respiratory diseases. Of the 49 children found suffering from tuberculosis 32 had cervical glands, 10 had disease of the lungs, 3 of the spine, 2 of the ankle joint and 2 of other glands. Only 2 children were detected as unvaccinated and none needed revaccination. Nutritional disease was present in 206 cases, infectious disease in 12, goitre in 6 and general debility in 171. T. A. B. inoculations totalled 1,625 in Bannu, where an outbreak of typhoid fever was anticipated. 168 major and 1,242 minor operations were performed.

Owing to the distance of hospitals from the schools, common medicines, dressings, etc., were kept by scout masters, who issued them under the supervision of the medical inspectors. Mid-day meals were issued to children in 4 schools in Peshawar and Bannu.

Punjab.—A. D. P. Hs. and district and municipal M. O. Hs. continued to deal with sanitation in schools within their respective areas. The scheme of medical inspection of school children was in operation in five rural districts and in a fairly large number of urban schools. Diseases of skin, eye, teeth and enlargement of spleen were very common.

Delhi.—In addition to the supervisor for rural and urban school work, the staff comprised two whole time male sub-assistant surgeons, one whole time woman sub-assistant surgeon, two part time woman sub-assistant surgeons for urban areas and five part time sub-assistant surgeons for rural areas.

School premises and children were examined twice a year. Of the 28,818 boys and 5,965 girls examined, 99% and 28% were found to be suffering from different diseases. Among 24% of the boys examined trachoma was the cause of disease; enlarged tonsils were found in 12%, defective vision 11%, malaria 10%, diseases of glands 8%, defective teeth 7%, throat diseases 4%, and other causes 5%; 9% were unclean and 9% unvaccinated. Among the girls 9% had enlarged tonsils, 8% diseases of teeth, 4% trachoma and 3% other diseases. 55% of the boys in urban areas suffered from eye diseases and 17% from tonsillar affections.

U. P.—Only 13 municipalities employed whole time school medical officers. Examinations were carried out in 150 anglo-vernacular and 200 primary schools. In 20 other municipalities the M.O.Hs. acted as school medical officers and conducted detailed examinations in 45 schools and ordinary examinations in 161. In the rural areas, 21 M.O.Hs. conducted detailed examinations in 43 schools and ordinary examinations in more than 8,100 schools.

B. & O.—Two Government medical officers carried out medical examinations of children in high schools and in certain middle schools. In addition a woman school medical officer was employed for girls schools. Ordinarily all new entrants were examined and a complete medical history of each child was recorded. All children who were found suffering from physical defects at the previous inspection were re-examined. Dispensary medical officers were required to record on the counterfoils of prescribed forms the treatment given and the result. Clinics have been opened in schools at the divisional headquarters.

Of the 11,166 boys examined, 6,212 or 56% exhibited defects, whilst defects were found in 78% of the girls examined. Amongst the boys enlarged tonsils, carious teeth, scabies and palpable neck glands were commonly found. Eye diseases constituted 3%, visual defects over 12%; heart affections 4% and enlarged spleen 4%. Several cases of leprosy were detected in the Orissa division.

The school medical officers lectured in hygiene, sanitation and epidemic diseases to senior students in the High English Schools. Attendance at 10 such lectures was compulsory for admission to the Matriculation examination. School and hostel buildings were regularly inspected, and arrangements made for physical exercises and games. The provision of cheap midday meals was reported to be working satisfactorily in Purulia.

Bengal Presidency.—In Calcutta the three medical officers of the Education Department, the medical officer of the Scottish Churches Collegiate School and other medical officers examined 7,980 children. Of these 81% were classed as well nourished or fairly well nourished and 19% as ill-nourished; 16·3% were poorly clad. Six per cent. of the students examined had skin disease; 13% defective teeth; 2% nasal disease; 15% enlarged tonsils; 2% adenoids; 10% glandular affections; 1% ottorrhoea; 4% bronchitis and other lung troubles; and 1% showed defects in speech.

In municipal areas, 26 medical officers examined 8,102 children in 72 schools. Over 25% of these were ill-nourished and 16% were poorly clad. Whilst average height of these groups was not far below the anthropometric standard, the average weight was considerably below standard. Over 5% had skin diseases, about 10% defective teeth, 3% nasal disease, 4% enlarged tonsils, 9% lymphatic glands, 1% ear disease, 1% lung diseases, 1% defective speech, 9% eye troubles and 2% enlarged spleen; over 4% were unvaccinated.

Of the 2,146 children examined in rural areas in 54 schools, 32% were reported to be ill-nourished and 26% poorly clad. Six per cent. had skin diseases, 10% defective teeth, 14% enlarged spleen, 5% eye disease, 3% enlarged tonsils, 3% lymphatic glands, 2% ear disease, 2% nasal disease and about 2% adenoids, lung diseases and defective speech; 3% were unvaccinated. The rural sanitary inspectors inspected 5,595 schools in 25 districts and examined 172,032 children. About 26% had enlarged spleens and 10% were unvaccinated.

C. P.—Assistant medical officers in charge of dispensaries carried out the medical inspections. On an average 90,285 boys and 18,802 girls were examined each month. Of these 975 or 1% were found unvaccinated, 2,494 or 2% had enlarged spleens and 5,923 or 5% had contagious or other diseases. It cannot be assumed that the remaining 92% were healthy; rather does this figure indicate that detailed examinations were not carried out. In many schools, accommodation, lighting and ventilation were insufficient; many local board school buildings were in a dilapidated and dangerous condition and sanitary arrangements were unsatisfactory.

Bombay Presidency.—The scheme of medical inspection of schools continued in abeyance. In Sind inspectors of sanitation and vaccination visited 114 rural schools to examine the vaccinal state of the children and to inspect sanitation, ventilation and water supplies. They gave 82 lectures on tuberculosis and general hygiene. Of the 3,666 children examined, 265 or 7% were found to have enlarged spleens. In other registration districts similar work was carried out.

Madras Presidency.—A scheme for the revival of medical inspection of school children was under consideration of Government. More attention was devoted to the sanitary condition of schools especially in regard to water supplies and latrine accommodation after Government issued instructions to district health officers and health inspectors to visit recognised elementary schools, and report on the conditions of the premises, drinking water supplies, ventilation, lighting and sanitary conveniences as well as on the vaccinal state and general health of the children. A sanitary certificate was necessary from an officer of the Public Health Department before recognition was given to a privately managed school.

Assam.—Although no special staff for medical inspection work was employed, the A. D. P. Hs., because of other duties, were unable to devote attention to school hygiene. Periodical medical inspections of selected institutions were, however, carried out and recommendations for the improvement of health of the pupils and general sanitation of schools and hostels were made by the medical officers in charge.

Burma.—The Government's contribution to the "Scheme of School Hygiene and the systematic medical care of school children" remained in abeyance for the fourth year in succession with the result that medical inspection work was limited in extent; data are available for only 17 institutions. Of the 4,405 children examined, 59% were found to be protected against smallpox by primary vaccination and 37% by revaccinations; 2% had had smallpox and 2% were unvaccinated. The most common defects were carious teeth 21%, enlarged tonsils 14%, defective vision 5%, trachoma 4%, anæmia 3%, nasal obstruction 2% and skin diseases 2%. Satisfactory measures against epidemic diseases were taken in some schools.

Fairs and Festivals.

46. In the *N.-W. F. P.* all fairs passed off uneventfully; no fair of importance was held in the *Punjab* or in *Delhi Province*.

U. P.—In those districts having a health service, the medical and sanitary arrangements of all fairs and religious gatherings were controlled by the district health staff. The *Magh Mela*, the most important event of the year, was held in January/February, the attendance numbering nearly ten lakhs. The inspection of pilgrims coming by rail and by road and all conservancy arrangements were organised by the A.D.P.H. in charge of the Range. Temporary regulations under the Epidemic Diseases Act were enforced in the *mela* area and in Allahabad. The general health of the pilgrims was excellent except for seven cases of cholera in the *mela* area, of which 5 were imported. In order to prevent further spread of the disease, contacts were medically treated and inoculated. Four imported cholera cases, with one death, were reported in the *Piran-i-Kaliar* fair at Roorkee.

B. & O.—The most notable events were the Sonepur fair, held in November, the *Snan* and *Rathjatra* festivals held in June and early July and the *Pitripaksh mela* in Gaya. Only 9 cases of cholera with 3 deaths were reported during the Sonepur fair. Although Puri district was heavily infected with cholera, only 44 cases with six deaths were reported in the *mela* areas of the *Snan* and *Rathjatra* festivals, at which over a lakh of pilgrims were present. Only one case of cholera occurred during the *Pitripaksh* fair, which was attended by 67,442 pilgrims.

Bengal Presidency.—At the *Rathjatra mela* in Hooghly district a few cases of cholera were recorded; at *Gangasagar mela* there were 15 cases with 5 deaths; at the *Nangalbundh mela* in Dacca distt. 2 cases of cholera; and at the *Dalalbazar Jhulan mela* in Noakhali district 2 cases of cholera.

Outbreaks of cholera were also reported in the Patiram fair in Dinajpur district and in the Chittagong Hill Tracts on the occasion of the Chamka Chief's installation. At the former no deaths were recorded but at the latter 27 deaths occurred.

C. P.—An outbreak of cholera occurred at Bhandakpur fair, Saugor district, but other fairs passed off uneventfully.

Bombay Presidency.—Ten cases of cholera, with 7 deaths and 2 cases of smallpox were recorded at the Pandharpur fair. During the Kartiki festival at Alandi 9 cases of suspected cholera were removed to hospital. No infectious or epidemic disease was reported from other fairs.

Madras Presidency.—Of the 620 festivals which were held, 490 took place in the first half and 130 in the latter half of the year. Sanitary arrangements as usual were supervised by district and municipal M. O. Hs. or health inspectors. Except for some imported cases of cholera, all the fairs, including the important *Ardhodayam* festival, which is held once in 30 years, passed off without incident.

Assam.—At none of the fairs did the attendance exceed 10,000 and no outbreak of epidemic disease occurred.

Health Propaganda.

47. *Punjab.*—The staff of the Epidemiological Bureau, in addition to organising health exhibitions and health dramas, gave a large number of demonstrations to post-graduates, to medical students, to health visitors and to the sanitary inspector classes. Broadcasts were given on vaccination, plague, c.s. fever, hookworm, quinine, personal hygiene, insect enemies of man, tuberculosis and leprosy. In rural areas M.O.Hs. gave lectures on health topics to the general public and to school children and at fairs and other large gatherings.

U. P.—The Hygiene Publicity Bureau was staffed by an A.D.P.H. and two assistant publicity officers. The equipment of the Bureau's cinema van was enlarged to include a cinema projector, loud speakers, records on rural development and epidemics and 4 additional model boxes on maternity and child welfare. By means of the van 107 demonstrations were given to audiences numbering about 55,000. Intensive demonstration work was also carried out in nine districts. Magic lantern demonstrations were given by the assistant publicity and reserve officers particularly in epidemic areas. Other health staff gave 1,017 demonstrations and 50,000 lectures to audiences numbering about 23½ lakhs. 1,645 lectures were delivered by a number of dispensary medical officers. In Garhwal district, the public health and medical staffs gave 2,196 lectures and 21 magic lantern demonstrations on epidemic diseases to pilgrims going to Badrinath and Kedarnath and other centres. Leaflets on cholera, flies, smallpox, etc., were also distributed to these pilgrims. Bullock carts equipped with locally-made models and with health posters and literature toured in the interior of three districts.

The Publicity Bureau prepared sets of slides on "rural development", on meningitis and on the pilgrim route to Badrinath and Kedarnath. Various health booklets and leaflets in English, Urdu and Hindi were prepared and distributed in rural areas, and posters on plague, smallpox, malaria, child welfare and cholera were redesigned. More than 100,000 leaflets, 5,500 booklets and 3,500 sets of posters were distributed throughout the province. Lectures and demonstrations on methods of hygiene publicity were given by the Bureau staff to post-graduates and post-licentiates at the Provincial Hygiene Institute.

The 3,057 Junior Red Cross groups had a membership of 83,391 divided between 2,366 schools. The activities of these groups embraced the organisation of fresh air camps in villages, first-aid, sanitation of schools and hostels.

B. & O.—The provincial public health bureau prepared a series of ten illustrated posters on rural sanitation and supplied 500 copies to local bodies. It also sent out a large number of pamphlets and leaflets for distribution at the exhibitions held at fairs and festivals. Special health sections were organised at the provincial exhibitions at Patna and Daltonganj. Illustrated lectures and demonstrations on health subjects were given at Sonapur fair and to the cadets of the Police Training College, Hazaribagh. Hygiene lectures and magic lantern demonstrations formed part of a special course organised at Patna for the training of Co-operative Society Inspectors. Articles were contributed to the press and Hindi translations of two health pamphlets were prepared and widely distributed. The A.D.P.Hs. gave short lectures on sanitation and hygiene during their inspection tours in rural areas.

The Red Cross Health Museum as usual did useful health publicity work whilst the anti-tuberculosis sub-committee of the Indian Red Cross Society continued to direct campaigns against the spread of tuberculosis.

Bengal Presidency.—The ten touring cinema parties held 1,680 demonstrations, 280 on malaria, 237 on cholera, 341 on maternity and child welfare and 127 on tuberculosis, which were attended by 964,305 persons. The same staff also assisted in about 100 exhibitions in the mufassal and 30 in Calcutta. One of the cinema parties toured with the Government exhibition van which was fitted with exhibits, a cinema outfit, a magic lantern, amplified radio, microphone, etc. The van visited three districts and held 84 exhibitions before audiences estimated at 2 lakhs. About 60,000 leaflets and 20,000 posters were distributed. Six new films were prepared.

C. P.—In rural areas health propoganda by the epidemic staff included lectures at schools and in villages illustrated by coloured charts and pamphlets.

Bombay Presidency.—Propaganda on maternity and child welfare was continued by the 17 Sanitary associations. The Broach Sanitary Association organised 48 magic lantern and other lectures. Five health shows were held, cinema films on the subjects of child welfare and campaign against tuberculosis were shown and leaflets and posters were distributed. The Bombay Association arranged lectures for the occupants of insanitary chawls in the city. The Ahmedabad and other Associations carried on similar activities.

Madras Presidency.—The propaganda section in the Office of the D.P.H. maintained propaganda material for supply to local bodies and others on demand. Leaflets, pamphlets and posters were sold and magic lantern slides and cinema films issued on hire. Leaflets and posters on 110 different subjects have so far been issued in English and other vernaculars. 776,863 copies of these and 3 copies of a leprosy film were sold. Other activities included 19,948 magic lantern lectures, 151,811 other lectures, 1,253 cinema shows and 1,010 health dramas, attended by nearly 81 lakhs of persons. The propaganda section also organised an exhibit during the Christmas Park Fair exhibition at the South Indian Athletic Association ground.

Assam.—Assistant surgeons of the Public Health Department during their inspection tours gave demonstrations and illustrated lectures on different health subjects.

Burma.—The staff of the Hygiene Publicity Bureau distributed 20,208 leaflets and posters, and gave 46 ordinary and 52 lantern lectures and 78 cinema demonstrations on health subjects to audiences estimated at 50,385 in 16 towns and 52 villages. A publicity campaign, mainly directed against plague and cholera, was intensively conducted in epidemic areas. An additional copy of the Rockefeller Foundation malaria film with Burmese captions was prepared, as were two new pamphlets. The number of leaflets cards, specimen lectures, hand bills and posters distributed by the Bureau aggregated 567,679. There was increasing demand from local bodies, public institutions and voluntary welfare organisations for literature on health subjects, for the loan of the Red Cross Society's health exhibits and for the services of the Hygiene Publicity Officer. The health staffs gave 9,337 talks in rural and 1,139 in urban areas, and 250 and 152 magic lantern and 4 cinema demonstrations to audiences estimated at 733,120 and 125,300, respectively; they also distributed 109,407 and 183,650 copies of health publications.

Under the auspices of the Burma Branch of the Indian Red Cross Society, two health weeks and exhibitions were held in Rangoon. School competitions for the best health essays and posters were held in connection with the health week and exhibition. These formed a special feature of health publicity work in this province.

Industrial Hygiene and Mines.

48. The daily average number of persons working in and about mines regulated by the Indian Mines Act, 1923, was 253,970. Of these, 129,381 worked under-ground, 59,882 in open workings and 64,707 on the surface. The numbers of women included in these categories were 9,551, 14,193 and 16,159 respectively.

The general health of the mining populations in the Jharia and Raniganj Mining Settlements in B. & O. and Bengal was on the whole satisfactory. Inspections were made by medical officers, as *ex-officio* inspectors of mines, in B. & O., Burma, C. P., Madras and in the Punjab. In Bengal similar inspections were made by the Chief Sanitary Officer to the Asansol Mines Board of Health and in Assam by the civil surgeons of Lakhimpur and Naga Hills.

Classes in first-aid were held at 11 centres in the Jharia coalfield and in the mining areas of Singhbhum and Sambalpur. Of the 169 persons who attended the classes, 117 were awarded certificates. In the Raniganj coalfield, classes were held at 5 centres; 116 persons attended, 111 completed the course and 92 were awarded certificates. Similar classes were also held at other important centres.

The Asansol Mining Settlement.—The public health administration of the Asansol Mining Settlement continued to be in charge of a Board of Health with an executive Chief Sanitary Officer.

The birth and death rates were 21 p. m. each. The decrease in the recorded infant mortality rate from 169 to 147 per 1,000 live-births was reported to be due to strict supervision by health visitors and a lesser incidence of malaria. The fever mortality also declined. Of the 3,045 recorded fever deaths only 96 were due to malaria. Cholera appeared in epidemic form in March, reached its peak in July and August and subsided towards the end of the year. During this epidemic 1,144 cases with 616 deaths were recorded. An unusual shortage of water supply, due to deficient rainfall in 1934 and delayed rains in 1935, was said to be responsible for the prolonged duration of the epidemic. The settlement is however, constantly exposed to imported infection because of the frequent migration of labour whilst the movement of the miners themselves within the Mining Settlement largely determined the route of the spread of infection. Preventive measures included the application of the provisions of the cholera regulations, 104,751 anti-cholera inoculations and other routine measures. The question of providing the more important parts of the coalfield with a piped water supply was engaging the attention of the authorities.

Only 20 deaths were due to smallpox. Vaccinations totalled 43,944, primary 14,642 and revaccinations 29,302. Temporary smallpox regulations were enforced. Travelling health exhibitions and baby shows were organised in 8 places.

The leprosy campaign was continued, the staff being provided by the Mining Board of Health, whilst the B. E. L. R. A. (Indian Council) maintained 11 leprosy clinics. Twelve trained health visitors were appointed by the B. E. L. R. A. for detailed surveys, educative propaganda and home visiting. A "leper day" was organised.

Jharia Mining Settlement.—The health and medical administration of this settlement, including neighbouring mining areas and extending over 787 sq. miles, is entrusted to a Board of Health which employed a chief medical officer.

The estimated population of the Jharia Mining Settlement was 544,539. The birth rate was 27 p.m.; the death rate 20; and the infantile mortality rate 102. Along with other parts of B. & O., this coalfield suffered from an outbreak of cholera, the cases and deaths numbering 983 and 447 respectively, but the deaths on the collieries alone numbered only 42. A total of 26,437 anti-cholera inoculations were done. There were 1,186 cases of suspected smallpox with 58 deaths. The system of underground drainage was further extended. A total of 178 collieries have now been connected to the Water Board mains.

The Board maintained a laboratory which examined 445 food samples. All the collieries have been required to remodel one-fifth of their non-standard houses to the Board's standard. Health propaganda was done in connection with leprosy, maternity and child welfare, general hygiene, sanitation and ventilation. There were 16 maternity and child welfare centres under 3 qualified health visitors. A fully equipped anti-leprosy centre was opened, in addition to the three leprosy clinics at Jharia, Katras and Dhanbad.

Factories Act.—In regard to factories, the most important new feature was the enforcement of the Factories Act, 1934, from 1st January 1935. This Act, *inter alia* provided for (i) reduction of the maximum weekly working hours for adults, women and children, (ii) the protection of workers against

serious discomfort due to high temperatures in factories (iii) tests of stability of factory buildings, etc., and (iv) protection from industrial disease. Further provisions for welfare have been incorporated. Registered factories actually at work totalled 8,831, of which 5,166 were perennial and 3,665 seasonal. The average number of operations was 1,610,932. Accidents numbered 23,119, including 207 fatal, 4,831 serious and 18,081 minor.

With regard to housing, the following paragraph has been taken from the Report on the working of the Factories Act for 1934 :—

“ In Madras, housing accommodation was provided in one more factory. In the Punjab, considerable progress in the quality and quantity of housing provided took place in the bigger mills and newly erected factories and there was also some progress in smaller industrial concerns. In Bombay, the Labour Union, Ahmedabad, completed 20 more tenements on the tenant ownership basis during the year. Each tenement provides two rooms, a kitchen, a verandah and a yard. The standard of these tenements is higher than that of those usually occupied by textile workers and tenants will become owners in 22 years. 435 tenements have been built by the Ahmedabad Mills Housing Society in the last two years and 304 of these are occupied. It is understood that the Calico Mill, Ahmedabad, has initiated a very extensive building scheme which will enable a large proportion of the labour to be suitably housed. In Bengal, as a result of better trade conditions, a large number of factories are in a position to pursue their policy of improving year by year the housing accommodation provided for their workers. The improvements effected during the year consist of the replacement of old and unsuitable houses by new ones of better design, extensions and repairs to existing houses, additional tube wells and better arrangements for the supply of drinking water, and the provision of bathing places and recreation grounds. In Delhi, the Government of India Press, and the Kilokri Pumping Station have provided housing for the majority of their workers. In the U. P., 602 additional quarters were constructed during the year. Sugar factories were responsible for the bulk of the new construction. The Cawnpore Improvement Trust also built 60 quarters each consisting of two rooms, a courtyard and latrine and 8 quarters each consisting of a room, a verandah, kitchen and latrine on the ground floor and a room on the first floor with a covered stair case leading to it. Reference was made in last year's report to the acquisition of 40 acres of land by a mill in Cawnpore, for the purpose of building a model settlement to accommodate 10,000 workers and their families. It is now learnt that the actual transfer of land has not yet taken place and the scheme has consequently been blocked. The position of housing in the C. P. and Burma is much the same as in previous years.”

The health of employees was generally good, whilst water supplies and sanitary arrangements were on the whole satisfactory. In the C. P., U. P. and B. & O. the disposal of effluents from rice and sugar mills presented a difficult problem. In Bombay the problem of the disposal of trade waste at Ahmedabad was likely to increase with the tendency to develop machine bleaching. In Assam, Bengal and the Punjab, there was still room for considerable improvement in sanitation, particularly in the smaller concerns.

Ventilation and humidification received considerable attention in the Ahmedabad and Sholapur textile mills in which nearly Rs. 60 lakhs have been spent on the improvement of working conditions. Progress was made in providing air conditioning plants in the Bombay Mills and the question of dust removal in the metal stamping and polishing industry also received attention.

The Delhi Cloth Mills management engaged a fully qualified woman doctor for the hospital. In the Birla Mills, a hospital with a fully qualified doctor and a first-aid clinic was provided. Crèches did not appear to be popular with the operatives, but in Bengal welfare centres continued to do useful work. Improvements and extensions have also been made in the crèches in Ahmedabad and Bombay. Thirty-one health exhibitions for mill workers were held, 15 in Bombay, 10 in Ahmedabad and 6 in other places.

U. P.—District and municipal M. O. Hs. were *ex-officio* inspectors of factories. Experiments in regard to the efficient disposal of molasses and effluents from sugar factories were being carried on by the Sugar

Technologist at the Harcourt Butler Technological Institute, Cawnpore. To provide for immediate requirements, factory rules and byelaws have been amended making factory owners responsible for the proper disposal of molasses and the maintenance of their factories and surroundings in a sanitary condition.

Bengal Presidency.—The installation of septic tank latrines and activated sludge plants for 23 factories were approved. Samples of 1,056 effluents were analysed in the Bengal Public Health Laboratory whilst 651 samples of chlorinated effluents were tested on the spot for residual chlorine.

Madras Presidency.—Both district and municipal M. O. Hs. were additional Inspectors of Factories. The statutory provisions in the Indian Factories Act and the rules framed thereunder by the Provincial Government were supplemented by certain sections in the District Municipalities and Local Boards Acts in the case of certain factories, workshops and work places which do not come under the Factories Act.

Assam.—Sanitary conditions on tea estates were, on the whole, satisfactory. Special regulations under the Emigration Labour Act, 1932, existed in regard to the supervision of sanitary conditions on these estates. Sanitation of factories and control of offensive trades were effected under the Indian Factories Act. A. D. P. Hs. were additional Inspectors of Factories.

Adulteration of Food.

49. *N.-W. F. P.*—The Punjab Pure Food Act, 1929, as applied to this province, and the rules made thereunder by the provincial Government were in force in all municipalities and notified areas except Nowshera. Food stuffs such as milk, *ghee*, *atta*, *tea*, etc., were inspected by the food inspectors in these towns; only those suspected of adulteration were sent for examination to the provincial health laboratory. The A. D. P. H. acted as public analyst.

One hundred and forty-six samples were examined, *atta* 4, milk 28, *ghee* 105, *tea* 2, mustard oil 1, and 6 of *gur*. Of the *ghee* samples, 41 % were found adulterated and 64 % of milk samples.

Punjab.—The total number of samples analysed at the Public Health Chemical Laboratory was 635, including water 204, *kankar* lime 59, milk 109, *ghee* 111 and miscellaneous 152; 45 % of the *ghee* and 60 of the milk samples were found below standard. The Public Health Chemist was employed by 27 local bodies as their public analyst. Three candidates admitted last year for training as Public Analysts were awarded certificates on the completion of the 6 months course.

A standard for mustard oil was worked out after examination of samples from different jails and was notified by Government under the Punjab Pure Food Act. Draft regulations for the sale and labelling of condensed milk were framed.

The Public Health Chemist, besides conducting experiments on chlorination of water, prepared 690 gallons of chlorine solution in the chloronome.

Delhi.—Four samples of milk and 2 of *ghee* were analysed, in addition to the usual bacteriological and chemical examinations of water.

U. P.—The U. P. Prevention of Adulteration Act was in force in 85 municipalities, 6 districts, 32 notified areas and several rural and town areas in 24 districts. Of the 7,896 samples analysed, 4,572 were *ghee*, 1,983 milk, 1,027 edible oils, 100 flour, 40 butter and 174 miscellaneous. Adulteration was discovered in 904 samples of *ghee*, or 15 %; 410 of milk, or 7 %;

322 of edible oils, or 5 % ; 25 of flour ; 16 of butter ; and 36 miscellaneous.

B. & O.—Chemical and bacteriological examination of 2,847 articles were carried out in the provincial Public Health Laboratory. Water samples totalled 1,097, food 1,740, *ghee* 679, mustard oil 851, sweets 74, milk 83, *atta* 26 and 24 miscellaneous ; 58 % of the *ghee* samples, 38 % of mustard oil, 70 % of sweets and 59 % of milk were found adulterated.

Bengal Presidency.—In the Bengal Public Health Laboratory 7,341 samples of food articles were analysed. The results are given below :—

	District Board.		Municipal	
	No. analysed.	Per cent. adulterated.	No. analysed.	Per cent. adulterated.
Mustard Oil	3,315	32	916	38
<i>Ghee</i>	565	45	644	45
Milk	273	66	224	66
<i>Atta</i> and wheat flour	174	5	114	2
Tea	100	19	55	25
<i>Chhana</i>	44	11	..	..
<i>Dahi</i>	59	93	25	40
Butter	2	..	4	78

The D. P. H. remarks :—

“ The adulteration of milk and milk products which are the most important food articles in Bengal has not yet been controlled to any appreciable extent by action hitherto taken by the local bodies under the Bengal Food Adulteration Act whereas adulteration of *atta* and tea appears to have actually increased. Seizure of food articles under the law must, therefore, still considerably increase before any satisfactory check on adulteration can be expected and the increasing analytical work can be dealt with by the establishment of a public health laboratory in every district ”.

The 4,648 samples of food stuffs analysed in the Dacca Branch Public Health Laboratory included mustard oil, 2,228 of which 42% showed adulteration, milk 1,055 and 50%, *ghee* 532 and 50%, *dahi* 74 and 81%, *atta* and wheat flour 24 and 8%, and tea 15 and 7%. The Darjeeling Municipal Laboratory examined 840 samples of food articles, *viz.*, milk 514, butter 38, *ghee* 78 and mustard oil 202. Adulteration was found in 11% of the milk samples, 23% of butter, 6% of *ghee* and 1% of mustard oil samples.

C. P.—The Public Health Institute, Nagpur, analysed 13 samples of butter, of which 12 were found adulterated ; of 20 milk samples 5 were adulterated ; and 24 out of 27 *ghee* samples.

Bombay Presidency.—The Bombay Prevention of Adulteration Act, 1925, was in force in the towns of Karachi, Ahmedabad, Surat, Broach and Shikarpur and samples of food stuffs from these towns examined by public analysts numbered 2,216, 871, 252, 149 and 133, respectively. The public health laboratories at Poona and Karachi and the municipal laboratory at Ahmedabad continued to carry out bacteriological and chemical tests of water samples.

Madras Presidency.—The prevention of Adulteration Act was in force in 57 local areas. Of the 6,833 samples analysed, 1,864 were found adulterated. The most commonly sampled foods were *ghee*, milk, butter and gingelly oil. Gross adulteration of milk, *ghee* and butter was still in evidence. Adulteration of *ghee* was completely prohibited under rules issued by Government.

Coorg.—No Act or rules exist which deal with the prevention of adulteration of milk and *ghee*.

Assam.—Of the 1,900 samples examined in the Public Health Laboratory, 331 showed adulteration. Of the milk samples 43%, *ghee* 52%, mustard oil 43%, flour 50%, and tea 28% were found adulterated.

Burma.—Of the 79 samples of *ghee* from Rangoon examined in the Chemical Examiner's laboratory 15 were adulterated. In the chemical section of the Sir Harcourt Butler Institute, 425 samples of foods and drugs were examined. These included *ghee* 159, mustard oil 72, rice 88, milk 42, and 64 miscellaneous. Adulteration was found in 18% of the *ghee* samples, 59% of mustard oil, 11% of rice and 57% of milk samples.

Railways.

50. (i) *Bombay, Baroda and Central India Railway.*—The Medical administration under a Chief Medical Officer comprised 7 district medical officers, 23 assistant surgeons, 47 sub-assistant surgeons, 2 matrons, 6 nursing sisters, 6 nurses, 59 dispensers and one anti-malaria inspector. In addition, six civil surgeons and three State medical officers were subsidised for medical services rendered to the railway staff.

Out of 354,108 new cases treated in hospitals and dispensaries during 1935-36, causes of sickness were classified in respect of 351,767 cases. These included airborne diseases 52,624, food and water borne diseases 39,778, insect borne 66,497, infectious diseases 977, pyrexia of uncertain origin* 14,003, diseases of direct contagion 861, food deficiencies 206, injuries 26,454 and other causes 150,367. Enteric fever was responsible for 189 cases, influenza 9,151 and rheumatic fever 97. Cholera was the cause of 7 cases with 2 deaths; plague was absent. Of the 238 cases and 17 deaths from smallpox, 93 and 1 occurred among the vaccinated and 145 and 16 among the unvaccinated. Six cases of C. S. fever with one death occurred. Surgical operations numbered 14,092. Arrangements for X-ray examinations and anti-rabic treatment were provided at Ajmer; 183 cases of dog bite were treated with one death. 3,426 primary and 2,063 revaccinations, 101 T. A. B. and 1,394 anti-cholera inoculations were performed. Routine anti-malarial measures were continued.

Thirty-eight first-aid training classes were held and 326 of the 550 candidates obtained certificates, 11 vouchers, 7 medallions and 1 label. Ten were trained in home nursing.

(ii) *Madras and Southern Mahratta Railway.*—Of a total of 327,817 cases treated in the medical institutions during 1935-36, malaria was the cause in 7,162, dysentery 6,406, diarrhoea 5,989, typhoid fever 193, measles 163, smallpox 114, cholera 33, plague 12 (all in Hubli), accidents 13,985 and other causes 293,760. Anti-cholera and anti-plague inoculations numbered 18,584 and 1,829; vaccinations totalled 5,907.

Chlorination of water supplies was usually carried out with stabilised bleaching powder, but a standardised method of purification of water supplies was being evolved. General sanitation was satisfactory. The new conservancy rules were expected to improve present methods for disposal of nightsoil and sewage. The disposal of effluents from septic tank systems in larger stations was becoming more difficult to arrange and borehole latrines have been built as an experimental measure. Sanitary committees continued to function at certain larger stations. Of the 648 candidates attending the first-aid class, 514 appeared in the examination and 368 passed.

(iii) *South Indian Railway.*—The medical organisation comprised six officers, 8 assistant surgeons, 37 apothecaries, 31 compounders, 21 matrons, nurses, ward attendants, *dais*, etc., and 2 sanitary inspectors.

General health conditions were satisfactory and the number of days and certified sickness fell by 11 %. Total cases treated fell by 15 % to 29,563 ; these included 13,163 for infectious and 13,384 for systemic, 2,459 for general and local and 535 for other general diseases ; 22 labour cases were dealt with. The total loss from sickness was 199,045 days or an average of 7 days per case. Deaths numbered 134 the equivalent of a rate of 5 per 1,000 sick. Influenza was responsible for 4,447 cases and the number of days lost through this disease was 20,965. Cases of dengue numbered 70 ; rabies 78 ; cholera 43 with 16 deaths ; smallpox 121 with 7 deaths ; and malaria 1,906, of which 1,114 were recorded in the Southern district. Malaria cases were treated with atabrin, plasmoquine and cinchona febrifuge. Plague was again absent. Vaccinations numbered 489. Investigations were continued into chronic bowel diseases and the general ill-health connected with these conditions. Arrangements for Kahn's test for syphilis cases are provided at Golden Rock, where an actino-therapy, diathermy and X-ray room was opened.

Sanitation was on the whole satisfactory, as were also conservancy and water supply arrangements during festivals. The water supplies of 20 large centres were analysed periodically.

The Railway maintains five hospitals which treated a total of 1,846 in-patients with 20 deaths. Expenditure on medicines amounted to Rs. 27,266 and on surgical appliances and stores to Rs. 3,988. Nine officers and 91 subordinates were granted first-aid certificates. Medical examination of school children was continued.

(iv) *Great Indian Peninsula Railway*.—This Railway spent Rs. 5,98,007 on the maintenance of its medical organisation and Rs. 4,07,546 on its health services. These comprised a Principal Medical and Health Officer, 7 district medical officers, 5 assistant medical officers, 17 assistant surgeons, 39 sub-assistant surgeons, 2 matrons, 23 nursing sisters, 6 nurses, 3 health assistants, 21 sanitary inspectors, 1 anti-malaria overseer, 47 dispensers and 40 anti-malaria coolies.

A total of 189,339 cases were treated at the various medical institutions ; the number of days of certified sickness totalled 732,814 and the loss on this account amounted to Rs. 12,09,061. The more important causes of sickness were malaria 8,163 cases, other fevers 15,702, influenza 7,090, venereal diseases 866 (gonorrhoea 401, soft sore 91 and syphilis 374), tuberculosis of the lung 158 and 51 cases of enteric fever. Only a few sporadic cases of plague occurred. Cholera was responsible for 28 cases with 19 deaths among employees and 50 and 23, respectively, among families. The medical staff performed 18,301 anti-cholera inoculations. Smallpox accounted for 54 cases with 3 deaths among employees and 577 and 47 among families. A total of 9,302 persons were vaccinated. Anti-rabic treatment continued to be provided at Byculla, Bhusaval and Jhansi and 224, 69 and 142 cases, respectively were treated.

Birth and death rates in the railway population were 11 p.m. and 5 p.m. and the infantile death rate 232 per 1,000 live-births. The Bhusaval infant-welfare and maternity centre continued to do useful work.

First-aid equipment boxes at railway stations and in trains were maintained in good order. Forty-three classes in first-aid were held at 25 centres and 504 candidates were given training ; of these 286 obtained certificates, 13 vouchers, 5 medallions and one label.

SECTION V.

MEDICAL INTELLIGENCE AND INTERNATIONAL HEALTH
INCLUDING PORTS.

Epidemiological Intelligence.

51. The office of the Public Health Commissioner continued to act as the epidemiological bureau of the Government of India. Epidemiological information is issued in a series of weekly and monthly statements and bulletins of which three are published in the *Gazette of India*. Details of these will be found in previous reports.

Office International d'Hygiene Publique, Paris.

52.(A) Lt.-Colonel G. G. Jolly, C.I.E., I.M.S. acted as delegate for India at the meeting held in April/May 1935. The delegate's report to the Government of India was printed and circulated to all concerned so that it is unnecessary here to do more than mention a few of the more important points. The greater part of the business was as usual transacted by Commissions and the delegate for India was a member of the Quarantine, Aerial Navigation, Yellow Fever and Opium Commissions.

The Quarantine Commission dealt mainly with questions of principles in connection with individual cases. These included (a) the demand of bills of health by certain countries which had neither signed nor ratified the Convention. Representations on the subject to those countries were considered out of order; (b) excessive sanitary dues or taxes: it was agreed that the "Office" should not refer to the practice of individual countries in dealing with such points, although delegates might be asked to take up the points with their Governments; (c) infractions of quarantine regulations: the Argentine Government complained that two ships, the S. S. "Springbank" and S.S. "Nairnbank" which had been granted deratisation exemption certificates at Calcutta were found on arrival at Bahia Blanca and Rosario to be heavily infected with rats. Pending receipt of information from the Government of India, the President, while recognising that there was no question of amending the Convention, emphasized that countries must be careful not to give certificates of exemption without a previous careful inspection. The delegate for India undertook to report the alleged facts to his Government with a view to necessary enquiries being made; and (d) conveyance of infected fleas in merchandise. Although the restrictions on the import of jute bags had been withdrawn after representations had been made and the Peruvian Government were unlikely to re-impose these, the IXth Pan-American Sanitary Conference held at Buenos Ayres in November, 1934, expressed the opinion that further investigations were required in respect of the possible carriage of plague by infected fleas in merchandise. The Commission decided that the Government of India should be asked to conduct an investigation into the survival of infected rat-fleas with special reference to the nature of the cargo, the duration of the voyage, temperature and humidity.

The Yellow Fever Commission considered a number of important communications including a note on 'A Survey of Aedes Mosquitoes in Bombay and the measures suggested for their control' by Dr. R. K. Mhatre communicated by the delegate for India. The latter also invited the attention of the

Abbreviations—

I. S. C.	.	.	.	.	International Sanitary Convention.
P. H. O.	.	.	.	.	Port Health Officer.
D. P. H.	.	.	.	.	Director of Public Health.
A. D. P. H.	.	.	.	.	Assistant Director of Public Health.

Commission to the Resolution on this subject passed by the twelfth Research Workers Conference.

Three main questions emerged from these communications. These were (a) the specificity of the mouse protection test (b) viscerotomy and (c) anti-amaryl vaccination. The Commission reaffirmed its conviction regarding the value of the mouse protection test ; it was of the opinion " that viscerotomy constitutes a very important means of investigation " and urged " that this method of viscerotomy should be applied as widely as possible in all countries in which the presence of yellow fever may be suspected ". In regard to anti-amaryl vaccination the Commission recommended the continuance of research and pointed out again the necessity of following up vaccinated persons living in an endemic environment, so as to obtain a comparison of the results obtained by different methods. It considered, nevertheless, " that the use of vaccination can on no account warrant any relaxation in the continued application of all the other measures intended for the control of yellow fever : destruction of mosquitoes, piped water systems, etc."

The Aerial Navigation Commission reported on (a) the necessity or otherwise of Bills of Health under Article 9 of the Aerial Convention, which provides for certain entries in the journey log book although it does not require the aircraft to carry bills of health ; (b) the sanitary dues imposed by some countries for medical inspection, disinfection of planes, isolation of passengers etc. ; and (c) destruction of mosquitoes in aircraft. The delegate for India presented a statement on the imminent danger to India from the so-called " silent " regions as centres of transmission of yellow fever.

The Commission decided that so far as bills of health were concerned a leaflet should be prepared referring briefly to the terms of Article 9 and to the fact that no bill of health is required and that this could be attached to a 'plane's log book.

As regards the destruction of mosquitoes in aircraft, no definite recommendation was made as the question was under investigation in the United States.

In regard to the statement on the potential dangers of the " silent " areas the Commission repeated " that in its view the evidence of a previous invasion of the virus of yellow fever in a region, as revealed by the mouse protection test should not be considered as implying, *a priori*, and on that ground alone, that from a scientific or administrative point of view, the region concerned was at the moment infected with yellow fever. Additional evidence, such as the positive result of liver sections, confirmed by clinical signs, or the recovery of the virus, are necessary before a " silent " area can be regarded as actually infected ".

The discussions in the Smallpox and Vaccination Commission were confined to the immunity conferred by vaccination. The delegate for India presented a paper on " Studies on Anti-Smallpox Vaccination " by the Director of Public Health, Madras.

The Commission dealing with international arrangements for the treatment of venereal diseases under the Brussell's Agreement considered the question of adoption of the new medical card for seamen by countries which had not signed the Convention and Col. Harrison's note regarding standard courses of treatment.

The Opium Commission had under consideration the problems connected with Indian hemp ; sterilised ampoules of morphine-atropine and eucodal-atropine ; and delacaine, paracodine and preparine.

The delegate for India presented four other communications. These were :—

- (i) " A biological method for the standardisation of plague vaccines and the relative protective power of some plague vaccines measured by this method " by Lt.-Col. Sokhey and Dr. Maurice.
- (ii) " A chemical basis for vibrio classification and variation " by Dr. R. W. Linton.
- (iii) " Note on milk supply by the Animal Husbandry Expert of the Imperial Council of Agricultural Research, India ".
- (iv) " The life line of the Thyroid Gland, a contribution to the study of Goitre " by Col. McCarrison.

(B) At the October meeting of the " Office " Lt.-Colonel A. J. H. Russell, I.M.S. attended as delegate for India. The Quarantine Commission discussed a question relating to the fumigation of vessels and decided that in derogation of the provisions of Article 25 (6) of the I.S.C., 1926, following a first fumigation made before unloading, a second fumigation may be permitted in certain cases but without expense to the shipowners. It also considered a number of points relating to the application of the I.S.C., 1926 and recorded the opinion:—

" (1) That under the terms of article 10 of the Convention, the unexpected arrival of cases of cholera in a port shall not *a priori* justify the application of measures to ships coming from that port;

(2) That a " healthy " ship, coming from a port declared to be infected with plague^e (Article 27) should not, on account of that fact alone, be subjected to deratisation; deratisation may be imposed " in exceptional cases and for well-founded reasons ", and the sanitary authority, which is naturally the judge of these reasons, must always satisfy itself of the necessity of the measure, by an inspection of the ship or, if necessary, by other convincing proofs;

(3) That, in any case, a ship which has once been deratised in one port of a country should only be subjected a second time to deratisation in another port of the same country, if the conditions are particularly serious;

(4) That although the actual terms of article 28 do not make it definitely obligatory the granting of an extension of one month in the case of ships proceeding to their " home ports ", should be the rule and should only be refused if there are special conditions against it, involving danger to the port in which the ship is lying; in the absence of such conditions the fact that the ship is not proceeding directly to its home port, it being understood that the return to that port does not take longer than one month,—should not in itself, according to the spirit of the Convention, be a sufficient reason for refusing the extension;

(5) That in principle a ship which is neither " infected ", nor " suspected ", nor " free " from plague, that is, a ship which has had no communication with an infected area, *should not, according to article 28, be deratised more often than every six months (not including the supplementary period for return to the " home port "), from the date on which it has obtained a certificate of deratisation or of exemption (still valid) issued by a " qualified " port.*"

Other matters considered by the Commission included (i) adhesions to the Agreement regarding the abolition of bills of health or consular visas; and (ii) omissions to notify in time under Article 16 of the I.S.C., 1926, of the application of measures against arrivals from another country. In regard to the last point the Commission suggested that, when it is a question of specially important measures of such a nature as to require certain precautions to be taken by ships and passengers before departure, in particular, the requirement of certificates of vaccination, the Office International should, according to the spirit of Article 16, be informed by telegram of the decision taken by a Government with regard to arrivals from another country.

The Yellow Fever Commission considered notes relating to (i) recent scientific research on the disease, (ii) epidemiology of the disease based on a

recent epidemic of yellow fever in Bathurst in British Gambia, (iii) vaccination against yellow fever, (iv) the views of the Government of India on the risks of infection being carried to India through aircraft from certain parts of Africa, (v) knowledge of the existence of the disease by means of the mouse protection tests. In regard to the fourth point, the Commission made the following observations :—

“(1) Investigations on the existence of yellow fever by means of the mouse protection tests, accompanied or followed by clinical investigation and histo-pathological examination should be pursued uninterruptedly in all suspected regions in Africa in order to discover as soon as possible those in which the disease actually exists.

(2) The Commission desires to draw attention to the measures which are being or will be taken at Juba, Malakal, Khartoum and Cairo in regard to aerial traffic. These measures include the isolation, before embarkation, of persons suspected of having been exposed to yellow fever and the systematic disinsectisation of aircraft. When necessary, the aircraft and crew will be changed; they will not proceed to areas where there is a risk of a new introduction of infection. The Commission are of opinion that such measures are sufficient to overcome the risk of transporting persons or infected mosquitoes beyond the locality where the measures have been taken. It is understood that if the aeroplane departs from an area where yellow fever exists, the aerodrome of departure will be of the anti-amaryl type (Art. 38 of the International Sanitary Convention for Aerial Navigation).

(3) The Commission also draws attention to the measures described in Section III of the International Sanitary Convention for Aerial Navigation which permit countries of arrival to repeat the procedure of inspection and disinsectisation of aircraft as well as the examination and, if necessary, the isolation of passengers. In the opinion of the Commission the measures mentioned in this and in the previous paragraph should provide sufficient safeguards to any country against the danger of the importation of the virus of yellow fever.

(4) The Commission were informed that the Government of India were considering the transformation of the Karachi aerodrome into an anti-amaryl aerodrome. A hope was expressed that the measures required for this purpose would be carried out with the least possible delay.

The Quarantine Commission for Aerial Navigation :—In connection with the enforcement of the Convention, it was agreed to circularise different participating countries in order to recall the terms of the Articles of the Aerial Convention which provide for the notification, through the Office International d'Hygiene Publique, of “sanitary” aerodromes, (a “local area” and “anti-amaryl” aerodromes) together with other information of importance for airway communications; and the necessity for entering particulars in the *carnet de route* in accordance with the terms of Article 9. The delegate for India gave an account of the arrangements envisaged for organising the aerodrome at Karachi and for applying the necessary measures to aircraft. The Commission was also informed that in British India pending the adoption of special regulations, the measures prescribed by the Convention of 1933 were in the meantime in force.

The question of the extension of the Alexandria Bureau as a local bureau for the collection and dissemination of information of infected or suspected regions on the air routes converging on Cairo was talked out; opinion was however in favour of deferring consideration of the matter till the next meeting of the “Office” and, in the meantime, of collecting information as to the conversion of aerodromes into anti-amaryl aerodromes and as to the possibility of countries sending their information by telegram to Paris for redistribution.

Other matters which engaged the attention of the Aerial Navigation Commission were the de-insectisation of aeroplanes; anti-plague inoculation; and regulations introduced by the Algerian Government for the control of aeroplanes coming north from the ‘silent’ yellow fever areas. Regarding anti-plague inoculation, the Commission reaffirmed its view that “there is no information to show that anti-plague inoculation is a preventive against a country and that it should not be practised as a quarantine measure.”

The Hedjaz Pilgrimage Report invited special attention to the danger, and the necessity for control, of the land routes to Mecca; the danger arising from the embarkation at Aden of uninoculated and unvaccinated pilgrims; the undesirable practice of pilgrims embarking at ports between Kamaran and Jeddah on ships which have already passed through Kamaran on their way to

-Jeddah ; the reopening of the Medina Railway ; the inadequacy of arrangements for the hospitalisation of sick pilgrims in Saudi Arabia ; the practice of examining stools of pilgrims passing through El Tor ; and lastly the case of a ship returning to Bombay with a large number of cases of disease on board, who had been embarked at Jeddah without any previous medical inspection by the ship's doctor.

The delegate for India presented the following contributions :—

- (i) " Duration and degree of immunity against smallpox conferred by vaccination in infancy " ; by Dr. Pinto.
- (ii) " Researches on cholera in India " ; by Col. Russell.
- (iii) " Serological relationships of certain vibrios isolated from non-cholera cases " ; by Col. Taylor.
- (iv) " Anti-cholera inoculation " ; by Dr. Govinda Raju.
- (v) " The probable trend of population growth in India " ; by Dr. Raja.

Singapore Bureau, League of Nations.

53. The Bureau was directed by Dr. C. L. Park throughout the year.

No meeting of the Advisory Council was held during the year, but the Director's report, accounts and the budget for the year and the budget for the following year were circulated to members for approval. Expenditure for the malariology course which previously was provided in the Health Section budget was included in the budget of the Bureau.

The second Committee to the Assembly in its report on the work of the Health Organisation referred to the importance of the epidemiological intelligence service and the international courses in malariology held at Singapore.

In accordance with the agreement between the Health Committee of the League of Nations and the " Office International," the Bureau continued to receive and distribute epidemiological information as required under the I.S.C., 1926. The weekly Fasciculus issued by the Bureau included epidemiological data from 35 countries in addition to a list of ports qualified to carry out deratisation of ships and to issue deratisation or deratisation exemption certificates.

Infected ships.—Twenty ships were notified as infected with cholera, infection in each case having been contracted in an Indian port. Calcutta alone was probably responsible for 15 and Burmese ports for 4. In regard to smallpox, 16 cases were traced to Chinese ports and 17 to Indian. No cases of plague infection were notified ; chickenpox was responsible for 65 cases and c.s. meningitis for one.

Pilgrim traffic.—The Hedjaz pilgrimage was declared clean by the Sanitary, Maritime and Quarantine Board of Egypt. In addition to 20 healthy carriers of agglutinating vibrios isolated in the Lazaret hospital at El Tor, 4 other sick persons were found to be carrying similar organisms.

Disease incidence in ports.—Four of the nine plague infected ports were in British India, viz., Bassein (34 cases), Rangoon (15), Moulmein (2) and Bombay (1). Calcutta with 4,947 cases was as usual the most heavily cholera-infected port in the East ; Madras had 338 cases and Bangkok 175 ; in other ports the incidence was sporadic or low. As regards small-pox Bombay had 1,919 cases, Calcutta 1,698 and Vizagapatam 667.

Research programme.—The report refers to work on plague, cholera and smallpox.

Plague.—(i) Inoculation of the population in plague infected areas with a living avirulent vaccine prepared by Otten from a strain isolated from a plague rat ; (ii) the Haffkine Institute studies on the potency of plague vaccine ; and (iii) study of the epidemiology of plague in the Hawaiian Islands in its relationship to the rat-flea species and to temperature and humidity.

Cholera.—(i) The serological examination of vibrio strains isolated from different sources in endemic and non-endemic areas in India by Taylor and Ahuja ; (ii) Linton's work in India on the isolation and analysis of 3 types of specific carbohydrate substances in vibrios ; and (iii) cholera researches and field experiments with bacteriophage in Assam.

Smallpox.—*The work of Japanese scientists in producing a therapeutically effective serum.* An active antiviral serum has been secured by the repeated subcutaneous inoculation into the goat of the purified vaccinia virus, the inoculations being made with successively increasing amounts of vaccinia virus over a period of 3-7 months at an interval of five days. It was reported that, provided a certain sufficient amount of the purified vaccinia virus was inoculated into rabbits weighing approximately 1,000 grms., generalised vaccinia occurred on the fourth or fifth day, but in the case of animals weighing about 2,000 grms., the occurrence of the vaccinia was postponed until the seventh day.

If these animals were later treated with anti-vaccinia sera, either intravenously or intramuscularly, it was found that the appearance of eruptions was completely or strongly inhibited.

Liaison work.—This was continued by the distribution of literature.

Malaria Course.—The second course was held during April, May and June and was attended by 14 doctors from 8 countries.

League of Nations Health Organisation, Geneva.

54. The Assembly of the League recorded its appreciation of the work of the Health Organisation in the following terms :—

“ The Assembly,

Notes with satisfaction that the national administrations of countries in all continents are making ever-increasing use of the services of the Health Organisation and are affording it a growing measure of support in discharge of its duties ;

Approves the work of the Health Organisation and the Rapporteurs' conclusions, and refers to the Health Committee for study the offers of collaboration and the suggestions enunciated in his report ”.

The League continued to maintain the Service of Epidemiological Intelligence and Public Health Statistics ; the Biological Standardisation Commission established in 1921 ; the system of liaison between Public Health Administrations started in 1922 ; and the Malaria Commission set up in 1924. In public health and social medicine the Health Committee continued to conduct its work of investigation, collection of data and liaison and to publish results through its Quarterly Bulletin.

From studies on the biological assay of certain therapeutic agents, international standards have been obtained. An Inter-governmental Conference on Biological Standardisation was convened at Geneva in October with a view to ensure the use and, if possible, the adoption in the official pharmacopœias, of the Health Organisation's standards and units in the case of 21 therapeutic substances.

In the field of epidemiological intelligence, various administrations were supplied as usual with early information concerning the health situation in neighbouring countries. The reports received by the League covered 148 countries and territories with 72 % of the world population.

The Malaria Commission during its existence of 10 years has accumulated a wealth of specialised knowledge of the treatment and prevention of malaria by synthetic remedies. International courses of malariology were organised. The Commission met in February in order to take a final decision on the details of the experiments and to acquaint themselves with the investigations on the same problems which were in progress in the U. S. S. R.

A Pan-African Health Conference was called at Johannesburg in November to continue the work of the Conference held at Cape Town in 1932. Further details of this Conference will be found in para. 56 on page 100.

After a request by the United Kingdom Government and preliminary investigation by the Communications and Transit Commission, the Council of the League authorised the Health Organisation to make necessary preparatory studies on the question of an international Convention dealing with pollution of the sea by oil. It was considered that such a Convention would considerably reduce the damage now caused to property in ports, to bathing resorts, to bird life and to fisheries.

The European Conference on Rural Hygiene held in 1931 had requested Institutes and Schools of Health to investigate *inter alia*, food stuffs, especially milk; typhoid fever in country districts; the supply and purification of drinking water; and the "treatment" of manure and household refuse with a view to destruction of flies. These investigations were carried out under the general direction of the Health Organisation and a large amount of data collected. The Directors of Schools and Institutes of Public Health from certain countries met at Geneva in April. These studies having been found of great interest and of practical utility, the Health Committee was asked to continue them. The question of rural housing and farms was also considered and the decision was that there should be (a) a general review of the housing conditions in farming districts, from the point of view of hygiene and public health and from the economic and social standpoint; and (b) a consideration of the types of rural dwellings best suited to various geographical areas and to the customs and nature of work of the inhabitants.

The Health Committee completed an enquiry into the treatment of syphilis involving a survey of over 25,000 cases in selected clinics of five countries. The enquiry has led to the establishment of certain general principles which should govern the treatment of this disease. Two plans of treatment have been formulated which should give satisfactory results in ordinary cases of early syphilis.

Nutrition has been on the League's programme since 1925. After a period of preliminary study, the League published a report which, after reviewing recent progress of science and applied physiology in this field, described what the public authorities in a number of countries have already done or propose to do. The Assembly of the League considered that the Health Organisation should continue to develop its investigations into nutrition and nutrition problems in relation to public health, and that the other technical organs of the League should continue their enquiries into the economic and financial aspects of the problem in connection with those measures already adopted in various countries for improving nutrition and mitigating the plight of agriculture. Because of the inter-dependence of the various aspects of the problem,

the Assembly considered it desirable to arrange for a wide survey and asked the Council of the League to prepare a general report for the next Assembly.

The resolution of the Assembly runs as follows :—

“ The Assembly,

Having considered the subject of nutrition in relation to public health and of the effects of improved nutrition on the consumption of agricultural products urges Governments to examine the practical means of securing better nutrition and requests the Council:

- (1) To invite the Health Organisation of the League of Nations to continue and extend its work on nutrition in relation to public health ;
- (2) To instruct the technical organisation of the League of Nations, in consultation with the International Labour Office and the International Institute of Agriculture, to collect, summarise and publish information on the measures taken in all countries for securing improved nutrition, and
- (3) To appoint a Committee, including agricultural, economic and health experts, instructed to submit a general report on the whole question, in its health and economic aspects, to the next Assembly, after taking into consideration *inter alia*, the progress of the work carried out in accordance with paragraphs (1) and (2) above.”

The Health Organisation representative attached to the Central Health Administration of China cooperated in the establishment and operation of model central institutions and in the improvement of health conditions in several provinces of the interior. In America the Health Organisation cooperated in an investigation into the problems of general nutrition in Chile and collaborated with the international centre for research on leprosy at Rio de Janeiro.

A collective study tour was organised in the U. S. A. in November, 1935.

The twenty second session of the Health Committee was held from 7th—14th October, 1935, and was attended by Lt.-Col. A. J. H. Russell, C.B.E., K.H.S., I.M.S. Colonel Russell was appointed a member of the Opium and Leprosy Commissions and also of that appointed to examine the report and budget of the Singapore Bureau.

The more important subjects of discussion were (i) the composition of the Health Committee and of the Health Bureau ; (ii) the preparation of an International Pharmacopœia ; (iii) Dr. Aykroyd's and Dr. Burnet's report on Nutrition and Public Health ; (iv) the invitation of the Dutch East Government to hold the Rural Hygiene Conference in Java and the possibility of holding a rural hygiene International Exhibition in Rome in 1937 and (v) the report of the Biological Standardisation Conference. The proposal to enlarge the Bureau was adopted.

Dr. Burnet's and Dr. Aykroyd's report on Nutrition and Public Health discussed three questions, (i) what are men's requirements ? (ii) what are the resources available to meet them ? and (iii) How can an adequate dietary be brought within the reach of those who need it? Col. Russell made references to the intimate connection between the incidence of deficiency and mal-nutritional diseases and epidemics, the interest that India was taking in the problem, and made particular mention of the appointment of Dr. W. R. Aykroyd as Director, Nutritional Research in India. He assured the Committee that India would collaborate with its work in this field in every possible way.

Inter-governmental Conference on Biological Standardisation, held at Geneva from October 1st to 4th, 1935.

55. Lt. Col. A. J. H. Russell, C.B.E., K.H.S., I.M.S., represented the Government of India:

The Permanent Commission on Biological Standardisation of the League had worked out international standards for a series of products, the assay of which could only be effected by biological methods. The main purpose of the conference was to induce health administrations, pharmacopœia commissions, research laboratories and manufacturers, who deal with biological assays, to express the results of titrations in terms of the international standards and units established by the Permanent Commission on Biological Standardisation. As the method so far followed in distributing these standards needed some modification, in order to afford relief to the National Institute at Hampstead and the State Serum Institute at Copenhagen which undertook this work on behalf of the Health Organisation, it was decided that the most suitable solution would be to set up in each country a national centre or centres to take charge of the distribution to laboratories and manufacturers concerned.

Two technical committees were set up to consider the two groups of international standards. Their recommendations which were accepted by the Conference, were :—

“ I. The Conference expresses the hope that the use of the international standards adopted by the Permanent Commission on Biological Standardisation of the Health Organisation will be made effective by the competent authorities of all countries.

II. The Conference recommends that each country should have a national centre or centres, recognised by the competent authority, to take charge of the international standards and equivalent national standards; and that every such centre should have a qualified staff to control the application of the international standards in its own country and thus to serve as the recognised national scientific authority in this field.

III. The Conference, looking confidently to the Health Committee to maintain the principles of the free distribution of international standards, recommends that the League of Nations should place the necessary funds at the disposal of the Health Organisation for it to continue to meet the expense entailed by the free distribution of such standards.

IV. The Conference, having been informed that patents protecting the preparation of streptococcus anti-toxin (anti-scarlatina serum) and of the toxin used for its assay have been granted in certain countries; believing that this practice constitutes an obstacle to progress in the standardisation of this serum; draws the attention of the Health Committee of the League of Nations to this state of affairs, and suggests that the Committee might usefully consider what means could be employed to avoid the serious drawbacks which ensue.

V. The Conference recommends that, in view of the progress achieved in the field of biological standardisation, inter-governmental conferences on this subject be summoned periodically at intervals not exceeding three years.”

Colonel Russell in his report on this Conference suggested to the Government of India that centres for the control of standards should be opened at (a) the Nutritional Laboratories in Coonoor for Vitamin standards; (b) the Central Research Institute, Kasauli, for sera, etc., and (c) the School of Tropical Medicine for hormones and drug standards.

The Pan-African Health Conference held at Johannesburg, Union of South Africa, 20th—30th November, 1935.

56. The Government of India was represented by Major General Sir Cuthbert Sprawson, Kt., I.M.S., Director-General, Indian Medical Service. Though sent as an observer only, General Sprawson participated actively in the discussions on yellow fever which was the subject of chief importance to India. He also gave Indian experience on plague, malaria and anti-locust campaigns.

General Sprawson's statement in regard to yellow fever is reproduced below :—

“ The Government of India is seriously apprehensive of the danger of entry by aeroplane, through the airport of Karachi, of man and mosquito infected with yellow fever from Africa. India's apprehension is chiefly with regard to her own large population, who are non-immune to yellow fever and who have the *Aedes Aegypti* around them ; but, also, since from the view of aerial traffic India is the gateway to the far East, the countries beyond India are also interested in the protection of India.

If India is the gateway to the Far East, the portcullis of that gate is Karachi, and India is doing her best to make there an efficient barrier. An officer is now being appointed for the sole duties of port health officer of the airport of Karachi, as distinct from the seaport, which is 10 miles distant. India is also proceeding to make the Karachi aerodrome anti-amaryl. But reliance on this one barrier on the Indian side alone is not enough ; it is necessary also that the utmost possible be done on the African side of the gate to prevent infective material approaching it. The International Sanitary Convention for Aerial Navigation of 1933 differentiates in Chapter II between these areas where yellow fever exists endemically (Section II) and those where it does not exist, but where conditions permit of its development (Section III). At present, the areas in Africa hitherto called “ silent areas ”, being classed only under Section III, the Government of India has good ground for a feeling of insecurity. This feeling will remain until it is recognised that those areas giving a fair percentage of positive protection tests and viscerotome tests should be regarded as endemic areas of yellow fever and be treated accordingly. After hearing Dr. Soper's paper on yellow fever in Brazil, we cannot doubt the importance of these tests and that the areas showing them are endemic.

We are, however, still in some doubt as to the extent of such areas in parts of Africa. It has been shown that extensive epidemics of yellow fever occur in French Equatorial Africa. There is a high percentage of positive seral reactions in towns of the interior, and facts point to the danger of the infection spreading eastward. A case of yellow fever has occurred at Wau, in the Anglo-Egyptian Sudan, and the infection was said to be endemic in Bahr-al-Ghazal six years ago, in Juba seven years ago, and in other places in the Anglo-Egyptian Sudan at varying intervals.

The report of the October 1935 meeting of the Yellow Fever Commission, of the Office International d'Hygiene Publique, is encouraging in that it advocates further viscerotome and mouse protection examination and gives particulars of protective measures that are being taken at various places. I have, however, reason to think that not everything in this respect is being done that has been claimed by some.

Considering the importance of this matter to India, I suggest to the Conference the following three procedures :—(1) A thorough examination by mouse-protection and viscerotome tests of the neighbourhood of all aeroplane stopping places in the Anglo-Egyptian Sudan, in Kenya and in Uganda ; (2) further examination by the above tests of other areas in Africa in order to determine the limits of the endemicity of yellow fever ; and (3) that all crews of planes crossing from Africa to India be immunised by means of Sawyer's mixed neurotropic yellow fever vaccine.

When, as a result of proposal (1) we know more of the position in the three administrations named, we may then be able to make more specific recommendations as to the necessity for further protection.”

The resolutions adopted by the Conference on the question of Yellow fever are quoted in extenso :—

“ The Conference recommends :

1. That investigations as to the existence of yellow fever by means of the mouse-protection test, accompanied or followed by clinical investigation and histopathological examination (including the routine use of the viscerotome), be carried out in all endemic regions in Africa, and particularly along the periphery of such regions, in order to ascertain as soon as possible those in which the disease actually exists.
2. That an intensive study of the possibility of the existence of jungle yellow fever in Africa should be made in view of the presence of this condition in South America.
3. That consideration be given to the training of laboratory workers in yellow fever research and routine investigations and that provision be made for Permanent laboratory facilities in centres accessible to endemic areas.
4. That further investigations be made regarding the distribution of *Aedes aegypti*, both in endemic and in other African territories to which the disease may spread.

5. That consideration be given to the organisation of measures for the control of *Aedes aegypti* in all territories included within and bordering upon endemic areas.

6. That a system be established of quarterly reports to the Office International d'Hygiene Publique of house larval indices relating to *Aedes aegypti* from important centres in endemic areas.

7. That every first case of yellow fever and the locality in which it has occurred be notified direct, by telegram as soon as official information is available, to the Office International d'Hygiene Publique by African Colonial Administrations.

8. That the decision to suspend traffic in an aerodrome which, situated in a region in which yellow fever has appeared, is not organised in accordance with the provisions of Article 38 of the International Sanitary Convention for Aerial Navigation of 1933, and the decision to reopen the aerodrome to traffic be similarly notified direct to the Office International d'Hygiene Publique."

Indian delegation to the 16th Ordinary Session of the Assembly of the League of Nations held from the 9th—28th September, 1935.

57. The Indian Delegation consisted of His Highness the Right Honourable the Agha Khan, G.C.S.I., G.C.I.E., G.C.V.O., leader of the Delegation; Sir Denys Bray, K.C.S.I., K.C.I.E., C.B.E., (Member of the Council of India); and Rai Bahadur Seray Mal (now Sir S. M.) Bapna, C.I.E., (Prime Minister of Indore). Mr. Bijay Kumar Basu, C.I.E., member of the Council of State, acted as substitute delegate.

The delegation reported on the second committee as follows :—

"The review of the work of the League Health Organisation during the preceding year, which was submitted by the Rapporteur, revealed no question of outstanding importance for discussion. Nearly every speaker, however, paid a tribute to the methods and achievements of the Organisation, to the worldwide character of its activities, and to the value of its collaboration with national health administrations. Particular interest was shown in a number of international conferences which were to be held in co-operation with the Organisation or under its auspices. Among these were the Conference on Biological Standardisation, to be held at Geneva in October 1935, at which India was to be represented; and the Second Pan-African Health Conference, which was to meet at Johannesburg in November 1935, and to which India was to send an observer, in view of the necessity of concerting measures for preventing the spread of infectious diseases between India and Africa. India is even more interested in the Conference on Rural Hygiene in the Far East, which is to be held towards the end of 1936*; indeed at each Assembly since 1932 the Indian Delegation has urged the convocation of such a Conference. The arrangements for the Conference are being undertaken by the Eastern Bureau of the League Health Organisation at Singapore, and its agenda was informally discussed at the ninth Congress of the Far Eastern Association of Tropical Medicine, held at Nanking in October 1934. It was there agreed that the principal questions for the Conference would be the type of medical and health organisation best adapted to the special conditions of rural districts in the East, the staff and its training, the campaign against the principal endemic and epidemic diseases, and the improvement of health and social conditions in rural districts.

The Government of India's appreciation of the work of the Health Organisation contact with which had accelerated progress in India, was expressed by Mr. Bapna, who said that his Government was devoting special attention to the question of rural hygiene and to the health and housing of the rural population; a problem so vast that the end in view could not be achieved for many years to come. They therefore welcomed the prospect of the Conference on Rural Hygiene in the Far East.

India attached the greatest value to the services being rendered by the Eastern Bureau at Singapore, in which it co-operated by supplying weekly by cables the epidemiological information relating to disease in Indian ports and British provinces, particulars of plague-infected rats in Indian ports, and of infected ships arriving at Indian ports and engaged in international traffic. The Bureau's weekly epidemiological messages, broadcast from Java, were re-broadcast in clear from Karachi and Madras every Saturday for the benefit of ships at sea.

* Since decided to be held in August 1937.

From India's point of view, the most important matters dealt with by the Regional Health Conference held in Cape Town in 1932 were the technical discussions on the prevention of the transmission of yellow fever by aircraft and on the spread of smallpox from India.

The existing provisions regarding yellow fever had been made as a result of the International Sanitary Convention for the Control of Aerial Navigation. The Central and East African countries had arranged for concerted action regarding the use of protection tests, and in making surveys of vector species in their ports and towns. Technical reasons had so far prevented the Government of India from reaching a final decision as to adherence to the Convention, but the discussions at Johannesburg would assist it in framing its future policy regarding yellow fever in general and the Aerial Sanitary Convention in particular.

With regard to smallpox, difficulties had arisen in recent years over the measures taken by the South African and East African Governments to prevent its introduction from India. Fresh problems arose with regard to the acceptance of vaccination certificates issued in India without verification by some responsible authority. The governments concerned had been discussing the matter and the Government of India had now amended its procedure in a manner acceptable to several of the East African Governments.

Thanks to a special fund called King George's Thanksgiving (Anti-tuberculosis) Fund, India had been enabled to carry on some useful work in connection with tuberculosis by the allocation of annual grants to local associations undertaking work in this field."

Nutrition and Public Health.—"The attention of the Assembly was drawn to the problem of nutrition in its relation to public health at the request of twelve delegations. It was pointed out that nutrition, a public health problem, has also become a social and economic problem and one closely connected with the formidable difficulties experienced by the farming industry all over the world in disposing of its surplus foodstuffs. The discussion in the Second Committee, in which twenty delegations took part, was opened by the Australian delegate, Mr. Bruce, who said that the study of the question might well pave the way to better health conditions in all countries and to a solution of the agricultural problems at present facing the world. He stated the essence of the problem in his description of the paradox of a glutted market for the farmer and the insufficient nourishment of a substantial proportion of mankind in "protective foodstuffs" such as milk, fresh vegetables, fruit, eggs and meat. He realised that the nutrition problem varied enormously in extent from country to country and said that in certain of the less developed overseas countries, with their teeming millions of population, improvement must be regarded as a long-range objective. In an intermediate class of countries, mainly agricultural, there was no scarcity of food, but the food available was not necessarily the most suitable from the nutrition standpoint. These might be regarded as a medium-range objective. On the other hand he thought that improvement in the richest and most developed countries could be viewed as an immediate goal, and to show the need for improvement in such countries he quoted the United States representative at the last International Labour Conference as saying that even in the prosperous year 1929, six million children in his country had suffered from malnutrition. He moved a resolution, the main lines of which met with general agreement and which, with slight modification, was ultimately adopted by the Committee and approved by the Assembly. The resolution suggested, first that the work of the League Health Organisation on nutrition in relation to public health should be continued and extended; secondly, that the League, in consultation with the International Labour Office and the International Institute of Agriculture, should collect information on the measures taken in all countries for securing improved nutrition; and, thirdly, that a Committee including agricultural, economic and health experts should be appointed to submit a report on the whole question in its health and economic aspects to the next Assembly."

The following extracts from the Report of the Fifth Committee which dealt with the questions of child welfare, opium and the International Relief Union are also of interest:—

"The questions relating to Child Welfare discussed this year fall into two categories. On the one hand, there were problems connected with abnormal children—young offenders, blind children and children abandoned by their parents. On the other hand, there were those aspects of the Committee's work, whose importance was emphasised by the Rapporteur, which concern the normal child. In this connection interesting exchanges of views took place on the effect of the economic depression and unemployment upon

the young and on the recreational aspect of the cinema in the life of the child. In addition, the Committee's attention was drawn to the work already achieved by the Information Centre since its foundation in June.

The speech of the delegate of India was at once a warning against extending the activity of the League in this sphere beyond these exchanges of views and this collection of information, and evidence that the policy of the Government of India is in agreement with the view, expressed in the resolution adopted by the Committee, that the treatment of delinquent children should be directed towards education rather than punishment. Mr. Bapna said that he had read with genuine pleasure the reports of the work of the Child Welfare Committee and of the Advisory Commission and the report submitted by the Rapporteur. They contained valuable suggestions and ideas to which no country could take exception. No doubt some questions were controversial, not in principle, but owing to varying conditions in different countries. An attempt at standardisation in this field by international agreements or conventions was neither desirable nor likely to succeed. Modifications and adaptations would be necessary according to the social, economic and religious conditions prevailing in a country. Child Welfare work was primarily the domestic concern of the States, and the League's activity should be confined to collecting and disseminating facts which should serve as a guide to social reformers and Governments. Any direct action taken by the League was likely to frustrate the very object for which action was intended. This was the view taken by the delegation of India in 1925 and in 1926 also.

As regards the progress of the work in his own country, great improvements had taken place during the last fifteen years. The ages of marriage had been raised and in most of the Provinces laws had been passed for the protection of children and, in the case of offenders, for their segregation from ordinary criminals. The Madras Juvenile Offenders Act, 1920, was typical of such legislation. As an alternative to ordinary punishment it provided for discharge under the care of a parent or guardian. Provision was also made for committal to an industrial school. Under the Act the Government was empowered to establish juvenile courts, or where this had not been done, young offenders were tried in a different room or at a different time. Several schools were maintained or certified by the Government for delinquent children. In some provinces, the Act provided for committal to an industrial school of children found begging or destitute, and for the punishment of cruelty to children. A special police staff had been appointed for the administration of the Bengal Act and a Children's Aid Society had been formed. With the co-operation of these bodies a large number of children had been removed from brothels and given shelter. For Borstal schools an adolescent offender was defined as between the ages of fifteen or sixteen and twenty-one years. The period of detention varied from two to five years. For delinquents below fifteen there were reformatory schools in which the period of detention varied between three and seven years. In some provinces there were Acts in which provision had been made for the boarding out of children and for rescuing them from immoral surroundings, also for improving their health and providing recreation. Similar provisions had also been made in some of the Indian States. This in brief was the record of work in India and he had no doubt that in future the progress would be maintained.

Opium and other dangerous drugs.—Although nearly every speaker paid a warm tribute to the work of the Advisory Committee and the other organs of the League which deal with the drug problem, it was frankly stated that, in spite of all that has been achieved in the way of international control, there has been no decrease in the illicit traffic. While the measures taken under the auspices of the League have put a stop to leakages on a considerable scale from the authorised manufacturer, the traffic now draws its supplies from clandestine factories. The Fifth Committee was unanimous in encouraging the League organs to persevere in their efforts to remedy this very serious situation. At its next session the Advisory Committee will discuss both clandestine manufacture and drug addiction, as well as measures to combat them. The Secretariat is already engaged in collecting such information as is available on these subjects. Moreover a Committee of Experts on which India would be represented, was to meet in December in order to consider the draft convention, which was in the hands of Governments, relating to the suppression of the illicit traffic. Lastly, the Fifth Committee asked the Governments of the producing countries to supply the Secretariat as soon as possible with the information it needs for its enquiries into the possibility of limitation of raw materials; this matter may be considered later at a special conference.

A separate problem is that of hemp drugs, which is being studied by the Advisory Committee. The situation was summed up by the Greek delegate, who said that examination of the question had made considerable progress from the medical and chemical standpoints, but much remained to be done in the direction of more efficient regulation of the hemp trade by means of international engagements.

A number of delegates gave interesting information concerning measures taken in their countries or overseas possessions to combat the drug habit by means of education. It was pointed out that useful work could be done not only by negative methods such as instruction in the dangers of drug addiction, but also by the positive method of providing other interests and occupations, such as the encouragement of games among the young.

During the discussion, Mr. Bapna said that, even prior to the Hague Convention, the Government of India had discharged their obligations under agreements which they had accepted, and since the establishment of the League they had whole-heartedly co-operated with its policy in the matter. He was glad to say that the obstacle which had hitherto prevented the ratification of the Bangkok Agreement by India had now been removed by the passing of the Dangerous Drugs Act in Burma.

The Chairman congratulated Mr. Bapna on this information, which is also mentioned in the Committee's report to the Assembly. In the course of his speech the Chinese delegate expressed his appreciation of the way in which the Government of India were carrying out the agreement between India and China; while the delegate of Iran pointed to this agreement as a model for the agreements which his Government hopes to conclude with the consuming countries of the East."

International Relief Union.—"In accordance with a decision by the Assembly, the Report of the International Relief Union for the period July 1933 to December 1934, was added to the agenda of the Fifth Committee. A resolution proposed by the Venezuelan delegation and adopted by the Committee noted that thirty states had acceded to the Union, congratulated it upon what it had already achieved, and stressed the importance of its work of co-ordinating the efforts of other relief organisations.

India has especial reason to be grateful for the work of the Union, since the first two manifestations of international generosity under its auspices have been for relief work in connection with earthquakes in India. In January 1934 the Union contributed £1,000 to the Indian Red Cross for the assistance of the victims of the Bihar earthquake. Again, when the Quetta earthquake occurred in June 1935, the Union rendered invaluable service by circulating to its member States an appeal which met with an extremely generous response from a number of Governments."

Port Quarantine.

58. All the major ports in India have well qualified Health Officers except Calcutta. Satisfactory arrangements have since been made with the Bengal Government for the appointment of a qualified officer. In most minor ports part-time arrangements exist with the civil surgeons, municipal M.O.Hs., medical officers and with customs officers.

The revised rules framed under Section 6 (1) (p) of the Indian Ports Act, 1908, and the question of the establishment of port sanitary authorities at the major ports in India were still under consideration of the Government of India.

The Government of India have not yet decided to ratify the I. S. C., 1926, but the epidemiological and other communications demanded under the Convention were as before supplied to the Singapore Bureau of the League and the Office International d'Hygiene Publique.

Although this report is intended to cover only the year 1935, it may be stated here that the Government of India have recently decided to reintroduce at the port of Karachi arrangements for the grant of deratisation and deratisation exemption certificates with effect from 1st April, 1937. It has also been decided that as an experimental measure, for two years in the first instance, all oceangoing ships as well as country craft, barges, etc., requiring fumigation in Bombay Harbour should be subjected to fumigation by the cyanide process.

The progressive acceleration of international communication, particularly by air, having increased the danger of an extension of yellow fever from West to East Africa and from thence to the Orient, the Government of India considered it important to obtain regular information as to the degree of infestation with *stegomyia* mosquito which exists at their major ports. Port authorities

and those in control of adjoining urban areas are now working out at regular intervals a stegomyia index for their own areas and various measures are being applied to ensure that this index is maintained at a low figure. The index is defined as the percentage of houses or quarters inspected in which stegomyia mosquitoes were found breeding.

The Government of India have prescribed standard forms for anti-cholera and vaccination certificates required by passengers embarking at Indian ports for foreign ports.

Table V (i) gives the more important mortality statistics of the major ports and Table V (ii) particulars of rat destruction within port areas.

TABLE V (i).

	Bombay.		Calcutta.		Madras.		Rangoon.		Karachi.	
	Deaths.	Ratio p.m.	Deaths.	Ratio p.m.	Deaths.	Ratio p.m.	Deaths.	Ratio p.m.	Deaths.	Ratio p.m.
Total	29,117	25·1	34,093	29·9	24,642	38·9	10,061	25·2	5,671	22·9
Small-pox	1,248	1·1	1,173	1·0	59	0·1	172	0·4	97	0·4
Cholera	13	...	2,116	1·8	141	0·2	69	0·2	...	...
Plague	1	...	...	...	...	...	17	...	...	...
Enteric fever	225	0·2	864	0·8	186	0·3	49	0·1	43	0·2
Malaria	96	0·1	607	0·5	167	0·3	80	0·3	25	0·1
Kala-azar	*1	...	149	0·1	...	...	3	...	...	...
C. s. fever	134	0·1	701	0·6	...	...	6	...	8	...
Influenza	71	0·1	457	0·4	...	...	6	...	7	...
Measles	264	0·2	146	0·1	7	...	1	...	41	0·2
Dysentery	346	0·3	1,311	1·1	1,314	2·1	161	0·4	83	0·4
Tuberculosis	1,913†	1·6	2,856†	2·5	1,209	1·9	879†	2·2	515†	2·1
Other causes	24,805	21·4	23,713	21·0	21,559	34·0	8,618	21·7	4,852	19·5

*Imported from Cawnpore.

†Phtbisis or pulmonary tuberculosis.

TABLE V (ii).

	Destroyed.	Examined.	Found infected with plague.
Total	48,526	12,669	140
Calcutta	5,562	637	..
Chittagong	136	136	..
Karachi (Wharf)	3,159	410	..
Bombay	7,458	7,458	..
Cochin	18,232	305	130
Rangoon	2,728	2,069	..
Bassein	4,355	957	10
Moulmein Town	6,896	697	..

In the ports of Calcutta, Bombay and Rangoon, considerable numbers of rats were destroyed on board ships but, of those examined, none were found infected with plague.

Deratisation of ships was carried out in Calcutta, Bombay and Rangoon by means of sulphur dioxide. At Calcutta, 51 vessels were deratised and 61 given exemption certificates; at Bombay 45 (loaded 1 and unloaded 44) and 17 (loaded 3 and unloaded 14); and at Rangoon 39 (loaded 25 and empty 14) and 34 (empty). No ships were deratised before discharge of cargo.

Port of Bombay.

59. Lt.-Col. C. L. Bilderbeck, I.M.S., continued as Port Health Officer.

Incoming vessels.—Medical inspections were made of 117 “infected” or “suspected” vessels carrying 13,487 members of crews and 23,893 passengers and pilgrims. Excluding intercoastal vessels, 22 were found to have or to have had cases of infectious disease on board at the time of arrival or during the voyage of which 24 were chickenpox, 12 measles, 5 mumps, 3 scarlet fever and 2 jigger. Six vessels, with cases of measles on board left the port within 12 days of arrival but their bills of health were endorsed indicating the disease which had occurred and the preventive measures taken. The international wireless code was used to full advantage.

Outgoing vessels.—Altogether 755 vessels carrying 54,928 members of crews and 48,621 passengers were inspected, whilst 26,143 Asiatic and African members of crews and 16,764 third class, fourth class and deck passengers and Asiatic and African servants were, prior to departure, subjected to medical examination; their clothing and bedding were also disinfected. Amongst these, 26,777 persons were vaccinated and 5,931 inoculated against cholera. Both pilgrims and all classes of African bound passengers were found fully protected against smallpox.

Available information shows that 43 cases of infectious disease were landed at overseas and other Indian ports from ships which sailed from Bombay. These included one case of smallpox at each of the ports of Colombo, Mombassa, Suez, Singapore, Jeddah, Karachi and Rangoon; 16 cases of chickenpox; 2 scarlet fever; 2 cerebrospinal meningitis; 9 pneumonia; and 7 measles. A system of advanced medical inspection was introduced in the case of large passenger vessels in order to facilitate the embarkation of passengers desirous of boarding earlier than the scheduled times for inspection.

Red Sea Pilgrim Traffic.—As regards outward traffic, prior to the first voyage every pilgrim ship was thoroughly cleansed and deratised by the Clayton process; on subsequent voyages, each ship was exempted from further deratisation subject to freedom from rats. All pilgrims were medically inspected and bedding and clothing, where there might have been exposure to infection, were disinfected. A total of 5,931 pilgrims in 12 vessels sailed for Jeddah between 12th November, 1934 and 28th February, 1935.

In regard to inward traffic ten ships returned from Jeddah with 5,009 pilgrims; 3 arrived with one or more cases of chickenpox on board, and 24 deaths were recorded on the voyages, these being mostly due to old age and debility.

General—(i) Disinfection.—Twenty-eight vessels were disinfected on account of infectious disease. The clothing and bedding of 43,207 members of crews and passengers in out-going and incoming vessels or in vessels lying in the harbour were disinfected. The port disinfection station dealt with 7,111 bundles of clothing and bedding received from different hospitals.

Under article 28 of the I. S. C. 45 ships were deratised, the number of rats killed varying from 9 to 163; deratisation exemption certificates were issued to 17 vessels. Fifteen deaths from accidents occurred on board the vessels in the harbour or docks.

(ii) Rats and fleas.—During the year, 759,618 rats were destroyed in Bombay city, 7,458 in the docks and 1,056 on 50 vessels; 227,485 rats from the city, 7,458 from the docks, and 542 from broadships were examined, but none was found plague infected.

(iii) *Port Sanitation*.—The sanitary state of the harbour and of the *bunders* and docks generally was reported to be satisfactory.

(iv) *Other matters*.—The inspection of food supplies for lascar crews was continued; 38 of the 123 samples of *ghee*, two of lime-juice and two of flour taken for analysis were condemned.

A mosquito survey of 11,989 country craft in the harbour was carried out by the Port Trust staff; 4,080 were found to be breeding mosquitoes.

An investigation was carried out to ascertain whether the rat and rat flea populations on steamers visiting the harbour were of the same species as those in the docks area.

The rat species were found to be much the same, but the shore rats had large numbers of fleas. Whilst *X. Cheopis* was the predominating flea on ship rats, the majority on dock rats were *X. astia*.

Port of Karachi.

60. *Staff and Administration*.—Dr. B. F. Khambata was the Port Health Officer.

Incoming vessels.—Seventy vessels including 11 pilgrim ships and 3 country craft, carrying 17,308 members of crews and passengers, entered the port under the "Quarantine" flag. Of these 54 came from the Red Sea, European and African ports, 2 from the Persian Gulf and 14 from other ports. One case of small-pox, 8 of chicken-pox and 2 of measles were detected. Three deaths from pneumonia were reported to have occurred on 3 vessels which arrived from Jeddah.

Outgoing vessels.—A total of 701 were granted bills of health. Two passengers, one in the infective stage of small-pox and the other suffering from chicken-pox, were prevented from embarking.

Pilgrim traffic.—Only one outgoing ship carrying 1,659 pilgrims sailed direct from Karachi on the 24th January, 1935; 10 others from Bombay embarked 5,133 additional pilgrims. Eleven incoming ships arrived with 11,568 pilgrims, of whom 8,226 disembarked; the rest continued their voyage to Bombay. Deaths during the voyages totalled 27, all from non-infectious diseases; 5 cases of chicken-pox, one suspicious case of leprosy and 60 ships hospital cases were reported on arrival.

General—(i) *Rats and fleas*.—Anti-rat operations were carried out within the wharf area, 3,159 rats being trapped and killed. The average number trapped per day per 100 traps was 5.5. None was found plague infected.

(ii) *Port Sanitation*.—The sanitary condition of the harbour was satisfactory.

(iii) *Other matters*.—Provisions and stores for the use of the Asiatic crews of 31 vessels were inspected. Of the 85 samples of *ghee* analysed, 17 were found to be not genuine or unfit for human consumption.

Air-port of Karachi.

61. In view of the rapid development of aerial traffic and the necessity for applying the International Sanitary Convention for Aerial Navigation, the Government of India had under consideration measures necessary to prevent the possible introduction and spread of infectious disease brought by aeroplane. It was decided to make the Karachi air port a "Sanitary Aerodrome", and in anticipation as an interim measure sanction was given in July, 1935 to the

appointment of a Health Officer for the Karachi Airport. This officer was placed under the administrative control of the Public Health Commissioner with instructions to carry out medical inspection of all planes, passengers and crews arriving at and departing from the Karachi Air Port. The Government of India also sanctioned the temporary appointment of a sanitary inspector for anti-mosquito work. A temporary post of sub-assistant surgeon was also created from October, 1935.

The Government of India have also had under consideration the question of providing the airport with medical inspection rooms, a first-aid post, a disinfection station, an isolation hospital and equipment for anti-mosquito operations. Regulations have also been framed similar to those in use for seaports for the prevention of the introduction of infectious diseases into India by air. Pending the erection of the necessary accommodation arrangements have been made for the segregation of cases of infectious diseases, except yellow fever, in the Municipal Epidemic Diseases Hospital.

During 1935, bills of health were issued to 260 west bound aircraft ; members of crews and passengers totalled 933 and 1,029, respectively. Eighty-two aircraft left the port for the East carrying 291 members of crews and 294 passengers. No cases of communicable disease were reported.

The air Companies operating from and to Karachi were (1) The Imperial Airways, Limited, (2) French Air Mail and (3) the Royal Dutch Air Mail. In addition 11 British planes, 2 French planes and one Egyptian private plane used the air-port.

Water is supplied from the Karachi Municipal mains and sanitation was satisfactory.

Port of Calcutta.

62. Lt. A. D. Campbell, I.M.D., acted as Port Health Officer. Other health staff included three assistant Port Health Officers, one woman medical inspector, one sanitary inspector and one fumigation inspector.

Inward traffic.—As before only infected or suspected incoming vessels were examined. Consequently, of the 1,192 vessels which entered the port, only 9 with 930 members of the crews and 1,496 passengers were subjected to inspection ; none was found to have infectious disease on board. There were 3 deaths, one each from cholera, sunstroke and " other causes " among the 364 European seamen admitted to hospitals. Of the total, 43 admissions were due to simple fever, 33 to dysentery, 17 to diarrhoea, 12 to malaria, 6 to influenza, 3 each to enteric fever and cholera, 1 to sunstroke and 246 to " other causes ". Amongst Asiatic seamen there were 180 admissions and 19 deaths, of which 47 and 14 were due to cholera, 8 and 1 to dysentery, 114 and 4 to " other causes ", 2 non-fatal admissions for diarrhoea, 6 for malaria, 1 for simple fever and 2 for influenza.

Outward traffic.—Of the 1,203 vessels which left the port 893 vessels proceeding to ports beyond India, with 67,231 members of crews and 41,060 passengers, were inspected. Six cases of cholera were removed to hospital from five out-going ships during their stay in the harbour. 934 persons were vaccinated. 7,277 boats, lighters, etc., were inspected by the sanitary inspector and 91 cases of sickness were reported from the harbour.

General—(i) Disinfection and fumigation.—Owing to the freedom of the town and port from plague, routine disinfection of clothing and bedding was not enforced in the case of Asiatic and African members of crews and third class deck passengers of ships leaving for ports beyond British India. Fourteen

seagoing vessels, 28 inland steamers, flats and launches and 29 lighters, *bhars* and *dinghis* were disinfected. 51 ships were fumigated.

(ii) *Rats and fleas*.—Fifty one deratisation certificates and 61 deratisation exemption certificates were issued. Of the 811 rats examined none was found infected.

(iii) *Port sanitation*.—The sanitation of the Kidderpore docks was as usual looked after by the Port Commissioners. The sanitary inspector inspected cargo boats plying in the river and supervised the conservancy arrangements at the bathing and burning *Ghats* within the limits of the port.

(iv) *Miscellaneous*.—Municipal filtered water was supplied to the shipping; it was satisfactory both in quality and quantity. Ships' provisions generally were found satisfactory.

(v) *Pilgrim traffic*.—Only one ship with 526 pilgrims on board left for the Hedjaz.

Port of Madras.

63. *Staff and Administration*.—The D. P. H. continued to be in charge of Port Health administration and an A. D. P. H. acted as part-time P. H. O. The other staff included a sub-assistant surgeon in charge of the disinfection shed and a nurse for inspection of female passengers.

Incoming vessels.—These numbered 660 and carried on board 56,143 members of crews and 53,496 passengers. Only one case of chickenpox and one of measles were landed and sent to the infectious diseases hospital.

Outgoing vessels.—A total of 639 vessels carrying 55,237 members of crews and 72,906 passengers were inspected and granted bills of health.

Disinfection.—The bedding and clothing of deck passengers and crews landing and embarking at this port, were disinfected at the discretion of the P. H. O.

Rats.—No mortality among rats was found on any vessel.

Port of Rangoon.

64. *Staff*.—Dr. J. A. Anklesaria, D. P. H. was Port Health Officer.

Incoming Vessels.—Altogether 850 vessels from Indian and 419 from foreign ports, carrying 118,937 members of crews and 259,646 passengers were inspected. Thirty-four cases of infectious disease were reported on 27 vessels, these comprised 7 cases of cholera, 3 smallpox, 17 chickenpox and 7 measles. Except for one death from cholera at sea, one case of chickenpox in this ship's hospital (a through passenger) and 2 cases of measles, all were removed to the Contagious Diseases Hospital. In addition, 8 unreported cases of small-pox, 26 cases of chickenpox and 1 case of measles were detected on 22 vessels during medical inspection and removed to hospital. Twenty-two lepers were also detected; except one sent to a leprosy asylum and another who was a through passenger all were allowed to proceed to their homes. Thirteen deaths from non-infectious diseases were also reported on 12 vessels.

Of a total of 265,637 passengers examined under the Burma Vaccination Act, 161,136 were found unprotected and were vaccinated by the Port Health Staff. In addition, 36 vaccinations were performed among members of crews.

The effects of 1,983 members of crew and 3,265 passengers were disinfected.

Outgoing vessels.—The effects of 35,376 members of crews and 13,521 deck passengers on 551 vessels which were proceeding to ports beyond India were disinfected; whilst 10,875 European members of crews and 4,018 saloon passengers were inspected. Vaccinations totalled—crews 289 and passengers 2,904. Baggage coolies numbering 3,500 were inspected and their clothes and uniforms disinfected prior to handling baggage.

Two deaths from non-infectious diseases, 1 case each of cholera, scarlet fever and beri-beri, 9 of chickenpox, 4 of mumps, and 2 others were reported on vessels in the harbour.

Of 3,195 new members of crews inspected prior to signing ships' articles, 3,146 were passed fit.

General—(i) Disinfection and Fumigation.—Thirty-nine vessels were fumigated to comply with the measures in force at their ports of destination. Deratisation exemption certificates were issued to 34 vessels after inspection. On these last 121 rats were destroyed. 812 rats were destroyed in empty vessels by fumigation. The number of rats destroyed on loaded vessels was not ascertained as they left the harbour immediately after fumigation.

(ii) Rats and fleas.—Measures to prevent the entry of rats to vessels lying at the wharves were inspected at frequent intervals. The total number of rats killed was 5,257 and of 2,069 examined none was found infected. A total of 8,676 rat burrows were treated with cyanogas, 17,080 connecting burrows were blocked and 24,681 rat holes were smoked.

(iii) Port sanitation.—The sanitation of the Port Commissioner's area was kept at a high standard.

(iv) Other matters.—Anti-cholera inoculations, totalling 1,640 were carried out on passengers and members of crews. 3,077 employees in the port were vaccinated. Provisions for Asiatic lascar crews on 363 vessels were inspected; of the 219 samples analysed, 26 were found bad or adulterated.

Port of Aden.

65. *Staff.*—Lt.-Col. E. S. Phipson, I.M.S., held charge of the office of Port Health Officer except for a period of leave, when Lt.-Col. J. B. Hanafin, I.M.S. was in charge.

Incoming and outgoing traffic.—Bills of Health were granted to 1,864 vessels. Eight vessels arrived with infectious disease on board.

Pilgrim traffic.—Eight ships carrying pilgrims passed through the port; all were medically examined but were not granted pratique. Aden is not a recognised pilgrim port but all pilgrims embarking for Jeddah are medically inspected, inoculated against cholera and vaccinated against smallpox if not already protected. Pilgrim passengers arriving from Mukalla *en route* to the Hedjaz *via* Aden are inoculated on board by ship surgeons.

Quarantine.—Of the four quarantine islands in the harbour, only Flint and Twin islands are now kept ready to receive patients; the other two are not now used for quarantine purposes.

Deratisation and disinfection.—Aden is not recognised internationally as a port which issues deratisation and exemption certificates but a Clayton apparatus is maintained for the fumigation of smaller vessels engaged in international coastal service, though not as a routine measure. The apparatus is maintained by a local firm, which charges rates fixed according to the size of the ship.

General.—The health and sanitation of the port were satisfactory.

Kamaran Quarantine Station, Red Sea.

66. The pilgrimage of 1934-35, which lasted for over 4 months, opened with arrival of the M. S. "Polyphemus" from the Netherlands East Indies on the 29th October 1934, and closed with the departure of the S. S. "Akbar" from India on 9th March, 1935. Twenty-six vessels, 22 British and 4 Dutch and carrying 18,454 pilgrims passed through Kamaran and were dealt with according to the measures prescribed for "healthy" ships under Article XX of the Schedule to the Anglo-Dutch Agreement of 1926. Of the pilgrims 13,376 were from British India, 3,424 from the Netherlands East Indies, 1,386 from the Straits Settlements and 268 from the Arabian Coast.

The health of the pilgrims was good ; only 5 deaths occurred on steamers from British India, 4 on those from the Netherlands East Indies and one on those from the Straits. Only 268 pilgrims were landed, whilst 19 British and 4 Dutch vessels were exempted from landing their passengers. 131 uninoculated pilgrims on the S.S. "Khosrou" who had embarked at Aden, were inoculated when the vessel called at Kamaran.

SECTION VI.

VACCINATION AGAINST SMALLPOX.

A.—British India.

General.

67. With an increase in the smallpox deaths the number of vaccinations increased correspondingly by over 2 millions to a total of 25,356,725. Primary vaccination operations increased by 494,914 and revaccinations by 1,592,587. Nearly 97 % of the primary cases and 46 % of the revaccinations were successful. No cases of post-vaccinal encephalitis were recorded. In most provinces, the number of operations was higher than in the previous year, the largest difference being recorded in the Punjab.

Of the 9,698,794 registered infants, only 45 % were successfully vaccinated. This low percentage gives a clear indication of the generally backward state of protection in this country.

Details for each province will be found in the Appendix to this Section, page 244. Success rates for the different provinces are given in the graph facing page 114.

Vaccine Institutes and Supply of Vaccine.

68. Glycerinated lymph continued to be used throughout British India. The N. W. F. P. as usual obtained its supplies from the Punjab Vaccine Institute. The large and sudden demands for lymph made on the Punjab Institute for vaccination of the Quetta refugees were met in full. The quality of the lymph from all provincial institutes was reported to be of high standard. In the Burma Institute, seed lymph was rejuvenated by passing through the modified Nijland cycle.

Yields in grammes of lymph obtained at the various vaccine depôts are given below :—

	Buffalo calf.	Ox calf.
Punjab	122·3	33·9
U. P.	61·6	23·6
B. & O.	51·1	33·0
Bengal	29·0	26·9
C. P.	70·5	39·2
Bombay	19·0	24·9
Madras	22·2*	26·0
Assam . . . . .	..	24·5
Burma	545·8	75·8

Tests.—In the Punjab each brew of vaccine was subjected to bacteriological and clinical examination and examined both aerobically and anaerobically for the presence of disease-producing organisms. When found free from pathogenic organisms, the potency of the lymph was tested. No brew was issued unless it gave cent per cent case and insertion success.

In U. P. bacteriological tests were always carried out before issue of vaccine. All the tests indicated complete absence of streptococci and gas-producing anaerobes and the number of viable organisms was in every case less than the prescribed standard of 5,000 per c.c. of lymph. Batches of lymph were chloroformed and issued only when subsequent tests showed adequate reduction of organisms. Rabbits were used to test potency, a number of

*For seed purposes.

batches being pooled and diluted 1 in 500 to 1 in 8,000. These tests indicated a uniformly good quality. The potency of the vaccine was found high enough to permit of a 1 in 7 dilution instead of the usual 1 in 5.

In Bengal all lymph was tested bacteriologically for purity and potency. None was issued without preliminary tests for efficiency.

In Bombay tests for purity and potency were as usual always made.

At the King Institute, Guindy, the usual laboratory tests proved the lymph to be of satisfactory potency. All batches were as usual subjected to detailed bacteriological examination both immediately after manufacture and at the time of issue. All supplies were diluted 1 in 7 and treated with clove-oil immediately before issue.

In Burma, the lymph before issue was subjected to animal tests for bacteria and to Calmette-Guerin's international potency test on rabbits. The standard in use was 100 % success without undue inflammation.

Table VI (i) gives details of the lymph produced by and issued from provincial institutes.

TABLE VI (i).

Vaccine Institutes.	Number of doses.	
	Output.	Issues.
N.-W. F. P. } Lahore	8,036,470	6,941,810
Punjab		
U. P., Patwa Dangar	4,003,700	3,352,850
B. & O., Namkum (Ranchi)	2,998,183	3,298,463
Bengal, Calcutta	6,086,730	9,302,292
C. P., Nagpur	1,028,520	771,980
Bombay, Belgaum	1,974,935	1,729,920
Madras, Guindy *	7,196,200	4,714,830
Assam, Shillong	1,100,209	1,057,845
Burma, Meiktila	2,270,790	1,743,849

* For the period 1st October, 1934, to 30th September, 1935 at 2 insertions per case.

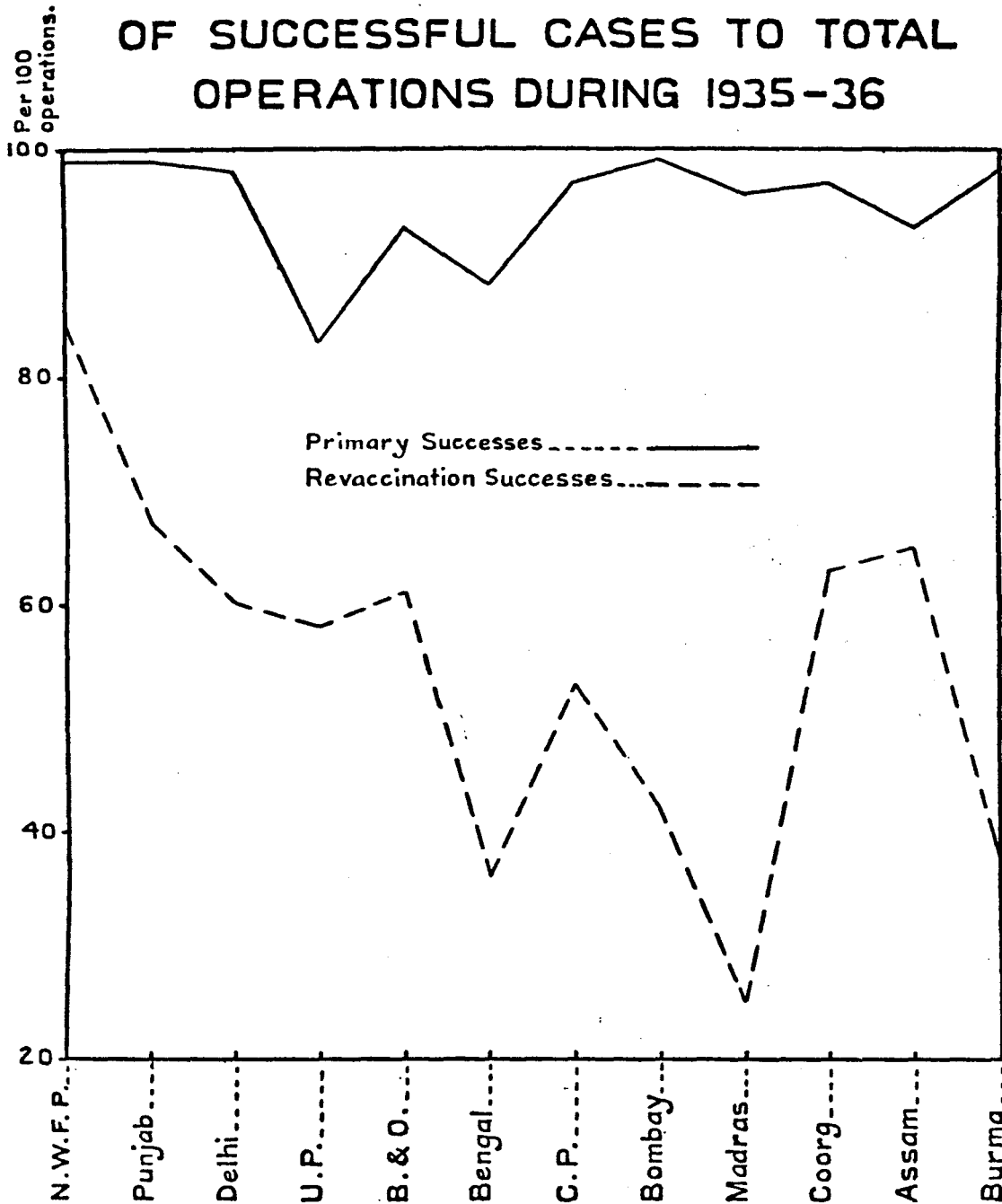
In the U. P. investigations were made into the cause of failure of the calves to give good lymph supplies. The seed lymph was first tested and its excellent quality proved that this was not the cause. Calves from different areas were then tested and only those animals showing relatively high susceptibility to vaccinia were used. The quality of seed lymph was further improved by careful animal passages. This resulted in an increase of over 5 grammes per animal in the average yield of pulp. The method of chloroforming vaccine lymph was further developed and a chemical test, based on the Guaresche-Lustgarten reaction, was adopted to ensure complete absence of chloroform.

The wastage of lymph in various areas was further investigated and measures were taken to minimise this loss. Deterioration of vaccine in transit during the hot months was minimised to some extent by packing the vaccine in cotton wool soaked in ice cold water; evaporation helped to keep the vaccine cool.

Field tests were carried out on children and only vaccine giving 100 per cent. case success and approximately 100 % insertion success in primary cases was issued. All samples gave 100 % case success in a dilution of 1 in 7½, but to provide a margin for possible deterioration vaccine issued for general use was diluted only 1 in 5 except for a few weeks during the cooler

No 7

VACCINATION GRAPH SHOWING PERCENTAGES OF SUCCESSFUL CASES TO TOTAL OPERATIONS DURING 1935-36



months when a 1 in 6½ dilution was found to give satisfactory results. Owing to the increased potency of the lymph, the suggestion was made that vaccination operations might commence from 1st October instead of 1st November. An experimental test was made in 15 municipalities and 20 districts and the results were so encouraging that the scheme will be given a further trial in 1936.

In B. & O. it was found that calves vaccinated with humanized lymph usually took longer to develop than those vaccinated with animal virus. Guinea-pigs were again tried for regeneration of seed vaccine and for the testing of issue vaccine, but the results were not satisfactory.

At the King Institute, Guindy, the following researches were made :—

(i) *Cultivation of vaccinia virus in the chorio-allantoic membrane of the chick-embryo.*—The researches outlined in the previous year were continued. The virus had now passed through 82 serial passages in eggs. The technique of inoculation in eggs was improved. With the new technique, the potency of the cultured virus in later passages increased considerably. The immunizing properties were investigated and found to be equal to those obtained with routine calf-lymph. Keeping qualities were not satisfactory. On serial passages no alterations in the character of the virus were noted. This cultured virus was used in the field along with routine calf-lymph and comparable results were obtained. Further work was in progress.

(ii) *Purification of vaccinia virus as obtained from calf-lymph.*—Attempts were made to prepare a bacteria-free suspension of vaccinia virus as obtained from crude calf-lymph by simple filtration through a Berkefeld 'V' filter and by the technique of elution with casein-alumina-gel. Suspensions of pure elementary bodies from lapine were also prepared. Immunizing and storage qualities of these pure suspensions of virus in different substances such as broth, glycerine water, semi solid agar, and gum-acacia were being studied. A comparative study of the immunological properties of active, attenuated and inactive virus was also in progress.

(iii) *Cultivation of different viruses on the chorio-allantoic membrane of the chick-embryo.*—Virus of varicella has been successfully cultivated on the chorio-allantoic membrane and a few serial passages were made.

(iv) *Attempts to modify Nijland's seed cycle.*—Experiments initiated last year in respect of the substitution of humanized lymph for rabbit lymph in the seed cycle were continued. Lymph so manufactured was found to give as good results as the routine lymph. Tested in the experimental range it gave 100 % case and insertion success rates. Results from different parts of the Presidency were comparable with the ordinary lymph and gave on an average a 90 % insertion success rate.

Training.—At the Punjab Vaccine Institute, 16 vaccinators, 48 private individuals and 38 students of Dayanand Ayurvedic and Unani Tibbia Colleges were trained in the technique of vaccination and in elementary principles of hygiene. In addition, 46 students of the sanitary inspectors' class, 13 health visitors and 89 medical students were given a course of lectures in vaccination. In the C. P. the usual seven weeks course of training was given to 106 new vaccinators. Two teachers and two assistant superintendents of vaccination were also trained. At the Vaccine Institute, Belgaum, a training class for vaccinators was held and 27 candidates passed the examination. In addition, 5 medical officers of health, 1 sub-inspector of sanitation, 1 inspector of sanitation and vaccination, 1 chief sanitary inspector and 2 clerks of the public health department were given special training in the preparation and preservation of lymph and in the theory and practice of vaccination,

In Madras, a certain number of women vaccinators were trained. In Burma the vaccination training class was held in abeyance.

Vaccination in Provinces.

69. *N. W. F. P.*—The staff consisted of 6 superintendents of vaccination and 49 vaccinators (including 5 temporary vaccinators). Successful primary vaccinations numbered 135,427, including 78,558 infants under 1 year of age and 47,461 children between one and 6 years. Successful revaccinations totalled 75,268. Of the total, 26,575 were done in Political Agencies and 5,864 (1,464 primary and 4,400 revaccinations) in cantonments. The average number of vaccinations performed by each vaccinator was 4,908 a considerable reduction as compared with the previous year.

70. *Punjab.*—The number of vaccinators employed by local bodies increased by 10 to 548. Appreciable increases in both primary and secondary vaccinations were recorded. The larger number of primary cases was chiefly due to the increase in registered births. But it is worth noting that the number of operations per smallpox death was over four times that for the record year 1932-33. Omitting the figures for Lahore city, where a severe epidemic occurred during that year, the present figures compare favourably.

As regards rural areas, the number of vaccination operations was the highest on record, exceeding those for 1932-33 by 251,602. These are satisfactory results when it is remembered that there was no epidemic of smallpox. The average number of operations performed by each vaccinator was 6,115. A few women vaccinators were employed and municipalities and local boards should be encouraged to make more use of women for this work. Although there was an increase in total expenditure, the average cost of each successful case fell slightly.

71. *Delhi Province.*—The four municipalities employed 8 whole time vaccinators; in rural areas there were three. With a higher smallpox incidence the numbers of vaccinations and revaccinations both showed an increase as compared with the previous year. The average number of vaccinations performed by each vaccinator was 4,040 in urban and 4,252 in rural areas; these cannot be said to be satisfactory and greater efforts should be made. Revaccination amongst women who observe strict *pardah* continued to be a difficult problem.

72. *United Provinces.*—The number of vaccinators was increased to 985. The increase of 114,729 in total operations was mostly due to greater activity in urban areas. The average number of operations performed by each vaccinator was only 1,985, a figure which might be multiplied by three without much difficulty and with a corresponding fall in average cost. The percentage of successful operations to total births was only 56 % among children under 1 year.

Of the total of 1,972,458 operations, 1,399,352 primary and 224,251 revaccinations were performed in rural areas; 205,398 and 139,797 in urban areas; 52 and 327 in dispensaries; 103 and 269 by private medical practitioners; and 813 and 2,096 at railway dispensaries. A total of 3,959 schools were inspected for vaccination purposes and 73,035 scholars were vaccinated as a result. In spite of an increase in total expenditure, the average cost per successful case fell slightly.

73. *Bihar and Orissa.*—The provincial staff consisted of 11 district inspectors, 36 sub-inspectors and 1,334 vaccinators. Licensed vaccinators continued to be generally employed in rural areas, but the Government made provision

for 100 temporary vaccinators to be employed during smallpox epidemics. The average number of operations performed by each vaccinator was only 1,498. Although this shows an increase over the previous year, it cannot be regarded as a satisfactory outturn of work. Total vaccination operations increased by 164,049 but another decrease occurred in the success rate which was only 70 %. In municipal areas, the number of operations increased by 99,097 to 217,985 of which only 91,387 were successful. Success rates were 87 % in primary cases and 29 % in revaccinations as against 98 % and 50 % during the previous year. It is hoped that these large decreases have been made the subject of investigation. Vaccination operations performed in rural areas numbered 1,779,963 and success rates were 97 % in primary cases and 38 % in revaccinations as compared with 99 % and 38 % during the previous year.

Unprotected children under one year numbered 1,190,994. Of these only 266 p. m. were successfully vaccinated, but this figure was 645 p. m. in municipal areas. So long as nearly two-thirds of the total infant population in rural areas and one-third of that in municipal areas remain unprotected, vaccination work can only be described as unsatisfactory.

74. *Bengal Presidency*.—The number of vaccinators increased from 1,738 to 2,043 in rural areas and from 165 to 240 in municipalities. Due to an epidemic of smallpox the number of vaccinations increased by 2,217,721 to the record total of 9,114,092. Even then the average number of operations performed by each vaccinator was only 3,886, which still leaves considerable scope for improvement. Although primary cases increased by 271,664 and revaccinations by 1,946,057, and the numbers of children under one year and between one and 6 years successfully vaccinated were 340,560 and 1,670,842, respectively, nevertheless over four-fifths of the population still remain unprotected. In rural areas 7,309,300 vaccinations (2,709,529 primary and 4,599,771 revaccinations) were performed, whilst in municipal areas the total was 1,376,293 against 589,707 in the previous year. In tea gardens 84,889 vaccinations were performed, in factories 106,450, in railways 110,395, on steamers 759 and in jails 124,423.

Of the available infant population, 241 p. m. were successfully vaccinated, the rates being 216 p. m. in rural areas and 751 p. m. in municipalities. The low percentage of protected infants was ascribed to the general reluctance of parents and guardians to have their children vaccinated before they reach the age of one year; in some districts the prevalence of malaria and other epidemic and endemic diseases was given as the cause.

Although there was an increase in total expenditure the average cost per successful case fell slightly. The rotary lancet is now used practically all over the province.

75. *Central Provinces*.—The vaccination staff comprised 36 assistant superintendents and 355 vaccinators. Of the total operations, 561,883 primary and 158,673 revaccinations were performed by district vaccinators, 4,430 by dispensary staffs and 9,419 by other agencies. The average number of operations done by each vaccinator was only 2,152, a figure which might easily be doubled. In municipalities, of 57,113 unprotected infants, 44,652 or 78 % were vaccinated. Although there was an increase in total expenditure on vaccination, the average cost per successful case fell slightly.

76. *Bombay Presidency*.—Of the total operations performed, the percentage of success was 99.43 %. Seventy-one per cent. of the primary cases were infants under 1 year of age and 26 % children between 1 and 6

years. Of the revaccination cases inspected, 42 % were successful. The average number of operations performed by each vaccinator was only 2,808, another figure which might easily be doubled. Vaccination work was regularly carried out in police lines and outposts, and at important fair centres.

At Karachi, the temporary establishment appointed for the vaccination of pilgrims proceeding to the Hedjaz vaccinated 4,924,—3,941 male and 983 female,—pilgrims between November, 1935 and February, 1936 at a cost of Rs. 638.

77. *Madras Presidency*.—The number of vaccinators was increased by one to 880. In addition, 278 health inspectors were employed on vaccination work. The number of operations fell from 5,223,920 to 4,275,890, the decrease being wholly recorded under revaccinations as primary vaccinations showed an increase. The decrease was to a certain extent due to the decreased prevalence of smallpox, but the wide-spread of cholera in some districts and the diversion of vaccinators for cholera duty also adversely affected the outturn of work. Each vaccinator performed 4,684 vaccinations on an average, a figure which is only fairly satisfactory. The number of operations performed in rural areas decreased to 3,725,295 (1,277,336 primary and 2,447,959 revaccinations). Successful vaccinations among children under 1 year of age numbered 534,994, the proportion of vaccinations to registered births varying from 20 % to 54 % in different districts. In municipalities 133,379 primary and 379,956 revaccination operations were performed and the proportion of vaccinations to registered births varied between 15 % and 97 %. In both districts and municipalities a few women vaccinators were employed and an additional number was trained for vaccination work among *purdah* women.

The average expenditure per successful vaccination in districts varied from Re. 0-3-6 to Rs. 1-0-4 ; in municipalities it varied from As. 2-7 to Rs. 1-3-11.

78. *Coorg*.—A total of 13,310 males and 7,174 females were vaccinated ; 18,207 were done in rural areas, 2,187 in urban areas and 90 in dispensaries. In the two towns in Coorg, where the Vaccination Act is in force, 232 infants were successfully vaccinated. Each vaccinator performed on an average 2,039 operations—a very unsatisfactory figure.

79. *Assam*.—The vaccination staff included 9 inspectors, 30 sub-inspectors and 434 departmental vaccinators. Vaccination operations increased by 147,749 (17,197 primary and 130,552 revaccinations), the total number performed being 852,685. Of this number, 767,542 were done by departmental vaccinators ; 16,176 by dispensary staff, 62,543 in tea-gardens, 5,474 in jails, police hospitals, etc., and 943 by railway staff. Each vaccinator performed on an average 1,965 vaccinations, a very small outturn. Of 6,057 unprotected infants registered in towns where vaccination is compulsory, 52% were successfully vaccinated and success rates varied between 4% and 93 %.

80. *Burma*.—The staff comprised 38 district superintendents, 112 part-time supervising officers, 25 inspectors and 350 vaccinators. Additional temporary staff was employed to deal with epidemics. The average number of vaccinations performed by each vaccinator was 3,750,—a figure which is susceptible of considerable improvement. Of the 1,052,126 operations performed in rural

areas, 543,984 were primary and 508,142 revaccinations and the percentages of success were 98 % and 37 % respectively. Of the 498,905 primary successful operations, 137,830 were infants under one year of age and 275,636 children between one and six years.

In urban areas, excluding cantonments, 261,108 operations were performed. Of the 53,532 primary operations about 98 % were successful; of the 207,576 revaccinations, 39 % of the verified cases were successful. Other vaccinations were 1,558 in cantonments, 3,602 by railway dispensary staff, 2,524 by Government dispensary staff, 1,349 by private practitioners, 40,818 in jails and 182,250 immigrants at the ports of Rangoon and Akyab.

81. *Andamans*.—Vaccinations numbered 578 (342 primary, 234 secondary and 2 revaccinations), of which 433 were successful. Of the vaccinations done with Java dried lymph only 4 were successful, whilst amongst the 566 done with glycerinated lymph 429 were successful.

Compulsory Vaccination.

82. Table VI (ii) gives the number of towns and districts in which compulsory vaccination is in force.

TABLE VI (ii).

	Towns.†		Districts.	
	Total No.	No. in which Vaccination Act is in force.	Total No.	No. in which Vaccination Act is in force.
British India—	1,524	1,180	256	117
N.-W. F. P. . . .	17	10	5	..
Punjab	177	171	29	27
Delhi	6	6	1	1
U. P.	439	243	48	..
B. & O.	59	58	21	10*
Bengal	119	119	27	26
C. P.	110	88	19	..
Bombay	154	50	28	1†
Madras	328	328	25	25
Coorg	5	5	1	..
Assam	31	24	14	—
Burma	74	74	37	27
Ajmer-Merwara . .	5	4	1	..

*Compulsory vaccination was also in force in certain selected areas of 4 other districts.

†In 10 villages in Belgaum District.

In addition, rules for extension of the Vaccination Act to certain groups of villages in six districts in the Central Provinces were promulgated during 1935 and 1936. Revaccination was compulsory throughout Madras Presidency and in 48 towns and 21 districts in Burma. In other provinces, there is still great scope for extension of compulsory vaccination.

B.—Indian States.

83. *Punjab States*.—Statistics of those Indian States which maintain their own establishments are given below:—

	Vaccinations.		Success-rates.	
	P.	R.	P.	R.
Patiala	64,655	51,585	99	80
Bahawalpur	35,604	2,058	100	97
Nabha	12,113	2,110	96	79
Jind	11,316	243	99	43
Kapurthala	5,995	5,477	96	56
Faridkot	8,393	2,924	99	50

Gujerat States Agency.—Totals of 37,522 primary and 4,725 revaccinations were performed. The success rate was 98 % for primary cases and 77 % for revaccinations. The results of 5 % of primary and 52 % of revaccinations could not be ascertained.

Shan States (Burma).—The staff comprised 2 district superintendents of vaccination, 2 part-time supervising officers and 45 vaccinators. Vaccinations performed were 75,204 (54,477 primary and 20,727 revaccinations). Of the verified primary cases and revaccinations 97 % and 75 % respectively were successful. The average cost per successful case was Re. 0-8-4.

Mysore State.—Vaccination operations numbered 406,816. Of these 389,689 (226,069 primary and 180,747 revaccinations) were done by district board and municipal vaccinators and 17,127 (8,553 primary and 8,574 revaccinations) by medical subordinates. Amongst the former success rates were 93 % and 23 % in primary and revaccination cases respectively; among the latter, success rates were 91 % and 44 %. The cost per successful case was Re. 0-4-5.

The potency of the lymph continued high and the bacterial content was kept within safe limits. All lymph was bacteriologically examined in the Vaccine Institute and the results were confirmed by tests at the Public Health Institute. In addition, the potency of the lymph was tested before it was sent out. Lano-line lymph sufficient for 379,162 cases and glycerine lymph for 69,855 cases were issued.

SECTION VII.
PUBLIC HEALTH WORKS.

A.—British India.

General.

84. It is difficult to add anything to the remarks made in previous reports in regard to the importance of environmental hygiene and to the general failure of local authorities throughout India to provide good water-supplies, good drainage and satisfactory systems for the removal and disposal of refuse and sewage. Until municipal committees are prepared to provide the funds for these primary essentials of environmental hygiene, urban populations cannot hope to enjoy a reasonable standard of health. In this connection there is considerable scope for the employment of trained sanitary engineers, but until public opinion becomes sufficiently vociferous in its demand for health amenities, it is unlikely that many students of the engineering colleges will attempt to specialise in this branch of their profession. It may be hoped that with the opening of the sanitary engineering section in the All-India Institute of Hygiene and Public Health, the importance of pure water, pure air and pure environment will persistently be stressed by health officers and by others passing out of the Institute who may be employed by municipal boards. Eighty-eight per cent. of the urban populations in towns with a population of over 50,000, 57 % of the population in towns with a population of 30,000—50,000 and 19 % in those with a population of below 30,000 enjoyed the benefits of a reasonably pure water-supply. Table A in Appendix VI on page 246 gives details of towns having reasonably pure water-supplies in different provinces.

Tables VII (i) and (ii) give available details of the income and expenditure on public health, conservancy, water-supply and drainage in municipalities and district boards during the year 1934-35.

TABLE VII (i).—*Provincial expenditure in Municipalities.*

	Income.	Expenditure.	Expenditure on P. H. per cent. of income.	Expenditure on—		
				Conser- vancy.	Water supply.	Drainage.
	Rs.	Rs.		Rs.	Rs.	Rs.
British India	17,59,16,528	4,27,43,537	24	1,77,08,044	1,07,11,605	45,09,800
N.-W. F. P.*	24,46,493	4,35,329	18	2,10,752	47,119	36,189
Punjab .	1,81,55,526	45,18,951	25	15,74,082	14,14,516	8,29,114
Delhi†	79,59,699	11,49,227	14	3,00,134	2,74,113	1,48,032
U. P. .	2,15,99,598	60,51,261	28	25,58,070	20,72,927	7,22,236
B. & O. .	78,15,841	24,16,168	31	12,15,075	6,25,665	3,98,328
Bengal .	1,13,92,693	47,86,558	42	26,09,596	10,12,699	3,35,298
C. P. .	86,05,345	22,47,526	26	11,61,056	5,14,714	2,48,686
Bombay* .	4,46,10,979	71,51,182	16	30,55,620	22,44,709	8,46,670
Madras .	2,59,54,238	80,18,393	31	22,14,753	13,63,235	5,95,076
Assam* .	14,72,254	5,38,982	37	2,90,242	1,67,499	27,576
Burma .	2,59,03,862	54,39,960	21	25,18,664	9,74,409	3,22,595

* Figures for the year 1935-36.

† Figures for 1935.

TABLE VII (ii) *Provincial expenditure by district boards.*

	Income.	Expendi- ture.	Percentage of Expen- diture on public health to income.	Expenditure on—		
				Conser- vancy.	Water- supply.	Drainage.
	Rs.	Rs.		Rs.	Rs.	Rs.
British India	14,46,26,106	66,85,026	5	5,26,364	13,39,614	35,747
N.-W. F. P. *	24,93,676	81,505	3	5,364	13,977	1,761
Punjab	2,33,53,882	6,23,770	3	†	†	†
Delhi†	2,82,323	13,290	5	..	..	..
U. P.	2,32,55,250	5,99,614	3	11,350	27,372	3,246
B. & O.	1,96,60,065	7,19,053	4	3,22,451	234,604	4,512
Bengal	2,15,08,135	27,38,356	13	†	630,381	24,983
C. P. .	1,01,01,541	1,98,484	2	†	25,633	..
Bombay	2,91,70,512	8,05,116	3	†	323,366	..
Madras		Figures not available.				
Assam	38,07,378	1,27,317	3	†	57,380	781
Burma	1,09,93,344	7,78,521	7	1,87,199	26,901	464

* Figures for 1935-36.

† Figures for 1935.

‡ Figures not available.

North West Frontier Province.

85. Expenditure on public health measures in municipal towns and notified areas increased by about one-fourth as compared with the previous year whilst that of district boards fell by about one-eighth.

Government grants-in-aid to municipalities and notified area committees for public health purposes amounted to Rs. 19,611, including Rs. 6,739 for sanitary purposes in Peshawar, Rs. 1,600 for sanitary improvements in Tank notified area and Rs. 7,000 for the improvement of water-supplies at Tank. Similar grants to district boards amounted to Rs. 9,000 including Rs. 5,000 for the improvement of sanitary conditions of Manshera and Rs. 2,000 for the improvement of drains in Nowdeh village.

Water-supply schemes amounting to Rs. 5,67,000 in towns and Rs. 1,86,992 in rural areas and other sanitary works amounting to Rs. 1,42,763 in towns and Rs. 1,79,500 in rural areas are pending for lack of funds.

No appreciable change was reported in municipal water-supplies. Conservancy arrangements in the towns are still primitive; few trenching or rubbish pits exist. No arrangements are in force for the cleansing and sanitary improvement of villages. No rural piped water-supply has been provided and, even when new wells are constructed, these do not seem to be provided with parapets. Sanitary defects and suggestions for their improvement were as usual brought to the notice of the urban authorities by the Director and Assistant Director of Public Health. The D. P. H. remarks that drainage, water-supplies and conservancy in municipal towns are all still far below reasonable standards, inspite of repeated reports by the Public Health Department. In rural areas no regular inspections were carried out owing to lack of District Medical Officers of Health.

Punjab.

86. In spite of the continued financial stringency and consequent reduction in grants-in-aid to local bodies, considerable progress was made in regard to new sanitary engineering works. Several important schemes were commenced

and a number of new pumping plants and other mechanical installations were installed or were in course of installation. It is estimated that mechanical installations with a total of 8,700 B. H. P. were either in existence or were in course of installation in connection with Government and municipal public health engineering works. The sanitary engineering department had under construction 20 public health projects on behalf of Government and 22 for local bodies. Good progress was made on the Montgomery drainage scheme, estimated to cost Rs. 5,97,220 and the intramural drainage system was completed. In the Okara drainage scheme, estimated to cost Rs. 2,54,167, the outfall system and collecting tanks were completed and the sullage pumping station was nearing completion. The Okara water-supply scheme was practically completed by the end of the year. The Bhiwani drainage scheme, estimated to cost Rs. 4,44,403, made good progress. The Sialkot drainage scheme, estimated to cost Rs. 4,49,881, was completed. The Superintending Engineer again comments on the failure of local bodies to maintain their sanitary and water-supply works in proper condition.

Seven preliminary and 16 new detailed projects were prepared by the sanitary engineering department and four detailed and four preliminary projects were revised. The most important of these were Ludhiana water works reorganisation (Rs. 1,08,398), Panipat water-supply skeleton scheme (Rs. 1,30,400), Multan Cantonment Saddar Bazar drainage (Rs. 1,46,450), Arafwala Mandi water-supply, Part I (Rs. 1,08,283), Chichawatni drainage scheme (Rs. 1,19,185), Pind Dadan Khan water-supply scheme (Rs. 1,38,000), Thal area, Isakhel water-supply scheme (Rs. 2,51,865), drainage of Lahore suburbs (Rs. 1,89,493) and Dajal water-supply (Rs. 1,99,114). Piped water-supplies are now in use in 48 towns.

Five projects prepared by local bodies and estimated to cost Rs. 2,21,357 were examined for technical sanction by the Public Health Circle, Punjab. These included improvements to Amritsar water-supply (Rs. 49,950), tube wells outside Masti Gate, Lahore (Rs. 26,185) and the enlargement of a sewer in Simla (Rs. 30,065).

Arrangements for the collection, removal and disposal of night soil and street sweepings in urban areas remained in the same unsatisfactory condition. Endeavours made by the health department to persuade local bodies to organise their conservancy systems suitably met with little encouragement and less success.

Rural water-supplies.—In addition to Rs. 40,930 allotted by the Sanitary Board for the improvement of water-supply in villages and to new wells and hand pumps provided by private individuals, the Government of India on the recommendation of the Punjab Government gave a grant of Rs. 2,16,918 for piped water-supplies in rural areas where dearth of drinking water was acute.

Sanitary Board (April 1935 to March 1936).—A total of Rs. 1,47,340 for urban sanitary works and rural water-supplies was placed at the disposal of the Board for grants-in-aid to local bodies. Of this sum, Rs. 1,06,407 were spent on urban and Rs. 40,930 on rural works. In urban areas, the most important works were Bhiwani drainage scheme (Rs. 70,711), Ludhiana water-supply reorganisation (Rs. 11,594) and reconditioning tube well No. 10, Multan water-works (Rs. 8,259); in rural areas, important works included the construction of a *pucca* tank in Hissar district (Rs. 14,000), improvement of water-supply in 25 village wells in Ambala district (Rs. 6,380), construction of a well at Taprian village, Ambala district (Rs. 5,649) and improvement of water-supply for Shah Qumais Fair, Sadhaura, Ambala district (Rs. 5,130).

Delhi Province.

87. The Joint Water Board was responsible for the supply of filtered water to the urban areas of New Delhi, Delhi City, Notified Area, Civil Lines, Notified Area, Fort, Delhi and Delhi Cantonment. Regular bacteriological examinations were carried out in the Provincial Public Health Laboratory and the quality of the water was maintained at a high standard. Owing to the length of the mains and the overtaxing of the filters, re-chlorination was carried out at all reservoirs and this process was also carefully supervised. Shahdara gets its water from deep tube-wells, but no municipal supply exists in other areas and water is provided by shallow wells.

The Kilokri Sewage Farm continued to attempt to deal with the sewage from New Delhi, Delhi City, Notified Area, Civil Lines, and the Fort, but the ultimate disposal of the sewage was not satisfactory. Large extensions of the system were carried out in New Delhi. All sewage from New Delhi along with that from the Notified Area and Delhi City was eventually distributed on land leased to cultivators. Whilst New Delhi has an excellent surface and underground drainage system, that of Delhi City is still insufficiently developed. The rural Notified Areas have no underground drainage.

Rural water-supplies are obtained either from shallow wells or from rivers and canals. Village drainage is practically non-existent.

United Provinces.

88. Expenditure on health works executed under the Superintending Engineer, Public Health Department, amounted to Rs. 30,80,194, an increase of Rs. 1·8 lakhs. Of this total, Rs. 5,03,503 were spent on original water works and special repairs, Rs. 18,91,618 on water-works maintenance, Rs. 3,54,033 on drainage works and Rs. 3,31,040 on other works. A sum of Rs. 2,14,491 was spent on constructional works. Projects to the value of Rs. 34,13,521 were finally sanctioned; others involving an expenditure of Rs. 16,40,626 were submitted but not sanctioned. Projects estimated to cost Rs. 8,34,000 were under preparation and other schemes costing Rs. 7,07,076 were delayed for want of staff.

Especially in those towns where the supply is intermittent, the quality of the water has considerably deteriorated. Although every effort to supply pure water may be made at the pumping station this is negated by the contamination which takes place through leaky fittings when the pressure in the pipes falls. Intermittent water-supplies always militate against increase in the use of sanitary fittings and local authorities generally are averse to bringing into operation bye-laws insisting on property owners connecting up their property in such a manner as to prevent foul water discharges finding their way into the public thoroughfares and thence into the storm water channels. In Cawnpore and Lucknow, appreciable extensions of house drainage were made, but the provision of sanitary fittings was handicapped by deficiencies in the water-supply. Drainage pumping stations were generally not operated to the best advantage, the common method being to allow sewage to pond up in the main sewers before the pumps are brought into operation. This practice must result in the sewers becoming silted up and in expensive clearing operations. The protection of urban roads with tar composition has not only improved surface drainage, but the resulting freedom from dust makes it also a valuable health measure.

Rural water-supplies.—Departmental orders were issued to the district health officers of Jaunpur, Partabgarh, Rae Bareli, Fatehpur, Allahabad,

Mirzapur, Benares, Sultanpur and Fyzabad for the sanitary improvement of wells on the *pucca* roads leading to Allahabad, especially in those places used as "*paraos*" which are largely used by pilgrims. With funds provided by district boards and the Board of Public Health a large number of wells were improved. In the Gonda district, a large number of sanitary wells were constructed or improved by the Balrampur Estate and other estates under the Court of Wards, the total expenditure amounting to Rs. 25,000. Outside the health unit area in Partabgarh district about 400 notices were issued for improvement of wells.

Board of Public Health.—Of the Rs. 1,77,568 at the disposal of the Board Rs. 47,058 were spent on pilgrim centres, Rs. 70,149 on urban sanitation and Rs. 54,449 on rural and minor sanitary works. The grant for pilgrim centres included Rs. 18,766 for Gobardhan town drainage scheme, Rs. 11,397 for the construction of three tube-wells in connection with the Brindaban water-supply and Rs. 8,898 for Hardwar municipality drainage scheme. Improvements in urban sanitation included Rs. 9,259 for the extension of the Budaun municipality drainage scheme, Rs. 26,939 for the Hardoi municipality drainage scheme and Rs. 13,017 for the construction of a trial tube-well in connection with the Orai water-supply scheme. The funds placed at the disposal of the Board are quite inadequate to meet the large demands for urban and rural public health works.

Bihar and Orissa.

89. Full details of income and expenditure in municipalities and district boards are contained in tables VII (i) and VII (ii) on pages 121 and 122.

Recommendations made by the Assistant Directors of Public Health involving minor expenditure were carried out by the municipalities themselves, but those involving higher costs such as major projects for improved drainage, slum clearance, etc., were postponed because of lack of funds.

Bengal Presidency.

90. The proportion of total receipts spent on public health measures in municipalities was 42 % as compared with 45 % during the previous year. Expenditure on markets and slaughter houses amounted to Rs. 39,382. Important municipal sanitary schemes included Hooghly-Chinsura drainage (Rs. 5,250), Uttarpara water-works (Rs. 11,368), Howrah drainage improvement (Rs. 7,986), Naihati drainage (Rs. 9,853), Kanchrapara drainage (Rs. 5,690), Nabadwip water-works (Rs. 8,073), Jessore water-supply (Rs. 5,587), Kurseong water-supply (Rs. 5,526), Dacca water-works improvement (Rs. 8,644) and Dacca drainage (Rs. 16,927).

Union boards numbering 4,738, with a total income of Rs. 90,27,793, spent Rs. 6,26,582 on water-supplies, Rs. 65,180 on drainage and Rs. 73,878 on conservancy.

Sanitary Board, Bengal.—Capital expenditure totalled Rs. 2,13,789 on water-works and Rs. 1,71,273 on sewerage works. Sketch projects for schemes estimated to cost Rs. 28,33,230 were prepared, detailed projects for Rs. 7,93,765 and detailed estimates and plans for miscellaneous works amounting to Rs. 1,65,867.

The stoppage of Government grants-in-aid to water-supply, drainage and other sanitary engineering schemes, necessitated by the adverse financial position, had an adverse effect on progress during the year. The Board, which met seven times, examined a number of schemes before their submission to

Government and generally reviewed the inspection reports of the departmental officers. Their advice was of particular value in regard to measures for the control of malaria and other mosquito-borne diseases.

Central Provinces.

91. Details of municipal income and expenditure on public health measures are given in Table VII (i) on page 121 of this section. As far as water-supplies were concerned, water-works for Buldana town were provided; water-supply schemes for the towns of Chhindwara and Itarsi were under consideration; Hinganghat town completed arrangements for tapping a supply from a third infiltration well; the town of Wardha was contemplating installation of mechanical filtration, was given a loan of Rs. 62,000 for provisions of an additional reservoir and submitted a scheme for improvement of pumping and supply system; Nagpur municipality installed chlorinomes for Gorewara and Ambajheri water-works; Harda municipality completed arrangements for pumping by electricity instead of steam; a scheme for the better protection of the water reservoir at Damoh was initiated; the eroded main in Jubbulpore was under replacement; the aqueducts and the system of chlorination in Burhanpur were satisfactorily improved; and proposals for improvement of water-supply to Saugor town were framed.

Drainage was generally unsatisfactory and except for ordinary repairs and petty works, nothing was done to effect improvement. Elaborate drainage schemes for most towns are in existence, but the prevailing financial stringency stood in the way of effecting improvement. Drainage proposals from Bilaspur and Khandwa were received. Marked improvement was effected in the surface drainage of Chhindwara, Khandwa and Akola. Damoh spent sufficiently on drainage but the results were disappointing and maintenance was defective. The general situation with regard to conservancy showed no appreciable improvement. In five municipalities the public and school latrines were improved but generally the condition of private latrines and the systems of collecting night-soil were very insanitary.

Rural sanitation.—In rural areas water supply is obtained chiefly from wells, but a large number of villages have either no wells at all or the water is brackish. Even when wells are provided, the water from tanks, rivers, streams or *nalas* is preferred and this is one of the important causes of the spread of epidemics of cholera. No grants from provincial revenues for the improvement of water-supplies were made, but it was proposed to utilise 1 lakh from the Government of India grant for the construction of wells in 209 villages.

The aggregate income of the 72 villages under the Village Sanitation and Public Management Act amounted to Rs. 2,23,082 whilst total expenditure was Rs. 2,09,907, including Rs. 3,695 on water-supply, Rs. 37,799 on cleaning of village sites and Rs. 5,400 on drainage. Total receipts of town fund and other villages under the *mukaddam rules* aggregated Rs. 20,814, and of the Rs. 21,203 expended on public health Rs. 1,438 were on water-supply, Rs. 11,799 on cleaning of village sites and Rs. 140 on drainage. In the *ryotwari* villages of 7 districts a sum of Rs. 4,482 was spent on improvement of water-supplies.

Bombay Presidency.

92. In Karachi city annual expenditure on public health measures per head of population amounted approximately to Rs. 3-7-0, the average figure in other municipalities being Rs. 2-15-11. Complete sanitary surveys of 19 towns

were made and 5 towns were the subject of special inspection or report. In many cases, action was taken on suggestions made by the Assistant Directors of Public Health. Belgaum and Hyderabad constructed surface drains at a cost of Rs. 36,681 and Rs. 28,667, respectively; Dharwar, Bagalkot, Karwar, Barsi, Yawal, and Tando Adam constructed drains; Sholapur spent Rs. 2,07,444 on 6" drains in different localities and Rs. 15,176 on storm water drains.

The Nasik system of trenching night-soil was adopted by 12 municipalities and in three cases it proved a financial success. Demonstrations of the compost system of disposal of night-soil and refuse were given at 10 different centres.

The water supplies of 8 of the larger towns were regularly sterilized and maintained their standard of purity. Improvements to drainage works were carried out in several towns.

Village Sanitary Boards.—The Sanitary Board at Siddapur in Kanara district carried out the usual conservancy work. The Sanitary Board at Shahpur Chakar in Nawabshah district whilst still in existence is reported to have done no work of any importance.

Board of Public Health.—The Board accorded approval to the preparation of drainage schemes for Surat, Ghatkopar and Amalner and for the provision of drains in the town planned areas of Baherpura.

Madras Presidency.

93. *Water-supplies.*—Water-supply schemes were under execution in four municipalities, whilst improvements or extensions were on hand in 12 municipalities. Plans and estimates for three new schemes and the investigation reports of one new and two improvement schemes were submitted during the year. In rural areas, no protected water-supplies exist but two schemes were under execution and plans and estimates for two others were under consideration.

Drainage.—Only three towns as before, had complete drainage system. Drainage works were under execution in four municipalities; plans and estimates for two urban drainage schemes were submitted to Government and for 5 others these were under preparation.

Assam.

94. Details of total income and expenditure on public health measures both in municipalities and rural areas are given in tables VII(i) and (ii) on pages 121 and 122.

The Public Works Department expended only Rs. 3,304 on the maintenance of water supplies and drainage.

Burma.

95. Of the total municipal incomes, over 21 % was spent on public health, the highest figure being Rs. 33,43,146 or nearly 61 % of the total in Pegu division. Rs. 7.50 lakhs were allotted for markets and slaughter houses whilst Rs. 36,168 were spent on epidemic charges.

Water-supply.—The Akyab Water Works scheme began to give adequate supplies to those parts of the town which previously suffered from acute shortage. In Moulmein town, the five tube-wells sunk in 1933 were under test in order to determine whether the yield of water would be sufficient for a continuous distribution system; a chlorination plant was also installed. In Bassein

the municipal committee approved of a scheme for sinking another 6-inch tube-well. In Mandalay the scheme for consolidating existing tube well water supplies and for extending the supply to other parts of the town was kept in abeyance. In Mawlaik the military police constructed a good supply by *bunding* a hill stream from which water is piped to two large storage tanks. In Lashio, Rs. 1,977 was spent on raising the *bund* and the sluice gate of the new reservoir.

In rural areas, no appreciable advance in the standard of supplies was made. The Local Government instituted an enquiry into the possibility of augmenting supplies in certain rural areas where there is a definite shortage, but district councils were inclined to assume that no improvement was possible without a grant from Government. The Director of Public Health, on the other hand, considered that much could be done to improve matters if district councils and villages relied more on their own resources. Minor improvements to tanks were reported from Hanthawaddy district. Preparations were made by the District Council for providing tanks in three villages in Myaungmya district; in Pyapon district budget provision was made for four new village tanks.

Conservancy and drainage.—The municipal committee of Moulmein town budgetted for a sum of Rs. 4,000 for the experimental introduction of a double bucket system; in Syriam town a sum of Rs. 14,500 was spent on *pucca* drains. Improvements to and extensions of *pucca* drains were carried out in ten other towns. In rural areas, 90 bore-hole latrines were constructed at Einme and 17 at Thayetmyo in Myaungmya district. In Kyaiklat township in Pyapon district a number of similar latrines were reported to be working satisfactorily. A few latrines of the same type were constructed in a few villages in Insein township for demonstration purposes.

Rural sanitary works.—Of the total income, only 7 % was spent on public health. A total of Rs. 1,60,409 were allotted for markets and slaughter houses, only Rs. 15,786 were spent on epidemic charges.

Public Health Board.—The Board remained in a state of suspended animation. As no Government funds were placed at the disposal of the Board no new sanitary engineering works could be financed.

B.—Indian States.

96. *Mysore State.*—The Bureau of Sanitary Engineering had 11 water-works under maintenance and 21 original water-works under construction. Improvements were carried out in three cases whilst estimates were prepared for 21 water-supply schemes. Seven drainage works were under construction, whilst five drainage estimates were prepared. Drainage projects for 15 places were under preparation. 36 bore-hole latrines were constructed during the year.

Federated Shan States, Burma.—Total income was Rs. 46,02,258; Rs. 2,73,264 in urban and Rs. 43,28,994 in rural areas. A total of Rs. 1,41,461 was spent on public health measures; Rs. 72,270 in urban and Rs. 69,191 in rural areas. Expenditure on water supplies amounted to Rs. 11,438 for urban areas and Rs. 2,861 for rural; and that on conservancy to Rs. 32,368 and Rs. 27,957. In urban areas Rs. 11,677 was allotted for drainage and Rs. 10,233 was spent on markets and slaughter houses.

SECTION VIII.

LABORATORIES AND MEDICAL RESEARCH.

Central Research Institute, Kasauli.*

97. Lt.-Col. J. Taylor, I.M.S., was Director of the Institute and continue to act as Editor, I. J. M. R. and I. M. R. Memoirs throughout the year. Other I.M.S. officers of the M. R. Deptt. who served on the staff were Lt.-Colonel Webster, Major Read and Captains Ahuja and Mallick.

The production of vaccines and anti-venom serum continued to be the major activity of the Institute. Anti-typhoid and anti-cholera vaccines were produced on a large scale as usual. Most of the anti-cholera vaccine was issued to Burma and Kashmir where it gave satisfactory results. Smaller quantities of influenza vaccine and mixed catarrhal vaccine were prepared and issued; the manufacture of anti-meningococcus vaccine was discontinued. Income derived from the sale of these various products, owing to increased demands was sufficient to cover the whole cost of the Institute.

The following table gives the quantities in c.cs. of vaccines and sera issued in 1934 and 1935 :—

TABLE VIII (i).

	1934.	1935.
<i>Vaccines.</i>		
Prophylactic cholera	601,590	1,836,820
Prophylactic mixed typhoid and paratyphoid (T.A.B.)	349,454	380,503
Prophylactic influenza	19,790	26,342
Prophylactic meningococcus . . . . .	..	52,462
Curative (various)	9,118 doses.	10,790 doses.
Autogenous	517 doses.	660 doses.
<i>Sera.</i>		
Anti-venine	5,973 tubes.	5,983 doses.
Normal horse	13,820	15,900
High titre (diagnostic)	1,080	1,051

The results of an experimental study of the protective value of the cholera vaccine in animals were discussed at the Medical Research Workers' Conference held in Calcutta in December 1935. Both laboratory workers and Public Health Officers agreed that the period of expiry of the vaccine which had previously been fixed at six months should be extended to one year.

A type collection of micro-organisms was maintained and subcultures of organisms were available for issue to recognised institutions and individuals requiring these for teaching purposes, research work, vaccine manufacture or as diagnostic reagents. Bacteriological media, strains and special reagents were prepared and issued for the convenience of other laboratories and workers.

The Institute continued to stock and issue prophylactic and curative sera for the use of the Army in India.

* Annual Report of the Central Research Institute, Kasauli, including the Annual Report of the Malaria Survey of India for 1935. Manager of Publications, Delhi, Price Rs. 2-10-0 or 4s. 9d.

Abbreviations—

I. R. F. A.	Indian Research Fund Association.
I. J. M. R.	Indian Journal of Medical Research.
D. P. H.	Diploma in Public Health.
D. T. M.	Diploma in Tropical Medicine.
D. M. C. W.	Diploma in Maternity and Child Welfare.
L. T. M.	Licentiate in Tropical Medicine.
I. M. R. Memoirs	Indian Medical Research Memoirs.
M. R. Deptt.	Medical Research Department.

As Chairman of the Cholera Advisory Committee the Director submitted reports on the work of the various cholera enquiries for communication to the 1935 meetings of the Office International d' Hygiene Publique held in Paris. Sections on sera, vaccines, snake bites, etc., were also revised for new editions of standard books. Lt.-Col. W. J. Webster, I.M.S., prepared a new Health Bulletin entitled "A note on hydrocyanic acid gas fumigation of rat burrows as an anti-plague measure".

Facilities were afforded to medical officers for the study of bacteriological technique, but no systematic courses of instruction were arranged. The Institute library was used by numerous workers, both civil and military.

Research Work.—With funds provided by the I. R. F. A., the following investigations were carried out by the Institute staff :—

(a) *Studies on cholera vibrios.*—This enquiry worked in association with other enquiries at Calcutta and Shillong, co-ordination being arranged by a Cholera Advisory Committee. The chief lines of investigation were :—

(i) *Changes in serological reactions of vibrios.*—The changes occurring during the serial passage of certain vibrio strains in white mice were investigated in regard to their serological reactions and in relation to their chemical structure as determined by Dr. Linton's enquiry in Calcutta. The strains were inagglutinable but in the course of serial passages forms were eventually obtained which showed full agglutination with cholera high-titre serum prepared with strains of the classical serological type.

(ii) *Serological types of vibrios.*—An extended inquiry into the serological types of vibrios obtained from cases of clinical cholera carriers and external sources was commenced. All vibrios isolated by associated inquiries were tested for agglutination at Calcutta where clinical material was readily available, whilst an "O" serum of the classical type and strains not agglutinating with that serum were received at Kasauli for further investigation. The biochemical and other characters of these strains were determined and their agglutination was tested with sera corresponding to Gardner and Venkatraman's "O" groups II to VI and also with sera prepared from selected Calcutta strains.

(iii) *Rough variations of vibrios.*—A large number of strains have been roughened by means of prolonged exposure to the action of homologous anti-sera or by action of bactericidal sera ; this study was in progress.

(iv) *Fermentation reactions of vibrios.*—Strains were studied in regard to their fermentation in mannose arabinose and saccharose and classified in accordance with Heiberg's scheme.

(v) *The value of dried "O" antigen for the production of agglutinating sera.*—Dried antigens prepared from the Inaba and Ogawa cholera strains were received from the National Institute for Medical Research, Hampstead, and the Standards Laboratory, Oxford, and were tested for their value in the preparation of agglutinating sera for use in the diagnosis of the cholera vibrio under practical conditions in India. The sera raised by means of the dried antigens have been found to be of great value in the examination of vibrios and have enabled strains possessing the "H" antigen of *V. Cholerae* only to be differentiated from those having the "O" fraction. Experience gained so far suggest that the issue of the dried antigens from the Standards Laboratory, Oxford, will enable reliable and comparative serological results to be obtained in any part of the world.

(vi) *Experimental observations on cholera vaccine.*—It has been found by experiments on animals that the cholera vaccine stored for a year, including

a full hot weather, in the plains of the Punjab gives protection equal to that obtained with freshly made vaccine. The expiry period has thus been extended to one year. Experiments as well as statistical evidence have indicated that the most effective immunity will be developed about the eighth day after inoculation.

The protection given in animals against infection with a typical cholera case strain by vaccine made from strains of different character and source of origin was tested.

(b) *Snake Venoms*.—The subjects studied included coagulant action of viper venoms on blood; preservation of coagulant solutions of daboia venom; pathology of *Echis carinata* venom poisoning and treatment with a heterologous anti-venine; chemical composition of daboia and cobra venoms and location of their active principles the enzymes of daboia and cobra venoms; the use of tapioca in immunisation of animals; and immunisation with venom fractions. Six papers embodying the results obtained were published in the I. J. M. R.

All-India Institute of Hygiene and Public Health, Calcutta.*

98. Lt.-Col. A. D. Stewart, I.M.S., the Director of the Institute proceeded on leave preparatory to retirement on 13th September, 1935, when Dr. R. B. Lal, the present officiating Director of the Institute, took charge. Lt.-Col. A. A. E. Baptist, the Assistant Director, retired in July and this post remained vacant until the end of the year. Dr. M. I. Neal-Edwards, W.M.S., was appointed Professor of Maternity and Child Welfare in succession to Dr. Jean M. Orkney, W.M.S.

In accordance with Section 7, Chapter XVIII of the Calcutta University Regulations, an Inspection Committee visited and reported on the Institute. As a result, the Institute was affiliated to the University of Calcutta for the Diploma in Public Health and for the Doctorate in Science (Public Health).

With the increased activities of the different departments, pressure on allotted accommodation was experienced and part of the quarters temporarily occupied by the Assistant Director was reconverted to provide additional laboratory accommodation. Although some further accommodation was made available by internal re-arrangements, the constantly growing needs of the various departments indicate that it will be increasingly difficult to house outside enquiries for any length of time.

The Library, which now contains 4,661 books, and that of the School of Tropical Medicine were open to the staff and students of both Institutions, most of the important journals and periodicals are available in one or other library.

During the year under review, 22 candidates joined the D.P.H. class of the Institute. Six post-graduate combined courses of three months' duration were provided in Biochemistry, Nutrition, Vital Statistics and Epidemiology, Malariology, Maternity and Child Welfare. A stipend of Rs. 50 per month was offered by the Indian Red Cross Society for a D. M. C. W. student and a scholarship of Rs. 30 for the same course was offered by Dr. Balfour. No student, however, joined this course during the year.

* Annual Report of the All-India Institute of Hygiene and Public Health, Calcutta. 1935. Government of India Press, Calcutta.

As regards field instruction, the students received training in the routine and special duties of a medical officer of health under the Health Officer, Calcutta Corporation. Practical demonstrations were also given in and outside Calcutta. A malaria centre was established near Burdwan to provide facilities for field studies in rural malaria.

Department of Vital Statistics and Epidemiology.—This department was associated with the cholera carrier enquiry under the I. R. F. A. A preliminary statistical investigation of the figures for cholera mortality in Bengal during 1901—30 having revealed heterogeneity among the districts as regards mean and seasonal incidence of the disease it was decided to work with the figures of individual *thanas* which were the smallest areas for which figures were available. The whole of the Howrah District, Magrahat in the 24-Parganas and 5 villages in the Midnapore District were found to be endemic.

The field enquiry devoted much of its time to the problem of transmission of cholera, which included the question of the maintenance of infection during non-epidemic seasons.

Investigations on epidemic dropsy were continued; no final conclusion was reached.

Department of Malariology and Rural Hygiene.—The necessary extra staff was sanctioned partly by the I. R. F. A. and partly by the Government of India.

The mechanism of haemolysis in malarial haemoglobinuria of monkeys was investigated. Treatment of haemoglobinuria, electrical charge of red cells, cholesterol changes in kala-azar, the incidence of syphilis in the general population and the causes of an outbreak of acute miliary tuberculosis which occurred in laboratory monkeys at the Institute were also studied. With a view to evolving a cheap method of rural malaria control, malarial conditions obtaining in the villages of Naity and Abujhati were studied. From the records of larval catches, jute steeping appeared to be an important factor in reducing the prevalence of anopheles carriers. The value of local fish as larvæ destroyers was also recognised. Several papers were published during the year and assistance given to outside agencies.

Department of Biochemistry and Nutrition.—A survey of the calcium and phosphorus contents of all readily available food stuffs was completed. The vitamin A, carotene and vitamin C surveys were also completed. As regards carotene, all the '*sags*' (spinach types) were found to be exceptionally rich in this constituent and '*langra*' mango was found to be very rich in vitamin C. The biological assay of vitamins could not be completed during the year. A diet survey of families and institutions in Calcutta showed that the diet was reasonably well-balanced among the middle-class families, but the diets of a Moslem orphanage, a Hindu orphanage and an Anglo-Indian school were found to be poor and ill-balanced.

The investigation of the physique of school children of Calcutta was continued. In co-operation with the School of Tropical Medicine, some clinical and biochemical work was done in connection with epidemic dropsy. Absorption of carotene, metabolism of ascorbic acid and the aetiology of cataract were also studied during the year.

An apparatus to measure the oxidation reduction potential of cholera cultures was being prepared.

Maternity and Child Welfare Department.—There were no students for the 1935-36 course. As regards research activities, an enquiry was made

into the health and nutrition of women jute mill workers with special reference to the effect of industrial conditions on the reproductive functions and on the health of the children during the first year of life. Another investigation dealt with the medical causes of infantile mortality and its correlation with social, economic and environmental factors.

***School of Tropical Medicine, Calcutta.**

99. Bt.-Col. R. N. Chopra, I.M.S., officiated as Director during the year and Dr. R. T. M. Hayter continued as Assistant Director. Dr. E. Muir retired during the year.

The Rockefeller fellowship awarded in 1934 to Drs. B. Mukerjee, B. M. Das Gupta and D. N. Roy were extended, and an additional fellowship was awarded to Dr. C. R. Das Gupta. The Minto Medal for 1935 was awarded to Dr. J. P. Bose for his researches in diabetes.

The School continued to function as a centre for post-graduate teaching and medical research. Of the 41 students who took the D. T. M. Course 32 passed. 48 students appeared for the L.T.M. Examination, and 35 passed. 22 students attended the 1934-35 D.P.H. course, 20 passed both parts of the examination and were awarded the Diploma of Public Health.

Researches carried out during the year included those on epidemic dropsy under Col. Chopra, anæmia and respiratory diseases under Dr. Napier, hookworm under Dr. Maplestone, leprosy under Dr. Lowe, bowel disease under Dr. deMonte, diabetes under Dr. Bose, filariasis under Dr. Sundar Rao, epidemic cerebro-spinal meningitis and the so-called mystery disease "jhin jhina". The Carmichael Hospital for Tropical Diseases, attached to the School continued to function as a teaching and research hospital.

Departmental activities—(a) Department of Tropical Medicine.—As usual the teaching for the L.T.M. and D.T.M. courses and a study of hospital cases figured as the main functions of the Department. It was discovered that alkalis and antiseptics, though very effective in the treatment of urinary infections, cannot be relied on in the treatment of sub-acute and chronic cases.

(b) Department of Bacteriology, Pathology and Helminthology.—The important results yielded by the study of 488 sera for the presence of agglutinins justified continuation of this work. Routine examinations included 4,710 specimens of stools and 488 samples of blood. Several labour-saving devices were introduced in the media section of the Department and the necessity for installing a central superheated steam sterilization plant was emphasised.

Work in connection with the three cholera inquiries financed by the I. R. F. A. was continued. One to two per cent of vibrio-passers were found amongst the healthy population of Calcutta. Unlike last year, cholera phage was shown to be of value in the treatment of cholera, the mortality rate among patients treated with cholera phage being 13.5%, that among patients not so treated being 16.6%. A new type of cholera phage designated 'Type M' was isolated and a standard cholera vibrio used for the propagation of cholera phage was found to be itself carrying vibriophage. Other questions studied were cholera toxin, the seasonal variation of vibrios, and the basic bacteriology of vibrios.

* Annual Report of the Calcutta School of Tropical Medicine and the Carmichael Hospital for Tropical Diseases for 1935, Superintendent, Government Printing, Bengal Government Press, Alipore, Bengal, 1936. (Gratis).

Following investigation of the diarrhoea and dysentery out-breaks in Darjeeling, the main conclusion was that the intestinal fluxes were bacterial infections due to a large variety of bacteria and that climatic factors were not solely responsible. Other work done in the department included the study of epidemic dropsy, epidemic cerebro-spinal meningitis, bacteriophagic analysis of *Past: pestis* strains in collaboration with Col. Sokhey and *B. pseudo-carolinus*.

(c) *Department of Protozoology*.—Altogether 6,853 routine examinations were performed, the majority being chronic amoebic dysentery, malaria and rat-bite fever. 25 out of the 40 cases of chronic intestinal amoebiasis were cured by amibiarsone. Positive cases of rat-bite fever were treated with N. A. B. or solusalvarsan with cent per cent success.

The malaria transmission enquiry under the auspices of the I. R. F. A. was continued throughout the year. For details the annual report of the school should be consulted, but it may be stated that the results obtained appear to confirm the view that quartan malaria in India is a cold-weather disease. Problems associated with monkey malaria, *plasmodium ovale* and immunity and electrical charge on erythrocytes were also studied.

(d) *Department of Entomology*.—The Calcutta anopheline survey was concluded and its report on the effects of physical conditions on the prevalence, longevity and avidity of anophelines was sent for publication. Observations were also made on the bionomics of anophelines. The work of the Bengal Delta Survey begun last year made good progress; the malaria survey of tea gardens was continued.

(e) *Department of Pharmacology*.—Chemotherapeutic studies with anti-malarial and anti-dysenteric drugs gave results of practical importance. It was shown that there was no direct relationship between concentration of quinine in the blood and the parasite count at any particular time and that the action of quinine on the parasite did not appear to be a direct one. A method of quantitatively estimating atebirin in the blood was devised and a method of estimating the distribution of atebirin in the body was being worked out. Studies on the action of snake venoms were continued and the claims regarding their therapeutic effects in relieving pain, in inoperable carcinoma, insanity, purpura, epilepsy, neuritis, hæmorrhagic diseases, etc., were being investigated.

A large amount of work was also done in connection with the physical and chemical changes produced in the blood by diseases and interesting results were obtained. Work was also done in connection with the alteration of the electrical charge of the blood cells after administration of drugs like quinine and emetine. Several indigenous drugs of vegetable origin and a number of inorganic preparations used as indigenous medicines were investigated.

The Drug Addiction Enquiry made investigations into the habitual use of barbituric-acid derivatives in India and the results of the work on the physical and mental effects produced by the opium habit were published. Experiments made with lecithin in the treatment of opium addicts were very successful.

(f) *Department of Chemistry and Physics*.—A number of indigenous drugs including *Hemidesmus indicus*, *Barringtonia acutangula*, *Tylophora asthmatica*, *Secuma lauralia*, *Vitex negundo*, and *Silvia moorcroftiana* were analysed; and a number of inorganic preparations including *Praurpya bhasma* and *Samudra phenā* were also examined. Biochemical work in connection with the

enzymes of cholera vibrios was continued. The proteolytic enzyme activity of different varieties of Indian *Ficus* trees was under investigation.

(g) *Serological and Immunological Department*.—In addition to medico-legal work, 13,473 Wassermann reactions were tested and blood grouping tests numbered 261. A serological study in rabies was commenced and good progress was made in the study of the distribution of blood groups in the Indian Army and in the study of antigens used in the Wassermann reaction.

(h) *Department of Hygiene*.—An enquiry into the existence of *B. typhosus* in raw Hooghly water was launched and the Cholera Enquiry in its various branches was continued throughout the year. 32 samples obtained from diphtheria cases were examined with a view to comparing the distribution in this country of McLeod's three types of *C. diphtheriae* with that in other countries.

(i) *Department of Public Health Laboratory Practice*.—The efficacy of chloramine in sterilizing tap water inoculated with *B. typhosus* was studied. The viscosity value of mustard oil, changes in the constants of ghee as a result of boiling and the effect of boiling in a particular type of vessel on the fat contents of milk were also examined.

The kala-azar enquiry financed by the I. R. F. A. was continued under Dr. Napier on a reduced scale. Some work was done on the bionomics of *Phlebotomus argentipes* and the transmission of *L. donovani* by the use of wild *P. argentipes*. Investigations into the probable causes of failure in transmission experiments were commenced.

A summary of the various researches carried out under the auspices of the Endowment Fund is given below:—

Anæmias and Respiratory diseases.—It was found that the vast majority of anæmias met within tea gardens were due to "conditioned" iron deficiency. All patients, excepting 3 suffering from hypochromic microcytic anæmia, responded well to iron treatment. Hookworm infection was noticed in all cases; its presence did not appear to affect blood regeneration when sufficient iron was given, though the improvement could not be maintained without expelling hookworms.

An examination of the different methods of measuring red cells led to the conclusion that the packed-cell method of estimating cell volume was both simple and accurate.

No regular work in the typing of pneumococci could be done during the year. 36 strains were isolated from the cerebro-spinal fluid and it was found that a cool-room temperature was more favourable for storing grown cultures of meningococci than the incubator temperature. Points of special interest in the investigation of asthma cases were (i) the testing of the pilocarpine response, (ii) the occurrence of three cases of asthma definitely sensitive to dust, and (iii) a study of the change in the Arneth count after a course of treatment with auto-vaccine, etc.

Hookworm.—Tetrachlorethylene was found to be a cheap and effective remedy in the treatment of hookworm.

It was also tried with success against tapeworm infections where it was thought inadvisable to give carbon tetrachloride. Work on hookworm anæmia was continued and experiments were conducted on the hookworm preventive value of bore-hole latrines. The problem of *Taenia solium* in man in India was investigated. The possibility of the use of fresh juice from Indian *Ficus* in the treatment of trichuris (whipworm) was also explored.

Leprosy.—Leprolin treatment caused distinct improvement in the lesions and, whilst signs of the activity of the disease often disappeared within a comparatively short time, later results proved to be unsatisfactory. Treatment with hydnocarpus oil or Esters brought about slow but steady improvement and arrested the progress of the disease in some cases. Rat leprosy was thoroughly studied.

Attempts to culture *M. leprae* and *M. leprae muirs* were continued by tissue culture methods. Rat tissues *in vitro* were successfully cultured and infected with *M. leprae muirs*, but there was no definite proof of the multiplication of the bacilli.

Bowel diseases.—The efficacy of cholera, dysentery and typhoid phages in the treatment of the bowel diseases was studied and a large amount of material from Diamond Harbour was tested for the presence of phages active against cholera, typhoid, flexner and shiga organisms. Experiments to determine the effect of freezing and drying cholera and dysentery phages were in progress.

Diabetes.—Arterio-venous sugar differences especially after a glucose meal were studied in cases of diabetes, in order to determine the severity of the disease. It was observed that, in adjudging the results of glucose tolerance tests; both the height to which the blood sugar curve rises as well as the time taken by it to return to normal should be taken into consideration as a criterion of the nature and severity of the disease.

Statistics regarding the mortality rate of diabetics among various races in India were being collected and work on the estimation of the total cholesterol content of blood in diabetic subjects was continued.

Filariasis.—It was found that temperature and humidity play a very important part in the transmission of filariasis in man by *Culex fatigans*, that the monsoon period in Calcutta was the time at which the maximum infection of fed mosquitoes occurred; and that the cold weather was very unfavourable for the development of micro-filariæ in mosquitoes.

19 papers were published in the I. J. M. R., 30 in the Indian Medical Gazette; and 14 in other journals.

Haffkine Institute, Bombay.

100. Lt.-Col. S. S. Sokhey, I.M.S., was Director except from 23rd July to 20th November, 1935, when Major R. C. Wats officiated. Major R. C. Wats, I.M.S., Dr. M. B. Soparkar and Dr. P. M. Wagle acted as Assistant Directors. Captain J. R. Dogra, I.M.S., and Dr. B. B. Dikshit were supernumerary officers.

The Institute continued to manufacture anti-plague vaccine and to carry out various researches. A total of 3,051,132 c. cs. of plague vaccine were issued. The pharmacological department which was closed down in 1933 was reopened and studies of synthetic anti-malarials commenced. Work on nutrition was also started. The Institute continued to hold classes for training medical officers of health and sanitary inspectors of the Presidency and neighbouring States.

Towards the end of the year a Plague Statistical Enquiry was started, but had to be abandoned later due to the unwillingness of the people to undergo plague inoculation during the harvest season.

Anti-rabic Section.—For details please see Pasteur Institute, Bombay, (page 142).

Rat Examination.—The examination of rats for plague infection was continued. None of the rats examined within the last 18 months have been found infected.

Snakes and Snake Venom.—152 Cobras and 185 Russell's vipers were received and 348 grammes of venom from the former and 51.2 from the latter were prepared for use.

Diagnostic Department.—In addition to cultural examinations of blood, stools and urine, 4,000 routine Wassermann tests were done, 430 pathological specimens sectioned and examined and numerous histological examinations were made for research purposes.

Research Work.—Plague Vaccine.—Work in connection with the maintenance of virulence of *B. pestis* cultures was continued. During the third year of storage at $4^{\circ}\text{C.} \pm 2$, cultures were found to be fully virulent. It was found that plague cultures could be rendered avirulent by repeated subcultures at 37°C. without destroying their antigenic value, thus making it possible to have the same strains of plague in both fully virulent form and avirulent form at the same time. An investigation of the relative values of vaccines made from living avirulent cultures and heat-killed cultures was started; the effect of temperature at which cultures are killed on the protective power of the resultant vaccine was also being studied.

Anti-plague Serum.—Buffalo serum was found to prolong the life of treated animals only temporarily, Horses' serum, however, saved 70—80% of the mice treated.

Serology of plague.—The substitution of serological for the biological methods hitherto employed to measure the protective and therapeutic values of sera was considered desirable, as the latter required a large number of mice and about one month for each test.

Epidemiology of plague.—An investigation into the relative susceptibility of rats to plague from different areas in India, which had had epidemic plague in varying degrees, showed that the immunity of rats was roughly proportional to the aggregate incidence of plague in those areas.

King Institute of Preventive Medicine, Madras.*

101. Dr. C. G. Pandit officiated as Director until 17th December 1934, Lt.-Colonel H. E. Shortt, I.M.S., for the rest of the year.

Vaccine lymph.—During the year 23,987 grammes of crude lymph were manufactured representing 143,924 c.cs. of diluted lymph for issue. All lymph was issued in a dilution of 1 in 7 and was treated with clove oil immediately before issue.

Bacterial vaccines.—25,107 doses of T. A. B. vaccine and 2,182,160 of cholera vaccine were issued, the latter figure being a record. The issues of various therapeutic vaccines rose to 51,761 doses, the increase being chiefly in the gonococcus vaccine, streptococcus (filarial) vaccine and mixed dysentery vaccines. The total issue of cholera bacteriophage was 181,620 c.cs. and of dysentery phage 7,218 c.cs. There was an increase of about 50% in the supply of various sera.

Bacteriological, serological and chemical examinations.—Altogether 67,371 examinations were carried out. Of the bacteriological examinations, 1,813 specimens were examined for cholera; of these 815 proved positive.

* Report of the King Institute of Preventive Medicine, Guindy, for the year ending 30th September 1935, Superintendent, Government Press, Madras, Price annas 8.

Research work.—The more important activities are summarised below but for detailed information the original report of the Director should be consulted.

(a) *Vaccine Lymph.*—Work on the cultivation of vaccinia virus in the chorio-allantoic membrane of the chick-embryo was continued. The strain has now had 82 serial passages in eggs. With improved technique, the potency of the cultured virus in the later passages has increased considerably. Its immunising properties have been found to be equal to those obtained with routine calf-lymph and its keeping qualities are not unsatisfactory. Field experiments with this cultured virus and the routine calf lymph have so far yielded comparable results.

Immunising and storage qualities of the bacteria-free suspensions of vaccinia virus as obtained from crude calf lymph by simple filtration through Berkefield "V" filter and by the technique of elution with casein-alumina-gel were being studied in different substances such as broth, glycerine water, semi-solid agar, etc., as were also the immunological properties of active, attenuated and inactive virus.

The virus of varicella has been successfully cultivated on the chorio-allantoic membrane; experiments designed to cultivate the viruses of dengue and sandfly fever and the probable viruses of trachoma and superficial punctate keratitis were in progress. The manufacture of gradacol membranes according to Dr. Elford's technique was undertaken as a useful adjunct in the study of filterable viruses.

An improved method by freezing the lymph preliminary to drying was adopted and two samples of dried lymph so treated were tested after two months' storage in vacuumised tubes at room temperature. These were found inactive on calves in 1-1000 dilution but active in 1-5, whereas the control dried lymph stored in the cold gave almost confluent vesiculation in 1-1000.

Lymph prepared by substituting humanised lymph for rabbit lymph in the seed cycle gave as good results as the routine lymph. Four strains of staphylococci of albus and aureus types isolated from vaccine lymph, all non-haemolytic, were tested for pathogenicity and toxicity.

Experiments were continued to ascertain whether anti-vaccinial response in sheep was better than that in cow calves or buffalo calves. The protective power of the concentrated anti-vaccine serum prepared from sheep was tested on vaccinated rabbits and it was found to have no effect on the development of the vaccinal lesions.

Animal experiments were being conducted to evaluate the duration of immunity to revaccination with the strains of vaccinia virus raised from variola virus by several passages through monkeys as compared with that obtained after vaccination with the routine lymph now in use.

Other studies were made in connection with (i) Demodex infection in calves; (ii) a modified Klines' test for the diagnosis of syphilis; and (iii) the viability of the "infective" forms of the larvæ of *Wuchereria bancrofti* when freed from the mosquito host. In addition, many other public health problems in connection with water, Kala-azar, monkey malaria, trachoma, etc., were studied. Sixteen papers embodying the results of these researches were published in the I. J. M. R. and other Indian and foreign journals.

Pasteur Institute of India, Kasauli.

102. Lt.-Col. G. Covell, I.M.S., was Director throughout the year.

During the year 21,898 patients sought treatment at the Institute and its ancillary centres. Of these 16,627, including 1,473 Europeans

underwent a complete course ; 3,027 persons abandoned treatment ; whilst 2,136 persons discontinued treatment either because the biting animal was not proved rabid or because it was not considered necessary.

Table VIII(ii) gives the death rates amongst Asiatics treated at Kasauli and its centres according to the position of wounds :—

TABLE VIII (ii).

Position of wounds.	Kasauli.			Centres.		
	Treated.	Deaths.	Rate %	Treated.	Deaths.	Rate %
Leg	442	1	0·2	8,087	24	0·3
Trunk	32	..	..	426	2	0·5
Arm	207	...	..	4,065	24	0·6
Multiple	80	..	..	915	14	1·5
Face	53	2	3·8	525	14	2·7
Multiple face	42	1	2·4	276	4	1·5

Table VIII(iii) gives figures arranged according to lateness of arrival expressed in days for Asiatics treated at the Institute and its centres :—

TABLE VIII(iii).

	Kasauli.			Centres.		
	Treated.	Deaths.	Rate %	Treated.	Deaths.	Rate %
1—7 days	732	1	0·1	11,451	59	0·5
8—14 days	82	2	2·4	1,717	11	0·6
15—21 days	26	1	3·9	531	4	0·8
22—28 days	7	..	..	113	1	0·9
Over 28 days	10	..	..	485	7	1·4

No death from hydrophobia occurred amongst Europeans. The dog was responsible for bites in 12,712 cases with 62 deaths ; the jackal in 1,607 with 22 deaths ; and other animals in 835 with only 2 deaths. Carbolised 5% Paris Sheep Vaccine was used both at the Institute and its centres, and dosage and duration of treatment remained unchanged. Complaints attributed to anti-rabic treatment were received from 287 patients, but as usual most of these bore no causal relationship to the treatment. Four paralytic cases including 2 Europeans were reported ; one European died and the others recovered. Of the 149 brains examined 85 were found positive.

Details of the work of the various Pasteur Institutes mentioned will be found in the following publications :—

- (1) Pasteur Institute of India, Kasauli—35th Annual Report of Central Committee of the Association and the Report of the Director of the Institute for 1935-36.
- (2) Pasteur Institute of Southern India, Coonoor—The Annual Report of the Director for 1935 together with the 29th Annual Report of the Central Committee of the Association for 1935-36.
- (3) King Edward VII Memorial Pasteur Institute and Medical Research Institute, Shillong—The 19th Annual Report for 1935, Assam Government Press, Shillong. (Rs. 1-10-0 or 2s. 6d. per copy).
- (4) Pasteur Institute, Bombay.—Report of the Haffkine Institute for the years 1932-33. The Govt. Central Press, Bombay. Price Annas 12 or 1s. 3d. per copy
- (5) Report on the working of the Burma Pasteur Institute and Bacteriological Laboratory, Rangoon, for 1935, Superintendent, Govt. Printing and Stationery, Burma, Rangoon. (Rs. 1-4-0 or 1s. 11d. per copy.)
- (6) Annual Report of the Pasteur Institute, Patna, and of the Anti-rabic Centre, Cuttack, for 1935. Superintendent, Govt. Printing, Bihar, Patna. Price Rs. 2-12-0 per copy.

Research Work.—This included experiments (a) on the post-infectious immunizing value of immune serum as an adjunct to vaccine treatment, (b) involving the use of live fixed virus in conjunction with anti-rabic serum as an adjunct to dead virus treatment, (c) in connection with the antigenic properties of carbolized 5% vaccine, (d) with a rabies virus fixed in the dog for the treatment of animals, and (e) in connection with the viricidal properties of phenol.

Pasteur Institute of Southern India, Coonoor.

103. Major K. R. K. Iyengar was Director throughout the year.

In all 535 patients applied for treatment at the Institute, of whom 433 including 18 Europeans underwent the full course, 44 discontinued treatment presumably not being at risk and 58 were advised to discontinue as the biting animal was not rabid. Advice cases numbered 198. In 30 cases the biting animal was proved to be rabid; in 3 it was certified rabid; in 213 it was probably rabid according to history; and in 187 cases the history of the biting animal was unknown. There were no deaths from hydrophobia. Semple's carbolized 5% sheep vaccine was used throughout without any post-treatment complications. 1,205,320 c.cs. of anti-rabic vaccine was manufactured during the year. 8,120 c.cs. of 1% vaccine and 16,184 c.cs. of 5% vaccine were issued to veterinary surgeons, although only 351 animals including 314 dogs were treated. Of the 342 brains examined 248 proved positive. The number of clinical and bacteriological examinations performed during the year rose to 2,611.

Out-centres.—Treatment was the same as at the Institute. 12,282 patients including 336 Europeans received the complete course, and among these 14 deaths occurred, all Asiatics. Those incompletely treated numbered 2,248, including 42 Europeans; of these 6 Asiatics died and 1,898 were presumed to be at risk. Two deaths occurred from jackal-bite and 18 from dog-bite. The total death rate was 0.16%, the lowest on record; that among the completely treated 0.11% and that among the incompletely treated 0.26%. Out of the 6 deaths among the incompletely treated five developed hydrophobia during the treatment course and one case occurred among those who had run off during treatment. The shortest incubation period was 13 days and the longest 231 days, both cases being dog-bites.

Research Work.—10 scientific papers embodying the results of investigations carried out at the Institute were published in the "I. J. M. R."

King Edward VII Memorial Pasteur Institute, Shillong.

104. Lt.-Col. L. A. P. Anderson was Director of the Institute except for the period 21st March to 21st Nov. 1935, when Dr. C. G. Pandit officiated.

Anti-rabic treatment.—Classification of the cases and dosage remained unchanged. 1,948 patients in all applied for treatment at the Institute and 21 public and 39 private centres and no post-treatment accidents were reported. Of the total, 1,550 cases, including 42 Europeans, were completely treated, 172 at the Institute and 1,378 at the centres; 4 underwent partial treatment; and 200 absconded before completion of the course. Advice cases numbered 194. The number of deaths was 11, all amongst Asiatics; 10 among dog-bite and 1 among jackal-bite cases. The increase in the death rate from 0.43% to 0.73% was due to the inclusion, for the first time, of non-failures or other forms of reduced mortality.

In 52 cases with one death treated at the Institute the biting animal was rabid ; in 5 cases it was certified rabid ; in 108 cases it was probably rabid according to history; and in 8 cases the history of the biting animal was unknown. Figures for centres are not available. Of 57 brains examined, 35 proved to be positive.

Vaccines.—During the year 475,955 c.cs. of cholera vaccine, 7,559 c.cs. of T. A. B. vaccine and 15,500 c.cs. of influenza vaccine were issued in addition to 1,020,481 doses of bacteriophage.

Research Work.—Field experiments on the prevention and treatment of cholera under village conditions by the extensive distribution of bacteriophage were continued in the two control areas of Nowgong and Habiganj, but no definite conclusions either for or against the value of bacteriophage were arrived at. Basic research was carried out on (i) the duration of potency of cholera bacteriophage ; (ii) the study of changes produced in *V. Cholerae* strain 653 by the action of single type cholera phage ; (iii) the changes produced in a typical *V. Cholerae* strain by the combined action of 10 and 11 types of cholera phage ; and (iv) the inhibition of individual types of cholera bacteriophage by vibrio extracts.

Burma Pasteur Institute and Bacteriological Laboratory, Rangoon.

105. Major G. C. Maitra, I.M.S., acted as Director of the Institute and Bacteriologist to the Govt. of Burma. Of the 3,341 patients who applied for anti rabid treatment, 2,014 comprising 232 Europeans and Anglo-Indians, 335 Burmans and 1,447 others underwent the full course (1,568 at the Institute and 446 at out-centres and hospitals). 442 did not complete the course and 457 stopped treatment as the biting animal was not rabid. Advice cases at the Institute numbered 961. Health cards were received from 93% of the cases treated at and from 79% of the cases treated outside the Institute. One fatal paralytic case occurred during the year. Three cases developed hydrophobia during treatment or just after completion of the course. The death rate at the Institute was 0.19% the lowest on record since 1920 ; no deaths occurred at out-centres.

Of the 44 animals under observation for rabies 26 died, 22 showing evidence of rabies on microscopic examination. Six human and 94 animal brains were also examined and 5 and 53 respectively proved positive. In all, 175,086 c.cs. of the anti-rabic vaccine were manufactured and 7,263 doses issued to out-centres.

Bacteriological Section.—A total of 25,122 examinations, including 20,167 serological, 3,409 microscopical, 875 cultural, 466 chemical and biochemical, 138 histological and 67 miscellaneous examinations were carried out. Cultural examinations included the isolation of several strains of cholera vibrio and organisms of epidemic meningitis. The cultures of cholera vibrio were preserved for further study. The issue of various vaccines and sera, apparatus and reagents all increased during the year. A total of 33,990 c.cs. of prophylactic T. A. B. vaccine was issued.

Research Work.—This included observations on the leptospiral infestation of rats and a systematic survey to elucidate the distribution and prevalence of tropical typhus fevers in Burma.

Pasteur Institute, Calcutta.

106. This Institute is a part of the School of Tropical Medicine, Calcutta.

Of the 2,654 patients who attended the Institute, 833 including 79 Europeans had a complete course of treatment; 498 including 11 Europeans were referred to other hospitals and centres; 127 voluntarily discontinued treatment; and 1,196 were advice cases. The percentage of health returns received was 62 for the Institute and 15 for the centres. Excluding 9 cases, which arrived with definite symptoms of hydrophobia, deaths numbered 29; three (including one European) at the Institute and 26 at the Centres. Of the latter 10 were considered as "failures" as they occurred 15 days after the completion of the treatment. The total death rate was 0·6%; 0·4% for the Institute and 0·6% for the centres.

Semple's carbolised 1% vaccine made from sheep's brain with the Paris strain of fixed virus continued to be used and treatment remained unchanged, viz., 5 c.cs. daily for 7 days for licks and 14 days for bites. A total of 467,780 c.cs. of vaccine was manufactured. No case of post-treatment paralysis was reported. Eighteen Medical Officers were trained in the technique of anti-rabic treatment.

Pasteur Institute, Bombay.

107. This Institute, which is a part of the Haffkine Institute, was attended by 2,953 patients. Of these 2,272, including 70 Europeans, underwent the complete course, 24 discontinued treatment and 657 were only advice cases. Most of the patients had bites on the bare trunk and the extremities. Health returns from 96·7% of the cases treated were received. One death from hydrophobia occurred within, and three deaths over, 15 days after completion of treatment, giving a total mortality rate of 0·17%. In the case of 137 patients (with one death) the biting animal was proved to be rabid, in 24 it was certified so, in 241 (with 3 deaths) it was probably rabid and in 1,870 the history was unknown. The dog was the biting animal in 2,190 cases (4 deaths), jackal in 19, cat in 23, monkey in 16, human being and horse in 6 each. In the other 12 cases, no particulars were available. Of the 213 animal brains examined 170 were found positive.

Out-centres.—5,850 patients, including 306 Europeans, received a full course of treatment and 51 were advice cases only. 3 patients died of hydrophobia during treatment, 15 within 15 days and 17 over 15 days after completion of treatment, giving a total mortality rate of 0·54%. Health returns from 81% of the cases treated were received. Sixteen deaths occurred amongst those bitten on the face and an equal number amongst those with bites on trunk and extremities including 30 on bare skin. In the case of 137 patients, with one death, the biting animal was proved rabid; in 144, with no death, it was certified so; in 4,182 with 30 deaths, it was probably rabid; and in 1,379 cases, with one death, the history of the biting animal was unknown. No patient developed paralysis after treatment either at the Institute or at the centres. 255 anti-rabic treatments were issued to veterinary surgeons complete for treatment of dogs and other animals.

Pasteur Institute, Patna.

108. A total of 3,920 patients, including 32 Europeans, underwent the complete course; 706 including 3 Europeans absconded whilst 285 including

5 Europeans were advice cases. Five cases arrived with definite symptoms of hydrophobia, 9 developed hydrophobia during treatment and 5 died of other causes during treatment; one case refused to undergo any treatment. The 23 deaths from hydrophobia, which gave a death rate of 0·6%, all occurred among Asiatics. In 31 cases, the animal was proved rabid, in 31 it was certified so, in 1,788 it was probably rabid, in 2,052 cases the history of the biting animal was unknown and in 18 cases the animal was probably not rabid. The interval between the bite and death in these 23 cases varied between 21 and 92 days. 13 deaths (57%) followed a jackal-bite and 10 (43%) were dog-bite cases.

25,962 c.cs. of 2% vaccine were issued to the Cuttack Centre, where 318 patients including 11 Europeans completed the treatment, 52 absconded and 6 including one European were advice cases. Three Asiatics died of hydrophobia due to jackal-bite, the death rate being nearly 1% and the interval between bite and death varying between 24 and 91 days. In 2 cases the animal was proved rabid, in 301 it was probably rabid and in 15 cases the animal was probably not rabid. Of the 32 brains examined 16 proved positive. Health returns were received from 66% of Europeans and 84% of Asiatics at the Institute and from 27% of Europeans and 78% of Asiatics at the Cuttack centre. Paris sheep virus was used throughout the year. At the Institute, all cases, except Classes III and IV who were treated with 5% carbolised vaccine only, were treated with 2% and 5% vaccines; at the centre all cases were treated with 2% carbolised vaccine only. Treatment lasted for 14 days except for lick cases which took only 7 days. 24 cases were treated by civil surgeons while vaccine for 23 domestic animals was supplied on payment. 6,000 c.cs. of 2% carbolised vaccine were issued to Nepal.

Medico-Legal Work.

109. The following table summarises the medico-legal work done in those provinces which employ a chemical examiner:—

	Cases investigated.	Cases detected.	Samples examined.
British India	11,960	7,789	37,070
N. W. F. P.	475	384	1,176
Punjab	2,430	1,981	8,559
U. P. and C. P.	1,629	1,215	4,489
Bengal	2,470	1,380	5,406
Bombay	1,263	827	5,343
Madras	1,558	1,180	8,268
Burma	2,135	822	3,829

N. W. F. P.—490 cases comprising 1,219 exhibits were examined, the increase being chiefly in blood-stain cases numbering 361. A positive result was obtained in 64·6% of human poisoning cases and 47% of cattle poisoning cases, in 87% of murder, etc. and 88% of sexual crimes. Of the 43 articles analysed for Government departments 15 were cocaine and its adulterants, 13 liquor, 9 *lahan* and one opium.

Punjab.—A total of 3,649 cases comprising 11,192 articles were examined, the increase being chiefly in stain cases. Of the 1,000 human and 35 animal poisoning cases investigated, 552 and 32 respectively were fatal. The

percentage of positive results in human poisoning cases was 69, in cattle poisoning cases 63, in blood stain cases 10 and in sexual offences 88. As usual, the poisons most commonly used in human cases were opium 49%, arsenic 19%, *dhatūra* 12%, alcohol 7% and mercury salts 2%. Arsenic was found in 13 fatal animal poisoning cases. Other examinations included 88 samples of various drugs.

U. P. and C. P.—Cases of human and animal poisoning investigated numbered 414 and 15, the total number of medico-legal cases received being 1,629 comprising 4,489 exhibits. Analyses numbered 2,015 and stain cases 1,161. Arsenic, opium and *dhatūra* were the commonest poisons.

Bengal.—Of the 2,470 medico-legal cases investigated, positive results were obtained in 1,380 or 56%. Medico-legal articles examined numbered 6,158 including 752 samples of preservatives. Poison was detected in 271 of the human and in 42 of the animal poisoning cases. Alcohol, arsenic, oleander, hydrocyanic acid and its salts, aconite and copper sulphate were observed in this order of frequency in human poisoning cases.

Bombay.—In all 5,434 medico-legal examinations were carried out and 1,263 cases investigated, including 648 of suspected human poisoning, 522 stain cases; 46 suspected animal poisoning and 47 miscellaneous. Other examinations included, 3,637 samples from the excise department, 486 from Government Stores and 263 miscellaneous. Poison was detected in 288 of the human cases, opium in 144, *dhatūra* in 54, arsenic in 20 and other poisons in 70 cases. Deaths numbered 109. Poison was detected in 24 animal cases, yellow oleander (*Cerebra thevetia*) in 10, arsenic in 11 and strychnine in 3. Miscellaneous examinations included, *inter alia*, 634 samples of chemicals and medicines.

Madras.—Cases numbered 1,692 comprising 8,402 articles, and included 380 of human poisoning, 18 of animal poisoning, 1,073 stains and 87 miscellaneous. Poison was detected in 198 human cases or 52% of the total. Oleander, opium or its alkaloids and *dhatūra* were the commonest poisons detected. Of the animal cases, 10 or 56% were positive, the common animal poisons being oleander (5 cases) and arsenic (5 cases).

Burma.—The number of examinations performed in the laboratory fell to 8,414, whilst the number of medico-legal cases rose to 2,135. Of the 650 cases of suspected human poisoning investigated, poison was detected in 286 cases, the most common poisons being opium, arsenic, oxalic acid and *dhatūra*.

THE INDIAN RESEARCH FUND ASSOCIATION*.

General.

110. The following is a brief summary of the investigations financed by, and carried out under the auspices of the Association during 1935. Full details will be found in the report of the Scientific Advisory Board, in the papers published in the I. J. M. R., in its Memoirs and in the Records of the Malaria Survey of India, the Indian Medical Gazette and other journals. A detailed list is given in the appendix to this section (page 248).

* Report of the Scientific Advisory Board of the Indian Research Fund Association, for the year 1935. Price Re. 1, obtainable from the Secretary, Governing Body, Indian Research Fund Association, New Delhi/Simla.

Cholera.

111. (i) *Cholera enquiry (Dr. R. W. Linton)*.—Beginning in 1931 as a study of vibrio carbohydrates, the work of the enquiry has expanded year by year, and has now covered a wide range of phenomena dealing with the bacteriology of cholera. It is difficult to give any brief account of the different lines of activity or of the findings of this important enquiry. For details original papers should be consulted.

(ii) *Cholera carrier enquiry and cholera toxin enquiry (Captain C. L. Pasricha)*.—These were concerned with (i) the bacteriological examination of specimens collected in the field, including stools from healthy persons, from suspected cholera cases, tank water from villages and experimental washings from known infected persons; (ii) the isolation of strains and their examination for smoothness or roughness, nitroso-indol reaction, type of growth agglutinability, etc.; (iii) bacteriophage studies, which included a careful periodic survey of the frequency and type of cholera-phages in the controlled experimental area in Diamond Harbour, the isolation of a new type of cholera-phage designated type M, the relationship of vibriophages to cholera vibrio, and phage analysis of strains from Diamond Harbour.

(iii) *Cholera clinical enquiry (Captain C. L. Pasricha)*.—Experiments were carried out with a view to ascertaining the value of cholera-phage in the treatment of cholera. Captain Pasricha reports—

“Taking the gross mortality in the two series, one treated in the usual manner and one in which cholera-phage was administered in addition, and irrespective of the exact nature of the case and irrespective of the cause of death, the evidence is in favour of the use of cholera-phage.” Other work carried out was on the seasonal variation of vibrios, basic bacteriological studies of vibrios and bacteriophagic studies of certain select-fatal and non-fatal cases.

(iv) *Cholera carrier and epidemiological enquiries (Field Section) (Dr. R. B. Lal)*.—This enquiry was carried out in a highly endemic zone in Bengal comprising 16 villages in Diamond Harbour *thana* in 24-Parganas district. The series of examinations made suggested that the carrier state amongst healthy individuals is of fairly long duration and that both its frequency and duration are in some way associated with the prevalence of cholera in the community. It was also indicated that the ultimate source of infection was the carrier whether infection was transmitted direct or through the medium of flies or tanks.

(v) *Statistical enquiry into the epidemiology of cholera in Bengal (Dr. R. B. Lal)*.—The incidence of cholera exhibits a seasonal variation as well as a variation from year to year. The total variation of cholera incidence for a *thana* for the period 1901-32 was divided into 3 parts, *viz.*, (1) seasonal or between months, (2) cyclical or between years, and (3) residual variability. The calculations involved prevented the completion of the work during the year. Methods of forecasting epidemics of cholera were also being studied.

(vi) *Enquiry into the cholera vibrios and related vibrios under the Director, Central Research Institute, Kasauli*.—This enquiry mainly dealt with the material obtained from the Clinical and Carrier enquiries at Calcutta. A detailed serological study was made of vibrio strains which had been examined in regard to their chemical structure and other characters by associated workers. The studies made included:—(a) The antigenic relationships of vibrios from cholera cases, carriers, and external sources; (b) Serological reaction of variants whether occurring naturally or derived by methods of laboratory

treatment ; (c) Serological and bio-chemical reactions of vibrios in relation to chemical structure as ascertained by associated enquiries ; (d) The value of 'O' agglutination in diagnosis and the use of pure 'O' sera ; (e) The production of high titre sera by the use of dried 'O' antigen and trials of the value of such sera ; (f) The serological relationships of vibrios through their rough derivatives ; and (g) The serological relationships of inagglutinable strains from cholera cases.

(vii) *Cholera Bacteriophage enquiry by the Director, Pasteur Institute, Shillong.*—Judged on this year's findings, bacteriophage did not yield as striking results as former reports had suggested. At the same time, it is stated that if the cholera mortality statistics for the prevaccination period, the vaccination period and the phage treatment period are compared, the first shows a high degree of mortality, the second a moderate and the third a low mortality. These reductions of course cannot be attributed solely to the use of vaccine alone or vaccine and phage.

Malaria.

112. (A). *Malaria Survey of India.*—(a) *General.*—Lt.-Col. J. A. Sinton, V.C., O.B.E., I.M.S., was Director and Major H. W. Mulligan, Assistant Director ; Dr. E. P. Hicks was research worker ; Dr. I. M. Puri, Entomologist ; Mr. Raja Ram, Malarial Engineer ; and Dr. N. D. Kehar, Biochemist.

(b) *Classes and Instructional work.*—The annual malaria class at Karnal was held from 18th March to 27th April 1935. Of the 20 students under training, 11 passed the examination at the end of the course. Of other workers who were given facilities for study at Karnal two were from East Africa, one from the United States and six from different parts of India. Two subordinate workers received training.

The Records of the Malaria Survey of India were edited by the Director. The compilation of new bulletins and the production of revised editions of the older bulletins occupied a large amount of the time of the Director and his staff. Twenty-four papers were published in various journals by workers of the Survey and those in attached enquiries.

(c) *Anti-mosquito work.*—This included (i) experimental work on the value and cost of Paris green for village work ; (ii) the relative values of different insecticidal spraying solutions ; (iii) the use of larvicidal fish ; and (iv) preliminary experiments on the value of the "Entoray" machine in anti-malarial work.

(d) *Entomological investigations.*—These included (i) the range of flight of Anopheline mosquitoes ; (ii) the chemical composition of water in relation to mosquito breeding places ; (iii) seasonal distribution and numerical prevalence of different species of anophelines (larval and adult stages) in the Karnal district ; (iv) bionomics of the anophelines of Quetta with special reference to types of breeding places, climatic conditions, range of flight, prevalence adult habits and habitat ; (v) studies in the hibernation of *A. superpictus* and some other Indian anophelines ; (vi) the study of a new species of Indian Anopheles and other species collected from Quetta ; (vii) study of differences in strains of *Aedes aegypti* from various parts of India.

(e) *Field work and surveys.*—(1) *The Sind Malaria Enquiry* closed in June but before that date its more important activities were (i) the dissection of Anopheline mosquitoes from the water-logged area of Khairpur State and from a village near Sukkur, (ii) routine spleen and blood examination of school

children at Khairpur Mirs and Lokman; (iii) the drafting of a report on "Malaria in Sind after the Lloyd Barrage and new canals came into operation"; (iv) a malaria survey of Quetta which was carried out under the auspices of the Government of India.

(B). *Air traffic and yellow fever prevention enquiry (Dr. Hicks)*.—The objects of this enquiry were (i) to survey the Karachi air-port with reference to *Aedes aegypti* and *Anopheles* (ii) to examine the possibility of transport of mosquitoes in aeroplanes; and (iii) to investigate the methods of preventing the introduction of mosquitoes into India by aeroplanes, in view of the danger from yellow fever. A report was submitted to the Government of India, which embodied the findings and recommendations.

(C). *Anti-malaria drugs enquiry*.—Dr. Hicks investigated the local action on the tissues of the new preparation of atabrin known as "atabrin musonate" or "atabrin for injection".

(D). *Malaria surveys* of 7 villages in Karnal district involving 5,600 spleen and blood examinations of children, and of Quetta before and after the earthquake were carried out.

(E). *Malaria transmission enquiry by Lt.-Col. R. Knowles, at the School of Tropical Medicine, Calcutta*.—A paper entitled "Atmospheric temperature and humidity with reference transmission of malaria by *A. stephensi*" was submitted to the Indian Science Congress, 1936. It contains the conclusions reached and should be consulted for details. Briefly both temperature and relative humidity have been found to play an important part in the transmission of malaria with *A. Stephensi*. Under experimental conditions the percentage of survivals of this species was found heaviest in low temperatures and high humidities.

Work on filariasis with a view to determine the limits of atmospheric temperature and relative humidity at which transmission may occur was in progress. A paper embodying tentative conclusions was sent to the Indian Science Congress, 1936. There is evidence to show that both temperature and relative humidity play a very important part in the transmission of the disease to man by *Culex fatigans*. All the evidence shows that the monsoon period of Calcutta is that at which maximum infection of fed mosquitoes occurs, and that the cold weather is very favourable for the development of microfilariae in mosquitoes.

(F). *Field Malaria enquiry by Dr. K. V. Krishnan at the All-India Institute of Hygiene and Public Health, Calcutta*.—Two malaria field centres were started, the one at Naity, a low endemic malarial village, and the other at Abujhati, a hyper-endemic centre, with the object of comparing the prevailing conditions in these two places and, from the knowledge gained, for evolving a cheap method of rural malaria control. The work is in progress.

(G). *Black water fever enquiry by Dr. K. V. Krishnan at the All-India Institute of Hygiene and Public Health*.—The object of this enquiry is to study the mechanism of haemolysis in malarial haemoglobinuria of monkeys and to elaborate a line of treatment for the condition. The first part of the work is nearly complete and the evidence available indicates that in the mechanism of haemolysis leading to haemoglobinuria in monkeys three factors are probably involved, viz., presence of a haemolysin; alteration in the red cell membrane; and alteration in the medium in which the red cells are suspended.

(H). *Assam Medical Research Society*.—The work of this Society comprised (i) an eight weeks' course in Malariology, (ii) Malarial surveys, (iii) experiments

at a treatment centre for the evaluation of the use of plasmoquine, (iv) entomological investigation to ascertain whether the breeding cycle of *A. minimus* was completed throughout the cold weather, (v) blood examinations; (vi) cold weather and premonsoon anti-larval control.

Nutrition.

113. *A Nutritional research by Dr. W. R. Aykroyd at I. R. F. A. Laboratory, Pasteur Institute, Coonoor.*—While much of the work done has been a continuation of that already in progress there have been a number of new developments, including a survey of Indian food stuffs and new lines of field work. The chief activities, besides the survey, included (i) spectographic detection of vitamin A and carotene; (ii) the estimation of carotene in food rich in the pigment lycopene; (iii) stone experiments; (iv) cheap "well-balanced" diets; (v) tissue culture; (vi) pathological changes in vitamin A deficiency; (vii) the isoelectric point of vitamin B; (viii) lethal factor for young rats in green leafy vegetables; (ix) cod liver oil in the treatment of burns and wounds; (x) an experiment to produce in rats conditions resembling human diabetes and liver cirrhosis; and (xi) experiments on rabies virus. Field work has included the examination of children in famine camps, schools, hostels and with the object of obtaining data about height and weight, and the incidence of food deficiency diseases.

B. Dietary research under the Bombay Presidency Baby and Health Week Association.—The I. R. F. A. sanctioned in September, 1935, a grant of Rs. 6,000 per annum for a period of three years to the Bombay Presidency Baby and Health Week Association for carrying out researches on cheap well balanced diets, both vegetarian and non-vegetarian. Experiments with various diets and their effects on height, weight, etc., are being conducted at the Byramji Jeejeebhoy Home and David Sassoon Industrial Boarding School.

Leprosy.

114. *Leprosy enquiry by Dr. J. Lowe at the School of Tropical Medicine, Calcutta.*—This enquiry is concerned with the pathology and bacteriology of human and rat leprosy. The main work during the year has been in connection with (i) culture of *M. leprae* Muris in tissue cultures; (ii) pathological and bacteriological studies of skin and nerve lesions in different forms of the disease in man; and (iii) the use of emulsions of the rat leprosy organism to test the bactericidal activity of certain preparations.

Plague.

115. (A). *Plague researches under the Director, Haffkine Institute, Bombay.*—These related to plague vaccine, anti-plague serum and the epidemiology of plague. In regard to plague vaccine work was done on the method of testing the virulence of plague cultures, the maintenance of the virulence of *bacillus pestis* cultures, optimum temperature for the growth of plague bacillus, a biological method for the standardisation of plague vaccine, the relative protective values of different plague vaccines, the protection afforded to guinea pigs by vaccine made from heat killed cultures; changes in the preparation of plague vaccine; relative protective values of supernatant fluid and the sediment of Haffkine vaccine and of vaccines made from heat-killed cultures and those made from live avirulent cultures.

Field and laboratory tests were carried out with buffalo and horse immune serum. Investigation into the epidemiology of plague showed that the percentages of survivors among rats from plague infection have a general

correspondence to the aggregate incidence of plague in the area from which the rats are obtained.

(B) *Plague recrudescence enquiry in the Cumbum Valley under the Director of Public Health, Madras.*—Study of the factors responsible for the recrudescence and carry over of infection, rat flea surveys in Cumbum and the surrounding villages and experiments in fumigation of grains were continued. A rat flea survey of Chellarkoilmethu on the Travancore Frontier at an elevation of 5,000 feet was also undertaken. Other studies were made on the effect of meteorological conditions, the climate of rat burrows and the value of cyanogas fumigation in plague prevention.

Vaccines.

116. *Anti-rabic vaccine enquiry at the Pasteur Institute of India, Kasauli.*—Experiments were continued to test the use of (i) anti-rabic serum as an adjunct to vaccine treatment in man, and (ii) live fixed virus in conjunction with anti-rabic serum as adjuncts to dead vaccine treatment of animals.

Tuberculosis.

117. *Tuberculosis enquiry by Dr. Ukil at the All-India Institute of Hygiene and Public Health, Calcutta.*—Two papers on sunlight experiments were published in the I. J. M. R. One described a new method for measuring the intensity of sunlight and the other dealt with the results of exposing inoculated guinea-pigs to direct and filtered sun's rays. Two papers on the incidence of tuberculosis infection in infancy and childhood were submitted for publication. Other studies included (i) culture and animal inoculation as methods for isolating tubercle bacilli from pathological materials; (ii) the portals of entry of the tubercle bacillus; (iii) types of tubercle bacilli found in pulmonary and extrapulmonary lesions; and (iv) the role of allergy and immunity in tuberculosis.

Kala-azar.

118. *Kala-azar enquiry at the School of Tropical Medicine, Calcutta, by Dr. R. O. A. Smith.*—Certain factors which might have been responsible for the poor results obtained in the transmission experiments were investigated. Smears from the throat and nasal mucous membranes of kala-azar patients were examined as routine for the presence of *Leishmania donovani*. Some work was also done on the bionomics of *P. argentipes* and the transmission of *L. donovani* by the use of wild *P. argentipes*.

Miscellaneous.

119. *Indigenous Drugs Enquiry by Bt.-Col. R. N. Chopra, I. M. S., at the School of Tropical Medicine.*—Chemotherapeutic studies were carried out in connection with malaria and intestinal amebiasis both from experimental and clinical points of view. The study of the physical properties of blood after injection of cobra and viper venoms is in progress. A detailed study of the action of venoms of different snakes is also being carried out. The effects produced by emetine on the activity of the adrenal and thyroid glands were investigated in Belgian rabbits.

Researches on *moringa pterygosperma*, *Tylophora asthmatica*, *Digitalis lanata*, *Anthemis nobilis* and *Bambusa arundinacea* were completed. In addition a large number of inorganic preparations were also examined, e.g., *Lauha bhasma*; *Banga bhasma* and *Samudra phena*.

Study and investigations of certain indigenous drugs of the Punjab by Dr. K. S. Grevil at the King Edward Medical College, Lahore.—The drugs studied included *Luffa acutangula*, *Tinospora cordifolia* and *Nirbasi*.

Enquiry into anaemia of women by Dr. L. E. Napier at the School of Tropical Medicine, Calcutta.—This work was carried out in direct continuity of that on anaemia in general amongst Assam tea-garden coolies. The tentative conclusion reached was that the incidence of this condition was chiefly a "conditioned" iron deficiency anaemia brought about by loss of blood from heavy hookworm infections in a population with a low iron intake.

Helminthological enquiry by Dr. P. A. Maplestone at the School of Tropical Medicine, Calcutta.—The work on the life history of the *gnathostome*, a common parasite of cats in Calcutta and occasionally found in the larval stage in human beings has been successful up to a point. The latex of certain local species of genus *Ficus* were examined for its usefulness in the treatment of trichurias. The presence of *Cysticercus cellulosae* in pigs in Calcutta was also studied.

Drug addiction enquiry by Bt.-Col. R. N. Chopra, I.M.S., at the School of Tropical Medicine, Calcutta.—Studies included (i) changes in the physical and chemical characteristics of the blood sera of opium addicts; (ii) habitual use of barbituric acid derivatives in India; and (iii) physical and mental effects produced by opium addiction. The treatment of drug addiction with special reference to India was dealt with in a paper published in the Indian Medical Gazette for March, 1935.

Medical mycology enquiry by Dr. P. A. Maplestone, School of Tropical Medicine, Calcutta.—By the employment of improved methods for the culture of fungi, it has been shown that *Trichophyton violaceum* really belongs to the genus *Achorion* and that three or four closely allied species or varieties which have hitherto been considered distinct are really identical. Work on the Actinomyces has been completed but results have not yet been analysed. Cases of skin diseases such as molluscum contagiosum, psoriasis, infective warts, herpes zoster and pityriasis rosea were treated with considerable success by injection of a filtrate prepared from material removed from the lesions.

Dracontiasis and filariasis enquiry by Dr. S. S. Rao, School of Tropical Medicine, Calcutta.—With a view to determine the incidence of guinea-worm infection, several districts in the Central Provinces and parts of the Nizam's Dominions were surveyed. Collections of cyclops from parts of C.P., Bombay Presidency, Hyderabad State and Madras Presidency were identified. Feeding experiments of mosquitoes under controlled conditions of humidity and temperature were continued. Several drugs were tested for their effect on microfilaria and on the frequency of attacks of lymphangitis.

Protozoal parasites enquiry by Lt.-Col. H. E. Shortt, I.M.S., King Institute, Madras.—As regards tick fever of dogs, results of the study of the parasite *Babesia canis* in its vector the tick *Rhipicephalus sanguineus* were submitted for publication. Other problems investigated were immunity against protozoal diseases in Babesiosis and malaria, the presence of *Leishmania donovani* in the nasal secretion of kala-azar cases; the possibility of transmission of surra by the ingestion of ticks infected in their preceding stage by feeding on infected animals; haemoproteus of the Gecko and its method of transmission; examination of plants (*Enphorbia* Sp.); sandfly serum; and trials with two fluids said to be effective against dog ticks.

Statistical enquiry under the Public Health Commissioner with the Government of India.—The compilation of weekly figures of incidence of cholera, smallpox and plague was continued.

Cancer in India by Dr. Viswanath.—This enquiry into the incidence of cancer in India, was further pursued this year in Madras and Rangoon. The data collected are being analysed.

Enquiry into the nature and natural reservoir of the virus of Tropical typhus in the Southern Command.—During the period 1st March 1935 to 31st January, 1936, various attempts were made to establish a strain of the virus of tropical typhus in the Southern Command Laboratory. Investigations were also made on animals likely to form a reservoir of infection in Poona.

Typhus enquiry by the Director, Pasteur Institute of India, Kasauli.—A systematic survey of the ectoparasites of wild rodents trapped in Kasauli and the neighbourhood was carried out. Most of the animals trapped were of the *Rattus rattus* group of which approximately 2,000 were examined. It has been proved that the wild rat is a reservoir of typhus in the Simla Hills area, and that the virus can be transmitted from rat to rat by rat fleas. There is also evidence to suggest that the rat flea is a probable natural vector of typhus in this area from rat to rat and from rat to man, but more experimental work is required before the possibility of other vectors can be excluded.

Enquiry into snake venoms and the production of anti-venene under the Director, C.R.I., Kasauli.—Although funds for this enquiry were sanctioned from 1st April, 1935, the work had begun in the previous year. Investigations were concerned with venoms of *V. Russellii* (daboia), *N. tripudians* (Indian cobra) and *Echis carinata* (Phoorsa).

Investigation on the etiology of cataract by Lt.-Col. R. E. Wright.—This investigation was concerned with the possible effects of solar radiation in the production of cataract. Work done recently seemed to show that if solar energy produced cataract it was by virtue of the long heat rays. Experimental heat cataracts showed certain peculiar features.

The bacterial flora of the conjunctiva by Dr. B. P. B. Naidu.—This investigation was started in July, 1935 in collaboration with Lt.-Col. R. E. Wright. From a comparative study of the microscopic findings and the cultural and biochemical characteristics of the organisms so far studied, it appears that (1) the pathogenic organisms of the conjunctiva are not so easily cultivable on artificial culture media as when they are isolated from other situations, (2) their viability in subcultures even on suitable media is relatively poorer than the latter and (3) heated human blood agar and heated pigeon blood agar have proved to be more suitable for the isolation and repeated subcultures of *Morax-Axenfeld* bacillus and the Koch-Week's bacillus.

Enquiry into the etiology of splenomegalic conditions in Bengal by Dr. M. N. De.—This investigation was undertaken to determine the nature of splenomegaly not associated either with leishmaniasis or chronic malaria. The sources from which materials were collected were necropsy cases from the Medical College Hospitals, Calcutta, as well as from cases which had been subjected to laparotomy in the different hospitals of Calcutta. The work is in progress.

Epidemic dropsy enquiry under the Directors of the School of Tropical Medicine and the All-India Institute of Hygiene and Public Health, Calcutta.—Although this disease was previously under investigation at the School of Tropical Medicine, the Indian Research Fund Association gave a grant for further investigations in 1934 when a wide epidemic occurred in the rural areas of Bengal and Bihar and in Benares. The clinical and experimental part of the work was done by the staff of the School. Investigations were made on the biochemical, pathological and epidemiological aspects of the problem. The work is in progress.

SECTION IX.

MEDICAL INSTITUTIONS.

I.—Hospitals and Dispensaries.

A.—British India.

General and Statistical.

120. At the end of 1935 in British India there were 6,700 hospitals and dispensaries following the western system of treatment,—an increase of 54 over 1934. Of the total, only 552 or 8% were controlled by private organisations; the rest were maintained by Government, municipal and district boards and railways. On an average, 40,185 persons were served by each institution.

Table IX(i) gives the numbers of institutions by areas and population.

TABLE IX (i).

Hospitals and dispensaries.

	Classes I, III and IV.		Classes II and VI.		Class V.		Total.		Average population served per institution, 1935.
	1934.	1935.	1934.	1935.	1934.	1935.	1934.	1935.	
British India . . .	5,237	5,294	860	858	549	552	6,646	6,700	40,185
N.-W. F. P. . . .	70	71	35	36	10	11	115	118	39,698
Punjab	780	782	181	170	8	7	969	959	24,589
Delhi	25	26	2	2	...	7	27	28	22,723
U. P.	493	503	110	112	83	83	686	698	71,081
B. & O.	540	539	84	85	66	66	690	690	54,605
Bengal	1,012	1,046	119	119	179	177	1,310	1,342	37,342
C. P.	230	232	53	53	53	54	336	339	45,745
Bombay	414	415	79	79	40	40	533	534	56,783
Madras	1,186	1,195	76	77	94	91	1,356	1,363	34,624
Coorg	11	11	...	...	3	...	14	14	11,666
Assam	210	215	43	44	7	8	260	267	34,636
Burma	231	226	68	71	2	4	301	301	48,728
Baluchistan	35	33	10	10	4	4	49	47	...

Of the total, 4,313 institutions were in rural, 2,326 in urban areas (excluding those in Delhi Province) and 33 in the Agencies in N.-W. F. P. On an average, 61,874 persons were served by each institution in rural and 12,039 in urban areas. Further progress in the provision of medical relief, particularly in rural areas, was slowed down owing to financial stringency. Table A in Appendix VIII (page 262) gives the distribution of these institutions in rural and urban areas in the different provinces and the populations served by each.

A large decrease occurred in the accommodation for in-patients in State-special, railway and private non-aided institutions, the number of beds falling from 14,283 in 1934 to 9,499 in 1935. This decrease was, however, counter-balanced to some extent by an increase of 2,089 beds in State-public, local

Abbreviations:—

M.	Male.	Class I.—State-Public.
F.	Female.	Class II.—State-special.
R.	Rural.	Class III.—Local, municipal
U.	Urban.	fund and subsidised dispens-
p.m.	per mille.	aries.
C. P.	Central Provinces and Berar.	Class IV.—Private-aided.
U. P.	United Provinces of Agra and Oudh.	Class V.—Private non-aided.
B. & O.	Bihar and Orissa.	Class VI.—Railways.
I.G.C.H.	Inspector-General, Civil Hospitals.	
P.U.O.	Pyrexia of uncertain Origin.	

fund and private aided hospitals and dispensaries, but the total number of beds in all classes (69,289) still was less by 2,695 beds than in 1934. Accommodation reserved for female patients was 42% less than that for males. Table B, Appendix VIII (page 263) gives details of beds in the different provinces.

Table IX (ii) shows the numbers of patients treated in hospitals, etc. The number of female patients attending for treatment was 40% less than the number of males. In the Madras Presidency only is the western system of treatment almost equally popular with both sexes.

TABLE IX (ii).

Patients treated.

	Classes I, III and IV.			All Classes.		
	Indoor.	Outdoor.	Total.	Males.	Females and Children.	Total.
British India	1,170,962	65,663,716	66,834,678	48,972,299	29,480,865	78,453,164
N.-W. F. P.	31,128	1,933,352	1,964,480	1,618,211	610,380	2,228,591
Punjab	212,860	13,646,068	13,858,928	9,383,667	5,813,487	15,197,154
Delhi	18,336	164,900	183,236	717,724	399,119	1,116,843
U. P.	127,844	7,509,951	7,637,795	6,181,365	2,976,061	9,157,426
B. & O.	82,680	5,514,454	5,597,134	5,119,723	2,072,154	7,191,877
Bengal	124,297	7,730,307	7,854,604	7,118,443	3,035,323	10,153,766
C. P.	39,552	3,067,555	3,107,107	2,494,092	1,149,594	3,643,686
Bombay	124,093	3,227,155	3,351,248	2,469,278	1,474,121	3,943,399
Madras	245,590	16,570,958	16,816,548	9,373,353	8,484,985	17,858,338
Coorg	4,996	295,719	300,715	214,996	1,068,886	1,283,882
Assam	19,051	2,251,570	2,270,621	1,738,310	779,569	2,517,879
Burma	131,235	3,046,049	3,177,284	2,010,420	1,434,925	3,445,345
Baluchistan	9,300	705,678	714,978	532,717	182,261	714,978

Special hospitals for the treatment of female patients are few in number and are ordinarily to be found only in headquarter and other urban centres. These number in the U.P. 81, the Punjab 40, in Madras 37, in C.P. 12, in Bengal *muffasal* 8, in Calcutta 6, in B. & O. 5, in Burma and in N.-W. F. P. 4 each. Of these 197 institutions, 25 were maintained by Government, 92 by municipal and other local bodies and 80 were private institutions aided by Government. In addition, however, facilities for the treatment of women were generally available in all hospitals and dispensaries.

Table C in Appendix VIII on page 264 gives the numbers of beds for women in general and special hospitals and numbers of patients treated.

The medical personnel employed in the different provinces comprised I. M. S. officers 172, W. M. S. officers 41, I. M. D. 103, salaried graduates or M. B., B. S. 1,798 and licentiates 6,598. Provincial figures are given in Table IX (iii). In most provinces, increased numbers of W. M. S. officers and other medical staffs were employed.

TABLE IX (iii).

Medical Personnel.

	I. M. S.	W. M. S.	I. M. D.	Salaried graduates.	Salaried Licentiates.
Total	172	41	103	1,798	6,598
N.-W. F. P.	13	2	8	23	97
Punjab	19*	..	19	188§	931
Delhi	2	12	4	22	28
U. P.	17	19	2	219	591
B. & O.	12	1	4	199	772
Bengal	23	..	15	391	1,402
C. P.	5	5	3	72	168
Bombay	18	..	9	245	553
Madras	30†	2	..	319	1,400
Coorg . . . . .	..	..	..	1	16
Assam	12	..	4	42	284
Burma	16	..	5	77	340
Baluchistan	5‡	..	30	..	..

*Does not include the 3 I. M. S. officers employed as Professors in the King Edward Medical College, Lahore, 1 as Medical Superintendent, Punjab Mental Hospital, Lahore, and 1 as Chemical Examiner to Government, Punjab.

†Including I. M. D. officers.

‡Including 3 part time I. M. S. officers—one at Chaman and two at Fort Sandeman.

§Does not include Assistant Surgeons employed in the Chemical Examiner's Department and the Mental Hospital, Lahore, as well as those employed in the King Edward Medical College, Lahore, and not attached to the Mayo Hospital.

Honorary Medical staff.—It is becoming more and more the practice to associate selected private medical practitioners in an honorary capacity with the staffs of Government hospitals and their numbers are steadily increasing. During 1935, a total of 674 medical graduates and 244 licentiates were so engaged, and meantime most of these gave their services at provincial and district headquarter hospitals. Provincial figures are given in Table IX (iv) below.

TABLE IX (iv).

Honorary Medical Staff.

	Graduates.	Licentiates.
Total	674	244
N.-W. F. P. . . . .	..	..
Punjab	14	4
Delhi . . . . .	..	..
U. P.	44	25
B. & O.	15	3
Bengal.	259	99
C. P.	18	2
Bombay	163	13
Madras	133	79
Coorg . . . . .	..	3
Assam	4	4
Burma	24	12
Baluchistan . . . . .	..	..

Nursing Services.—Nurses Registration Acts have been passed by the provincial legislatures of Bengal, Bombay, Burma, Madras, Punjab and U. P. and it is hoped that other provinces will shortly follow their example.

In every province, existing nursing staffs fall far short of actual requirements, particularly in the rural institutions. Whilst in-patients totalled 1,170,962 in state-public, local fund and private-aided institutions, the total number of nurses employed numbered only 3,879.

Table IX (v) gives the numbers of nurses employed in rural and urban areas and figures of expenditure.

TABLE IX(v).

Number of Nurses and Expenditure on nursing.

	No. of nurses.			Expenditure on nursing.	
	Rural.	Urban.	Total.	Total.	Per case ¹ treated.
				Rs.	Rs. A. P.
Total	267	3,612	3,879	3,892,698	3 5 3
N.-W. F. P. . . . .	..	85	85	41,241	1 5 2
Punjab	6	276	282	315,316	1 7 8
Delhi . . . . .	..	147	147	168,336	9 2 11
U. P.	30	324	354	223,160	1 11 11
B. & O.	50	215	265	137,112	1 10 6
Bengal	3	596	599	654,604	5 4 3
C. P.	12	94	106	95,185	2 6 6
Bombay	17	732	749	645,624	5 3 3
Madras	96	654	750	968,201	3 15 1
Coorg	3	4	7	8,662	1 11 8
Assam	14	10	24	93,795	4 14 9
Burma	36	473	509	531,612	4 0 10
Baluchistan . . . . .	..	2	2	9,850	1 0 11

In Bengal Presidency, arrangements for nursing in Calcutta, with the exception of the Presidency General Hospital and in *muffassil* hospitals remained unsatisfactory partly owing to shortage of funds and partly to insufficiency of trained nurses. The 1934 Bengal Nurses Registration Act has been enforced and a Nursing Council has been constituted. Registered nurses numbered 887.

Training for the "senior certificate" of nursing was provided in the Calcutta Medical College and the Presidency General Hospital, Calcutta; that for the "junior certificate" in 2 hospitals in Calcutta and in 9 in the *muffassil*. Of the 258 pupils under training 16 obtained the "senior certificate" and 31 the "junior certificate".

The Calcutta Hospital Nurses Institution provides nurses for the Presidency General Hospital and the Medical College Hospitals, but was considerably handicapped by lack of funds and of suitably qualified nurses. The Government sanctioned a scheme under which it was hoped to attract suitable Indian women for training in the Medical College group of hospitals. In the *muffassil*, trained nurses were available only in eleven district *sadr* hospitals and in seven mission hospitals, but nowhere was their number adequate. In other institutions, untrained male and female attendants, *dais*, midwives, ward servants and compounders were employed to carry out such nursing work as they could.

In the C. P. the numbers of nurses employed in provincial hospitals were inadequate. The Mayo Hospital, Nagpur, the Victoria Hospital, Jubbulpore, and the Irwin Hospital, Amraoti, continued to provide training for probationer nurses; staff nurses were employed at the main hospitals at Saugar, Wardha and Akola. In Assam only the two civil hospitals at Gauhati and Dibrugarh had trained European nursing sisters. In N.-W. F. P. also arrangements for nursing were very inadequate.

Subsidised practitioners.—Further progress was made during 1935 in extending medical aid to the rural population. In Madras Presidency, 428 subsidised dispensaries were at work, whilst in the Punjab, the sanctioned programme of 375 dispensaries was only 15 short of completion. Other provinces do not seem to have made such satisfactory progress. In the U. P. only 21 subsidised medical practitioners had settled in rural areas, whilst in B. & O., N.-W. F. P., Bengal and the C. P. the numbers were even smaller.

Surgical operations.—A total of 2,569,967 principal and 82,643 secondary operations were performed in state-public, local fund and private-aided institutions. Table D in Appendix VIII on page 264 gives numbers by provinces.

Expenditure.—Out of the total expenditure of Rs. 3,92,54,573 on the maintenance of state-public, local fund and private-aided hospitals and dispensaries, Rs. 1,87,78,552 came from Government and Rs. 1,48,62,309 from municipal and local funds. Of the total, Rs. 1,01,12,991 were spent on the employment of medical officers, Rs. 38,92,698 on nurses, Rs. 30,26,610 on diet and Rs. 41,60,051 on medicines. Tables E and F in Appendix VIII on pages 265 and 266 give figures of income and expenditure for the different provinces.

Provincial.

121. Details in regard to malaria, ankylostomiasis, tuberculosis, venereal diseases, beri-beri, leprosy, trachoma and guineaworm have already been given in Section II of this report. Provincial reports should be consulted in regard to the figures for other diseases.

In the N.-W. F. P., 31,128 indoor patients were treated of which 860 died, giving a death rate of 2.76 p. m. The four female municipal hospitals at Peshawar, Dera Ismail Khan, Bannu and Kohat, maintained in the past by Government grants, treated 3,474 indoor and 76,285 outdoor cases. The eight subsidised dispensaries treated 60,222 patients. Two travelling motor dispensaries were attended by 3,646 cases. The dispensary medical officers continued to visit neighbouring villages and treated 87,072 patients. The medical relief in the Agencies received greater attention; the construction of a well equipped hospital was sanctioned for Miranshah in North Waziristan.

In the Punjab, the scheme for the provincialization of hospitals at district and *tahsil* headquarters remained in abeyance. A new hospital was constructed at Abhor and the Rai Bahadur Amar Nath Tuberculosis Institute was added to the Mayo Hospital, Lahore. The opening of a Tuberculosis sanatorium at Simla has already been mentioned. A great strain was thrown on the medical resources of the province owing to the influx of victims of the Quetta earthquake.

In regard to women arrangements existed at nearly all state-public and local fund institutions for their examination and treatment. At the close of the year, there were 50 separate hospitals under the charge of medical women and 33 women doctors were in charge of the female sections of general hospitals. The numbers of women medical students continued to increase

both at Medical College, Lahore, and the Medical Schools, Amritsar, and Ludhiana and the demands for admission were far in excess of available vacancies. Additional facilities were provided for the training of medical women by reserving 7 seats for Punjabi students at the Lady Hardinge Medical College, Delhi, 10 seats for women students at the King Edward Medical College, Lahore, and 15 at the Medical School, Amritsar. The Punjab Medical School for Women in Ludhiana now admits each year 36 students to the medical licentiate class. The Punjab Dental Hospital, Lahore, treated 26,875 patients and provided abundant clinical material for teaching purposes.

In Delhi, the municipal committee maintained the Silver Jubilee Tuberculosis Hospital and the Civil (Dufferin) Hospital with eight branches in Delhi city; the New Delhi Municipal Committee met the cost of the Willingdon Hospital, including the Willingdon Nursing Home and 2 other branch dispensaries, whilst the District Board maintained 5 dispensaries. Rapid progress was made with the construction of the Irwin Hospital.

In the U. P., the scheme for post-graduate studies for officers of the Provincial Subordinate Medical Service was further extended, but the introduction of an advanced course of study at the Agra Medical School remained in abeyance. The appointment of honorary physicians, surgeons and dental surgeons continued to receive encouragement from Government. Subsidies were continued in order to encourage qualified medical practitioners to settle in rural areas. The scheme for augmenting medical relief in rural areas made satisfactory progress, but more money is needed for this purpose. Only 47 subsidised dispensaries and 21 subsidised medical practitioners were available in the province, the main cause for the slow development of the subsidy scheme being the absence in out-of-the-way villages of social amenities for the medical officers. The total medical personnel of the province numbered 988, an increase of 44 over the present year. The proposed central tuberculosis clinic at Allahabad and the Tuberculosis Hospital at Lucknow could not be opened for want of funds. The Nurses Registration Act, which was passed during the year, was not enforced because of financial difficulties.

In B. & O., the special grants for the treatment of kala-azar and venereal diseases were renewed to *Sadr*, sub-divisional and other important hospitals.

As regards Bengal, 45 institutions provided for the needs of the people in Calcutta; 22 of these treated out-patients only and the others dealt with both out and in-patients. The total number of beds was 3,723, of which 1,835 were for males and 1,294 for females. Cases treated in all classes of hospitals and dispensaries numbered 976,216, comprising 70,622 in-patients and 905,594 out-patients. In the *mufassil*, 1,298 hospitals and dispensaries, of which 750 were rural and 548 urban provided 6,067 beds, 4,478 for males and 1,589 for females. A total of 258 pupil nurses were under training at 11 centres; 16 passed the senior and 31 the junior certificate examination. The scheme for establishing a new training centre at the Campbell Hospital mainly for Indian nurses was under consideration.

In the C. P., the number of hospitals and dispensaries was 339,164 in rural and 175 in urban areas. The inadequacy of medical relief is indicated by the fact that each dispensary served an area of 476 square miles. Independent medical practitioners held honorary appointments as physicians, surgeons, dentists and specialists in the eye, ear, nose and throat departments at the Mayo Hospital, Nagpur, the Victoria Hospital, Jubbulpore, the Irwin Hospital, Amraoti, the Silver Jubilee Hospital, Raipur, and the Main Hospital, Akola. Government approved of the proposal to establish tuberculosis clinics at each divisional headquarters and at the Union Mission Tuberculosis Sanatorium at Pendra Road in Bilaspur District.

In Bombay Presidency, a new hospital with 49 beds was constructed at Thana at a cost of Rs. 2 lakhs. It was hoped that, with the opening of this hospital and with improvements carried out in other suburban hospitals, the congestion in Bombay City institutions would be considerably relieved. In order to improve the efficiency of the subordinate medical staff it was decided to send all new recruits to the civil hospitals at Poona and Ahmedabad for 6 months' practical training and for one month's additional training in hygiene and preventive medicine. Arrangements were also made to give the second assistants at Civil Hospitals training in clinical laboratory work and venereology at Poona and Ahmedabad. Training in X-ray, mental diseases, leprosy and other diseases was also provided in order to have a cadre of officers with special qualifications. In respect of medical aid in rural areas, it was concluded that before any comprehensive and efficient scheme of rural medical relief could be launched, it was essential that financial help should be forthcoming from private or local bodies to supplement the contributions from Government which amounted to two-fifths of the cost in the case of district board dispensaries, two-sevenths for municipal dispensaries and nine-tenths for district headquarter hospitals. As in other provinces, it was found difficult to induce medical practitioners to leave the social amenities of the towns for work in isolated rural tracts.

In Madras Presidency of a total of 1,363 medical institutions, 1,116 were in rural and 247 in urban areas. The practice of appointing honorary medical officers to Government hospitals was further developed. In respect of anti-rabic treatment, 21 medical officers were given a special training at the Pasteur Institute in Coonoor.

In Assam, several important advances were held in abeyance because of financial stringency; the question of providing a hospital for males in Shillong was still under consideration. Public philanthropy made possible the construction of a maternity and gynaecological ward in the Civil Hospital at Dibrugarh and a Child Welfare Centre at Nowgong. Seven new dispensaries were opened in rural areas, including one private non-aided dispensary. The Ganesh Das Red Cross Hospital for Women and Children in Shillong was opened at the close of the year. A new hospital and dispensary at Sadiya and a maternity block at Karimganj were under construction.

In Burma, important new works included the construction of an additional female ward at Maymyo, an operation theatre at Yandoon, a ward at Danubyu, an isolation ward at Henzada and a maternity ward at Monywa. Two new Nurses' Homes were built at Maymyo and Mandalay by means of private donations. The eye department at the Mandalay Hospital was extended and new X-ray apparatus were provided for the Maymyo and Mandalay hospitals. It is worth noting that a blood transfusion service was organised for the Rangoon General Hospital and 13 transfusions were given in the course of the year.

In Baluchistan as a result of the earthquake in Quetta, the municipal dispensary, the Mission Hospital and the Lady Sandeman Dufferin Hospital were completely destroyed. As usual, the civil dispensary at Ziarat remained open for the summer months and the C. M. S. dispensary which works at Mastung during the summer and at Dhadar during the winter continued to treat large numbers of outdoor patients.

The earthquake was the cause of great suffering in addition to many thousands of deaths. Medical relief was quickly organised and evacuation of the injured was carried out expeditiously and satisfactorily. Temporary dispensaries were opened in the refugee camp on the race-course and at the brewery camp. The civil hospital in Quetta which had been totally destroyed

was immediately re-opened in tents provided by the military authorities and by the end of the year huts were constructed which provided bed accommodation for 100 patients. Two special hospitals for victims of the earthquake were opened at Pishin and Mastung by Mission doctors. A military relief party, with two I. M. S. officers and a Field Ambulance, was sent to Mastung, and the Kalat hospital staff was transferred to Mangchur for relief work. Many injured persons were also treated in the hospitals at Sibi, Loralai, Chaman, Pishin and Fort Sandeman.

B.—Indian States.

122. In Mysore State, the 281 medical institutions provided 2,574 beds for in-patients, 1,170 for males and 1,404 for females. Thirty-one hospitals and dispensaries for females provided treatment for 16,129 in-patients, including 9,005 cases of child-birth. The fact that malaria cases totalled over 800,000 indicates that this disease is widespread; respiratory diseases were also very common. The 287 midwives conducted 27,062 labour cases, an average of 94 cases each. The Princess Krishnajammanni Sanatorium dealt with 343 in-patients and 1,668 out-patients. 204 lepers were treated as in-patients in the Leper Asylum in Bangalore and the out-patients' dispensary at Kalasi-paiyam and the Local Fund Dispensaries at Hosur and Malvalli treated 91 cases. Propaganda was carried on against leprosy and a film on leprosy was prepared. The McGann Hospital, Shimoga, was opened. The Lakshmidamma's Children's Hospital at Bangalore was nearing completion, and a maternity hospital with an out-patient block at Shimoga, was under construction. The construction of a new and up-to-date hospital at Kolar at an estimated cost of Rs. 85,000 was sanctioned.

II.—Mental Hospitals.

123. A total of 19 mental hospitals provided accommodation for 9,608 patients (7,351 males and 2,257 females). The actual number of patients housed in these hospitals was, however, 13,329 (10,301 males and 3,028 females) or 39% in excess of available accommodation. In the appendix to this section Table H shows that, particularly in the Punjab, C. P., Bombay and Madras, severe overcrowding existed.

Other tables in the Appendix give the admissions, total population, daily average strength, daily average sick, numbers cured and total deaths, the principal types of insanity treated, details of the causes of insanity, details of admissions by age-groups and religions respectively, and expenditure incurred on the maintenance of these mental institutions.

In Bombay Presidency, 174 deaths occurred during the year, the death rate being 7·7% as against 7·5% in 1934, but the health of the patients, despite overcrowding, was generally good and, if anything, slightly better than during the previous year. The chief causes of death were malaria, tuberculosis, dysentery, anaemia, nervous diseases and pneumonia. The Hyderabad mental hospital recorded the low death rate of 5·5%. In an attempt to solve the problem of over-crowding, the Bombay Government sanctioned the provision of 250 beds at the Central Mental Hospital, Yeravda, in addition to the new block of 41 beds for Parsee patients which was nearly completed. The question of providing 100 additional beds at Ahmedabad was also under consideration. In the Central Provinces, deaths numbered 30, giving a rate of 6·3%. Most of the deaths were among patients between 60—70 years of age. In Assam, 35% of the inmates were admitted in good health, 34% in indifferent and 31% in bad health. A total of 91 deaths was

recorded during the year, giving a rate of 13·5%, the chief causes being tuberculosis of the lungs (33) and dysentery (33). All inmates were repeatedly examined for tuberculosis and suspicious cases were segregated. In Madras Presidency, 130 deaths occurred giving a rate of 7·1%. In view of the shortage of accommodation, the local Government approved a scheme for extension of the Madras Mental Hospital at an estimated cost of Rs. 2,17,000. The question of finding funds for the construction of an additional block in the Waltair hospital was also under consideration. In the Punjab, the death rate was 3·96%. Of the 44 deaths recorded, 7 were due to *status epilepticus*, 6 to pneumonia and 4 to tuberculosis. In the United Provinces the number of deaths fell to 96 and the death rate to 6·8%. In the Ranchi Indian Mental Hospital the death rate was only 3·5%. Of the 88 cases treated with *sulfosin*, 3 recovered, 50 improved and 35 showed no change. In the European Mental Hospital, Ranchi, where the latest methods of treatment were in vogue, the death rate was 4·2%. No epidemic or infectious disease was experienced during the year and only few patients were confined to bed for physical reasons other than feebleness of age. Some additional accommodation was made possible by internal re-arrangement. The death rate in the mental hospitals was 7·9%. Of the 90 deaths recorded in Tadagale mental hospital many were cases of general paralysis admitted at a stage when treatment was of no avail.

III.—Medical Colleges.

124. Medical colleges numbered 10, two each in the Presidencies of Bengal, Bombay and Madras and one each in the Punjab, Delhi, U. P. and Bihar. The college in Delhi is exclusively for women; women students are also admitted to the others.

During the year, 68 of the 143 final year students in the K. E. Medical College, Lahore, passed the final M. B., B. S. examination; 15 out of 20 passed part A and 14 out of 19 passed part B in the Lady Hardinge Medical College in Delhi; 91 out of 115 passed part I and 36 out of 68 passed part II in the King George's Medical College at Lucknow; and 13 out of 25 passed part I and 18 out of 41 passed part II in the Prince of Wales' Medical College at Patna.

Eighty-two of 1927 students passed the final M. B., B. S. examination at the Medical College in Calcutta. In the membership medical faculty final examination (new regulations) 4 passed out of 9; in part I (old regulations) 12 passed out of 15 and part II (old regulations) 3 passed out of 4. Seventy-six students passed the final M. B. examination and three the State Medical Faculty examination from the Carmichael Medical College, Belgachia.

In the Grant and the Seth Gordhandas Medical Colleges in Bombay, passes in the final M. B. B. S. examination were as follows: In the former college 63 males and 11 females in group A and 46 males and 11 females in group B; in the latter a total of 41. In addition, 2 obtained the M. D.; 3 the M. S.; 1 the B. Hy. part I and 4 part II; 3 the B. Sc.; and 4 the L. C. P. & S.

In the Madras Medical College, 71 students passed the final M. B., B. S., part II; 18 passed part I and 24 part II from the Vizagapatam Medical College.

Medical Research.

125. The following short paragraphs make mention of the activities of various medical colleges in the field of medical research.

Medical College, Lahore.—Investigations were made on (a) the nature of pulmonary tuberculosis in adult Punjabis; (b) postural hypotania; (c) cancer

in India ; (d) vitamin ' A ' contents of ghee ; (e) indigenous drugs of the Punjab ; (f) clinical evidence of rheumatic fever in the Punjab ; and (j) chronic encephalitis lethargica.

King George's Medical College, Lucknow.—The Department of Anatomy carried out research on (1) the relative position of the *ductus deferens* and ejaculatory ducts in the squirrel, the mongoose, the white rat and the porcupine, with special reference to their morphological significance and (2) the relative dimensions and capacities of the various cranial air sinuses. Anthropometric investigations on the human bony orbit were also made. The Department of Physiology contributed over 22 papers to the proceedings of the Science Congress held at Indore in January, 1936. These dealt with (1) investigations on enzymes and temperature reflexes ; (2) studies in the diets of various classes, examination of their efficacy and the collection of data relative to the alkali reserve of U. P. inhabitants ; (3) study of insulin ; (4) data on the vital capacities of students ; (5) studies of intraocular tension ; and (6) anaesthetic drugs.

Prince of Wales' Medical College, Patna.—A research paper entitled " Distribution of Vitamin ' C ' in different parts of common Indian Food-stuffs " was sent to the " Biochemical Journal of England " for publication and abstracts of papers on (1) " Observations on the action of ergotamine " and (2) " An investigation on the action of evipan sodium on the blood sugar of rabbits " were communicated to the Science Congress held at Indore.

Medical College, Calcutta.—Papers were published on (1) bacteriology in relation to clinical medicine ; (2) a case of unusual congenital malformation ; (3) epidemic dropsy with special reference to the development of cutaneous nodules ; (4) nodular eruptions in epidemic dropsy ; (5) pathology of epidemic dropsy ; (6) pathology of the heart in acute infections ; (7) verruga eruptions in epidemic dropsy ; (8) retro peritoneal hernia ; (9) an investigation on the absorption of carotene (provitamin A) in human subjects ; (10) disorders of digestion in children ; (11) epidemic dropsy discussions at the British Medical Association ; (12) treatment of hookworm anaemia with massive doses of iron ; (13) thromboangeitis obliterans ; (14) unilocular cystic kidney in a child ; and (15) blindness in India. Under the auspices of the Indian Research Fund Association, research work in connection with splenomegaly in Bengal was carried out.

Seth Gordhandas Sunderdas Medical College, Bombay.—With the help of grants received from the Indian Research Fund Association and the Sir Dorabji Tata Trust, an enquiry into the essentials of a cheap well-balanced nutritious diet was undertaken. Other investigations included (1) bacteriological investigations by blood culture in certain eye diseases ; (2) mycetoma or fungus foot disease ; (3) development of the body parts of children between approximately 6 to 11 years of age ; and (4) incidence of pneumococcal types of infection in Bombay with a view to the preparation of a specific serum.

Grant Medical College, Bombay.—The Department of Ophthalmology published papers on eye diseases resulting from improper diet and the Physiology Department papers on the " Evolution of man's diet " and " A study of the human electrocardiogram ". In the Department of Anatomy measurements of the Indian pelvis in a fresh state were being determined in order to compare the same with European figures. Dissections of fetuses and babies were carried out to co-relate the embryological facts with gross anatomy and a film on the development of the heart was prepared. Work done in the Department of Pathology included, *inter alia*, researches on (1) sudden death with special reference to heart lesions and *post mortem* serology ;

relation of status thymolympathicus with death ; (3) incidence of syphilis ; (4) a reliable test for sugar in urine ; (5) tubercle bacilli in cerebrospinal fluid and the effects of inoculation on guinea-pigs ; (6) cerebro-spinal fluid in jaundice ; (7) urinary amoebiasis ; (8) tubercle bacilli in stomach contents of babies ; (9) secretion of HCL in infants ; and (10) reaction of guinea-pigs to tetanus toxin in human serum and cerebro-spinal fluid.

Medical College, Madras.—A paper on “ An enquiry into the origin of non-pulmonary tuberculosis ” was submitted by the Department of Bacteriology to the Indian Science Congress. In the Department of Midwifery, special work was done in eclampsia and diseases of the placenta. The Department of Ophthalmology published 31 papers on its investigations into diseases of the eye. The Department of Operative Surgery continued work on the value of a vaso-motor index in the treatment of vasospastic disease and published papers on (1) lumbar sympathectomy in the treatment of circulatory diseases ; and (2) cyst of the spleen ; (3) the pathology of tuberculosis ; and (4) heterotopic bone in elephantoid tissues. The Department of Pathology published an article on tuberculosis of mammary glands. Investigations were made into a rare case of dermal reticulosis ; tuberculosis in rare situations ; and a rare type of tumour called “ Epitheliom adenoids cysticum ”. Results were published in three papers.

IV.—Medical Schools.

126. Medical schools numbered 28, 10 in Bengal ; 3 in Madras ; 5 in Bombay ; 2 in U. P. ; 2 in Punjab ; 2 in B. & O. ; 1 in Burma ; 1 in C. P. ; 1 in Assam ; and 1 in Central India.

In the Amritsar Medical School, Punjab, the percentage of passes in the final L. S. M. F. examination was 67·5 in April and 61·5 in September. Eleven passed the final L. S. M. F. from the Ludhiana Medical School for Women. Forty students from the Agra Medical School passed the final examination part I and 56 part II ; from the Agra Women's Medical School 18 passed part I and 17 part II of the final examination. Thirty-five students from the Medical School, Darbhanga in B. & O. passed the licentiate examination ; 29 including 2 females passed from the School at Cuttack. In Bengal, 79 students passed the final examination of the State Medical Faculty and 37 passed the compounders' examination from the Campbell School, Calcutta ; 22 and 13 from the Lytton School, Mymensingh ; 40 and 22 from the Ronaldshay School, Burdwan and 73 and 31 from the Dacca Medical School. A total of 24 passed the final examination from the Chittagong School ; 15 from the Jackson School, Jalpaiguri ; 33 from Bankura Sammilani School ; 58 from the National Medical Institute, Calcutta ; and 73 from the Calcutta Medical School. In C. P., 39 students passed the final board examination from the Robertson Medical School, Nagpur. From the K. E. Medical School at Indore, three students passed the final L. C. P. & S. (Bombay), 44 the final L. M. P. (Nagpur), 1 final L. M. F. (Calcutta), 30 S. A. S. grade examination and 54 compounders examination. Twenty-five passed the L. C. P. S. final examination from the B. J. Medical School, Poona ; 23 from the B. J. Medical School, Ahmedabad ; 15 from the Medical School, Hyderabad ; 29 from the National Medical College, Bombay ; and 11 from the Christian Medical School, Miraj. Twenty-three students passed the final examination part I and 55 part II from the Stanley Medical School, Madras ; 23 and 31 in the Lady Willingdon Medical School for Women, Madras ; and 45 part II from the Missionary Medical School for Women at Vellore. Thirty-six students from the Berry-White Medical School in Dibrugarh passed the final examination ; 25 from the Rangoon Medical School passed part I of the final examination and 33 passed part II.

127. *The Countess of Dufferin's Fund*.—A total of 331 women students were on the rolls in different medical colleges in India. Twenty-seven scholarships were awarded, 18 at the Lady Hardinge Medical College, Delhi and 3 each at Bombay, Madras and Calcutta. Of these scholarships, 18 were awarded from Association Funds and the remainder from the Trust administered by the Dufferin Council.

The extent of the work done in Dufferin Hospitals may be estimated from the following figures :—

New in-patients	157,331
Out-patients (old and new)	6,510,313
Gynaecological cases—	
Indoor	9,813
Outdoor	79,270
Midwifery cases—	
Abortion	1,875
Normal labour	8,949
Abnormal labour	3,127
Operations—	
Abdominal	1,475
General or spinal anaesthesia	10,593

SECTION X.

HEALTH OF JAILS IN INDIA.

Population, Sickness and Mortality Rates.

128. During 1935 a slight increase occurred in the average daily jail population (excluding Andamans), the figure being 143,579 or 1,684 more than in 1934 but 555 less than the quinquennial mean. Increases occurred only in Bengal (+978), Madras (+959), B. & O. (+373), C. P. (+353), N.-W. F. P. (+110) and Assam (+8). In Andamans the average strength of 5,351 compared favourably with 5,759 during 1934 and 7,088 the quinquennial mean.

Table X (i) gives the authorised accommodation, the daily average population and the maximum population confined on any one day in jails and subjails during 1934 and 1935.

TABLE X (i).

	Authorised accommodation excluding hospitals and observation cells.		Daily average population.		Maximum number confined on any one day.	
	1935.	1934.	1935.	1934.	1935.	1934.
N.-W. F. P.	5,367	5,024	6,668	6,351	7,438	7,260
Punjab	15,013	15,013	21,992	21,849	25,720	26,370
U. P.	32,112	32,053	31,659	31,925	32,318	32,650
B. & O.	13,964	13,730	12,549	12,431	17,503	18,988
Bengal	17,220	18,304	22,724	21,851	30,266	28,969
C. P.	6,518	6,518	5,162	4,793	6,404	5,924
Bombay	19,389	19,275	13,739	14,510	21,302	22,647
Madras	20,129	20,123	16,375	14,959	*14,931	13,466
Assam	3,579	3,581	4,014	4,009	†	4,818
Burma	20,993	20,362	20,434	20,477	†	22,525

*Exclusive of sub-jails.

†Not available.

NOTE—The statistics in paras. 128 to 144 relate to all classes of prisoners in the central and district jails; those in para. 145 and particularly the figures of sickness and mortality in para. 146 to convicts only.

Abbreviations :—

p.m.—*per mille*.

I. G. of P.—Inspector General of Prisons.

C. S. fever—Cerebrospinal fever.

P. U. O.—Pyrexia of uncertain origin.

129. The constantly sick rate, exclusive of Andamans, rose slightly from 21 p. m. in 1934 to 22 p. m., but was still less than the quinquennial average (23 p. m.). Provinces showing increases included U. P., Madras, Assam and Burma; in other provinces the rate was the same as or lower than that of 1934.

130. Excluding the Andamans, the "admission to hospital rate" further dropped to 497 p. m.; the figure for the quinquennial mean being 586 p. m. In N.-W. F. P., Punjab, B. & O., C. P., Bombay, Assam and Burma the rate was below both that for 1934 and the mean. Bengal, with its overcrowded jails, again returned the highest rate, viz., 1,046 p. m. whilst the lowest admission rate was reported in Burma 146 p. m. The Andamans recorded the higher rate of 651 p. m. but this compares well with 738 p. m. the quinquennial mean.

131. In India proper (excluding Andamans) the death rate fell from 12 p. m. in 1934 to 11 p. m. Death rates were lower than in 1934 in B. & O., C. P., N.-W. F. P., Bombay, U. P., Bengal, Punjab and Madras; higher in Assam and Burma. In Assam the high death rate, which exceeded that for 1934 by 8 p. m. was ascribed to increased incidence of malaria, pneumonia and anaemia and debility; in Burma to an increase in the number of admissions in a poor state of health.

Causes of Sickness and Mortality.

132. The principal recorded causes of sickness and mortality, exclusive of the Andamans, are given in Tables X (ii) and X (iii). The variations require no comment.

TABLE X (ii).

	1934.		1935.	
	Admissions.	Rate. p. m.	Admissions.	Rate. p. m.
Malaria	21,622	152	19,683	137
Abscess, ulcer and Boil	4,982	35	5,429	38
Dysentery	4,746	33	4,239	30
Influenza	5,667	40	3,937	27
Respiratory diseases*	4,329	31	3,596	25
Diarrhoea	2,834	20	2,894	20
Pneumonia	1,614	11	1,431	10
Anaemia and debility	1,089	8	1,057	7
Pyrexia of uncertain origin	1,132	8	1,000	7
Tubercle of the lungs	831	6	789	5
Sandfly fever	406	3	289	2
Enteric fever	243	2	278	2
C. S. fever	130	1	96	1

*Excluding tubercle of the lungs and pneumonia.

TABLE X (iii).

	1934.		1935.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.
Pneumonia	392	2.8	292	2.0
Tubercle of the lungs	308	2.2	310	2.2
Dysentery	112	0.8	100	0.7
Malaria	82	0.6	71	0.5
C. S. fever	78	0.6	60	0.4
Respiratory diseases*	70	0.5	46	0.3
Anaemia and debility	46	0.3	43	0.3
Enteric fever	41	0.3	37	0.3

133. *C. S. Fever*.—There were 96 cases with 60 deaths as against 130 and 78 in 1934. Of these 29 cases and 19 deaths were recorded in the Punjab jails; 17 and 9 in U. P.; 16 and 8 in B. & O.; 13 and 13 in Bombay Presidency; 8 and 4 in Bengal; 7 and 2 in N.-W. F. P.; 3 and 3 in Delhi; 2 and 1 in C. P. and 1 fatal case in Burma.

134. *Influenza*.—Bengal Presidency as usual suffered most with 2,297 admissions; U. P. recorded 582 admissions; Madras 313; Burma 276; and B. & O. 240. Admission rates for 1935 are in every province lower than those for 1934.

135. *Cholera*.—The number of cases decreased from 35 in 1934 to 18 and the deaths from 7 in 1934 to 5 this year. These comprised 13 cases with 3 deaths in the U. P., 3 and 1 in Bengal and 2 and 1 in Burma.

136. *Small-pox*.—59 admissions with 3 deaths were reported as against 54 and 1 respectively in 1934. The U. P. recorded 41 cases with 2 deaths, Bengal 6 cases and 1 death, Punjab 5 cases, C. P. and Bombay 2 cases each and Delhi, Madras and Burma 1 case each.

137. *Plague*.—Except for six fatal cases in Burma jails, this disease was absent.

138. *Enteric fever*.—Of 278 admissions with 37 deaths, 85 and 10 occurred in the Punjab, 35 and 6 in Burma, 33 and 4 in N.-W. F. P., 25 and 4 in Bengal, 24 and 1 in U. P., 22 and 5 in Bombay, 19 and 4 in Madras, 13 non-fatal cases in B. & O., 10 and 3 in Assam, 4 each in C. P., and Ajmer, and 1 each in Quetta, Secunderabad, Mercara and Delhi.

139. *Kala Azar*.—Admissions from this cause numbered 285 with 15 deaths of which 198 and 5 respectively were recorded in Bengal, 73 and 7 in B. & O., 7 and 2 in Assam and 7 and 1 in U. P.

140. *Dysentery*.—Bengal again headed the list with 1,318 admissions and 21 deaths, B. & O. recorded 517 cases and 10 deaths, Madras 505 and 9, Bombay 437 and 10, Assam 386 and 15, U. P. 360 and 5, and Punjab 246 and 11. In N.-W. F. P., Punjab, U. P., Bombay, Assam and Burma the admission rate was lower than that for 1934 and the quinquennial mean; whilst in Bengal the admission rate, though higher than the quinquennial average, was still below that for 1934.

141. *Diarrhoea*.—Bengal recorded 1,497 admissions, or nearly 52% of the total, as against 1,211 admissions in 1934. The figures in the U. P. (419), Bombay (267) and Punjab (231) are also worthy of note.

*Excluding pneumonia and tubercle of the lungs.

Table X (iv) gives combined figures for dysentery and diarrhoea.

TABLE X (iv).

	Admission rate p. m.			Death rate p. m.		
	Mean	1934.	1935.	Mean	1934.	1935.
	1930-34.			1930-34.		
India	59	52	50	1	1	1
N.-W. F. P.	24	18	11	..	..	..
Punjab	53	48	24	1	1	1
U. P.	35	30	24	1	1	..
B. & O.	111	64	66	2	2	1
Bengal	119	129	139	2	2	1
C. P.	71	50	62	2	2	1
Bombay	86	83	61	1	..	1
Madras	50	38	42	1	2	1
Assam.	142	110	111	3	2	4
Burma	23	12	11	2	1	1
Andamans	32	32	49	5	1	1

142. *Malaria*.—The incidence of malaria was lower than in 1934 and was 10% less than the quinquennial mean. All provinces shared in the decrease except U. P. and Assam where admission rates were 153 p. m. and 140 p. m. as against 127 p. m. and 111 p. m. during the previous year. The Andamans reported a rate of 253 p. m. as compared with 260 p. m. in 1934 and 380 p. m. the mean.

Burma, Madras Presidency, C. P. and B. & O. continued to record the lowest incidences.

The malaria death rate was highest in the Andamans (1.3 p. m.), Assam (1.2 p. m.) and Bengal (0.9 p. m.). In other provinces the rates varied between 0.8 p. m. in B. & O. and 0.2 p. m. in C. P., Madras and Burma.

143. *Pneumonia*.—269 admissions and 55 deaths were registered in Bengal, 263 and 64 respectively in U. P., 159 and 26 in the Punjab, 144 and 22 in Bombay, 140 and 22 in B. & O., 106 and 18 in N.-W. F. P., 103 and 23 in Assam, 98 and 31 in Burma, 86 and 13 in Madras and 33 and 10 in C. P.

The highest admission rate was recorded in Assam (26 p. m.), the rate in N.-W. F. P. was 16 p. m., in B. & O. 14 p. m. and in Bengal and Bombay 13 p. m.

The highest mortality rate was recorded in Assam (5.7 p. m.). Other provincial rates were N.-W. F. P. and Bengal (2.7 p. m.), B. & O. and C. P. (2.2 p. m.), U. P. and Bombay (2.0 p. m.), Burma (1.5 p. m.) and Madras Presidency (1.0 p. m.).

144. *Tubercle of the lungs*.—Excluding the Andamans, the number of admissions (789) was below that for the previous year (831) and for the quinquennium (938), whilst the number of deaths (310) was higher than that of 1934 and the quinquennial mean.

Admission and death rates for individual provinces will be found in Appendix IX, Table A.

Accommodation provided for the segregation and treatment of tubercular patients was as follows :—

N.-W. F. P.—Abbottabad jail has a ward containing 40 beds.

Punjab.—As in 1934 most tubercular prisoners were concentrated in the Multan New Central Jail (138 beds). Montgomery Central Jail had a special tuberculosis ward of 12 beds and Rawalpindi District of 8 beds.

U. P.—Sultanpur jail (148 beds).

B. & O.—Arrangements for housing tubercular cases exist at Bhagalpur (35 beds), Buxar (12 beds) and Gaya Central (6 beds) Jails. The District Jail at Purulia also provides 4 beds.

Bengal.—Suri Jail has accommodation for 34 cases and Comilla Jail for 40. Besides this, Dacca Central Jail (10 beds), Midnapore (10), Rajshahi (2), Alipore (8) and Presidency Jail (10) have accommodation for treatment and segregation of cases of tuberculosis for short termers and such of them who cannot travel.

C. P.—Chhindwara Jail (22 beds).

Bombay Presidency.—Special provision exists in the Central Jails at Belgaum (18 beds), Yeravda (8 beds), Ahmedabad (6 cells) and Hyderabad (3 cells) and in the Karachi District Jail (3 beds).

Madras Presidency.—Wellesley Sanatorium Jail, Bellary, is set apart solely for the treatment and segregation of prisoners suffering from tuberculosis and has accommodation for 160 patients.

Assam.—Sylhet Jail (23 beds).

Burma.—The Myingyan Jail has a tubercular ward with 50 beds. Accommodation is also provided at Rangoon and Insein (20 beds each), Myaungmya (8 beds), Thayetmyo and Moulmein (5 beds each), Akyab, Tharrawaddy, Bassein and Toungoo (4 beds each), Henzada (3 beds) and Mandalay (2 beds).

Weight of Prisoners.

145. Table X (v) shows in percentages the condition of prisoners on discharge in the different provinces. The table is arranged in the order of loss of weight :—

TABLE X (v).

Provinces.	Gained weight.	Stationary.	Lost weight.
Aden	45	27	28
Andamans	50	24	26
Bombay,	52	26	22
Burma	60	25	15
B. & O.	59	27	14
Assam	54	32	14
Bengal	50	37	13
U. P.	58	32	10
C. P.	62	29	9
Punjab	40	51	9
Coorg	73	12	9
N.-W. F. P.	49	43	8
Madras	67	25	8

In the Punjab, U. P., and N.-W. F. P. 70%, 87% and 87% respectively of the prisoners released were reported to be in good health, 29%, 11% and 12% in indifferent and 1% in each in bad health. These figures compare well with the conditions of health recorded on admission to jails, *viz.*, 66%, 82% and 83% in good, 33%, 17% and 15% in indifferent and 1%, 2% and 2% in bad health.

In the Madras Presidency, the largest percentages of prisoners who lost weight were recorded in Salem (26%), and in Vizagapatam (21%).

Special remarks on provinces.

146. *N.-W. F. P.*—Jails numbered eight and lock-ups seven. The daily average strength rose to 7,094 (7,004 males and 90 females), but despite overcrowding, the year was a fairly healthy one.

30 prisoners were released on medical grounds. The number of hospital admissions decreased from 2,867 to 2,443 and deaths also decreased from 91 to 67. The daily average sick rate fell to 25 p. m., males 25 and females 34 p. m. The hospital admission rate for females (1,068) was once more over twice the rate for males (418).

Of the 67 deaths, 24 were due to pulmonary tuberculosis, 16 to pneumonia, 3 to malaria, 3 to other tubercular diseases, 1 to diarrhoea and 20 to other causes.

The Adolescents Training Centre at Haripur did excellent work during the year.

The chief works carried out during the year included, *inter alia*, the construction of a new ward for the treatment of sick prisoners in Charsadda Sub-jail.

Dietary charges per head further fell to Rs. 29-6-4, whilst hospital charges clothing and bedding charges and sanitation charges increased to Rs. 236-15-0, Rs. 11-15-0 and Rs. 1-6-10, respectively.

Punjab.—Excluding hospitals and observation cells, accommodation was provided in 4 Central Jails, 1 Borstal, 17 District, 2 Camp, one special and 11 sub-jails for 14,367 male and 646 female prisoners. The daily average strength for all classes of prisoners rose to 21,992 (males 21,695 and females 297), and the maximum population confined on any one day was 25,720 (25,355 males and 365 females).

Overcrowding was still acute and if the proposals to erect a new jail near Amritsar and to enlarge the District Jails of Hissar and Mianwali are accepted, much needed relief will be given. Works of importance executed during the year included :—

1. Construction of forty cells and the remodelling of a barrack in the Multan Old Central Jail.
2. Construction of twenty cells in the Dera Ghazi Khan Jail.
3. Improvements to the water supply at Hoshiarpur Jail.

During the year health conditions were good. Admissions to hospital (12,790), daily average sick (445) and total deaths (218) were all lower than those of 1934. The death rate of less than 10 p. m. was the lowest on record. The New Central Jail, Multan, recorded the highest mortality rate, *viz.*, 32 against 46 in 1934.

Whilst malaria continued to be the chief cause of sickness and tuberculosis and pneumonia were the most important causes of death, there was a general decrease in the incidence of malaria, pneumonia and dysentery.

The total of 3,751 admissions and 7 deaths compare favourably with 5,272 and 27 respectively for the previous year. Tuberculosis accounted for 194 admissions and 72 deaths, of which 47 occurred in the special ward attached to the New Central Jail, Multan, and 6 in the Lahore Central Jail. Pneumonia was responsible for 155 admissions and 26 deaths.

C. S. fever was the cause of 29 admissions and 19 deaths of which 12 occurred in the Borstal Institution. Dysentery accounted for 215 admissions and 11 deaths; Multan Central Jail and Lahore District Jail admitted 68 and 23 cases respectively.

28 prisoners developed mental disease of which 7 were transferred to the Mental Hospital. 10 old and 2 new leprosy patients were treated in the special ward attached to the District Jail, Mianwali; 3 were released during the year.

Dietary charges increased from Rs. 22-10-7 to Rs. 27-7-11 per head; clothing and bedding and sanitation charges dropped from Rs. 7-7-6 and Rs. 2-14-2 to Rs. 6-8-2 and Rs. 2-4-9 per head. Hospital charges rose from Rs. 419-14-6 to Rs. 503-14-5 per head.

U. P.—The daily average jail population declined from 31,925 in the previous year to 31,659. The total available accommodation for all classes of prisoners was sufficient for 30,657 males and 1,455 females. The maximum population on any one day was 32,318 as compared with 32,650 in the year 1934.

The improvement in health conditions recorded in the previous years was well maintained. Both admissions to hospital 15,431, with a rate of 487 p. m. and daily average sick, *viz.*, 684 or 22 p. m. rose slightly. The death rate (7.5 p. m.) recorded this year was with one exception, the lowest during the past decade.

The main causes of sickness were malaria 4,120 admissions; abscesses, boils and ulcers 1,914; other respiratory diseases 792; diarrhoea 354; dysentery 273; pneumonia 218; anaemia and debility 118; tuberculosis 108; and cholera 12. Nine prisoners died of c. s. meningitis. Pneumonia (57) and tuberculosis (36) accounted for nearly 39% of all deaths; other respiratory diseases caused 12 deaths, malaria 8, dysentery 5, abscess, boils and ulcers 5, anaemia and debility 4, cholera 2 and diarrhoea 1. Plague was absent.

Several important changes were made to improve conditions. These included the replacing of iron by brass utensils, the supply of mustard cakes for washing purposes, the supply of an additional blanket to old and convalescent prisoners during the cold months, the supply of rice-cakes and the supply of an additional bi-weekly paper to A and B class prisoners.

Leprosy cases, as usual, were concentrated in the Rae Bareilly Jail. Old and new cases numbered 83 and 90 respectively.

Dietary charges rose to Rs. 27-15-1; hospital charges fell to Rs. 93-8-9 per head.

Sanitary charges fell from Rs. 1-10-5 to Rs. 1-8-0 whilst the cost of clothing and bedding rose from Rs. 3-0-6 to Rs. 3-5-8.

B. & O.—Excluding hospitals and observation cells accommodation was available for 12,385 convicts, 1,461 under-trials and 118 civil prisoners. The number of central (4) and district (12) jails remained the same as in the previous year, whilst subsidiary jails decreased from 50 to 49. The Juvenile Jail at Monghyr which had been seriously damaged by the earthquake was under reconstruction, and the prisoners were temporarily housed in the Hazaribagh Central Jail. To relieve the great congestion in the permanent jails the reduced jails at Arrah, Chaibassa, Balasore and Daltonganj continued to function as district jails.

The daily average number of prisoners of all classes rose from 12,431 in 1934 to 12,549.

Despite acute over-crowding, the general health was satisfactory in every respect. Total admissions to hospital, and daily average number of sick both fell from 5,241 and 284 in 1934 to 4,720 and 265 respectively. Total deaths from all causes and the death rate *per mille* also fell from 230 and 18·5 in 1934 to 211 and 16·8 respectively. The Central Jails at Bhagalpur (61), Buxar (28) and Gaya (23) and the District Jail at Purnea (15) returned the largest numbers of deaths. In Darbhanga District Jail there were no deaths. The highest death rate was recorded at Dumka (46·2 p. m.). Other high death rates were Purnea (44·3), Sambalpur (30·8), Bhagalpur (27·4) and Bankipur (18·9).

Cholera was absent.

C. S. fever accounted for 17 cases and 8 deaths, of which 11 sporadic cases with 5 deaths occurred at the Bhagalpur Central Jail. 5 cases with 3 deaths occurred at the Gaya Central Jail during the earlier part of the year these being in continuation of the outbreak of the previous year. There were 536 cases and 12 deaths from dysentery. Malaria was responsible for 458 cases and 8 deaths and influenza for 245 and 7 respectively. Pneumonia was responsible for 129 cases and 24 deaths, diarrhoea for 172 cases, abscesses, boils, etc., for 174 cases and other respiratory diseases for 342 and 4 respectively.

Ankylostomiasis caused 397 admissions and 30 deaths. The Central Jail at Bhagalpur alone recorded 76 cases and 14 deaths. Of the 17,793 prisoners examined 7,687 were found infected.

The number of admissions from pulmonary tuberculosis fell from 108 to 81, whilst the deaths increased from 38 to 43. Anaemia and debility caused 34 cases and one death.

Leprosy cases were, as usual, segregated in the Muzaffarpur District Jail. The daily average number of lepers was 48.

53 non-criminal mental cases were sent to jails for observation. Criminal lunatics are transferred temporarily to the Central Jail at Hazaribagh where they are detained until accommodation is available in the Mental Hospital at Ranchi. It is undesirable to detain mental cases for an indefinite period in jail, and the Government have under consideration the advisability of relaxing existing rules in order to enable the Indian Mental Hospital to admit patients up to a certain percentage over the registered capacity of that hospital.

Dietary charges and hospital charges rose to Rs. 33-15 and Rs. 4-9 respectively, whilst expenditure per head on clothing and bedding fell to Rs. 4-11; sanitation charges were as before Rs. 1-14.

Bengal Presidency.—Serious overcrowding continued to exist in all jails throughout the year, in regard to both convict and under-trial prisoners. In order to provide some relief, the two special jails at Dum Dum, the additional special jail at Hijli and the special jail at Berhampore were utilised throughout the year. Excluding hospitals and observation cells, accommodation existed for 17,220 prisoners (16,564 males and 656 females). The daily average population rose to 22,724 (22,468 males and 256 females), this figure being the highest in the last 10 years except for 1932. The daily average convict population rose to 18,129 (17,929 males and 199 females).

A heavy flood in the Damodar river in mid-August 1935, inundated the whole area of the Burdwan Jail. Prisoners had to be kept on the roofs of the workshops for more than 24 hours.

The reconstruction of the perimeter wall in the lower portion of the Darjeeling Jail and the construction of 2 new barracks were completed.

Sickness rates were slightly higher, but mortality was considerably lower than in 1934. The daily average sick rose from 789 to 808, though the ratio *per mille* fell from 36 p. m. to 35·6 p. m., and the number of deaths from 282 (13 p. m.) to 240 (11 p. m.). The general health of prisoners remained fairly good, the rise in the daily average sick being probably due to the poor health of new admissions. The death rates for individual jails varied from 20 in Darjeeling to 7 in Berhampore.

Epidemic dropsy was responsible for 22 cases of which 14 were treated in the Dum Dum Special Jail B; all recovered. There were eight cases of c. s. meningitis with four deaths; of these 6 occurred at the 2 Dum Dum Special Jails.

Dysentery, malaria, pneumonia and pulmonary tuberculosis were the chief causes of mortality.

The manufacturing section of the Presidency Jail continued to meet the increased demand for cinchona and quinine and issued 43,081 lbs. of these drugs in addition to 80,032 boxes of quinine.

The Bengal After-Care Association and its district ramifications continued their useful work. The Claude Martin Fund distributed Rs. 1,871 amongst the 1,884 released prisoners.

Dietary and sanitation charges per head, and hospital charges per head of average sick rose from Rs. 39-12, Rs. 2-15 and Rs. 200-7 to Rs. 41-2, Rs. 3-7 and Rs. 203-7 respectively; whilst expenditure on clothing and bedding of prisoners fell from Rs. 4-12 to Rs. 4-3.

Total expenditure on jail buildings amounted to Rs. 4,22,167 of which Rs. 1,43,794 were spent on original works.

C. P. and Berar.—There was no change in the number and classification of jails. Accommodation existed for 6,076 males and 442 females. The daily average jail population rose from 4,793 in 1934 to 5,162 and the number of convicted persons rose from 6,990 to 8,077, the maximum numbers confined on any one day being 6,135. The number of prisoners sentenced under the Borstal Act was 122.

The year was a healthy one. Admissions to hospital (1,138 or 222 p.m.), daily average sick (42 or 8 p.m.), and deaths (55 or 11 p.m.) all were lower than the figures of the previous year.

Cholera was conspicuous by its absence. Malaria (205 cases), diarrhoea (113) and dysentery (176) were the chief causes of sickness. There were 62 admissions for abscesses, boils and ulcers, 42 for pneumonia, 29 for anaemia and debility, 14 for tuberculosis of the lungs and 5 for other tubercular diseases. Of the total deaths, pneumonia was the cause in 12, tuberculosis in 6 and dysentery in 5.

The Nagpur Central Jail continued to meet the steady increase in demand for quinine and cinchona. Quantities issued during the year are given below :—

	1933.	1934.	1935.
	lbs.	lbs.	lbs.
Quinine sulphate	641	652	683
Cinchona febrifuge	619	558	533
Quinine hydrochloride	29	25	38
Quinine tablets	346	292	384
Cinchona tablets	185	184	195
Quinine boxes	2,965	3,176	3,832

The Discharged Prisoners Aid Societies at Nagpur, Amraoti and Bilaspur rendered useful service by providing, wherever possible, released prisoners with work.

Dietary and hospital charges rose to Rs. 25-3-7 and Rs. 537-8-5 respectively, and clothing and bedding and sanitation charges to Rs. 8-9-1 and Rs. 3-1-11 respectively.

Bombay Presidency.—Statistics for the Borstal School have been dealt with separately at the end of this paragraph.

Owing to continuous rain in January, 1935, and the rise in the subsoil water, the jail buildings and walls of the Special Prison at Shikarpur were seriously damaged. Owing to the danger to the life of the inmates, this jail was abandoned after the close of the year.

The Visapur Prison was continued on a temporary basis. Since the close of the year, it has however been designated as "The Government Prisoner Farm, Visapur", and convicts are trained in modern agricultural and farming methods, dairying and poultry farming.

Proposals have been submitted to Government for the housing of all criminal lunatics and un-certifiable criminal mental defectives in the District Prison at Bijapur on the lines of "Broadmoor" in England, with special staff for the care and treatment of these cases. Another scheme for the conversion of the old District Prison at Ratnagiri into a "Reception Borstal School" was also under consideration.

Excluding hospitals and observation cells accommodation existed for 18,992 prisoners (16,239 males and 2,753 females) as compared with 18,878 (16,135 males and 2,743 females) in 1934. The daily average strength was 13,348 (13,095 males and 253 females), whilst the maximum number confined on any one day was 20,882 (20,102 males and 780 females).

This year overcrowding was not so acute as in 1934 the daily average population exceeding authorised accommodation only in Hyderabad Central and Sukkur District Prisons.

The number of adolescents admitted between the ages of 15 and 21 decreased to 1,628 (1,542 males and 86 females).

Admissions to hospital (8,548), daily average number sick (263), constantly sick rate per 1,000 (20), total number of deaths (158) and the death rate per 1,000 (12) were all lower than the corresponding figures for 1934. The highest death rate (20 p.m.) was once again recorded in Shikarpur Special Prison.

Plague was entirely absent and only one case of cholera was recorded.

C. S. fever accounted for 12 admissions and 12 deaths, *viz.*, Visapur Temporary Prison (5), Hyderabad Central Prison (1), Shikarpur Special Prison (1) and Sind Convict Gang (5). The sources of infection could not be traced.

The following cases of infectious or deficiency diseases were reported during the year—mumps 127, influenza 40, chicken-pox 19, small-pox 2, scurvy 8 and enteric group 22 (with 5 deaths).

Dysentery and diarrhoea caused 644 admissions and 12 deaths, tuberculosis 59 admissions and 18 deaths, malaria 2,686 admissions and 4 deaths and pneumonia 141 admissions and 22 deaths.

Five cases were released on medical grounds.

Of the 28 convict boys who appeared for the First-Aid Examination 27 passed.

The Discharged Prisoners Aid Societies at Bombay, Ahmedabad, Belgaum and Bijapur continued to work usefully.

13 male and 2 female prisoners were transferred to Mental Hospitals.

Dieting, hospital, clothing and bedding and sanitation rates all increased, these being Rs. 37-8-9, Rs. 116-6-4, Rs. 3-7-0 and Rs. 5-13-4 respectively.

Borstal.—The Bombay Act XVII of 1935 has raised the detention period from 2 to 3 years.

Excluding hospitals and observation cells accommodation existed for 397 prisoners; daily average strength was 391 and maximum number confined on any one day 420.

There were 148 admissions to hospital with 1 death. Of these 63 cases were due to malaria, 15 to abscesses, boils and ulcers, 8 to diarrhoea, 6 to "other respiratory diseases", 3 to dysentery and 13 to "other infective diseases".

The revised scale of diet which was sanctioned on March 1, 1935, has been continued. Dieting, hospital, clothing and bedding and sanitation charges were Rs. 30-2-5, Rs. 192-11-3, Rs. 4-5-3 and Rs. 5-7-5 respectively.

Madras Presidency.—Nine Central, 3 District, 2 Borstal, 3 Special and 310 Sub-jails provided accommodation for 20,129 prisoners (18,420 males and 1,709 females). The daily average population of all classes rose to 16,004 males and 371 females and that of convicts to 12,356 and 309 respectively. 18 convicts were released on medical grounds. Other releases included 3 females convicted of infanticide; these were placed under the care of the Madras Seva Sadan.

Adolescents detained in Borstal schools at Tanjore and Palamcottah numbered 1,004.

Ambulance and First-Aid training was provided as usual; 33 of the 763 new admissions were awarded certificates.

Admissions to hospital and daily average number of sick rose to 4,871 (297 p.m.) and 235 (14 p.m.) respectively. The female admission rate (431 p.m.) continued to be in excess of that for males (294 p.m.). Total deaths

further rose to 178 although the death rate (11 p.m.) was the same as in 1934. Of the total deaths, 145 occurred among convicts, 29 among under-trials and 4 among civil prisoners; 28 occurred in Rajahmundry; 25 in Trichinopoly; 24 in Vellore; 19 in Coimbatore; 11 in Vizagapatam; 7 each in Penitentiary, Madras and the Central Jail, Cannanore; 5 each in Salem, Cuddalore and Madura and 3 each in Behrampur and the Vellore Presidency Jail for Women and 2 in Bellary.

Cholera was again absent. The number of admissions from dysentery rose from 388 to 477, but deaths fell from 12 to 9. 124 cases were admitted into the Cannanore Jail alone, 61 in Trichinopoly and 59 in Bellary. The number of admissions due to malaria rose from 196 to 214, but only 2 deaths were recorded. The highest number of admissions 78 was reported by the Bellary Jail.

Tuberculosis continued widespread in all jails except at Salem, Berhampur and Tanjore and Palamcottah Borstal schools. Deaths fell from 22 to 15 notwithstanding the fact that the number of admissions rose from 57 to 59.

Both admissions and deaths from anaemia and debility fell from 78 and 6 to 57 and 2 respectively. Rajahmundry (17) recorded the highest number of admissions. Only 2 deaths occurred, 1 at Rajahmundry and the other at Salem.

A considerable increase occurred in the number of admissions, 33 to 76, from pneumonia, but the number of deaths (12) was the same. Diarrhoea and syphilis each accounted for 24 admissions and 1 death, enteric fever 18 and 3, and ankylostomiasis 10 and 1 respectively.

The mental defectives' section of the Cuddalore Jail accommodated 93 prisoners, of which 4 were transferred to the Mental Hospital at Madras; the Leper Annexe of the Salem Central Jail had 152 prisoners.

With the exception of the Jails at Trichinopoly, Madras, Bellary, Vizagapatam, Madura and Berhampur, which are linked with the municipal water pipe connection, all other jails in the Presidency obtained their water-supply from properly constructed and protected wells.

Of the 32,642 prisoners released during the year, 902 were helped by the Discharged Prisoners' Aid Society.

Dietary, hospital and sanitation charges further dropped to Rs. 33-11-9, Rs. 2-9-4 and Rs. 3-6-7, but clothing and bedding charges rose to Rs. 5-6-11.

Assam—Available accommodation provided for 3,954 prisoners.

The daily average population (4,014) was the highest on record including 3,406 convicts, 603 undertrials and five civil prisoners.

Overcrowding continued to exist and the necessity for additional accommodation remained acute.

Hospital admissions fell from 2,122 to 1,992 and the admission rate p.m. from 529 to 496. Daily average sick rose from 87 to 93 and deaths and death rate from 58 and 14.5 p. m. to 87 and 21.7 p. m. respectively. 81 deaths occurred among convicts and six among undertrials.

In the Assam Valley and Surma Valley Jails the percentage of habitual drug-takers among convicts was 32.1 and 6.5 respectively.

8 Prisoners were transferred to the mental hospital.

Malaria (489 admissions) and dysentery (312 admissions) continued to be the main causes of sickness; 21 deaths were ascribed to pneumonia, 15 to dysentery, 11 to pulmonary tuberculosis and five to malaria.

The incidence of dysentery was again highest in Gauhati (114 cases) and malaria in Sylhet (136 cases).

Cases infected with hook-worm were, as usual, given suitable treatment; of the 3,603 prisoners examined, 577 were found infected.

Dietary charges per head rose to Rs. 34-8-3 and cost per head of average sick fell to Rs. 183-6-4.

Expenditure on clothing and bedding and sanitation rose to Rs. 20,965 and Rs. 2,925 respectively.

Assistance was given to ex-convicts by the Discharged Prisoners' Aid Society founded in 1934.

Burma.—Excluding hospitals and observation cells, accommodation existed for 20,993 prisoners (20,682 males and 311 females). The Alôn Camp Jail was reopened on 24th January, 1935 and District Jail at Monywa was then reduced to the status of a subsidiary jail. At the close of the year there were thus 9 central, 17 district, 2 camp and 5 subsidiary jails or a total of 33, as against 32 in the previous year. The structural alterations to the old Reformatory School Buildings were completed during the year, and the subsidiary jails at Pegu and Pyapon, hitherto under the supervision of the Police Department, were brought under the general control of the Inspector General of Prisons. The combined Borstal and Senior Training School at Thayetmyo continued to function.

Daily average population was 20,434 (20,226 males and 208 females) so that no over-crowding existed. Of the prisoners discharged, 29 were released on medical grounds and 11 were sent to the Mental Hospital.

The year was fairly healthy. Admissions to hospital further dropped from 3,668 to 2,949, but the daily average sick rose to 225 and deaths to 221. The admission rate was 144 p. m., the daily average sick 11 p. m. and death rate 11 p. m., as against 179, 10 and 10 p. m. respectively during 1934. 200 deaths occurred among convicts, 20 among undertrials and 1 of a civil prisoner.

One death was recorded from cholera and 5 from plague. Partly because of effective chlorination of water-supplies, admissions from dysentery fell from 180 to 152; dysentery deaths increased from 12 to 14.

Tuberculosis was responsible for 122 admissions and 63 deaths. In the special ward at Myingyan 90 cases, including 46 new admissions, were treated and of these 13 died. Four cases were discharged cured.

Anaemia and debility accounted for 44 admissions and 5 deaths; enteric fever 37 and 6; beri-beri 8 and nil; and influenza 289 with no death.

Nearly 5 % of the convict population were opium addicts.

Important works executed during the year included :—

1. Installation of a new well at Rangoon Jail.
2. The Rangoon Jail was connected with the Rangoon Corporation water supply system as a precautionary measure in case of emergency.
3. Wooden covers were provided for wells in the Insein Jail Annexe.
4. Pipe connections were installed at the Shwebo Jail for bringing water from Moksogyon Branch Canal.

The Burma Prisoners' Aid Society did useful work among released prisoners.

First-aid classes were held in 10 jails, but the courses could be completed only in 8. Training was given to 8 jailors, 11 cadet jailors, 20 warders and 111 prisoners, of whom 8, 11, 10 and 91 respectively passed the prescribed test.

Dietary, clothing and bedding and sanitation charges all increased during the year, whilst hospital charges decreased. The restricted issue of clothing introduced as a measure of retrenchment having failed, reversion to the old scale was sanctioned.

Andamans.—The daily average population numbered 5,288 males and 63 females as against 5,679 males and 80 females in 1934. Allowing 50 superficial feet per prisoner, barracks and cells had accommodation for 4,309 (4,249 males and 60 females). The maximum population confined on any one day was 5,512 (5,442 males and 70 females).

3,484 convicts were admitted to hospital and 52 deaths were recorded as against 3,268 admissions and 83 deaths in 1934. The daily average number of sick was 242 as against 156.

The general health of the settlement was good throughout the year in spite of the fact that total admissions to hospital and daily average sick were higher as compared with the rates for 1934. This was due to the fact that anaemic prisoners and those with enlarged spleens were sent to hospital for treatment.

Energetic anti-malarial campaign lowered the incidence of and mortality from malaria, the figures being 1,353 and 7 respectively.

Tuberculosis was responsible for 15 admissions and 8 deaths and pneumonia for 18 and 4. There were 128 admissions for respiratory diseases. Dysentery caused 210 admissions and 3 deaths.

Weil's disease caused 13 admissions and 3 deaths; influenza 64 admissions; and anaemia 36 admissions with 3 deaths.

During the last two months of the year under report, 18 cases of epidemic dropsy occurred. Effective measures were speedily taken to stamp out the epidemic.

Two imported small-pox cases occurred amongst the free population. 578 persons were vaccinated.

Village water supplies are still unsatisfactory. The supply of milk improved during the year.

Aerated water factories, tea shops, public eating houses, bakeries, sweet-meat stalls, slaughter of animals and the sale of meat are now regulated by rules introduced during the year.

Half-yearly medical inspection of the school children continued.

All ships were inspected immediately on arrival. Passengers leaving the settlement were medically inspected before embarkation.

An Annexe to the Indian Women and Children's Hospital at Atlanta Point is under construction.

Aden and Coorg.—No detailed comment is necessary.

Conclusion.

147. The health of the jail population was generally good throughout the year under review. The general death rate fell to 11 p. m. which is 0.11 p. m. lower than the average figure for the past five years. The marked decrease in the death rate in the Andamans, which was the subject of favourable comment in last year's report, has been followed by a further small decrease so that the figure for this area is now below the average of the total jail population in India. Although one cannot make too much of this comparison in the absence of age-constitution figures, nevertheless this low death rate indicates a satisfactory state of affairs. Assam is the only province to record a considerable variation in the death rate, but the constantly sick rate in the province does not indicate any great change, so that further comment is unnecessary.

Malaria and dysentery admissions continue to diminish satisfactorily; the former from 21,622 to 19,683 and the latter from 4,746 to 4,239. Figures for tuberculosis of the lungs remain about the same level and this infectious disease must remain a source of anxiety to jail medical officers.

It is apparent that medical administration has been maintained at a satisfactory level of efficiency.

SECTION XI.

INDIAN VOLUNTARY HEALTH ORGANISATIONS.

The Indian Red Cross Society*.

148. The year 1935 will remain a memorable one in the history of this Society for two events which will be re-called with emotions of a widely different character. The first was Their Majesties' Silver Jubilee and the second the Quetta Earthquake.

On May 6th the Silver Jubilee of Their Majesties' the King-Emperor and the Queen-Empress was celebrated with great public rejoicings throughout India. To mark the occasion, His Excellency the Viceroy inaugurated a Silver Jubilee Fund "for the relief of sickness and suffering throughout India". This Fund reached the splendid total of over 138 lakhs of rupees, a striking tribute to the efforts of Her Excellency the President and to the generosity of the princes and peoples of India. By His Majesty's wish, the proceeds were divided among four leading charitable organisations, of which this Society was one. The greater portion (70%) has been returned to the provinces for distribution, while 30% has been allotted to headquarters. The total allocation to Indian Red Cross headquarters was Rs. 18,57,000 at the end of 1935. All Red Cross activities will benefit greatly by this munificent and timely assistance, which has effectively dispelled the financial gloom referred to in the 1934 report.

The second event was the Quetta earthquake, which destroyed the capital of Baluchistan in the early hours of May 31st, killing about 20,000 people, wounding many thousands more, and reducing to ruins a flourishing city of 70,000 inhabitants. Such a disaster called for immediate and widespread Red Cross action. The Society contributed over Rs. 30,000 to the Relief Funds and forwarded another Rs. 53,382 sent by foreign Red Cross Societies. It mobilised 27 nurses from headquarters and 20 nurses through the Bombay Branch, and in addition to personnel and funds, sent large consignments of splints, bandages, dressings, etc., as well as tents. Collecting depôts for clothing were opened in Simla and Lahore, and consignments for the refugees were despatched daily.

Another important event was the outbreak of the Italo-Ethiopian War in the first week of October, which led to a vast mobilization of Red Cross resources, both in personnel and supplies. The International Red Cross Committee in October offered aid to both belligerents, an offer which was accepted only by the Ethiopian Red Cross. Legal advice obtained from different quarters agreed that the provisions of Act XV of 1920 prevented the Society from spending its funds outside India, except in the case of an Indian expeditionary force. The Society, however, publicly announced its willingness to receive gifts from the public either in cash or kind, for transmission to the Ethiopian Red Cross. Up to the end of 1935 four consignments of bandages, dressings, chlorine, vaccine, etc., had been forwarded and about Rs. 500 in cash.

Membership.—The total number of members enrolled in all categories was 18,713 compared with 15,912 at the end of 1934, so it is possible again to report an increase. The Punjab Branch this year reports 9,469 members, a splendid total, and next year it will probably reach five figures. Very few other Branches can report even four figures, but Assam, Sind and the United Provinces have all over 1,000 members. The branches which have done

*Prepared from a note supplied by Miss Norah Hill, A.R.R.C., Organising Secretary, Indian Red Cross Society.

best in membership this year are Assam, Kotah, Madras, the Punjab and the United Provinces. Madras has shown an impressive increase from 364 in 1934 to 981 in 1935, largely due to the strenuous efforts of its district branches.

Maternity and Child Welfare Bureau.—Dr. Jean Orkney, W.M.S., who had been in charge of the Maternity and Child Welfare Section of the All-India Institute of Hygiene and Public Health, Calcutta, succeeded Dr. Ruth Young, M.B.E., W.M.S., as Director of the Bureau at the end of December.

Four Health Schools in Delhi, Poona, Madras and Rangoon, were aided with grants, and other institutions which received help were the Mothercraft Training School, Bareilly, the Vocational Institute Nursery School, Mysore, and the Calcutta Health Week Welfare Centre attached to the All-India Institute of Hygiene.

The total grants from the Victoria Memorial Scholarship Fund for training of indigenous *dais* amounted to Rs. 14,492 to Indian States and Rs. 22,147 to provinces in British India. Good progress is being made in most of the provinces, but in the States it is much less marked.

Army child welfare continues to receive a great deal of the Director's time and attention. Reports were submitted by 43 British Army stations and 59 Indian Army stations. In the latter some degree of medical relief for women and children is now provided in almost all stations, but there is room for great advance in the welfare services. Many reports mention difficulty in getting suitable doctors and nurses. In Quetta the hospital building was damaged beyond repair during the earthquake, and it has been closed for an indefinite period.

King George Thanksgiving (Anti-Tuberculosis) Fund.—The Fund received Rs. 86,000 out of the Silver Jubilee allotment to Red Cross Headquarters.

The travelling cinema lorry fitted up by headquarters started touring in March. It toured in the Punjab from March to May, in the United Provinces in August and September, and in Ajmer-Merwara, Rajputana and Central India in December. The visits of the lorry aroused great interest amongst the public.

A special training course in tuberculosis was organised by the Fund at the All-India Institute of Hygiene and Public Health, Calcutta, from February 4 to 23, 1935, and was attended by 25 doctors.

The Hasan Suhrawardy Anti-Tuberculosis Challenge Shield was awarded to the Tuberculosis Association of Bengal, for having done the best anti-tuberculosis work in India during 1934.

A large amount of propaganda material was distributed both by headquarters and through the 16 provincial and state anti-tuberculosis committees, all of which are carrying on active propaganda.

Junior Red Cross.—Junior membership again showed an increase, from 351,656 to 370,669, and the reports sent in by branches make very encouraging reading. Training conferences for teachers on Red Cross activities were organised at Sukkur (Sind), Shillong (Assam) and Coonoor (Madras), and were well attended.

There has been increased Junior Red Cross activity in girls' schools, especially in the Punjab, where a medical inspection programme is being carried out under Dr. Curjel Wilson's supervision, and a School Hygiene Certificate course for women teachers has been inaugurated.

The propaganda for prevention of blindness has been continued and a large number of vernacular pamphlets have been distributed, while lectures

for teachers have been given in training institutions with the help of the generous grant received from the National Institute for the Blind.

Juniors also collected large sums and did very useful work both for the Silver Jubilee Fund and the Quetta Earthquake.

Cinema Section.—The Section was very busy throughout the year, as films as a method of teaching health are becoming increasingly popular. The Section produced a new film of 2,500 ft., entitled “What the Red Cross does in India”, which was released in December. Work on another film entitled “Two Ways of Living”, dealing with housing, is well advanced, and a beginning has been made with a third film dealing with village welfare, most of which was “shot” near Rawalpindi. A new copy of the film “Prevention of Blindness” was prepared as the old one got worn through constant use.

The Film Circulating Library has proved very popular and 253 films were distributed, 163 of 35 mm. size and 90 of 16 mm. against 105 and 55 respectively last year. Four new 16 mm. films were purchased during the year.

A short 35 mm. talkie film, entitled, “The Eyes have it”, was presented to the Society by the National Ophthalmic Treatment Board, London.

The Section for the first time prepared magic lantern slides; 12 sets on school hygiene, 36 sets on “prevention of blindness”; and one set on tuberculosis were manufactured, a total of 1,728 slides.

Propaganda and Publicity.—The Red Cross Journal continues to pay its own way with the support of advertisers; 4 pictorial supplements were issued. Two popular series of articles this year were those on nutrition, and a series on “The chief preventible blinding diseases of childhood” by Lieut.-Colonel R. E. Wright, C.I.E., I.M.S.

A number of new publications and posters were issued by headquarters during the year.

Nurses and Volunteers.—The scheme for the enrolment of trained nurses for emergency service has been approved but has yet to be put into action. During the year various financial and other details were completed, and the co-operation of the branches has now been invited.

The voluntary aid detachment scheme for supplying volunteer nurses to military hospitals is being operated by the St. John Ambulance Brigade Nursing Divisions.

The “volunteer service scheme”, which aims at enrolling and training Red Cross members for various types of volunteer service, has been published in pamphlet form and is now being operated by a number of branches.

Rural Welfare.—In view of the increased interest in rural welfare, stimulated by the grants made by the Government of India to Provincial Governments, the Society has paid special attention to village activities, and has made a beginning in providing special propaganda material for use in village work. The material issued by headquarters will eventually include a film, a set of posters, lantern slides and a pamphlet on rural work for Red Cross branches. The film has been begun and enquiries are being carried out about existing posters and slides. A pamphlet has also been drafted; during 1936 it is hoped to issue most of this propaganda material.

The United Provinces branch has also paid special attention to rural propaganda, and has issued useful slides and pamphlets. Its junior groups do valuable work in village schools.

The Bombay branch has travelling dispensaries in rural areas and employs travelling lecturers in others. The Central Provinces and Berar Branch, which has made great strides in establishing rural welfare centres, has received a special Government grant of Rs. 5,000.

The St. John Ambulance Association (Indian Council) and St. John Ambulance Brigade Overseas.*

149. In recent years the financial difficulties of the Association have been frequently mentioned, but thanks to the good offices of Their Excellencies Lord and Lady Willingdon and the graciousness of His late Majesty King George V, these difficulties have now been solved to a considerable extent by the inclusion of the St. John Ambulance Association as one of the beneficiaries to Their Majesties' Silver Jubilee Fund in India, from which the Association has received a sum of Rs. 2,73,000. It is hoped that this will enable the Indian Council to stabilize its financial position and to look forward to an expansion of its activities in many needed directions.

In the last report mention was made at the outset of the Bihar Earthquake which was described as one of the worst calamities of this nature that India has ever experienced. But the Quetta Earthquake which occurred on 31st May 1935, was even more terrible for although it affected a small area, the loss of life was much greater. The St. John Ambulance Association, the St. John Ambulance Brigade Overseas and the Indian Red Cross Society, both at headquarters and in the provinces, at once mobilised for action and a relief party which was later further reinforced, proceeded to the scene of the disaster within 24 hours of its occurrence.

During the year 28,105 persons attended courses of instruction in first-aid, home nursing, hygiene and sanitation, domestic hygiene and mothercraft, of whom 18,295 qualified for the Association's certificates, namely 16,491 in first aid, 1,038 in home nursing, 585 in hygiene and sanitation, and 181 in domestic hygiene and mothercraft. In addition 607 persons obtained the voucher certificate by passing a second higher test in first aid, 178 obtained medallions by passing the same examination for the third time, and 101 labels and 22 pendants were earned by passing further re-examinations in first aid and home nursing respectively. The Mackenzie School Course continued to grow in popularity and during the year under report 10,643 students received instruction, of whom 7,665 qualified for certificates.

During 1935, an Indian supplement to "First aid to the injured" was prepared and 10,000 copies have been printed. It contains useful suggestions for using Indian articles (*puggries, lathis, charpoys, etc.*) in improvising first aid, and gives valuable information about the effects of heat, treatment of rabies, and snakes and snake-bite treatment. It fills a long-felt want and will be an invaluable aid to lecturers as well as students. It is proposed to publish the book in the vernaculars and to bind these with the vernacular editions of the first aid manual. A revised edition of the manual for the Mackenzie School Course was also published. This edition contains many improvements and is now suitable for girls also. A new manual for the combined hygiene and sanitation course has also been written and is gradually being introduced.

During the year under report a total of 25,177 books have been sold from the St. John Ambulance Stores Depot, an increase of 4,301 over the 1934 figures.

* Prepared from a note supplied by Miss Norah Hill, Secretary, Indian Red Cross Society.

The two first aid road stations in Calcutta continued to do very useful work. The total number of cases dealt with was 896, of which 728 were treated on the spot and 126 sent to hospital. In 20 cases the ambulance had to be summoned.

The first voluntary aid detachment consisting of 16 fully-qualified members was formed in Calcutta about the end of the year and training and enrolment were in progress in Lahore and Burma when the year closed. Field Marshal Sir Philip Chetwode, Bart., G.C.B., G.C.S.I., K.C.M.G., D.S.O., prior to his departure from India, wrote to the Army Commanders commending the scheme to their support, and asking for their assistance in obtaining recruits for the detachments by encouraging wives and daughters of officers, and other ranks of the army, to qualify and enrol as members of nursing divisions.

St. John Ambulance Brigade Overseas (Empire of India).—The report for 1934 began with an account of the great earthquake in Bihar. Unhappily the report for the year 1935 must also open with the account of a similar disaster in Quetta, which evoked a splendid response by those members of the St. John Ambulance Brigade Overseas who were called upon to take part in the relief work.

Immediately on receipt of the news, Dr. J. Cairns, C.I.E., O.B.E., Assistant Commissioner, No. 1 District, ordered mobilization of St. John Divisions, both Ambulance and Nursing, and on the evening of the 31st May he left for Quetta with a relief party of 8 officers and sisters of the nursing divisions and 30 officers and men of the Indian Railway Ambulance Division. First aid dressing posts were set up on the station platform and the approach roads, and by the 2nd June, 1,500 cases of injury had been dealt with at these posts. Great assistance was also rendered by the officers and members of the St. John Ambulance Brigade to injured and feeble refugees and in the removal of injured persons to hospitals. All refugee trains which left Quetta between 2nd and 7th June were provided with ambulance personnel, and some of the Brigade men did several journeys between Quetta and Sukkur and Quetta and Lahore. In the evacuation of stretcher cases by ambulance trains, although these trains were staffed with military personnel, Brigade Nursing and Ambulance members rendered great service in assisting in the transfer of the cases from the motor transport vehicles into the trains and in seeing to their comfort. A very useful piece of work was done by the nursing sisters in attending to injured *purdah* women who had been extricated from the ruins.

The Assistant Commissioner estimated that up to 10th June, over 12,000 dressings had been done at the first aid posts in the railway area, while over 700 "sitting" and "walking" cases and a similar number of "stretcher" cases were evacuated by trains.

As regards relief work carried out by officers and members of No. 1 district at other places, a party of 9 officers and sisters of the various local nursing divisions did duty in the Mayo Hospital, Lahore. All the ambulance officers and men did ambulance duty at Lahore station on their return from Quetta up till the 8th July.

The progress reported in last year's report was maintained in 1935, and the year saw the establishment of two new districts, *viz.*, the Burma district and the E. I. Railway district. No. II district has had to be further subdivided by the creation of the Calcutta Police Sub-District. Four new Ambulance divisions, one each in Bengal and Delhi and two in Burma, were formed during the year. Special importance attaches to the formation of a new nursing division in Bombay, called the Bombay (Muslim) Nursing Division, in

April 1935. This unit has been established under the aegis of the Muslim Ambulance Society, which is to be warmly congratulated on having formed this pioneer division. Four cadet divisions were formed at Lucknow, Moradabad and Fyzabad in the United Provinces; these continued to be under the direct charge of the Chief Commissioner for the Empire of India. At the end of 1935 therefore, the strength of the Brigade Overseas in India comprised seven districts, 69 ambulance, 13 nursing, 13 cadet ambulance and 6 cadet nursing divisions, with a total strength of 2,772 members.

The services rendered by Brigade Ambulance and nursing divisions were very varied and included rendering first aid on railways and in railway workshops, attendance at *melas*, sports, parades, etc., the removal of sick and injured persons in ambulances, assistance at hospital out-patient departments and school medical inspections.

British Empire Leprosy Relief Association (Indian Council)*.

150. The British Empire Leprosy Relief Association (Indian Council) has continued its programme of anti-leprosy work in 1935 by means of scientific research into the epidemiology and treatment of the disease, educational propaganda, treatment clinics and the training of doctors.

Research work has been carried on in Calcutta, in collaboration with the School of Tropical Medicine and the Indian Research Fund Association, at a cost to the Association of a sum of Rs. 31,000. This work has embraced clinical, pathological and bacteriological investigations, besides treatment which provides material for research and instruction.

In addition to routine measures, experimental treatment has been carried on in selected cases in order to test the value of "leprolin". Leprolin is an emulsion of lepra bacilli prepared by a special method from the nodules of leprosy patients, and contains a roughly standardised number of lepra bacilli. The early results of treatment with this preparation have been favourable. Electrical treatment by diathermy has also been found to be of considerable value particularly in the treatment of inflammatory conditions arising in the nerves.

Attempts to culture *M. Leprae* and *M. Leprae muris* have been continued without success. In order to verify the reports for successful cultures made by other workers, research work has been done, on a subject which has hitherto received little attention, namely, the application of tissue culture methods by the use of growing tissue as a culture medium for the leprosy organisms. Rat tissues and *M. Leprae muris* were used for the most part. Whilst a few encouraging results have been obtained, no definite proof of multiplication of the bacilli has yet been found.

The propaganda officer of the Association toured in Madras, Cochin State, Bihar and Orissa, the United and the Central Provinces, visiting leprosy clinics, giving lectures and demonstrations to medical students and doctors and advising local bodies and provincial branches in their anti-leprosy campaigns. Useful investigations were also made by him on the incidence of leprosy among the children. The inspection of 58,000 children in 300 schools in a Madras district resulted in the detection of 514 clinically positive cases of leprosy, while 476 cases were detected in the Madras City Corporation schools.

A special course in diagnosis and treatment was held at the School of Tropical Medicine, Calcutta. This was attended by 17 doctors from all over India

* Prepared from a note supplied by the Honorary Secretary, British Empire Leprosy Relief Association (Indian Council).

and one from the Seychelles Islands, bringing the number of doctors trained by the Association at Calcutta to 765. Two similar instructional courses were held, under the auspices of the Association, at the Leper Hospital at Dichpalli in Hyderabad State for the final year students of the Osmania Medical College and for the doctors of the State Medical Department. Lectures were also given to the D.T.M., L.T.M. and D.P.H. classes at the Calcutta School of Tropical Medicine.

The reports for 1935 received from the provincial and state branches show that the scientific knowledge gained through research carried on at Calcutta and elsewhere is gradually filtering through the barriers of superstition and apathy. The leper has thus become more willing and ready to seek treatment instead of concealing his malady.

The number of treatment clinics has increased in many provinces. In Bombay, out of 2,514 patients who received treatment regularly, 7.7% were discharged as totally cured and 37.5% showed marked improvement. In the Madras Presidency, over 30,000 new cases were treated at 441 clinics during the first nine months of the year and over 200,000 attendances were recorded each quarter. In the Punjab, the benefit received by leper patients aroused considerable interest. A total of 1,215 cases received regular treatment at 57 clinics in the province; of these 159 were reported as relatively cured, 241 much improved and 380 improved. Similar encouraging results are reported from other provinces.

The work done by the Association during the last 10 years indicates that the leper is now beginning to feel that he is not an outcast, that his life is not doomed, but that his disease is curable and his return to a life of usefulness is not an impossibility.

The Countess of Dufferin's Fund and Women's Medical Service.

151. The celebration of its Silver Jubilee made 1935 a memorable year in the history of the National Association for Supplying Medical Aid by Women to the Women of India (Countess of Dufferin's Fund).

The main source of income of this Fund is the interest on its investments which amounted to Rs. 7.20 lakhs on the 1st January, 1935. The Government of India grant for 1935-36 was restored to its full figure of Rs. 3,70,000.

The usual grants were given to provincial Dufferin branches and to various hospitals and other institutions, 18 scholarships were given to students in the Lady Hardinge Medical College, Delhi; and 3 each in Bombay, Madras and Calcutta. Of these 18 were awarded from the Association's funds and the others from trust funds administered by the Dufferin Council.

The Association continued to assist maternity and child welfare work, not only by paying the salary of the W.M.S. officer in charge of the Maternity and Child Welfare section in the All-India Institute of Hygiene and Public Health, Calcutta, but by financing the model centre used for teaching purposes.

The cadre of the Women's Medical Service consists of 42 officers excluding 7 temporary members and a training reserve of 12 officers.

Lady Minto's Indian Nursing Association.

152. The income of this Association is made up of an annual Government subsidy of Rs. 32,500; of interest on invested funds amounting to Rs. 25,819, donations, fees, subscriptions totalling Rs. 1,53,225; and miscellaneous headings Rs. 2,977.

The nursing staff is composed of European nursing sisters possessing maternity qualifications. They are for the most part recruited under a 5 or 3 years agreement, by a selection committee in England.

The following nursing homes and hospitals are staffed by nursing sisters of this Association :—

(1) The Walker Hospital, Simla ; (2) the Ripon Hospital, Simla ; (3) Hindu Rao Hospital, Delhi ; (4) the Georgina McRobert Hospital, Cawnpore ; (5) Portmore nursing home, Simla ; (6) the Kashmir nursing home, Srinagar ; (7) the railway hospital, Ajmer ; (8) the Lady Willingdon nursing home, New Delhi and (9) the Murree nursing home, Murree.

During the year, the nursing sisters attended 3,106 cases, including 1,624 medical, 1,064 surgical, 178 infectious, 5 mental, 32 massage and 203 maternity cases.

The Bombay Presidency Baby and Health Week Association.

153. This Association, assisted by a Government grant of Rs. 4,990, continued its numerous health propaganda activities. A special Govt. grant of Rs. 3,000 was given for rural health work.

A revised set of 40 magic lantern slides on ' Food and Health ' with a key lecture was prepared. 659 reels of cinema films on public health and child welfare topics were projected.

25,500 copies of a valuable pamphlet on ' Balanced Diets ' were published in English, Marathi, Gujarati and Hindi ; these had a wide circulation and were greatly appreciated. The Trustees of the Sir Dorabji Tata Trust gave the Association a grant of Rs. 300 a month for a period of three years for carrying out research work on cheap balanced diets and the Governing Body of the Indian Research Fund Association sanctioned Rs. 6,000 a year for three years to assist this research. The present programme of the Association on nutrition work includes the feeding of groups of children on ideal diets of varying costs. The children are classified into three non-vegetarian groups, two vegetarian groups, and the effects on growth and health are noted by making careful measurements at regular intervals.

Another part of the Association's activity includes analytical and biological work in the Haffkine Institute and in the Bio-Chemistry Laboratory of the Seth G. S. Medical College. Various foods and diets are analysed, whilst some are tested on rats and their vitamin values ascertained.

Efforts are also being made to determine Indian standards of growth and nutrition by measuring the growth records of nearly 20,000 healthy children of different Indian communities attending primary and middle schools in Bombay and in district towns.

***Activities of the International Health Division of the Rockefeller Foundation in India during 1935.**

154. In 1935 three members of the International Health Division of the Rockefeller Foundation were stationed in India, with offices at Madras, Bangalore and Delhi. One of the officers acted as adviser in Public Health to the Travancore and Mysore Governments.

* Supplied by Dr. W. P. Jacocks, Representative in India of the Rockefeller Foundation, International Health Division.

Financial and advisory assistance was given to Government public health activities in Travancore, Mysore, Madras and the United Provinces ; in Travancore to the Neyyattinkara Health Unit (4th year) ; in the United Provinces to the Partabgarh Health Unit (4th year), and in Madras to the Poona-malle Health Unit (1st year, beginning October 1935).

Government research and control activities in malaria and dracontiasis were given assistance in Mysore State and arrangements were made during the year to set up a special malaria research office in Madras.

During 1935 five fellowships were granted to Indians for study in foreign countries and in India and one travel grant was awarded to a medical officer of health to study health unit work in Ceylon. Four other fellows completed their studies during the year.

SECTION XII.
MISCELLANEOUS.
Nutrition.

155. The question of nutrition has within recent years commanded such widespread interest not only from medical and agricultural research workers but also from politicians and the general public that this report would be seriously incomplete if it made no mention of the subject.

The following paragraphs published in the May, 1937, report of the Health Committee of the League of Nations, review the position.

“ Since 1935, the Health Organisation has been engaged in the study of nutrition in its relation to public health ; the preceding Health Committee in 1934 included in its three-year programme the drafting of a general report on the problem of nutrition and entrusted this task to Dr. W. R. Aykroyd and Dr. Etienne Burnet. This report, intended primarily for public health administrations, defines the rôle of nutrition in public health and preventive medicine ; it served as a basis for discussion when, at the sixteenth Assembly, twelve delegations requested the inscription of this problem on the agenda.

“ On the proposal of the Australian delegate, the Assembly recommended that the Health Organisation should continue and develop its work on nutrition in collaboration with the technical organisations of the League, the International Labour Office and the International Institute of Agriculture ; at the same time, the Assembly decided upon the creation of a Mixed Committee of experts in agriculture, economics and public health, with the mandate of presenting a general report to the next Assembly on the problem of nutrition in its public health and economic aspects. The nineteenth International Labour Conference (1935) adopted a similar recommendation.

“ In October, 1935, the Health Committee having considered the Burnet-Aykroyd report, decided to set up a Technical Commission on Nutrition. This Commission, at its first session in London in November 1935, laid down the physiological bases of nutrition and established the food requirements of human beings during their growth, from conception until adult age. With a view to the application of the recommendations of the Committee in different countries and their adaptation to varying geographic, economic and social conditions, the report was communicated to learned societies and social study institutions in various countries.

“ At its second session held in Geneva in June 1936, the Technical Commission examined the observations communicated by various bodies, and revised and amplified its London report in certain respects. This revised report was communicated to the mixed Committee, in conformity with the Assembly's resolution in 1935, and was included in that Committee's report to the 1936 Assembly.

“ The report of the Technical Commission recommended for further study a list of problems as follows:—

- (a) Assessment of the nutritional state of children ;
- (b) Nutritive food requirements during the first year of life ;
- (c) Minimum vitamin and mineral requirements ;
- (d) Minimum fat requirements ;
- (e) The nutritive and “ supplementary ” values of the different protein-containing foods, to determine to what extent and in what forms animal protein is necessary for growth and health ;
- (f) The relative nutritive value of different cereals according to the degree of milling ;
- (g) The extent to which the increasing consumption of sugar is detrimental to health ;
- (h) Influence of climate on food requirements ;
- (i) The extent to which diets in common use fall below the standards recommended in this report ;
- (j) The optimum amounts of milk required at different ages.

“ The study of questions (a) and (b) was considered by two consultations of physiologists and pediatricians (December 1936), representing the national agencies to whom

Abbreviations:—

<i>U. P.</i>	.	.	United Provinces of Agra and Oudh.
<i>C. P.</i>	.	.	Central Provinces and Berar.
<i>N. W. F. P.</i>	.	.	North West Frontier Province.
<i>P. H. C.</i>	.	.	Public Health Commissioner with the Government of India.
<i>M. O. Hs.</i>	.	.	Medical Officers of Health.

the Technical Commission's report had been submitted. As regards the methods of assessment of the nutritional state of children, the experts recommended different types of survey in accordance with the number of children to be examined. The first type is applicable to the state of nutrition of large groups of children; it is limited to a record of age, sex, physical appearance, weight and height. The second type of survey involves more extensive tests but applied to smaller groups of children. In addition to the tests under type I, a thorough medical examination is recommended as well as an economic and social survey of the families. The third type of enquiry, biotypological in character aims at studying the disturbances affecting the human body owing to a quantitatively and qualitatively deficient diet. The latter type will include various somatometric and physiological measurements, bearing upon the different bodily functions, as well as blood and sensorial measurements and psychological tests. Several of these different types of study are being carried out in Belgium, France, the Netherlands, the United States, the United Kingdom, Poland and Norway; others, of the first and second types, are contemplated in Sweden, Czechoslovakia and Austria and will deal with 50,000, 10,000 and 20,000 children respectively.

"The second group of experts has determined the nutritive food requirements during the first year of life. The participants distributed among themselves the following three problems for further study:

- (1) Has the daily administration of more than 750 cc of cow's milk to children between 6 and 12 months any unfavourable influence on the nutritive exchanges and particularly on the absorption of calcium and iron?
- (2) What are the differences between the action of an artificial preparation of an irradiated sterol and that of irradiated milk, when quantities containing the same number of international units of vitamin D are administered?
- (3) Is it desirable to provide systematic preventive treatment against anaemia for all children between 4 and 12 months by the administration of an iron salt?

"The problems recommended for study under (c), (d) and (e) above should now be taken up in some detail—namely, the minimum vitamin, mineral and fat requirements at different ages, and the nutritive and "supplementary" values of the different protein-containing foods. These problems have been submitted to the learned societies and scientific bodies in several countries, which in some instances have nominated special commissions *à* rapporteurs for the purpose. It is on these questions that study will be concentrated during 1937—namely, in three successive stages. First, the drafting of a report which will be based, in particular, on the views expressed by the leading scientific institutions and national nutrition commissions; next, the consideration of that report by a group of experts and formulation by them of relevant recommendations; finally, the deliberation of the Technical Commission on those recommendations and its advice thereon.

"As regards the question of the optimum amount of milk required at different ages (problem j), this should be studied in its relation to human growth, the pathogenics of rickets, dental caries and anaemia and correlated to climatic factors and dietary habits of populations. These studies should be based on the experimental studies in animal metabolism and on observations made in children's institutions (nutritional state and growth of children receiving supplementary milk ration as against children not in receipt of this ration). Similar observations should be made in the case of nursing and pregnant mothers.

"A general study should be made of the problems under (h) and (i), in order to establish, on the one hand, the extent to which dietaries in common use fall below the standards recommended in the report of the Technical Commission, and, on the other, what are the differences observed as regards the state of nutrition of people in different countries or in different regions of the same country. Should such differences be found, it would be necessary to determine whether they are essentially due to the influence of climate.

"Finally, the attention of the Health Committee has been drawn to the interest there would also be in a study of the adulteration of foodstuffs, particularly of the addition of antiseptics and colouring matters.

"The work of the Technical Commission on Nutrition has aroused the greatest interest both in the medical world and outside it. The Commission's first report on the physiological bases of nutrition has created a considerable impression, not only in Europe, but also overseas. Thus, the agenda of the Inter-Governmental Conference of Far Eastern Countries on Rural Hygiene includes items inspired by the Commission's report such as the composition of dietaries, nutritive value of the principal foods, deficiency diseases, the method of their investigation having to be adapted to local contingencies. Likewise the Commission's recommendations will be followed in the action following on the study made by Professor Dragoni and Professor Burnet in 1935 in regard to popular nutrition in Chile.

“ Finally, problems concerning nutrition cannot fail to figure prominently in the agenda of the Conference on Rural Hygiene in American countries and in that of the European Conference on rural life.

“ The procedure followed up to the present in the study of nutrition by the Health Organisation has produced valuable results in a comparatively short space of time. Since, therefore, it has proved its worth, there is no reason to modify it. Thus the Technical Commission will remain the pivot of all activity in this field. For specific studies it will, as in the past, have the benefit of the collaboration of groups of specialists or can apply for authoritative opinions to national authorities, leading scientific institutions, learned societies, institutes and schools of hygiene—the latter carrying out certain field studies on behalf of the Commission. The scope of the activities contemplated is thus apparent. It is incumbent upon the Health Committee to secure their co-ordination in their different aspects.”

In India, especially since the assumption of the Viceroyalty by H. E. Lord Linlithgow, interest in the question of nutrition has grown rapidly, but it is to be noted that this country was by no means behind others in the field of nutrition research. In fact, the Indian Research Fund Association with considerable foresight has for some 15 years past been financing research work on nutritional problems and the first Director of Nutrition Research, Sir Robert McCarrison, carried out pioneer investigations on different aspects of the nutrition problem and demonstrated their importance to India long before the present world-wide interest was roused. The importance of many of the facts described and published years ago by Sir Robert McCarrison is only now being generally recognised. It was not, therefore, because of lack of information that economists, doctors and agriculturists failed to appreciate the importance of nutrition in determining the state of the public health, but now that the question is in the forefront it may be hoped that the new knowledge available will, sooner rather than later, be used to benefit the people of this country, so many of whom suffer from malnutrition and deficiency diseases. “ There is abundant evidence indeed that a very large proportion of the population is under nourished and that this nourishment not only affects the mental and physical energy of the individual but increases the morbidity and mortality of the multifarious infections to which he is subjected. Further, the more the matter is investigated the more sufferers from diseases due to specific food deficiencies do we recognise. On the other side we have the very low economic status of the population as a whole, a common factor in the nutrition problem in almost any country but of exceptional importance here.”

In a recent note on ‘ Nutrition work in India ’ prepared by Dr. Aykroyd, the following views are expressed :

“ Hitherto the view that malnutrition is prevalent in India has rested on *a priori* reasoning ; on general knowledge of the conditions prevailing in the villages and the poorer quarters of towns and cities ; on scattered observations regarding the existence of food deficiency diseases ; on animal experiments ; on the pronouncements of experts ; rather than on exact data collected by systematic research. Research in India is, however, now being organised for the collection of these fundamental data, which will enable the whole problem to be defined and clarified, and vague general statements replaced by precise knowledge.

“ Human nutrition research and public health nutrition work are impossible without knowledge of food values. There is at present no comprehensive table of food values available for general use in India. In 1935 a systematic survey of the nutritive value of Indian foodstuffs was begun in Coonoor, and has rapidly progressed. Tables giving the value of about 200 common Indian foodstuffs as regards their content of calories, proximate principles, calcium, phosphorous, and iron will shortly be published. Simultaneously about 160 foods have been investigated for their vitamin A and carotene content, a similar number for vitamin C content, and about 50 for vitamin B² content. Research on the biological value of the proteins of common foods is at present in progress in Coonoor and elsewhere. An investigation of the distribution in foodstuffs of the various factors in the vitamin B² complex is being carried out in Calcutta and also in Coonoor. In Coonoor the effect of various factors—storage, cooking, etc.—on food value has been studied.

“ There is still much work to be done in this field. For example, the effect of common Indian methods of cooking on nutritive value needs further investigation. The systematic survey of nutritive values will require extension over many years. But already sufficient data has been gathered to provide the necessary basis for field research and public health work, and it is to be anticipated that nutrition work in India will be greatly stimulated by the publication of preliminary tables of food values.

“ Dietary surveys are being carried out by the Coonoor and Calcutta research units. The preliminary results of surveys in progress in South Indian villages suggest the diet of the average villager is even more deficient, from the stand point of both quality and quantity, than earlier more casual investigations had indicated. It appears that the diet of the poor *ryot* in South India is composed of an insufficient quantity of cereal grains, rice or millet, and contains milk, meat, fruit and vegetables in negligible quantities or not at all. There is evidence, however, that grosser degrees of malnutrition are encountered among the poor in towns and cities, which is probably due to the fact that the latter live on a staple of milled rice, with negligible additions, while the villager usually consumes hand-pounded rice or millet which is not subjected to milling.

“ Attempts are being made to study the effect on health and physique of various types of diet. The diets supplied in a number of childrens' residential hostels have been tabulated, and simultaneously investigations of the 'state of nutrition' of children consuming these diets have been carried out. In this way it is possible to observe the relation between diet and general health, physical development, and the incidence of food deficiency disease, and also to obtain information about energy requirements. It appears that children in residential hostels in South India, though usually fed on a diet costing about Rs. 3 per month which leaves much to be desired as regards quality, are very appreciably heavier for a given height than children of the general population. This fact in itself throws light on the 'state of nutrition' of the general population.

“ Enquiries have also been carried out in day schools in South India. The Coonoor laboratories have completed an enquiry into the 'state of nutrition' of some 5,000 school children in South Indian towns, the general result of which is to show that a high percentage of children are in a state of malnutrition and display symptoms of food deficiency disease. In this connection attention may be drawn to the annual reports of the Health Department, Corporation of Madras, which show the prevalence of malnutrition and food deficiency disease among children of the poorer class attending Corporation Schools in Madras.

“ While pellagra is uncommon in India a large percentage of children in South India show a pellagra-like stomatitis which is curable by foods rich in the P-P (pellagra-preventive) factor. Xerophthalmia of varying degrees of severity is commonly met with, and Keratomalacia is one of the most important blinding diseases in South India. Follicular keratosis of the skin, due to diet deficiency, is of extremely common occurrence.

“ Striking evidence that average Indian children are in a subnormal 'state of nutrition' has been provided by experiments with skimmed milk. These preliminary experiments carried out in children's homes indicate that skim milk, fed in comparatively small quantities, is a valuable addition to average South Indian diets. The fact that stomatitis, a common deficiency disease, disappears when skim milk is fed, is of obvious importance. The greatest improvement in general health and vitality occurred in the girls receiving 1.5 ozs. of skim milk powder daily, and it is probable that the best results would be obtained by giving quantities of this order or more. It is to be observed, however, that the addition of even small quantities of milk in this form,—the cheapest form,—involves a considerable percentage increase in expenditure on food.”

“ Further evidence of widespread malnutrition is provided by blood examination. It has been found that the haemoglobin content of the blood of South Indians is on the average some 20 % below European standards. This low haemoglobin content does not appear to be physiological; it is probably evidence of mild anaemia resulting from the consumption of a diet poor in iron. If large doses of iron are given to South Indian children, their haemoglobin rapidly rises. It is therefore probable that typical Indian diets contain insufficient "available" iron to maintain the blood in a fully satisfactory condition.

“ Preliminary clinical experiments suggest that a large proportion of the population may be in a state of 'vitamin C subnutrition', which is in conformity with the observation that intake of fruit and vegetables is in general small. Overt scurvy does not, however, appear to be common. The relation between a low intake of vitamin C and 'state of nutrition' needs further investigation.

“ Basal metabolism studies have been undertaken; in general these indicate that the basal metabolism of average Indians is lower than that of average North Americans or Europeans.”

Largely because of the emphasis which His Excellency has at different times laid on the practical human importance of the subject and also as the result of a survey the food supplies of Madras Presidency in relation to 'consumption units' which Dr. Aykroyd, the Director of Nutrition Research, had carried out, the Governing Body of the Indian Research Fund Association reached the conclusion that the time had come for the formation of an advisory committee, the members of which should have special knowledge of the problems associated with human and animal nutrition. The main functions of this Committee, it was thought, should be to advise on programmes of research work in the field of nutrition; to make recommendations in regard to nutrition surveys; and to indicate methods to be adopted for dissemination among the urban and rural populations of this country of the facts elicited from these researches and surveys.

In May 1936, a Nutrition Advisory Committee was appointed with the P. H. C. as Chairman and Dr. Aykroyd as its Secretary. This Committee held its inaugural meeting in Simla on 18th, 19th and 20th June 1936, and was honoured by the presence of H. E. the Viceroy who opened the proceedings.

His Excellency emphasised the need of practical application in the homes of the people of the fruits of research work in terms of the diet of both rural and urban populations. He also referred to the proposals envisaged by the Royal Commission on Agriculture and endorsed by the Royal Commission on Labour to set up a Central Institute of Nutrition. He particularly remarked on the need for establishing a link between research on the problems of human nutrition and those of agriculture and invited the members of the Advisory Committee to consider the expediency of establishing a point of contact between these two branches of science.

It will, therefore, be of interest to indicate briefly the steps which have recently been taken to make a beginning at least in giving effect to this policy. While India had in Sir Robert McCarrison, and has now in his successor Dr. Aykroyd, a specialist of international eminence, the ordinary machinery of Public Health administration does not include Public Health Officers with a special knowledge of its technique or special training for propaganda or other activities aiming at the practical application of the results of laboratory investigations. This was perhaps natural in the early years of nutrition work, as the first objective obviously was to collect the scientific data on which practical work extending to the homes of the people could be based. This material having been brought together by the labours of Sir Robert McCarrison and his associates both in the laboratory and the field, the time is now ripe for a move to popularise these results.

A report of the Advisory Committee's proceedings was issued as soon as possible and copies were circulated to all local Governments by the Government of India. In the first place, the Committee drew attention to the need for a preliminary survey of the "state of nutrition in relation to the dietary habits of the people", if the state of nutrition in India were to be improved. These preliminary surveys, it was recommended, should be carried out in representative areas throughout the whole country on the lines indicated in the Committee's report.

Emphasis was also laid on the importance of every local Government having at least one officer with special knowledge of the subject. It was proposed by the Committee that a three months' course of training at the Nutrition Research Laboratories in Coonoor should be arranged for officers

deputed by the Central and Local Governments so that every Government might have at least one officer in its Public Health Department with that special knowledge.

The first response of local Governments to this proposal was somewhat disappointing, perhaps because there seemed to have been some misapprehension in regard to the expenditure involved. After a further letter on the subject was sent out by the Government of India, it was decided to proceed with the proposal and the course of training envisaged by the Nutrition Advisory Committee commenced at Coonoor on 15th April, 1937. Those attending the course include Medical Officers of Health from : (a) Madras ; (b) United Provinces ; (c) Burma ; (d) Bihar ; (e) Bengal ; (f) Orissa ; and (g) Punjab ; and (h) permission has also been given to the Medical Inspector of Schools, Indore, to attend the course. These workers will be attached to public health departments, and their functions will include : the determination of height-weight-age averages in different social groups, the detection of malnutrition in schools, the planning of institutional diets, the preparation of educational material and the organisation of propaganda work in towns and villages.

It is hoped that it may be possible to hold a further course of the same kind in the near future and that those provinces not represented at the present course will realise the advantage to be gained by sending one of their officers to Coonoor for the training and instruction given there. There can be little doubt that the medical and public health departments of every local Government will in the near future be compelled to co-ordinate the question of nutrition, both human and animal, with their normal activities, if their work is to be made more effective. It seems reasonable to believe that this end can be reached to some extent by having in these departments at least one officer having up-to-date knowledge of the intricate problems associated with malnutrition and deficiency disease and of the means by which these defects can be remedied.

In accordance with another of the recommendations made by the Nutrition Advisory Committee, the Governing Body, I. R. F. A., have appointed an experienced officer whose duty it will be to develop and maintain a close liaison between human nutrition work and agricultural research. This officer is now at Coonoor undergoing a six months' intensive training under Dr. Aykroyd. At the end of this period he will be given accommodation in the Imperial Agricultural Research Institute, Delhi, where he will be in immediate touch with the research activities of the workers in the agricultural field. His main function will be to link up the results of human nutrition research with agricultural investigations and to indicate to agricultural workers the adjustments which seem to be required to meet the varying nutritional requirements of the populations of India. At the present moment, it is not possible, nor does it seem wholly desirable, to attempt to make a more exact definition of the liaison officer's duties and functions. Rather it is hoped that time and experience will indicate the lines along which his activities can best be directed.

It may be added that Sir John Russell agrees with the importance of this appointment ; in his opinion it will link up two very effective services and cannot fail to lead to important developments both on the agricultural and the dietetic sides.

Yet another of the recommendations made by the Nutrition Advisory Committee has been accepted. Three field workers on nutrition have been appointed and are now in Coonoor receiving training with special reference to the conduct of dietary surveys. On the advice of Dr. Aykroyd, who already

has on his staff officers who have been engaged in this type of work in South India, these three new workers have been recruited with the intention of carrying out additional surveys in representative areas of Bengal and Assam, of the U. P. and the Punjab. Exact knowledge of the diets in common use is an essential preliminary to other investigations and to recommendations for improvement of nutritional needs. It is hoped that all local Governments will realise the advantage to be gained from this work by the populations under their charge and that they will assist in promoting these surveys by instructing the officers of their Medical, Public Health, Agricultural and other Departments to co-operate with the workers it is proposed to employ in carrying them out.

Under the auspices of the Royal Society, London, and by means of a grant from funds originally placed at the disposal of the Royal Society by an Indian philanthropist, Dr. Curjel Wilson, lately a member of the W. M. S., has during last winter carried out a wide series of dietary surveys among families in the Punjab and in Delhi Province. The data collected by Dr. Wilson are now being examined statistically and are being prepared for publication. These data should be of great value to the Governments concerned in their efforts to improve conditions among the poorer classes of society.

It is gratifying to be able to record that, in both Provinces in which Dr. Wilson carried out her work, the local Governments gave her willing and valuable co-operation without which it would have been almost impossible to obtain results. Not only did the Punjab Government give assistance through their official Departments, but they sanctioned a grant of Rs. 500 which was utilised by Dr. Wilson to facilitate her collection of the food expenditure and consumption of individual families. Dr. Wilson intends to carry out similar work next cold weather in the Central Provinces and Orissa and there is reason to hope that the Governments of those two Provinces will co-operate in the same generous fashion. Only those who have had practical experience of the work involved in carrying out dietary surveys can realise the immense difficulties of that task and it is only made at all possible where Governments and others interested give active and continued assistance. These surveys, it may be repeated, are the very basis of all nutrition work, and it is essential for success that they should be prepared in as accurate a fashion as possible. Inaccuracies are difficult to avoid, but every inaccuracy detracts heavily from their value.

The Nutrition Advisory Committee also recommended that an Assistant Director of Nutritional Research should be appointed. The Committee were of opinion that the Director would be overburdened, if he attempted to control all the new field work in addition to the experimental and laboratory research units whose activities have during recent years continued to expand in different directions. The Governing Body, I. R. F. A., accepted the Advisory Committee's recommendation and have already taken steps to recruit an officer possessing the requisite qualifications. When that officer takes up his duties, Dr. Aykroyd will be able to devote more of his time to field work and to get into closer and more frequent touch with the Medical and Public Health Departments of the various provinces.

The subject of propaganda, or as His Excellency put it, the need for practical application in the homes of the people of the fruits of research, is also being energetically pursued. In 1928, Sir Robert McCarrison published a small book entitled 'Food' which has gone through several editions and which has also been translated into a number of vernacular languages. This book

has been widely used by those in charge of hostels, boarding schools and similar institutions and has been of great value to those concerned in improving the diets of the children under their charge, especially when finances have forbidden any large additional costs. Human nutrition research and public health nutrition work are, however, impossible without knowledge of food values. There has been up till recently no comprehensive table of food values available for general use in India, but in 1935, under the auspices of the Indian Research Fund Association, a systematic survey of common foodstuffs in India was undertaken and this has progressed so rapidly that Dr. Aykroyd, Director, Nutrition Research, has been able recently to issue a Health Bulletin which summarises the available knowledge concerning the nutritive value of Indian foodstuffs for the benefit of public health workers, medical practitioners, superintendents of residential institutions and others interested in practical dietetics. With the help of the tables in this Bulletin it is possible to work out 'balanced diets' for individuals and groups and, in order to indicate what is meant by a 'balanced diet', a brief statement outlining modern dietetic principles is to be found in the first sections of the Bulletin. This Bulletin which has been issued at the nominal price of two annas contains a mine of information from which it will be possible for public health administrators and others to extract material which can usefully be issued in leaflet or pamphlet form in the local vernaculars. It is impossible in these pages to go into details, but a study of the Bulletin will amply reward the interested reader. Other notes, such as those recently issued from the Nutritional Laboratory at Coonoor on the value of skimmed milk, are issued at intervals. Arrangements are also under way for the preparation of series of coloured posters. In these different ways it is hoped to pass on acquired knowledge so that those interested may use that knowledge for the benefit of the general population of the country.

In order to give some idea of the expenditure on nutrition work which has been and will be incurred by the Indian Research Fund Association, the following details are of interest. In the first place, the cost of the maintenance of the Nutrition Research Laboratory at Coonoor with its staff of 11 qualified research workers, about half of whom are medical men and the others chemists and biochemists, amounts to over Rs. 82,500 per annum. Six other grants for nutritional research include one to the department of Biochemistry and Nutrition in the Calcutta All-India Institute of Hygiene and Public Health and three to University workers, whilst their total annual cost amounts to over Rs. 18,000. In addition, and in order to implement the recommendations of the Nutritional Advisory Committee, the I. R. F. A. have earmarked a sum of Rs. 1.5 lakhs for the additional activities outlined in previous paragraphs. It has been decided to spread the expenditure of this sum over a period of five years in order to ensure some degree of continuity of work. The average additional expenditure will therefore be approximately Rs. 30,000 per annum. During the past decade, the total amount devoted to nutrition work has approximated to Rs. 1 lakh per annum and for the next five years will reach a figure of Rs. 1.3 lakhs per annum.

In the report of a dietary survey recently carried out in England under the auspices of the Medical Research Council, the authors express the opinion that "the main causal factor of inadequate diets in many households is ignorance of how to buy, what to buy, and how to use to the best advantage the material bought". And they go on to ask the question, "How can things be improved?" They disagree with "those who imagine that they can alter the dietary habits of the people by direction or dictation. . . . It is not dictation but education which is required." If that be the case in England, is it

not much more so in this country? What are the methods to be adopted to educate the people in correct dietary habits? How are the facts obtained from these dietary surveys to be got across to the persons concerned? A certain amount of educational work by means of pamphlets and posters, etc., is being carried out by public health departments and by charitable bodies such as infant welfare associations, the Indian Red Cross Society, etc. But much more remains to be done in this direction before it will be possible to bring to the notice of the average town dweller or villager the practical results of scientific research and to get him so to adjust his diet as to give him the best value for his expenditure on food materials.

Yellow Fever.

156. The danger of the introduction of yellow fever into India has been a subject of concern to its public health authorities for many years, but with the development of air traffic the question has become one of urgent importance. During more recent times, the Government of India's representative at the meetings of the Office International d'Hygiene Publique in Paris has unfailingly impressed on his fellow delegates the grave view which his Government take of the potential danger and the Government of India's attitude has been abundantly justified by recent events. In the first place, during 1936 a new air route has come into operation between Lagos and Khartoum where it links up with the Capetown-Cairo route. There is therefore the possibility of infected persons and mosquitoes being carried from endemically infected areas in West and Central Africa to India within the incubation period of the disease. In the second place, it has been shown that "an endemic type of yellow fever could occur, and did occur, in districts where there were no *Aedes aegypti* (stegomyia) mosquitoes". "The *Aedes aegypti* is no longer the sole villain of the piece. There is another unknown villain, or villains, and perhaps other hosts to the disease than man. Vast areas of the hinterland of both South America and Africa are endemic centres of the disease." This new variety of yellow fever, called "jungle yellow fever", chiefly affects workers on the land and is not contracted in houses, so that it is distinct from the urban type of the disease ordinarily contracted in dwelling houses. There seems little doubt that human beings are not essential to continuance of the endemicity nor to spread of this new type. As Col. James, President of the Yellow Fever Commission of the Office International, remarks it would seem that jungle yellow fever in man is an accidental occurrence in the course of an epizootic among lower animals; this is confirmed by the fact that monkeys in widely separated endemic areas in South America have been shown to possess an acquired immunity to yellow fever infection.

Recent laboratory findings have demonstrated that the yellow fever virus can be transmitted from monkey to monkey by a widely distributed genus of mosquito, certain species of which have been observed to attack man viciously in districts of jungle fever endemicity. Moreover, the new jungle yellow fever virus has been transmitted from monkey to monkey by the *Aedes aegypti* mosquito, the most important urban vector of the disease. If, as all recent work indicates, the virus of jungle yellow fever is identical with that of the urban type of the fever, the position in India is that, in addition to the immense human reservoir for the virus, there exists a vast monkey reservoir which could by no practical means be eliminated or controlled. This new knowledge makes it all the more necessary to take every possible measure, however stringent, to prevent introduction of the yellow fever virus to this country.

In regard to Africa, which is of primary interest to India in view of the rapid development of air traffic, during 1935 cases of yellow fever were notified

in French Equatorial Africa, the French Colonies of Dahomey, Ivory Coast, Niger, Senegal, Sudan and Togoland and cases also occurred in the British Colonies of the Gambia, Gold Coast, Nigeria and Sierra Leone. Further cases were reported from the Gold Coast in 1936. The immunity survey by the International Health Division of the Rockefeller Foundation, undertaken largely as a result of the Pan-African Conference held at Capetown in 1932, was completed in 1935. It has shown that in Africa immunity to yellow fever among human beings is widely distributed over a region extending from the coast of Senegal eastwards for 3,300 miles to the upper reaches of the White Nile in the Anglo-Egyptian Sudan. Positive mouse protection tests have been obtained in Egypt, the Anglo-Egyptian Sudan and in Uganda, suggesting the presence of sporadic infection in the surveyed tracts. In the south-western area of the Anglo-Egyptian Sudan, considerable numbers of persons are shown to have acquired immunity to yellow fever and the western and north-western parts of Uganda are definitely within the area of recent infection. Further, mouse protection tests done on monkeys make it almost certain that the same epidemiological factors exist in Africa as have been found in South America. The danger of yellow fever reaching the east coast of Africa has, therefore, been considerably enhanced and as the stegomyia mosquito is to be found freely breeding all along that coast, the disease may reach India by sea as soon as any of the East African ports are infected. The fact is that the stegomyia mosquito is also ubiquitous round the coastal regions of India, although it is only fair to add that in a few of the larger ports, such as Bombay and Karachi, anti-stegomyia campaigns have been instituted and regular checks are being made to determine the degree of infestation of harbour areas, shipping, etc., in these ports. Although the air-port of Karachi and the neighbouring cantonment and its surrounding areas are remarkably free from stegomyia, in the Karachi harbour area the recorded index has been as high as 10 % in January, 11 % in February and 9 % in May, 1937. Similarly, high stegomyia indices continue to be reported amongst the country craft using Bombay harbour. In view of the increasing proximity of infected areas to India, both in time and space, more sustained effort to stamp out this dangerous vector must obviously be made.

The questions of stegomyia eradication and control of air traffic have received studied attention from all African Governments whose territories lie along the air route between Capetown and Alexandria. In the Sudan, all aircraft are examined and sprayed on entry and departure at the frontier aerodromes and stringent anti-mosquito measures are taken in all towns situated near the aerodromes used for international traffic. In Kenya, routine disinfection of all planes arriving at Kisumu, Nairobi and Mombasa is being carried out, whilst these aerodromes are being kept as mosquito-free as possible. In Cairo and Alexandria, also, every machine on arrival from the south is thoroughly fumigated before it is allowed to proceed. The Egyptian Sanitary and Maritime Quarantine Board have agreed to do their best to ensure proper disinfection of all machines flying from Central Africa to Karachi and to prevent passengers from embarking at Alexandria for India if they can arrive there within less than nine days from possible exposure to infection. Even so, on more than one occasion air passengers have reached Karachi within the 9 days period and it is fortunate for India that none of these persons developed the disease.

In order to provide further safeguards for this country, the Government of India in June and September, 1936, issued notifications, under the Epidemic Diseases Act, which forbade the entry into India of any aircraft which

had started from or alighted in a yellow fever endemic or 'silent' area except such aircraft which have obtained at Alexandria or Cairo a certificate of disinsectisation with 'Pyroicide 20' in the manner prescribed. These notifications also prohibited the entry into India of a passenger or a member of the crew of an aircraft within 9 days of his having been in an endemic or 'silent' area, unless he were protected by inoculation or by a previous attack of yellow fever. The prohibition period of 9 days is 3 days longer than that laid down in the Aerial Navigation Sanitary Convention, but this extended period was fixed in order to cover both the 6 days incubation and the first 3 days of infection during which a patient is infective. As it is known that the incubation period in certain cases may be as long as 13 days, it cannot be argued that the regulations in force in India are in any way too strict.

Following the issue of the Government of India notifications, all aircraft coming from South Africa, before leaving for Karachi, are now fumigated at Cairo or Alexandria with 'Pyroicide 20', which experimentation had shown to be the most satisfactory fumigant for the destruction of mosquitoes, and the certificates of fumigation granted at these ports are examined on arrival of the aircraft at Karachi. As the majority of the aircraft crews of aircraft coming from Central Africa are still non-immunised to yellow fever and as these individuals might infect mosquitoes entering the planes at intermediate ports of call, fumigation at Karachi is in force for all such machines; it is not proposed to abolish this preventive measure until the position becomes easier than it is at present.

Informal arrangements have been made with the Director of the Egyptian Maritime and Sanitary Quarantine Board to keep the Airport Health Officer at Karachi informed by cable of the possibility of a passenger reaching India by Air from infected or suspected areas in Africa within the 9 days period. This arrangement is all the more necessary, as the quarantine block for the detention and isolation of such persons at Karachi airport is not yet complete. It also enables the Karachi Airport Health Officer to intimate to the health authorities of the ports of disembarkation on the air route through India, the arrival of a suspected person.

The Government of India have also framed rules for the sanitary control of Indian aircraft, which are based on the provisions of the International Sanitary Convention for Aerial Navigation. They have taken steps to enable medical officers, particularly those belonging to the Public Health and Medical Research Departments, to be immunised against yellow fever while they are on leave in England, whilst Officers of the Medical Research Department are to have the opportunity of learning the method of administering the yellow fever vaccine. In addition, the Government of India have now arranged to stock in Bombay small supplies of vaccine which would be available at once should any emergency unfortunately arise. By these several measures, it is hoped that catastrophe will be avoided and that, if by some mischance infection reaches India, properly immunised medical officers will be available to carry out the necessary further preventive measures.

It must be remembered that the whole responsibility for the preventive campaign does not rest on the shoulders of Government. Port Trust authorities, municipal councils, local boards and individual householders must all play their part in the attempt to eradicate the *stegomyia* vector of this deadly disease. With co-ordination of effort, the danger can be reduced to infinitesimal proportions and may, it is hoped, be entirely avoided.

Drug Adulteration.

157. Following the adoption of a resolution in the Council of State in 1927, a Drugs Enquiry Committee, under the chairmanship of Colonel Chopra, I.M.S., was appointed in 1930 by the Government of India. This Committee submitted an exhaustive report on the whole question of the control of the import, manufacture and sale of drugs and medicines in India. The main conclusions reached by the Committee were that drugs and medicines, whether imported or manufactured in this country, were subject to considerable adulteration and that in order to secure effective uniformity, central legislation was required for the setting up of suitable standards. Local Governments were consulted in regard to the numerous recommendations made in the Committee's report, but while there was general acceptance of the recommendations, the general financial stringency of the time prevented their active collaboration. The whole question was once more discussed in the Council of State during 1935 and the general opinion was that the conclusions of the Drugs Enquiry Committee should be implemented as soon as possible. The Government of India, recognising the seriousness of the situation, again impressed on Local Governments the need for action and enquired whether, in view of the urgency of the problem, they would be prepared to take further action. The establishment of a Central Drug Testing Laboratory was also made the subject of reference.

A number of provincial Governments considered that little could be done in the absence of Central legislation which would prescribe common standards for drugs and medicines and suggested that this was the first step to be taken. This proposal was carefully examined but for various reasons it was found impossible to carry it through.

In March, 1935, the League of Nations Health Organisation drew the attention of States Members' Governments to the fact that the work carried out by its Permanent Commission on Biological Standardisation had enabled the latter to recommend the adoption of international standards for a series of products, the assay of which could only be effected by biological methods. An Inter-Governmental Conference on the subject was held in May 1935, at Geneva, the Government of India being represented by their Public Health Commissioner. After three days' discussion, the Conference adopted a number of resolutions which are detailed in Section V of this report. In connection with the resolution recommending the setting up of national centres in each country, the Nutrition Laboratories at Coonoor and the Pharmacology Department of the Calcutta School of Tropical Medicine have been used for some time past as centres for the standardised vitamins and standardised hormones and drugs respectively, so that the Committee's proposal was no innovation in this country. The suggestion has been made that the Central Research Institute, Kasauli, should be the national centre for standardised sera, etc., and when that suggestion has been accepted, India will have adopted in full the recommendations made by the Biological Standardisation Committee on this question.

As a first step towards the effective control of drugs and medicines in India, the Government of India have sanctioned the establishment of a Biological Standardisation Laboratory under the direction of Brevet Colonel Chopra, I.M.S. This laboratory was opened in March, 1937, being housed for the time being in the All-India Institute of Hygiene and Public Health in Calcutta. The Report of the Drugs Committee recommended that the Central Laboratory should be located in a centre (a) where the drug industry was progressing; (b) which was a centre of drugs import and distribution; and (c) where drugs

were actually being used on a large scale. The establishment of the new laboratory in Calcutta complies with all these recommendations. Bio-assay and pharmaceutical sections have been provided and the technical staff which includes a pharmacologist, a senior experimental assistant, a pharmaceutical chemist and a biochemist has started its work. The authorities of the National Institute for Medical Research and the Medical Research Council, London, have been generous in their offers of assistance to and collaboration with the new Drugs Control Laboratory in Calcutta. The work of this laboratory will no doubt in due course indicate the lines on which further advance is necessary.

It will probably be necessary to open later on a further section for the testing of sera and vaccines; evidence already shows that these substances require a degree of control which does not yet exist in this country. But the Drugs Enquiry Committee at no time considered that the whole of their control scheme should be started at once. An institution of this kind must be allowed to develop gradually and a period of 3-5 years will probably be necessary before a complete scheme can be put into full working order.

It must be remembered, however, that one of the essential parts of the scheme is the development of a suitable laboratory in each province, as these will play an important part in the evolution of the Central Government's laboratory. Under the new Constitution now in force in India, the control of drugs is vested in provincial Governments and it is to be expected that these Governments will find it necessary to establish their own laboratories for this purpose. At the same time, it will be necessary to evolve some arrangement by which co-ordination will be effected between these provincial laboratories and the Central Government's laboratory.

The Drug Enquiry Committee's report visualises that the Central Laboratory will undertake commercial testing of drugs for manufacturers and dealers on payment of fees. It is understood that the laboratories of the Pharmaceutical Society of Great Britain, where drugs are tested for the drug control authorities, undertake work of this kind for private manufacturing firms and it would seem that the Government of India's laboratory might well do the same. In a country like India, where the drug manufacture industry is still in its infancy, the expert advice available in the Central Laboratory would be of great assistance in the development of the industry. Many of the manufacturing firms in India have not at present the means for proper testing and standardisation especially where biological methods of assay are involved and are, it is believed, experiencing considerable difficulties in having their products standardised. This question therefore is one of considerable importance and deserves further examination.

The Quetta Earthquake.

158. The earthquake which occurred in Baluchistan on the early morning of 31st May, 1935, and which lasted for little more than 30 seconds, destroyed the whole of Quetta city and a number of villages lying over a considerable tract of country and caused considerable damage to the Quetta cantonment. No less than 40,000 persons lost their lives of which by far the greatest proportion was killed in Quetta, whose population was at the time probably in the neighbourhood of 66,000. Fortunately, the troops living in the neighbouring cantonment were immediately available for rescue work and the Army Commander was able to take over administrative control of the whole area. This was the more essential as nearly the whole of the civil police force had been killed or injured. With the help of the troops all injured persons lying

in the ruined city were speedily rescued, over 2,500 dead were removed, whilst arrangements for the evacuation of sick, wounded and refugees were quickly made as the railway had not been seriously damaged. By the 14th June, 31,500 persons had been despatched by rail, but there remained about 5,000 refugees who were housed in tents on the Quetta race course, about 3,500 persons in temporary railway camps and a few hundreds camping in the civil area.

It was estimated that about 12,000–16,000 human bodies lay buried in the ruins of the dead city and these figures alone give a clear idea of the serious health problem which the catastrophe presented.

The military medical authorities had laid the foundations of a sound public health organisation both in the refugee camp and in the occupied civil areas before additional health staff could be obtained from civil sources but, by the 15th June, 9 district medical officers of health from the Punjab, a number of sanitary inspectors and additional sweepers were at work, along with a Sanitary Company provided by the military authorities. The whole public health organisation for the civil areas was placed in charge of Major (now Lt.-Col.) Nicol, I.M.S., Assistant Director of Public Health, Punjab, and he remained in charge until October by which time the danger of untoward epidemic outbreaks was over.

During the first few weeks, the work of organisation proceeded at high pressure. Within 24 hours a piped water supply was provided for the refugee camp; in outlying villages water supplies were chlorinated or otherwise treated. In the refugee camp, suitable hospitals for men and women were quickly organised, whilst an infectious diseases hospital was erected $2\frac{1}{2}$ miles outside the city area, although this was fortunately not required. Within a few days, every refugee was vaccinated against smallpox and inoculated against cholera. Milk supplies were abundant almost from the first day and all necessary medical and sanitary stores and equipment were supplied at first by the military authorities. Within a week of the earthquake, every possible health precaution had been satisfactorily completed and it is a matter for profound satisfaction that neither among the civil nor the military population in the stricken area did any outbreak of disease occur. In fact, the army medical authorities have stated that at no period for which they have records has the health of Quetta cantonment been so satisfactory as during the months following the earthquake. The fact is, of course, that at no period in the history of Quetta has there ever been maintained such a high standard of sanitation.

One of the most urgent problems facing those who took over emergency control of the civil areas lying round the ruined city was the disposal of bodies and carcasses which quickly began to decompose and cause offence from smell and from flies. Bodies and carcasses which were totally or partially exposed were speedily removed, but many of those even deeply buried soon caused a menace to health which had to be dealt with at once. Even with the protection afforded by gas masks and thick leather gloves those who undertook the urgent work of exhumation and removal were given a gruesome and repulsive task, but by the 16th June the occupied areas within a 3 mile radius of the civil areas were cleared of all bodies causing an immediate nuisance. On the advice of the Public Health Commissioner, the Government of India decided to proceed at once with the salvage of the ruined city, section by section, and within fifteen months the whole of the debris had been removed.

over 9,000 human bodies being discovered during the clearing process. This work was carried out in such a way as to cause no danger to the health of those living in the proximity of the city. In April, 1936, a section of the city was reopened for occupation and within a very short space of time, 27,000 people were once more living in Quetta in temporary one storey buildings laid out according to plans drawn up by the civil authorities. These temporary structures were in certain health respects not all that could have been desired, but a return of the people to their city and the opportunity of resuming their occupations and of finding employment were considered to be important psychological factors which outweighed all others at the time. It is hoped that in time more permanent and better houses will take the place of the present temporary erections.

For several years before the earthquake, the high incidence of malaria among the civil and military communities in Quetta had been a matter of considerable concern to the local authorities. Immediately prior to the earthquake, an officer of the Malaria Survey of India had made a preliminary reconnaissance of the malaria problem in order to advise as to the steps which should be taken to ameliorate conditions. The destruction of the city and part of the cantonment changed the whole position and the opportunity was taken to point out that, in considering the programme of reconstruction, due regard should be paid to the malaria problem. A malaria survey unit was accordingly sent to Quetta in July, 1935, and this unit was able to determine the local malaria carrying mosquitoes, to obtain information as to their habits and breeding places and to map out the distribution of malaria in Quetta and its immediate environments. A complete report was prepared and was made available to all those concerned with the reconstruction of the city and the cantonment; it remains to be seen whether or not the recommendations contained in that report will receive the consideration they deserve.

Quetta had for long been known as an endemic centre for oriental sore, which had periodically caused a considerable amount of sickness both in the military and civil communities. The masses of dry debris in the ruined city offered very favourable conditions for the breeding of sandflies in large numbers, whilst the breeding season lies between May and September. It is not surprising, therefore, that during 1935 there occurred a greatly increased prevalence of oriental sore. During 1936, the disease assumed epidemic proportions and in March of that year, a total of 760 cases were reported of which 450 occurred in the civil population, 54 among employees in the cantonment, 220 among the Indian troops and 36 among the British troops. A research unit was sent to Quetta in April, 1936, to investigate conditions and it was able to advise as to precautionary measures although, until the city was cleared, effective control was found to be more than difficult.

Nothing need be added here to what has already been said of the courage and heroism displayed by all who took part in the rescue, organisation and reconstruction work carried out in the devastated area; these were beyond all praise. This note is merely intended to give a brief outline of the difficult and unusual public health problems presented in the earthquake area and to indicate that these were solved in a manner entirely satisfactory not only to those responsible for their solution but to those for whose benefit and protection they were instituted. Those who took part in the work no doubt gained new experience in preventive medicine; none, it is hoped, will ever be called upon to reapply that experience.

Organisation of Provincial Public Health Departments.

159. In the early days of the development of modern medicine in India, as in other countries, prevention of disease received little attention, except perhaps as regards vaccination against smallpox. Indeed, few even of the members of the medical profession had what may be called the "preventive" outlook, and because of the recognised urgency of the need to provide medical treatment for the sick and suffering, effort and money were concentrated on the establishment of hospitals and dispensaries. By the time the importance of public health work came to be realised, "the physicians and surgeons were already strongly entrenched so that public health workers found it difficult to awaken any enthusiasm for preventive medicine amongst the administrative medical officers". (Megaw, 1933).

"The position is now very different. The prevention of disease has come to be universally recognised as being the chief aim of medical work." (Megaw 1933). As a result of the general change in outlook which has for the most part developed since the Great War, various provinces in India have since 1919, re-organised their Public Health Departments on a more satisfactory scale than was previously considered either possible or even necessary. But even in those provinces where considerable developments in the field of public health have been carried through, the allotments for public health activities in both provincial and in municipal and local board budgets are still much smaller than they ought to be. As a result, Directors of Public Health are severely handicapped in their endeavours to make progress. Until the existing deficiencies in public health budgetary allotments are corrected and public health development is more generally recognised to be the primary need of the people, it will not be possible to effect those improvements which are of such vital importance to the people of this country.

One of the first steps necessary for effecting improvement in the public health is the organisation of provincial Public Health Departments and the adoption of schemes whereby the supply and employment of trained Medical Officers of Health for municipal and district work can be assured. Little improvement can be expected unless Governments and local bodies provide themselves with trained personnel capable of advising on health problems and of supervising the execution of Government and local health activities both of which are so intimately associated with the welfare, happiness and prosperity of the people.

In order to throw light on the present day position, in the first place the attempt has been made to collect details from every province of India in regard to the numbers of trained health officers now employed in these areas. The following tabular statement incorporates the latest information in regard to both municipalities and districts. It indicates clearly the comparative position of the individual provinces and the wide differences which exist. It shows, for instance, that nearly half the districts and three-quarters of the municipalities in India have no qualified health officers. It also shows that, whilst a few provinces are to some extent reasonably well equipped in this respect, in others no trained health personnel has been appointed except in one or two of the large cities.

Numbers of Health Officers employed in rural areas.

(Information extracted from Provincial Public Health Reports for 1935.)

	Holding D. P. H. or equivalent degrees.		Licentiates. L. P. Hs.		No. of districts.	Districts employing M. O. Hs.	Districts without M. O. Hs.
	Whole time.	Part time.	Whole time.	Part time.			
Punjab	28	...	...	...	29	28	1
Sind . . . .	...	...	1	...	8	1	7
U. P.	40	...	29	...	48	32	16
Bihar	12	...	...	...	16	...	...
Orissa	3	...	1	...	8	4	4
Bengal	25	...	...	...	26	25	1
Assam . . . .	...	...	...	...	13	...	13
Bombay	1	...	1	...	20	2	18
C. P. . . . .	...	...	...	...	19	...	19
Madras	28	...	18	...	24	24	...
N.-W. F. P. . . .	...	...	...	...	5	...	5

Numbers of Health Officers employed in urban areas, excluding Bombay, Madras and Calcutta cities.

(Information extracted from Provincial Public Health Reports for 1935.)

	Holding D. P. H. or equivalent degrees.		Licentiates L. P. Hs.		No. of Municipa- lities.	Municipa- lities employing M. O. Hs.	Municipa- lities without M. O. Hs.
	Whole time.	Part time.	Whole time.	Part time.			
Punjab	15	7	1	18	111	13	98
Sind	7	...	...	...	6	4	2
U. P.	21	...	13	...	85	34	51
Bihar	5	2	...	...	55	7	48
Orissa	2	...	1	...	8	3	5
Bengal	24	...	...	...	117	24	93
Assam	1	...	10*	...	26	11	15
Bombay	10	...	7	...	150	17	133
C. P.	2	...	1	...	74	3	71
Madras	26	...	29	...	80	55	25
N.-W. F. P. . . .	1	...	...	...	7	1	6

*L. M. Ps.

As regards Civil Surgeons or District Medical Officers most of these officers have little time to spare from their medical duties, but in many parts of the country they continue to act as health advisers to district and municipal authorities in the absence of qualified health officers. But district and municipal health work requires constant supervision and inspection and this.

can only be given by a full-time officer free to tour at all times. This is not to deny that the civil surgeon requires to possess the preventive outlook, because co-operation between the medical and health personnel is essential if the best value is to be obtained from each. The time has come indeed when greater co-ordination of effort between the medical and public health departments should be effected and this can be arranged not only by closer association between the heads of the two departments at headquarters but by mutual assistance rendered by the personnel of each department to the other in the mufassil areas.

Reverting to the appointment of district health personnel, the objection has been made that many district boards are too poor to provide for a qualified health officer and the necessary subordinate staff. When it is remembered that the average annual expenditure on public health in most districts amounts only to one or two annas *per capita*, it is difficult not to believe that this vital preventive service is gravely neglected in comparison with others for which local authorities are responsible and that some re-arrangement of budgetary allotments would make it possible in most cases to find the necessary money.

It may be suggested that Local Governments have had difficulty in finding medical officers willing to take up a public health career, but the real difficulty has been that, with few exceptions, little inducement to take up public health work has been offered to young medical graduates, either in the form of suitable emoluments or of security of tenure. The result has been that the best students have specialised in other subjects even when their initial preference was for preventive medicine.

In actual fact, where a Local Government has, by one method or another, encouraged the appointment of municipal and district health officers, no difficulty has been experienced in obtaining suitable candidates for these posts. As soon as it became evident that the policy of the Government was to expand public health activities, it was possible each year to recruit for public health training the best men passing out of the medical colleges, and, within a few years, more well qualified men were available than could be given appointments.

This question may perhaps be looked at from another point of view, namely, that of unemployment which is a problem facing particularly the educated classes. It is a well known fact that a large proportion of young medical graduates crowd into the larger urban centres, there competing for such private practice as exists. It is also well known that many of these practitioners fail to earn even a modest competence. The Sapru Unemployment Committee's Report in its chapter dealing with medical graduates states that Public Health Departments "can provide scope for the employment of a fairly large number of educated men". No public health officer with experience of conditions in India is likely to disagree with that statement and the figures already quoted supply ample confirmation of that opinion. Directors of Public Health of most of the provinces of India have for years past been pressing their Governments, mostly in vain, to plan and legislate for expansion of public health personnel, whilst within more recent times public opinion has begun to impress on Governments and local authorities the importance of expanding their health activities.

Whilst most Local Governments have, as already remarked, got suitable public health staffs at headquarters, in many of the provinces little or

no progress has been made in providing trained municipal and district health officers because Provincial Governments have been reluctant to interfere with local administration and because Municipal Councils and Local Boards have largely failed to appreciate the need for trained health advisers. At the same time since 1920 a few Provincial Governments, by means of legislation, grants, etc., have been able to effect remarkable progress in the development of urban and rural health organisations and have not only been able to provide congenial employment for considerable numbers of medical graduates and other educated young men, but have laid the foundations at least of a structure essential for the protection of the populations under their control.

One interesting feature to which notice must be drawn is the advance made in nearly every province of India within recent years in respect of public health legislation ; details will be found in Section XII of the Public Health Commissioner's report for 1933. It may perhaps be taken for granted that public opinion was in favour of these legislative advances, but legal enactments require to be applied if they are to have the intended effect. In order to make the best use of public health legislation, it is therefore necessary to have trained health officers capable of advising when and where to use the force of law and equipped with the necessary delegation of powers to carry that law into effect. Previous paragraphs have shown how inadequately Local Self-Government authorities have provided themselves with the trained officers required for these purposes.

A number of other points with a direct bearing on this question deserve comment. In some provinces the Local Governments concerned have taken powers (a) to form provincial Public Health Services, (b) to compel municipalities and district boards to appoint medical officers of health, and (c) to lay down conditions for the recruitment, qualifications and terms of service of all health officers. Under existing legislation, other Local Governments seem to possess few such powers and it is perhaps correct to state that it is exactly in these provinces where progress has been least satisfactory. It is particularly desirable that Governments should lay down minimum qualifications for health officers' posts and it is satisfactory to note that this has been done in a number of provinces. Nothing can be more detrimental to progress than to appoint unqualified persons to technical posts of the kind and unfortunately this is not unknown even at the present day in more than one part of India.

If Medical Officers of Health are to be of real value, they must also be given some security of tenure. Experience in England showed that failure to provide such security was always a severe handicap to ordered advance in public health and India has already proved to be no exception in this respect. Instances could be quoted where Health Officers have been unable to retain their appointments for more than short periods because, as soon as they reported on glaring sanitary defects, vested interests represented on the Municipal Councils or Local Boards rendered their position intolerable. In order to prevent the development of such a situation, in other countries it has been found necessary to pass legislation making it illegal for municipal councils and local boards to dismiss an approved health officer without the sanction of Government. In a number of the provinces of India, Local Governments have already laid down this condition, so essential to progress, but the information supplied shows that, in other provinces, local authorities possess unfettered control over their officers.

In Madras Presidency a Government Public Health Service has been formed consisting of 1st class and 2nd class health officers, who are required to possess certain minimum qualifications before they are recruited. All municipal and district board health officers' posts are filled from the Government cadre, but always in consultation with the local authorities. This system not only ensures a suitable supply of trained officers but provides the necessary security of tenure to those officers. In the Punjab and the United Provinces, similar schemes have been partially introduced. It may be thought that this system savours too much of centralisation, but in practice it has proved eminently satisfactory and there has been no friction with the local bodies concerned. An additional advantage of a Government Public Health Service is that it is easy to obtain trained officers for special lines of public health work such as anti-malaria schemes and tuberculosis and leprosy activities. This method has been adopted in Madras, the Punjab and the United Provinces with considerable benefit to all concerned.

Several Local Governments have adopted the practice of paying a percentage, at least, of the salaries of the health officers employed by Municipal Councils and Local Boards. In other provinces no such practice exists and in those areas little or no progress has been made. Schemes under which percentage grants are given for different public health purposes have proved of great advantage in many countries of the world and there seems no reason to think that similar schemes would fail to produce equally good results in India. Whatever system of public health organisation may be evolved,—and there is no necessity for rigid uniformity in this respect,—the offer by Government of percentage grants not only encourages development but permits of a degree of control over expenditure not always easily obtained otherwise and over conditions of service already shown to be essential.

Finally, mention must be made of the question of delegation of executive powers to municipal and district health officers. In all provincial, municipal and local boards Acts, there will be found sections under which it is permissible for Chairman and Executive Officers to delegate certain powers. These sections doubtless find a place in the Acts because of the practical convenience which such delegation gives in day to day administration. In some provinces, the powers which may be delegated to health officers are both numerous and wide, in other cases they are definitely restricted in extent. But in actual practice, for one reason or another, Chairmen and Presidents have apparently been reluctant to delegate these powers to the officers serving under them and it is significant that, in one province it has been reported that seldom if ever does this occur. In order to do successful work, the health officer should for instance, normally have full control over his subordinate staff. Unfortunately, few health officers are given that control, much less the power to proceed under other sections of the Municipal or District Boards Acts. It should be evident that to get full value from a trained health officer and to save time otherwise spent in making petty references to a Chairman or President, the delegation of powers permitted by the Acts should be freely exercised.

These paragraphs will have indicated that wide variations exist between the provinces in regard to public health staffs, although it may be added at once that variations are not *per se* necessarily undesirable. At the same time, in certain instances, existing conditions would seem to be distinctly unfavourable to the satisfactory development of the public health services

of the provinces in which they occur and considerable amendments are required before reasonable progress can be achieved. The whole question of improvement of public health organisations is urgent, not only because of the poor state of the public health in India, but because in the near future public opinion will almost certainly compel Governments and local bodies to devote additional funds for the promotion of measures intended to improve existing health conditions. The subject is one which deserves serious consideration from all concerned.

A. J. H. RUSSELL, *Col., I.M.S.,*
Public Health Commissioner with the
Government of India.

SIMLA.

The 12th June 1937.

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Appendix I

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Section I.

TABLE A.—ESTIMATED POPULATION ON 30TH JUNE, 1935 IN RURAL AND URBAN AREAS AND BY SEX.

	Rural.	Urban.	Total.	Male.	Female.	Area in square miles.	Density per square mile.
BRITISH INDIA	249,032,073	29,167,472	278,199,545	143,328,624	134,870,921	890,116	312
N.-W. F. P.	2,128,814	329,753	2,458,567	1,328,212	1,130,355	13,308	185
Punjab	21,706,734	3,315,319	25,022,053	13,618,845	11,403,208	96,614	259
Delhi	206,797	465,773	672,570	388,735	283,835	578	1,164
U. P.	45,207,003	5,691,210	50,898,213	26,743,714	24,154,499	106,248	479
B. & O.	37,879,006	1,448,743	39,327,749	19,608,980	19,718,769	83,054	473
Bengal	47,710,285	3,521,148	51,231,433	26,626,896	24,604,537	72,514	706
C. P.	14,597,570	1,762,416	16,359,986	8,171,991	8,187,995	99,920	164
Bombay	18,562,150	4,330,908	22,893,058	12,027,991	10,865,067	123,069	186
Madras	41,186,663	6,481,519	47,668,182	23,606,935	24,061,247	142,277	335
Coorg	155,225	9,565	164,790	91,287	73,503	1,593	103
Assam	8,072,165	204,934	8,277,099	4,360,846	3,916,253	31,382	264
Burma	11,222,444	1,426,672	12,649,116	6,448,677	6,200,439	116,848	108
Ajmer-Merwara	397,217	179,512	576,729	305,515	271,214	2,711	213

TABLE B.—ESTIMATED POPULATION BY SEX AND AGE.

	N.-W. F. P.		Punjab.		Delhi.		U. P.		B. & O.		Bengal.		C. P.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Under 1 year .	39,373	37,361	469,075	462,378	10,669	10,580	785,897	788,306	479,482	488,695	848,940	851,930	282,860	289,564
1—5 years .	162,078	157,795	1,549,540	1,489,289	36,125	35,417	3,054,106	3,081,822	2,372,746	2,507,114	3,083,017	3,170,982	968,090	1,016,974
5—10 years .	188,857	153,630	1,788,278	1,547,914	41,416	35,181	3,411,958	2,943,676	2,757,508	2,537,785	3,642,691	3,231,938	1,050,866	1,015,684
10—15 years .	168,570	127,089	1,661,634	1,363,593	41,749	33,384	3,162,014	2,580,108	2,402,172	2,134,334	3,187,149	2,846,620	950,987	900,615
15—20 years .	116,936	100,129	1,272,415	1,051,646	41,774	30,822	2,421,107	2,118,896	1,631,778	1,692,632	2,333,008	2,599,977	719,773	756,193
20—30 years .	228,720	215,943	2,361,353	1,983,433	85,803	57,834	4,776,596	4,408,255	3,357,742	3,573,709	4,877,302	4,861,080	1,449,168	1,479,292
30—40 years .	182,641	153,742	1,773,607	1,390,247	63,244	37,363	3,871,170	3,456,837	2,831,730	2,858,514	3,943,713	3,157,181	1,137,536	1,112,485
40—50 years .	115,674	93,041	1,223,074	968,245	37,068	22,091	2,700,653	2,344,215	1,945,904	1,891,724	2,492,816	1,936,510	815,098	764,489
50—60 years .	69,539	53,411	804,842	613,641	18,707	12,472	1,553,522	1,412,916	1,116,132	1,148,554	1,330,466	1,136,222	472,030	468,322
60 years and over	55,824	38,214	715,027	532,822	12,180	8,691	1,006,697	1,019,468	713,786	885,708	887,794	812,097	325,583	384,377

	Bombay.		Madras.		Coorg.		Assam.		Burma.		Ajmer-Merwara.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Under 1 year .	339,122	341,040	658,337	676,665	2,144	2,209	144,025	110,294	162,847	172,973	9,569	9,633	4,232,340	4,241,628
1—5 years .	1,356,383	1,374,698	2,742,866	2,815,863	7,600	7,747	224,989	165,088	683,450	712,528	34,054	34,280	16,275,044	16,569,597
5—10 years .	1,558,707	1,401,950	3,095,074	3,025,480	9,602	9,182	413,132	291,407	786,966	777,715	37,568	33,017	18,782,623	17,004,559
10—15 years .	1,395,603	1,204,286	2,846,442	2,695,479	10,072	9,054	651,699	493,974	735,387	711,735	35,500	29,927	17,248,978	15,130,198
15—20 years .	1,050,692	998,462	2,063,852	2,206,513	9,201	7,588	774,515	753,793	599,114	621,551	30,507	26,832	13,064,672	12,965,034
20—30 years .	2,211,191	2,053,575	3,960,818	4,546,279	19,772	15,396	359,771	398,841	1,187,492	1,141,013	57,028	49,245	24,932,756	24,783,895
30—40 years .	1,867,875	1,510,883	3,360,558	3,331,708	16,467	10,418	501,393	447,372	943,152	796,719	41,186	35,837	20,534,272	18,299,306
40—50 years .	1,176,714	979,565	2,355,735	2,216,940	9,452	5,985	589,729	534,349	619,412	553,863	32,585	26,719	14,113,914	12,337,736
50—60 years .	650,392	584,000	1,428,226	1,411,352	4,453	3,482	564,065	582,321	403,795	389,813	18,239	15,380	8,434,408	7,831,886
60 years and over	421,312	416,608	1,095,027	1,134,968	2,524	2,442	137,528	138,814	327,062	322,529	9,279	10,344	5,709,617	5,707,082

TABLE C.—BIRTHS IN RURAL AND URBAN AREAS.

	Rural.	Urban.	Rate p. m.	
			Rural.	Urban.
BRITISH INDIA	8,752,220	946,574	34.9	34.5
N.-W. F. P.	65,420	10,572	31	32
Punjab	947,371	121,767	44	37
Delhi	9,174	19,687	44	42
U. P.	1,501,367	243,469	32	62
B. & O.	1,274,217	31,363	34	22
Bengal	1,556,790	77,339	33	22
C. P.	616,228	80,576	42	46
Bombay	657,257	149,732	35	35
Madras	1,521,169	150,017	37	23
Coorg	3,753	426	24	45
Assam	233,516	6,382	29	31
Burma	351,904	47,869	31	34
Ajmer-Merwara	14,054	7,375	35	41

TABLE D.—TOTAL BIRTHS BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p. m.	Males born to every 100 females.
BRITISH INDIA	787,695	719,254	749,287	719,106	684,840	684,591	774,806	844,705	891,531	960,176	951,501	931,302	9,698,794	34.9	108
N.-W. F. P.	6,552	7,131	6,658	5,768	5,386	5,671	6,230	6,776	6,109	6,207	6,809	6,695	75,992	31	131
Punjab	87,637	80,065	80,982	64,755	67,209	71,935	87,069	100,533	101,084	106,833	110,491	110,545	1,069,138	43	112
Delhi	2,082	1,694	1,822	1,728	1,728	1,740	2,498	3,073	3,091	3,255	3,343	2,807	28,861	43	106
U. P.	137,533	129,718	118,674	120,997	110,745	112,533	134,834	170,501	187,740	183,716	173,363	164,477	1,744,836	34	113
B. & O.	110,588	98,822	95,950	102,079	93,594	89,796	100,200	107,662	122,438	129,820	127,460	127,176	1,305,580	33	106
Bengal	147,560	142,423	156,719	136,676	116,033	99,171	97,975	94,130	113,834	162,804	184,969	181,835	1,634,129	32	112
C. P.	52,016	46,869	55,296	54,173	49,777	48,155	56,600	70,822	73,706	70,866	61,877	56,647	696,804	43	105
Bombay	64,436	60,015	68,073	62,357	60,280	61,690	69,300	74,034	74,022	74,641	70,541	67,560	806,989	35	108
Madras	119,690	102,980	115,542	119,948	131,792	143,899	162,066	164,635	157,547	156,624	149,427	147,536	1,671,186	35	105
Coorg	299	329	412	394	355	405	388	361	343	345	271	277	4,179	25	114
Assam	25,621	20,506	18,802	17,391	15,726	14,490	15,403	16,099	17,571	24,206	26,649	27,434	239,898	29	106
Burma	31,891	27,178	28,937	31,411	30,729	34,118	40,490	34,017	31,983	38,795	34,039	36,185	399,773	32	104
Ajmer-Merwara	1,790	1,524	1,420	1,429	1,486	1,483	1,753	2,062	2,068	2,024	2,262	2,128	21,429	37	115

TABLE E.—TOTAL DEATHS BY MONTHS.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.	Rate.
BRITISH INDIA	547,933	449,847	479,089	531,075	573,645	549,027	530,524	565,962	597,905	590,435	579,981	583,288	6,578,711	23·6
N.-W. F. P.	5,380	4,856	3,522	3,141	3,615	4,064	3,398	3,455	3,193	3,290	3,923	3,959	45,796	19
Punjab	62,473	45,475	40,335	40,176	50,745	51,766	44,972	43,096	51,460	53,066	50,690	49,585	583,839	23
Delhi	1,627	1,242	1,385	1,636	2,178	2,015	1,574	1,496	1,671	1,594	1,599	1,293	19,310	29
U. P.	91,400	85,991	88,584	116,992	126,186	127,285	101,568	94,993	100,773	96,984	88,277	80,615	1,199,653	24
B. & O.	67,430	53,539	58,540	77,691	84,212	87,516	86,138	95,891	96,608	87,369	77,104	75,013	947,051	24
Bengal	102,600	83,298	92,747	97,420	86,901	70,561	75,727	81,573	90,061	102,549	118,266	129,724	1,131,427	22
C. P.	32,641	28,413	34,064	37,461	48,284	47,182	35,239	48,112	62,742	59,339	51,611	46,760	532,748	33
Bombay	47,459	40,846	50,766	48,511	47,027	37,545	42,988	50,919	50,774	45,595	48,620	46,478	557,519	24
Madras	100,834	73,642	79,455	73,709	88,089	84,040	97,043	107,132	104,753	100,024	101,526	109,089	1,124,336	24
Coorg	262	215	271	266	306	407	449	366	350	332	244	300	3,768	23
Assam	14,106	10,574	9,687	13,534	16,745	17,552	16,347	14,046	12,752	15,008	14,647	14,725	169,723	21
Burma	20,041	15,479	17,411	18,832	17,420	17,867	24,195	28,643	21,282	23,953	22,387	24,625	247,135	20
Ajmer-Merwara	1,689	1,277	1,422	1,706	1,937	1,227	886	1,240	1,481	1,332	1,087	1,122	16,400	28

TABLE F.—DEATH RATES PER MILLE BY MONTHS.

	Jan.	Feb.	March.	Aprill.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
BRITISH INDIA	24	19	21	23	25	24	23	24	24	25	25	25
N.-W. F. P.	26	24	17	15	18	20	17	17	16	16	19	19
Punjab	30	22	19	19	24	25	22	21	25	25	24	24
Delhi	29	22	25	29	38	36	28	27	30	28	29	23
U. P.	22	20	21	28	30	30	24	22	24	23	21	19
B. & O.	21	16	16	18	24	27	26	29	37	27	24	23
Bengal	24	20	22	23	20	17	18	19	21	24	23	30
C. P.	24	21	26	27	25	35	26	35	46	44	38	34
Bombay	25	21	27	25	22	20	23	27	27	24	25	24
Madras	25	20	20	19	22	21	24	27	26	25	26	27
Coorg	19	16	20	19	22	30	33	27	25	24	18	22
Assam	29	15	14	20	24	25	24	20	18	22	21	21
Burma	19	15	17	18	17	17	23	22	20	23	21	23
Ajmer-Merwara	35	27	30	35	40	26	18	26	31	28	23	23

TABLE G.—DEATHS BY MONTHS IN RURAL AREAS.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.	Rate p. m.
BRITISH INDIA	489,562	400,488	421,633	470,184	505,169	489,640	475,949	505,691	539,008	534,889	524,829	529,223	5,886,265	2.34
N.-W. F. P.	4,772	4,422	3,108	2,686	2,988	3,454	2,856	2,893	2,725	2,864	3,427	3,537	39,752	19
Punjab	56,601	41,287	35,510	35,377	44,206	44,793	39,341	37,140	45,794	47,734	45,162	44,632	517,577	24
Delhi	610	383	420	502	595	671	448	431	623	656	679	554	6,572	32
U. P.	78,312	74,480	74,144	98,599	104,394	108,532	88,552	80,009	85,023	83,859	76,305	69,644	1,021,853	23
B. & O.	65,787	52,237	56,916	75,991	82,216	85,689	84,021	93,583	94,543	85,568	75,459	73,293	925,303	24
Bengal	95,566	76,995	86,089	91,024	80,407	65,399	69,936	75,696	84,575	96,964	112,184	123,085	1,057,920	22
C. P.	23,886	25,193	30,840	33,135	42,876	42,652	31,505	43,056	57,017	54,094	46,665	41,906	477,825	33
Bombay	36,996	31,649	39,304	37,683	36,783	29,379	34,225	40,993	41,782	36,894	39,824	37,401	442,913	24
Madras*	90,470	70,124	70,816	65,489	79,134	76,251	87,683	97,005	95,351	90,137	91,555	99,048	1,013,063	25
Coorg	217	192	233	225	271	358	406	310	307	299	208	254	3,280	21
Assam	13,769	10,277	9,452	13,245	16,394	17,160	15,937	13,738	12,423	14,682	14,284	14,457	165,818	21
Burma	16,494	12,427	13,928	15,333	13,928	14,646	20,479	20,074	17,865	20,253	18,404	20,677	204,508	18
Ajmer-Merwara	1,032	822	873	895	977	656	560	763	980	865	673	735	9,881	25

*Inclusive of figures of towns other than municipalities.

TABLE H.—DEATHS BY MONTHS IN URBAN AREAS.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.	Rate p. m.
BRITISH INDIA	58,371	49,359	57,456	60,891	68,476	59,387	54,575	60,271	58,897	55,546	55,152	54,065	692,446	25·3
N.-W. P. P.	608	434	414	455	627	610	542	562	468	406	496	422	6,044	18
Punjab	5,872	4,188	4,825	4,799	6,539	6,973	5,631	5,956	5,666	5,332	5,528	4,953	66,262	20
Delhi	1,017	859	965	1,134	1,583	1,344	1,126	1,065	1,048	938	920	739	12,738	27
U. P.	13,088	11,511	14,440	18,393	21,792	18,753	13,016	14,984	15,755	13,125	11,972	9,971	177,800	31
B. & O.	1,643	1,302	1,624	1,700	1,996	1,827	2,117	2,308	2,065	1,801	1,645	1,720	21,748	15
Bengal	7,034	6,303	6,658	6,396	6,494	5,162	5,791	5,877	5,486	5,585	6,082	6,639	73,507	21
C. P.	3,755	3,220	4,124	4,326	5,408	4,530	3,734	5,056	5,725	5,245	4,946	4,854	54,923	31
Bombay	10,454	9,197	11,462	10,328	10,244	8,166	8,763	9,926	8,992	8,701	8,796	9,077	114,606	26
Madras*	10,364	8,518	8,639	8,220	8,955	7,789	9,360	10,127	9,402	9,887	9,971	10,041	111,273	17
Coorg	45	23	38	41	35	49	43	56	43	33	36	46	488	51
Assam	337	297	235	289	351	392	410	308	329	326	363	268	3,905	19
Butma	3,547	3,052	3,483	3,499	3,492	3,221	3,716	3,569	3,417	3,700	3,983	3,948	42,627	30
Ajmer-Merwara	607	455	549	811	960	571	326	477	501	467	414	387	6,525	36

* For municipalities only.

TABLE I.—DEATHS ACCORDING TO AGE.

	Under one year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA	777,821	654,615	587,957	554,451	181,579	164,566	98,736	86,184	103,019	122,941
N.-W. F. P.	5,884	4,158	4,435	3,662	1,494	1,189	856	758	879	846
Punjab	90,192	75,725	56,022	49,718	17,244	15,125	12,364	11,396	12,127	11,857
Delhi	2,690	2,426	2,104	2,079	520	465	315	353	374	466
U. P.	149,626	124,663	163,108	143,042	32,261	28,253	18,943	17,097	17,107	17,917
B. & O.	91,962	76,726	103,616	97,545	34,420	28,826	18,271	14,340	17,200	17,247
Bengal.	140,449	118,587	78,783	78,239	42,891	38,794	23,350	19,058	22,765	33,157
C. P.					Not available.					
Bombay	71,423	60,821	61,033	61,632	13,771	13,873	6,659	6,783	6,643	8,327
Madras*	161,475	136,921	87,414	87,005	26,304	26,344	10,858	10,114	17,941	24,297
Coorg	375	340	186	197	104	102	60	81	122	116
Assam	21,015	18,140	14,800	14,887	6,779	5,980	3,269	2,794	3,219	4,284
Burma	40,349	34,026	14,361	14,431	5,465	5,269	3,595	3,214	4,424	4,149
Ajmer-Merwara	2,381	2,082	2,095	2,014	326	341	196	196	218	278
	20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years & upwards.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA	229,061	285,081	240,934	226,083	244,366	183,627	242,738	193,924	448,948	419,858
N.-W. F. P.	2,214	2,182	2,190	2,185	2,178	1,739	2,227	1,577	3,179	1,964
Punjab	18,433	19,671	18,946	18,719	20,083	17,833	22,250	18,383	43,004	34,747
Delhi	832	1,033	657	614	602	463	612	449	1,254	1,002
U. P.	40,976	47,128	40,848	39,853	44,934	33,887	47,624	36,725	82,969	72,692
B. & O.	42,823	47,429	44,018	39,685	39,798	31,840	40,413	37,415	59,457	64,020
Bengal.	53,121	72,124	54,996	47,879	53,181	36,622	47,156	35,666	72,533	62,076
C. P.					Not available.					
Bombay	17,471	23,053	19,727	18,404	21,869	15,022	22,241	15,244	47,283	46,235
Madras*	35,589	50,557	39,321	40,131	42,951	32,765	43,005	35,596	107,246	109,028
Coorg	251	251	306	242	255	160	164	120	191	145
Assam	6,668	10,248	7,634	7,288	7,199	5,073	6,766	4,888	10,705	8,087
Burma	10,151	10,749	11,826	10,652	10,646	7,797	9,515	7,401	20,114	19,001
Ajmer-Merwara	532	656	465	431	670	426	765	460	1,013	861

* Madras includes 526 deaths amongst Europeans and Anglo-Indians.

TABLE J.--DEATH RATES ACCORDING TO AGE.

	Under 1 year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA . . .	166	152	38	36	10	10	6	6	8	10
N.-W. F. P. . . .	187	126	27	23	8	8	5	6	8	8
Punjab	160	150	36	33	10	10	7	8	10	11
Delhi	181	174	58	59	13	13	8	11	9	15
U. P.	162	152	53	46	9	10	6	7	7	8
B. & O.	137	121	44	39	12	11	8	7	11	10
Bengal	166	151	26	25	12	12	7	7	10	13
C. P.					Not available.					
Bombay	170	157	45	45	9	10	5	6	6	8
Madras	189	168	32	31	8	9	4	4	9	11
Coorg	168	174	24	25	11	11	6	9	13	15
Assam	170	156	66	90	16	21	5	6	4	6
Burma	198	174	21	20	7	7	5	5	7	7
Ajmer-Merwara . . .	207	209	62	59	9	10	6	7	7	10

	20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years & upwards.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA . . .	10	12	12	13	18	16	30	26	83	79
N.-W. F. P. . . .	10	10	12	14	19	19	32	29	57	51
Punjab	8	10	11	13	16	18	28	30	60	65
Delhi	10	18	10	16	16	21	33	36	103	115
U. P.	9	11	11	12	17	14	31	26	82	71
B. & O.	13	13	16	14	20	17	36	33	83	72
Bengal	11	15	14	15	21	19	35	31	82	76
C. P.					Not available.					
Bombay	8	11	11	12	19	15	34	26	112	111
Madras	9	11	12	12	18	15	30	25	98	96
Coorg	13	16	19	23	27	27	37	34	76	59
Assam	19	28	15	16	12	9	12	8	78	58
Burma	9	9	13	13	17	14	24	19	61	59
Ajmer-Merwara . . .	9	13	11	12	21	16	42	30	109	83

TABLE K.—DEATHS ACCORDING TO AGE IN RURAL AREAS.

	Under one year.		1—5 years.		5—10 years.		10—15 years.		15—20 years.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA	678,276	570,360	524,738	492,069	166,587	149,726	89,997	76,341	92,374	107,425
N.-W. F. P.	5,082	3,509	3,802	3,115	1,325	1,055	771	631	766	699
Punjab	79,459	66,661	49,116	43,291	15,563	13,558	11,206	10,091	10,862	10,200
Delhi	833	713	695	643	215	158	112	117	119	123
U. P.	121,920	100,977	142,055	121,678	28,383	24,200	16,817	14,146	14,953	13,739
B. & O.	89,592	74,809	101,761	95,916	33,803	28,264	17,853	13,936	16,752	16,641
Bengal	132,949	112,299	75,084	74,981	40,831	37,092	21,968	17,898	21,142	31,456
C. P.					Figures not available.					
Bombay	54,236	45,972	49,447	49,975	11,764	11,747	5,559	5,522	5,212	6,281
Madras*	136,945	116,464	73,876	73,570	22,745	22,717	9,090	8,219	15,381	20,283
Coorg	363	327	171	182	96	95	52	71	100	105
Assam	20,560	17,789	14,579	14,662	6,681	5,861	3,212	2,734	3,130	4,171
Burma	56,135	29,787	12,879	12,914	4,973	4,768	3,216	2,851	3,805	3,625
Ajmer-Merwara	1,202	1,053	1,273	1,142	208	211	141	125	152	152
	20—30 years.		30—40 years.		40—50 years.		50—60 years.		60 years & upwards.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA	199,558	248,246	213,864	201,891	217,226	165,643	216,708	176,566	395,604	369,753
N.-W. F. P.	1,925	1,886	1,953	1,968	1,912	1,588	1,972	1,459	2,682	1,652
Punjab	16,266	16,914	17,035	16,899	18,199	16,247	20,113	16,770	38,286	30,931
Delhi	274	320	246	263	232	199	242	206	482	375
U. P.	35,813	37,943	36,294	34,490	40,175	30,138	42,604	33,160	70,791	61,577
B. & O.	41,740	46,170	42,949	38,873	38,758	31,242	39,398	36,777	57,714	62,355
Bengal	46,462	66,478	50,739	44,530	49,109	33,864	43,496	33,033	67,189	57,270
C. P.					Figures not available.					
Bombay	13,017	17,303	15,135	14,803	17,115	12,394	17,798	12,703	38,764	38,216
Madras*	29,062	41,374	32,392	33,276	35,629	27,758	36,046	30,670	90,949	92,102
Coorg	193	202	211	214	197	149	145	111	167	129
Assam	6,387	10,020	7,319	7,133	6,935	4,972	6,546	4,773	10,459	7,895
Burma	8,061	9,281	9,255	9,247	8,486	6,803	7,806	6,512	17,430	16,701
Ajmer-Merwara	358	355	336	280	479	289	542	342	691	550

* Including Europeans and Anglo-Indians.

TABLE M.—INFANTILE MORTALITY RATE IN TOWNS HAVING A POPULATION OF 30,000 AND OVER.

Towns.	Rates p. m. live- births.	Towns.	Rates p. m. live- births.
<i>N.-W. F. Province.</i>		<i>Bengal—contd.</i>	
Peshawar	194	Titagarh	195
Dera Ismail Khan	115	Naihati	127
<i>Delhi.</i>		Bhatpara	155
Delhi	196	Calcutta	239
New Delhi	69	Serajganj	147
<i>United Provinces.</i>		Dacca	172
Dehra	254	Narayanganj	191
Saharanpur	281	Mymensingh	218
Hardwar Union	308	Barisal	256
Muzaffarnagar	183	Chittagong	186
Meerut	166	<i>Central Provinces.</i>	
Khurja	227	Nagpur	261
Aligarh	223	Jubbulpore	223
Hathras	293	Saugor	226
Muttra	222	Khandwa	225
Agra	199	Burhanpur	228
Bareilly	155	Raipur	275
Budaun	306	Bilaspur	236
Moradabad	216	Amraoti	160
Amroha	194	Akola	215
Sambhal	229	<i>Bombay Presidency.</i>	
Shahjahanpur	225	Bombay	248
Pilibhit	253	Jalgaon	179
Farrukhabad-cum-Fatehgarh	270	Dhulia	171
Etawah	311	Surat	272
Cawnpore	287	Broach	152
Allahabad	194	Nadiad	386
Jhansi	241	Godhra	240
Benares	280	Ahmedabad	280
Mirza-Bindhachal	183	Ahmednagar	149
Jaunpur	138	Poona	320
Gorakhpur	190	Nasik	274
Lucknow	224	Malegaon	244
Fyzabad-Ajodhya	180	Bandra	150
Bahraich	184	Kurla	210
<i>Bengal Presidency.</i>		Belgaum	157
Asansol	156	Gadag-Bettigeri	193
Bankura	104	Bijapur	106
Hooghly-Chinsura	144	Sholapur	222
Serampur	156	Karachi	151
Howrah	261	Hyderabad	232
South Suburban	133	Sukkur	123
Baranagar	195	Shikarpur	221

TABLE M.—INFANTILE MORTALITY RATE IN TOWNS HAVING A POPULATION OF 30,000 AND OVER—*concl'd.*

Towns.	Rates p. m. live- births.	Towns.	Rates p. m. live- births.
<i>Madras Presidency.</i>		<i>Madras Presidency—contd.</i>	
Bellary	207	Vellore	188
Adoni	120	Virudhunagar	184
Conjeevaram	167	Srivilliputtur	161
Saidapet	169	Salem	149
Coimbatore	168	Cuddalore	170
Erode	129	Tanjore	184
Berhampur	123	Kumbakonam	172
Cocanada	239	Negapatam	208
Rajahmundry	298	Mayavaram	134
Guntur	158	Tuticorin	229
Tenali	151	Tinnevely	258
Bezwada	261	Palamcottah	206
Masulipatam	237	Trichinopoly	157
Madras	227	Vizagapatam	323
Madura	239	Vizianagram	188
Dindigul	139		
Calicut	158	<i>Burma.</i>	
Palghat	175	Akyab	198
Cannanore	107	Rangoon	252
Tellicherry	167	Bassien	260
Nellore	200	Moulmein	187
		Mandalay	228

TABLE N.—INFANTILE MORTALITY IN RURAL AND URBAN AREAS.

	Rural.		Urban.	
	Deaths.	Rate p. m. live-births.	Deaths.	Rate p. m. live-births.
Total	1,386,801	158	201,401	213
N.-W. F. P.	8,591	131	1,451	137
Punjab	146,120	154	19,797	163
Delhi	1,546	169	3,570	181
U. P.	222,897	148	51,392	211
B. & O.	164,401	129	4,287	137
Bengal	245,248	158	13,788	178
C. P.	138,165	224	17,601	218
Bombay	100,208	152	32,036	214
Madras	253,409	167	44,987	300
Coorg	690	184	25	59
Assam	38,349	164	806	126
Burma	64,922	177	9,453	256
Ajmer-Merwara	2,255	160	2,208	299

Appendix II
relating to
Section II-Chief diseases.

TABLE A.—DEATHS AND RATES P. M. FROM CHIEF GROUPS OF DISEASES.

	Cholera.		Small-pox.		Plague.		Fevers.		Dysentery and Diarrhoea.		Respiratory Diseases.		Other causes.		Total.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.
BRITISH INDIA	217,162	0·8	90,703	0·3	32,091	0·1	3,754,751	13·5	279,223	1·0	482,870	1·7	1,721,911	6·2	6,578,711	23·6
N.-W. F. P.	245	0·0	86	0·0	...	...	36,939	15·0	399	0·2	2,822	1·1	5,305	2·2	45,796	18·5
Punjab	714	0·0	1,822	0·1	976	0·0	396,321	15·8	12,292	0·5	58,800	2·3	112,914	4·5	583,839	23·2
Delhi	181	0·2	427	0·6	...	...	11,966	17·8	648	1·0	3,420	5·1	2,668	4·0	19,310	28·7
U. P.	10,412	0·2	26,032	0·5	23,019	0·5	929,298	18·3	18,283	0·4	46,270	0·9	146,339	2·9	1,199,653	23·6
B. & O.	64,876	1·6	22,967	0·6	2,861	0·1	663,964	16·9	19,956	0·5	7,148	0·2	165,279	4·2	947,051	24·1
Bengal	59,605	1·2	7,548	0·1	2	...	705,628	13·7	51,930	1·0	84,868	1·7	221,846	4·3	1,131,427	22·0
C. P.	20,140	1·2	2,802	0·2	798	0·0	281,367	17·2	35,299	2·2	39,462	2·4	152,880	9·3	532,748	32·5
Bombay	11,235	0·5	13,976	0·6	2,453	0·1	204,752	8·9	26,130	1·1	115,262	5·0	183,711	8·0	557,519	24·3
Madras	35,456	0·7	12,330	0·3	645	0·0	315,998	6·6	96,181	2·0	102,843	2·1	560,883	11·8	1,124,336	23·5
Coorg.	...	...	42	0·3	25	0·2	2,804	17·0	168	1·0	156	1·0	573	3·5	3,768	23·0
Assam	7,436	0·9	529	0·1	...	...	106,719	12·9	10,947	1·3	7,022	0·8	37,070	4·5	169,723	20·5
Burma	6,858	0·5	1,262	0·1	1,312	0·1	88,426	7·0	6,366	0·5	11,954	1·0	130,957	10·3	247,135	19·5
Ajmer-Merwara	4	...	880	1·5	...	...	10,569	18·3	624	1·1	2,843	4·9	1,486	2·6	16,406	28·4

TABLE B.—DEATHS FROM CHOLERA FROM 1905 TO 1935.

Year.	British India.	N.-W. F. P.	Punjab.	Delhi.	U. P.	B. & O.	Bengal.	C. P.	Bombay.	Madras.	Coorg.	Assam.	Burma.	Ajmer-Merwara.	Indian States.			
															Raj-putana.	Central India.	Hyder-abad.	Mysore.
1905—1909	2,371,365	3,545	20,354	324	399,144	555,350	677,816	61,011	89,644	422,658	410	95,927	44,897	285	5,926	13,366	2,227	16,000
1910—1914	1,767,770	5,421	17,643	503	331,970	394,482	451,025	78,258	96,929	289,444	254	81,967	19,800	74	6,219	25,896	9,210	17,672
1915—1919	2,098,749	5,557	25,030	242	346,359	598,862	453,864	110,998	97,606	321,297	191	99,088	38,713	942	7,970	15,652	26,647	13,062
1920—1924	1,069,136	4,390	22,843	781	228,540	229,512	276,455	72,680	25,793	131,845	34	54,379	21,805	79	3,911	6,826	9,254	8,023
1925	115,645	116	3,049	50	7,653	17,336	34,276	124	57	44,815	4	6,233	1,932	...	...	43	22	...
1926	138,151	...	87	18	6,166	27,268	59,106	4,565	73	24,407	2	10,275	6,182	2	4	269	26	6
1927	304,710	2	11,286	16	28,285	49,022	118,377	16,311	26,153	35,334	...	15,392	4,528	4	1,357	2,584	8,913	1,367
1928	351,305	...	2,034	34	44,941	77,103	136,245	12,198	6,881	57,677	...	6,915	7,209	68	1,371	7,520	4,314	413
1929	295,434	30	2,309	193	50,924	104,034	81,090	6,168	9,084	25,846	1	7,765	7,970	20	722	1,155	450	140
1930	337,322	449	1,181	8	61,334	155,215	54,963	23,250	15,142	18,746	...	6,332	661	41	2,101	11,165	18,369	535
1931	220,909	105	391	61	31,118	40,943	79,073	14,135	18,646	30,232	116	5,523	534	32	294	1,411	5,653	6,385
1932	67,219	70	614	4	9,734	9,348	33,910	854	1,353	5,278	...	4,971	1,082	1	122	168	71	83
1933	68,318	...	160	...	1,915	17,514	29,242	2,152	7,797	3,851	...	5,508	179	...	35	642	4,838	90
1934	199,708	...	178	19	31,903	57,289	50,742	27,329	11,362	18,158	1	1,904	822	1	969	4,471	4,951	346
1935	217,162	245	714	181	10,412	64,876	59,605	20,140	11,235	35,456	...	7,436	6,858	4	33	1,043	10,553	1,407

TABLE C.—DEATHS AND RATES P. M. FROM CHOLERA IN RURAL AND URBAN AREAS.

	Deaths.			Rate p. m.			No. of anti-cholera inoculations.	Total villages.	Number infected.
	R.	U.	Total.	R.	U.	Total.			
BRITISH INDIA	201,395	15,767	217,162	0·8	0·5	0·8	6,929,809	461,144	42,233
N.-W. F. P.	201	44	245	0·1	0·1	0·1	46,084	2,802	79
Punjab	360	354	714	...	0·1	...	60,150	34,520	158
Delhi	17	164	181	0·1	0·4	0·2	23,124	17	6
U. P.	9,338	1,074	10,412	0·2	0·2	0·2	207,620	105,640	1,799
B. & O.	63,750	1,126	64,876	1·7	0·8	1·6	945,665	83,402	12,149
Bengal	54,835	4,770	59,605	1·1	1·4	1·2	2,329,326	86,361	14,569
C. P.	18,903	1,237	20,140	1·2	0·7	1·2	590,587	39,874	2,785
Bombay	10,556	679	11,235	0·6	0·2	0·5	261,749	30,550	1,906
Madras	30,370	5,036	35,456	0·7	0·8	0·7	1,889,904	37,093	5,605
Coorg . . . . .	...	...	...	...	...	...	...	298	...
Assam	7,334	102	7,436	0·9	0·5	0·9	333,534	28,333	1,509
Burma	5,730	1,128	6,858	0·5	0·8	0·5	241,713	11,515	1,666
Ajmer-Merwara	1	3	4	...	...	...	353	739	2

TABLE D.—DEATHS FROM CHOLERA BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
BRITISH INDIA	13,717	10,848	13,686	23,899	17,324	15,637	19,809	29,435	30,068	17,527	12,871	12,341	217,162
N.-W. F. P. . . . .	...	...	...	...	...	...	...	33	181	31	...	...	245
Punjab . . . . .	...	2	2	4	10	17	159	210	203	90	12	5	714
Delhi . . . . .	...	...	...	...	1	3	143	25	8	...	1	...	181
U. P.	145	146	644	1,907	1,391	1,827	1,097	1,379	1,449	370	49	8	10,412
B. & O.	338	315	1,461	4,702	5,812	5,860	8,125	15,341	10,801	7,326	3,515	1,230	64,876
Bengal	5,785	5,328	8,270	9,500	5,152	2,412	3,143	3,979	3,242	2,435	4,266	6,043	59,605
C. P.	52	224	296	3,880	1,330	2,512	2,903	732	5,451	2,400	327	33	20,140
Bombay	16	54	60	117	104	118	1,107	2,814	3,901	1,388	1,172	384	11,235
Madras	6,205	3,956	2,081	1,542	953	1,249	1,773	3,539	4,402	3,020	2,921	3,815	35,456
Coorg . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
Assam	609	240	297	1,249	2,167	1,080	462	248	135	134	343	472	7,436
Burma	517	583	575	998	404	558	895	1,134	295	253	265	351	6,858
Ajmer-Merwara . . . . .	...	...	...	...	...	1	2	1	...	...	...	...	4

TABLE E.—DEATHS FROM PLAGUE BY MONTHS.

(i) British Provinces.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p.m.	No. of anti-plague inoculations.
GRAND TOTAL	4,900	6,425	7,959	7,870	4,467	953	380	555	979	1,494	1,131	1,389	38,502	...	..
BRITISH INDIA	3,511	5,342	7,284	7,612	4,357	853	214	259	419	607	648	985	32,091	0·1	709,143
N.-W. F. P.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Punjab	22	45	159	319	356	69	2	1	...	...	3	...	976	...	80,715
Delhi	...	...	...	...	...	...	...	...	...	...	...	...	...	...	9
U. P.	2,129	3,421	5,354	6,426	3,842	738	100	54	87	134	264	470	23,019	0·5	207,991
B. & O.	319	789	879	600	93	3	7	6	14	11	25	115	2,861	0·1	64,524
Bengal	...	...	2	...	...	...	...	...	...	...	...	...	2	...	...
C. P.	87	147	125	24	4	...	4	24	64	131	121	67	798	...	20,888
Bombay	523	557	489	163	30	9	46	86	148	216	94	92	2,453	0·1	113,418
Madras	137	81	58	13	2	2	4	36	52	84	84	92	645	...	82,243
Coorg	1	1	1	...	...	...	4	1	7	6	2	2	25	0·2	14,275
Assam	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Burma	293	301	217	67	30	32	47	51	47	25	55	147	1,312	0·1	125,079
Ajmer-Merwara	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

(ii) Indian States and Agencies.

TOTAL	1,389	1,083	675	258	110	100	166	296	560	887	483	404	6,411		
Punjab	...	23	22	36	12	...	...	...	...	...	16	...	109		
U. P.	...	...	...	9	3	...	...	...	...	...	...	...	12		
B. & O.	...	...	...	...	...	...	...	...	...	...	...	...	...
Bengal	...	...	...	...	...	...	...	...	...	...	...	...	...
C. P.	...	...	...	...	...	...	...	...	...	...	...	...	...
Deccan States Agency & Kolhapur Residency	148	124	82	11	11	...	30	42	49	36	14	...	547		
Madras	12	11	4	3	...	...	...	...	...	...	...	...	30		
Mysore	440	307	168	81	59	73	110	73	177	129	121	84	1,822		
Bangalore C. & M. Station	4	1	2	2	...	...	...	2	...	...	1	...	12		
Hyderabad	703	483	338	87	14	21	14	154	312	704	284	307	3,421		
C. I. Agency	10	33	9	16	3	...	...	...	19	12	42	10	154		
Baroda	31	52	32	5	...	...	...	...	...	...	2	...	122		
Cambay State	...	1	4	1	...	...	...	...	...	...	...	...	6		
Rajputana	28	48	14	5	...	...	...	...	...	...	...	...	95		
Assam	...	...	...	...	...	...	...	...	...	...	...	...	...
Burma	13	...	...	...	4	6	12	25	1	6	3	3	73		
Jammu & Kashmir	...	...	...	2	4	...	...	...	2	...	...	...	8		
Baluchistan	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE F.—DEATHS AND RATES P. M. FROM SMALLPOX IN RURAL AND URBAN AREAS.

	Deaths.			Death rate p. m.			Deaths in children.			Percentage of deaths to total mortality.		
	R.	U.	Total.	R.	U.	Total.	Under 1 year.	1—10 years.	Total.	Under 1 year.	1—10 years.	Total.
BRITISH INDIA	72,446	18,257	90,703	0·3	0·6	0·3	17,653	26,506	44,159	20	29	49
N.-W. F. P.	80	6	86	...	...	...	18	46	64	21	54	75
Punjab	1,298	524	1,822	0·1	0·1	0·1	531	887	1,418	29	49	78
Delhi	6	421	427	...	0·9	0·6	139	204	343	32	48	80
U. P.	20,012	6,020	26,032	0·4	1·1	0·5	6,482	9,282	15,714	25	35	60
B. & O.	22,459	508	22,967	0·6	0·4	0·6	1,602	3,096	4,698	7	13	20
Bengal	5,279	2,269	7,548	0·1	0·6	0·1	400	910	1,310	5	12	17
C. P.	2,165	637	2,802	0·1	0·4	0·2	958	1,177	2,135	34	42	76
Bombay	9,538	4,438	13,976	0·5	1·0	0·6	4,114	6,839	10,953	29	49	78
Madras	9,823	2,507	12,330	0·2	0·4	0·3	3,338	3,751	7,089	27	30	57
Coorg	28	14	42	0·1	1·5	0·3	9	9	18	21	21	42
Assam	516	13	529	0·1	0·1	0·1	14	26	40	3	5	8
Burma	724	538	1,262	0·1	0·4	0·1	98	279	377	8	22	30
Ajmer-Merwara	518	362	880	1·3	2·0	1·5	...	...	...	...	...	...

TABLE G.—DEATHS FROM SMALLPOX BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
BRITISH INDIA	7,053	7,485	10,300	15,047	15,423	11,181	7,107	4,848	2,475	1,770	2,613	5,401	90,703
N.-W. F. P.	18	3	14	11	13	11	78	1	...	...	5	2	86
Punjab	118	125	113	155	307	272	162	81	55	53	128	253	1,822
Delhi	10	26	43	85	125	79	24	8	...	1	14	12	427
U. P.	1,617	1,876	2,572	4,891	5,264	4,106	2,198	1,242	516	260	492	998	26,032
B. & C.	1,510	1,493	1,993	3,711	4,174	3,421	2,318	1,123	618	369	695	1,537	22,967
Bengal	827	379	770	1,211	1,206	843	492	309	250	187	393	1,181	7,548
C. P.	131	234	370	111	545	275	181	560	47	28	94	226	2,802
Bombay	1,610	1,898	2,709	2,863	2,021	1,060	719	376	159	94	165	302	13,976
Madras	1,559	1,274	1,372	1,321	1,137	849	875	1,044	766	735	594	804	12,330
Coorg	7	6	8	3	2	5	2	5	...	...	4	...	42
Assam	14	26	28	99	112	87	36	24	20	27	16	40	529
Burma	71	94	203	336	275	95	54	45	36	14	13	26	1,262
Ajmer-Merwara	61	51	105	250	242	78	38	25	8	2	...	20	880

TABLE H.—DEATHS AND RATES P. M. FROM FEVERS AND MALARIA IN RURAL AND URBAN AREAS.

	Fever deaths.			Death rate p. m.			Reported malaria deaths.		
	R.	U.	Total.	R.	U.	Total.	R.	U.	Total.
British India	3,542,096	212,655	3,754,751	14·2	7·3	13·5	1,560,646	71,437	1,632,083
N.-W. F. P.	33,940	2,999	36,939	15·9	9·1	15·0	...	100	100
Punjab	366,692	29,629	396,321	16·8	8·9	15·8	159,529	10,776	170,305
Delhi	5,001	6,965	11,966	24·2	15·0	17·8	11	46	57
U. P.	858,648	70,650	929,298	19·0	12·4	18·3	780,557	33,034	813,591
B. & O.	653,787	10,177	663,964	17·3	7·0	16·9	...	1,380	1,380
Bengal	691,624	14,004	705,628	14·5	4·0	13·7	340,637	2,318	342,955
C. P.	261,619	19,748	281,367	17·9	11·2	17·2	251,386	17,863	269,249
Bombay	181,481	23,271	204,752	9·8	5·4	8·9	28,526	2,695	31,221
Madras	287,802	23,196	315,998	7·0	4·4	6·6	...	1,324	1,324
Coorg	2,759	45	2,804	17·8	4·7	17·0	...	...	...
Assam	105,607	1,112	106,719	13·8	5·4	12·9	...	248	248
Burma	83,943	4,483	88,426	7·5	3·1	7·0	...	1,569	1,569
Ajmer-Merwara	9,193	1,376	10,569	23·1	7·6	18·3	...	84	84

TABLE I.—DEATHS FROM FEVERS BY MONTHS.

	Jan.	Feb.	Mar.	Apl.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
British India	307,804	252,672	265,567	307,743	340,509	333,669	299,956	300,129	331,443	342,309	339,259	333,700	3,754,751
N.-W. F. P.	4,310	3,987	2,776	2,484	2,895	3,371	2,773	2,784	2,362	2,672	3,239	3,286	36,939
Punjab	42,076	30,448	27,199	27,216	34,925	36,225	30,804	28,204	35,396	36,607	31,428	32,793	396,321
Delhi	879	664	824	1,086	1,511	1,402	906	896	1,071	1,024	989	714	11,966
U. P.	71,909	66,403	65,019	86,803	96,758	101,557	80,606	71,183	77,285	76,822	70,786	64,167	929,298
B. & O.	49,912	38,753	41,577	54,067	59,474	62,774	57,381	58,710	64,756	62,423	58,005	56,132	663,964
Bengal	62,667	49,970	54,453	57,410	53,908	44,429	47,660	50,880	57,887	67,153	77,133	82,078	705,628
C. P.	16,815	14,500	18,386	22,265	28,261	26,939	16,744	20,783	28,712	31,559	29,345	27,058	281,367
Bombay	17,121	14,692	19,077	19,527	19,440	14,241	14,733	17,142	16,764	16,441	18,499	17,075	204,752
Madras	25,343	20,273	22,714	20,992	26,140	23,907	27,197	30,620	30,463	28,656	28,683	31,005	315,998
Coorg	161	145	195	193	219	328	356	286	258	265	178	220	2,804
Assam	8,018	6,365	5,883	7,900	9,799	11,823	11,466	9,554	8,466	9,546	8,965	8,934	106,719
Burma	7,297	5,448	6,502	6,958	6,267	6,007	8,779	8,271	6,963	8,198	8,263	9,473	88,426
Ajmer-Merwara	1,296	1,019	962	842	912	666	551	807	1,060	943	746	765	10,569

TABLE J.—DEATHS AND RATES P. M. FROM DYSENTERY AND DIARRHŒA IN RURAL AND URBAN AREAS AND BY SEX.

	Deaths.					Rate per mille.		
	R.	U.	M.	F.	Total.	R.	U.	Total.
British India	223,629	55,594	145,389	133,834	279,223	0·9	1·9	1·0
N. W. F. P.	173	226	243	156	399	0·1	0·7	0·2
Punjab	8,504	3,788	6,589	5,703	12,292	0·4	1·1	0·5
Delhi	117	531	357	291	648	0·5	1·1	1·0
U. P.	5,456	12,827	9,346	8,937	18,283	0·1	2·3	0·4
B. & O.	18,805	1,151	10,640	9,316	19,956	0·4	0·8	0·5
Bengal	44,903	7,027	27,375	24,555	51,930	0·9	2·0	1·0
C. P.	31,220	4,079	17,965	17,334	35,299	2·1	2·3	2·2
Bombay	20,253	5,877	13,705	12,425	26,130	1·1	1·4	1·1
Madras	79,168	17,013	49,394	46,787	96,181	1·9	2·6	2·0
Coorg	129	39	92	76	168	0·8	4·1	1·0
Assam	10,469	478	5,791	5,156	10,947	1·3	2·3	1·3
Burma	4,430	1,936	3,596	2,770	6,366	0·4	1·4	0·5
Ajmer-Merwara	2	622	296	328	624	...	3·5	1·1

TABLE K.—DEATHS FROM DYSENTERY AND DIARRHŒA BY MONTHS.

	Jan.	Feb.	Mar.	Apl.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
British India	21,182	16,332	17,721	21,887	22,271	21,599	25,536	29,387	31,920	26,571	22,620	22,197	279,223
N.-W. F. P.	40	24	26	33	32	38	23	45	55	17	31	35	399
Punjab	844	629	811	864	1,301	1,292	964	1,126	1,268	1,200	1,006	987	12,292
Delhi	46	15	25	28	35	41	74	128	119	63	45	29	648
U. P.	854	888	1,159	1,516	2,184	2,184	1,784	2,115	2,036	1,501	1,155	907	18,283
B. & O.	1,484	1,165	1,332	1,653	1,398	1,349	1,882	2,719	2,563	1,721	1,301	1,389	19,956
Bengal	4,543	3,671	4,098	5,131	4,424	3,507	3,968	4,348	4,433	4,467	4,407	4,933	51,930
C. P.	1,591	1,462	1,729	4,314	2,206	2,327	2,170	1,740	6,797	5,218	3,255	2,490	35,299
Bombay	1,449	1,183	1,432	1,382	1,636	1,563	2,988	4,255	3,550	2,575	2,261	1,856	26,130
Madras	9,289	6,521	6,193	5,512	7,014	7,193	9,498	10,974	9,515	8,321	7,864	8,287	96,181
Coorg	9	5	5	6	26	21	25	13	23	15	16	4	168
Assam	661	490	568	990	1,417	1,407	1,124	966	849	944	817	714	10,947
Burma	355	262	311	383	510	640	1,006	848	634	473	409	535	6,366
Ajmer-Merwara	17	17	32	75	88	37	30	110	78	56	53	31	624

TABLE L.—DEATHS AND RATES P. M. FROM RESPIRATORY DISEASES IN RURAL AND URBAN AREAS AND BY SEX.

	Deaths.					Rate p. m.					Reported deaths from pulmonary tuberculosis.	
	R.	U.	Total.	M.	F.	R.	U.	Total.	M.	F.	R.	U.
British India	327,308	155,562	482,870	273,029	209,841	1·3	5·3	1·7	1·9	1·6	...	...
N.-W. F. P.	1,580	1,242	2,822	1,631	1,191	0·7	3·8	1·1	1·2	1·0	...	315*
Punjab	44,763	14,037	58,800	33,060	25,740	2·1	4·2	2·3	2·4	2·3	8,269	1,901
Delhi	1,109	2,311	3,420	1,884	1,536	5·4	5·0	5·1	4·8	5·6	88	470
U. P.	8,083	38,187	46,270	24,033	22,232	0·2	6·7	0·9	1·0	0·9	373	6,952
B. & O.	6,279	869	7,148	4,203	2,945	0·2	0·6	0·2	0·2	0·1	...	4
Bengal	67,822	17,046	84,868	54,021	30,847	1·4	4·8	1·7	2·0	1·3	12,373	4,151
C. P.	34,106	5,356	39,462	23,070	16,392	2·3	3·0	2·4	2·8	2·0	3,258	890
Bombay	78,939	36,323	115,262	62,796	52,466	4·3	8·4	5·0	5·2	4·8	17,208	7,570
Madras	75,037	27,806	102,843	55,580	47,263	1·8	4·3	2·1	2·4	2·0	...	...
Coorg	66	90	156	118	38	0·4	9·4	1·0	1·3	0·5	...	...
Assam	6,456	566	7,022	4,096	2,926	0·8	2·8	0·8	0·9	0·7	...	158†
Burma	3,065	8,889	11,954	7,103	4,851	0·3	6·2	1·0	1·1	0·8	...	2,371
Ajmer-Merwara	3	2,840	2,843	1,429	1,414	...	15·8	4·9	4·7	5·2	74	...

TABLE M.—DEATHS FROM RESPIRATORY DISEASES BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
British India	48,139	40,583	43,604	40,328	40,807	34,537	34,327	36,130	37,081	39,195	42,492	45,647	482,870
N.-W. F. P.	500	339	240	261	261	169	159	109	147	171	236	230	2,822
Punjab	9,341	6,394	4,503	4,273	4,877	4,796	4,066	3,243	3,526	3,982	4,332	5,467	53,800
Delhi	461	337	288	237	281	261	205	194	232	282	307	335	3,420
U. P.	4,192	3,877	4,470	4,864	5,194	3,919	3,006	3,177	3,073	3,265	3,625	3,608	46,270
B. & O.	683	584	697	733	661	547	546	555	514	497	512	619	7,148
Bengal	7,354	7,331	8,040	7,434	6,686	5,374	5,436	5,590	5,839	6,993	8,547	9,744	84,868
C. P.	3,115	2,800	3,680	3,083	3,281	2,751	2,435	3,541	3,759	3,709	3,645	3,663	39,462
Bombay	10,935	9,573	12,016	10,358	9,154	7,258	7,959	8,814	9,187	9,199	10,187	10,622	115,262
Madras	9,341	7,962	7,966	7,123	8,338	7,646	8,702	9,094	8,973	9,165	9,138	9,395	102,843
Coorg	14	9	10	20	11	11	11	12	17	12	8	21	156
Assam	582	474	489	600	646	597	591	555	538	672	703	575	7,022
Burma	957	831	967	939	886	884	1,043	1,061	1,068	1,058	1,083	1,177	11,954
Ajmer-Merwara	164	72	238	403	531	324	168	135	208	190	169	191	2,843

*For Municipal towns only.

†For 13 larger towns.

TABLE N.—QUININE AND CINCHONA FEBRIFUGE ISSUED BY THE PUBLIC HEALTH, MEDICAL, AND OTHER DEPARTMENTS IN THE VARIOUS PROVINCES OF BRITISH INDIA DURING 1935.

	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
British India	36,260	1	25,745	1
N. W. F. P.	1,617	3	737	1
Punjab	3,028*	1	416	..
Delhi	361	4	179	2
U. P.	3,693	1	4,174	1
B. & O.	317	..	..	..
Bengal	13,409	2	13,606	2
C. P.	1,515	2	676	1
Bombay	4,795	1	7	..
Madras	5,342	1	743	..
Coorg	488	21	279	12
Assam	1,608	1	2,453	2
Burma† . . . . .	..	..	2,444	1
Ajmer-Merwara	87	1	31	..

*Includes 2,084 lbs. for 1935-36.

† This represents issues made by the Public Health Department. In addition quinine treatment and cinchona febrifuge amounting to 3,005 lbs. were sold by the Medical Store Depot, Rangoon, during 1934-35.

Appendix III

relating to

Section III.

TABLE A.—MATERNAL DEATH RATES PER 1,000 BIRTHS RECORDED IN CERTAIN TOWNS.

	1935.		1935.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.
<i>Delhi.</i>				
Delhi City	82	5		
Delhi Ntd. Area	17	19		
<i>Madras Presidency.</i>				
			Chingleput	19 23
			Tanjore	72 26
			Guntur	83 29
<i>United Provinces.</i>				
Lucknow	73	6	Nellore	63 27
Agra	77	6	Negapatam	39 25
Cawnpore	137	11	Nandyal	20 23
Allahabad	53	6	Anantapur	17 28
Benares	139	13	Mayavaram	20 18
Moradabad	78	13	Kurnool	16 9
Aligarh	27	8	Cuddapah	17 18
Bareilly	38	6	Kumbakonam	28 13
Saharanpur	48	12	Tinnevely	24 12
Hathras	19	8	Cuddalore	49 23
Muttra	42	13	Trichinopoly	57 11
Muzaffarnagar	10	6	Conjeeveram	63 24
Meerut	22	6		
Jhansi	24	6		
<i>Central Provinces.</i>				
			Calicut ^y	50 13
Nagpur	124	11	Rajahmundry	46 20
Amraoti	37	14	Palamcottah	27 14
Raipur	33	18		
Burhanpur	31	14	Madura	135 16
Akola	56	25	Vellore	64 20
Jubbulpore	57	9	Cocanada	10 6
Khamgaon	9	9		
			Tuticorin	36 16
			Bezwada	37 14
			Ellore	30 14
			Madras	295 10
<i>Bombay Presidency.</i>				
Bombay City	195	6		
Ahmedabad	135	8		
Karachi	47	4		
Surat	54	9		
Sukkur	30	13		
Shikarpur	63	29		
Hyderabad	22	6		
Poona	19	3		
Larkana	35	39		
Nasik	4	3		
Sholapur	91	13		
Satara	12	21		
Ahmednagar	25	12		
			<i>Burma.</i>	
			Mandalay	69 9
			Moulmein	34 17
			Rangoon Town	58 6
			Myingyan	19 17
			Akyab	4 6
			Prome	14 13
			Pegu	12 14
			<i>Coorg.</i>	
			Mercara	1 5

TABLE B.—MATERNITY AND CHILD WELFARE CENTRES IN RURAL AND URBAN AREAS.

	Centres maintained by								Trained visitors.		Trained midwives.		Trained <i>dais</i> .	
	Govt.		Local and Municipal bodies.		Other Agencies.		Total.							
	R	U	R	U	R	U	R	U	R	U	R	U	R	U
Total	15	7	262	247	49	207	326	461	51	225	1,209	1,254	2,357	2,220
N.-W. F. P.	..	..	..	1	..	1	..	2	..	1	..	3	10	5
Punjab.	..	1	16	16	5	38	21	55	20	58	..	16	304	714
Delhi	..	..	7	15	1	3	8	18	1	13	7	5	1	17
U. P.	..	..	120	109	..	..	120	109	6	14	151	142	350	524
B. & O.	..	6	..	6	4	8	4	20	..	8	4	20	..	7
Bengal	9	..	12	16	2	12	23	28	2	10	24	76	2,411	484
C. P.	..	..	..	7	14	43	14	50	9	49	5	1	23	319
Bombay	..	..	34	16	8	42	42	58	1	22	42	143	251	134
Madras.	4	..	73	57	14	27	91	84	11	34	852	707	4	12
Coorg	..	..	..	..	..	1	..	1	..	..	..	..	3	..
Assam	..	..	..	..	..	5	..	5	..	2	2	11	..	4
Burma	2	..	..	4	1	27	3	31	1	14	122	130	..	..
Ajmer-Merwara	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Appendix IV

relating to

Section IV.

TABLE A.—EXPENDITURE ON PUBLIC HEALTH.

(i) *By the Government of India.*

	India general.	Baluchistan.	Other areas.	Total.
	Rs.	Rs.	Rs.	Rs.
Total	10,66,901	11,306	3,88,071	14,66,278
Public Health Establishment	3,48,549	9,306	12,911	3,70,766
Grants for Public Health Purposes	2,91,843	2,000	1,38,943	4,32,786
Expenses in connection with epidemic diseases	49,301	..	2,34,800	2,84,101
Bacteriological Laboratories	2,38,868	..	..	2,38,868
Pasteur Institutes	1,733	..	..	1,733
Works	1,36,607	..	1,417	1,38,024

(ii) *By the Provincial Governments.*

	Total.	Public Health establishment.	Grants for public health purposes.	Epidemic Diseases.	Bacteriological Laboratory.	Pasteur Institutes.	Works.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Total	1,52,29,920	60,67,795	50,14,741	17,87,262	8,42,234	3,47,578	11,70,310
N.-W. F. P.	1,27,680	82,188	28,711	16,781	..	..	..
Punjab	10,43,729	6,01,894	2,83,026	1,14,108	19,491	25,210	..
U. P.	22,79,095	14,45,134	5,76,949	1,52,126	..	..	1,04,886
B. & O.	12,57,378	4,90,761	3,91,903	1,41,935	28,988	15,033	1,88,758
Bengal	35,99,109	6,97,296	24,53,574	3,13,524	88,660	40,969	5,086
C. P.	3,81,568	95,910	48,208	2,34,243	3,207	..	..
Bombay	24,21,352	8,71,198	2,39,613	1,47,094	2,81,354	33,241	8,48,852
Madras	23,92,872	12,40,843	6,24,764	93,669	3,92,895	36,853	3,848
Coorg	11,442	2,499	..	8,518	..	..	425
Assam	7,08,738	1,69,528	18,817	3,61,103	13,798	1,29,558	15,934
Burma	9,72,406	3,36,049	3,49,176	2,04,105	13,841	66,714	2,521
Shan States Federation	34,551	34,495	..	56	..	..	..

TABLE SHOWING THE DISTRIBUTION OF HEALTH STAFFS IN RURAL AND URBAN AREAS.

	Rural Areas.									
	Medical Officers of Health.				Epidemic Staff.	Sanitary and Health Inspectors.	Vaccinators.		School Medical Officers.	Other Health Staffs.
	Holding D. P. H.		Licentiates (L. P. Hs.)				M.	F.		
	Whole time.	Part time.	Whole time.	Part time.						
Total	136	1	61	...	593	1,237	5,591	45	12	876
N.-W F P.	...	...	...	...	2	...	24	...	...	2
Punjab	23	...	...	...	42	49	441	...	...	17
Delhi	...	1	...	...	...	2	3	...	5	10
U. P.	40	...	29	...	43	158	821	...	...	9
B. & O.	5	...	1	...	82	36	424	1	7	48
Bengal	29	...	11	...	236	572	1,851	37	...	674
C. P.	...	...	...	...	35	...	274	...	...	36
Bombay	1	...	2	...	61	5	379	...	...	51
Madras	29	...	17	...	16	350	652	6	...	...
Coorg	...	...	1	...	...	1	7	...	...	...
Assam	...	...	...	...	45	1	402	1	...	...
Burma	4	...	...	...	31	63	303	...	...	29
Ajmer-Merwara.	...	...	...	...	...	...	10	...	...	...

	Urban Areas.									
	Medical Officers of Health.				Sanitary and Health Inspectors.	Vaccinators.		Inspectors of Vaccination.	School Medical Officers.	Other Health Staffs.
	Holding D. P. H.		Licentiates (L. P. Hs.)			M.	F.			
	Whole time.	Part time.	Whole time.	Part time.						
Total	129	6	91	22	1,083	954	37	93	48	690
N. W. F. P.	1	...	...	...	8	5	1	6	5	...
Punjab	12	2	1	18	128	96	11	6	7	74
Delhi	1	3	...	...	16	8	...	...	3	8
U. P.	21	...	13	...	180	185	...	...	13	...
B. & O.	5	...	...	1	28	40	1	13	...	12
Bengal	22	...	1	2	108	152	12	6	5	125
C. P.	2	...	1	...	56	81	...	...	...	3
Bombay	22	...	46	...	127	61	2	2	9	252
Madras	26	...	23	...	279	175	10	17	6	40
Coorg	...	...	...	...	2	2	...	1	...	...
Assam	1	...	...	1	14	49	...	41	...	97
Burma	15	1	6	...	125	93	...	...	...	57
Ajmer-Merwara.	1	...	...	...	12	7	...	1	...	22

Appendix V

relating to

Section VI.

TABLE A.—VACCINATION OPERATIONS PERFORMED IN BRITISH INDIA AND IN DIFFERENT PROVINCES.

Province.	Population.	Operations performed.			Percentage of success.		Children successfully vaccinated.		Total cost.	Average cost per successful case.	Rate of successful vaccinations per 1,000 of population.	Percentage of annual births successful vaccinated.
		P.	R.	Total.	P.	R.	Under 1 year.	1 to 6 years.				
British India . . .	269,668,192	10,623,029	14,733,696	25,356,725	97	48	4,332,547	4,454,385	33,97,008	0 3 8	56	45
N.-W. F. P. . . .	3,762,678	140,872	99,638	240,510	99	85	78,558	47,461	27,543	0 2 1	56	103
Punjab	23,427,835	1,019,039	2,466,896	3,485,935	99	67	782,431	137,982	3,88,095	0 2 10	97	73
Delhi	636,246	21,803	27,312	49,115	98	60	17,323	2,580	8,220	0 3 11	52	60
U. P.	48,408,763	1,605,718	366,740	1,972,458	83	58	977,880	451,738	3,87,860	0 3 9	34	56
B. & O.	37,677,576	1,153,538	877,721	2,031,259	93	61	316,809	760,486	67,733	0 0 9	40	24
Bengal	50,114,002	2,907,210	6,206,882	9,114,092	88	36	340,560	1,670,842	4,59,373	0 1 6	95	21
C. P.	15,507,723	565,836	168,569	734,405	97	53	425,051	96,372	1,89,839	0 5 2	38	61
Bombay	21,855,800	728,801	498,719	1,227,520	99	42	498,756	177,840	5,49,621	0 11 4	31	62
Madras	45,204,545	1,418,663	2,857,227	4,275,890	96	25	630,862	548,006	7,55,652	0 6 9	40	38
Coorg	163,327	6,871	13,676	20,547	97	63	1,396	3,963	5,849	0 6 4	90	33
Assam	9,247,857	423,982	423,703	852,685	93	65	70,292	265,302	1,19,139	0 3 6	67	29
Burma	13,102,048	600,475	721,792	1,322,267	98	38	173,444	288,419	4,29,278	0 9 0	58	43
Ajmer-Merwara . .	560,292	25,221	4,821	30,042	97	91	19,185	3,394	8,806	0 4 10	52	90

P = Primary.
R = Revaccinations.

Appendix VI.
relating to
Section VII.

TABLE A.—NUMBER OF TOWNS HAVING WATERSUPPLIES IN DIFFERENT PROVINCES.

	Towns having a population of 50,000.		Towns having a population of 30,000—50,000.		Towns having a population below 30,000.		Total.			
	No. of towns.	Towns having a protected water supply.	No. of towns.	Towns having a protected water supply.	No. of towns.	Towns having a protected water supply.	No. of towns.	Aggregate population.	Towns having a protected water supply.	Population of towns included in col. 10.
1	2	3	4	5	6	7	8	9	10	11
British India—	77	61	86	50	1,131	149	1,294	24,661,056	260	13,223,557
N.-W. F. P.	1	1	1	1	15	6	17	299,284	8	206,293
Punjab	8	6	11	6	158	23	177	2,922,754	35	1,442,755
Delhi	2	2	...	...	4	3	6	447,442	5	439,180
U. P.	17	11	13	3	409	8	439	5,423,472	22	1,655,252
B. & O.	6	4	8	5	64	2	78	1,653,837	11	783,553
Bengal	4	4	17	15	96	27	117	2,295,835	46	1,382,507
C. P.	2	2	7	4	103	3	112	1,679,546	9	550,338
Bombay	11	10	11	6	135	27	157	4,432,502	43	3,105,339
Madras	22	18	16	9	43	14	81	3,674,755	41	2,610,789
Coorg . . . . .	...	...	...	...	2	1	2	9,827	1	5,995
Assam . . . . .	...	...	...	...	25	10	25	194,474	10	111,879
Burma	3	3	2	1	73	24	78	1,447,129	23	908,280
Ajmer-Merwara	1	...	...	...	4	1	5	180,199	1	21,397

Appendix VII

relating to

Section VIII.

List of Scientific Papers by Research workers under the Government of India, the Indian Research Fund Association, Provincial Governments and Indian States published during 1935.

A.—(i) PAPERS PUBLISHED IN THE INDIAN JOURNAL OF MEDICAL RESEARCH (I. J. M. R.) AND ITS MEMOIRS.

Ahmad, B.

The vitamin C value of some common Indian fruits, vegetables and pulses by the chemical method. (Volume XXII, No. 4).

Ahuja, M. L.

A short note on an epizootic amongst rabbits due to *Salmonella certrycke*. (Volume XXII, No. 3).

A short note on viability of bacterial cultures. (Volume XXII, No. 3).

Specificity of antivenomous sera with special reference to sera prepared with venoms of Indian and South African snakes. (Volume XXII, No. 3).

Ahuja, M. L., and Naranjan Singh.

On types of meningococci isolated during the 1934 epidemic of cerebro-spinal meningitis in India, with special reference to the manufacture of a prophylactic vaccine. (Volume XXII, No. 4).

Basu, K. P., and Sarkar, S. N.

Biochemical investigations on different varieties of Bengal rice. Part I. The chemical composition of various rice samples. (Volume XXII, No. 4).

Biochemical investigations on different varieties of Bengal rice. Part II. Enzymic-digestibility of rice starch. (Volume XXII, No. 4).

Bhaskara Menon, T., and Annamalai, D. R.

The incidence of hepatic cirrhosis in South India. (Volume XXII, No. 4).

A note on splenic enlargement in malignant hepatoma. (Volume XXII, No. 4).

Bhatnagar, S. S., and Kartar Singh.

Bacteriological studies in acute lobar pneumonia due to pneumococcus and *B. pneumoniae* Friendlander. (Volume XXIII, No. 2).

Bose, A. C.

A modified method of estimating arsenic-content of Indian food-stuffs. (Volume XXII, No. 4).

Bose, J. P.

Arterio-venous sugar difference in diabetes mellitus: Its value in adjudging the severity of the disease. (Volume XXIII, No. 1).

Chakraborty, R. K.

The vitamin C content of some Indian food-materials. (Volume XXIII, No. 2).

Chatterjee, D. D.

The motor functions of the bowel in avitaminosis B and in starved animals. (Volume XXIII, No. 1).

Chopra, R. N., and Chopra, G. S.

Opium habit in India. Studies on the physical and mental effects produced by opium addiction. (Volume XXIII, No. 2).

Chopra, R. N., Chowhan, J. S., and De, N. N.

An experimental investigation into the action of the venom of *Echis carinata*. (Volume XXIII, No. 2).

Chopra, R. N., De, N. N., and Chakerburty, M.

The pharmacological action of tylophorine: the alkaloid occurring in *Tylophora asthmaticus*. (Volume XXIII, No. 1).

Chopra, R. N., Mukherjee, S. N., and Chopra, G. S.

Studies on the protein fractions of blood sera. Part II. Blood sera of opium addicts. (Volume XXII, No. 3).

Chopra, R. N., Mukherjee, S. N., and Gupta, J. C.

Studies on the protein fractions of blood sera. Part IV. Epidemic dropsy. (Volume XXIII, No. 2).

Chopra, R. N., Gupta, J. C., and Roy, A. C.

Action of emetine on the activity of the adrenal and thyroid glands. (Volume XXII, No. 4).

Chopra, R. N., and Das, N. N.

An improved method of recording amplified electrical changes in tissues for pharmacological work. (Volume XXII, No. 4).

Cunningham, J., and Fraser, A. G. L.

Further observations on Indian relapsing fever. Part II. The Serology of relapsing fever in human beings. (Volume XXII, No. 4).

Chopra, R. N., Mukherjee, S. N., and Sen, B.

Studies on the protein fractions of blood sera. Part III. Malarial sera during and after the rigor stage. (Volume XXII, No. 3).

Das, N., and Guha, B. C.

Observations on the chemistry of oxytocin (the oxytocic hormone of the pituitary gland). Part IV. (Volume XXII, No. 3).

De, N. K.

Spectrographic examination of some Indian milks. (Volume XXII, No. 3).

A spectrographic study of the vitamin A content of some oils and fats. (Volume XXII, No. 3).

A spectrographic analysis of thyroid glands. (Volume XXIII, No. 2).

Vitamin A activity and ultra-violet light. A simple spectrophotometric method of assaying vitamin A and carotene. (Volume XXIII, No. 2).

Dey, B. B., Pillay, P. P., David, J. C., and Rajmanikam, N.

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Ghosh, A. R., and Guha, B. C.

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Appendix VIII

relating to

Section IX

TABLE A.—NUMBER OF HOSPITALS AND DISPENSARIES AT WORK IN BRITISH INDIA AND DIFFERENT PROVINCES.

	Classes I, III and IV.		Classes II and VI		Class V.		Total.		Grand Total.	Average population served by each institution.	
	R.	U.	R.	U.	R.	U.	R.	U.		R.	U.
British India	3,620	1,633	345	494	348	199	4,313	2,326	6,639	61,874	12,039
N.-W. F. P.	35	21	6	13	3	7	44	41	85*	46,339	9,419
Punjab	595	187	88	82	3	4	686	273	959	29,902	11,235
U. P.	301	202	20	92	62	21	383	315	698	115,050	17,621
B. & O.	466	73	44	41	54	12	564	126	690	63,872	13,126
Bengal	624	422	26	93	99	78	749	593	1,342	66,908	6,213
C. P.	113	119	12	41	39	15	164	175	339	84,264	9,648
Bombay	157	258	27	52	17	23	201	333	534	103,672†	15,665†
Madras	1,004	191	54	23	58	33	1,116	247	1,363	36,539	27,598
Coorg	9	2	..	..	3	..	12	2	14	12,792	4,913
Assam	176	39	22	22	6	2	204	63	267	45,283	5,014
Burma	130	96	41	30	2	2	173	128	301	75,995	11,875
Baluchistan	10	23	5	5	2	2	17	30	47	..	..

* Excluding 33 dispensaries in the Agencies.

† Do not include Aden and Persian Gulf.

TABLE B.—NUMBER OF BEDS IN HOSPITALS AND DISPENSARIES.

	All classes of Institutions.			State-public, local fund and private aided hospitals and dispensaries.		
	Males.	Females and Children.	Total.	Males.	Females and Children.	Total.
British India	43,871	25,418	69,289	37,134	22,656	59,790
N.-W. F. P.	1,686	481	2,067	846	397	1,243
Punjab	7,076	4,264	11,340	5,469	4,024	9,493
Delhi	330	506	836	272	506	778
U. P.	6,071	3,049	9,120	4,417	2,707	7,124
B. & O.	4,052	1,891	5,943	2,770	1,517	4,287
Bengal	2,344	1,379	3,723	4,270	2,426	6,696
C. P.	1,853	1,164	3,017	1,394	897	2,291
Bombay	4,897	3,519	8,416	4,277	3,043	7,320
Madras	7,505	6,277	13,782	6,612	4,598	11,210
Coorg	88	66	154	88	66	154
Assam	1,266	401	1,667	759	328	1,087
Burma	6,157	2,272*	8,429	5,484	2,013	7,497
Baluchistan	546	149	795	476	134	610

* Including 8 special beds for children.

TABLE C.—NO. OF BEDS FOR FEMALES IN GENERAL AND FEMALE HOSPITALS AND DISPENSARIES OF CLASSES I, III AND IV.

	General hospitals.	Female hospitals.	Total.	Female hospitals.	
				Total in-door patients treated.	In-door daily average.
Total	15,949	5,807	22,084	126,560	3,982·90
N.-W. F. P.	283	114	397	2,642	106·04
Punjab	2,729	1,295	4,024	20,002	737·09
U. P.	1,307	1,400	2,707	24,308	799·30
B. & O.	1,298	219	1,517	2,898	140·81
Bengal	2,020	406	2,426	9,126	224·54
C. P.	579	318	897	6,002	221·93
Bombay	2,243	800	3,043	23,190	629·35
Madras	3,578	1,020	4,598	34,121	1,012·17
Assam . . . . .	..	..	328	..	..
Burma	1,809	204	2,013	4,009	110·00
Baluchistan	103	31	134	262	1·67

Class I.—State public.

Class III.—Local and Municipal Fund.

Class IV.—Private aided.

TABLE D.—SURGICAL OPERATIONS DONE IN CLASSES I, III AND IV INSTITUTIONS.

	Operations performed during the year.		Cured.	Died.
	Principal.	Secondary.		
British India	25,69,967	82,643	23,98,221	9,200
N.-W. F. P.	1,17,399	4,712	1,15,741	167
Punjab	5,79,254	13,188	5,48,241	1,102
Delhi	27,740*	..	..	501
U. P.	3,32,594	10,410	3,03,210	1,423
B. & O.	2,89,149	3,861	2,78,856	509
Bengal	1,82,803	27,696	1,66,825	1,609
C. P.	1,07,201	1,925	1,05,038	298
Bombay	1,69,319	4,667	1,48,005	1,068
Madras	6,02,304*	..	5,77,334	1,660
Coorg	4,616	2	4,584	8
Assam	24,084	43	23,711	82
Burma	1,20,655	16,088	1,14,222	751
Baluchistan	12,849	51	12,454	22

* Including Secondary operations.

TABLE E.—INCOME OF HOSPITALS AND DISPENSARIES.

	Total income Classes I, III and IV institutions.	Contributions by	
		Government.	Municipal and local funds.
	Rs.	Rs.	Rs.
British India	4,63,22,476	1,87,78,552	1,48,62,809
N.-W. F. P.	7,00,820	4,03,882	2,52,892
Punjab	52,06,207	21,07,391	22,64,684
Delhi	8,14,493	3,03,887	2,57,465
U. P.	39,19,370	9,65,405	18,07,792
B. & O.	34,91,716	9,04,048	16,09,352
Bengal	75,86,542	21,42,830	26,24,711
C. P.	26,74,249	7,05,737	2,92,992
Bombay	63,51,707	27,68,688	20,14,590
Madras	81,61,644	53,59,870	18,54,640
Coorg.	1,09,874	48,832	53,489
Assam	9,99,433	4,36,888	3,24,284
Burma	60,36,868	23,90,722	14,95,388
Baluchistan	2,69,553	2,40,372	10,030

TABLE F.—EXPENDITURE ON THE MAINTENANCE OF HOSPITALS AND DISPENSARIES.

	Total Expenditure.	Expenditure on			
		Medical officers.	Nurses.	Diet.	Medicines.
		Rs.	Rs.	Rs.	Rs.
British India	3,92,54,573	1,01,12,991	38,92,698	30,26,610	41,60,051
N.-W. F. P.	6,85,439	1,78,201	41,241	29,718	1,02,980
Punjab	49,92,301	15,06,348	3,15,316	1,42,135	6,13,160
Delhi	7,89,085	1,03,030	1,68,336	44,486	98,584
U. P.	32,93,664	9,11,331	2,23,160	16,114	4,86,083
B. & O.	28,46,666	8,03,771	1,37,112	1,74,682	4,95,585
Bengal	61,76,851	11,95,000	6,54,604	5,78,667	7,99,716
C. P.	13,31,239	4,50,414	95,185	22,878	1,73,012
Bombay	56,01,900	13,51,348	6,45,624	4,63,739	6,69,983
Madras	80,58,386	20,03,582	9,68,201	10,44,941	2,01,861
Coorg.	1,09,874	37,607	8,662	10,325	19,572
Assam	8,50,045	3,42,242	93,795*	48,533	1,26,918
Burma	42,69,629	11,34,927	5,31,612	4,43,881	3,50,937
Baluchistan	2,49,494	95,190	9,850	6,511	21,660

* Including compounders.

TABLE G.—ACCOMMODATION IN MENTAL HOSPITALS.

	Number.	Accommodation.			Maximum confined.			Square feet per head.
		M.	F.	Total.	M.	F.	Total.	
British	19	7,351	2,257	9,608	8,108	2,525	10,633	..
Punjab	1	826	182	1,008	925	233	1,158	70
U. P.	3	1,208	406	1,614	1,087	321	1,408	50
B. & O.	2	1,210	372	1,582	1,159	367	1,526	50
C. P.	1	344	126	470	387	105	492	54
Bombay	6	1,273	628	1,901	1,636	748	2,384	50—140
Madras	3	900	254	1,154	1,435	447	1,882	50
Assam	1	566	124	690	569	121	690	50
Burma	2	1,024	165	1,189	910	183	1,093	36—87

TABLE H.—ADMISSIONS, POPULATION, DAILY AVERAGE STRENGTH, DAILY AVERAGE SICK, CURES AND DEATHS AMONGST MENTAL CASES.

	Admitted.	Population.			Cured.	Died.	Average strength.	Average sick.	Criminal insanes.
		M.	F.	Total.					
British India	3,128	10,301	3,028	13,329	1,374	710	10,347·47	712·13	2,596
Punjab	263	1,113	257	1,370	151	40	1,110·13	76·65	235
U. P.	399	1,394	378	1,772	239	96	1,320·16	48·38	398
B. & O.	203	1,271	411	1,682	88	54	1,495·27	73·34	542
C. P.	118	454	124	578	50	30	476·54	20·30	160
Bombay	989	2,209	920	3,129	433	174	2,250·70	101·10	56
Madras	685	1,871	578	2,449	199	130	1,818·69	287·63	279
Assam	172	713	144	857	69	91	673·93	72·22	294
Burma	299	1,276	216	1,492	145	95	1,202·05	32·51	632

TABLE I.—TYPES OF INSANITY TREATED IN MENTAL INSTITUTIONS.

	Punjab.	U. P.	B. & O.	C. P.	Bombay.	Madras.	Assam.	Burma.	Total.
Total	1,370	1,772	1,682	479	3,148	2,437	857	1,492	13,237
Mental Deficiency	113	153	80	51	218	215	8	88	926
Manic Depressive Insanity	168	12	168	51	199	117	132	17	864
Mania	229	333	163	85	681	345	250	396	2,482
Melancholia	101	237	163	62	677	134	142	262	1,778
Schizophrenia including Dementia Praecox	214	98	345	69	368	724	178	268	2,264
Secondary Dementia	209	32	127	7	243	143	6	54	821
Paranoia and Paranoid States	36	64	164	23	155	96	13	41	592
Epilepsy and Epileptic Insanity	118	131	81	42	91	154	50	40	707
Toxic Psychosis—									
(a) Acute Confusional Insanity	36	151	39	6	61	41	1	59	394
(b) Alcoholic Psychosis	8	26	30	3	60	79	..	13	219
(c) Cannabis Indica Psychosis	68	321	107	5	161	139	73	22	896
(d) Of Endocrine origin . . . . .	..	..	..	5	1	7	..	..	13
(e) In relation to child bearing	9	61	..	12	59	29	1	8	179
(f) In relation to other constitutional diseases	8	24	4	2	49	58	..	1	146
Organic Psychosis—									
(a) General . . . . .	..	2	4	..	11	35	..	112	164
(b) Cerebral Syphilis	1	64	11	2	..	18	3	3	102
(c) Arterio-pathic and Senile Psychosis	24	10	22	26	28	63	..	41	214
(d) Encephalitis	8	..	2	..	1	..	..	4	15
(e) Other Cerebral Lesions	3	..	4	..	20	4	..	4	35
Neurosis and Psycho-Neurosis	1	14	46	1	13	4	..	3	82
No appreciable disease	16	22	117	26	11	18	..	56	266
Not yet diagnosed ,	17	5	1	41	14	78

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TABLE J.—CAUSES OF INSANITY AMONGST CASES TREATED IN MENTAL HOSPITALS.

	Punjab.	U. P.	B. & O.	C. P.	Bombay.	Madras.	Assam.	Burma.	Total.
Total	333	111	357	238	1,963	1,316	185	299	4,802
Mental Stress—									
Moral	3	2	2	..	97	21	..	..	125
Business worry	13	1	10	31	71	37	6	6	175
Domestic worry	20	2	49	..	272	231	3	22	599
Stress of Military Service . . . . .	..	..	..	..	6	..	..	..	6
Toxins—									
Cannabis Indica	45	33	6	14	101	55	13	13	280
Alcohol	8	1	12	..	39	40	..	..	100
Other Toxins . . . . .	..	1	4	..	62	23	..	7	97
Opium	7	..	2	..	3	1	..	40	53
Physical . . . . .	..	10	1	..	12	110	..	..	133
Bodily illness	14	..	9	5	100	85	4	10	227
Pregnancy . . . . .	..	..	..	..	8	5	..	..	13
Child-birth	1	2	4	7	28	22	2	2	68
Climacteric	1	1	..	3	12	18	..	1	36
Epilepsy	12	1	19	6	34	62	14	8	156
Head injury . . . . .	..	..	..	..	7	..	..	1	8
Infection—									
Encephalitis Lethargica . . . . .	..	..	1	..	2	..	..	..	3
Influenza . . . . .	..	..	..	..	2	5	..	..	7
Syphilis	2	..	26	..	20	51	2	63	164
Other infections	13	..	..	..	13	18	..	4	48
Old age	3	..	..	1	45	16	..	..	65
Hereditary pre-disposition	21	2	36	36	109	128	10	38	380
Previous attacks	71	5	42	22	80	130	2	18	370
Unascertained	99	50	134	113	840	258	129	66	1,689

TABLE K.—ADMISSIONS BY AGE-GROUPS IN MENTAL HOSPITALS.

	Under 20 years.		20—40 years.		40—60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British India	157	65	1,787	414	479	161	28	18	2,451	658
Punjab	20	1	173	18	43	5	2	1	238	25
U. P.	16	8	252	46	64	9	4	..	336	63
B. & O.	12	7	91	32	30	23	3	5	136	67
C. P.	5	2	75	16	13	7	..	..	93	25
Bombay	56	23	525	178	129	63	7	8	717	272
Madras	25	18	374	85	124	39	7	3	530	145
Assam	11	2	115	16	18	1	..	..	144	19
Burma	12	4	182	23	58	14	5	1	257	42

TABLE L.—ADMISSIONS BY COMMUNITIES IN MENTAL HOSPITALS.

	Hindus.		Muhammadans.		Christians and Europeans.		Others.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British India	1,485	362	581	79	207	156	188	61	2,451	658
Punjab	104	14	123	7	7	4	4	..	238	25
U. P.	259	50	72	9	3	3	2	1	336	63
B. & O.	78	21	29	8	28	36	1	2	136	67
C. P.	76	15	13	2	2	7	2	1	93	25
Bombay	463	141	181	43	55	60	18	28	717	272
Madras	359	98	96	10	70	35	5	2	530	145
Assam	100	18	30	..	7	..	7	1	144	19
Burma	46	5	37	..	35	11	149	26	257	42

TABLE M.—EXPENDITURE ON MENTAL HOSPITALS.

	Total.	Diet.	Bedding and clothing.	Medicines.
	Rs.	Rs.	Rs.	Rs.
British India	36,21,193	9,01,828	1,30,966	18,761
Punjab	4,94,624	1,01,865	21,234	1,816
U. P.	2,35,772	62,803	15,396	882
B. & O.—				
European	3,91,610	74,787	13,751	3,833
Indian	4,83,573	1,59,438	26,664	5,746
C. P.	1,20,325	33,911	6,585	7
Bombay	7,64,370	1,91,056	32,456	3,248
Madras	5,17,021	1,84,456	7,385	2,220
Assam	1,17,268	40,981	5,251	202
Burma	4,96,630	52,531	2,244	807

Appendix IX

relating to

Section X (Prisoners).

TABLE A.—SICKNESS

Statistics by

Administrations.*	Average strength.	Con-stantly sick.	Cholera.		Small-pox.		Malaria.	
			A.	D.	A.	D.	A.	D.
India (excluding Andamans)	143,579	22	0·1	...	0·4	...	137	0·5
	141,895	21	0·2	...	0·4	...	152	0·6
	144,134	23	0·1	...	0·4	...	168	0·5
Andamans	5,351	45	...	...	...	...	253	1·3
	5,759	27	...	...	...	...	260	1·7
	7,088	38	...	...	0·1	...	350	7·3
India (including Andamans)	148,930	23	0·1	...	0·4	...	141	0·5
	147,654	22	0·2	...	0·4	...	157	0·6
	151,222	23	0·1	...	0·4	...	178	0·9
N.-W. F. P.	6,557	25	...	...	...	...	149	0·5
	6,447	30	...	...	...	...	157	0·9
	6,306	32	...	...	0·2	...	218	0·6
Punjab	19,939	21	...	...	0·3	...	193	0·4
	19,957	22	...	...	0·3	...	274	1·4
	20,104	27	0·1	..	0·2	...	331	1·0
U. P.	31,659	22	0·4	0·1	1·3	0·1	153	0·4
	31,925	19	0·7	0·1	0·8	...	127	0·1
	33,395	20	0·2	...	0·6	...	148	0·3
B. & O.	10,374	22	...	...	...	...	38	0·8
	10,001	24	0·6	0·1	0·7	...	50	0·6
	10,325	27	0·2	0·1	0·7	0·1	98	0·4
Bengal	20,249	38	0·1	...	0·3	...	253	0·9
	19,271	38	0·2	0·1	0·3	...	269	1·2
	16,592	36	0·2	...	0·4	...	274	1·1
C. P.	4,554	8	...	...	0·4	...	47	0·2
	4,201	11	0·5	0·2	0·7	...	35	0·2
	4,529	12	0·2	0·1	0·3	...	51	0·7
Bombay	11,399	22	...	...	0·2	...	253	0·4
	12,143	22	...	...	...	...	317	0·3
	13,741	20	...	...	0·3	...	236	0·3
Madras	12,599	16	...	...	0·1	...	18	0·2
	11,640	15	...	...	0·1	...	18	0·2
	12,678	19	...	...	0·2	...	26	0·1
Assam	4,015	23	...	...	...	...	140	1·2
	4,007	22	...	...	...	...	111	0·7
	3,490	28	...	...	0·1	...	120	0·5
Burma	20,116	11	0·1	...	...	...	15	0·2
	20,239	10	0·1	...	0·4	...	12	0·2
	20,344	13	...	...	0·4	...	34	0·4

A = Admissions.

D = Deaths.

NOTE.—The three figures against each administrative group
The rates have been calculated *per mille*

* Excluding subsidiary jails.

AND MORTALITY.

Administrations.

Tubercle of the lungs.		Pneumonia.		Respiratory diseases.		Dysentery.		Diar- rhœa.		Anæmia and debility.		All causes.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
5	2.2	10	2.0	25	0.3	30	0.7	20	0.1	7	0.3	497	11
6	2.2	11	2.8	31	0.5	33	0.8	20	0.2	8	0.3	541	12
7	1.9	12	2.6	30	0.4	40	0.9	21	0.2	9	0.3	586	12
3	1.5	3	0.9	24	...	39	0.6	10	...	8	0.6	651	10
4	2.1	4	1.0	28	0.2	26	1.2	6	...	8	1.7	567	11
3	2.0	6	2.3	22	0.4	22	5.0	10	0.3	10	3.4	738	29
5	2.1	10	2.0	25	0.3	30	0.7	20	0.1	7	0.3	503	11
6	2.2	11	2.7	30	0.5	33	0.8	19	0.2	8	0.4	552	12
6	1.9	11	2.6	30	0.4	39	1.1	20	0.2	9	0.5	593	13
9	3.8	16	2.7	31	0.2	7	...	4	0.2	6	0.2	412	11
10	3.1	33	7.4	59	0.9	13	...	5	...	19	...	496	15
10	2.9	31	6.4	63	0.4	14	0.2	10	0.1	7	...	603	14
9	3.6	8	1.3	32	0.1	12	0.6	12	0.2	5	0.1	582	10
8	3.9	13	3.0	50	0.4	32	0.6	16	0.4	6	0.2	745	15
7	2.7	13	3.4	48	0.5	33	0.5	20	0.4	13	0.2	837	14
3	1.1	8	2.0	25	0.6	11	0.2	13	0.1	5	0.1	487	8
8	1.2	7	2.0	25	0.2	15	0.4	15	0.2	6	0.1	459	8
6	1.2	11	2.4	24	0.4	22	0.4	13	0.2	6	0.2	494	9
8	4.3	14	2.2	33	0.5	50	1.0	16	...	2	0.2	341	18
9	3.8	14	4.4	29	0.7	45	1.5	19	...	3	0.1	363	20
7	3.0	14	3.0	37	0.5	70	1.6	41	0.2	2	0.1	502	16
6	1.3	13	2.7	41	0.3	65	1.0	74	...	18	0.5	1,046	11
6	1.9	11	2.6	41	0.8	66	1.5	63	0.1	30	0.7	1,079	13
5	1.6	12	2.3	36	0.5	62	1.3	57	0.2	20	0.6	1,041	13
3	1.5	7	2.2	8	0.2	37	0.7	25	...	7	0.2	224	10
5	1.7	8	2.9	14	1.4	31	0.7	19	1.0	5	1.4	289	15
8	1.6	8	2.0	15	1.1	56	1.2	15	0.5	4	0.7	332	12
4	2.0	13	2.0	27	0.1	38	0.9	23	0.2	8	0.4	610	12
3	1.3	17	3.5	40	0.5	51	0.3	32	0.1	7	0.6	737	13
3	1.1	16	3.1	34	0.3	54	0.3	32	0.2	8	0.3	639	10
5	1.2	7	1.0	8	0.6	40	0.7	2	0.1	5	0.2	232	11
5	2.0	3	1.1	7	0.8	36	1.3	2	0.3	7	0.6	210	12
10	1.9	4	1.1	14	0.4	48	1.0	2	0.1	9	0.4	312	10
10	2.7	26	5.7	40	0.2	96	3.7	15	0.5	25	2.5	496	22
8	1.7	18	5.2	66	0.7	99	1.7	11	...	19	0.5	530	14
10	3.0	14	3.8	54	0.6	119	2.7	23	0.2	14	1.1	579	17
5	2.4	5	1.5	5	0.1	8	0.8	3	0.1	3	0.3	146	11
6	2.1	8	1.5	6	0.1	10	0.7	2	0.1	2	0.1	179	10
6	2.1	6	1.6	9	0.2	20	1.4	3	0.1	5	0.5	322	12

are those for (1) 1935, (2) 1934 and (3) 1930—34.
of average population.

TABLE B.—*SICKNESS AND MORTALITY FROM PRINCIPAL DISEASES.

Year.	Average annual strength.	Influenza.				Cholera.				Small-pox.				Enteric fever.			
		Actuals.		Rates.		Actuals.		Rates.		Actuals.		Rates.		Actuals.		Rates.	
		A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
1935	143,579	3,937	15	27	0·1	18	5	0·1	...	59	3	0·4	...	278	37	2	0·3
1934	141,895	5,667	26	40	0·2	35	7	0·2	...	54	1	0·4	...	243	41	2	0·3
Mean 1930—34	144,134	6,711	30	40	0·2	17	4	0·1	...	66	3	0·4	...	327	43	2	0·3
Year.	Average annual strength.	Malaria.				Pyrexia of uncertain origin.				Tubercle of the lungs.				Pneumonia.			
		Actuals.		Rates.		Actuals.		Rates.		Actuals.		Rates.		Actuals.		Rates.	
		A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
1935	143,579	19,683	71	137	0·5	1,000	10	7	0·1	789	310	5	2·2	1,431	292	10	2·0
1934	141,895	21,622	82	152	0·6	1,132	2	8	...	831	308	6	2·2	1,614	392	11	2·8
Mean 1930—34	144,134	24,207	79	163	0·5	1,647	5	11	...	933	279	7	1·9	1,680	370	12	2·6
Year.	Average annual strength.	Respiratory diseases.				Dysentery.				Diarrhoea.				Anæmia and Debility.			
		Actuals.		Rates.		Actuals.		Rates.		Actuals.		Rates.		Actuals.		Rates.	
		A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
1935	143,579	3,596	46	25	0·3	4,239	100	30	0·7	2,894	14	20	0·1	1,057	43	7	0·3
1934	141,895	4,329	70	31	0·5	4,746	112	33	0·8	2,634	25	20	0·2	1,089	46	8	0·3
Mean 1930—34	144,134	4,364	63	30	0·4	5,801	125	40	0·9	2,993	31	21	0·2	1,222	49	9	0·3

NOTE.—Rates have been calculated *per mille* of average population.

* Excluding Andamans.

A—Admissions.

D—Deaths.

ANNUAL REPORT
OF THE
PUBLIC HEALTH COMMISSIONER
WITH THE GOVERNMENT OF INDIA
FOR 1935



Volume II

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ANNUAL REPORT OF THE PUBLIC HEALTH COMMISSIONER
WITH THE GOVERNMENT OF INDIA FOR 1935.

VOLUME II.

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ABBREVIATIONS.

A.	Admissions.
A. D. P.	Assistant Director of Pathology.
A. H. Q.	Army Head Quarters.
Av. C. S.	Average constantly sick.
B. M. H.	British Military Hospital.
B. Os.	British Officers.
B. O. Rs.	British Other Ranks.
C.	Cases.
C. M. %	Case mortality per cent.
D.	Deaths.
D. A. D. P.	Deputy Assistant Director of Pathology.
D. A. H.	Disordered Action of the Heart.
G. S. W.	Gun-shot Wounds.
I. O. Rs.	Indian Other Ranks.
M. Os.	Medical Officers.
N. C. Os.	Non-Commissioned Officers.
O. C.	Officer Commanding.
P.	Primary.
P. A.	Per annum.
P. M.	Per mille.
P. U. O.	Pyrexia of uncertain origin.
R.	Revaccinations.
U. K.	United Kingdom.
V. D.	Venereal diseases.
V. D. H.	Valvular diseases of the heart.
%	Per cent.

ANNUAL REPORT OF THE PUBLIC HEALTH COMMISSIONER WITH THE GOVERNMENT OF INDIA FOR 1935.

VOLUME II.

SECTION I.

ON THE HEALTH OF THE BRITISH ARMY IN INDIA.

(From the Director of Medical Services in India.)

1. General health statistics of the British Army in India during the year 1935 are given in the table below :—

TABLE 1.

1935.	Average strength.	Admissions.		Deaths.		Invalids sent home.		Invalids discharged from service.		Average constantly sick.	
		No.	Ratio per 1,000.	No.	Ratio per 1,000.	No.	Ratio per 1,000.	No.	Ratio per 1,000.	No.	Ratio per 1,000.
Officers	2,227	1,047	470·1	15	6·74	54	24·25	...	...	37·61	16·89
Other Ranks	52,646	29,853	567·1	134	2·55	363	6·90	...	...	1,407·76	26·74
Numbers of Nursing Service.	...	84	...	...	...	8	...	...	...	3·34	...
Women	4,178	1,305	312·4	14	3·35	39	9·33	...	...	41·07	9·83
Women confinement . . . . .	...	904	...	1	...	...	...	...	...	34·11	...
Children	6,522	2,180	334·3	63	9·66	14	2·15	...	...	62·29	9·55
Royal Navy and R. A. F. . . . .	...	1,258*	...	63	...	75	...	...	...	43·59*	...
R. A. F. Women and Children.	...	57	...	...	...	...	...	...	...	2·19	...
R. A. F. Women confinement.	...	10	...	...	...	...	...	...	...	0·40	...
Royal Indian Marine . . . . .	...	5	...	...	...	...	...	...	...	0·40	...
Boys of Sanawar L. R. M. School.	...	580	...	...	...	...	...	...	...	7·58	...
Others :											
Men . . . . .	...	479	...	21	...	...	...	...	...	5·94	...
Women . . . . .	...	329	...	8	...	25	...	...	...	9·10	...
Women confinement . . . . .	...	129	...	...	...	...	...	...	...	4·74	...
Children . . . . .	...	184	...	7	...	3	...	...	...	5·32	...

* Includes 402 and 11·72 respectively for R. A. F. cases treated in quarters.

The ratios per 1,000 for admissions, deaths and invalids, amongst officers and other ranks for the quinquennial periods 1910-14, 1920-24, 1925-29 and 1930-34 with that for 1935 are given separately for purposes of comparison in the following table :—

TABLE 2.

Periods.	Ratio per 1,000.					
	Admissions.		Deaths.		Invalids.	
	Officers.	Other Ranks.	Officers.	Other Ranks.	Officers.	Other Ranks.
1910—14	567·5	567·2	5·14	4·36	16·30	7·03
1920—24	676·7	791·9	6·71	5·24	20·99	18·91
1925—29	589·9	619·4	5·25	2·90	17·44	13·50
1930—34	428·6	604·7	6·69	2·64	20·09	8·88
1935	470·1	567·1	6·74	2·55	24·25	6·90

Officers.

2. 470·1 per 1,000 of strength were admitted to hospital during the year, compared with 429·2 in 1934.

The principal causes of sickness were :—

Malaria	79	Wounds (other than G. S. W.)	24
Jaundice	78	Contusion	23
Cellulitis	65	Concussions	22
Dysentery	64	Sprain and strain	19
Sandfly fever	60	Pharyngitis	19
Tonsillitis	51	Gastritis	16
Diarrhoea	44	Appendicitis	14
Fractures	43	Common cold	11
Influenza	30		

There were 15 deaths giving a ratio of 6·74 per 1,000 compared with 16 and 6·83 per 1,000 in 1934.

The causes of death were injuries (other than G. S. W.) 9 cases, G. S. wound, typhoid fever, dysentery, embolism coronary artery, obstruction of the intestines and nephritis interstitial each one case.

The average constantly sick in hospital was 37·61 or 16·89 per 1,000 of strength as compared with 34·05 or 14·50 in the previous year.

1,216 or 546·0 per 1,000 of the strength were treated as outpatients.

Soldiers.

3. 29,853 or 567·1 per 1,000 of the strength were admitted to hospital, compared with 574·1 in 1934 and 580·5 in 1913.

The principal causes of admission to hospital showing the increase or decrease compared with the previous year were :—

	Increase 1935. or decrease.		Increase 1935. or decrease.
Malaria	2,955 — 721	Boils	473 + 21
Cellulitis	2,301 — 34	Appendicitis	423 — 52
Sandfly fever	1,922 — 51	Pharyngitis	420 — 21
Dysentery	1,536 + 147	Impetigo contagiosa	371 + 1
Tonsillitis	1,494 — 202	Soft chancre	357 + 136
Gonorrhœa	1,357 — 13	Jaundice	353 — 44
Sprain	907 — 91	Common cold	342 + 167
Bronchitis	757 — 13	Constipation	332 — 14
Diarrhoea	754 — 77	Syphilis	315 + 71
Fractures	710 + 52	Gastritis	307 — 35
Contusion	607 — 219	Wounds	303 — 60
Synovitis	578 + 50	Dengue	262 — 98
Influenza	560 — 337		

18 Diphtheria "Carriers" were admitted to hospital.

There were 134 deaths or 2·55 per 1,000 of the strength compared with 121 or 2·22 per 1,000 in 1934.

The most important causes of mortality were :—

Local injuries	32
Pneumonia	19
General injuries	21
Enteric group of fevers	9

363 or 6·90 per 1,000 of the strength were sent home as invalids, compared with 511 or 9·39 per 1,000 in 1934.

The principal causes of invaliding to the United Kingdom were :—

	1935.	Increase or Decrease.		1935.	Increase or Decrease.
Pulmonary tuberculosis	35	—16	Epilepsy	13	—13
Mental diseases, other than schizophrenia and neurasthenia. Injuries, other than fractures	30	— 9	Deformities of limbs	13	—11
Diseases of joints	21	+ 4	Valvular disease of the heart	10	— 3
Schizophrenia	20	— 3	Diseases of bronchi and bronchioles	10	— 3
Diseases of urinary organs	17	..	Fractures	9	—11
Otitis media	14	+ 1	Tuberculosis, other than pul- monary	9	— 1
		..	Duodenal ulcer	8	—18

The average number constantly sick in hospital was 1,407·76 or 26·74 per 1,000 of the strength, compared with 1,411·13 or 25·93 per 1,000 in 1934.

The diseases chiefly responsible were :—

	Average Constantly Sick.		Average Constantly Sick.
Gonorrhœa	175·57	Soft chancre	36·33
Malaria	107·66	Sprain and strain	29·58
Cellulitis	78·99	Appendicitis	29·08
Dysentery	67·16	Syphilis	27·34
Fractures	49·69	Bronchitis	26·04
Sandfly fever	39·53	Synovitis	24·53
Tonsillitis	37·45	Contusions	20·04

83,234 men, or 1,581·0 per 1,000 of the strength were treated as out-patients, with an average daily number under treatment of 1,088·76 or 20·68 per 1,000.

The combined ratio constantly sick in hospital and under treatment as out-patients was 47·42 per 1,000 of the strength, compared with 49·19 in 1934.

The actual loss to the Army in India in working days was 513,832 due to sick in hospital and 397,397 due to sick in barracks, making a total of 911,229 days compared with 977,196 in 1934.

The admission and death ratios per 1,000 of the strength for all causes and certain important diseases for stations with a strength of 1,000 and upwards compared with all India, are shown in the following tables:—

TABLE 3.

Table showing admission and death ratios per 1,000 of the strength for all causes and certain important diseases for stations with a strength of 1,000 and upwards compared with all-India.

Stations with total admission ratios higher than all-India.

	Peshawar.	Lahore.	Nowshera.	Quetta.	Meerut.	Mhow.	All-India.
Strength.	1,248	1,174	1,297	2,386	1,715	1,475	52,646
All Causes.	{ A. . . 954·3 D. . . 4·01 Av. C. S. . 39·18	{ A. . . 712·9 D. . . 2·56 Av. C. S. . 42·90	{ A. . . 652·3 D. . . 3·86 Av. C. S. . 27·89	{ A. . . 594·7 D. . . 4·61 Av. C. S. . 22·83	{ A. . . 583·7 D. . . 1·17 Av. C. S. . 30·94	{ A. . . 581·0 D. . . 2·03 Av. C. S. . 23·02	{ A. . . 567·1 D. . . 2·55 Av. C. S. . 26·74
Malaria	{ A. . . 132·2 D.	{ A. . . 69·8 D.	{ A. . . 69·4 D.	{ A. . . 171·8 D. . . 0·84	{ A. . . 84·5 D.	{ A. . . 83·4 D.	{ A. . . 56·1 D. . . 0·08
Sandfly fever	{ A. . . 291·7 D.	{ A. . . 26·4 D.	{ A. . . 144·9 D.	{ A. . . 2·1 D.	{ A. . . 11·1 D.	{ A. . . 0·7 D.	{ A. . . 36·5 D.
Enteric group of fevers	{ A. . . 5·6 D.	{ A. . . 6·8 D.	{ A. . . 1·5 D.	{ A. . . 1·3 D.	{ A. . . 1·7 D.	{ A. D.	{ A. . . 2·0 D. . . 0·17
Dysentery	{ A. . . 70·5 D.	{ A. . . 43·4 D.	{ A. . . 16·2 D.	{ A. . . 40·7 D.	{ A. . . 39·1 D.	{ A. . . 19·7 D.	{ A. . . 29·2 D. . . 0·02
Diarrhoea	{ A. . . 24·0 D.	{ A. . . 17·0 D.	{ A. . . 6·2 D.	{ A. . . 7·1 D.	{ A. . . 13·4 D.	{ A. . . 19·7 D.	{ A. . . 13·9 D.
Influenza	{ A. . . 1·6 D.	{ A. . . 5·1 D.	{ A. . . 1·5 D.	{ A. . . 17·2 D.	{ A. . . 19·8 D.	{ A. . . 29·8 D.	{ A. . . 10·6 D.
Pneumonia (Lobar and Lobular)	{ A. . . 7·2 D. . . 0·80	{ A. . . 8·5 D. . . 1·70	{ A. . . 13·9 D. . . 0·77	{ A. . . 4·2 D. . . 0·42	{ A. . . 8·2 D. . . 1·17	{ A. . . 6·8 D.	{ A. . . 4·2 D. . . 0·40
Venereal diseases	{ A. . . 28·8 D.	{ A. . . 71·6 D.	{ A. . . 15·4 D.	{ A. . . 15·1 D.	{ A. . . 26·8 D.	{ A. . . 22·4 D.	{ A. . . 38·8 D. . . 0·04
Minor septic diseases	{ A. . . 75·3 D.	{ A. . . 60·5 D.	{ A. . . 53·2 D.	{ A. . . 56·6 D.	{ A. . . 42·6 D.	{ A. . . 54·9 D.	{ A. . . 59·7 D.
Local injuries	{ A. . . 72·1 D. . . 2·40	{ A. . . 56·2 D.	{ A. . . 73·2 D. . . 0·77	{ A. . . 49·5 D. . . 0·84	{ A. . . 54·8 D.	{ A. . . 64·4 D. . . 1·36	{ A. . . 62·2 D. . . 0·61
Heat-stroke	{ A. D.	{ A. . . 1·7 D.	{ A. . . 0·8 D. . . 0·77	{ A. D.	{ A. D.	{ A. D.	{ A. . . 0·2 D. . . 0·08
Heat exhaustion	{ A. . . 1·6 D.	{ A. . . 9·4 D.	{ A. D.	{ A. D.	{ A. . . 2·3 D.	{ A. D.	{ A. . . 1·5 D. . . 0·09

A.—Admissions.
D.—Deaths.
Av. C. S.—Average constantly sick.

TABLE 3—*contd.*

Table showing admission and death ratios per 1,000 of the strength for all causes and certain important diseases for stations with a strength of 1,000 and upwards compared with all-India.

Stations with total admission ratios lower than all-India.

		Bangalore.	Lucknow.	Jubbulpore.	Sialkot.	Poona.	Rawalpindi.	Razmak.	Secunderabad.	Karachi.	Ranikhet.	All-India.
	Strength.	1,047	2,288	1,358	1,306	2,327	2,525	1,062	2,676	1,123	1,108	52,646
All Causes	{ A.	554·0	534·1	533·1	518·4	510·5	499·4	499·1	494·4	423·9	422·4	567·1
	{ D.	3·82	4·37	0·74	2·30	1·72	1·58	2·14	0·75	3·61	3·61	2·55
	{ Av. C. S.	26·10	25·42	26·35	21·47	34·87	25·83	25·14	21·46	30·11	29·23	26·74
Malaria	{ A.	11·5	24·0	47·9	20·7	80·4	57·4	60·3	6·7	37·4	10·8	53·1
	{ D. . . . .	...	...	...	...	...	...	...	...	...	...	0·08
Sandfly fever	{ A. . . . .	...	7·0	6·6	47·5	...	57·4	1·9	19·8	17·8	10·8	36·5
	{ D. . . . .	...	...	...	...	...	...	...	...	...	...	...
Enteric group of fevers	{ A. . . . .	...	0·4	1·5	1·5	0·9	0·8	...	1·5	1·8	...	2·0
	{ D. . . . .	...	...	...	...	...	...	...	0·37	...	...	0·17
Dysentery	{ A.	34·4	16·6	26·5	19·9	32·2	21·8	5·6	35·5	34·7	55·1	29·2
	{ D. . . . .	...	...	...	...	...	...	...	...	...	...	0·02
Diarrhoea	{ A.	2·9	20·5	19·9	13·0	7·7	9·1	11·3	20·2	3·6	21·7	13·9
	{ D. . . . .	...	...	...	...	...	...	...	...	...	...	...
Influenza	{ A.	3·8	11·4	0·7	0·8	6·9	19·0	3·8	37·7	...	0·9	10·6
	{ D. . . . .	...	...	...	...	...	...	...	...	...	...	...
Pneumonia Lobar and Lobular).	{ A.	3·8	4·4	4·4	2·3	3·0	4·4	2·8	4·1	0·9	4·5	4·2
	{ D. . . . .	...	0·44	...	...	...	...	...	...	...	0·90	0·40
Venereal diseases.	{ A.	79·3	58·6	36·1	19·9	25·4	17·8	12·2	19·8	22·3	9·0	38·8
	{ D. . . . .	...	...	...	...	...	...	...	...	...	...	0·04
Minor septic diseases	{ A.	109·8	53·1	75·1	48·2	41·7	45·9	71·6	44·5	34·7	22·6	59·7
	{ D. . . . .	...	...	...	...	...	...	...	...	...	...	...
Local injuries	{ A.	68·8	77·4	61·9	74·3	73·9	44·0	50·8	54·2	49·0	60·5	62·2
	{ D.	0·96	1·75	0·74	...	0·43	0·79	...	0·37	...	...	0·61
Heat-stroke	{ A. . . . .	...	...	0·7	0·8	...	...	...	...	...	...	0·2
	{ D. . . . .	...	0·44	...	...	...	...	...	...	...	...	0·08
Heat exhaustion.	{ A. . . . .	...	0·4	1·5	6·1	...	...	...	...	...	...	1·5
	{ D. . . . .	...	0·44	...	...	...	...	...	...	...	...	0·08

A.—Admissions.
D.—Deaths.
Av. C. S.—Average constantly sick.

CU

Women and Children (B. O. Rs.).

4. 1,305 women or 312·4 per 1,000 of the strength were admitted to hospital, compared with 1,396 or 311·6 per 1,000 in 1934.

The principal causes of admission to hospital were :—

Abortion	114	Appendicitis	41
Malaria	99	Constipation	40
Dysentery	60	Cellulitis	38
Tonsillitis	56	Gastritis	33
Diarrhœa	44	Bronchitis	31

In addition, 904 women were admitted to hospital for parturition.

2,936 or 702·7 per 1,000 of the strength were treated as out-patients.

2,180 children or 334·3 per 1,000 of the strength were admitted to hospital compared with 2,077 or 299·6 in 1934.

The principal causes of admission to hospital were :—

Tonsillitis (including inflammation and hypertrophy)	357	Constipation	57
Dysentery	169	Measles	56
Bronchitis	148	Taenia saginata.	38
Diarrhœa	136	Fractures	37
Malaria	103	Caries teeth	35
Cellulitis	68	Rubella	33
Enteritis	66	Jaundice	32

There were 63 deaths giving a ratio of 9·66 per 1,000. The chief causes were :—

Enteritis	16	Convulsions	4
Inanition	8	Premature birth	4
Dysentery	5		

4,914 or 753·4 per 1,000 of the strength were treated as out-patients.

PRINCIPAL DISEASES AFFECTING THE BRITISH ARMY.

Cerebro-spinal fever.

5. One British Officer at Rawalpindi and one British Other Rank at Peshawar contracted the disease and both recovered.

Table No. 4 shows the incidence of the disease in the Army in India during the last five years and it will be seen that there has been a further decrease both in the number of cases and in the case mortality among Indian Other Ranks.

TABLE NO. 4.

Incidence, Death and case mortality in Cerebrospinal meningitis.

	1931.			1932.			1933.			1934.			1935.		
	A.	D.	C.M. %	A.	D.	C.M. %	A.	D.	C.M. %	A.	D.	C.M. %	A.	D.	C.M. %
B. O. Rs.	2	2	100	8	6	75	3	2	67	2	1	50	1	...	...
I. O. Rs.	15	9	60	9	9	100	24	16	67	38	15	40	19	7	37
B. Os. . . . .	...	...	...	...	...	...	1	1	100	...	...	...	1	...	...
Others . . . . .	...	...	...	...	...	...	1	1	100	12	4	33	20*	9	45
Total	17	11	65	17	15	88	29	20	69	52	20	39	41	16	93

C. M. % = Case Mortality per cent.

* Includes—Territorial 6
Mily. School boys 4
Followers 9
Navy 1

Out of the total of 41 cases there were 21 in Northern Command, 10 in Eastern Command, 7 in Southern Command and 3 in Western Command.

The majority of cases occurred in the first three months of the year.

Triple concentrated serum was used as in 1934 and the average amount injected in each case was 105 c.c. intrathecally and 50 c.c. intravenously or intramuscularly.

In three cases iodine was given intravenously as well as serum and all three cases recovered. In two other cases Trypaflavine was given intravenously in addition to serum ; one case recovered and the other died.

Cysticercosis.

6. There were 5 cases during the year (Razmak 2, Ahmednagar 1, Poona 1, Wellington 1) of which 4 were invalided. Special attention is still being paid to the control of piggeries and the sale of pig products, and also to the prevention of infestation from carriers. In spite of all precautions there were 24 cases of infestation with *T. Solium* during the year, the same number as in 1934. Of these 24 cases this year 7 occurred in Northern Command, 12 in Eastern Command and 5 in Burma. Thirteen cases of epilepsy were invalided during the year but none of these was associated with cysticercosis.

Dracontiasis.

7. There were 9 admissions during the year but of these there were only 5 actual cases, the other 4 being readmissions. Four of the cases occurred at Mhow and the fifth at Ahmednagar.

Dengue, Sandfly fever, Fevers of the Typhus Group, and P. U. O.

8. Table No. 5 shows the incidence of these diseases during the last four years :—

TABLE NO. 5.

	1932.		1933.		1934.		1935.	
	Admns.	Ratio per 1,000.	Admns.	Ratio per 1,000.	Admns.	Ratio per 1,000.	Admns.	Ratio per 1,000.
Dengue	432	7.8	644	11.7	360	6.6	262	5.0
Sandfly fever	2,262	40.9	2,252	40.9	1,973	36.2	1,922	36.5
Fevers of the Typhus Group	11	0.2	23	0.4	52	1.0	19	0.4
P. U. O.	106	1.9	61	1.1	46	0.8	37	0.7

Dengue.

The incidence of this disease in 1935 is the lowest in 11 years.

The stations with the highest incidence were :—

Stations.	Actuals.	Ratio per 1,000.
Mingaladon	84	108.11
Madras	44	55.28
Calcutta	41	45.51
Bangalore	28	26.74
Bombay	15	6.83

It will be seen that the three coastal stations as usual produced the greater number of cases. At Karachi there were no cases either among British or Indian troops and this is interesting in view of the importance now being placed on the prevention of yellow fever gaining admittance from Africa to India through the Karachi Airport.

The great majority of the cases do not show the typical signs or symptoms such as the initial and terminal rashes or the secondary rise of temperature, and this diagnosis therefore remains, as in former years, to a considerable extent an inexact one.

Sandfly fever.

Research into the epidemiology of sandfly fever were continued at Peshawar. Further attempts to infect mice with material from human cases and produce a fixed virus were however uniformly unsuccessful.

The incidence of this disease and its distribution shows little change. Peshawar District still produces the greatest number of cases, Landikotal being the station most affected.

As in the case of Dengue the correctness of the diagnosis of this disease except possibly in the northern areas, is frequently a matter of uncertainty. For example during the past few years there had been an unaccountable increase in the number of cases in certain stations; attention was directed to this and since then the incidence of the disease appeared to have lessened in these stations although local conditions remained the same. In view of the fact that many undoubted cases of sandfly fever do not exhibit classical clinical features the difficulties of clinicians in this respect must be realised. During 1935 an unaccountable rise occurred in three other stations in Eastern Command.

Until some preventive method can be discovered against this disease, the policy of replacing and repairing unsuitable buildings is being continued. The following note from Northern Command sums up the situation in that area.

“It is very noticeable, both with barracks and bungalows, that in old buildings, particularly with mud walls, the majority of occupants invariably succumb, whereas in new buildings and well-repaired buildings the occupants remain free, provided rubble heaps and other breeding places are eliminated from the immediate vicinity. Unless we obtain some prophylactic preventive method, it seems very unlikely that we can expect any real reduction in this disease as long as the present conditions of housing continue.”

Fevers of the Typhus Group.

Eighty two cases occurred among British and Indian troops, of which only 19 were among British troops as compared with 52 in 1934.

The results of agglutination tests against standardised “O” suspensions of *B. proteus* XK, X2, and X19, as in 1934, fall into three serological groups corresponding to each of the above antigens (XK=18 cases, X2=14 cases, X19=43 cases). Seven cases owing to a general rise in titre, too small a rise in titre or insufficient tests could not be grouped.

Forty-five cases occurred in Southern Command, twenty in Northern Command. Five (X19) in Western Command, eight in Eastern Command, and four (XK) in Burma.

The seasonal incidence in all groups was mainly in the post-monsoon and cooler months. In Southern Command the seasonal distribution covered rather a wider period probably due to the greater humidity, and less extremes of temperature which occur in this command.

Symptoms in each group varied from very severe to very mild. On the whole the 18 cases of the XK group were the most severe. A greater proportion suffered from nervous symptoms, *e.g.*, lassitude, drowsiness, indifference to surroundings, etc. On the other hand 4 cases (22 per cent.) complained of no symptoms, except pyrexia of very moderate degree and duration and slight initial headache. Throat symptoms were a marked feature in several cases. Rash was present in 22 per cent only (erythema, or erythema *plus* macules) and in all cases was restricted to the trunk.

Six of these cases occurred as part of a small epidemic in the early autumn in the Simla Hills, which included some civil as well as military cases. This period corresponds with the height of the "Flea" season and Lt.-Colonel G. Covell, I.M.S., discovered and passaged a strain of Rickettsia from fleas caught in this area but this proved to be in antigenic structure OX19. Co-agglutinins to OX19 and OX2 were mainly absent or present only in low titres. In 3 cases, 10 per cent, (1 OX2, 1 OX19, 1 OX2 and OX19) co-agglutinins were present in appreciable titres.

In only one case (officer) was there any history of insect bites. The flea was suspected by the patient as vector but the history was not absolutely definite.

Cases of the OX2 serological group occurred mainly in Southern but also in Northern and Eastern Commands, seasonal distribution being very similar to that of the OXK group. Symptoms in this group were similar and come next in order of severity to the OXK cases, mental disturbance, drowsiness, etc., being however less frequent than in the former. In 6 cases (42 per cent.), no symptoms were present except headache and moderate pyrexia.

Maculo papular rash involving the extremities as well as the trunk was present in 85.7 per cent. of the cases, and in the majority (contrary to the other two groups), there was in many cases a history of association with camps, flag marches, training, etc., but, as was the case with the other groups, no history of tick or other insect bites.

Co-agglutinins to OX19, OXK, or both occurred in practically all cases, but insufficiently so in the vast majority to create any doubt as to correctness of the grouping on serological grounds.

Cases of the OX19 serological group occurred as in 1934 to a large extent in Southern Command (50 per cent.). Twelve cases were discovered in Northern Command of which seven were from Rawalpindi, four in Western and three in Eastern Command. Seasonal distribution was similar to those of the other groups. Symptoms were definitely milder than in either the OXK, or OX2 group, being on the whole more severe among the few British cases. In only a few cases are nervous symptoms such as drowsiness, lassitude, etc., mentioned. Complications such as broncho-pneumonia did occur, and one case developed acute nephritis. Rashes variously described as erythema, subcuticular mottling, maculo reseolar, in two cases pigmented in the later stages, were seen in 70 per cent. of the British cases, but in only 18 per cent. of the Indian. In the former both trunk and extremities were involved. In the latter rash on trunk only was noted. It is probable that the dark skin of the Indian troops renders the record of a mild rash of doubtful accuracy, in that it may depend to a considerable extent on the interest taken

in its discovery. One case (British) is interesting in that symptoms occurred 5 days after landing in India from the U. K. In 72 per cent symptoms other than headache and pyrexia of moderate duration were absent.

Co-agglutinins to OXK, and OX2 were present in the great majority but on the whole the serological result are clear cut, and very high titres were reached in some of the cases.

As in 1934 a marked rise in agglutinins to Enteric group H agglutinins was found to occur, most marked in the OXK group but close on 30 per cent. of the total cases in the three groups would have been included among the Enteric group of fevers had not tests been simultaneously carried out against the Proteus group. T. O. agglutinins although not affected to the same extent, show a definite rise in a certain number of cases, approximately 7-10 per cent.

In this connection it may be mentioned that a certain amount of caution seems necessary in connection with the differential diagnosis of this group of fevers. It will be noted that 22 per cent. of the OXK group, 42 per cent. of the OX2 group and 72 per cent. of the OX19 group, appear to have suffered only from slight initial headache and pyrexia, varying from 6 to 22 days, onset being either sudden with rigors, or gradual with "chilly feelings", with slight morning remissions, falling usually by lysis, and very occasionally by crisis. A slow pulse in proportion to the temperature was present but few or no other signs or symptoms were observed. Such a sequence of events will be found in a considerable proportion of proved typhoid cases among the inoculated population of the army in India. It is considered that in no small proportion of the cases therefore the diagnosis is at the moment purely a laboratory diagnosis. Before this can always be accepted as final it must be very certain that Enteric group infections have no influence on Proteus OX agglutinins in the serum of individuals who may have suffered from previous infections of the typhus group. Such individuals must be at least fairly common in India. A certain amount of evidence has been collected which indicates that the effect of the Enteric group infections is by no means always negligible. It is considered therefore that for the time being, particularly in regard to the mild rashless cases, it is unwise to cease laboratory investigations for the Enteric group of bacilli, except in the face of very definite clinical evidence or the appearance of really high titres of agglutination to the proteus group. Further investigations in connection with this problem are proceeding.

Pyrexia of Uncertain Origin.

There were 37 cases during the year and the steady decrease in the last three years of cases classified under this heading has been maintained. Poona had the greatest number of cases and the hill stations Murree, Kuldana, and Barian in Rawalpindi District took second place.

Many of the cases diagnosed Sandfly fever and Dengue, especially in stations where these diseases are not endemic, might more correctly be classified as Pyrexia of Uncertain Origin.

Diphtheria.

9. Table No. 6 shows the incidence of diphtheria among British troops in 1935.

TABLE No. 6.

Stations.	Number of cases.	Stations.	Number of cases.
Rawalpindi	33	Nowshera	1
Mhow	6	Peshawar	1
Meerut	5	Roorkee	1
Kamptee	3	Agra	1
Bareilly	3	Barrackpore	1
Lahore	2	Jubbulpore	1
Razmak	2	Bangalore	1
Delhi	2	Maymyo	1
Calcutta	2		

There was an outbreak of cutaneous and faucial diphtheria in a battalion engaged in operations on the N. W. Frontier in the autumn of 1935 and this outbreak presented many interesting points.

A detailed report by Major Bensted, R.A.M.C., D.A.D.P., Rawalpindi District is to be published in the R.A.M.C. Journal and the following notes are extracted from his report. Although the epidemic extended in the early months of 1936, for the sake of continuity it is here dealt with as a whole.

The troops were operating over rocky ground and there were few who did not suffer from abrasions which at the time appeared trivial. In one battalion these abrasions not only did not heal but also became progressively worse under the ordinary treatment, thus giving rise to the impression that they were the "frontier" sores frequently seen in the area. These frontier sores are usually staphylococcal and not to be confused with cutaneous Leishmaniasis.

In November 1935, when the force was returning from the operations, two cases of faucial diphtheria occurred in the battalion while on the line of March. Bacteriological examination of the sores of men in hospital from the same unit then revealed eight cases of cutaneous diphtheria; these men had all suffered from abrasions in the same area of operations. Repeated throat swabs from the cutaneous cases were negative for *C. diphtheriae*.

Extensive investigations were then carried out among all the troops operating in the same area with the result that 31 men of the infected battalion were found to be harbouring *C. diphtheriae* whereas none were found in any other units. Moreover, although men from other units were suffering from sores, it was only in the infected battalion that *C. diphtheriae* were isolated from the sores. Actually one case did occur in a man from another unit but subsequently this was proved to be a cross infection in hospital.

The discovery of cases of cutaneous diphtheria and virulent throat carriers continued for sometime and then in December 1935 cases of typical faucial diphtheria began to occur and continued inspite of isolation of cases and carriers. Schick testing material was then obtained by air mail from England and the whole battalion was tested. Twenty-seven per cent were found to be non-immune and were immunised but before immunity was established 4 more cases of faucial and 2 of cutaneous diphtheria developed. It was not until immunity was established that the outbreak eventually came to an end.

The cases and carriers which occurred during the whole period of the epidemic were :—

	1935.			1936.		Total.
	Oct.	Nov.	Dec.	Jan.	Feb.	
Carriers . . .	1	9	14	6	1	31
Faucial . . .	..	3	5	6	..	14
Cutaneous . . .	..	2	7	6	..	15

Seventy-three different strains of diphtheria-like bacilli were isolated in all, 61 of them virulent *C. diphtheriae mitis*, 31 being from cutaneous cases, 15 from faucial and 15 from healthy throats.

For the treatment of cutaneous cases diphtheria antitoxin was injected intramuscularly and also applied locally as a dressing. The initial intramuscular injection was 8,000 to 16,000 units and the average amount injected in each case was 30,000 units. In most cases the ulcers were healing by the fourth day and diphtheria bacilli could no longer be obtained. In some cases however *C. diphtheria* persisted for a long time inspite of a healthy granulating surface and prolonged serum treatment. In these cases the best results were obtained by applying mucidan as a dressing.

Enteric group of Fevers

10. The incidence of enteric fevers among British and Indian troops during the years 1933, 1934, and 1935 is shown in Table No. 7.

TABLE No. 7.

	British.											
	1933.				1934.				1935.			
	Actuals.		Ratio per 1,000.		Actuals.		Ratio per 1,000.		Actuals.		Ratio per 1,000.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Typhoid . . .	56	11	1·0	0·20	27	5	0·5	0·09	27	8	0·5	0·15
Para. A . . .	14	..	0·3	..	8	..	0·1	..	13	..	0·2	..
Para. B . . .	1	..	0·02	..	..	..	..	..	..	..	..	..
Para. C . . .	..	..	..	..	1	..	0·02	..	..	..	..	..
Enteric group	102	3	1·9	0·05	55	2	1·01	0·04	66	1	1·3	0·02
Total . . .	173	14	3·1	0·25	91	7	1·7	0·13	106	9	2·0	0·17
	Indian.											
	1933.				1934.				1935.			
	Actuals.		Ratio per 1,000.		Actuals.		Ratio per 1,000.		Actuals.		Ratio per 1,000.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Typhoid . . .	81	15	0·7	0·13	78	11	0·66	0·09	55	8	0·5	0·07
Para. A . . .	38	1	0·3	0·01	45	..	0·38	..	46	3	0·4	0·03
Para. B . . .	2	..	0·02	..	4	..	0·03	..	1	..	0·01	0
Para. C . . .	3	..	0·03	..	2	..	0·02	..	..	..	..	..
Enteric group.	120	7	1·0	0·06	93	4	0·8	0·03	62	2	0·5	0·02
Total . . .	244	23	2·1	0·20	222	15	1·9	0·13	164	13	1·4	0·1

The incidence among British troops has increased slightly (0·3 per 1,000) during 1935, but the incidence in 1934 was however the lowest ever

recorded, and the admission ratio in 1935 is the second lowest during a period of 64 years. The death rate in 1935 also rose slightly (0·04 per 1,000) as compared with 1934. The numbers of bacteriologically proven typhoid cases were the same in 1934 (27), half as many as occurred in 1933, and one third of those which occurred in 1932.

In contrast to the British troops the progressive, although less dramatic, fall in incidence among Indian troops since 1932 has continued, there being 58 fewer cases of enteric group of fevers than in 1934, and 23 fever cases of bacteriologically proven typhoid fever. As regards the fall in the enteric group cases it should be noted that a considerable percentage of cases now diagnosed as belonging to the typhus group would three years ago have been included among the enteric group. In fact it is difficult to assign any comparative value to annual statistics for Indian troops in this connection owing to the greater accuracy in diagnosis, and improved bacteriological investigation, which has been progressive for the last ten years. The average admission ratio per 1,000 during the years 1930-1935 (1·87) is actually greater than during the years 1910-1914 (1·8), *i.e.*, before T. A. B. inoculation was introduced for Indian troops, when very large numbers of cases were included under such diagnostic headings as simple continued fever, remittent fever, P. U. O. etc., now discarded. During the years 1920-1925 there were 148 Indian cases of Typhoid bacteriologically diagnosed, whereas during 1930-1935 there were 549 cases. Statistics for British troops are more reliable, though open to the same error in a less degree. There were 1,149 cases of the enteric group fevers admitted to hospital in 1920-1925, and 948 in 1930-1935. Improvement in laboratory diagnosis is shown by the fact that in spite of the drop in numbers, the number of bacteriologically proven typhoid fevers is the same for the two periods, 312 as compared with 310. It is satisfactory to record that the number of deaths dropped from 107 to 69 in the latter period.

In 1935 there were 9 deaths among the British, and 13 deaths among the Indian cases. A striking feature of these cases is that in 19 out of 22 deaths occurred before the end of the 2nd week, suggesting either an overwhelming infection, or an ambulant type of the disease. Perforation of the intestine occurred in 3 cases, (8th, 11th, 12th day), haemorrhage in 2 cases (9th and 10th day), seven cases died of intense toxæmia on 6th, 8th, 10th (2), 11th, 12th, 14th day after admission to hospital. The remaining deaths were due to lung complications, broncho-pneumonia, lobar pneumonia, empyema, etc. The great majority, particularly among Indian troops had been repeatedly inoculated during their service, one case who had been inoculated on 7 occasions, dying of a perforation on the 11th day.

In the annual report of 1933 attention was directed to the fact that the admission ratio, case mortality and death ratio, for bacteriologically proven typhoid cases in British troops were high in the case of men under 1 year's service in India when compared with those of over one year's service.

The average of the years 1929-1933 in these respects is reproduced in Table No. 8, and corresponding figures are given for the years 1934 and 1935. It will be noted that in the latter two years both the admission and death ratios in the group under 1 year in India have fallen markedly as compared with the group of over 1 year in India. It seems reasonable to conclude that the fall is due to the improvement in the T. A. B. vaccine manufactured at the R. A. M. College since the year 1933. The case mortality rate is however disappointingly high during 1934 and 1935, and mainly due to the type of case noted above.

TABLE NO. 8.

Typhoid Fever in British Troops (B. O. Rs. only).

	Under 1 year in India.						Over 1 year in India.					
	Strength.	Cases.		Deaths.		Case mortality %.	Strength.	Cases.		Deaths.		Case mortality %.
		Actu-als.	Ratio per 1,000.	Actu-als.	Ratio per 1,000.			Actu-als.	Ratio per 1,000.	Actu-als.	Ratio per 1,000.	
Average for 5 years 1929—												
1933 . . .	10,632	30	2.84	7	0.68	23.84	44,814	32	0.71	4	0.08	11
1934 . . .	10,988	7	0.64	2	0.18	28.57	43,441	20	0.46	3	0.07	15
1935 . . .	10,830	7	0.65	2	0.18	28.57	41,816	20	0.48	6	0.14	30
Average for 2 years 1934—												
1935 . . .	10,909	7	0.65	2	0.18	28.57	42,628	20	0.47	4	0.11	22

Proportionate admission ratios, case mortality and death ratios for the two groups of cases, and for the periods 1929—1933, and 1934—1935 are given in Table No. 9.

TABLE NO. 9.

	1929—1933.		1934—1935.	
	Over 1 year.	Under 1 year.	Over 1 year.	Under 1 year.
Admission ratio	1	4.0	1	1.4
Case mortality	1	2.1	1	1.3
Death ratio	1	8.6	1	1.6

For several years before and including 1928, it was the custom to re-inoculate all troops with 1 c.c. T. A. B. vaccine. Owing to the fact that as high a proportion as 50 per cent. of the cases occurred annually within 6 months of inoculation the two dose system 1/2 and 1 c.c. at 18 monthly periods was introduced from 1929. The results obtained since this year among British troops are given in Table No. 10. It is of interest that the percentage of cases falling within the first six monthly period after inoculation has remained almost constant during a period of 7 years at just above 30 per cent, which still appears unduly high. Nearly every year the highest percentage lies between the six and twelve monthly period and the lowest percentage in the twelve to eighteen monthly period, when it might be expected that protection was beginning to fail. No figures are available from which the actual numbers of the population at risk in each post-inoculation period can be calculated, but after so many years it is considered probable that the numbers would have fallen into three approximately equal groups and the percentages in each group are sufficiently approximate during this series of years to suggest that they are of some significance.

TABLE No. 10.

	Total Enteric group of fevers (British).			Typhoid cases (British) bacteriologically proven.		
	0—6 months.	6—12 months.	12—18 months.	0—6 months.	6—12 months.	12—18 months.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
1929 . . .	32.2	50.5	17.5	31.2	58.3	10.4
1930 . . .	37.6	43.6	18.8	32.7	46.6	20.7
1931 . . .	35.4	35.4	29.2	34.4	34.9	30.2
1932 . . .	33.7	38.0	28.2	30.9	45.4	23.6
1933 . . .	32.0	44.0	24.0	25.0	45.8	29.2
1934 . . .	33.7	35.1	31.1	40.0	24.0	36.0
1935 . . .	30.0	43.3	26.6	21.7	43.4	34.7
Average 1929— 1935.	33.4	41.4	25.0	30.8	42.6	26.4

The seasonal distribution of 1,041 cases of the enteric group of fevers (British and Indian troops) for the years 1933, 1934, 1935 is shown in Table No. 11 below :—

*Seasonal Distribution of the Enteric Group of Fevers British and Indian Troops
1933, 1934, 1935.*

TABLE No. 11.

	Commands.				
	Northern.	Southern.	Western.	Eastern.	All-India.
No. of cases	444	184	106	307	1,041
January	5.4	8.1	0.9	5.2	5.3
February	4.5	7.6	5.6	5.5	5.4
March	5.4	4.1	6.6	5.2	5.2
April	9.9	8.1	6.6	13.6	10.3
May	14.1	10.8	6.6	10.4	11.7
June	14.8	3.8	16.0	10.0	11.6
July	13.5	10.3	18.8	7.1	11.6
August	11.2	7.6	10.8	13.0	11.0
September	8.5	16.3	12.2	13.0	11.6
October	5.6	11.4	6.6	6.8	7.1
November	3.6	5.4	5.6	2.6	3.8
December	3.1	5.9	3.6	7.1	4.9

It will be seen that this group of diseases although occurring in all months of the year shows a very marked increase in incidence during the hot weather months most marked from May to September. In Northern Command, where the seasons are very distinct the high incidence in the hot weather months is particularly noticeable for typhoid fever both British and Indians. As regards the latter a percentage of the cases are regularly infected during their leave in their villages, the leave period coinciding with the hot weather months. Western Command statistics for British troops for the three year period show no cases of Typhoid during the period November--May. This seasonal incidence is in direct contrast to that of tropical typhus in India, and to the autumnal incidence found in England, and corresponds roughly with the incidence of fly breeding in the various commands. There were no epidemics to record in 1935. In Lahore District there were 14 cases more than in the previous year. Twelve cases occurred in August and September, and were probably contracted on the repeated journeys and moves necessary in connection with civil disturbances.

As pointed out later in connection with the dysentery group, it must be realised that the enteric group infections among the troops is only a reflection of the number of un-diagnosed cases among the mass of the civil population and the general insanitary conditions in proximity to the military areas with the difference that a certain amount of protection is available by means of T. A. B. inoculation, which is not the case for the dysentery group.

In the annual report of 1934, attention was drawn to the unsatisfactory results obtained with T. O. alcoholised suspensions in cases of the enteric group. A detailed analysis of the results of as many cases as possible has been carried out, of which certain of the results are given in Table No. 12 below. An attempt was made to ascertain first the titre of O agglutination which might reasonably be considered as the result of inoculation with T. A. B. vaccine as apart from disease, by considering only serological results obtained in the first few days (1—4) after admission to hospital. Twenty cases in which the first test was carried out on the 5th—7th day and which showed "O" agglutinins, in some cases to high titre, to be present were excluded from the analysis. On the other hand a certain number of cases which showed no agglutinins at as late a date as this after onset are included, the presumption being that agglutinins were absent also prior to this date. It is probable however that the percentages shewn are influenced to some extent by the onset of enteric fever. The results obtained from 565 such individuals are given in the 1st line of the table. Actually these cases were divided into monthly groups from the date of inoculation, but as there was little difference between those inoculated in the period 1—2 months, and the period 17—18 months, the figures given in the table represent the average over a period of 18 months from date of inoculation. It is a strange fact that the largest proportion of cases reaching the higher titres (over 1/100) was found in a group of 62 cases, who were within the 11th—12th monthly period after inoculation.

TABLE NO. 12.

	Titre												
	Nil agglutinins present.	Agglutinins present but under 1/25 titre.	1/25	1/25 + 1/50	1/50	1/50 + 1/100	1/100	1/100 + 1/150	1/150	1/150 + 1/200	1/200	1/250	1/250 + 1/300
1) Inoculation T. O. agglutinins 565 individuals	69.7	...	11.5	1.5	8.3	0.3	...	4	...	...	0.7	2.8	0.5
(2) Highest titre of T. O. agglutination in 2nd or 3rd week of 169 Typhoid cases	32.5	...	8.5	0.5	11.2	2.3	0.5	11.2	1	1	0.5	13.2	10.2
3) Highest titre of T. O. agglutination in 2nd or 3rd week of 37 Paratyphoid A cases	27	...	10.8	...	37.8	...	...	13.5	5.4	...	...	5.4	...
(4) Highest titre of T. O. agglutination in 2nd or 3rd week of 24 cases who died of typhoid fever	16.6	...	...	...	12.5	4.1	...	16.6	...	...	...	2.5	2.5
(5) Highest titre of T. O. agglutination in 2nd or 3rd week of 75 cases of Typhus group of fevers	56.5	5.0	18.4	5.5	5.0	3.9	...	2.6	...	1.3	...	...	1.3

Brief conclusions from a scrutiny of the four series of percentages given in this table are that using our present methods :—

1. There is no real base line of T. O. agglutination titre in an inoculated individual, above which enteric infection could be diagnosed by a single test, or in the majority of cases even by a series of tests.
2. At least 30 per cent. of typhoid cases produced no evidence of T. O. agglutinins by the second week, and in only 44 per cent. did the titre rise to over 1/50.
3. In a small group of 24 cases who died of typhoid fever it is seen that T. O. agglutinins were present in a much higher percentage, and to higher titres than in the ordinary type of case.
4. The typhus group of fevers appear to have a certain stimulating effect on the T. O. inoculation agglutinins as well as on the 'H' inoculation agglutinins as shown by the small percentage (56·5) with *nil* agglutinins as compared with the 69·7 per cent. present in group 1.

In the majority of such cases the rise in T. O. titre of agglutination did not exceed 1/50, but occasionally higher titres may be found.

The results in one such case, which illustrates well also the anamnestic reaction on T. A. B. "H" agglutinins is given in Table No. 13 below :—

TABLE No. 13.

	Day of Disease.						
	5	12	16	25	31	46	
Bact. typhosum 'H'	150	550	600	1,200	600	<i>Nil</i>	A case of Typhus fever (tropical) in which attack was severe, and pyrexia lasted 20 days—Typical rash present.
Bact. Paratyphosum A 'H'	100	85	40	85	55	test.	
Bact. Paratyphosum B 'H'	800	800	600	2,000	1,100	"	
Bact. typhosum O	50	125	175	125	50	"	
B. Proteus OX2	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	"	
B. Proteus OX19	50	50	25	25	<i>Nil.</i>	"	
B. Proteus OXK	50	100,000	100,000	100,000	14,000	1,750	

The inoculation state, which is approximate only and is the average of the two half-yearly returns rendered is shown in Table No. 14.

TABLE No. 14.

Fevers of Enteric Group.

British Other Ranks, 1935.

Group.	Strength.	Actuals.		Ratio per 1,000.		Case mortality per cent.
		Cases.	Deaths.	Cases.	Deaths.	
Protected	52,048	97	8	1·9	0·15	8·25
Unprotected	1,211	9	1	7·4	0·83	11·11

Table No. 15 gives the actual incidence of cases among these different classes, showing the types of fevers and the distribution between protected and unprotected.

TABLE No. 15.
Fevers of Enteric Group.

		Average strength	Admissions.					Total.
			Typhoid.	Para. "A"	Para. "B"	Para. "C"	Enteric group.	
British Officers (British and Indian Service).	{ Protected	: 4,033	2	...	...	...	6	} 16
	{ Unprotected	: 272	1	2	...	...	5	
B. O. Rs.	{ Protected	: 52,048	25	13	...	...	59	} 06
	{ Unprotected	: 1,211	2	...	...	...	7	
Women	{ Protected	: 4,649	1	2	...	...	1	} 7
	{ Unprotected	: 326	2	...	1	...	...
Children	{ Protected	: 5,872	2	...	...	...	3	} 17
	{ Unprotected	: 1,199	8	1	...	...	3	

Dysentery, Diarrhoea, Colitis and Amoebic Hepatitis.

11. The incidence for the last three years is shown in Table No. 16.

TABLE No. 16.

	Dysentery.		Diarrhoea.		Colitis.		Total.		Amoebic Hepatitis.		Liver abscess.	
	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.
1933	1,369	24.9	842	15.3	53	1.0	2,264	41.2	36	0.65	7	0.13
1934	1,538	25.5	811	14.9	42	0.8	2,242	41.2	52	0.98	5	0.09
1935	1,536	29.2	734	13.9	19	0.4	2,239	43.5	24	0.46	4	0.08

The admission ratio for dysentery increased by 3.7 per 1,000 in 1935. The diarrhoea admission ratio decreased by 1.0 per 1,000, and that for colitis by 0.4 per 1,000. The average sick time in days decreased by 286.79 per 1,000. The average number of days lost per 1,000 of strength was 598.19.

Four cases were invalided (2 amoebic dysentery, 2 bacillary dysentery) as compared with 10 in 1934. There was 1 death from bacillary dysentery during the year.

Dysentery cases were, as usual, sporadic in occurrence, the main incidence corresponding with the fly season. There were no epidemics with the exception of a small outbreak in the 2nd Battalion of the Royal Scots in Lahore (16 cases) which was found to be caused by *B. sonne*. Apparently this bacillus is comparatively common as a cause of dysentery in the Spring months of the year in that area, being replaced by the Flexner group in the warmer months. A small outbreak among the Indian platoon attached to the 20th Rifles in Burma is of interest in that one of the newly discovered strains of dysentery bacilli (known in India at the moment as P. 288) was isolated in practically pure culture from every case. The hospital admissions for this group of diseases during the six year period 1930—1935, when compared with the period 1920—1925 are very interesting, particularly so if the admissions among Indian troops are considered for the same period.

It may be pointed out that in the year 1925 the reorganisation of the military laboratories on the lines of the home organisation was commenced, and that about this period also the high incidence of bacillary infections among the troops in India was brought to notice. The period 1925—1929, may therefore be considered as an intermediate period during which reorganisation was progressing, and a knowledge of modern methods of diagnosis of the dysentery infections increasing among medical officers. The strength of British and Indian troops varied little from year to year during the above periods the average for 1920—1925, being British 59,218, Indian 120,771 and during the period 1930—1935 British 55,613, Indian 120,771. Ratios per 1,000 are therefore not given in Table No. 17 and the figures represent only the total hospital admissions.

TABLE NO. 17.

	British Other Ranks.				Indian Other Ranks.			
	1920—1925.		1930—1935.		1920—1925.		1930—1935.	
	C.	D.	C.	D.	C.	D.	C.	D.
Bacillary dysentery	402	10	5,470	3	241	9	7,892	17
Amoebic dysentery	3,176	25	1,079	0	3,272	47	814	1
Clinical dysentery	497	7	1,987	1	4,281	74	2,767	11
Diarrhoea	5,878	0	4,960	0	14,627	8	5,065	0
Colitis	1,420	2	187	0	15,485	42	167	2
TOTAL	11,373	44	13,683	4	37,906	180	16,705	31

C=Cases.

D=Deaths.

The extraordinary contrast in diagnoses, the large reduction in the number of deaths and the slight increase in admissions among British troops, as compared with the huge fall in total admissions among Indian troops can perhaps be better appreciated if only the difference in admissions between the two periods are observed.

TABLE NO. 18.

Total admissions 1930—1935 contrasted with 1920—1925.

	Bacillary dysentery.	Amoebic dysentery.	Clinical dysentery.	Diarrhoea.	Colitis.	Total adms. for group.	Deaths.
British troops	+5,068	-2,097	+1,490	-918	-1,233	+2,310	-40
Indian troops	+7,651	-2,458	-1,514	-9,562	-15,318	-21,201	-149
Total British and Indian troops	+12,719	-4,555	-24	-10,480	-16,551	-18,891	-189

In the report on the health of the Army in India, 1934, the practically stationary annual admission ratio among the British troops was commented on. It requires however to be realised that in the great majority of stations in India, the method of disposal of excreta is still by means of the bucket (fly proofed in British lines)—sweeper—and incineration method. In some cases incineration is carried out in the vicinity of the latrines. In others cartage in filth carts to incinerators at a distance is necessary, while in a few stations the most unsatisfactory method of cartage, and burial of excreta is still in vogue.

The introduction of water carriage systems of sewage disposal is for the time being largely ruled out either on financial grounds, or lack of water, and should they be introduced at a future date will probably cause little reduction in the incidence of these diseases unless adequately provided also for the private servants, regimental followers and families, and for the Indian population of military cantonments generally. It is this population, not the troops, which supplies the source of infection, the vector (fly), and whose sanitary arrangements (open pan latrines, often deficient in number, in siting, and staff) are very defective. In addition barracks and cantonments are frequently sited within easy fly range of cities, municipal areas, villages, and bazaars, sanitary conditions in which from a modern public health European standard are to all intents and purposes non-existent. At certain times of the year flies swarm into the military areas from these places, and an early morning walk along any of the small nullahs, ditches, etc., in close proximity will quickly demonstrate the impossibility of the prevention of this group of diseases until such time as efficient sanitary services, and a sanitary conscience have developed throughout the country.

It is feared therefore that the incidence of the diseases will remain in the same stationary condition for many years to come.

One of the striking features of the post-earthquake period in Quetta was a dramatic fall in the dysentery incidence among the troops in the station. For several years previously the incidence in this station had been high, and increasing inspite of the most stringent sanitary precautions in the military area.

The small increase recorded among British troops is considered to be mainly due to the milder type of cases now admitted to hospital, which previous to 1925 were frequently treated as out-patients. The improvement in treatment following on more accurate diagnosis is obvious at a glance at the reduced death rate.

The fact that from 1930—1935 there have been 21,201 fewer admissions among Indian troops is a reflection of the steadily improving sanitation among Indian troops since the post war period, but, as in the case of British troops it is feared that the position has now become more or less stationary. The improvement in diagnosis, and treatment is equally well marked by a reduction of 149 in the number of deaths, the percentage mortality dropping from 0·47 per cent. to 0·18 per cent.

The hepatitis (all causes) and liver abscess incidence compared over similar periods follow closely the figures given above.

TABLE No. 19.

	Hepatitis all causes including amoebic.				Liver abscess.			
	1920—1925.		1930—1935.		1920—1925.		1930—1935.	
	A.	D.	A.	D.	A.	D.	A.	D.
British troops . . .	948	4	417	2	184	53	46	5
Indian troops . . .	681	10	358	1	84	23	37	5

The proportions of the different types of dysentery occurring in 1935 are almost identical with the results obtained in 1934, the total percentage of the bacillary cases being identical even to the decimal point.

TABLE No. 20.

	Admissions.	Percentage.
Dysentery Protozoal	158	10·3
Dysentery Bacillary (bacteriologically proved)	637	41·5
Dysentery Bacillary Exudate. (No dysentery bacilli isolated)	353	23·0
Dysentery clinical	388	25·3
Total	1,536	

Table No. 21 is an analysis of the bacilli isolated from all specimens submitted to laboratories during the past 5 years.

The scheme for the investigation of the mannite fermenting group of bacilli hitherto unclassified was continued throughout the year. The results of this investigation were published by Major J. S. K. Boyd in the R. A. M. C. Journal of January 1936. The conclusions arrived at are briefly as follows:—

1. Dysentery group bacilli isolated by Major Boyd in Bangalore and Poona of types not described in "A System of Bacteriology 1929" have proved to be widely distributed throughout India.
2. Using a system of classification in which these strains are included it is now possible to identify practically all dysentery group bacilli found in India.
3. The evidence as a whole is strongly in favour of the belief that the majority of these "new" strains (three of which have been found in other countries) are capable of causing dysentery.

Brief details of the scheme for classification of dysentery bacilli used in the military laboratories are given later in this report in the section referring to the laboratories.

TABLE No. 21.

Year.	Non-mannite fermenting.			Mannite fermenting.					
	Shiga.	Schmitz.	Total.	Andrews' Types.	Sonne.	New Types.	Unclassified.	Total.	Percentage unclassified.
1931 . . .	340	79	419	1,138	69	..	331	1,538	21·5
1932 . . .	384	126	510	1,007	108	126	152	1,393	10·9
1933 . . .	253	80	333	960	198	315	91	1,564	5·8
1934 . . .	191	95	286	921	202	313	27	1,463	1·8
1935 . . .	230	106	336	798	292	392	10	1,492	0·7

Tropical abscess of the liver and hepatitis.

12. There were 56 admissions for hepatitis, of which 24 were considered to be definitely amoebic in origin, and 10 cases in which the aetiology of the hepatitis was doubtful. Three of the former group of cases had two admissions to hospital. As in 1934, there were 3 cases of Tropical abscess—all recovered. One death from multiple liver abscesses occurred during the year, but these were pyaemic in origin and followed on the rupture of a gangrenous appendix.

Malaria.

TABLE NO. 22.

13. Admission Ratio per 1,000—British troops.

Commands.	Total.		
	1933	1934	1935
Northern	159·8	75·8	57·3
Eastern	62·6	48·1	44·8
Southern	60·6	55·3	48·9
Western	204·0	160·4	136·1
Burma District	39·8	54·9	29·2
All-India	103·3	67·5	56·1

It is satisfactory to record that the incidence in 1935 is 11·4 per 1,000 lower than that in 1934, which was up to that date the record year. The position is even more satisfactory than appears, when the fact is taken into account that frontier operations in a notoriously unhealthy area and during the malaria season were undertaken. In addition British troops in Northern Command were brought down from the hills in connection with civil disturbances during the malaria season.

On the other hand monsoon conditions all over India generally were favourable to a low malaria incidence, *e.g.*, in the north the winter of 1934-35 was cold, as was the spring in 1935. Monsoon rains were reduced below normal, and the autumn months were cold.

The admission ratio has been reduced in all four commands, and also in Burma. In Northern Command the incidence of fresh malaria infection was slightly increased (3·9 per 1,000), but the ratio of admissions for relapsed cases dropped by 22·4 per 1,000, thus reducing the total admissions. An increase in both fresh and relapse cases also occurred in Meerut District. Temperature and humidity were favourable early in the year for mosquito breeding in Meerut where most of the cases occurred, and defects in malaria control measures taken by units in that station added the necessary factors for an increase of malaria infections.

Although the total admissions for the past two years have shown so great a fall, minor incidents such as above indicate that any relaxation in anti-malaria measures will be at once reflected in an increased incidence. For example in Lahore, where mosquito proofing of Barracks has been successful in reducing the incidence for several years, 29 cases of fresh infections out of a total of 34 from the whole cantonment occurred in one battalion. Twenty of these cases were from one company, and on investigation it was found that the mosquito proofing over the skylights in the barrack room had been broken. Repair of these and fumigation of the barrack room stopped further incidence. Poona and Kirkee are the only stations in Southern Command in which a reduction in incidence did not occur. The greater percentage of the cases in these stations occurred among troops acting as guards in the arsenal at Kirkee, and a further proportion occurred in camps, which had been occupied earlier than usual and before pools have been given time to dry after the rains. In Jubbulpore, a station which has always given trouble fewer cases occurred in 1935. An interesting analysis of the malaria statistics in that station by Major T. Young, R.A.M.C., shows that the malaria incidence is greater each year in the unproofed portion of the barracks than in the proofed, partial proofing

only having been carried out to date owing to lack of funds. The following is a list of stations with strengths of over 500 in which the malaria incidence exceeded 100 per 1,000 (the all-India ratio being 56·1).

	Admission ratio per 1,000.
Quetta	171·8
Peshawar	132·2
Agra	116·3
Nasirabad	113·0
Allahabad	101·4

Quetta, the second worst station in this respect in 1934, moved up to the top of the list in 1935. Endeavours are being made to ensure that in the new cantonment, which is to be built, matters in this respect will be improved. The mosquito breeding areas are however sited mainly in areas not under military control, and as in the case of the dysentery and enteric group of fevers a reduction or not in the incidence will depend largely on the extent of control carried out by the civil authorities.

In Delhi which figured among the most malarial stations in the 1934 report a reduction from 169 to 87·5 per 1,000 occurred. This is the most satisfactory figure for many years.

The percentage in which benign tertian and malignant tertian cases occurred in the four commands in India is given below :—

Command.	Total malaria cases.	Benign tertian.	Malignant tertian.	Mixed B. T. & M. T.	Clinical.
		%	%	%	%
Northern	956	75·5	15·8	1·9	6·8
Southern	706	61·5	29·6	4·0	1·7
Eastern	708	76·6	16·1	1·6	5·4
Western	532	79·9	18·6	0·5	0·6

In Southern Command 23 cases of Quartan infection (3·3 per cent.) were reported. *Plasmodium malariae* is comparatively rare in the other commands. Two cases only occurred in Eastern Command and one in Western Command among British troops. None were reported from Northern Command.

There were 4 deaths during the year, of which two were *P. falciparum* infections, one a *P. vivax* infection, and in one both species were present. No death occurred in Northern or Southern Commands. The percentage of cases diagnosed only on clinical grounds without positive microscopic confirmation is considered to be creditably low particularly in the Southern and Western Commands and reflects the great improvement in the clinical side room work in hospitals during the past few years.

Treatment has been carried out mainly with Atebrin followed by a course of Plasmoguinine, or Quinine and Plasmoguinine concurrently for 21 days. An examination of 2,768 case cards of cases of malaria among British troops, disclosed the fact that there appears to be among the medical officers treating cases no particular preference for either method of treatment. 1,381 were treated with Atebrin and Plasmoguinine, and 1,060 by Quinine and Plasmoguinine. From an administrative point of view the former seems preferable

as the length of time off duty is shorter. There is a fairly universal consensus of opinion that Atebrin does not always reduce the temperature promptly or prevent in Benign Tertian cases a further rise in temperature after 48 hours from commencement of treatment. It is recommended therefore that treatment for the first 48 hours should be by Quinine (grs. xx per diem) followed by a 7 days course of Atebrin (0·3 grm. per diem), a three day interval and finally a five days course of Plasmoquine (0·03 grammes daily for five days).

The question of the effect of these synthetic drugs in diminishing the relapse ratio in Benign Tertian cases has been discussed fully elsewhere. No useful purpose is therefore served by going into this matter further. Statistics for Indian troops are considered useless, as a large proportion proceed to their villages on leave during the malaria season and are infected there. It is also very difficult in practice, even with a full knowledge of those academic distinctions found in text-books, to distinguish between relapses and fresh infections during the malaria season with any degree of confidence. Opinions therefore can only be general.

One outstanding fact is definite however, *viz.*, that since the almost universal use of Plasmoquine in the Army in India the chronic relapsing cases of Benign Tertian malaria, which used to be gathered together in the Malaria Treatment Centre, Kasauli, no longer exist in any appreciable number, if any.

In this connection the following incident is of interest. It was noticed that a group of 30 odd cases of Benign Tertian malaria in Burma had been treated with Quinine alone. As this is contrary to present general procedure enquiries were made, which elicited the fact that a medical officer being impressed with the recommendations in the quarterly Bulletin of the Health Organisation of the League of Nations of June 1933, had carried out treatment on the lines suggested in this publication. Almost without exception every case relapsed, and treatment in future was carried out on the usual lines in India, as indicated above.

The "relapse" figures for British troops in Northern Command from the year 1930 are given below :—

	Per 1,000.
1930	120·6
1931	76·5
1932	49·8
1933	39·6
1934	35·6
1935	13·2

Trials with Atebrin musonate were carried out in Southern and in Northern Commands. Of 75 cases treated in Southern Command 30 shortly relapsed. In Northern Command the figures appeared to be more satisfactory, but as the experiment was carried out on cases infected during the Mohmand Operations who were in process of evacuation to their permanent stations, statistics sufficiently reliable to base conclusions upon regarding the relapse percentage were not obtained. Among both groups of cases however medical opinion was definite that pyrexia was quickly controlled by the injections with this drug. An important observation bearing on this fact was that cases treated in Field Ambulances by injections of Atebrin Musonate arrived at the base hospital in Peshawar in a much fitter condition than those treated in the usual way by the oral method. For cases therefore admitted to field medical

units Atebrin Musonate would appear to be the most suitable form of treatment. With our present knowledge however further treatment will have invariably to be instituted in the base hospital, a minor matter if a comfortable journey to the base can be provided.

Incidence of malaria during the Mohmand Operations, 1935.

The admissions from all causes during the period of these operations and also for malaria are given in Table No. 23.

TABLE NO. 23.

	Strength.	All causes.		Malaria.	
		Admns.	Ratio per 1,000.	Admns.	Ratio per 1,000.
British Officers	264	42	159·1	12	45·4
British Other Ranks	2,622	1,417	540·4	708	270·0
Indian Officers and Indian Other Ranks	9,940	2,184	219·7	1,192	119·9
Followers	1,244	264	212·2	166	133·4

Operations were carried on from 15th August to 15th October, the height of the malaria season in a notoriously malarial area, resulting in a large number of malaria infections among the force, although considerably less than in 1933, which was a severe malaria year.

An anti-malaria officer was appointed to the force, but unfortunately he only arrived two weeks after the commencement of operations, and it was at least a week before the staff working under him could be considered as working on proper lines, by which time the mischief had been done, and active operations commenced with an already infected force. Unfortunately camps which apparently must be occupied such as Kila Gai, Dand and Chalanai, are situated close to streams over grown with vegetation and breeding enormous numbers of anophelines including *A. culicifacies* and *A. stephensi*.

The usual measures such as canalising, oiling the stream, and clearing vegetation from its banks were eventually carried out, at first by working parties detailed by units. This method proved unsatisfactory as working parties were not always available when required, and eventually coolies trained in anti-malaria work at Peshawar were engaged, who carried out the work under the supervision of one specially selected sub-assistant surgeon in each camp.

Flit guns and flit solution were freely issued for destruction of adult mosquitoes in tents, etc., but it is stated that very little use was made of them.

The incidence of malaria began to rise by 8th September, the maximum number of admissions to field medical units being on the 18th September, when 123 cases of malaria were admitted.

After this date, probably due to the anti-malaria measures becoming effective, the daily evacuation of cases to field medical units was approximately 25 per day to the end of the month. As however the number of admissions was again tending to rise 10 grs. of quinine acid hydrochlor daily for 10 days was administered to the most infected units.

This method of keeping down admissions is now popularly known in the Army in India as treatment with Delay Action Quinine; in lieu of the old term prophylactic treatment.

The conclusion reached as in the 1933 operations, was that "it afforded valuable assistance as regards keeping the troops on duty for a more or less limited period".

Three pairs of field service panniers were fitted out in Southern Command laboratory for the use of field ambulances in the diagnosis of malaria and dysentery in the field. One pair was sent to the District laboratories in Peshawar, Rawalpindi and Quetta for issue to field ambulances mobilising in these stations.

It is intended that these should become an authorised article of equipment for all field ambulances, and possibly other field medical units in due course.

Venereal Diseases.

TABLE NO. 24.

	All-India.	Gonorrhoea.	Syphilis.	Soft-chancere.	Total.
1931		29.5	6.8	6.2	42.6
1932		26.1	6.0	5.5	37.7
1933		23.2	4.9	5.0	33.4
1934		25.2	4.5	4.1	34.1
1935		25.8	6.0	6.8	38.8

From the above table it will be seen that venereal disease has increased during the last two years; this is due to increases in the Southern and Eastern Commands. Burma District still accounts for the greatest number of cases but admissions were less this year than last year. Western Command continues to have the lowest incidence.

The stations with the highest admission rates were nearly all "one unit" stations, the majority being in Southern and Eastern Commands.

Mandalay had the highest admission rate with 272.73 per 1,000 but this only represents 36 cases. Dacca in Eastern Bengal was second with 180.07 per 1,000 representing 103 cases.

Dacca is a good example of how boredom and the presence of sources of infection combine to increase the incidence of venereal diseases. At this station the troops live in thatched huts and cannot visit the adjacent town on account of the terrorist movement so that they are dependent on their own resources for amusement. At the same time there is ample opportunity for exposure to infection in the vicinity of barracks.

The percentage of relapse cases of gonorrhoea was 23.2 and the average number of days in hospital was 47.22 for this disease. Routine treatment was by lavage with alkaline potassium permanganate. The use of Gonococcus exotoxin was found to reduce somewhat the length of time in hospital and in obstinate cases which did not respond to exotoxin a polyvalent gonococcus vaccine gave beneficial results.

Syphilis has been treated with both Sulphostab and Metarsenobillon. Several cases have occurred of severe reactions to the latter.

Dmelcos vaccine has been found to be very satisfactory in the treatment of soft chancre and it appears to reduce the incidence of adenitis in these infections.

One case of lymphogranuloma inguinale was of interest in that the initial clinical symptoms led to a provisional diagnosis of typhoid fever and the true nature of the case was not revealed until the full development of the local lesion.

Smallpox.

15. Table No. 25 shows the half-yearly state of vaccination of British troops and families.

TABLE NO. 25.

	Percentage protected.	
	On 31st March.	On 30th September.
British Officers	98·93	98·49
British Other Ranks	98·61	99·72
Wives and Children	99·05	99·15

In spite of this high state of protection there were 8 cases of smallpox during the year : three of these were British other ranks, 3 were wives and 2 were children and all of them had been vaccinated within five years. All except two of the cases occurred in the month of May and six out of the 8 cases were infected in the United Provinces. In 1934 there were 9 cases of which 1 was a British officer, 6 were British other ranks and 2 were women or children.

Tuberculosis.

16.

TABLE NO. 26.

	Pulmonary Tubercle.	Tuberculosis of organs other than the lungs.	Pulmonary tubercle.
	Actuals.	Actuals.	Ratio per 1,000.
Admissions	54	15	1·0
Deaths	3	1	0·06
Invalids	35	9	0·66

There were two cases of pulmonary tuberculosis less than in 1934 and 16 fewer invalids sent to the U. K. but there were 2 more deaths.

Diseases of the Respiratory System.

17. Excluding pulmonary tuberculosis there were 1,217 admissions for respiratory diseases giving a ratio of 23·1 per 1,000 which is 1·3 more than in 1934. There were 164 cases of lobar pneumonia of which 19 died, thus showing a case mortality of 11·6 per cent. Out of 58 cases of broncho-pneumonia, 2 died, the case mortality thus being 3·4 per cent. Bronchitis accounted for 757 admissions and pleurisy for ninety-three.

Diseases of the Digestive System.

18. There were 5,014 admissions as compared with 5,582 in 1934. This is a very substantial decrease as compared with the two previous years when there were decreases of about 80 cases in each year.

	1934.	1935.
Tonsillitis	1,696	1,494
Diarrhoea	811	734
Appendicitis	475	423
Pharyngitis	441	420
Jaundice	397	353
Constipation	346	332
Gastritis	342	307

Reference to Table No. 16 (Dysentery, Diarrhoea and Colitis) shows that while there has been a greater increase of dysentery as compared with the previous year there has been also a concomitant decrease in diarrhoea although this disease has gone up from tenth to ninth place in the principle causes of admission to hospital.

Diseases of Areolar Tissue and Local Injuries.

19. Although there has been a slight reduction in the incidence of diseases of the areolar tissue, these still rank second only to malaria in the production of inefficiency through sickness. Admissions totalled 2,809 for cellulitis and 473 for boils giving ratios per 1,000 of 53·4 and 9·0 respectively.

The admissions for local injuries were also slightly lower [than in the previous year and were as follows :—

	Actuals.	Ratio per 1,000.
Sprains, contusions and abrasions	1,767	33·6
Gunshot wounds	33	0·6
Other wounds	303	5·8
Fractures	710	13·5
Dislocations	182	3·5

There were 32 deaths from local injuries which was 5 more than in the previous year.

Effects of Heat.

20. In spite of the fact that more British troops in the Northern Command than usual had to remain in the plains during the hot weather on account of military operations and civil disturbances, the total number of admissions for effects of heat was exactly the same as last year. Out of the total of 90 cases, 78 were heat exhaustion, 11 were heat-stroke and 1 was sun-stroke. There were 8 deaths compared with 9 in 1934.

Hygiene.

21. A summary of work carried out at the Military Food Laboratory, Kasauli, during 1935 is given in Table No. 27.

TABLE No. 27.

Source of sample.	Number of samples received.	Accepted.	Rejected.	Percentage of rejections.
<i>On offer or for acceptance.</i>				
Direct from overseas	674	372	142	21.1
Indian products	945	530	315	33.3
Grains from grain depots	3,113	3,010	99	3.2
Wheat products from controlled mills	600	600	..	..
Bran from other than controlled mills	1,189	1,000	187	15.7
Ghi from Ghi Heating Centre, Agra	4,460	4,280	..	..
<i>From I. A. S. C. stocks for periodical analysis</i>	1,653	1,602	11	0.7
<i>From units on complaint or for advice</i>	1,605	1,160	311	19.4
Total	14,239*	12,554†	1,065	7.5

Forty-four per cent. of samples manufactured abroad were rejected but this high percentage was partly due to fifteen samples of *ghi* which were received from New Zealand and which were found unsuitable.

The high proportion of rejections of milk, jam, cheese and preserved meat point out the necessity for careful selection of such articles.

Goods manufactured in India showed a large percentage of rejections owing to the poor quality of articles purchased in bazaars for comparison with present supplies.

Samples of essence of meat from firms of world wide reputation, when submitted by Indian firms, are frequently found to be unsatisfactory.

Barley has been poor and weed-ridden during the year but wheat products have been of great consistency and high quality.

Bacon has given cause for dissatisfaction owing partly to the fact that samples taken from consignments on arrival at ports in India show signs of age and partly because supplies that are apparently fresh on tender rapidly deteriorate after acceptance. The best supplies were from an English firm and consisting of the middle cut divided into 2 or 3 portions each of 10 lbs. and packed under negative pressure in tin containers.

Ghi storage tests were carried out during the year and indicated that *ghi* of good quality and packed in sealed tins will keep for long periods. It has been found that *ghi* with an acidity of over 11 points is liable to develop sufficient acidity to exceed this figure within a year, therefore the acidity of *ghi* which is to be stored should not exceed 8 points.

* In 124 cases further samples were called for.

† The remainder of the samples received represent special examinations, including 35 of drinking water.

The work done at the Ghi Testing Laboratory, attached to the Ghi Heating Centre at Agra, showed that a high standard of ghi was being supplied to the Army for out of 4,384 samples examined after heating, only 34 were rejected.

The installation of electrical heaters has produced a clean and noiseless Laboratory well up to the modern standards.

Food.—Tests on a large scale were carried out in the Northern Command with a modified Shakapara biscuit and as a result two new types of biscuit have been adopted, namely, a sweet and a salt. The proportion in which they will be issued is 3 sweet to 1 salt—and a revision of the hard scale of rations is being examined.

Water supplies.—Chemical analyses of all station water supplies have been carried out at the Military Food Laboratory, Kasauli, and the chloramination method of sterilizing drinking water was tested with the different samples. As a result it has been decided to adhere at present to the older method of chlorination for field service.

Improvements to the water supplies by installation of filtration and chlorination plants have been carried out as funds were available but there are still many stations without piped water supplies.

Dress.—Sun helmets—In certain stations in Northern Command the wearing of sun helmets during the cold weather was not considered necessary and under certain conditions permission was granted for the wearing of peaked Service caps on parade.

Air conditioning.—Experiments were carried out on a hospital ward in the British Military Hospital, Delhi. The results were so good that it was decided to experiment on hospital wards in other hot plains stations next year. The method tried was by means of *khus-khus* screens on doors and windows; these screens were kept moist by means of a water drip-feed from overhead tanks and air was drawn through the screens into the ward by electric fans.

Barracks and Quarters.—All newly constructed British barracks will in future be provided with medical inspection rooms and these will be provided as funds become available in existing barracks where necessary.

Revised scales for quarters for officers (both married and single) and lady nurses have been authorised. The new quarters provide for all essential requirements and will be more comfortable than the existing ones.

Warrant Officers, Class II, now get class IX quarters which have been re-designed to be convertible so as to have one, two or three bedrooms, thus coming into line with the arrangements for soldiers' married quarters in U. K.

Improvements to existing and provision of new quarters at an approximate expenditure of 9½ lakhs, for British married personnel were carried out at various stations.

Special efforts were made to bring up the existing accommodation for Dining Halls and Cookhouses for British troops up to scale. An approximate expenditure of Rs. 1,40,000 was incurred at Jhansi, Meerut, Karachi, etc.

Sanitary Survey.—Owing to the unhealthy conditions prevailing at Rani-khet in the Lucknow District, a special sanitary survey of the station was carried out.

As a result the sum of Rs. 12,000 was allotted for immediate improvements in the military area and a 3 year plan for further work was drawn up. Pressure was also brought to bear on the Cantonment authorities to improve

the very defective sanitation in the bazaars (largely responsible for the unhealthiness of the station) and to start a deforestation scheme to ventilate and allow access of sunlight to the effluents of drains. The work carried out during the year consisted of fly-proofing married quarters near bazaars, provision of grease traps and soakage pits and improvements of latrines and urinals.

Fly proofing.—Fly proofing in India is frequently found to be unsatisfactory after it has been in use for a short time, chiefly owing to faulty construction and to the wooden frame work warping. It is particularly noticeable in latrines where fly proof flaps at the back come in for rough handling owing to having to be lifted in order to allow withdrawal of the pans. Latrine seats also are frequently unsatisfactory on account of the pan not fitting closely under the seat and the lids being early broken. A new type of iron latrine seat and lid and an iron framed flap at the back of the latrine is being tried at Ranikhet. Experiments are also being carried out at Rawalpindi.

Conservancy.—The disposal of sewage from quarters by means of water carriage into (individual) septic tanks has been found very satisfactory in Northern Command and such installations are now being provided in Eastern Command.

It was hoped that the scheme for provision of a water carriage system in Fort William, Calcutta, would be started this year but this was not possible, as the funds which had been sanctioned for the project had to be diverted on account of the Quetta earthquake—Funds are provided in the 1936 budget for this work.

Experiments were made with an automatic self-dosing device for the Rattersley method of treating sullage water with ferrous sulphate and lime. The apparatus was found satisfactory but there were several minor improvements required and the experiments were still in progress at the end of the year.

Portable disinfectant.—Experiments from the transport point of view were continued by the I. A. O. C. on the portable disinfectant which had been accepted by the medical directorate in 1934. This disinfectant is not suitable for pack transport and will be carried in M. T. vehicles or horse drawn transport. It is hoped that it will form the standard pattern portable disinfectant for India in both peace and war.

Quetta Earthquake.

22. Details of this disaster and the emergency measures taken to combat it have already been recorded in an official pamphlet published by the Government of India from which the following is a brief extract :—

“ At three minutes past three on the morning of May 31st, 1935, Quetta and the surrounding districts were shaken by an earthquake that lasted for 25 seconds. During this short period practically the whole of Quetta city was destroyed ; the military cantonments to a great extent escaped but the Royal Air Force suffered heavily, out of an establishment of 656 of No. 3 (Indian) Wing 148 persons being killed and over 200 injured while out of 27 aircraft only 3 escaped damage.

It was fortunate that the military cantonments escaped serious damage for within half an hour of the occurrence of the disaster troops were on the spot and military control was established in place of the civil police and other administration which had been wiped out.

The first and most immediate need was transport as most of the vehicles in the City had been smashed. Every available vehicle in cantonments was used to bring troops into the area and were then used in addition to the military motor ambulances to take casualties to the military hospitals which were soon overflowing with patients. The Civil and Missionary hospitals had been destroyed and the walls of the military hospitals were cracked and unsafe so that verandahs and tents had to be used.

On the day of 31st May 345 inpatients were received into the British military hospital and approximately 600 were treated as outpatients.

The Indian Military Hospital soon became a large Casualty Clearing Station dealing with casualties at the rate of 200 an hour and by the evening of June 1st, 4,500 cases had been treated including 450 major operations, 300 fractures and 1,200 anaesthetics. During the period 31st May to 14th June between 20,000 and 25,000 casualties were treated.

Extra medical assistance was on its way from India, within a very short time but until this arrived the staffs of the two military hospitals, with civilian assistance, carried on night and day without rest in spite of the fact that several of them had been injured. The gallantry of the British women of Quetta must be recorded. Within a few hours of the occurrence of the earthquake a hundred officers' wives reported for duty at the hospitals and took over even the most menial task in spite of the fact that many of them were without any experience of hospital or first aid work.

The work of dealing with casualties was greatly assisted by the fact that there were large medical Mobilization Stores and an Arsenal in Quetta and therefore large quantities of medical supplies, blankets, stretchers, tents and other material were quickly available. Within 12 hours the arsenal issued 1,000 tents, 5,400 blankets and 500 stretchers besides innumerable picks, shovels and other articles. Similarly the Supply Depot was able to answer the call for large quantities of rations.

By 6 A.M. on the 31st May a Relief Headquarters was established on the lawn of the ruined Quetta Club and the city and civil lines were subdivided into areas allotted to military units for rescue work.

A refugee camp was organised on the race course and polo grounds by officers of the Staff College. Burial places were selected for the dead. A police force was organised and guards and patrols were formed in the city to direct traffic and prevent looting.

Communications with the outside world had been cut off except by wireless as most of the railway and postal and telegraph personnel were dead but the Royal Corps of Signals very quickly repaired the civil telegraphs and re-established communication.

Water and electric light supplies were disorganised as most of the personnel for these services lived in the city and had been killed or injured; of the M. E. S. alone 27 had been killed. The Sappers and Miners took over control and although the 10 inch water pipe line to the city was badly damaged and difficult to repair, an adequate water supply was maintained. Similarly the Sappers and Miners took over the electric power station and were able to supply electric light to the hospitals at night.

News of the earthquake was received at A. H. Q. by wireless on the morning of 31st May and at once the whole of the resources of the Army was put at the disposal of Quetta. Fourteen medical officers, 16 nursing sisters, 12 I. M. D., 120 nursing orderlies and six tons of medical stores were sent at

once by air and rail and they were followed by three sections of a Field Ambulance from Waziristan and 2 Sanitary Sections from Eastern Command. All available ambulance trains were also put into commission.

As soon as the news of the earthquake became public several hundreds of passengers travelled to Quetta. Food and accommodation for such a rush were not available and therefore only those on official duty were allowed past Sibi where a Traffic Control Post was established.

Special trains were run from Quetta for the evacuation of refugees and wives and children of British and Indian troops. The evacuation of British women and children was complicated by outbreaks of chicken-pox, measles and dysentery among the children, but they were sent to Karachi and eventually to the U. K. by a steamer chartered for the purpose. Difficulty was experienced in embarking the infectious cases on account of the Port Health Rules but with the help of the Secretary of State for India arrangements were made with the Quarantine Board, Egypt, to facilitate the passage of the ship through the Suez Canal.

Rescue work had gone on unceasingly in Quetta and all the living had been extricated from the ruins in the first 36 hours. By June 3rd, it was realised that any who were entombed must be dead and as the smell from the city had by this time become appalling and there was grave danger of an epidemic it was decided to evacuate the area and seal it. A cordon of barbed wire had been placed round the city and after a thorough search to remove everyone the area was closed and surrounded by sentries to prevent ingress.

Martial law was established from the 1st of June until the 28th June when the civil administration resumed control."

The reconstruction of Quetta cantonment is being undertaken and the work is being co-ordinated by a local Reconstruction Committee at Quetta and a Central Reconstruction Committee at A. H. Q.

Mohmand Operations.

23. Operations were undertaken in the Mohmand country, consisting of bare rugged hills 3-6 thousand feet high enclosing narrow valleys in which the water courses are mostly dry.

The Peshawar Brigade moved out on August 15th and were followed two days later by the Nowshera Brigade and in September by two more Brigades. The operations continued until the end of October.

Climatic conditions were not severe except during August and September. The only cases of heat exhaustion or heat stroke occurred in these months there being 2 cases in the former and 15 in the latter month.

The incidence of malaria and the outbreak of cutaneous diphtheria in a British unit of the Mohmand Force are described elsewhere in this report.

Intestinal diseases did not play any important part in these operations. Four sub-sections of sanitary sections were mobilized, but none was attached to the force for over a fortnight after the troops moved out with the result that the sanitation of camps during this period left much to be desired. This might have been avoided if sanitary personnel had been included among the first troops to move.

All troops and followers were inoculated against cholera before leaving their peace stations and although cholera was prevalent among the civilian population, no cases occurred in the force.

Considering the adverse conditions under which they were serving, and apart from malaria, the health of the troops throughout was remarkably good.

The water supply for the whole force, except for a short period in one camp, was taken from one source and distributed to the different camps after chlorination.

Troops were on field scale of rations which were sufficient and satisfactory. Dairy products were sent up daily from the Government Dairy Farm at Peshawar; milk being kept cool in transit by means of cylindrical ice containers in each can. Ice was issued to British troops and a special issue of 4 bottles of mineral water per man per day was made to British personnel of Armoured Cars and the Light Tank Company while employed on road duties.

Loe Agra Operations.

24. From February to June a brigade from Peshawar operated in the Loe Agra area, west of Malakand. The health of the troops was good throughout. The total sick rate of 96·42 per 1,000 compared very favourably with that in the Mohmand Operations when it was 668·8 per 1,000. The Loe Agra operations were however carried out during the healthy season whereas the Mohmand Operations took place during the most malarial months in the year.

The chief discomfort to the troops was from the swarms of flies, which were present in many of the perimeter camps, owing to the presence of large numbers of labourers living under primitive sanitary conditions in close proximity.

Strenuous measures were taken to deal with this nuisance, which were ably supported by unit commanders with the satisfactory result that the admission rate for the intestinal diseases remained creditably low.

Civil Disturbances.

25. During July troops were called out in aid of the civil power in Lahore. Troops in Sialkot, Ambala, Amritsar, Ferozepore and Multan were affected and practically all troops in hill stations had to be recalled. The troops were continuously on duty in Lahore city at the worst time of the year and under very trying conditions but hot weather precautions were taken early and there was not an undue amount of heat exhaustion or heat stroke.

Pathology.

26. *Military Laboratories.*—The work in the 1 Command, 13 District and 13 Brigade Laboratories has been increasing for a period of years. In 1935 approximately 160,000 examinations were carried out at the request of military hospitals. Clinical side room work actually carried out in hospitals has also been steadily extending in scope. In Peshawar District 24,045 specimens were examined in the hospital side rooms. Similarly the Enteric Laboratory, Kasauli, originally started as a laboratory for the detection of carriers among convalescent cases of enteric fever in British troops has now become more in the nature of a large central laboratory, to which organisms of doubtful nature are referred, and where standard agglutinable cultures and agglutinating serum is manufactured and issued to District or Brigade Laboratories. During 1935, 3,648 ccs. of agglutinating serums of fifty different

varieties; 98,100 ccs. of dilute broth suspensions for widal tests, 4,000 ccs. of concentrated suspensions for the Weil Felix test, and 1,070 ccs. of concentrated suspensions of TO, AO, and BO were issued to military laboratories. This laboratory now maintains 284 stock cultures, and the number is continually being added to annually.

The routine work in all military laboratories is mainly bacteriological and to a large extent connected with the examination of specimens from dysentery cases, from pyrexia cases, *e.g.*, suspected enteric group cases and in the last few years suspected cases of the typhus group of fevers. In addition to being a skilled bacteriologist, the military laboratory worker in India requires a knowledge of Protozoology, Helminthology, Pathology; to an increasing, though not great, extent Biochemistry, and he is liable to be asked for his opinion on entomological specimens in addition to the above. The work in District Laboratories is invariably heavy, but in the Brigade laboratories the scope of the work depends to a great extent on the enthusiasm of the medical officer in charge of the laboratory, and the staff of the hospitals in the stations in which the laboratories are located. For a keen young medical officer interested in laboratory and clinical work the charge of a Brigade laboratory is an invaluable experience, whatever branch of work he may ultimately decide to specialise in at a later date. Also before taking over charge he is given the advantage of 3 months training in a District Laboratory. The following details may be of interest as indicating the type of work mainly dealt with at the present time in the military laboratories.

Enteric group of fevers—4,397 blood cultures were sent to laboratories for examination. From these 311 enteric group bacilli were isolated. 3,346 of the blood cultures (76·1%) were proved to be sterile. The percentage of contaminations from all India was 16·6%. This is a lower figure than in previous years, and considering the long distances from which many of the specimens have to come by rail, it is considered fairly satisfactory. In certain laboratories, *e.g.*, Peshawar the percentage of contaminations was as low as 5%. Modifications of McCartney's bottles have been tried out in two or three laboratories, and it is probable that in time some modification of these will replace the present rubber capped bottles of bile salt medium supplied by most laboratories. Great differences of opinion exist as to the source of the so-called contaminating organisms. Major H. J. Bensted, M.C., R.A.M.C., is of opinion that many of these are not of extraneous origin, but were really present in the blood of the patient, while on the other hand Major F. G. A. Smyth, another laboratory worker of great experience, considers that 86% (staphylococci, coliform organisms, *B. pyocyaneus*) are due to skin contaminations, while 14% are due to errors in the taking of the culture or in its despatch to the laboratory. The fact that when greater efforts for sterilisation are made, the percentage of contaminations seems to be invariably reduced, supports the conclusion that the great majority at least of these non-enteric group organisms are really contaminations.

An organism similar to one reported from Jhansi last year was isolated on two occasions from the blood of a patient in Quetta. The peculiarity of these two identical strains is that while their H antigen is identical with *B. paratyphosus* A, their "O" antigens are intermediate between those of *B. paratyphosus* A, and the *B. typhosum*. There is no evidence of the presence of a group phase in the H antigen.

Another bacillus of the salmonella group biochemically was isolated from the stool of a child in Poona suffering from dysentery. It was found to have

the "H" antigen type and group of the B paratyphosum B by Lt.-Col. Bridges, but the "O" antigen differs entirely from that organism and it has not been possible to classify it in any recognised antigen group.

Wilson and Blairs medium has been thoroughly tried out over a period of years, but the results have been for some reason unsatisfactory, and litmus lactose bile salt agar remains the stock media for this purpose in all the laboratories. It is hoped to try out thoroughly bacto-bismuth sulfite agar medium prepared by the Difco Laboratories during 1936.

Excluding the examinations of convalescent cases in the Enteric Laboratory, Kasauli, 11,705 bacteriological examinations of stools were carried out. These examinations include the 20 examinations laid down for Indian cases in convalescence. 41 *B. typhosus*, 28 paratyphoid A, and 2 paratyphoid B (the latter organism being uncommon in India) were isolated. The results on specimens of faeces sent from outstations emulsified in 30% glycerine in 0.6% saline have never been satisfactory, but it is thought that if these examinations were carried out considerably earlier in the case than has been the custom, better results might be obtained. It should be realised also that a large number of these cases of pyrexia are eventually diagnosed as other than enteric group. 10,657 specimens of urine were examined bacteriologically also for enteric group bacilli, 69 of the specimens only giving positive results. The same remarks apply with even greater force as in the case of samples from stools particularly in the hot weather months.

Blood culture remains far the most satisfactory method of diagnosis, but it is surprising how frequently in the usual sporadic case, two or even three blood cultures taken early in the disease are found to be sterile, and the third or fourth culture from the case yields a positive result. On the other hand in small groups of cases quite frequently blood cultures seem to be positive in almost 100% of the cases. It may be possible that in a much inoculated population the bacilli may be present in the blood stream for shorter and more infrequent periods and possibly earlier in the intestine. The D. A. D. P., Quetta was able to isolate *B. typhosus* in the sputum of a typhoid case in 17 out of 25 occasions, the sputum being first washed in 1-200,000 brilliant green solution before plating. In view of the very frequent bronchitic or broncho-pneumonic symptoms so common in typhoid cases, particularly among Indian troops, it is hoped that this means of diagnosis will be further explored.

Complete series of (3-4 tests) widal tests were carried out in 280 suspected enteric group cases. Results with "H" agglutination tests were considered definitely diagnostic in 41.8% of the cases, *i.e.*, typhoid 69, para-typhoid A 19, paratyphoid B 29. In view of the rarity of paratyphoid B infections it is probable that some of the results as regards the latter are due to co-agglutinins rising to unduly high titres of agglutination.

The results on 226 clinically enteric group cases as regards "E" agglutination are even less helpful. In 21.1% only was the titre of "O" agglutination over 100, and in only 12% did the titre rise to over 1 in 200.

Of those cases in which "H" agglutination was negative or indefinite "O" agglutiniis were also of no help in diagnosis, as in only 5 such cases did the titre rise to over 1-100.

Typhus group of fevers.—These have already been briefly discussed. 1,799 Widal tests were carried out in connection with the OX K, OX 2, OX 19 Proteus group. It is interesting that 127 cases were considered positive by the laboratory workers but only 82 were officially diagnosed clinically, this

presumably being due to the absence of symptoms—a group of 10 such cases of the OX K group on laboratory results in Rawalpindi were thus placed among the P. U. O. group by a local committee of physicians who considered the cases. In Bangalore where the disease appears to be endemic the D. A. D. P. mentions that in the majority of the cases, nine to eighteen days fever falling by lysis without distinctive symptoms, the commonest being orbital headache and vague neuralgia, occurs. In a percentage of the British cases a rash may point to the diagnosis, but in the absence of rash the clinical diagnosis of these mild cases is very difficult. In view of the above, considered along with the facts that very many of the enteric group of fevers including proved typhoid cases show a similar absence of clinical signs, that in some undoubted cases of the typhus group agglutinins do not reach a higher titre than 1—100, occasionally less, and that in a few proved typhoid cases the agglutinins to the Proteus group may reach a titre of 1—125 or higher and finally that in typhus cases agglutinins to the Proteus group may be absent or remain at a low titre until after the defervescence of pyrexia and the establishment of convalescence, it is difficult to blame clinicians for their occasional doubts as to the validity of the laboratory diagnosis on such cases.

This group of fevers particularly of the above indefinite type must be commoner among the civil populations than is realised, as a percentage among Indian troops are infected while on leave in their villages, and both D. A. D. P. Madras District, and Rawalpindi District have discovered cases among the civil population not differentiated from the numerous fevers of unknown origin common in all Indian cities and villages.

Dysentery.—20,610 bacteriological examinations were carried out during 1935 on 4,142 cases of dysentery and 3,013 cases of diarrhoea—Bacillary exudates were present microscopically in 2,505 cases (60·4 per cent.) and an indefinite exudate in 1,703 cases. The following Bacilli were isolated from the above—*B. shiga* 230, *B. schmitz* 106, *B. flexner* V-Z series 798, Boyds strains (group A₂ and B) 392, *B. sonne* 292. Twice during the year the Newcastle bacillus was isolated. The commoner type, Boyd's 88 strain, serologically identical with the above, but biochemically identical with *B. flexner* except in so far as two thirds of the strain ferment Dulcitol late are included in Group B above.

There were 215 cases of amoebic dysentery diagnosed during the year, and also 21 mixed bacillary and amoebic infections.

29 organisms (*B. flexner* biochemically) could not be placed in the above groups by the present system of classification in force.

This briefly is as follows :—

- (1) On the morning after the specimen has been plated out, three likely colonies are picked off the plate into lactose, and glucose and mannite peptons water and on to agar slopes and incubated.
- (2) If the results next day suggest that the bacillus is possibly of the dysentery group, a preliminary slide agglutination is carried out.

(a) Non-mannitol fermenters against Shiga and Schmitz (Indian strain 214) serum. If both are negative, against also sub-group B serum (a serum polyvalent against the late dulcitol fermenting group, which includes the Newcastle bacillus, and certain other strains in India almost certainly pathogenic).

(b) If glucose and mannite are fermented without gas formation against—

- (1) Polyvalent serum of Andrewes V-Z spectrum.
- (2) Polyvalent serum for strains 103, P119 and 170. Strain 103 is identical with one of the original Flexner Y strains not included in Andrewes's classification. Strain P 119 is related to Flexner X and occurs in Aoki's Japanese classification. Strain 170 is a new strain common as a cause of mild dysentery chiefly in the earlier months of the year.
- (3) Group B serum, polyvalent for the late dulcitate fermenting group noted in (a).
- (4) B. Sonne serum polyvalent for smooth and rough varieties of B. Sonne.

A provisional report is rendered on the slide agglutination results, but in all cases a further test by Dreyer's method must be carried out. Sub-cultures of unidentifiable non-mannite fermenters are forwarded to the District Laboratory, Quetta for investigation. Sub-cultures of B. (2) (3) are forwarded with a *proforma* in duplicate to Southern Command laboratory, Poona, District Laboratories, Trimulgherry, Meerut, Rawalpindi, Quetta, whichever is the nearest, for confirmation. After identification one copy of the *proforma* is forwarded to the Medical Directorate and one to the laboratory from which the culture originated.

Cultures which do not agglutinate with one or other of the four polyvalent sera above are forwarded to the Officer in charge, Enteric Laboratory, Kasauli for further investigation.

Lt.-Colonel R. F. Bridges, R. A. M. C. has collected at the Enteric Laboratory, Kasauli 18 strains believed to be causative of bacillary dysentery, but which cannot be identified with any of the types in the Flexner or Boyd groups. Some were isolated by Major J. S. K. Boyd, R. A. M. C. in Poona, and others have been collected in the past four years.

All give the following biochemical reactions lactose,—glucose and mannite, acid no gas, saccharose—up to 7 days incubation. These he has divided serologically by indol reactions and by fermentation of dulcitate into four groups; group 1, dulcitate—indol—, group 2, dulcitate—indol + group 3, dulcitate + indol —, group 4, dulcitate + indol +. Agglutinating sera are now maintained in his laboratory for each of these groups.

He has also examined Sartorius types of dysentery bacilli F. G. K. and L. in conjunction with the Boyd strains, and finds Sartorius F = type strain 103 B, Sartorius G = type strain P 119, Sartorius L = type strain 88. Sartorius K, a very rough culture, could not be typed to any known dysentery bacillus. He considers it is probably a rough type strain 88.

Lt.-Colonel R. A. Hepple, M. C., R. A. M. C. continued Lt.-Colonel D. T. M. Large's work on non-mannite fermenting organisms (not B. shiga a B. schmitz) during the year. 54 cultures were sent to him for investigation. Of these 30 fell into one or other of Large's 6 groups. The remainder were found to be either mannite fermenters, or not dysentery bacilli, and six were lost in the confusion resulting from the Quetta earthquake.

As with the specimens from Enteric group cases, difficulty is experienced with specimens from out-stations sent to the laboratory preserved in 30 per cent. glycerine in 0.6 per cent. saline. Frequently the glycerine is allowed to become on the acid side, or sufficiently fresh and well selected specimens of

mucus are not placed promptly in the glycerine mixture by the staff of hospitals sending the specimens. A. D. P. Southern Command states that his isolations from recently passed bacillary exudates in the hospital close to his laboratory is in the nature of 100 per cent. The positive isolations from all Bacillary exudates whether from out-stations or otherwise average between 60—70 per cent. in most laboratories. The percentage however varies with the interest taken by the O. C. hospital and the enthusiasm of the laboratory worker. It is reported that during the year a pathologist after series of negative results from a certain hospital demanded that bed-pans containing specimens "hot from the patient" should be brought to his laboratory. After a further series of negative results it was discovered that to comply with his wishes the subordinate staff in the hospital were heating the bed-pans over a charcoal brazier prior to coming to the laboratory with the specimen. The common occurrence of the Flexner group bacilli among the local population is shown by the fact that this bacillus invariably heads the list of those isolated during carrier examinations of prospective servants for military employ, *e.g.*, in 1935, 18 *B. flexner* (*plus* 4 Boyd's strains) 6 *B. shiga*, 3 *B. sonne*, and 1 *B. schmitz* were isolated during these routine examinations.

In this connection the large number of carriers examined annually may be pointed out. In 1935, 37,119 bacteriological examinations of stools were carried out on 11,345 carriers.

The results particularly as regards the isolation of the enteric group bacilli has always been meagre, and in recent years has become even more so. The main difficulties are in procuring suitable specimens from this uneducated class of people, who are drawn from all ends of a large station to the hospital or laboratory after an early morning dose of salts; easy in theory but very difficult in practice.

Diphtheria.—The interesting cutaneous outbreak followed by fauciae infections in the 1st East Hampshire Regiment and the eventual Schick testing and immunisation of the susceptibles in the regiment has been referred to elsewhere in this report. During the year, 6,118 throat swabs from suspected cases were examined with 353 positive results—Virulence tests were carried out with 200 of these cultures, as orders now are in force that all Diphtheroids morphologically resembling *C. diphtheria* from contacts or from inflammatory throat conditions not typical of Diphtheria must be tested for virulence before an official diagnosis of Diphtheria is submitted.

The value of this rule is illustrated in a small way by a small outbreak of Diphtheria in the 1st Battalion, The Gloucestershire Regiment in November 1935. The majority of the regiment were swabbed and 18 suspected carriers discovered. After virulence tests had been carried out 13 of these men were found to be carrying non virulent strains and were returned to duty. The intracutaneous method of carrying out the virulence tests with guinea pigs is practically universally employed.

Cerebrospinal fluid.—Examinations apart from specimens sent for Wassermann test, or from suspected cases of cerebrospinal fever, are not frequent. 227 specimens however were bacteriologically examined, cell counts were made on 196, chemical tests on 179, and in 34 cases Lange's Colloidal gold chloride test was carried out—Wassermann tests numbered 178.

Other examinations.—It is difficult to select particular items coming under the comprehensive heading "Other Items" in the annual laboratory reports.

as representative of the work in military laboratories, but the following may be considered as fairly so.

(1) Bacteriological examinations of water 1848, a type of work which is increasing annually in all the laboratories. Complete chemical examinations only number 181 and are only required for special reasons at rare intervals	
(2) Bacteriological and chemical examinations of milk and butter = 443. The number varies greatly in laboratories according to the interest taken in this subject. In certain laboratories very few such tests were carried out.	
(3) Preparation of autogenous vaccines = 646. Work in this direction is also increasing. Not many years ago it was the custom for hospitals to obtain stock vaccines from Central Research Institute, Kasauli, rather than make use of their laboratory in this respect	
(4) Dark ground examinations for <i>treponema pallida</i>	1,244
(5) Urethral smears for presence of Gonococci	686
(6) Bacteriological examinations of urine for presence of <i>B. Coli</i>	1,843
(7) Bacteriological examination of mineral waters	336
(8) Blood grouping for blood donors :	752
(9) Estimation of Quinine in hospital stock mixtures	55
(10) Examination of scrapings for presence of Leishman Donovan bodies :	192
(11) Examination of sections of Dog's brains for negri bodies (including 1 cat, 1 mule, 1 monkey)	125
(12) Examination of Rats, mice, Bandicoots and squirrels in connection with plague investigation	164
(13) Bacteriological examination of pathological fluids, peritoneal, pleural, synovial, etc.	620
(14) Blood smears from dogs, horses, mules, calves, cows, buffaloes, bulls	384
(15) Identification of mosquitoes, sandflies, etc., (usually carried out at hospitals by antimalarial officer rather than in the laboratory)	277
(16) Identification of poisonous snakes	20

Friedman's test for pregnancy is becoming popular among the families and is being carried out in increasing numbers in many of the laboratories. The actual number of these tests performed during the year is not available, but in one laboratory 16 tests were made and the number was limited only by the ability of his stock of rabbits in breeding young females.

Chemical examinations.—Apart from the simpler routine tests in connection with blood, urine, faeces, these are not required to the same extent as in civil hospitals owing to the different type of population catered for. The number of such tests however is increasing and all laboratories are now equipped to carry out the more common biochemical tests.

Blood sugar tests 178, Blood urea tests 142, Vanden Berg's reaction 245, Urea concentration tests 141, fractional test meals 409, represent the main work in this connection in 1935.

Helminthology.—*Taenia saginata* is extremely common, possibly more so in Southern Command than elsewhere. Assistant Director of Pathology, Southern Command states that the pumps in the Poona sewage plant are frequently stopped by these worms. 205 specimens were reported. *Taenia*

solium much rarer, but of serious significance in view the numbers of cases of cysticercosis which have been invalided in the past five or six years, has not been discovered in Poona for four years. 24 cases of infestation with this worm were reported by other laboratories of which 8 were from Southern Command, 11 from Northern Command, 3 from Eastern and two from Burma.

The following list of ova discovered during the routine examination of faeces illustrate well the usual helminth infestations encountered.

Hymemolepis nana 74, *Ankylostoma duodenale* 656, *Necator americanus* 410 (of which 383 were from District Laboratory, Trimulgherry). *Ascaris lumbricoides* 459, *Trichuris trichiura* 300, *Oxyurus vermicularis* 27, *Strongyloides stercoralis* 4.

Examination of sections of tissues.—As in the case of the biochemical work the military population is not good field for this class of work but in certain of the bigger stations an appreciable amount has to be carried out. In all 486 pathological sections of tissues were reported on. Of these 51 were simple tumours of varying nature, 17 were sarcomas and 21 carcinomas.

In many stations civil hospitals and mission hospitals are without local resources in this respect, and much work of this nature can be carried out by M. Os. in Brigade Laboratories if they signify their willingness to do so. Such work can always be undertaken on the grounds of instructional purposes for the subordinate staff of the laboratory.

Wassermann Tests.—Five laboratories are concerned with carrying out these tests, 1 in each command in India and 1 in Burma, *i.e.*, Southern Command Laboratory, Poona, District Laboratories, Quetta, Rawalpindi, Meerut and District Laboratory in Maymyo. Specimens of blood serum and cerebrospinal fluid are forwarded by post to these laboratories from the various hospitals in their commands and in view of the trying conditions under which specimens are taken and the temperature to which the serum is subjected in transit during the hot season of the year, the results are very satisfactory. Amboceptor and Wassermann antigen are prepared and stocked in Command laboratory, Poona for issue to the other laboratories on indent. For Kahn antigen "Bacto Beef" heart is used. It has been found to be very satisfactory and keeps well.

Complement is prepared locally in the laboratories, but in the hottest months of the year, *i.e.*, in Meerut, where the temperature in the laboratory reached to 116°, it is liable to be of poor titre. By using concentration methods satisfactory tests were carried out in the hottest months. Guinea pigs may possibly have to be brought down from the hills at intervals in future years. The number of tests carried out during the year excluding control tests are given in table No. 28.

TABLE No. 28.

	Wassermann test.	Kahn test	Langes colloidal gold chloride test.
District Lab., Quetta	1,133	1,081	..
District Lab., Rawalpindi	5,866	499	24
District Lab., Meerut	5,002	36	..
Command Lab., Poona	4,375	4,299	..
District Lab., Maymyo	1,500	..	..
Total	17,876	5,915	24

The total number of specimens posted to these laboratories were 17,361. Of these the following percentages arrived "septic" in the laboratory—Meerut 0·5 per cent., Rawalpindi 0·5 per cent., Poona 3·2 per cent., Quetta 0·0 per cent., Maymyo 1·6 per cent., 103 capsules arrived broken, 0·5 per cent.

TABLE No. 29.

	Negative.	Positive.
Primary Syphilis before treatment	48	747
Secondary Syphilis before treatment	1	221
Tertiary Syphilis before treatment	0	202
Test after treatment (4 laboratories)	4,497	768

It may be noted from the number of primary cases in which positive Wassermanns were present prior to treatment, that the microscopic diagnosis of *Treponema pallida* from sores is not being carried out at a sufficiently early date to allow for treatment being instituted in the great majority of cases before the Wassermann reaction has become positive. The "outstation" situation is here again the difficulty to be contended with.

Lt.-Colonel Price, D. S. O., R. A. M. C. makes the following important observations on the Kahn test. "The experience of some twenty thousand Kahn tests controlled by Wassermann test show that the Kahn test is not reliable except in the hands of an expert. The Kahn test is however always negative in a negative serum whether septic or aseptic. The Wassermann is nearly always positive (false positive) in a septic serum when the serum is really negative. The Kahn test is found to become positive in early syphilis later than the Wassermann, and to disappear after treatment after the Wassermann has ceased to be positive. The greatest accuracy is needing in preparing the saline for the Kahn test, and water doubly distilled off glass is essential. It must be neutral and not acid, as from a metal still, and though the test is simple it is not recommended as a substitute for the Wassermann.

Such a definite and authoritative statement is valuable, as owing to the difficulties in connection with the keeping of animals in extremes of temperature in India, the Kahn test being simple to carry out, and not requiring healthy laboratory animals for its performance would appear on superficial examination to be the most suitable test. In the District laboratory, Meerut the Kahn test was found not to be satisfactory during the hottest months, as the flocculating properties of the serum were evidently being affected by the heat.

Animal inoculations.

27. Animal houses have been provided for practically all laboratories. Sheep are maintained at Southern Command Laboratory in connection with the provision of amboceptor for Wassermann tests, and Guinea pigs and rabbits in all the laboratories. Excluding the Enteric laboratory 505 Guinea pigs, 499 mice, and 41 rabbits were used for various tests. The mice were employed mainly in Peshawar in connection with research work by which it was hoped to fix the virus of sandfly fever in mouse brain tissue. The results were all negative. In Rawalpindi 181 mouse virulence tests on strains of *B. typhosus* forwarded from the other laboratories were carried out. The majority to date are reported to be only of moderate virulence by means of this test.

In certain stations precautions have to be taken during the very hot, or cold seasons of the year to preserve the health of the animals, sometimes very difficult. Epidemics among them have been negligible this year, but in Quetta during the cold months the rabbits annually suffer from a disease with

symptoms of purulent nasal discharge, abscesses behind the lower jaw, and congestion of lungs. The organism isolated from these cases is considered to be *B. leipsepticus*.

Lt.-Colonel Bridges in an endeavour to increase the agglutination titre of sera prepared for certain of the new strains of dysentery bacilli experimented with goats in lieu of rabbits. Audit objections as to cost of upkeep were met by his proving satisfactorily that, taking the yield of serum into consideration, 3·125 rabbits were the equivalent of one goat as regards expense to the state; no mean feat and one illustrating the value of a scientific outlook.

Four goats were used in the test. One yielded a good serum of high agglutinogenic properties. Two were unsatisfactory, and the fourth died during the process of immunisation, from intestinal obstruction after eating too large a branch of a tree. It is understood that 'death' was viewed as attributable to military service.

Equipment.

28. Equipment is now complete and sufficient in all laboratories and annually a few extra articles are supplied for special purposes in connection with research work. McCartney's screw-capped bottles are coming more into general use for storage of media. All district laboratories have been supplied with Frigidaires during the year.

Training.

29. Training of officers, Assistant Surgeons, and Sub-Assistant Surgeons in laboratory duties, and of the latter to groups in clinical side room work in hospitals is an important part of the work in district laboratories. Officers in charge of Brigade laboratories also train in clinical side room work.

During the year 3 medical officers were trained for Brigade laboratory appointments, 9 Assistant Surgeons (6 months course) for sub-charge of District laboratories, and 8 Sub-Assistant Surgeons (12 months course) for sub-charge of Brigade laboratories. 28 Assistant Surgeons, and 71 Sub-Assistant Surgeons were trained in clinical side room duties.

Surgery.

TABLE NO. 30.

30. *Surgical Operations—1935.*

Operations.	Officers.	Other Ranks.	All Others.	Recovered	Invalided	Died.
<i>I. Nervous System—</i>						
Brain abscess	1	1				1
Stretching nerve	1	1		2		
Epidural Injection	2			2		
Ulnar Nerve Transplantation		1		1		
Injection, Sciatic nerve		1			1	
Orbital Nerve excision			1	1		

TABLE No. 30—*contd.*

Operations.	Officers.	Other Ranks.	All Others	Recovered.	Invalided,	Died.
2. Eye—						
Dacryocystitis	1	1	..	..
Enucleation Eye	1	..	1	1	..
F. B. Removal	4	..	4	..	..
Others	1	..	..	1	..	..
3. Ear, Nose and Throat—						
Wart in Nostril Excision	1	..	1	..	..
Rhinitis (Septic)	3	..	3	..	..
Frontal Sinus (Howarth)	1	..	..	1	..
Incision of Membrana Tympani	3	..	3	..	..
Mastoid (Swartz's)	3	..	3	..	..
Myringotomy	1	1	..	..
Polypus Auditory Meatus Excised	1	..	1	..	..
Septum, Submucous, Resection	4	..	4	..	..
Severed Larynx (cut throat)	3	..	3	..	..
Deformity Nasal Septum S. M. R.	1	..	1	..	..
Empyema Maxillary Antrum	1	..	1	..	..
Mastoidectomy	1	1	..	..
Turbineotomy	2	..	2	..	..
Antrum Puncture and Washout	5	..	5	..	..
Cavernous Sinusitis	1	..	..	1
Others	4	30	34	..	..
4. Circulatory and Blood forming organs—						
Splenectomy	2	..	..	1	1
Varicose Veins	4	45	5	54	..	..
5. Lymphatic system—						
Lymphadenitis	2	16	..	17	1	..
Tropical Bubo—Aspiration	1	..	1	..	..
Gland Enucleation	3	..	3	..	..
Tubercular Glands	2	..	2	..	..
Adenitis Submaxillary	2	..	2	..	..
Adenitis Groin (Excision of Glands)	3	..	3	..	..
Others	12	10	22	..	..
6. Ductless Glands—						
Goitre	1	1	2	..	..
7. Breast—						
Cysto-Adenoma	2	2	..	..
Residual Abscess, Excision	1	1	..	..
Fibro-Adenoma, Excision	2	2	..	..
Mastectomy for Carcinoma	2	2	..	..
Amputation	1*	1	2	..	..
Mastitis	1	1	2	..	..
8. Respiratory—						
Tracheotomy	2	2	..	..
Empyema	1	6	3	8	1	1
Aspiration Pleural Effusion	1	..	1	..	..
Thoracotomy (Resection Rib)	8	..	8	..	..
Artificial Pneumothorax	1	..	1	..	..
9. Teeth and gums—						
Teeth Extraction	2	54	24	80	..	..
Alveolar abscess	6	..	6	..	..

*For hypertrichy.

TABLE No. 30—contd.

Operations.	Officers.	Other Ranks.	All Others	Recovered.	Invalided.	Died.
10. Digestive—						
Appendicostomy . . . . .	..	..	2	2	..	..
Appendicectomy	37	326	54	409	2	6
Hernia	9	91	11	111	..	..
Cholecystectomy	1	9	6	14	2	..
Laparotomy . . . . .	..	8	7	11	2	2*
Ulcer, Duodenal and Gastric	2	6	..	3	2	3
Gall Stones . . . . .	..	..	2	2	..	..
Repair Abdominal Wall . . . . .	..	1	..	1	..	..
Intraperitoneal Abscess . . . . .	..	2	..	2	..	..
Gastro-Enterostomy	1	..	..	1	..	..
Sub-Phrenic Abscess . . . . .	..	1	..	..	..	1
General Peritonitis . . . . .	..	1	..	1	..	..
Faecal Fistula Closure . . . . .	..	1	..	1	..	..
Liver Abscess . . . . .	..	5	..	4	..	1
Tonsillectomy	3	55	86	144	..	..
Adenoidectomy	1	5	12	18	..	..
Haemorrhoids	14	79	1	94	..	..
Fistula in Ano	1	8	1	10	..	..
Fissure in Ano	2	5	2	9	..	..
Ischio Rectal Abscess	1	8	..	9	..	..
Pelvis Abscess per Rectum . . . . .	..	3	..	3	..	..
Prolapse Repair	1	..	..	1	..	..
Sigmoidoscopy	2	4	1	7	..	..
Haematoma . . . . .	..	3	1	4	..	..
Anal Papillomata	1	6	..	7	..	..
Anal Warts . . . . .	..	4	..	4	..	..
Quinsy . . . . .	..	1	..	1	..	..
Oesophagoscopy . . . . .	..	..	1	1	..	..
Chronic Pyelitis . . . . .	..	..	1	1	..	..
Enterostomy	1	..	..	..	..	1
Perforated Intestine (enteric) . . . . .	..	1	..	..	..	1
Intestinal Obstruction . . . . .	..	3	..	2	..	1
Rupture Intestine . . . . .	..	1	..	..	..	1
Calculi of Wharton's Duct . . . . .	..	2	..	2	..	..
Proctoscopy . . . . .	..	3	..	3	..	..
Others	6	31	16	48	3	2
11. Generative (male)—						
Undescended Testicle . . . . .	..	1	..	1	..	..
Varicocele . . . . .	..	44	..	44	..	..
Circumcision	1	45	18	64	..	..
Dorsal Slit Prepuce . . . . .	..	1	..	1	..	..
Biopsy, Testicle	1	..	..	..	1	..
Paraphimosis . . . . .	..	2	..	2	..	..
Phimosis . . . . .	..	17	3	20	..	..
Hydrocele . . . . .	..	14	..	14	..	..
Castration . . . . .	..	1	..	1	..	..
Orchidectomy	2	7	1	7	3	..
Tumour Cord . . . . .	..	1	..	1	..	..
Urethra Stricture . . . . .	..	6	..	6	..	..
Periurethral Abscess . . . . .	..	1	..	1	..	..
Urethral Fistula . . . . .	..	1	..	1	..	..
Epididymectomy . . . . .	..	1	..	1	..	..
Others . . . . .	..	9	5	14	..	..

*1 Pulmonary Embolus.

TABLE NO. 30--*contd.*

Operations.	Officers.	Other Ranks.	All Others.	Recovered.	Invalided.	Died.		
12. Generative (Female)—								
Haematocele	2	2	..	..
Retroversion of Uterus and Appendicectomy and Ovarian Cyst	1	..	..	1		
Retroversion Uterus	1	1	..	..
Colpotomy	1	1	..	..
Colpoperineorrhaphy	1	1	..	..
Fixation Uterus	1	1	..	..
Caesarean Section	4	3	..	1		
Cystocele	1	1	..	..
Hysterectomy	2	2	..	..
Ectopic Gestation	3	2	..	1		
Endometritis, Curettage	1	1	..	..
Salpingo-Oophorectomy	2	2	..	..
Pelvis Dilatation and Curettage	2	2	..	..
Vesico Vaginal Fistula Repair Operation	1	1	..	..
Others	8	8	..	..
13. Bones, Joints, Muscles, Fasciae and Tendons—								
Fractures	{	Manipulated	11	80	13	104
		Plated or Wired	1	18	2	20	1	..
		Pin Extension	1	11	2	13	1	..
		Others	9	70	9	84	4	..
Osteomyelitis	4	10	12	2	..		
Osteochondritis	5	..	4	1	..		
Osteoclasia	2	1	3	..	..
Sequestrectomy	12	1	13	..	..
Excision of Metatarsal Spur	1	..	1	..	..
Removal of Plates	1	6	1	8	..	..
Biopsy Sarcoma	1	..	1	..	..
Calcanean Spur	1	..	..	1	..	..
Periostitis	2	..	2	..	..
Necrosis	1	..	1	..	..
Sinus Bone Scraping	2	..	2	..	..
Removal Distal End 4th Metacarpal Bone	1	..	1	..	..
Exostosis Astragalus Excision	5	..	5	..	..
Exostosis Clavicle	1	..	1	..	..
Exostosis Tibia and Big Toe	2	..	2	..	..
Osteitis Tibia	1	..	1	..	..
Dislocation	1	23	3	27	..	..
Aspiration	1	25	1	25	2	..		
Hammehr Toe	20	..	19	1	..		
Reduction Dislocation	5	20	..	25	..	..
F. B. Removal	2	..	2	..	..
Manipulations, Joints	12	76	2	88	2	..		

TABLE NO. 30—*contd.*

Operations.	Officers.	Other Ranks.	All Others.	Recovered.	Invalided.	Died.
13. Bones Joints Muscles Fasciae and Tendons						
<i>contd—</i>						
Synovitis . . . . .	..	2	..	2	..	..
Semilunar Cartilage	6	71	..	76	1	..
Intra-articular Cartilage . . . . .	..	3	..	3	..	..
Arthrotomy and Meniscectomy	7	94	..	100	1	..
Hallux Valgus . . . . .	..	6	1	7	..	..
Hallux Rigidus . . . . .	..	1	..	1	..	..
Rupture of Adhesions . . . . .	..	9	..	9	..	..
Bursitis . . . . .	..	9	..	9	..	..
Disarticulation Finger . . . . .	..	1	..	..	1	..
Tenotomy . . . . .	..	4	2	6	..	..
Suture Tendon	1	6	..	7	..	..
Ganglion . . . . .	..	8	..	8	..	..
Hernia Gastrocnemius Muscle . . . . .	..	1	..	1	..	..
Dupuytren Contracture	1	1	..	2	..	..
Lengthening, tendons . . . . .	..	1	1	2	..	..
Tendo-Lysis	1	..	..	1	..	..
Excision . . . . .	..	2	..	2	..	..
Excision of Calcaneo-scaphoid Capsule . . . . .	..	..	1	1	..	..
Others	4	20	3	24	3	..
14. Amputations—						
Toe . . . . .	..	5	..	5	..	..
Leg . . . . .	..	1	..	..	1	..
Terminal Phalanx of Finger . . . . .	..	2	..	2	..	..
Finger . . . . .	..	4	..	3	1*	..
Others . . . . .	..	5	1	4	2	..
15. Skin and subcutaneous tissues—						
I. A. T.	39	259	22	318	..	2†
Onychia . . . . .	..	8	..	8	..	..
Keloid . . . . .	..	1	..	1	..	..
Carbuncle . . . . .	..	..	2	2	..	..
Finger Nail Excision . . . . .	..	1	..	1	..	..
Ingrowing toe Nails	1	54	3	58	..	..
Avulsion of Nails . . . . .	..	23	..	23	..	..
Paronychia . . . . .	..	6	..	6	..	..
Skin Graft	1	5	..	5	1	..
Sores . . . . .	..	6	..	6	..	..
Warts . . . . .	..	5	..	5	..	..
Scars . . . . .	..	3	..	3	..	..
Plastic Operations . . . . .	..	2	..	2	..	..
Cellulitis Neck, Opening and Drainage . . . . .	..	2	..	2	..	..
Others . . . . .	..	22	..	21	1	..
16. Urinary—						
Pyelolithotomy . . . . .	..	..	1	1	..	..
Perinephric Abscess . . . . .	..	6	1	6	..	1
Tumour Kidney . . . . .	..	1	..	1	..	..

*G. S. W. self inflicted.

†Death due to Septicaemia.

TABLE No. 30—concl'd.

Operations.	Officers.	Other Ranks.	All Others.	Recovered.	Invalided.	Died.
16. Urinary—cont'd.						
Renal Fixation (Floating Kidney)	..	1	..	1	..	..
Nephrectomy	..	4	1	3	..	2
Nephrolithotomy	..	1	..	1	..	..
Cystoscopy	2	32	1	32	3	..
Ureterotomy for Calculus	..	1	..	1	..	..
Nephropexy	1	..	..	1	..	..
17. Injuries—						
Wounds	6	44	2	52	..	..
Contusion	..	1	..	1	..	..
Gunshot Wounds	5	18	..	17	3	3
18. Tumours—						
Lipoma, abdominal wall	..	1	..	1	..	..
Malignant	..	2	1	1	2	..
Non-malignant	3	22	3	28	..	..
Excision	..	1	1	1	1	..
Rodent ulcer	..	1	..	1	..	..
19. Cysts—						
Sebaceous	2	104	2	108	..	..
Bronchial	..	1	..	1	..	..
Dental	..	2	..	2	..	..
Bursal	..	4	..	4	..	..
Meibomian	..	2	..	2	..	..
Bartholins	..	..	1	1	..	..
Ovarian.	..	..	2	2	..	..
Thyro-Lingual	..	1	..	1	..	..
Dermoid	..	1	..	1	..	..
Epididymis	..	2	..	2	..	..
Others	1	3	..	4	..	..
20. Parasites—						
Cysticercosis	..	1	..	1	..	..
Guinea-worm	..	1	..	1	..	..
Myiasis foot	..	2	..	2	..	..
21. Miscellaneous—						
Foreign bodies removed	2	18	5	25	..	..
Blood transfusion	1	16	1	17	..	..
Minor operation	..	59	10	69	..	..
Examinations	1	6	..	7	..	..
Anaesthetics.						
Chloroform Open	..	..	..	..	..	54
Aether	..	..	..	..	..	171
Chloroform and Aether Open	..	..	..	..	..	649
Nitrous Oxide	..	..	..	..	..	160
Nitrous Oxide and Aether	..	..	..	..	..	9
Avertin	..	..	..	..	..	1
Phenolaine	..	..	..	..	..	9
Percaine	..	..	..	..	..	22
Stovaine	..	..	..	..	..	10
Ethyl Chloride	..	..	..	..	..	48
Ethyl Chloride and Aether	..	..	..	..	..	23
Evipan	..	..	..	..	..	22
Evipan and Aether	..	..	..	..	..	3
Spinal	..	..	..	..	..	6
Novocaine (Local)	..	..	..	..	..	147

Special Report of Surgical Work during Quetta Earthquake, May 31st et seq. 1935.—A detailed list of the Surgical work performed following the Quetta disaster is impossible except in the most approximate terms.

At the British Military Hospital, Quetta, twenty-four Major Operations were performed—with three deaths.

At the Indian Military Hospital approximately 400 Major Operations were performed—the number of post operative deaths is not known. Certain striking lessons were learnt and certain facts became evident—these will be set down categorically.

I. *Organization.*—(a) The division of the large tent hospital into Special areas, viz.,

Area A—for cases of fractured spine and pelvis, retentions of urine, etc.

Area B—for female cases of whatever kind.

Area C—for closed fractures and severe wounds.

Area D—for compound fractures.

Area O—operation and recovery tents.

Each area was staffed with its own team of medical officers, nurses, orderlies, followers and voluntary workers and was run as a self-contained unit. This arrangement greatly facilitated the work of the officer commanding and 'Specialist officers' and also made the task of evacuation much more simple.

(b) *Transport.*—The use of Plaster of Paris casts for practically all cases of fracture to facilitate their transport. This method was found to be far superior both in comfort, safety and ease of handling to the usual cumbersome "Splint" method. In addition the plaster of paris was applied just as quickly as were the ordinary splints.

(c) *Surgical Team Work.*—The undoubted value of this was again emphasised.

II. *Clinical Features.*—(a) The routine use in all cases of antitetanus and anti-gas gangrene sera. The effectiveness of this was demonstrated by the occurrence of only four cases of tetanus and one case of gas gangrene (all amongst Indians). It is also by no means certain that prophylactic doses had been given to these people as omissions were inevitable.

(b) In spite of the lack of adequate sterilization facilities for dressings (Antiseptic precautions were employed in the operation theatres throughout—towels soaked in 1/20 carbolic acid, etc.), wounds healed remarkably satisfactorily. The procedure adopted was to wash thoroughly with soap and water, remove all badly damaged tissue and dress with acriflavine or Eusol, combined with glycerine or methylated spirit. The use of iodine was discouraged as its effectiveness in Baluchistan, at any rate, had not been proved by previous experiences.

(c) The satisfactory end results of fracture cases seen later in spite of the fact that they had received little or no treatment apart from the original manipulation and fixation in plaster of paris (for purposes of transportation).

(d) The death of most cases of abdominal and spinal injuries—chiefly owing to their arriving late for treatment.

Cases of Special Interest.

1. *Intestinal Obstruction.*—Operation was performed for cure of sub-acute appendicitis, retroversion and right sided ovarian cyst. The patient's condition after the operation and until the next day at noon was perfect. Then she was quite suddenly seized with moderate epigastric pain, and vomited. Stomach washes, but not medicinal treatment, relieved her temporarily. There was no distension, and the bowels were obstinately constipated but passed a little flatus. Decision to explore for intestinal obstruction (not due to paralytic ileus) was made 48 hours after onset of vomiting. This was done under spinal anaesthesia. About three feet of small gut were tightly impacted in the pelvis. This gut was distended and blue when extracted and the points of entry and exit were sharply demarcated. It was viable. Caecostomy was performed (after Grey Turner). Four hours later the patient's condition was quite dramatically improved and she asked for a bed-pan. Four hours later still about 9 P. M. she collapsed suddenly and died next day at 8 A.M. Examination P. V. after the collapse showed that there was no evidence of re-impaction in the pelvis, though regurgitant vomiting recommenced.

2. *Intestinal Obstruction.*—An officer was admitted with rapidly increasing intestinal obstruction. X-rays showed the obstruction to be in the descending colon. A caecostomy was performed to relieve the distension and ten days later a laparotomy was performed. An Annular constricting growth was found in the middle of descending colon. The growth with a portion of bowel each side was resected and an end-to-end anastomosis performed. A blood transfusion was then given. The patient made a good rapid recovery from the operation. The caecostomy was closed four weeks later. Ten days after this a large lump was felt in the left hypochondrium. A laparotomy was performed and an inoperable hard growth about the size of a fist was felt. He was immediately transferred to Bombay, where deep X-ray was available. After a few treatments he was sent to England, when the lump had disappeared. This officer is now on duty as a riding instructor at the Equitation School at Saugor. Microscopic examination of the slide in India reported "a mixed cell sarcoma", but apparently the report at home did not confirm malignancy. Clinically from the rapidity of the symptoms the case was very suggestive of malignancy.

3. *Foreign Bodies in Intestine.*—One patient a prisoner undergoing detention swallowed on three successive occasions, the following articles. *First admission to hospital.*—Two two-inch nails, ten tunic buttons, one Gillette razor blade in small pieces, six large hooks and eyes, twelve blunt and sharp pins, four buttons.

Second admission.—Twelve large and small tunic buttons and broken pieces of a safety razor blade.

Third admission.—Thirty-three short lengths of twisted wire.

The above mentioned patient was treated with Normacol and passed all the objects without difficulty or untoward symptoms.

4. *Foreign Body in Rectum.*—A round 14 oz. bottle was in the rectum of a man. The anus was so patulous that under low spinal Anaesthesia low midwifery forceps could be applied over the shoulder of the bottle. However, delivery could not be effected till the left levator ani muscle had been cut across. Wound was sutured and healed with perfect control of bowel.

5. *Rupture of the Kidney*.—A girl aged 11. She was kicked by her horse in the right abdomen and on observation there was a rising pulse rate and increase of pain. Initially there was haematuria which had almost disappeared in 24 hours. Tenderness was general and more marked on the right side of the abdomen and right loin. Laparotomy was decided upon and a small rupture of the liver sutured. There was marked subserous haemorrhage around the ascending colon which was contused. In the right paracolic fossa a large haematoma was seen shining through the peritoneum. It was opened and the kidney was found to be torn completely into two halves. The vessels and ureter were tied and the kidney removed. The kidney fossa was drained. On the 6th day the stomach became dilated and there was copious vomiting, while the pulse and temperature rose. The wound was re-opened and an abscess found in the kidney fossa, which despite drainage had apparently become infected from the overlying contused ascending colon. The extra-peritoneal portion of the duodenum (2nd and 3rd parts) which is normally in relation with the R. Kidney was traversing this abscess. It was red, inflamed and dilated, being in a state of paralytic ileus; this was the cause of the dilatation of the stomach and the vomiting. The abscess was drained after which recovery was rapid. This case was treated in British Families Hospital, Nowshera.

6. *Liver abscess*.—A patient with clinical symptoms of liver abscess and a history of dysentery in Egypt two years previously was admitted to the British Military Hospital, Trimulgherry off the troop train from Bombay. A full course of emetine was tried without any response. Aspiration of the right lobe of the liver yielded thick pus. Two inches of the tenth rib were resected and the abscess cavity drained by the transpleural route. The pus on laboratory examination revealed a pure culture of staphylococcus. Recovery slow but uneventful. X-Ray examination revealed a chronic cholecystitis and it is possible that the abscess was secondary to a gall bladder infection.

7. *Branchiogenic Carcinoma*.—(Lateral cervical Neoplasm). This occurred in the rare supraclavicular position, and was of cystic type with malignant degeneration of squamous carcinoma.

Operation.—Excision *en masse* from posterior triangle, including a wide area of skin and a portion of sterno-mastoid muscle. The main area of malignancy appeared to be anteriorly, invading sterno-mastoid muscle, and skin. The deep portion was separated through cellular tissue planes from floor of triangle and from carotid sheath medically. No lymphatic metastases.

Total capacity about $1\frac{1}{2}$ times a tennis ball.

Disposal.—Invalided to allow palliative deep X-Ray Therapy.

In view of its rarity the tissue is being submitted for independent pathological study for confirmation of diagnosis with a view to publication.

Radiology.

32.

TABLE NO. 31.

No. of patients examined	{	British	13,152		
		Indian	8,593		
		Civilian	1,702		
No. and nature of examinations carried out.	{	Bones and Joints	{	Injury	14,651
				Disease	2,067
				Sinuses	861
			Teeth	993	
			Lungs	2,412	
			Heart	152	
		{	Gastro intestinal	575	
			Liver and gall bladder	370	
			Urinary tract	785	
		{	Genital tract	84	
			Miscellaneous	427	
			Foreign body	61	
			Pregnancy	67	
Number in which a contrast medium was used and nature of medium.	{	Barium	645		
		Shadacol	124		
		Uro-selectan B and lipiodol	99		
Miscellaneous information	{	No. of ordinary films used	34,070		
		No. of dental films	3,535		
		No. of exposures	47,607		
		No. of prints	114		
		No. of screen examinations	863		

Dental treatment.

33. Dental officers unanimously express their appreciation of the helpful assistance of officers commanding hospitals and the valued co-operation received from medical officers. X-Ray facilities have enabled many obscure oral conditions to be diagnosed speedily with a consequent celerity of the alleviation of pain and cure.

A number of officers report the success of "Evipan" as an anaesthetic for multiple extractions of teeth and advocate it as a valuable addition to the anaesthetics for dental operations.

All dental officers are agreed that the provision of electric dental engines would considerably increase the efficiency of the dental services in this country. The cost of this item scarcely allows of purchase from contingent allowances of dental officers.

Figures relative to dental treatment in India are given in Table No. 32.

TABLE No. 32.

India.	Men inspected.		Men selected for treatment.				Men whose treatment has been completed		Anaesthetics.		Teeth conserved.		Scalings completed.	Gingivitis or stomatitis treatments completed.	Supplied with new dentures.	Dentures supplied.	Dentures remodelled.	Dentures repaired.	Appliances for jaw injuries fitted.
	Trained soldiers.	Recruits.	Trained soldiers.	Recruits.	Trained soldiers.	Recruits.	Teeth extracted.	Local.	General.	Without root treatment.	With root treatment.								
British other ranks	33,936	...	20,584	...	18,939	...	15,185	13,278	194	39,315	77	3,498	551	455	534	313	169	18	
Officers . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Families of B. O. Rs.	2,044	...	2,036	...	1,963	...	3,183	1,503	376	1,562	6	219	33	6	9	...	...	...
Royal Air Force other ranks	1,206	...	657	...	635	...	285	251	6	1,430	6	106	15	15	19	18	9	...	
Officers	51	...	51	...	43	...	2	2	...	137	...	16	1	...	...	...	...	...
Royal Navy Ratings . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Indian Other Ranks	140	...	138	...	124	...	253	174	7	24	1	11	8	11	18	...	1	4	
Total	37,377	...	23,466	...	21,704	...	18,908	15,208	583	42,468	90	3,850	608	487	580	331	179	22	

SECTION II.

ON THE HEALTH OF THE INDIAN ARMY FOR THE YEAR 1935.

(From Director, Medical Services in India.)

General.

34. TABLE A.

	Average strength.	Admissions.		Deaths.		Invalids sent to United Kingdom.		Invalids discharged in India.		Average constantly sick.	
		No.	Ratio	No.	Ratio	No.	Ratio	No.	Ratio	No.	Ratio
			per 1,000.		per 1,000.		per 1,000.		per 1,000.		per 1,000.
Officers	2,053	712	346·8	15	7·31	14	6·82	...	...	21·16	11·77
Indian Ranks	116,984	49,452	422·7	252	2·15	...	...	648	5·54	1,837·30	15·71
Followers	26,055	7,893	302·9	95	3·65	...	...	120	4·61	279·64	10·73
Others*	...	1,859	...	14	...	...	...	74	...	...	...

The health statistics of officers and Indian ranks for the quinquennial period 1925-29 with those for 1930, 1931, 1932, 1933, 1934 and 1935 are given separately in the following table for purposes of comparison.

TABLE B.

Period.	Ratio per 1,000.					
	Admissions.		Invalids.		Deaths	
	King's Commissioned officers.	Indian ranks.	King's Commissioned officers.	Indian ranks.	King's Commissioned officers.	Indian ranks.
1925-29	498·0	385·6	5·22	10·80	4·74	3·43
1930	313·7	417·9	16·42	6·23	5·47	3·16
1931	367·4	451·3	14·73	8·73	5·52	2·96
1932	321·8	429·8	11·95	6·47	6·90	2·52
1933	345·5	510·9	16·41	5·68	4·69	2·39
1934	335·2	456·8	2·86	5·62	4·29	2·10
1935	346·8	422·7	6·82	5·54	7·31	2·15

Officers.

35. The admission rate of officers sick in hospital for 1935 is 346·8 per 1,000 of strength as compared with 335·2 in 1934.

* Includes Reservists, Indian Territorial Forces, Royal Indian Marine, Indian States, Forces, B. A. F., Civilians and Pensioners.

The principal causes of sickness were:—

TABLE C.

Diseases.	Actuals.	Ratio per 1,000.	Increase or decrease as compared with 1934.	
			Increase.	Decrease.
Local injuries	104	50·7	4·4	..
Digestive diseases other than tonsillitis, appendicitis and diarrhoea	93	45·3	..	2·9
Malaria	82	39·9	2·2	..
Minor septic diseases	56	27·3	6·3	..
Dysentery	36	17·5	..	5·4
Ear and nose	33	16·1	..	0·1
Tonsillitis	32	15·6	..	1·6
Respiratory diseases	30	14·6	3·2	..
Diseases of bones, joints, muscles, fasciae and bursae	29	14·1	0·3	..
Diarrhoea	25	12·2	1·7	..

There were 15 deaths of which 4 were due to injuries, and 9 to other diseases (septicaemia 2, malaria, poliomyelitis, encephalo-myelitis, fatty degeneration of myocardium, agranulocytosis, angina-pectoris and carcinoma Pylorus 1 each).

Soldiers.

36. 49,452 or 422·7 per 1,000 of the strength, were admitted to hospital, compared with 456·8 in 1934. There is thus a decrease of 34·1 per 1,000 compared with the 1934 figures.

The principal causes of admissions to hospital were:—

TABLE D.

Diseases.	Actuals.	Ratio per 1,000.	Increase or decrease as compared with 1934.	
			Increase.	Decrease
Malaria	14,728	125·9	..	30·6
Local injuries	6,209	53·1	4·1	..
Minor septic diseases	4,127	35·3	0·7	..
Pharyngitis	1,926	16·5	..	5·1
Dysentery	1,424	12·2	..	1·7
Bronchitis	1,320	11·3	..	3·0
Venereal diseases	1,186	10·1	0·5	..
Scabies	1,126	9·6	..	1·5
Sandfly fever	882	7·5	..	0·8
Ankylostomiasis	846	7·2	4·0	..
Mumps	799	6·8	..	1·3
Conjunctivitis	752	6·4	..	0·1
Common cold	675	5·8	1·0	..

TABLE D—Contd.

Diseases.	Actuals.	Ratio per 1000.	Increase or decrease as compared with 1934.	
			Increase.	Decrease.
Diarrhoea	651	5·6	..	0·7
Influenza	635	5·4	..	5·1
Tonsillitis	609	5·2	..	0·2
Pneumonia (lobar and lobular)	576	4·9	..	1·1
Indigestion	428	3·7	..	0·1
Dengue	395	3·4	0·9	..
Constipation	377	3·2	..	..
Synovitis	361	3·1	..	0·1
Coryza	339	2·9	1·2	..
Otitis media	317	2·7	0·3	..
Dermatitis	302	2·6	..	0·4
Jaundice	295	2·5	..	0·2
Myalgia	292	2·5	0·3	..
Rhinitis	278	2·4	..	4·0
Ring worm	285	2·4	0·1	..
Measles	260	2·2	0·1	..
Eczema	237	2·0	..	0·3
Trachoma	237	2·0	0·5	..
Pleurisy	221	1·9	0·1	..
Pulmonary tuberculosis	219	1·9	0·1	..
Dracontiasis	202	1·7	..	0·2
Appendicitis	189	1·6	..	..
Piles	177	1·5	..	0·2
Enteric group of fevers	166	1·4	..	0·5
Chicken-pox	148	1·3	0·3	..
Keratitis ulcerative	136	1·2	..	0·2
Colic	136	1·2	..	..

The death rate shows an increase of 0·05 per 1,000 from 2·10 in 1934 to 2·15 in 1935.

The main causes of deaths were:—

Diseases.	Actuals.	Ratio per 1,000.	Increase or decrease as compared with 1934.	
			Increase.	Decrease.
Pneumonia (Lobar and lobular)	60	0·51	0·02	..
Local injuries	39	0·33	..	0·04
General injuries	25	0·21	0·16	..
Pulmonary tuberculosis	15	0·13	0·06	..
Circulatory diseases	14	0·12	..	..
Digestive diseases	13	0·11	..	0·11
Enteric group of fevers	13	0·11	..	0·02
Malaria	9	0·08	0·03	..
Nervous diseases	8	0·07	..	..
Meningococcal infection	7	0·06	..	0·07
Tuberculosis (other than pulmonary)	7	0·06	0·02	..
Septicaemia	4	0·03	0·01	..
Poisons	4	0·03	0·02	..

Invalids.—There were 648 or 5·54 per 1,000 invalids discharged during the year, this is 0·08 per 1,000 less than in 1934.

TABLE F.

Principal causes of invaliding.

Diseases.	Actuals.	Ratio per 1,000.	Increase or decrease as compared with 1934.	
			Increase.	Decrease.
Pulmonary tuberculosis	194	1·66	0·05	..
Injuries	106	0·85	0·06	..
Diseases of the nervous system	40	0·34	..	..
Diseases of the eye	38	0·32	..	0·02
Diseases of bones, joints, muscles, fasciae and bursae	34	0·29	..	0·10
Respiratory diseases	33	0·28	0·04	..
Mental diseases	30	0·26	..	0·08
Circulatory diseases	27	0·23	..	0·04
Digestive diseases	26	0·22	0·09	—
Other tubercular diseases	25	0·21	..	0·05
Diseases of ear and nose	19	0·16	0·01	..
Leprosy	13	0·11	0·06	..
Diseases of urinary organs	9	0·08	0·05	..
Venereal diseases	7	0·06	..	..
Diseases of blood	6	0·05	..	0·01
Diseases of lymphatic system	5	0·04	..	0·01

The average number constantly sick in hospital was 1837·30 or 15·71 per 1,000 of the strength, compared with 16·14 in 1934.

The average sick time to each soldier was 5·73 days, and the average duration of each case 13·56 days; the corresponding figures were 5·97 and 12·89 in 1934.

144,262 men, or 1233·2 per 1,000 of the strength, were treated as out patients compared with 1325·6 per 1,000 in 1934. The average daily number under treatment in barracks was 2029·79 or 17·35 per 1,000 compared with 18·32 per 1,000 in 1934.

The combined ratio constantly sick in hospital and under treatment as out-patients was 33·06 per 1,000 of the strength, compared with 34·46 in 1934.

The above represents a loss of 670,614 men days in hospital and 740,873 men days treated in barracks or a total loss of 1,411,487 men days in the year.

TABLE

Table showing admission and death ratios per 1,000 of the strength for all causes and certain Stations with *total* admission ratios, all causes, higher than all-India.

Stations.	Bannu.	Wana.	Delhi.	Jhelum.	Dehra Dun.	Fort Sandeman.	Nowshera.	Quetta.	All India.
Strength	2,024	3,198	2,088	2,254	2,734	2,111	2,95	7,015	116,984
All causes	{ A. 841.8 D. 2.96 Av.C.S. 23.87	{ 729.5 2.81 20.71	{ 571.8 1.92 17.13	{ 535.9 1.77 15.81	{ 478.1 1.46 25.31	{ 465.7 1.89 10.46	{ 438.5 2.37 15.39	{ 428.5 2.57 19.42	{ 422.7 2.15 15.71
Analysis of the above <i>total</i> admission rates.									
Malaria	{ A. 155.1 D.	{ 436.5 0.31	{ 135.5 0.96	{ 239.1	{ 105.7	{ 243.5 0.47	{ 98.5	{ 180.8	{ 125.9 0.08
Sand-fly fever	{ A. 50.9 D.	{ 0.06	{	{ 9.3	{ 1.1	{ 7.1	{ 4.4	{ 0.1	{ 7.5
Enteric group	{ A. 2.0 D.	{ 0.3	{ 0.5	{ 1.3 0.44	{ 1.1	{ 0.5	{ 3.0	{ 1.7 0.14	{ 1.4 0.11
Dysentery	{ A. 16.4 D.	{ 7.9	{ 12.0	{ 20.9	{ 12.9	{ 2.4	{ 12.2	{ 14.3	{ 12.2 0.02
Diarrhoea	{ A. 10.9 D.	{ 10.9	{ 6.2	{ 4.4	{	{ 11.4	{ 8.1	{ 3.1	{ 5.6
Influenza	{ A. 3.0 D.	{ 0.9	{	{	{ 0.37	{	{ 6.1	{ 8.0 0.14	{ 5.4 0.03
Pneumonia lobar & lobular	{ A. 5.9 D. 0.49	{ 5.0 0.94	{ 7.2 0.48	{ 6.2	{ 7.7 0.37	{ 5.7 0.95	{ 3.7 0.34	{ 6.3 1.00	{ 4.9 0.51
Venereal diseases	{ A. 10.4 D.	{ 6.6	{ 14.8	{ 5.8	{ 16.5	{ 3.8	{ 6.4	{ 6.4	{ 10.1 0.01
Minor septic diseases	{ A. 67.7 D.	{ 32.5	{ 63.7	{ 19.5	{ 43.5	{ 21.8	{ 31.5	{ 17.5	{ 35.3 0.01
Local injuries	{ A. 84.5 D.	{ 71.6 0.6	{ 85.2 0.48	{ 39.9	{ 81.6	{ 49.7 0.47	{ 84.0 0.68	{ 36.9 0.43	{ 53.1 0.33
Heat-stroke	{ A. D.	{	{	{	{	{	{	{	{ 0.0 0.01
Heat-exhaustion	{ A. D.	{	{	{	{	{	{ 0.7	{	{ 0.1
Ankylostomiasis	{ A. 12.4 D.	{ 4.4	{	{ 6.7	{ 16.8	{ 1.4	{ 6.1	{ 6.9	{ 7.2
Pulmonary tuberculosis	{ A. 5.4 D.	{ 2.2 0.31	{ 2.9	{ 3.1	{ 2.9	{ 1.9	{ 2.0 0.68	{ 1.0	{ 1.9 0.13

G.

important diseases for stations with a strength of 2,000 and upwards compared with all-India.

Stations with *total* admission ratios, all causes, lower than all-India.

Banga- lore.	Abbot- tabad.	Trimul- gherry.	Pesha- war.	Rawal- pindi.	Lahore.	Meerut.	Kohat.	Jubbul- pore.	Ambala.	Sial- kot.	Poona.	Rax- mak.
2,598	4,000	3,117	5,186	4,240	2,336	2,342	4,178	2,183	2,291	2,032	3,816	4,657
406.9	406.5	390.8	389.1	376.2	370.7	359.0	358.5	357.3	347.4	341.5	324.4	311.6
2.69	3.60	2.57	1.16	1.42	3.0	3.84	1.91	1.37	1.31	2.46	1.05	2.58
19.80	12.64	13.79	14.84	16.03	14.70	18.05	12.37	13.90	14.62	15.48	13.40	14.97

Analysis of the above *total* admission rates.

26.9	68.0	18.9	148.1	84.9	69.8	91.4	143.8	72.4	90.4	32.0	88.6	57.8
...	..	...	15.2	14.9	6.8	0.4	10.8	...	1.3	5.4	..	0.21
0.4	0.7	1.6	1.6	2.0	3.0	3.0	0.8	0.5	0.8	...	0.9	1.9
0.38	0.25	0.32	0.19	...	...	0.85	...	...	...	...	...	0.43
9.7	3.4	21.2	21.4	19.8	9.0	20.2	16.9	24.8	7.0	3.9	13.2	6.4
9.2	0.25	...	6.4	5.9	9.0	3.0	8.6	6.9	4.4	9.8	2.1	5.2
27.3	...	2.2	0.2	...	8.1	0.9	...	...	0.9	3.4	2.1	0.6
...
3.5	5.0	2.9	6.4	4.7	7.7	10.3	3.8	0.9	2.2	4.9	5.5	5.4
0.38	0.75	0.96	0.39	0.47	1.71	0.85	0.72	...	0.44	1.48	0.52	1.07
14.6	3.7	6.1	10.4	8.3	5.6	14.5	6.9	2.3	5.2	8.9	11.8	10.5
83.9	53.7	28.6	22.0	28.1	59.5	25.6	26.8	49.9	36.2	36.4	81.4	27.3
...	0.25	...	...	...	...	...	...	...	...	...	...	...
91.2	50.7	75.1	33.6	46.5	67.6	59.8	31.4	60.5	51.5	82.7	8.7	57.1
...	...	0.64	0.19	...	...	0.85	0.48	0.46	...	0.98	...	...
...
...	...	...	...	...	...	...	...	...	...	...	0.3	...
...
0.4	6.0	112.6	4.4	6.8	2.1	1.3	1.7	6.0	12.2	0.5	2.1	4.3
...
0.8	2.75	0.6	1.3	1.4	1.3	1.3	1.9	1.3	2.6	1.5	1.1	1.6
...	0.50	...	...	...	...	...	...	...	0.41	...	...	...

The statistics as a whole show that the health of the Indian Army was very good.

Admissions to hospital for Indian ranks were 34·1 per 1,000 less than last year and are the lowest since 1930.— The invaliding rate and the death rate are practically the same.

PRINCIPAL DISEASES AFFECTING THE INDIAN ARMY.

Cerebro-spinal Meningitis.

37. The incidence during the year was as follows :—

	Cases.	Deaths.	Case mortality per cent.
Indian Troops (Regular)	19	7	37
Indian Troops (Territorial)	6	1	17
Followers	9	6	67
Pupils, K. G. R. I. M. School, Ajmer	4	1	25
	<u>38</u>	<u>15</u>	<u>39</u>

Comparative figures for the last five years will be found in Table No. 4 on page 6 in the Section of the report dealing with British Troops.

The seasonal and geographical distribution of the total Indian cases were :—

January—

Jhelum	1
Abbottabad	4
Karachi	1
Rawalpindi	1
Nasirabad	1
Banna	1
Meerut	6
Total	<u>15</u>

February—

Abbottabad	2
Jullundur	2
Campbellpore	1
Wana	1
Razmak	1
Comilla	1
Total	<u>8</u>

March—

Lahore	:	:	:	:	:	:	:	1
Jullundur	:	:	:	:	:	:	:	1
Bangalore	:	:	:	:	:	:	:	1
Total								3

May—

K. G. R. I. M. School, Ajmer	.	.	.	.	.	.	.	4
Total								4

June—

Quetta	.	.	.	.	.	.	.	1
Total								1

July—

Quetta	.	.	.	.	.	.	.	1
Total								1

October—

Jhansi	.	.	.	.	.	.	.	1
Lahore	.	.	.	.	.	.	.	1
Peshawar	.	.	.	.	.	.	.	1
Total								3

December—

Sialkot	.	.	.	.	.	.	.	1
Cawnpore	.	.	.	.	.	.	.	1
Meerut	.	.	.	.	.	.	.	1
Total								3

GRAND TOTAL . **38**

The age incidence was chiefly between 18 and 20 years and only 2 cases occurred in persons over 30 years of age. Out of the 19 cases in Indian Regular units 12 were recruits.

Dengue.

38,395 cases were admitted for this disease giving a ratio of 3.4 per 1,000 compared with 2.5 in 1934. The stations principally affected were:—

	Actuals.	Ratio per 1,000.		Actuals.	Ratio per 1,000.
Madras	209	398.9			
Mandalay	76	90.3	Mingaladon	64	84.1

No cases occurred in Karachi and this is of interest in view of the importance placed on prevention of yellow fever entering Karachi Airport from Africa.

Typhus Fever.

39. There were 45 cases among Indian ranks and the distribution and type are given below :—

TABLE H.

Command and Stations.	OX 19	OX 2	OX K	OX M	Total
<i>Northern Command—</i>					
Rawalpindi	4	1	..	..	5
Lahore	1	..	..	..	1
<i>Western Command—</i>					
Quetta	4	..	..	..	4
Chaman	1	..	..	..	1
<i>Eastern Command—</i>					
Bareilly	1	..	..	..	1
Meerut . . . . .	..	1	..	..	1
Fatehgarh	1	..	..	..	1
Calcutta	1	..	..	..	1
<i>Southern Command—</i>					
Bangalore	9	1	..	..	10
Secunderabad	3	3	1	1	8
Jubbulpore . . . . .	..	3	1	..	4
Aurangabad	1	..	..	..	1
Poona . . . . .	..	2	..	..	2
Baroda . . . . .	..	1	..	..	1
Madras	1	..	..	..	1
<i>Burma—</i>					
Maymyo . . . . .	..	..	3	..	3
	27	12	5	1	45

Except in Southern Command where cases occurred all the year round the seasonal incidence was chiefly during the monsoon season.

This disease is dealt with in greater detail in the Section of the report on British Troops.

Sandfly Fever.

40. There were 882 cases in 1935 compared with 970 in 1934, thus giving ratios per 1,000 of 7·5 and 8·3 respectively.

The incidence was chiefly among the troops in Peshawar District, Waziristan District, Kohat District, Rawalpindi District, Lahore District, Zhob (I) Brigade Area and Lucknow District with ratios per 1,000 of 29·7, 11·5, 9·0, 8·1, 7·5, 7·2, and 6·4 respectively.

Dysentery, Diarrhoea and Colitis.

41.

TABLE I.

Years.	Dysentery.		Diarrhoea.		Colitis.		Total.	
	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.
1933	1,804	15·3	933	7·9	30	0·3	2,767	23·5
1934	1,632	13·9	742	6·3	28	0·2	2,402	20·5
1935	1,424	12·2	651	5·6	21	0·2	2,096	17·9

The admissions for different types of dysentery are given below and the percentage of each type remains very much the same as in 1934.

	Actual admissions.	Percentage.
Dysentery protozoal	50	3.51
Dysentery bacillary (proved bacteriologically)	592	41.57
Dysentery bacillary exudate (no dysentery bacilli isolated)	407	28.58
Dysentery clinical	375	26.33

Only two deaths occurred in the 1,424 dysentery cases, thus giving a case mortality of 0.14 per cent. In 1934 there were 6 deaths in 1,632 cases and a case mortality of 0.36 per cent. The distribution of dysentery by Commands is given below :—

TABLE J.

	Dysentery. (Ratio per 1,000).			
	Amoebic.	Bacillary (bacteriologically proven).	Bacillary exudate.	Clinical.
Northern Command	0.3	4.0	3.4	4.1
Western Command	0.4	3.3	1.6	4.2
Eastern Command	0.6	5.5	2.8	2.6
Southern Command	0.2	7.5	4.7	0.6
Burma District	2.3	7.8	6.9	3.3

Enteric Group of Fevers.

42. The comparative incidence of the enteric group of fevers among British and Indian Troops during the past three years is given in the Section of the report dealing with British Troops where these diseases are dealt with at length.

Among Indian Troops in 1935 the admission rate was 1.4 per 1,000 as compared with 1.9 per 1,000 in 1934, there being actually 58 less cases in 1935 than in 1934.

Out of the total of 166 cases there were 13 deaths representing a case mortality of 7.8 per cent. In 1934 there were 15 deaths in 224 cases giving a case mortality of 6.7 per cent.

The inoculation state of the troops is satisfactory, the figures for the last half yearly inoculation in September being :—

TABLE K.

	British officers.	Indian other ranks.	Followers.
Strength	1,758	115,387	23,728
Protected	1,679	114,060	23,560
Unprotected percentage	79	1,327	168
Protected	95.5	98.8	99.2

The relative incidence, deaths and case mortality among protected and unprotected I. O. Rs. were:—

TABLE L.

	Actuals.		Ratio per 1,000		Case mortality per cent.
	Cases.	Deaths.	Cases.	Deaths.	
Protected	151	11	1.30	0.09	7.28
Unprotected	16	2	8.56	1.07	12.50

Malaria.

43. There were 14,728 cases of malaria with 9 deaths in 1935 compared with 18,353 cases and 6 deaths in 1934. The ratios per 1,000 during the last five years were:—

TABLE M.

	1931.	1932.	1933.	1934.	1935.
Admissions	149.4	145.1	212.2	156.5	125.9
Deaths	0.10	0.10	0.08	0.05	0.08
Invalids	0.08	0.07	0.05	0.06	0.03

The following table shows the incidence of the various types of malaria by Commands:—

TABLE N.

Commands & Independent Districts.	Admissions and Deaths.								
	Actuals.				Ratio per 1,000.				
	B. T.	M. T.	Qtn.	Clin.	B. T.	M. T.	Qtn.	Clin.	
Northern	A.	4,418	2,352	9	724	80.0	42.6	0.2	13.1
	D.	..	2	..	..	..	0.04	..	..
Western	A.	1,630	559	1	154	120.9	41.5	0.1	11.4
	D.	..	2	..	..	..	0.15	..	..
Eastern	A.	1,607	672	10	291	61.3	25.6	0.4	11.1
	D.	..	1	..	..	..	0.04	..	..
Southern.	A.	902	742	16	23	42.1	34.6	0.7	1.1
	D.	..	..	..	..	..	..	..	..
Burma	A.	165	201	3	34	53.9	65.7	1.0	11.1
	D.	..	1	..	..	..	0.33	..	..
All India	A.	8,722	4,526	39	1,226	74.6	38.7	0.3	10.5
	D.	..	6	..	..	..	0.05	..	..

The stations with an average annual strength of over 1,000 in which malaria admissions exceeded 100 per 1,000 were:—

Wana	436·5	Jullundur	153·6
Mardan	252·4	Peshawar	148·1
Fort Sandeman	243·5	Kohat	143·8
Jhelum	239·1	Delhi	135·5
Lansdowne	187·6	Chaman	122·4
Maymyo	182·4	Ferozepore	107·7
Quetta	180·8	Dehra Dun	105·7
Bannu	155·1		

The stations with an average strength of over 500 and under 1,000 in which malaria admissions exceeded 100 per 1,000 were:—

Neemuch	368·3	Nasirabad	164·2
Loralai	276·1	Mir Ali	154·6
Shagai	274·2	Malakand	154·1
Thal	254·7	Almora	143·6
Jhansi	247·1	Muttra	134·9
Bombay	219·0	Comilla	126·0
Dharamsala	209·2	Mandalay	121·1
Chittagong	206·3	Mhow	115·2
Ahmedabad	205·6	Manzai	113·6
Fatehgarh	187·9	Said Pur	109·2
Bakloh	174·4	Saugar	104·6

During the Mohmand Operations 1935 the malaria admissions for Indian troops and followers were 119·9 and 133·4 per 1,000 of strength respectively.

Treatment and prevention of malaria are dealt with in the Section of the report on British Troops.

Pneumonia.

44.

TABLE O.

Years.	Admissions.		Deaths.	
	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.
1931	1,078	8·7	132	1·06
1932	961	7·9	97	0·80
1933	730	6·2	89	0·76
1934	704	6·0	58	0·49
1935	576	4·9	60	0·51

Of the 576 cases admitted 472 were lobar and 104 lobular in type. The case mortality of the two types were 9·96 and 12·50 per cent. respectively.

The incidence by Commands was:—

	Ratio per 1,000
Northern Command	5·1
Western	5·5
Eastern	5·3
Southern	3·1
Burma District	4·9

Pyrexia of uncertain origin.

45. 11 cases were included under this head giving a ratio of 0·1 per 1,000 as in 1934.

Small-pox.

46. There were 22 admissions with 3 deaths giving a ratio per 1,000 of 0·2 and 0·03 respectively. This is practically the same as in 1934.

Ten of the cases occurred during March, April and May and the other cases were spread evenly over the remaining months. The high incidence in the U. P. noted among British Troops was not seen among Indian troops of which only 8 out of the 22 cases occurred in the U. P.

Tuberculosis.

47. Pulmonary tuberculosis caused 219 admissions with 15 deaths and 194 invalids giving ratios per 1,000 of 1·9, 0·13 and 1·6, respectively.

There were 56 admissions for tuberculosis of other organs with 8 deaths and 25 invalids giving ratios per 1,000 of 0·5, 0·07 and 0·21 respectively. Tuberculosis of various abdominal organs produced 11 admissions.

Venereal Diseases.

48. This group accounted for 1,186 admissions, giving a ratio per 1,000 of 10·1 which was 0·5 per 1,000 more than in 1934.

TABLE P.

Diseases.	Admissions.		Percentage.	
	1933.	1934.	Increase.	Decrease.
Gonorrhœa	491	543	10·59	..
Syphilis	409	433	5·87	..
Soft chancre	229	210	..	8·30

Other Diseases due to Infection or Infestation.

49. There were 5,501 admissions under this heading. The most important diseases in this group were :—

Scabies	1,126	Rheumatic fever	96
Ankylostomiasis	846	Intestinal taeniasis	89
Mumps	799	Oriental sore	67
Common Cold	675	Filariasis	62
Influenza	535	Typhus fever	45
Measles	260	Kala azar	19
Jaundice catarrhal	218	Leprosy	10
Dracontiasis	202	Septicæmia	8
Chicken Pox	148	Relapsing fever	6
Ascariasis	126	Diphtheria	3

Diseases of the Circulatory System.

50. Circulatory diseases caused 102 admissions to hospital of which the majority were D. A. H. The ratio per 1,000 for admissions was 0·9 which was the same as in 1934.

There were 13 deaths from this group of diseases giving a ratio per 1,000 of 0·11, the same as in 1934.

Diseases of Respiratory System.

51. The admissions for diseases of the respiratory system exclusive of pneumonia and tuberculosis, totalled 1,745 giving a ratio of 14·9 per 1,000. Of these 1,320 or 75 per cent. were due to bronchitis. There were 2 deaths and 33 cases were invalided. The ratio per 1,000 for bronchitis was 11·3 which was 3 per 1,000 less than in 1934.

The other important diseases in the group were pleurisy 221, laryngitis 106 and asthma 76.

Diseases of the Digestive System.

52. There were 5,217 admissions for the diseases of the digestive system with 13 deaths and 26 invalids, the ratios per 1,000 being admissions 44·6, deaths 0·11 and invalids 0·22 respectively.

The most important diseases in this group were :—

TABLE Q.

	Admissions.	Deaths.	Invalids.
Pharyngitis	1,926	..	..
Diarrhœa	651	..	..
Tonsillitis	609	..	3
Indigestion	428	..	1
Constipation	377	..	..
Appendicitis	189	3	3
Hæmorrhoids	177	..	..
Colic	136	..	..
Gastritis	101	1	1
Jaundice	77	..	..
Hepatitis	60	..	2

In addition to the above there were 111 cases of hernia with 1 death and 6 invalids.

Minor Septic Diseases.

53. This group produced 4,127 admissions giving a ratio of 35·3 per 1,000 of strength. Included in the group were :—

Cellulitis	2,701
Boils	692
Abscess	411
Inflammation of lymphatic glands and vessels	166

Local Injuries.

54. There were 6,209 admissions in this group. The ratio per 1,000 was 53.1 compared with 49.0 in 1934.

Followers.

55. The total admissions 7,893 or 302.9 per 1,000 of the strength compared with 287.6 in 1934.

The table below gives figures for certain endemic and infectious diseases amongst followers :—

TABLE R.

	Admissions.			Admissions.	
	Actuals.	Ratio per 1,000.		Actuals.	Ratio per 1,000.
Malaria	2,778	106.6	Sandfly fever	110	4.2
Venereal diseases*	269	10.3	Scabies	105	4.0
Pneumonia	195	7.5	Pulmonary tuberculosis	42	1.6
Dysentery	192	7.4	Dengue	40	1.5
Influenza	127	4.9	Enteric group of fevers	22	0.8
Diarrhoea	110	4.2	Small-pox	8	0.3

There were 95 deaths with a ratio of 3.65 per 1,000 of strength.

The principal causes of death were :—

TABLE S.

	Actuals.	Ratio per 1,000.		Actuals.	Ratio per 1,000.
Pneumonia	32	1.23	Other respiratory diseases	6	0.23
Digestive diseases	10	0.38	Injuries	4	0.15
Other infectious diseases	8	0.31	Poisons	3	0.12
Nervous diseases	7	0.27	Pulmonary tuberculosis	2	0.08
Circulatory diseases	7	0.27			

Recruiting.

56. The total number of recruits examined at Recruiting Centres in the year ending the 31st March 1936, was 24,747; of these 8,907 were rejected, a percentage of 35.99. The percentage of rejections for the year 1934-35 was 35.55.

*Gonorrhoea 117, Syphilis 108 and Soft chancre 44.

The principal causes of rejection of recruits for the year ending 31st March 1936 were as follows :—

Disability.	No. of men rejected as unfit for enrolment out of 24,747 presented at recruiting centres only.		No. of recruits found unfit during training: out of 13,126 enrolled (11,823 recruits enrolled at recruiting centres and 1,303 at unit headquarters).	
	Actuals.	Percentage.	Actuals.	Percentage.
Malaria (enlarged spleen)	648	2·62	6	0·05
Tuberculosis (pulmonary)	176	0·71	9	0·07
Tuberculosis (other organs)	7	0·03	..	..
Venereal diseases	419	1·69	5	0·04
Other diseases due to infection	105	0·42	8	0·06
Diseases of the nervous system	62	0·25	20	0·15
Defective vision	455	1·84	13	0·10
Trachoma	691	2·79	4	0·03
Other eye affections	248	1·00	10	0·08
Otitis media	437	1·77	4	0·03
Defective hearing	19	0·08	8	0·06
Other ear diseases	245	0·99	1	0·01
Diseases of nose and throat	161	0·65	4	0·03
Valvular disease of the heart	392	1·58	..	..
Disordered action of heart	734	2·97	..	..
Varicose veins	269	1·09	2	0·02
Hæmorrhoids	215	0·87	..	..
Varicocele	210	0·85	..	..
Other diseases of circulatory system	26	0·11	..	..
Anæmia	193	0·78	3	0·02
Goitre	353	1·43	1	0·01
Respiratory diseases excluding tuberculosis	31	0·13	4	0·03
Pyorrhœa	275	1·11	..	..
Loss or decay of teeth	41	0·17	..	..
Hernia	363	1·47	2	0·02
Other diseases of digestive system	17	0·07	4	0·03
Ankylosis of joints	65	0·26	3	0·02
Flat foot	47	0·19	14	0·11
Knock knee	84	0·34	..	..
Curvature of spine	232	0·94	1	0·01
Other deformities	345	1·39	35	0·27
Skin diseases	297	1·20	4	0·03
Poor physique	199	0·80	21	0·16
Other causes	846	3·42	34	0·26
Total	8,907	35·99	220	1·68

N.B.—The figures in columns 4 and 5, and in the heading, are in respect of the following, only :—

- Cavalry.
- Infantry (excluding Gurkha Battalions).
- Artillery.
- Signals.
- Machine Gun Platoons of British Infantry.

Military Operations.

57. Indian Other Ranks.

Locality and period.	Loe Agra.		Mohmand.	
	16-2-35—13-6-35.		16-8-35—4-11-35.	
Average strength.	3,132		9,940	
Admission to hospital.	Actuals.	Ratio per 1,000.	Actuals.	Ratio per 1,000.
All causes	349	111.43	2,184	219.72
Principal causes of admissions :—				
Malaria	19	6.07	1,192	119.92
Dysentery	22	7.02	48	4.83
Minor Septic diseases	30	12.77	119	11.97
Digestive diseases;	59	18.84	268	26.96
Local injuries excluding G. S. W.	77	24.58	228	22.94
G. S. W.	13	4.15	86	8.65

The higher sick rate in the Mohmand operations may be attributed to the high incidence of malaria, due to the operations being carried out during the malaria season in country notorious for malaria. Further remarks on these operations have been included in the Section of this report dealing with British Troops.

Quetta Earthquake.

58. This has already been commented on in the Section on British Troops.

APPENDICES.

SECTION I.

BRITISH TROOPS.

TABLE A.

STATIONS BY COMMANDS AND INDEPENDENT DISTRICTS.

Stations.	Height above M.S. level in feet.	Authority for height.	Points of reference.	Stations.	Height above M.S. level in feet.	Authority for height.	Points of reference.
<i>Northern Command.</i>				<i>Eastern Command.</i>			
Abbottabad . . .	4,010	S.D.	Map.	Agra (Fort) . . .	525	S.D.	S.B.M.
Ambala . . .	902	"	S.B.M.	Allahabad & Fort . . .	314	"	"
Amritsar . . .	754	"	"	Fareilly . . .	563	"	"
Bannu . . .	1,250	"	Map.	Barrackpore . . .	24	"	"
Barian Camp and Khyragali . . .	7,133	I.B.	"	Benares . . .	256	"	"
Campbellpore . . .	1,180	S.D.	Map.	Cawnpore . . .	407	"	B.M.
Cherat . . .	4,546	"	"	Chakrata . . .	6,885	"	Map.
Dagshai . . .	6,087	"	"	Dacca . . .	20	M.D.	"
Dalhousie Convalescent Depot . . .	7,887	"	"	Dehra Dun . . .	2,232	S.D.	S.B.M.
Dera Ismail Khan . . .	568	"	S.B.M.	Delhi . . .	757	"	"
Ferozepore . . .	649	"	"	Dinapore . . .	170	"	Church.
Gharial . . .	6,811	S.G.	"	Fatehgarh . . .	467	"	"
Jhelum . . .	762	S.D.	"	Fort William . . .	17	S.G.	"
Jullundur Cantt. . .	771	"	B.M.	Fyzabad . . .	330	S.D.	S.B.M.
Jutogh . . .	6,370	"	Map.	Jhansi . . .	849	"	"
Kalabagh & Bara-gali . . .	7,963	"	"	Landour Convalescent Depot . . .	7,528	"	"
Kalabagh & Mari Indus . . .	682	"	"	Lansdowne . . .	5,823	"	Map.
Kasauli Convalescent Depot . . .	6,050	"	"	Lebong . . .	6,000	"	"
Kohat . . .	1,725	"	Map.	Lucknow Kalubir's . . .	383	"	B.M.
Khanspur and Ghora Dhaka . . .	7,721	"	"	Meerut . . .	737	"	S.B.M.
Kuldana . . .	7,049	S.G.	"	Muttra . . .	560	"	"
Lahore Cantt. and Fort . . .	706	S.D.	S.B.M.	Naini Tal . . .	6,400	"	"
Landikotal . . .	3,509	"	Map.	Ranikhet and Chaubattia . . .	5,980	"	"
Manzal . . .	1,650	"	"	Roorkee . . .	6,942	S.G.	"
Mir Ali . . .	2,240	S.G.	V.G.L.		879	S.D.	S.B.M.
Multan . . .	404	S.D.	S.B.M.	<i>Southern Command.</i>			
Murree Convalescent Depot . . .	7,073	"	Map.	Ahmedabad . . .	162	S.D.	S.B.M.
Nowshera (Rly. Station) . . .	966	"	B.M.	Ahmednagar . . .	2,180	"	Map.
Peshawar . . .	1,152	"	S.B.M.	Bangalore . . .	3,002	"	S.B.M.
Rawalpindi . . .	1,689	"	"	Baroda . . .	114	"	B.M.
Razmak . . .	6,556	"	Map.	Belgaum . . .	2,523	"	S.B.M.
Risalpur . . .	1,014	"	B.M.	Colaba (Bombay Town Hall) . . .	20	"	"
Sialkot . . .	829	"	"	Deolali . . .	1,894	"	"
Solon . . .	5,078	"	"	Jubbulpore . . .	1,320	"	"
Sargodha . . .	615	"	"	Kamptee (Rly. Station) . . .	940	"	B.M.
Sabathu . . .	4,000	"	Map.	Madras (Obsy.) . . .	250	"	"
Wana . . .	4,530	S.G.	V.G.L.	Malapuram (Rly. Station) . . .	1,380	"	"
				Mhow . . .	1,887	"	"
				Mount Abu Sanatorium . . .	3,836	"	"
				Nasirabad . . .	1,461	"	Map.
				Pachmarhi . . .	3,490	"	"
				Poona . . .	1,867	"	S.B.M.
				Purandhar . . .	4,560	"	"
				Saugor . . .	1,755	"	S.B.M.
				Se-underabad . . .	1,776	"	"
				Wellington (Stn. Hospital) . . .	5,800	"	Map.
<i>Western Command.</i>				<i>Burma Ind. District.</i>			
Fort Sandeman . . .	4,600	S.D.	Map.	Mandalay (Fort Dufferin) . . .	246	S.D.	Map.
Hyderabad . . .	93	"	S.B.M.	Maymyo . . .	3,508	"	"
Karachi (Holy Trinity Church) . . .	28	"	"	Mingaladon . . .	118	"	"
Loralai . . .	4,699	"	Map.	Port Blair (Tindal Obsy.) . . .	9	"	B.M.
Quetta . . .	5,510	"	S.B.M.				

S.D. = Survey Department.
S.B.M. = Standard Bench Mark.
B.M. = G. T. Bench Mark.
S.G. = Surveyor-General of India.
M.D. = Meteorological Department.
V.G.L. = Village ground level.

Map. = Heights taken from Topo. Maps.
I.B. = Intelligence Branch of the Division of the Chief of the Staff.

TABLE I.

WARRANT OFFICERS, N. C. OS. AND MEN.

INDIA.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1935, with ratios per 1,000 of the strength.

Diseases.	Actuals.				Ratio per 1,000.			
	Admissions.	Deaths.	Invalids sent home.	Average number constantly sick.	Admissions.	Deaths.	Invalids sent home.	Constantly sick.
Average strength 52,646.								
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.								
Common cold	342	..	..	5.97	6.5	..	..	0.11
Diphtheria	66	..	..	5.09	1.3	..	..	0.10
Dysentery	1,536	1	4	67.16	29.2	0.02	0.08	1.28
Enteric fevers (inclusive of typhoid, para. A, B and C and enteric group.)	106	9	1	14.38	2.0	0.17	0.02	0.27
Erysipelas	8	..	..	0.38	0.2	..	..	0.01
Influenza	560	..	..	15.83	10.6	..	..	0.30
Malaria	2,955	4	..	107.66	56.1	0.08	..	2.04
Measles	19	1.08	0.4	0.02
Meningococcal infection	1	0.90	0.0	0.00

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Diseases of the :-

Circulatory system.	{	Valvular diseases of the heart.	24	2	10	3.26	0.5	0.04	0.19	0.06
		Disordered action of the heart	125	1	11	6.87	2.4	0.02	0.21	0.13
		Other diseases	85	2	6	6.79	1.6	0.04	0.11	0.13
Blood and blood forming organs		273	1	3	16.46	5.2	0.02	0.06	0.31	
Ductless or endocrine glands		22	..	6	2.30	0.4	..	0.11	0.04	
Breast		11	..	..	0.25	0.2	..	..	0.00
Respiratory system.	{	Larynx and trachea	61	..	1	1.68	1.2	..	0.02	0.03
		Bronchi and bronchioles	817	1	10	30.39	15.5	0.02	0.19	0.58
		Other diseases	117	..	8	9.51	2.2	..	0.15	0.18
Teeth and gums		148	..	..	3.83	2.8	..	..	0.07
Digestive system.	{	Inflammation of tonsils	1,494	37.45	28.4	0.71
		Inflammation of pharynx	420	9.20	8.0	0.17
		Inflammation of stomach	307	..	1	12.87	5.8	..	0.02	0.24
		Gastric ulcer	19	2	3	2.16	0.4	0.04	0.06	0.04
		Duodenal ulcer	27	1	8	4.18	0.5	0.02	0.15	0.08
		Other diseases	2,680	8	8	109.85	50.9	0.15	0.15	2.09
Diseases due to disorders of nutrition or of metabolism		14	4	1	0.75	0.3	0.08	0.02	0.01	
Diseases of the :-										
Generative system		655	..	..	32.91	12.4	..	..	0.63
Bones, joints, muscles, fasciæ and bursæ		1,266	1	47	68.39	24.0	0.02	0.89	1.30	
Areolar tissue.		2,809	..	..	93.36	53.4	..	..	1.77
Skin		1,571	..	6	67.63	29.8	..	0.11	1.28	
Urinary system		285	4	17	21.44	5.4	0.08	0.32	0.41	
Injuries	{	General	137	19	3	4.37	2.6	0.36	0.06	0.08
		Local	3,275	33	30	140.74	82.2	0.63	0.57	2.67
		In action
Tumours and cysts		132	4	10	7.45	2.5	0.08	0.19	0.14	
Poisons		11	1	..	0.27	0.2	0.02	..	0.01	
No appreciable disease		149	..	..	5.69	2.8	..	..	0.11
*Suicides . . . . .		..	(9)	..	..	..	(0.17)	..	..
Total		29,858	134	363	1,407.76	567.1	2.55	6.90	26.74	

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE II.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

NORTHERN COMMAND.

Table showing the average strength, admissions into hospital, deaths and constantly sick during the year 1935 with ratios per 1,000 of the strength.

Diseases.	Actuals.			Ratio per 1,000.		
	Admissions.	Deaths.	Average number constantly sick.	Admissions.	Deaths.	Constantly sick.
Average strength 16,683.						
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.						
Common cold	96	..	1.74	5.8	..	0.10
Diphtheria	39	..	2.72	2.3	..	0.16
Dysentery	480	..	22.37	28.8	..	1.34
Enteric fever (inclusive of typhoid, para A, B and C and enteric group)	48	5	6.33	2.9	0.30	0.38
Erysipelas	6	..	0.33	0.4	..	0.02
Influenza	134	..	3.77	8.0	..	0.23
Malaria	956	..	35.07	57.3	..	2.10
Measles	4	..	0.19	0.2	..	0.01
Meningococcal infection	1	..	0.09	0.1	..	0.01
Mumps	9	..	0.35	0.5	..	0.02
Pneumonia	86	7	8.32	5.2	0.42	0.50
Pyrexia of uncertain origin	17	..	1.36	1.0	..	0.08
Rheumatic fever	20	..	2.17	1.2	..	0.13
Sandfly fever	1,387	..	27.65	83.1	..	1.66

Scarlet fever
Small-pox
Tuberculosis	{	Pulmonary	12	..	3.50	0.7	..	0.21	
		Other	.	.	.	.	4	..	1.42	0.2	..	0.09
Venereal diseases	{	Gonorrhœa	332	..	49.43	19.9	..	2.96	
		Soft chancre	.	.	.	.	58	..	7.10	3.5	..	0.43
		Syphilis	.	.	.	.	61	..	6.15	3.7	..	0.37
		Other V. D.	.	.	.	.	3	..	0.17	0.2	..	0.01
Other diseases due to infection	.	.	.	.	.	.	180	..	10.34	10.8	..	0.62
Diseases due to infestation by Metazoan parasites.	{	Scabies	.	.	.	.	26	..	0.70	1.6	..	0.04
		Other diseases.	.	.	.	.	55	..	1.62	3.3	..	0.10

OTHER DISEASES CLASSIFIED UNDER SYSTEMS.

Diseases of the nervous system	114	3	5.91	6.8	0.18	0.35
Mental diseases	36	..	8.21	2.2	..	0.49
Diseases of the eye	89	..	4.92	4.1	..	0.29
Diseases of the ear and nose	398	1	15.58	23.9	0.06	0.93
Diseases of the Circulatory system.	{	Valvular disease of the heart	6	..	0.57	0.4	..	0.03
		Disordered action of the heart	.	.	.	.	49	..	2.44	2.9	..	0.15
		Other diseases	.	.	.	.	19	..	2.16	1.1	..	0.13
Diseases of blood and blood forming organs.	.	.	.	.	.	.	67	1	3.89	4.0	0.06	0.23
Diseases of ductless or endocrine glands	.	.	.	.	.	.	11	..	1.07	0.7	..	0.06
Diseases of the breast	.	.	.	.	.	.	5	..	0.09	0.3	..	0.01
Diseases of the Respiratory system.	{	Larynx and trachea	21	..	0.56	1.5	..	0.03
		Bronchi and bronchioles	.	.	.	.	253	1	9.47	15.2	0.06	0.57
		Other diseases	.	.	.	.	34	..	3.00	2.0	..	0.18
Diseases of the teeth and gums	{	Inflammation of tonsils	.	.	.	.	513	..	12.94	30.7	..	0.78
		Inflammation of pharynx	.	.	.	.	117	..	2.65	7.0	..	0.16
Diseases of the Digestive system.	{	Inflammation of stomach	.	.	.	.	140	..	6.35	8.4	..	0.38
		Gastric ulcer	.	.	.	.	11	..	1.29	0.7	..	0.08
		Duodenal ulcer	.	.	.	.	11	..	1.34	0.7	..	0.08
		Liver diseases	.	.	.	.	21	..	1.56	1.3	..	0.09
		Other diseases	.	.	.	.	881	2	34.90	52.8	0.12	2.09

TABLE II—contd.

Diseases.	Actuals.			Ratio per 1,000.		
	Admissions.	Deaths.	Average number constantly sick.	Admissions.	Deaths.	Constantly sick.
Average strength 16,683.						
Diseases due to disorders of nutrition or of metabolism	6	1	0·15	0·4	0·06	9·01
Diseases of the generative system	174	..	8·00	10·4	..	0·48
Diseases of bones, joints, muscles, fasciæ and bursæ	430	1	20·56	25·8	0·06	1·23
Diseases of the areolar tissue	953	..	29·56	57·1	..	1·77
Diseases of the skin	456	..	19·05	27·3	..	1·14
Diseases of the urinary system	93	3	7·43	5·6	0·18	0·45
Injuries { General	65	11	2·51	3·9	0·66	0·15
Local	1,106	14	45·40	66·3	0·84	2·72
In action . . . . .	..	..	..	..	..	..
Tumours and cysts	41	1	2·13	2·5	0·06	0·13
Poisons	1	..	0·01	0·1	..	0·00
No appreciable disease	44	..	1·96	2·6	..	0·12
*Suicides . . . . .	..	(2)	..	..	(0·12)	..
Total	10,195	51	449·28	611·1	3·06	26·93

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE III.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

WESTERN COMMAND.

Table showing the Average Strength, Admissions into Hospital, Deaths, and Constantly Sick, during the year 1935, with the Ratios per 1,000 of the Strength.

Diseases.	Actuals.			Ratio per 1,000.		
	Admissions.	Deaths.	Average number constantly sick.	Admissions.	Deaths.	Constantly sick.
Average strength 3,908.						
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.						
Common cold	62	..	0.96	15.9	..	0.25
Diphtheria . . . . .	..	..	..	..	..	..
Dysentery	145	..	6.35	37.1	..	1.62
Enteric fever (inclusive of typhoid, para. A, B, and C and enteric group)	5	..	0.98	1.3	..	0.25
Erysipelas . . . . .	..	..	..	..	..	..
Influenza	44	..	1.26	11.3	..	0.32
Malaria	532	2	13.89	136.1	0.51	3.55
Measles	1	..	0.05	0.3	..	0.01
Meningococcal infection . . . . .	..	..	..	..	..	..
Mumps	2	..	0.06	0.5	..	0.02
Pneumonia	13	1	1.38	3.3	0.26	0.35
Pyrexia of uncertain origin . . . . .	..	..	..	..	..	..
Rheumatic fever	12	..	0.86	3.1	..	0.22
Sandfly fever	25	..	0.74	6.4	..	0.19

TABLE III—*contd.*

Diseases. Average Strength 3,908.		Actuals.			Ratio per 1,000.		
		Admissions.	Deaths.	Average number constantly sick.	Admissions.	Deaths.	Constantly sick.
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION—<i>contd.</i>							
Scarlet fever		..	..	..	..	..	..
Small-pox		..	..	..	..	..	..
Tuberculosis	{ Pulmonary	7	1	1.52	1.8	0.26	0.39
	{ Other	1	..	0.27	0.3	..	0.07
Venereal diseases	{ Gonorrhoea	69	..	9.92	17.7	..	2.54
	{ Soft chancre	8	..	0.87	2.0	..	0.22
	{ Syphilis	8	..	0.63	2.0	..	0.16
	{ Other V. D.	2	..	0.09	0.5	..	0.02
Other diseases due to infection		19	1	1.00	4.9	0.26	0.26
Diseases due to infestation by Metazoan parasites	{ Scabies	3	..	0.07	0.8	..	0.02
	{ Other diseases	14	..	0.50	3.6	..	0.13
OTHER DISEASES CLASSIFIED UNDER SYSTEMS.							
Diseases of the nervous system		27	..	1.65	6.9	..	0.42
Mental diseases		28	..	3.47	7.2	..	0.89
Diseases of the—							
Eye		13	..	0.74	3.3	..	0.19
Ear and nose		56	..	1.87	14.3	..	0.48
Circulatory system	{ Valvular diseases of the heart	4	..	0.25	1.0	..	0.06
	{ Disordered action of the heart	21	..	0.82	5.4	..	0.21
	{ Other diseases	4	1	0.38	1.0	0.26	0.10
Blood and blood forming organs		9	..	0.91	2.3	..	0.23
Ductless or endocrine glands		1	..	0.02	0.3	..	0.01
Breast		1	..	0.02	0.3	..	0.01
Respiratory system	{ Larynx and trachea	1	..	0.02	0.3	..	0.01
	{ Bronchi and bronchioles	37	..	1.30	9.5	..	0.33
	{ Other diseases	10	..	0.88	2.6	..	0.23

Teeth and gums	6	..	0·12	1·5	..	0·03	
Digestive system. {	Inflammation of tonsils	103	..	2·81	26·4	0·72	
	Inflammation of pharynx	19	..	0·59	4·9	0·15	
	Inflammation of stomach	7	..	0·25	1·8	0·06	
	Gastric ulcer . . . . .	..	..	0·01	..	..
	Duodenal ulcer . . . . .	..	..	..	..	..
Liver	1	..	0·14	0·3	..	0·04	
	Other diseases	130	1	5·76	33·3	0·26	1·47
Diseases due to disorders of nutrition or of metabolism	1	..	0·04	0·3	..	0·01	
Diseases of the :--							
Generative system	34	..	2·10	8·7	..	0·54	
Bones, joints, muscles, fasciæ and bursæ	109	..	5·72	27·9	..	1·46	
Areolar tissue	181	..	6·49	46·3	..	1·66	
Skin	111	..	5·03	28·4	..	1·29	
Urinary system	15	..	1·02	3·8	..	0·26	
Injuries {	General	2	1	0·04	0·5	0·26	0·01
	Local	193	2	9·25	49·4	0·51	2·37
	In action
Tumours and cysts	13	1	0·90	3·3	0·26	0·23	
Poisons	1	1	0·03	0·3	0·26	0·01	
No appreciable disease	4	..	0·07	1·0	..	0·02	
Suicides . . . . .	..	..	..	..	..	..
Total	2,114	12	94·10	540·9	3·07	24·08	

TABLE IV.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

EASTERN COMMAND.

Table showing the Average Strength, Admissions into Hospital, Deaths and Constantly Sick during the year 1935 with Ratios per 1,000 of the Strength.

Diseases.	Actuals.			Ratio per 1,000.		
	Admissions.	Deaths.	Average number constantly sick.	Admissions.	Deaths.	Constantly sick.
Average strength 15,819						
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.						
Common cold	142	..	2.49	9.0	..	0.16
Diphtheria	15	..	1.18	0.9	..	0.07
Dysentery	484	1	21.38	30.6	0.06	1.35
Enteric fever (inclusive of typhoid, para. A, B and C and enteric group)	37	3	4.63	2.3	0.19	0.29
Erysipelas . . . . .	..	..	..	..	..	..
Influenza	189	..	5.96	11.9	..	0.38
Malaria	708	2	30.13	44.8	0.13	1.90
Measles	7	..	0.37	0.4	..	0.02
Meningococcal infection . . . . .	..	..	..	..	..	..
Mumps	4	..	0.27	0.3	..	0.02
Pneumonia.	70	11	6.13	4.4	0.70	0.39
Pyrexia of uncertain origin	3	..	0.20	0.2	..	0.01
Rheumatic fever	14	1	1.48	0.9	0.06	0.09
Sandfly fever	385	..	8.52	24.3	..	0.54

Scarlet fever	1	..	0.12	0.1	..	0.01
Small-pox	3	..	0.43	0.2	..	0.03
Tuberculosis { Pulmonary	15	1	6.90	0.9	0.06	0.44
{ Other	8	..	2.46	0.5	..	0.16
Venereal diseases { Gonorrhœa	521	..	60.12	32.9	..	3.80
{ Soft chancre	157	..	16.72	9.9	..	1.06
{ Syphilis	124	..	9.78	7.8	..	0.62
{ Other V. D.	3	..	0.12	0.2	..	0.01
Other diseases due to infection	191	2	8.27	12.1	0.13	0.52
Diseases due to infestation { Scabies	25	..	0.79	1.6	..	0.05
by Metazoan parasites { Other diseases	46	..	0.96	3.0	..	0.06

OTHER DISEASES CLASSIFIED UNDER SYSTEMS.

Diseases of the nervous system	128	..	6.34	8.1	..	0.40
Mental diseases	61	..	10.95	3.9	..	0.69
Diseases of the eye	48	..	1.97	3.0	..	0.12
Diseases of the ear and nose	340	..	9.35	21.5	..	0.59
Diseases of the circula- { Valvular diseases of the heart	6	2	1.11	0.4	0.13	0.07
tory system. { Disordered action of the heart	30	..	2.02	1.9	..	0.13
{ Other diseases	25	1	1.62	1.6	0.06	0.10
Diseases of the blood and blood forming organs	88	..	5.30	5.6	..	0.33
Diseases of ductless or endocrine glands	4	..	0.46	0.3	..	0.03
Diseases of the breast	3	..	0.09	0.2	..	0.01
Diseases of the respiratory { Larynx and trachea	21	..	0.40	1.3	..	0.03
system. { Bronchi and bronchioles	299	..	11.40	18.9	..	0.72
{ Other diseases.	50	..	3.72	3.2	..	0.24
Diseases of the teeth and gums	45	..	1.37	2.8	..	0.09
Diseases of the Digestive { Inflammation of tonsils	432	..	10.72	27.3	..	0.68
system. { Inflammation of pharynx	190	..	3.91	12.0	..	0.25
{ Inflammation of stomach	80	..	2.75	5.1	..	0.17
{ Gastric ulcer	5	2	0.62	0.3	0.13	0.04
{ Duodenal ulcer	5	1	1.15	0.3	0.06	0.07
{ Liver	22	1	1.59	1.4	0.06	0.10
{ Other diseases	831	3	32.65	52.5	0.19	2.06

TABLE IV—*contd.*

Diseases.	Actuals.			Ratio per 1,000.		
	Admissions.	Deaths.	Average number constantly sick.	Admissions.	Deaths.	Constantly sick.
Average strength 15,819.						
OTHER DISEASES CLASSIFIED UNDER SYSTEMS—<i>contd.</i>						
Diseases due to disorders of nutrition or of metabolism	7	3	0.38	0.4	0.19	0.02
Diseases of the generative system	221	..	12.29	14.0	..	0.78
Diseases of bones, joints, muscles, fasciæ and bursæ	379	..	20.27	24.0	..	1.28
Diseases of the areolar tissue	815	..	27.44	51.5	..	1.73
Diseases of the skin	462	..	18.69	29.2	..	1.18
Diseases of the urinary system	74	1	5.97	4.7	0.06	0.38
Injuries { General	40	5	1.17	2.5	0.32	0.07
{ Local	977	6	41.62	61.8	0.38	2.63
{ In action . . . . .	..	..	..	..	..	..
Tumours and cysts	33	1	2.29	2.1	0.06	0.14
Poisons	4	..	0.10	0.3	..	0.01
No appreciable disease	50	..	1.63	3.2	..	0.10
*Suicides . . . . .	..	(3)	..	..	(0.19)	..
Total	8,927	47	430.75	564.3	2.97	27.23

*The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE V.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

SOUTHERN COMMAND.

Table showing the Average Strength, Admissions into Hospital, Deaths and Constantly Sick, during the year 1935, with Ratios per 1,000 of the Strength.

Diseases.	Actuals.			Ratio per 1,000.		
	Admissions.	Deaths.	Average number constantly sick.	Admissions.	Deaths.	Constantly sick.
Average strength 14,423.						
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.						
Common cold	39	..	0.71	2.7	..	0.05
Diphtheria	11	..	1.02	0.8	..	0.07
Dysentery	369	..	14.65	25.6	..	1.02
Enteric fever (inclusive of Typhoid, Para. A, B and C and enteric group).	10	1	1.38	0.7	0.07	0.10
Erysipelas	1	..	0.02	0.1	..	0.00
Influenza	182	..	4.51	12.6	..	0.31
Malaria	706	..	26.41	48.9	..	1.83
Measles	7	..	0.47	0.5	..	0.03
Meningococcal infection . . . . .	..	..	..	..	..	..
Mumps	9	..	0.40	0.6	..	0.03
Pneumonia	52	2	5.41	3.6	0.14	0.37
Pyrexia of uncertain origin	16	..	1.12	1.1	..	0.08
Rheumatic fever	22	..	2.75	1.5	..	0.19
Sandfly fever	125	..	2.62	8.7	..	0.18

TABLE V—contd.

Diseases.	Actuals.			Ratio per 1,000.		
	Admissions.	Deaths.	Average number constantly sick.	Admissions.	Deaths.	Constantly sick.
Average strength—14,423.						
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION— <i>contd.</i>						
Scarlet fever	2	..	0.20	0.1	..	0.01
Small-pox . . . . .	..	..	..	..	..	..
Tuberculosis { Pulmonary	18	1	7.25	1.2	0.07	0.50
{ Other	1	..	0.21	0.1	..	0.01
Venereal diseases { Gonorrhoea	357	..	45.16	24.8	..	3.13
{ Soft chancre	112	..	10.47	7.8	..	0.73
{ Syphilis	80	..	7.25	5.5	..	0.50
{ Other V. D.	3	..	0.30	0.2	..	0.02
Other diseases due to infection	191	1	8.27	13.2	0.07	0.57
Diseases due to infestation by Metazoan parasites. { Scabies	19	..	0.47	1.3	..	0.03
{ Other diseases	73	..	1.98	5.1	..	0.14
OTHER DISEASES CLASSIFIED UNDER SYSTEMS.						
Diseases of the nervous system	117	1	8.93	8.1	0.07	0.62
Mental diseases	42	..	13.42	2.9	..	0.93
Diseases of the eye	51	..	2.33	3.5	..	0.16
Diseases of the ear and nose	322	..	10.64	22.3	..	0.74
Diseases of the circulatory system. { Valvular disease of the heart	8	..	1.33	0.5	..	0.09
{ Disordered action of the heart	23	1	1.52	1.6	0.07	0.11
{ Other diseases	31	..	2.14	2.1	..	0.15
Diseases of the blood and blood forming organs	93	..	5.48	6.4	..	0.38
Diseases of ductless or endocrine glands	5	..	0.67	0.3	..	0.05
Diseases of the breast	2	..	0.05	0.1	..	0.00

Diseases of the respiratory system.	{	Larynx and trachea	12	..	0.53	0.8	..	0.04
		Bronchi and bronchioles	211	..	7.65	14.6	..	0.53
		Other diseases	22	..	1.87	1.5	..	0.13
Diseases of the teeth and gums		48	..	1.22	3.3	..	0.08	
Diseases of the digestive system.	{	Inflammation of tonsils	382	..	9.16	26.5	..	0.64
		Inflammation of pharynx	84	..	1.81	5.8	..	0.13
		Inflammation of stomach	70	..	2.92	4.9	..	0.20
		Gastric ulcer	2	..	0.16	0.1	..	0.01
		Duodenal ulcer	11	..	1.69	0.8	..	0.12
		Liver diseases	16	..	1.34	1.1	..	0.09
	{	Other diseases	767	2	32.45	53.2	0.14	2.25
Diseases due to disorders of nutrition or of metabolism . . . . .		..	..	0.18	..	..	0.01	
Diseases of the generative system		199	..	9.13	13.8	..	0.63	
Diseases of bones, joints, muscles, fasciæ and bursæ		312	..	19.21	21.6	..	1.33	
Diseases of the areolar tissue		737	..	24.96	51.1	..	1.73	
Diseases of the skin		479	..	21.30	33.2	..	1.48	
Diseases of the urinary system		87	..	5.88	6.0	..	0.41	
Injuries	{	General	29	2	0.62	2.0	0.14	0.04
		Local	877	8	39.21	60.8	0.55	2.72
		In action . . . . .	..	..	..	..	..	..
Tumours and cysts		41	1	1.66	2.8	0.07	0.12	
Poisons		5	..	0.13	0.3	..	0.01	
No appreciable disease		51	..	2.03	3.5	..	0.14	
*Suicides . . . . .		..	(3)	..	..	(0.21)	..	
Total		7,541	20	374.65	522.8	1.39	25.98	

*The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE VI.

WARRANT OFFICERS, N. C. Os. AND MEN—*contd.*

BURMA DISTRICT.

Table showing the average strength, admissions into hospital, deaths and constantly sick, during the year 1935, with ratios per 1,000 of the strength.

Diseases.	Actuals.			Ratio per 1,000.		
	Admissions.	Deaths.	Average number constantly sick.	Admissions.	Deaths.	Constantly sick.
Average strength—1,813.						
SPECIFIC DISEASES DUE TO INFECTION OR INFESTATION.						
Common cold	3	..	0·07	1·7	..	0·04
Diphtheria	1	..	0·17	0·6	..	0·09
Dysentery	58	..	2·41	32·0	..	1·33
Enteric fever (inclusive of typhoid, para. A, B, and C, and enteric group).	6	..	1·06	3·3	..	0·58
Erysipelas	1	..	0·03	0·6	..	0·02
Influenza	11	..	0·33	6·1	..	0·18
Malaria	53	..	2·16	29·2	..	1·19
Measles . . . . .	..	..	..	..	..	..
Meningococcal infection . . . . .	..	..	..	..	..	..
Mumps . . . . .	..	..	..	..	..	..
Pneumonia	1	..	0·07	0·6	..	0·04
Pyrexia of uncertain origin	1	..	0·04	0·6	..	0·02
Rheumatic fever . . . . .	..	..	..	..	..	..
Sandfly fever . . . . .	..	..	..	..	..	..
Scarlet fever . . . . .	..	..	..	..	..	..
Small-pox . . . . .	..	..	..	..	..	..

22

Tuberculosis	{	Pulmonary	2	..	0.67	1.1	..	0.37
		Other	1	..	0.14	0.6	..	0.08
Venereal diseases	{	Gonorrhoea	78	..	10.94	43.0	..	6.03
		Soft chancre	22	..	1.17	12.1	..	0.65
		Syphilis	42	i	3.53	23.2	0.55	1.95
		Other V. D.	2	..	0.28	1.1	..	0.15
Other diseases due to infection			111	..	3.11	61.2	..	1.72
Diseases due to infestation by Metazoan parasites.	{	Scabies	2	..	0.03	1.1	..	0.02
		Other diseases	5	..	0.31	2.8	..	0.17

OTHER DISEASES CLASSIFIED UNDER SYSTEMS.

Diseases of the nervous system			18	..	0.80	9.9	..	0.44
Mental diseases			6	..	0.68	3.3	..	0.38
Diseases of the eye			9	..	0.55	5.0	..	0.30
Diseases of the ear and nose			31	..	0.86	17.1	..	0.47
Diseases of the circulatory system.	{	Valvular diseases of the heart . . . . .	..	..	..	..	..	..
		Disordered action of the heart	2	..	0.07	1.1	..	0.04
		Other diseases	6	..	0.49	3.3	..	0.27
Diseases of the blood and blood forming organs			16	..	0.88	8.8	..	0.49
Diseases of the ductless or endocrine glands			1	..	0.08	0.6	..	0.04
Diseases of the breast . . . . .			..	..	..	..	..	..
Diseases of the respiratory system.	{	Larynx and trachea	6	..	0.17	3.3	..	0.09
		Bronchi and bronchioles	17	..	0.57	9.4	..	0.31
		Other diseases	1	..	0.04	0.6	..	0.02
Diseases of the teeth and gums			13	..	0.39	7.2	..	0.22
Diseases of the digestive system.	{	Inflammation of tonsils	64	..	1.82	35.3	..	1.00
		Inflammation of pharynx	10	..	0.24	5.5	..	0.13
		Inflammation of stomach	10	..	0.60	5.5	..	0.33
		Gastric ulcer	1	..	0.08	0.6	..	0.04
		Duodenal ulcer . . . . .	..	..	..	..	..	..
		Liver	7	..	0.66	3.9	..	0.36
Other diseases			71	..	4.09	39.2	..	2.26

TABLE VI—*contd.*

Diseases.	Actuals.			Ratio per 1,000.		
	Admissions.	Deaths.	Average number constantly sick.	Admissions.	Deaths.	Constantly sick.
Average strength—1,813.						
OTHER DISEASES CLASSIFIED UNDER SYSTEMS— <i>contd.</i>						
Diseases due to disorders of nutrition or of metabolism . . . . .	..	..	..	..	..	..
Diseases of the generative system	27	..	1.39	14.9	..	0.77
Diseases of the bones, joints, muscles, fasciæ and bursæ	36	..	2.63	19.9	..	1.45
Diseases of the areolar tissue	123	..	4.91	67.8	..	2.71
Diseases of the skin	63	..	3.56	34.7	..	1.96
Diseases of the urinary system	16	..	1.14	8.8	..	0.63
Injuries						
{ General	1	..	0.03	0.6	..	0.02
{ Local	122	3	5.26	67.3	1.65	2.90
{ In action . . . . .	..	..	..	..	..	..
Tumours and cysts	4	..	0.47	2.2	..	0.26
Poisons . . . . .	..	..	..	..	..	..
No appreciable disease . . . . .	..	..	..	..	..	..
*Suicides . . . . .	..	(1)	..	..	(0.55)	..
Total	1,081	4	58.98	596.2	2.21	32.53

*The figures against "suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE VII.

BRITISH OTHER RANKS.

Table showing monthly ratios per 1,000 of the strength of admissions for certain diseases for all India during the year 1935.

1935.	Enteric group of fevers.	Influenza.	Cholera.	Small-pox.	Malaria.	Dysentery protozoal.	Dysentery bacillary.	Dysentery bacillary exu- date.	Dysentery group.	Pyrexia of uncertain origin.	Pneumonia (Lobar and Lobular).	Diarrhoea.	Dengue.	Sandfly fever.	Plague.	Effects of Heat.	All Causes.
January	0.1	1.9	..	..	1.7	0.2	0.7	0.5	0.2	0.02	0.5	0.5	0.2	0.1	..	..	42.6
February	0.1	0.8	..	..	1.0	0.2	0.3	0.4	0.1	0.1	0.3	0.6	0.1	0.2	..	..	32.4
March	0.2	1.0	..	..	1.2	0.1	0.5	0.6	0.6	..	0.3	0.3	0.1	0.6	..	0.05	59.0
April	0.2	1.2	0.02	..	1.3	0.2	1.5	0.7	1.2	0.04	0.4	1.3	0.3	1.6	..	0.02	41.8
May	0.2	2.5	..	0.1	1.7	0.4	1.3	1.2	1.0	0.2	0.5	2.0	0.1	5.1	..	0.04	52.4
June	0.2	0.3	..	..	2.3	0.2	1.0	0.6	0.6	0.1	0.6	1.3	0.3	5.3	..	0.2	48.7
July	0.1	0.9	0.02	..	4.3	0.3	1.7	0.6	0.4	0.1	0.2	1.5	0.8	9.1	..	0.8	60.2
August	0.2	0.6	..	..	8.6	0.3	1.6	0.6	0.9	0.1	0.1	2.7	0.7	5.5	..	0.1	59.1
September	0.1	0.2	..	..	13.1	0.3	1.0	0.4	0.6	..	0.02	1.1	0.8	4.9	..	..	55.6
October	0.3	0.3	..	..	10.0	0.2	0.7	0.4	0.3	0.04	0.1	0.9	1.0	2.7	..	..	51.6
November	0.02	0.3	..	..	8.3	0.3	0.7	0.5	0.5	0.02	0.4	0.7	0.2	0.9	..	0.02	45.8
December	0.1	0.5	..	..	3.6	0.2	0.6	0.5	0.3	0.02	0.4	0.5	0.2	0.2	..	..	36.7
Total	2.0	13.5	0.04	0.1	53.2	2.8	11.7	7.0	6.8	0.7	4.0	14.1	4.8	36.5	..	1.3	565.1

VIII.

OTHER RANKS.

diseases and constantly sick for all causes in each station and district in during 1935.

Diarrhoea.	Cholera.	Veneral diseases.	Small-pox.	Malaria	Dengue.	Sandy fever.	Plague.	Influenza.	Pneumonia (Lobar and Lobular).	Heat-stroke.	Heat-exhaustion.	All Causes.	Average annual number Constantly sick.
24.1	..	21.1	..	63.3	..	51.2	..	18.1	6.0	..	..	593.4	21.84
23.6	..	9.7	..	23.6	..	522.9	..	12.5	5.5	..	..	1,131.8	27.00
6.2	..	15.4	..	69.4	..	144.9	..	1.5	13.9	0.8	..	652.3	27.89
24.0	..	28.8	..	132.2	..	291.7	..	1.5	7.2	..	1.5	954.3	39.18
22.9	..	5.7	..	45.7	..	26.7	..	..	7.6	..	..	369.5	6.48
18.2	..	17.7	..	76.9	..	232.8	..	4.6	9.0	0.2	0.5	786.8	27.94
6.3	63.3	..	63.3	..	6.3	19.0	..	..	588.6	23.80
..	142.9	..	..	142.9	0.00
..
5.9	58.8	..	58.8	..	5.9	23.5	..	..	552.9	22.12
98.4	..	15.5	..	88.1	..	..	..	..	..	..	..	751.3	22.02
..	..	74.3	..	54.5	..	59.4	..	..	..	..	..	361.4	39.06
14.6	..	7.3	..	58.4	..	36.5	..	..	7.3	..	..	583.9	15.62
5.3	..	42.8	..	18.7	..	13.4	..	2.7	2.7	..	..	286.1	11.18
..	1,000.0	..	..	..	..	..	..	..	1,142.9	12.86
..	..	12.0	..	29.9	..	18.0	..	6.0	..	..	..	381.0	10.95
..	341.3	11.32
3.6	3.6	..	3.6	..	10.8	..	..	..	377.7	11.58
10.9	32.6	..	32.6	..	10.9	21.7	..	..	1,184.8	176.52
9.1	..	17.8	..	57.4	..	57.4	..	19.0	4.4	..	..	499.4	25.83
..
11.8	..	20.2	..	50.3	..	42.9	..	13.3	3.7	..	..	485.7	26.10
19.7	..	28.2	..	42.3	..	31.0	..	50.8	..	..	1.4	579.7	26.71
17.3	..	34.7	..	37.6	..	31.8	..	..	..	..	..	586.7	18.99
28.6	..	121.4	..	64.3	..	42.9	..	14.3	..	..	7.1	792.9	42.79
4.7	..	23.5	..	21.1	..	4.7	..	..	4.7	..	..	535.2	25.35
9.0	..	53.1	..	31.4	..	71.2	..	..	3.4	3.4	1.1	655.4	26.43
15.6	..	22.1	..	9.1	..	19.5	..	..	3.9	..	11.7	515.6	19.12
13.9	..	50.9	..	9.3	..	..	..	..	4.6	..	..	777.8	25.32
10.9	..	10.9	..	92.9	..	..	..	..	..	..	..	688.5	56.07
17.0	..	71.5	..	69.8	..	26.4	..	5.1	8.5	1.7	9.4	712.9	42.90
7.8	..	36.1	..	31.4	..	23.5	..	3.1	1.6	..	1.6	525.9	23.33
45.8	..	7.6	..	45.8	..	45.8	..	..	7.6	..	..	519.1	13.36
13.0	..	19.9	..	20.7	..	47.5	..	0.8	2.3	0.8	6.1	518.4	21.47
11.0	..	11.0	..	..	..	..	..	..	..	..	..	329.7	10.88
14.3	..	38.6	..	41.9	..	33.2	..	6.7	3.4	0.9	4.6	594.7	27.40
11.2	..	22.5	..	157.3	..	78.7	..	11.2	..	..	..	764.0	26.74
16.1	306.5	..	16.1	..	..	..	..	..	516.1	15.81
..	230.8	..	..	..	..	..	..	..	230.8	3.85
..	166.7	..	..	..	..	..	..	83.3	583.3	15.83
11.3	..	12.2	..	60.3	..	1.9	..	3.8	2.3	..	..	499.1	25.14
..	300.0	..	..	..	..	..	..	..	300.0	8.00
..	283.8	..	27.0	..	..	..	..	..	700.2	19.32

TABLE

Stations and Districts.	Average annual strength.	Enteric group of fevers.					Dysentery.			
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary Bact.	Bacillary exudate.	Protozoal.	Clinical.
<i>Waziristan District</i>	1,322	..	..	..	..	..	7.6	..	1.5	..
Quetta	2,386	0.4	..	..	..	0.8	18.4	8.0	1.7	12.6
<i>Baluchistan District</i>	2,386	0.4	..	..	..	0.8	18.4	8.0	1.7	12.6
Loralai	..	..	..	..	..	..	..	..	..	..
Zhob Brigade Area	..	..	..	..	..	..	..	..	..	..
Hyderabad	399	..	..	..	..	..	10.0	..	..	15.0
Karachi	1,123	..	0.9	..	..	0.9	18.7	0.9	1.8	13.4
<i>Sind Bde. Area</i>	1,522	..	0.7	..	..	0.7	16.4	0.7	1.3	13.8
Bareilly	746	..	..	..	..	..	16.1	6.7	..	13.4
Chakrata	878	..	..	..	..	..	..	17.1	..	..
Dehra Dun	79	..	..	..	..	..	12.7	..	..	..
Jhansi	975	1.0	..	..	..	..	9.2	6.1	5.1	5.1
Landour	50	..	..	..	..	20.0	20.0	..	..	..
Meerut	1,715	..	0.6	..	..	1.2	12.2	21.6	2.9	2.3
Roorkee	275	..	..	..	..	..	36.4	18.2	14.6	3.6
<i>Meerut District</i>	4,718	0.2	0.2	..	..	0.6	11.4	14.4	3.0	4.2
Allahabad	838	..	..	..	..	1.2	9.5	10.7	7.2	10.7
Benares	126	..	7.9	..	..	..	7.9	7.9	7.9	7.9
Cawnpore	774	1.3	..	..	..	1.3	..	..	..	12.9
Fyzabad	743	..	..	..	..	1.3	6.7	2.7	..	14.8
Lucknow	2,288	..	..	..	..	0.4	10.9	3.1	2.6	..
Ranikhet	1,108	..	..	..	..	..	19.0	3.6	9.0	23.5
<i>Lucknow District</i>	5,877	0.2	0.2	..	..	0.7	10.2	3.9	3.9	9.7
Calcutta	901	1.1	2.2	..	..	4.4	21.1	4.4	5.5	8.9
Barrackpore	576	..	1.7	..	..	3.5	6.9	10.4	10.4	..
Dinapore	634	..	..	..	..	..	..	3.2	..	1.6
Lebong	555	1.8	..	..	..	5.4	..	1.8	3.6	1.8
Dacca	572	1.7	..	..	..	8.7	7.0	3.5	1.7	3.6
<i>F. & A. District</i>	3,233	0.9	0.9	..	..	4.3	8.3	4.6	4.3	3.7
Agra	722	1.4	..	..	..	1.4	1.4	1.4	..	5.5
Delhi	994	1.0	1.0	..	..	..	4.0	22.1	7.0	7.0
Muttra	262	..	..	..	..	..	7.6	..	3.8	38.2
<i>Delhi Ind. Bde.</i>	1,986	1.0	0.5	..	..	0.5	3.5	11.6	4.0	10.6
Ahmednagar	899	..	..	..	..	..	14.5	5.6	2.2	..
Jubbulpore	1,358	1.5	..	..	..	..	12.5	10.3	3.7	..
Kamptec	731	..	..	..	..	..	1.4	2.7	..	5.5
Secunderabad	2,676	0.4	0.4	..	..	0.7	22.9	5.6	2.2	3.7
Pachmarhi	58	..	..	..	..	..	17.2	..	..	..
Saugor	22	..	..	..	..	..	..	45.5	..	..

VIII—contd.

Diarrhoea.	Cholera.	Veneral diseases.	Small-pox.	Malaria.	Dengue.	Sandfly fever.	Plague.	Influenza.	Pneumonia (Lobar and Lobular).	Heat-stroke.	Heat-exhaustion.	All Causes.	Average annual number constantly sick.
10.6	..	11.3	..	95.3	..	9.1	..	3.8	2.3	..	0.8	525.0	24.06
7.1	..	15.1	..	171.8	..	2.1	..	17.2	4.2	..	..	594.7	22.83
7.1	..	15.1	..	171.8	..	2.1	..	17.2	4.2	..	..	594.7	22.83
..
12.5	..	60.1	..	210.5	..	..	..	5.0	2.5	..	..	548.9	16.14
3.6	..	22.3	..	37.4	..	17.8	..	..	0.9	..	..	423.9	30.11
5.9	..	32.2	..	82.8	..	13.1	..	1.3	1.3	..	..	456.6	26.45
21.4	..	48.3	..	18.8	..	34.9	..	9.4	2.7	..	..	506.7	29.44
37.6	..	27.3	..	39.9	4.6	8.0	..	..	1.1	..	..	462.4	21.55
12.7	..	139.2	..	38.0	..	12.7	..	38.0	..	..	..	810.1	37.72
31.8	..	30.8	..	70.8	1.0	34.9	..	3.1	2.1	..	1.0	538.5	21.85
..	..	40.0	..	20.0	..	..	..	..	..	..	..	440.0	12.00
13.4	..	26.8	..	84.5	0.6	11.1	..	19.8	8.2	..	2.3	583.7	30.94
10.9	..	76.4	..	36.4	..	..	..	..	7.3	..	..	476.4	9.64
22.7	..	36.0	..	58.7	1.3	18.4	..	10.0	4.5	..	1.1	535.6	25.75
17.9	..	57.3	..	101.4	1.2	74.0	..	8.4	4.8	1.2	1.2	700.5	34.16
7.9	..	103.2	..	7.9	23.8	182.5	..	..	7.9	..	15.9	920.6	45.63
20.7	..	33.6	1.3	27.1	6.5	85.3	..	3.9	2.6	..	..	682.2	25.57
5.4	..	14.8	..	5.4	1.3	92.9	..	4.0	1.3	..	..	475.1	16.54
20.5	..	58.6	0.4	24.0	..	7.0	..	11.4	4.4	..	0.4	534.1	25.42
21.7	..	9.0	..	10.8	..	10.8	..	0.9	4.5	..	..	422.4	29.23
18.2	..	41.2	0.3	30.3	1.7	42.2	..	6.8	3.9	0.2	0.7	557.1	26.71
2.2	1.1	48.8	..	15.5	45.5	1.1	..	27.7	10.0	..	..	497.2	25.59
5.2	..	121.5	..	20.8	17.4	..	..	5.2	..	..	..	468.7	59.31
..	..	50.5	..	22.1	..	48.9	..	1.6	4.7	..	..	383.3	17.27
7.2	..	37.8	..	14.4	..	..	..	10.8	3.6	..	..	291.9	10.61
8.7	..	178.3	..	31.5	..	..	..	12.2	1.7	..	..	580.4	13.02
4.3	0.3	83.1	..	20.4	15.8	9.9	..	13.0	4.6	..	..	449.4	25.17
15.2	..	48.5	1.4	113.3	1.4	15.2	..	..	1.4	2.8	2.8	868.4	37.06
15.1	1.0	42.3	..	87.5	..	2.0	..	62.4	8.0	..	..	827.0	34.39
7.6	..	84.0	..	84.0	..	19.1	..	..	7.6	..	..	759.5	32.75
14.1	0.5	49.8	0.5	97.2	0.5	9.1	..	31.2	5.5	1.0	1.0	829.8	35.01
16.7	..	14.5	..	97.9	..	2.2	..	..	..	..	..	496.1	12.27
19.9	..	36.1	..	47.9	..	6.6	..	0.7	4.4	0.7	1.5	533.1	26.35
6.8	..	45.1	..	49.2	..	36.9	..	9.6	4.1	1.4	5.5	448.7	18.78
20.2	..	19.8	..	6.7	0.4	19.8	..	37.7	4.1	..	..	494.4	21.46
..	86.2	..	..	..	..	..	..	..	172.4	3.10
..	..	90.9	..	..	..	..	..	..	..	..	..	454.5	8.64

TABLE

Stations and Districts.	Average annual strength.	Enteric group of fevers.					Dysentery.			
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary Bact.	Bacillary exudate.	Protozoal.	Clinical.
<i>Deccan District</i>	5,744	0·5	0·2	...	...	0·8	16·7	6·4	2·3	2·4
Mhow	1,475	...	...	...	...	...	10·8	8·1	...	0·7
Mount Abu	60	...	...	...	...	...	...	...	...	...
Nasirabad	664	...	...	...	...	...	21·1	1·5	1·5	1·5
Ahmedabad	131	...	...	...	...	...	7·6	30·5	...	7·6
Colaba	732	...	...	...	...	4·1	4·1	4·1	1·4	2·7
Deolali	340	...	...	...	...	...	...	14·7	5·9	...
<i>Bombay District</i>	3,402	...	...	...	...	0·9	10·0	7·3	1·2	1·5
Belgaum	776	...	...	...	...	...	13·2	13·2	...	...
Poona	2,327	0·4	0·4	...	...	...	20·6	9·0	2·1	0·4
Purandhar	61	...	...	...	...	...	...	...	...	...
<i>Poona Bde. Area</i>	2,464	0·4	0·4	...	...	...	19·9	8·9	2·0	0·4
Bangalore	1,047	...	...	...	...	...	21·0	11·5	1·9	...
Madras	795	...	...	...	...	...	1·3	10·1	3·8	...
Malapurum	142	...	...	...	...	...	...	...	...	...
Wellington	829	...	...	...	...	...	7·2	1·2	8·4	4·8
<i>Madras District</i>	2,813	...	...	...	...	...	10·3	7·5	4·3	1·4
Mandalay	132	...	...	...	...	15·2	...	...	...	7·6
Maymyo	776	...	...	...	...	2·6	11·6	11·6	1·3	1·3
Mingaladon	777	...	...	...	...	2·6	25·7	3·9	3·9	11·6
Port Blair	123	...	...	...	...	...	...	7·8	15·6	...
<i>Burma District</i>	1,813	...	...	...	...	3·3	16·0	7·2	3·3	6·1
INDIA	52,646	0·5	0·2	...	...	1·3	12·1	6·7	3·0	7·4

VIII—concl'd.

Diarrhoe.	Cholera.	Veneral diseases.	Small-pox.	Malaria.	Dengue.	Sandy fever.	Plague.	Influenza.	Pneumonia (Lobar and Lobular).	Heat-stroke.	Heat-exhaustion.	All Causes.	Average annual number constantly sick.
17.6	...	26.1	...	36.9	0.2	15.8	...	19.0	3.5	0.3	1.0	494.6	20.60
19.7	...	22.4	...	83.4	...	0.7	...	29.8	6.8	...	...	581.0	28.02
16.7	100.0	...	...	...	...	...	...	...	566.7	15.33
6.0	...	36.1	...	113.0	...	27.1	...	1.5	...	...	...	491.0	16.46
7.6	...	76.3	...	152.7	45.8	61.1	...	...	...	...	...	717.6	19.16
5.5	...	79.2	...	27.3	5.5	5.5	...	4.1	...	...	1.4	785.5	50.57
5.9	...	35.3	...	55.9	...	...	...	14.7	2.9	...	...	461.8	12.21
12.1	...	40.3	...	77.3	2.9	9.1	...	15.6	3.2	...	0.3	600.5	28.47
26.3	...	13.2	...	26.3	...	...	...	...	13.2	...	...	473.7	11.84
7.7	...	25.4	...	80.4	...	...	...	6.9	3.0	...	...	510.5	34.87
16.4	163.9	...	...	...	...	...	...	...	704.9	42.95
8.5	...	24.4	...	80.8	...	...	...	6.5	3.2	...	...	514.2	34.36
2.9	...	79.3	...	11.5	26.7	...	...	3.8	3.8	...	...	554.0	26.10
13.8	...	91.8	...	11.3	55.3	...	...	...	...	...	...	480.5	29.17
28.2	...	63.4	...	7.0	...	...	...	...	...	...	...	619.7	26.69
33.8	...	26.5	...	8.4	1.2	...	...	2.4	2.4	...	1.2	377.6	23.82
16.4	...	66.5	...	10.3	25.9	...	...	2.1	2.1	...	0.4	484.5	26.33
22.7	...	272.7	...	15.2	30.3	...	...	...	...	...	...	977.3	59.09
1.3	...	73.5	...	38.7	16.8	...	...	14.2	...	...	...	430.4	27.04
10.3	...	55.3	...	9.0	108.1	...	...	...	1.3	...	...	707.9	33.19
7.8	...	23.4	...	109.4	...	...	...	...	...	...	7.8	507.8	21.95
7.2	...	76.7	...	29.2	55.7	...	...	6.1	0.6	...	0.6	596.2	31.6
13.9	0.0	38.8	0.1	56.1	5.0	36.5	...	10.6	4.2	0.2	1.5	567.1	26.74

TABLE IX.

BRITISH OFFICERS (BRITISH SERVICE).

ALL INDIA.

Table showing the Average Strength, Admissions into Hospital, Deaths and Constantly Sick, during the year 1935, with Ratios per 1,000 of the Strength.

Diseases.	Actuals.			Ratio per 1,000.		
	Admissions.	Deaths.	Average number constantly sick.	Admissions.	Deaths.	Constantly sick.
Average strength	2,227.					
<i>Specific diseases due to infection or infestation.</i>						
Common cold	11	..	0.12	4.9	..	0.05
Diphtheria	2	..	0.22	0.9	..	0.10
Dysentery	64	1	2.53	28.7	0.45	1.14
Enteric fever (inclusive of typhoid, para. A, B and C, and enteric group).	13	1	1.91	5.8	0.45	0.86
Erysipelas . . . . .	..	..	..	..	..	..
Influenza	30	..	0.45	13.5	..	0.20
Malaria	79	..	2.16	35.5	..	0.97
Measles	1	..	0.05	0.4	..	0.02
Meningococcal infection	1	..	0.20	0.4	..	0.09
Mumps	4	..	0.08	1.8	..	0.04
Pneumonia	5	..	0.29	2.2	..	0.13
Pyrexia of uncertain origin	1	..	0.03	0.4	..	0.01
Rheumatic fever	2	..	0.06	0.9	..	0.03
Sandy fever	60	..	0.89	26.9	..	0.40
Scarlet fever.	1	..	0.03	0.4	..	0.01
Small-pox . . . . .	..	..	0.03	..	..	0.01
Tuberculosis { Pulmonary	1	..	0.20	0.4	..	0.09
{ Other . . . . .	..	..	..	..	..	..
Venereal diseases { Gonorrhœa	1	..	0.06	0.4	..	0.03
{ Soft chancre . . . . .	..	..	..	..	..	..
{ Syphilis . . . . .	..	..	..	..	..	..
{ Other V. D. . . . .	..	..	..	..	..	..

Other diseases due to infection	97	..	4.00	43.6	..	1.80
Diseases due to infestation by Metazoan parasites. { Scabies . . . . .	..	..	..	..	..	..
Other diseases	5	..	0.08	2.2	..	0.04
<i>Other diseases classified under systems.</i>						
Diseases of the nervous system	18	..	0.80	8.1	..	0.36
Mental diseases	6	..	0.98	2.7	..	0.44
Diseases of the —						
Eye	6	..	0.12	2.7	..	0.05
Ear and nose	38	1	0.91	17.1	0.45	0.41
Diseases of the circulatory system. { Valvular disease of the heart . . . . .	..	..	0.02	0.9	..	0.01
{ Disordered action of the heart	2	..	0.61	2.7	..	0.27
{ Other diseases	6	..				
Diseases of the blood and blood forming organs	13	..	0.47	5.8	..	0.21
Diseases of ductless or endocrine glands . . . . .	..	..	..	..	..	..
Diseases of the breast . . . . .	..	..	..	..	..	..
Diseases of the respiratory system. { Larynx and trachea	4	..	0.10	1.8	..	0.04
{ Bronchi and bronchioles	10	..	0.21	4.5	..	0.09
{ Other diseases	2	..	0.17	0.9	..	0.08
Diseases of the teeth and gums	5	..	0.06	2.2	..	0.03
Diseases of the digestive system. { Inflammation of tonsils	51	..	1.26	22.9	..	0.57
{ Inflammation of pharynx	19	..	0.35	8.5	..	0.16
{ Inflammation of stomach	16	..	0.42	7.2	..	0.19
{ Gastric ulcer	4	..	0.27	1.8	..	0.12
{ Duodenal ulcer	8	..	0.77	3.6	..	0.35
{ Liver diseases	10	..	0.66	4.5	..	0.30
{ Other diseases	132	1	3.74	59.3	0.45	1.68
Diseases due to disorders of nutrition or of metabolism	1	..	0.04	0.4	..	0.02
Diseases of the generative system	2	..	0.03	0.9	..	0.01
Diseases of bones, joints, muscles, fasciæ and bursæ	32	..	1.50	14.4	..	0.67
Diseases of the areolar tissue	75	..	2.60	33.7	..	1.17
Diseases of the skin	17	..	1.09	7.6	..	0.49
Diseases of the urinary system	20	1	1.00	9.0	0.45	0.45
Injuries { General	6	4	0.12	2.7	1.80	0.05
{ Local	156	6	5.47	70.9	2.69	2.46
{ In action . . . . .	..	..	..	..	..	..
Tumours and cysts	3	..	0.17	1.3	..	0.08
Poisons	2	..	0.04	0.9	..	0.02
No appreciable disease	6	..	0.26	2.7	..	0.12
<i>Suicides</i> . . . . .	..	..	..	..	..	..
Total	1,048	15	37.63	470.6	6.74	16.90

TABLE X.

WIVES OF WARRANT OFFICERS, N. C. Os. AND MEN.

INDIA.

Table showing the Average Strength, Admissions into Hospital, Deaths and Constantly Sick, during the year 1935, with Ratios per 1,000 of the Strength.

Diseases.	Actuals.			Ratio per 1,000.			
	Average strength	Admissions.	Deaths.	Average number constantly sick.	Admissions.	Deaths.	Constantly sick.
Average strength	4,178.						
<i>Specific diseases due to infection or infestation.</i>							
Common cold		12	...	0·17	2·9	...	0·04
Diphtheria		3	...	0·24	0·7	...	0·06
Dysentery		60	...	1·80	14·4	...	0·43
Enteric fever (inclusive of typhoid, para. A, B and C. and enteric group).		4	...	0·42	1·0	...	0·10
Erysipelas		3	...	0·10	0·7	..	0·02
Influenza		5	...	0·08	1·2	...	0·02
Malaria		99	...	2·64	23·7	...	0·63
Measles		2	...	0·09	0·5	...	0·02
Meningococcal infection . . . . .		...	...	...	...	...	...
Mumps		1	...	0·02	0·2	...	0·00
Pneumonia		5	1	0·29	1·2	0·24	0·07
Pyrexia of uncertain origin . . . . .		...	...	...	...	...	...
Rhumatic fever		6	...	0·43	1·4	...	0·10
Sandy fever		15	...	0·21	3·6	...	0·05
Scarlet fever.		2	...	0·18	0·5	...	0·03
Small-pox		3	1	0·14	0·7	0·24	0·03
Tuberculosis { Pulmonary		3	...	0·38	0·7	...	0·09
{ Other		3	...	0·26	0·7	...	0·06
Venereal diseases { Gonorrhœa . . . . .		...	...	...	...	...	...
{ Soft chancre . . . . .		...	...	...	...	...	...
{ Syphilis		1	...	0·06	0·2	...	0·01
{ Other V. D. . . . .		...	...	...	...	...	...
Other diseases due to infection		21	...	0·61	5·0	...	0·15

Diseases due to infestation by metazoan parasites.	Scabies . . . . .	...	...	...	...	...
	Other diseases	10	...	0·18	2·4	0·04

Other diseases classified under systems.

Diseases of the nervous system	20	...	0·41	4·8	...	0·10	
Mental diseases	26	...	0·78	6·2	...	0·18	
Diseases of the eye	7	...	0·21	1·7	...	0·05	
Diseases of the ear and nose	27	...	0·78	8·5	...	0·19	
Diseases of the—							
Circulatory system.	Valvular diseases of the heart	2	1	0·13	0·5	0·24	0·03
	Disordered action of the heart	7	1	0·19	1·7	0·24	0·05
	Other diseases	17	1	1·00	4·1	0·24	0·24
Blood and blood forming organs	18	1	0·63	4·3	0·24	0·15	
Ductless or endocrine glands	5	1	0·12	1·2	0·24	0·03	
Breast	15	...	0·38	3·6	...	0·09	
Respiratory system.	Larynx and trachea	3	...	0·08	0·7	...	0·02
	Bronchi and bronchioles	43	...	1·23	10·3	...	0·29
	Other diseases	10	...	0·52	2·4	...	0·12
Teeth and gums	17	...	0·17	4·1	...	0·04	
Digestive system.	Inflammation of tonsils	56	...	0·95	13·4	...	0·23
	Inflammation of pharynx	8	...	0·17	1·9	...	0·04
	Inflammation of stomach	33	...	0·73	7·9	...	0·17
	Gastric ulcer	1	...	0·06	0·2	...	0·01
	Duodenal ulcer	3	...	0·14	0·7	...	0·03
	Liver	5	...	0·19	1·2	...	0·05
Other diseases	222	1	6·24	53·1	0·24	1·49	
Diseases due to disorders of nutrition or of metabolism	7	...	0·31	1·7	...	0·07	
Diseases of the generative system	279	4	9·88	66·8	0·96	2·36	
Diseases of bones, joints, muscles, fasciæ and bursæ	30	...	0·81	7·2	...	0·19	
Diseases of the areolar tissue	42	1	1·24	10·1	0·24	0·30	
Diseases of the skin	9	...	0·12	2·2	...	0·03	
Diseases of the urinary system	57	1	2·51	13·6	0·24	0·60	
Injuries	General . . . . .	...	1	...	0·24	...
	Local	31	...	1·11	7·4	...	0·27
	In action . . . . .	...	...	...	...	...
Tumours and cysts	18	...	1·10	4·3	...	0·26	
Poisons	2	...	0·05	0·5	...	0·01	
No appreciable disease	27	...	0·60	6·5	...	0·14	
Suicides . . . . .	...	...	...	...	...	...
Total	1,305	15	41·07	312·4	3·59	9·83	

TABLE XI.

CHILDREN OF WARRANT OFFICERS, N. C. Os. AND MEN.

INDIA.

Table showing the Average Strength, Admissions into Hospital, Deaths, and Constantly Sick, during the year 1935, with Ratios per 1,000 of the Strength.

Diseases.	Actual			Ratio per 1,000.		
	Admissions.	Deaths.	Average number constantly sick.	Admissions.	Deaths.	Constantly sick.
Average strength	6,522					
<i>Specific diseases due to infection or infestation.</i>						
Common cold	13	..	0·18	2·0	..	0·03
Diphtheria	24	3	1·40	3·7	0·46	0·21
Dysentery	192	5	6·33	29·4	0·77	0·07
Enteric fever (inclusive of typhoid, para. A, B and C and enteric group).	12	..	1·35	1·8	..	0·21
Erysipelas	1	1	0·04	0·2	0·15	3·01
Influenza	17	..	0·34	2·6	..	0·05
Malaria	103	..	2·89	15·8	..	0·44
Measles	56	..	1·86	8·6	..	0·29
Meningococcal infection . . . . .	..	..	..	..	..	..
Mumps	28	..	1·16	4·3	..	0·18
Pneumonia	24	3	1·37	3·7	0·46	0·46
Pyrexia of uncertain origin	1	..	0·03	0·2	..	0·01
Rheumatic fever	11	1	0·87	1·7	0·15	0·13
Sandfly fever	26	..	0·37	4·0	..	0·06
Scarlet fever	27	..	1·71	4·1	..	0·26
Small pox	2	..	0·14	0·3	..	0·02
Tuberculosis { Pulmonary . . . . .	..	..	..	..	..	..
{ Other	3	..	0·16	0·5	..	0·02
Veneral diseases. { Gonorrhœa	8	..	1·54	1·2	..	0·24
{ Soft chancre . . . . .	..	..	..	..	..	..
{ Syphilis . . . . .	..	..	..	..	..	..
{ Other V. D. . . . .	..	..	..	..	..	..
Other diseases due to infection	126	1	3·82	19·3	0·15	0·59

Diseases due to infestation by metazoan parasites.	Scabies . . . . .	..	..	..	..	..	..	..
	Other diseases	57	..	0·84	8·7	..	0·13	..
<i>Other diseases classified under systems.</i>								
Diseases of the nervous system	. . . . .	28	7	0·60	4·3	1·07	0·09	..
Mental disease	. . . . .	1	..	0·01	0·2	..	0·00	..
Diseases of the—								
Eye	. . . . .	16	..	0·63	2·5	..	0·10	..
Ear and nose	. . . . .	56	..	1·53	8·6	..	0·23	..
Circulatory system.	{ Valvular disease of the heart	1	..	0·20	0·2	..	0·03	..
	{ Disordered action of the heart	3	1	0·15	0·5	0·15	0·02	..
	{ Other diseases	6	1	1·00	0·9	0·15	0·15	..
Blood and blood forming organs	. . . . .	21	..	0·70	3·2	..	0·11	..
Ductless or endocrine glands	. . . . .	..	..	..	..	..	..	..
Breast.	. . . . .	..	..	..	..	..	..	..
Respiratory system.	{ Larynx and trachea	6	..	0·20	0·9	..	0·03	..
	{ Bronchi and bronchioles	157	..	3·49	24·1	..	0·54	..
	{ Other diseases	4	3	0·03	0·6	0·46	0·00	..
Teeth and gums	. . . . .	44	..	0·47	6·7	..	0·07	..
	{ Inflammation of tonsils	188	..	3·38	28·8	..	0·52	..
	{ Inflammation of pharynx	24	..	0·40	3·7	..	0·06	..
	{ Inflammation of stomach	7	..	0·09	1·1	..	0·01	..
Digestive system.	{ Gastric ulcer . . . . .	..	..	..	..	..	..	..
	{ Duodenal ulcer . . . . .	..	..	..	..	..	..	..
	{ Liver	7	1	0·11	1·1	0·15	0·02	..
	{ Other diseases	507	16	9·61	77·7	2·45	1·47	..
Diseases due to disorders of nutrition or of metabolism	. . . . .	42	9	1·69	6·4	1·38	0·26	..
Diseases of the—								
Generative system	. . . . .	38	6	1·07	5·8	0·92	0·16	..
Bones, joints, muscles, fasciæ and bursæ	. . . . .	18	3	1·06	2·8	0·46	0·16	..
Areolar tissue	. . . . .	87	..	2·42	13·3	..	0·37	..
Skin	. . . . .	35	..	1·05	5·4	..	0·16	..
Urinary system	. . . . .	31	..	1·72	4·8	..	0·26	..
Injuries	{ General	3	1	0·07	0·5	0·15	0·01	..
	{ Local	91	1	3·75	14·0	0·15	0·57	..
	{ In action . . . . .	..	..	..	..	..	..	..
Tumours and cysts	. . . . .	4	..	0·09	0·6	..	0·01	..
Poisons	. . . . .	2	..	0·01	0·3	..	0·00	..
No appreciable disease	. . . . .	22	..	0·31	3·4	..	0·05	..
Suicides	. . . . .	..	..	..	..	..	..	..
Total	. . . . .	2,180	63	62·29	334·3	9·66	9·55	..

TABLE XII.

BRITISH OTHER RANKS.

Table showing admission and death ratios per 1,000 of Strength by Commands contrasted with the previous year, and the average for the previous five years.

Commands.		Enteric group of fevers.		Influenza.		Cholera.		Small-pox.		Malaria.		Dysentery.	
		A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Northern Command	{ 1930-34 . . .	3·9	0·29	21·2	..	..	..	0·1	..	134·6	0·07	23·3	..
	{ 1934 . . .	1·8	0·17	14·3	..	..	..	..	..	75·8	..	20·4	..
	{ 1935 . . .	2·9	0·30	8·0	..	..	..	..	..	57·3	..	28·8	..
Western Command	{ 1930-34 . . .	3·6	0·15	30·7	0·15	..	..	0·1	..	146·1	0·20	34·7	..
	{ 1934 . . .	1·5	..	33·9	..	..	..	..	..	160·4	..	46·7	..
	{ 1935 . . .	1·3	..	11·3	..	..	..	..	..	136·1	0·51	37·1	..
Eastern Command	{ 1930-34 . . .	3·4	0·27	16·8	0·02	0·1	..	0·1	..	79·5	0·06	23·9	0·04
	{ 1934 . . .	2·3	0·13	15·2	..	0·3	..	0·3	..	48·1	0·06	23·5	..
	{ 1935 . . .	2·8	0·19	11·9	..	0·1	..	0·2	..	44·8	0·13	30·6	0·06
Southern Command	{ 1930-34 . . .	1·8	0·13	10·1	0·01	..	..	0·1	..	67·3	0·06	27·8	..
	{ 1934 . . .	1·1	0·13	17·1	..	..	..	0·1	..	55·3	0·07	29·9	..
	{ 1935 . . .	0·7	0·07	12·6	..	..	..	..	..	48·9	..	25·6	..
Burma District	{ 1930-34 . . .	1·2	..	19·1	..	..	..	..	..	50·2	0·11	17·3	..
	{ 1934 . . .	0·6	..	5·0	..	..	..	0·1	..	54·9	..	18·3	..
	{ 1935 . . .	3·3	..	6·1	..	..	..	..	..	29·2	..	32·0	..
All-India	{ 1930-34 . . .	3·1	0·22	17·6	0·02	0·03	..	0·1	..	97·3	0·08	25·4	0·01
	{ 1934 . . .	1·7	0·13	16·5	..	0·1	..	0·1	..	67·5	0·04	25·5	..
	{ 1935 . . .	2·0	0·17	10·6	..	0·04	..	0·1	..	56·1	0·08	29·2	0·02

Commands.		Pyrexia of uncertain origin.		Pneumonia, lobar and lobular.		Venereal diseases.		Dengue.		Sand-fly fever.		Plague.	
		A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Northern Command	{ 1930-34 . . .	2.1	..	5.3	0.48	27.7	..	0.8	..	89.0	..	..	..
	{ 1934 . . .	1.3	..	5.9	0.23	25.0	..	0.3	..	79.8	..	..	..
	{ 1935 . . .	1.0	..	5.2	0.42	27.3	..	..	..	83.1	..	..	..
Western Command	{ 1930-34 . . .	1.9	..	3.6	0.39	30.6	..	3.7	..	8.7	..	..	..
	{ 1934 . . .	..	..	3.5	..	24.8	..	3.2	..	7.9	..	..	..
	{ 1935 . . .	..	..	3.3	0.26	22.2	..	..	..	6.4	..	..	..
Eastern Command	{ 1930-34 . . .	1.0	..	4.0	0.32	43.0	..	11.8	..	24.6	..	..	..
	{ 1934 . . .	0.4	..	3.3	0.25	40.4	..	2.7	..	22.6	..	..	..
	{ 1935 . . .	0.2	..	4.4	0.70	50.8	..	4.6	..	24.3	..	..	..
Southern Command	{ 1930-34 . . .	2.8	..	3.1	0.24	37.8	..	12.0	..	19.0	..	..	..
	{ 1934 . . .	1.1	..	2.6	0.20	34.5	..	13.3	..	12.5	..	..	..
	{ 1935 . . .	1.1	..	3.6	0.14	38.3	..	5.9	..	8.7	..	..	..
Burma District	{ 1930-34 . . .	1.0	..	2.8	0.22	102.3	..	63.2	..	1.9	..	0.1	0.11
	{ 1934 . . .	..	..	2.2	..	84.3	..	82.7	..	0.6	..	..	..
	{ 1935 . . .	0.6	..	0.6	..	79.4	0.55	57.4	..	..	..	..	..
All India	{ 1930-34 . . .	1.9	..	4.0	0.35	37.7	..	9.5	..	41.4	..	0.0	0.00
	{ 1934 . . .	0.8	..	3.9	0.20	34.2	..	6.6	..	36.2	..	..	..
	{ 1935 . . .	0.7	..	4.2	0.40	38.8	0.02	5.0	..	36.5	..	..	..

A.—Admissions.

D.—Deaths.

TABLE XIII.

VACCINATION PERFORMED IN THE BRITISH AND INDIAN ARMIES DURING 1935—OFFICERS AND OTHER RANKS.

Commands.	British Troops.									
	Officers.					Warrant, and N. C. Officers and men.				
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.			
	P.	R.	P.	R.	P.	R.	P.	R.		
Northern . . . . .	..	218	..	94	4	3,421	100	87		
Western	36	125	89	89	545	1,476	98	85		
Eastern . . . . .	..	172	..	80	4	4,654	100	65		
Southern	22	286	100	77	160	3,829	91	66		
Burma District . . . . .	..	11	..	36	..	351	..	79		
Total	58	812	93	83	713	13,731	97	73		

Commands.	Indian Troops.											
	European officers.				Indian commissioned, Non-commissioned officers and men.				Follower .			
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.	
	P.	R.	P.	R.	P.	R.	P.	R.	P.	R.	P.	R.
Northern	6	188	100	89	427	15,162	100	81	27	3,921	100	84
Western . . . . .	..	54	..	91	..	3,914	..	96	..	664	..	86
Eastern . . . . .	..	107	..	73	537	9,205	44	74	26	1,934	100	78
Southern . . . . .	..	172	..	65	180	10,528	94	58	167	2,669	95	66
Burma District . . . . .	..	13	..	77	100	1,060	90	79	13	142	77	59
Total	6	534	100	78	1,244	39,929	74	75	233	9,330	95	77

P.—Primary

R.—Revaccinations,

TABLE XIV.

VACCINATION PERFORMED IN THE FAMILIES—BRITISH ARMY DURING 1935.

Commands.	Women.				Children.			
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.	
	P.	R.	P.	R.	P.	R.	P.	R.
Northern . . .	3	237	100	95	131	316	98	92
Western . . .	59	75	98	79	116	65	95	80
Eastern . . .	3	341	100	59	123	432	90	66
Southern . . .	20	389	95	71	199	501	91	64
Burma District . . .	..	57	..	70	18	104	100	91
Total . . .	85	1,099	98	73	587	1,418	94	74

TABLE XV.

VACCINATION PERFORMED IN THE FAMILIES—INDIAN ARMY DURING 1935.

Commands.	Women.				Children.			
	Number.		Percentage of successful cases to total operations.		Number.		Percentage of successful cases to total operations.	
	P.	R.	P.	R.	P.	R.	P.	R.
Northern . . .	6	57	100	75	14	25	100	64
Western . . .	..	22	..	91	8	5	100	60
Eastern . . .	30	86	93	69	55	67	100	70
Southern . . .	..	83	..	72	2	64	100	66
Burma District . . .	..	11	..	36	2	6	100	..
Total . . .	36	259	94	72	81	167	100	65

SECTION II.
INDIAN ARMY, 1935.

TABLE B.

STATIONS BY COMMANDS AND INDEPENDENT DISTRICTS.

Stations.	Height above M. S. level in feet.	Authority for height.	Points of reference.	Stations.	Height above M. S. level in feet.	Authority for height.	Points of reference.
Northern Command.				Eastern Command—contd.			
Abbottabad . . .	4,010	S. D.	Map.	Almora . . .	5,494	S. D.	Map.
Ambala . . .	902	"	S. B. M.	Bankura . . .	"	"	"
Amritsar . . .	754	"	"	Bareilly . . .	563	S. D.	S. B. M.
Bakloh . . .	4,585	"	Map.	Benares . . .	256	"	"
Bannu . . .	1,250	"	"	Cawnpore . . .	407	"	B. M.
Campbellpore . . .	1,180	"	"	Chittagong . . .	"	"	"
Chitral . . .	4,980	"	"	Comilla . . .	"	"	"
Dagshai . . .	6,087	"	"	Dacca . . .	20	M. D.	"
Dalhouseie . . .	7,687	"	"	Dehra Dun . . .	2,232	S. D.	S. B. M.
Dera Ismail Khan . . .	568	"	S. B. M.	Delhi . . .	757	"	"
Dharamsala Cantt. . .	4,500	"	Map.	Dinapore . . .	170	"	Church.
Drosh Fort . . .	4,340	"	"	Fategarh . . .	467	"	"
Ferozepore . . .	649	"	S. B. M.	Fyzabad . . .	330	"	S. B. M.
Jhelum . . .	762	"	"	Ghoom . . .	7,313	"	Jn. of road.
Jullundur Cantt. . .	771	"	B. M.	Gyantse . . .	13,120	"	Map.
Jutogh . . .	6,370	"	Map.	Gorakhpore . . .	"	"	"
Kalabagh and Bara-gali . . .	7,963	"	"	Jhansi . . .	849	S. D.	S. B. M.
Kalabagh and Mari Indus . . .	682	"	"	Lansdowne . . .	5,823	Map.	"
Kohat . . .	1,725	"	"	Lucknow . . .	383	"	B. M.
Kuldana . . .	7,049	S. G.	"	Meerut . . .	737	"	S. B. M.
Lahore Cantonment . . .	706	S. D.	S. B. M.	Midnapore . . .	"	"	"
Landikotal . . .	3,509	"	Map.	Muttra . . .	560	S. D.	S. B. M.
Lockhart Fort . . .	6,613	"	"	Mymensingh. . .	"	"	"
Malakand . . .	2,740	"	"	Nowgong . . .	735	S. D.	B. M.
Manzai . . .	1,650	"	"	Roorkee . . .	879	"	S. B. M.
Mardan . . .	1,000	"	"	Saidpur . . .	"	"	"
Mir Ali . . .	2,240	S. G.	V. G. L.	Shillong . . .	4,921	S. D.	Map.
Mona . . .	3,500	S. D.	Map.	Southern Command.			
Multan . . .	404	"	S. B. M.	Ahmedabad . . .	162	S. D.	S. B. M.
Nowshera (Ry. Sta-tion) . . .	966	"	B. M.	Ahmednagar . . .	2,180	"	Map.
Peshawar . . .	1,152	"	S. B. M.	Aurangabad . . .	1,905	M. D.	"
Rawalpindi . . .	1,689	"	"	Bangalore . . .	3,002	S. D.	S. B. M.
Razmak . . .	6,556	"	Map.	Baroda . . .	114	"	B. M.
Risalpur . . .	1,014	"	B. M.	Belgaum . . .	2,523	"	S. B. M.
Sargodha (Railway Rest House) . . .	615	"	"	Bombay (town hall) . . .	20	"	"
Sialkot . . .	829	"	"	Cannanore . . .	40	"	"
Solon . . .	5,078	"	"	Deolali . . .	1,894	"	S. B. M.
Subathu . . .	4,000	"	Map.	Jubbulpore . . .	1,320	"	"
Thall . . .	2,450	"	"	Kamptee (Rly. Sta-tion) . . .	940	"	B. M.
Wana . . .	4,530	"	V. G. L.	Mhow (Ry. Station) . . .	1,887	"	"
Shagai . . .	3,174	"	B. M.	Mount Abu (Sanito-rium) . . .	3,836	"	"
Western Command				Neemuch . . .	1,613	"	"
Chaman Fort . . .	5,502	S. D.	Map.	Nasirabad . . .	1,461	"	B. M.
Fort Sandeman . . .	4,600	"	"	Pachmarhi . . .	3,490	"	"
Hindubagh . . .	5,821	"	"	Poona . . .	1,867	"	S. B. M.
Hyderabad (Sind) . . .	96	"	S. B. M.	Saugor . . .	1,755	"	"
Karachi (Holy Tri-nity Church) . . .	28	"	"	St. Thos. Mount (Ry. Station) . . .	34	"	B. M.
Loralai . . .	4,699	"	Map.	Madras (Obsy.) . . .	250	"	"
Quetta . . .	5,510	"	S. B. M.	Trichinopoly . . .	256	"	S. B. M.
Sibi . . .	436	"	"	Trimulgherry . . .	1,843	"	Map.
Eastern Command.				Wellington Stn. Hospl. . .	5,800	"	"
Agra (Fort) . . .	525	S. D.	S. B. M.	Burma District.			
Alipore . . .	17	"	B. M.	Mandalay (Fort Dufferin) . . .	246	S. D.	Map.
Allahabad . . .	314	"	S. B. M.	Maymyo . . .	3,508	"	"
				Mingaladon . . .	118	"	"

* These heights are usually those of the survey-marks or of the mercury surface in barometer cisterns of meteorological observatories.

S. D. = Survey Department (Map Publication Office).

S. G. = Surveyor-General of India.

S. B. M. = Standard Bench Mark.

B. M. = G. T. Bench Mark.

V. G. L. = Village Ground Level.

Map. = Heights taken from Topo. Maps.

M. D. = Meteorological Department.

TABLE XVI.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

ALL INDIA.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1935, with ratios per 1,000 of the strength.

Diseases.	Actuals.				Ratio per 1,000.			
	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Admissions.	Deaths.	Invalids.	Constantly sick.
Average strength.	116,984.							
<i>Specific diseases due to infection or infestation.</i>								
Common cold	675	..	..	11·01	5·8	..	..	0·09
Diphtheria	3	..	..	0·19	0·0	..	..	0·00
Dysentery	1,424	2	1	52·55	12·2	0·02	0·01	0·45
Enteric fevers (inclusive of typhoid, para. A B & C and enteric group).	166	13	1	25·28	1·4	0·11	0·01	0·22
Erysipelas	10	..	..	0·45	0·1	..	..	0·00
Influenza	635	3	..	15·62	5·4	0·03	..	0·13
Malaria	14,728	9	3	358·81	125·9	0·08	0·03	3·07
Measles	260	..	..	12·41	2·2	..	..	0·11
Meningococcal infection	19	7	..	1·88	0·2	0·06	..	0·02
Mumps	799	..	..	39·91	6·8	..	..	0·34
Pneumonia	576	60	..	45·82	4·9	0·51	..	0·39
Pyrexia of uncertain origin	11	..	..	1·60	0·1	..	..	0·01
Rheumatic fever	96	..	3	7·77	0·8	..	0·03	0·07
Sandfly fever	882	..	..	14·60	7·5	..	..	0·12
Scarlet fever	1	..	..	0·10	0·0	..	..	0·00
Small pox	22	3	..	1·93	0·2	0·03	..	0·02
Tuberculosis								
{ Pulmonary	219	15	194	24·75	1·9	0·13	1·66	0·21
{ Other	56	8	25	6·41	0·5	0·07	0·21	0·05
Venereal diseases								
{ Gonorrhœa	543	1	4	58·27	4·6	0·01	0·03	0·50
{ Soft chancre	210	..	..	22·57	1·8	..	..	0·19
{ Syphilis	433	..	3	38·00	3·7	..	0·03	0·32
{ Other V. D.	..	..	..	..	..	..	..	..

TABLE XVI—contd.

Diseases.	Actuals.				Ratio per 1,000.			
	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Admissions.	Deaths.	Inalid s.	Constantly sick.
Other diseases due to infection	952	13	21	49·01	8·1	0·11	0·18	0·42
Diseases due to infestation by Metazoan parasites { Scabies	1,126	..	..	33·78	9·6	..	..	0·29
Other diseases	1,332	..	4	57·85	11·4	..	0·03	0·49
<i>Other diseases classified under systems.</i>								
Diseases of the nervous system	369	7	39	20·42	3·2	0·06	0·33	0·17
Mental diseases	93	..	30	6·79	0·8	..	0·26	0·06
Diseases of the eye	1,357	..	38	54·66	11·6	..	0·32	0·47
Diseases of the ear and nose	1,189	1	19	37·07	10·2	0·01	0·16	0·32
Diseases of the circulatory system. { Valvular diseases of the heart	14	1	13	1·66	0·1	0·01	0·11	0·01
Disordered action of the heart	41	4	6	1·66	0·4	0·03	0·05	0·01
Other diseases	47	8	8	3·23	0·4	0·07	0·07	0·03
Diseases of blood and blood forming organs	367	4	11	24·30	3·1	0·03	0·09	0·21
Diseases of ductless or endocrine glands	22	..	1	1·07	0·2	..	0·01	0·01
Diseases of the breast	6	..	..	0·28	0·1	..	..	0·00
Diseases of the respiratory system. { Larynx and trachea	117	..	..	3·37	1·0	..	..	0·03
Bronchi & bronchioles	1,397	..	10	47·92	11·9	..	0·09	0·41
Other diseases	232	2	23	23·15	2·0	0·02	0·20	0·20
Diseases of the teeth and gums	338	..	1	8·91	2·9	..	0·01	0·08
Diseases of the digestive system. { Inflammation of the tonsils	609	..	3	15·17	5·2	..	0·03	0·13
Inflammation of pharynx	1,926	..	..	37·97	16·5	..	..	0·32
Inflammation of stomach	101	1	1	2·96	0·9	0·01	0·01	0·03
Gastric ulcer	1	1	..	0·03	0·0	0·01	..	0·00
Duodenal ulcer	10	1	1	0·83	0·1	0·01	0·01	0·01
Liver diseases	137	..	2	7·69	1·2	..	0·02	0·07
Other diseases	2,433	10	19	84·04	20·8	0·09	0·16	0·74
Diseases due to disorders of nutrition or of metabolism	19	..	5	1·83	0·2	..	0·04	0·02
Diseases of the generative system	308	..	2	13·24	2·6	..	0·02	0·11
Diseases of bones, joints, muscles, fasciæ and bursæ	1,067	1	34	49·56	9·1	0·01	0·29	0·42
Diseases of the areolar tissue	3,845	1	4	129·21	32·9	0·01	0·03	1·10
Diseases of the skin	1,438	1	3	59·34	12·3	0·01	0·03	0·51
Diseases of the urinary system	282	1	9	14·97	2·4	0·01	0·08	0·13

Injuries .	{	General	41	25	..	1.20	0.4	0.21	..	0.01
		Local	6,209	37	101	292.00	53.1	0.32	0.86	2.50
		Inaction	15	3	..	1.36	0.1	0.03	..	0.01
Tumours and cysts		159	2	3	7.98	1.4	0.02	0.03	0.07	
Poisons		30	5	..	0.75	0.3	0.04	..	0.01	
No appreciable disease		55*	2	3	2.11	0.5	0.02	0.03	0.02	
Suicides† . . . . .		..	10	..	..	..	0.09	..	..
Total .		49,452	252	648	1,837.30	422.7	2.15	5.54	15.71	

* Includes 4 cases of malformations and 1 case of carrier (Typhoid fever).

† The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

TABLE XVII.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

NORTHERN COMMAND.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1935, with ratios per 1,000 of the strength.

Diseases.	Actuals.				Ratio per 1,000.			
	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Admissions.	Deaths.	Invalids.	Constantly sick.
Average strength, 55,247.								
<i>Specific Diseases due to infection or infestation.</i>								
Common cold	196	...	...	3.25	3.5	...	...	0.06
Diphtheria	1	...	...	0.07	0.0	...	...	0.00
Dysentery	654	2	...	22.97	11.8	0.04	...	0.42
Enteric fever (inclusive of typhoid, para A, B & C, and enteric group).	87	5	...	12.60	1.6	0.09	...	0.23
Erysipelas	6	...	...	0.24	0.1	...	...	0.00
Influenza	298	2	...	6.84	5.4	0.04	...	0.12
Malaria	7,571	3	2	156.63	137.0	0.05	0.04	2.84
Measles	94	...	...	4.18	1.7	...	...	0.08
Meningococcal infection	18	7	...	1.11	0.2	0.13	...	0.02
Mumps	234	...	...	12.22	4.2	...	...	0.22
Pneumonia	282	36	...	22.26	5.1	0.65	...	0.40
Pyrexia of uncertain origin	8	...	...	1.04	0.1	...	...	0.02
Rheumatic fever	51	...	1	3.72	0.9	...	0.02	0.07
Sandfly fever	788	...	...	12.91	14.3	...	...	0.23
Scarlet fever.	...	1	...	0.80	0.2	0.02	...	0.01
Small-pox	...	...	...	...	...	...	...	...
Tuberculosis	{ Pulmonary 112	10	99	12.48	2.0	0.18	1.79	0.23
	{ Other 29	4	14	2.69	0.5	0.07	0.25	0.05
Venereal diseases	{ Gonorrhœa 201	...	1	20.48	3.6	...	0.02	0.37
	{ Soft chancre 78	...	...	7.07	1.4	...	...	0.13
	{ Syphilis 135	...	1	12.08	2.4	...	0.02	0.23
	{ Other V. D. ...	...	...	...	...	...	...	...

Other diseases due to infection	247	7	10	16·85	4·5	0·13	0·18	0·30
Diseases due to infestation by Metazoan parasites, { Scabies	554	...	...	16·74	10·0	...	...	0·30
Other diseases	423	...	2	23·55	7·7	...	0·04	0·43
<i>Other Diseases classified under systems.</i>								
Diseases of the nervous system	162	2	15	9·15	2·9	0·04	0·27	0·17
Mental diseases	41	...	10	2·93	0·7	...	0·18	0·05
Diseases of the :—								
Eye	639	...	15	23·50	11·6	...	0·27	0·43
Ear and nose	500	1	5	17·67	9·1	0·02	0·09	0·32
Diseases of the circulatory system, { Valvular diseases of the heart	3	1	2	0·32	0·1	0·02	0·04	0·01
{ Disordered action of the heart	22	1	3	0·96	0·4	0·02	0·05	0·02
{ Other diseases	24	3	2	1·72	0·4	0·05	0·04	0·03
Blood and blood forming organs	141	3	6	7·59	2·6	0·05	0·11	0·14
Diseases of ductless or endocrine glands	6	...	...	0·28	0·1	...	...	0·01
Diseases of the breast	4	...	...	0·13	0·1	...	...	0·00
Diseases of the respiratory system, { Larynx and trachea	59	...	...	1·59	1·1	...	...	0·03
{ Bronchi and bronchioles	641	...	2	21·60	11·6	...	0·04	0·39
{ Other diseases	131	1	12	12·30	2·4	0·02	0·22	0·22
Diseases of the teeth and gums	142	...	...	3·76	2·6	...	...	0·07
Diseases of the digestive system, { Inflammation of tonsils	274	...	...	6·79	5·0	...	...	0·12
{ Inflammation of pharynx	978	...	...	18·84	17·7	...	...	0·34
{ Inflammation of stomach	49	1	...	1·11	0·9	0·02	...	0·02
{ Gastric ulcer . . . . .	...	...	...	...	...	...	...	...
{ Duodenal ulcer	3	...	...	0·26	0·1	...	...	0·00
{ Liver diseases	42	...	1	2·59	0·8	...	0·02	0·05
{ Other diseases	1,194	4	8	39·42	21·6	0·07	0·14	0·71
Diseases due to disorders of nutrition or of metabolism	10	...	...	0·56	0·2	...	...	0·01
Diseases of the generative system	139	...	1	5·71	2·5	...	0·02	0·10
Diseases of bones, joints, muscles, fasciæ and bursæ	460	1	11	22·21	8·3	0·02	0·20	0·40
Diseases of the areolar tissue	1,682	1	...	55·71	30·4	0·02	...	1·01
Diseases of the skin	640	...	2	25·44	11·6	...	0·04	0·46
Diseases of the urinary organs	140	...	4	7·28	2·5	...	0·07	0·13
Injuries { General	21	6	...	0·60	0·4	0·11	...	0·01
{ Local	2,807	13	30	129·74	50·8	0·22	0·54	2·35
{ In action	15	3	...	1·36	0·3	0·05	...	0·02
Tumours and cysts	87	1	1	4·87	1·6	0·02	0·02	0·09
Poisons	12	3	...	0·41	0·2	0·05	...	0·01
No appreciable disease	†22	...	2	0·59	0·4	...	0·04	0·01
Suicides* . . . . .	...	5	...	...	...	0·09	...	...
Total	23,161	122	262	799·77	419·2	2·21	4·74	14·48

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.
† Includes 3 cases of malformations.

TABLE XVIII.

INDIAN OFFICERS AND INDIAN OTHER RANKS. WESTERN COMMAND.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1935, with ratios per 1,000 of the strength.

Diseases.	Actuals.				Ratio per 1,000.			
	Admissions.	Deaths.	Invallds. sent home.	Average number constantly sick.	Admissions.	Deaths.	Invallds. sent home.	Average number constantly sick.
Average strength, 13,482.								
<i>Specific Diseases due to infection or infestation.</i>								
Common cold	130	..	..	2.28	9.6	..	..	0.17
Diphtheria . . . . .	..	..	..	..	..	..	..	..
Dysentery	128	..	1	4.40	9.5	..	0.07	0.33
Enteric fever (inclusive of typhoid, para. A, B & C and enteric group).	18	1	1	3.04	1.3	0.07	0.07	0.23
Erysipelas	3	..	..	0.10	0.2	..	..	0.01
Influenza	62	1	..	1.49	4.6	0.07	..	0.11
Malaria	2,360	3	..	73.56	175.0	0.22	..	5.46
Measles	44	..	..	2.14	3.3	..	..	0.16
Meningococcal infection	1	..	..	0.18	0.1	..	..	0.01
Mumps	150	..	..	7.96	11.1	..	..	0.59
Pneumonia	74	11	..	5.37	5.5	0.82	..	0.40
Pyrexia of uncertain origin . . . . .	..	..	..	..	..	..	..	..
Rheumatic fever	9	..	..	0.59	0.7	..	..	0.04
Sandfly fever	39	..	..	0.65	2.9	..	..	0.05
Scarlet fever. . . . .	..	..	..	..	..	..	..	..
Small-pox	2	..	..	0.13	0.1	..	..	0.01
Tuberculosis	16	..	14	2.47	1.2	..	1.04	0.18
{ Pulmonary	11	..	3	1.60	0.8	..	..	0.12
{ Other	19	2	..	2.11	0.15	0.22	..	0.16
{ Gonorrhoea	27	..	..	3.08	1.4	..	..	0.23
{ Soft chancre	20	..	..	1.79	1.5	..	..	0.13
{ Syphilis . . . . .	..	..	..	..	..	..	..	..
{ Other V. D.	67	..	4	4.41	5.0	..	0.30	0.33
Other diseases due to infection	64	..	..	2.03	4.7	..	..	0.15
Diseases due to infestation by Scabies	80	..	..	3.30	5.9	..	..	0.24
Metazoan parasites. . . . .	..	..	..	..	..	..	..	..

Other diseases classified under systems.

Diseases of the nervous system	34	1	4	1.90	2.5	0.07	0.30	0.14
Mental diseases	12	..	3	0.89	0.9	..	0.22	0.07
Diseases of the eye	74	..	4	3.00	5.5	..	0.30	0.22
Diseases of the ear and nose	73	..	2	2.28	5.4	..	0.15	0.17
Diseases of the circulatory system. {								
Valvular diseases of the heart	4	..	3	0.46	0.8	..	0.22	0.03
Disordered action of the heart	8	1	1	0.08	0.2	0.07	0.07	0.01
Other diseases	4	1	..	0.14	0.3	0.07	..	0.01
Diseases of the blood and blood forming organs	57	..	1	3.42	4.2	..	0.07	0.25
Diseases of the ductless or endocrine glands	1	..	..	0.11	0.1	..	..	0.01
Diseases of the breast . . . . .	..	..	..	..	..	..	..	..
Diseases of the respiratory system. {								
Larynx and trachea	15	..	..	0.49	1.1	..	..	0.04
Bronchi and bronchioles	164	..	1	5.65	12.2	..	0.07	0.42
Other diseases	19	..	..	1.38	1.4	..	..	0.10
Diseases of the teeth and gums	36	..	..	0.96	2.7	..	..	0.07
Diseases of the digestive system. {								
Inflammation of tonsils	63	..	..	1.59	4.7	..	..	0.12
Inflammation of pharynx	264	..	..	5.71	19.6	..	..	0.42
Inflammation of stomach	5	..	..	0.13	0.4	..	..	0.01
Gastric ulcer . . . . .	..	..	..	..	..	..	..	..
Duodenal ulcer . . . . .	..	..	..	..	..	..	..	..
Liver diseases	7	..	..	0.18	0.5	..	..	0.01
Other diseases	215	2	3	6.84	15.9	0.15	0.22	0.51
Diseases due to disorders of nutrition or of metabolism	1	..	1	0.03	0.1	..	0.07	0.00
Diseases of the generative system	29	..	..	1.45	2.2	..	..	0.11
Diseases of bones, joints, muscles, fasciæ, and bursæ	116	..	5	4.71	8.6	..	0.37	0.35
Diseases of the areolar tissue	192	..	1	6.81	14.2	..	0.07	0.51
Diseases of the skin	139	..	..	5.76	10.3	..	..	0.43
Diseases of the urinary system	20	..	1	0.82	1.5	..	0.07	0.06
Injuries {								
General	2	13	..	0.14	0.1	0.96	..	0.01
Local	522	7	14	25.17	38.7	0.52	1.04	1.87
In action . . . . .	..	..	..	..	..	..	..	..
Tumours and cysts	11	1	1	0.53	0.8	0.07	0.07	0.04
Poisons . . . . .	..	..	..	..	..	..	..	..
No appreciable disease	8	..	..	0.41	0.6	..	..	0.03
Suicides* . . . . .	..	..	..	..	..	..	..	..
Total	5,414	44	68	203.78	401.6	3.28	5.04	15.11

*The figures against "suicides" having already been shown under the heading of the injury, etc, which caused death, are not included in the total.

TABLE XIX.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

EASTERN COMMAND.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1935, with ratios per 1,000 of the Strength.

Diseases.	Actuals.				Ratio per 1,000.			
	Admissions.	Deaths.	Invalids sent home.	Average number constantly sick.	Admissions.	Deaths.	Invalids sent home.	Average number constantly sick.
Average strength, 23,744.								
<i>Specific diseases due to infection or infestation.</i>								
Common cold	197	...	...	3.46	8.3	...	...	0.15
Diphtheria . . . . .	...	...	...	...	...	...	...	...
Dysentery	302	...	...	12.15	12.7	...	...	0.51
Enteric fever (inclusive of typhoid, para. A, B & C. and enteric group)	36	3	...	6.24	1.5	0.13	...	0.26
Erysipelas . . . . .	...	...	...	...	...	...	...	...
Influenza	154	...	...	3.52	6.5	...	...	0.15
Malaria	2,642	2	...	73.59	111.3	0.06	...	3.10
Measles	95	...	...	4.72	4.0	...	...	0.20
Meningococcal infection	3	...	...	0.35	0.1	...	...	0.01
Mumps	337	...	...	15.41	14.2	...	...	0.65
Pneumonia	139	6	...	12.83	5.9	0.25	...	0.54
Pyrexia of uncertain origin	1	...	...	0.23	0.0	...	...	0.01
Rheumatic fever	11	...	1	1.06	0.5	...	0.04	0.04
Sandfly fever	33	...	...	0.67	1.4	...	...	0.03
Scarlet fever	1	...	...	0.10	0.0	...	...	0.00
Small-pox	9	...	...	0.78	0.4	...	...	0.03
Tuberculosis { Pulmonary	62	4	53	6.74	2.6	0.17	2.23	0.28
{ Other	15	2	7	2.00	0.6	0.08	0.29	0.08
Venereal diseases { Gonorrhoea	177	...	2	21.04	7.5	...	0.08	0.89
{ Soft chancre	46	...	...	6.51	1.9	...	...	0.27
{ Syphilis	123	...	1	11.20	5.2	...	0.04	0.47
{ Other V. D. . . . .	...	...	...	...	...	...	...	...

Other diseases due to infection	146	4	3	10.44	8.1	0.17	0.13	0.44
Diseases due to infestation { Scabies	296	...	...	8.26	12.5	...	...	0.35
by Metazoan parasites. { Other diseases.	201	...	...	11.03	8.5	...	...	0.46
<i>Other diseases classified under systems.</i>								
Diseases of the nervous system	88	1	6	4.35	3.7	0.04	0.25	0.18
Mental diseases	18	...	4	0.92	0.8	...	0.17	0.04
Diseases of the eye	393	...	11	17.31	16.6	...	0.46	0.73
Diseases of the ear and nose	292	...	3	8.87	12.3	...	0.13	0.37
Diseases of the { Valvular disease of the heart	1	...	2	0.41	0.0	...	0.13	0.02
Circulatory sys- { Disordered action of the heart	6	...	2	0.28	0.3	...	0.08	0.01
tem. { Other diseases	5	1	3	0.42	0.2	0.04	0.13	0.02
Blood and blood forming organs	73	1	3	5.80	3.1	0.04	0.13	0.24
Diseases of ductless or endocrine glands	14	...	1	0.58	0.6	...	0.04	0.02
Diseases of the breast	2	...	...	0.15	0.1	...	...	0.01
Diseases of the res- { Larynx and trachea	27	...	...	0.96	1.1	...	...	0.04
piratory sys- { Bronchi and bronchioles.	296	...	3	10.88	12.5	...	0.13	0.46
tem. { Other diseases	46	...	5	5.16	1.9	...	0.21	0.22
Diseases of the teeth and gums	84	...	1	2.19	3.5	...	0.04	0.22
Diseases of the { Inflammation of the tonsils	131	...	1	3.28	5.5	...	0.04	0.14
	digestive { Inflammation of pharynx	321	...	...	6.56	13.5	...	0.28
	system. { Inflammation of stomach	19	...	...	0.62	0.8	...	0.03
	{ Gastric ulcer . . . . .	...	...	...	0.01	...	...	0.00
	{ Duodenal ulcer	4	...	1	0.45	0.2	0.04	0.02
	{ Liver diseases	47	1	...	2.73	2.0	0.04	0.11
{ Other diseases	562	1	5	21.36	23.7	0.04	0.21	0.90
Diseases due to disorders of nutrition or of metabolism	3	...	3	0.65	0.1	...	0.13	0.03
Diseases of the generative system	76	...	...	3.48	3.2	...	...	0.15
Diseases of bones, joints, muscles, fasciæ and bursæ	222	...	10	10.23	9.3	...	0.42	0.43
Diseases of the areolar tissue	966	...	2	23.63	40.7	...	0.08	1.42
Diseases of the skin	351	...	...	13.48	14.8	...	...	0.57
Diseases of the urinary system	53	...	3	3.70	2.2	...	0.13	0.16
Injuries { General	11	3	...	0.29	0.5	0.13	...	0.01
	Local	1,423	8	72.27	59.9	0.34	1.14	3.04
	In action . . . . .	...	...	...	...	...	...	...
Tumours and cysts	23	...	...	1.26	1.0	...	...	0.05
Poisons	8	2	...	0.14	0.3	0.08	...	0.01
No appreciable disease	13	2†	...	0.44	0.5	0.08	...	0.02
Suicides* . . . . .	...	2	...	...	...	0.08	...	...
Total	10,604	41	164	445.19	446.6	1.73	6.91	18.75

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.
† Cause unknown.

TABLE XX.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

SOUTHERN COMMAND.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1935, with ratios per 1,000 of the strength.

Diseases.	Actuals.				Ratio per 1,000.			
	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Admissions.	Deaths.	Invalids.	Constantly sick.
Average strength, 21,450.								
<i>Specific diseases due to infection or infestation.</i>								
Common cold	150	...	...	1.96	7.0	...	...	0.09
Diphtheria	2	...	...	0.12	0.1	...	...	0.01
Dysentery	278	...	...	10.09	13.0	...	...	0.47
Enteric fever (inclusive of typhoid, para. A, B & C, and enteric group).	23	4	...	2.76	1.1	0.19	...	0.13
Erysipelas	1	...	...	0.05	0.0	...	...	0.00
Influenza	118	...	...	3.69	5.5	...	...	0.17
Malaria	1,730	...	1	42.94	80.7	...	0.05	2.00
Measles	13	...	...	0.60	0.6	...	...	0.03
Meningococcal infection	2	...	...	0.24	0.1	...	...	0.01
Mumps	77	...	...	4.27	3.6	...	...	0.20
Pneumonia	66	7	...	4.42	3.1	0.83	...	0.21
Pyrexia of uncertain origin	1	...	...	0.15	0.0	...	...	0.01
Rheumatic fever	25	...	1	2.40	1.2	...	0.05	0.11
Sandfly fever	22	...	...	0.37	1.0	...	...	0.02
Scarlet fever	...	...	...	...	...	...	...	...
Small-pox	2	2	...	0.22	0.1	0.09	...	0.01
Tuberculosis								
{ Pulmonary	22	...	22	2.63	1.0	...	1.03	0.12
{ Other	1	...	1	0.12	0.0	...	0.05	0.01
Veneral diseases								
{ Gonorrhœa	75	1	...	6.75	3.5	0.05	...	0.31
{ Soft chancre	39	...	...	3.50	1.8	...	...	0.16
{ Syphilis	87	...	1	7.83	4.1	...	0.05	0.36
{ Other V. D.	...	...	...	...	...	...	...	...

Other diseases due to infection	341	2	4	13.19	15.9	0.09	0.19	0.25
Diseases due to infestation by Metazoan parasites. { Scabies	165	...	...	5.26	7.7	...	...	0.61
Other diseases	568	...	2	17.95	26.5	...	0.09	0.84
<i>Other diseases classified under systems.</i>								
Diseases of the nervous system	60	3	12	3.86	2.8	0.14	0.56	0.18
Mental diseases	18	...	12	1.45	0.8	...	0.56	0.07
Diseases of the eyes	224	...	8	9.04	10.4	...	0.37	0.42
Diseases of the ear and nose	203	...	9	5.89	9.5	...	0.42	0.27
Diseases of the circulatory system. { Valvular diseases of the heart	2	...	2	0.12	0.1	...	0.09	0.01
{ Disordered action of the heart	9	2	...	0.27	0.4	0.09	...	0.01
{ Other diseases	14	1	3	0.95	0.7	0.05	0.14	0.04
Diseases of the blood and blood forming organs	63	...	1	4.31	2.9	...	0.05	0.20
Diseases of ductless or endocrine glands	1	...	...	0.10	0.0	...	...	0.00
Diseases of the breast . . . . .	...	...	...	...	...	...	...	...
Diseases of the respiratory system. { Larynx and trachea	10	...	...	0.19	0.5	...	...	0.01
{ Bronchi and bronchioles	242	...	4	7.43	11.3	...	0.19	0.35
{ Other diseases	21	1	4	1.91	1.0	0.05	0.19	0.09
Diseases of the teeth and gums	52	...	...	1.47	2.4	...	...	0.07
Diseases of the digestive system. { Inflammation of tonsils	117	...	2	3.05	5.5	...	0.09	0.14
{ Inflammation of pharynx	192	...	...	3.98	9.0	...	...	0.19
{ Inflammation of stomach	23	...	1	1.03	1.1	...	0.05	0.05
{ Gastric ulcer . . . . .	...	...	...	...	...	...	...	...
{ Duodenal ulcer	2	1	...	0.07	0.1	0.05	...	0.00
{ Liver diseases	33	...	1	1.80	1.5	...	0.05	0.08
{ Other diseases	366	2	3	13.29	17.1	0.09	0.14	0.62
Diseases due to disorders of nutrition or of metabolism	3	...	1	0.47	0.1	...	0.05	0.02
Diseases of the generative system	89	...	1	1.48	1.8	...	0.05	0.07
Diseases of bones, joints, muscles, fasciæ and bursæ	220	...	6	9.69	10.3	...	0.28	0.45
Diseases of the areolar tissue	882	...	1	28.28	41.1	...	0.05	1.32
Diseases of the skin	226	...	1	11.07	10.5	...	0.05	0.52
Diseases of the urinary system	64	...	1	2.87	3.0	...	0.05	0.13
Injuries { General	3	2	...	0.05	0.1	0.09	...	0.00
{ Local	1,233	6	26	55.90	57.5	0.28	1.21	2.61
{ In action . . . . .	...	...	...	...	...	...	...	...
Tumours and cysts	33	...	1	1.21	1.5	...	0.05	0.06
Poisons	7	...	...	0.11	0.3	...	...	0.01
No appreciable disease	8†	...	1	0.41	0.4	...	0.05	0.02
Suicides* . . . . .	...	2	...	...	...	0.09	...	...
Total	8,178	34	133	303.16	381.3	1.59	6.20	14.3

* The figures against "Suicides" having already been shown under the heading of the injury, etc, which caused death, are not included in the total.
† Includes 1 case of typhoid carrier.

TABLE XXI.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

BURMA DISTRICT.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick during the year 1935, with ratios per 1,000 of the strength.

Diseases. Average strength, 3,061.	Actuals.				Ratio per 1,000.			
	Admissions.	Deaths.	Invalids sent home.	Average number constantly sick.	Admissions.	Deaths.	Invalids sent home.	Average number constantly sick.
<i>Specific diseases due to infection or infestation.</i>								
Common cold	2	...	...	0·06	0·7	...	...	0·02
Diphtheria . . . . .	...	...	...	...	...	...	...	...
Dysentery	62	...	...	2·94	20·3	...	...	0·96
Enteric fever (inclusive of typhoid, para. A, B, & C, and enteric group).	2	...	...	0·64	0·7	...	...	0·21
Erysipelas . . . . .	...	...	...	...	...	...	...	...
Influenza	3	...	...	0·03	1·0	...	...	0·03
Malaria	425	1	...	12·09	138·8	0·33	...	3·95
Measles	14	...	...	0·77	4·6	...	...	0·25
Meningococcal infection . . . . .	...	...	...	...	...	...	...	...
Mumps	1	...	...	0·05	0·3	...	...	0·02
Pneumonia	15	...	...	0·94	4·9	...	...	0·31
Pyrexia of uncertain origin	1	...	...	0·18	0·3	...	...	0·06
Rheumatic fever . . . . .	...	...	...	...	...	...	...	...
Sandy fever . . . . .	...	...	...	...	...	...	...	...
Scarlet fever . . . . .	...	...	...	...	...	...	...	...
Small-pox . . . . .	...	...	...	...	...	...	...	...

Tuberculosis	{	Pulmonary	7	1	6	0.58	2.3	0.33	1.96	0.17
		Other . . . . .	...	...	...	...	...	...	...	...
Venereal diseases	{	Gonorrhœa	71	...	1	7.89	23.2	...	0.33	2.58
		Soft chancre	20	...	...	2.41	6.5	...	...	0.79
		Syphilis	68	...	...	5.10	22.2	...	...	1.67
		Other V. D. . . . .	...	...	...	...	...	...	...	...
Other diseases due to infection		151	...	...	4.12	49.3	...	...	1.35	
Diseases due to infestation by Metazoan parasites.	{	Scabies	47	...	...	1.49	15.4	...	...	0.49
		Other diseases.	60	...	...	2.02	19.6	...	...	0.66
<i>Other diseases classified under systems.</i>										
Diseases of the nervous system		25	...	2	1.16	8.2	...	0.65	0.38	
Mental diseases		4	...	1	0.60	1.3	...	0.33	0.20	
Diseases of the										
Eye		27	...	...	1.81	8.8	...	...	0.59	
Ear and nose		121	...	...	2.36	39.5	...	...	0.77	
Circulatory system.	{	Valvular diseases of the heart	4	...	3	0.35	1.3	...	0.98	0.11
		Disordered action of the heart	1	...	...	0.07	0.3	...	...	0.02
		Other diseases. . . . .	...	2	...	...	...	0.65	...	...
Blood and blood forming organs		33	...	...	3.18	10.8	...	...	1.04	
Ductless or endocrine glands . . . . .		...	...	...	...	...	...	...	...
Breast . . . . .		...	...	...	...	...	...	...	...
Respiratory system.	{	Larynx and trachea	6	...	...	0.14	2.0	..	...	0.05
		Bronchi and bronchioles	54	...	...	2.36	17.6	...	...	0.77
		Other diseases	15	...	2	2.40	4.9	...	0.65	0.78
Teeth and gums		24	...	...	0.53	7.8	...	...	0.17	
Diseases of the digestive sys- tem.	{	Inflammation of the tonsils	24	...	...	0.46	7.8	...	...	0.15
		Inflammation of pharynx.	171	...	...	2.88	55.9	...	...	0.94
		Inflammation of stomach	5	...	...	0.07	1.6	...	...	0.02
		Gastric ulcer	1	1	...	0.02	0.3	0.33	...	0.01
		Duodenal ulcer	1	...	...	0.05	0.3	...	...	0.02
		Liver	9	...	...	0.47	2.9	...	...	0.15
Other diseases		95	...	...	3.05	31.0	...	...	1.00	
Diseases due to disorders of nutrition or of metabolism		2	...	...	0.12	0.7	...	...	0.04	
Diseases of the generative system		25	...	...	1.12	8.2	...	...	0.37	
Diseases of the bones, joints, muscles, fasciæ and bursae		49	...	2	2.72	16.0	...	0.65	0.89	

TABLE XXI—contd.

BURMA DISTRICT—contd.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and constantly sick, during the year 1935, with ratios per 1,000 of the strength—contd.

Diseases.	Actuals.				Ratio per 1,000.			
	Admissions.	Deaths.	Invalids.	Average number constantly sick.	Admissions.	Deaths.	Invalids.	Constantly sick.
Average strength, 3,061.								
<i>Other diseases classified under systems—contd.</i>								
Diseases of the :—								
Areolar tissue	123	...	...	4.78	40.2	...	...	1.46
Skin	82	1	...	3.59	26.8	0.33	...	1.17
Urinary system	5	1	...	0.30	1.6	0.33	...	0.10
Injuries { General	4	1	...	0.12	1.3	0.33	...	0.04
{ Local	224	3	4	8.92	73.2	0.98	1.81	2.91
{ In action . . . . .	...	...	...	...	...	...	...	...
Tumours and cysts	5	...	...	0.11	1.6	...	...	0.04
Poisons	3	...	...	0.09	1.0	...	...	0.03
No appreciable disease	4†	...	...	0.26	1.3	...	...	0.08
Suicides* . . . . .	...	1	...	...	...	0.33	...	...
Total	2,095	11	21	85.40	684.4	3.59	6.86	27.90

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

† Includes one case of malformation.

TABLE XXII.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

Table showing monthly ratios per 1,000 of strength of admissions for certain diseases for All-India during the year 1935.

	Enteric group of fevers.	Influenza.	Cholera.	Small-pox.	Malaria.	Dysentery protozoal.	Dysentery bacillary.	Dysentery bacillary exudate.	Dysentery group.	Pyrexia of uncertain origin.	Pneumonia lobar and lobular.	Diarrhoea.	Dengue.	Sand-fly fever.	Plague.	Effects of heat.	All causes.
January	0·1	1·0	∴	0·0	2·9	0·∴	0·2	0·1	0·1	0·0	0·6	0·3	0·3	∴	0·0	∴	27·7
February	0·0	0·4	∴	0·0	2·1	0·0	0·1	0·1	0·1	0·∴	0·4	0·1	0·3	∴	∴	∴	21·4
March	0·1	0·4	∴	0·0	1·9	0·1	0·2	0·2	0·1	0·0	0·4	0·3	0·2	0·0	∴	∴	23·4
April	0·1	0·8	∴	0·0	2·2	0·0	0·4	0·3	0·4	∴	0·4	0·4	0·1	0·2	∴	0·0	26·2
May	0·1	0·3	∴	0·0	4·2	0·0	0·5	0·5	0·6	0·0	0·3	0·9	0·1	0·9	∴	0·1	30·6
June	0·2	0·2	∴	0·0	6·7	0·1	0·6	0·4	0·5	0·0	0·3	0·8	0·2	1·0	∴	0·1	30·8
July	0·2	0·2	0·∴	∴	9·8	0·0	0·5	0·3	0·3	0·0	0·3	0·5	0·4	2·3	∴	∴	37·9
August	0·2	0·2	0·0	∴	23·1	0·0	0·6	0·6	0·3	∴	0·3	0·6	0·6	1·4	∴	∴	51·0
September	0·2	0·3	∴	∴	30·7	0·0	0·6	0·4	0·3	0·0	0·3	0·6	0·6	1·3	∴	∴	59·8
October	0·1	0·2	∴	0·0	21·9	0·1	0·6	0·2	0·2	∴	0·3	0·5	0·5	0·5	∴	∴	47·6
November	0·1	0·3	∴	0·0	16·4	0·0	0·4	0·3	0·2	∴	0·5	0·4	0·1	0·2	∴	∴	40·5
December	0·1	1·1	∴	0·0	5·9	0·0	0·3	0·2	0·2	∴	0·6	0·3	0·1	0·0	∴	∴	29·1
Total	1·3	5·4	0·0	0·2	126·0	0·4	5·0	3·5	3·2	0·1	4·9	5·6	3·4	7·6	0·0	0·1	423·2

XXIII.

INDIAN OTHER RANKS.

diseases in each Station and District in India during the year 1935.

	Colitis.	Diarrhoea.	Cholera.	Veneral diseases.	Small-pox.	Malaria.	Dengue.	Sand-fly fever.	Plague.	Influenza.	Pneumonia lobar and lobular.	Heat-stroke.	Heat-exhaustion.	All causes.	Average number constantly sick.
	..	13.2	..	..	..	13.2	..	39.7	..	..	..	..	..	225.2	5.63
	..	8.4	..	2.4	..	49.4	..	12.0	..	8.4	1.2	..	..	214.5	8.23
	..	8.3	..	4.4	0.5	93.9	..	131.3	..	64.3	4.4	..	..	493.4	14.15
	..	3.0	..	3.0	..	154.1	..	41.5	..	..	4.4	..	..	370.4	9.57
	..	2.9	..	3.9	..	252.4	..	12.6	..	23.2	4.8	..	1.9	549.3	14.84
	..	8.1	..	6.4	..	98.5	..	4.4	..	6.1	3.7	..	0.7	438.5	15.39
	..	6.4	..	10.4	0.2	148.1	..	15.2	..	0.2	6.4	..	..	389.1	14.34
1.6	2.5	..	8.7	..	274.2	..	11.2	..	..	9.9	7.4	..	1.2	466.5	8.09
	9.4	..	6.3	1.6	76.9	..	33.0	..	..	..	7.8	..	1.6	397.2	10.03
0.1	6.0	..	7.1	0.2	135.4	..	29.7	..	..	12.4	5.1	..	0.4	416.5	13.34
3.1	..	..	3.1	..	116.4	..	..	..	..	3.1	18.9	..	..	345.9	9.21
0.2	8.6	..	6.9	..	143.8	..	10.8	..	..	..	3.8	..	..	358.5	12.37
..	12.4	..	5.2	..	254.7	..	4.1	..	..	1.0	2.1	..	..	383.0	9.18
0.4	8.8	..	6.4	..	161.8	..	9.0	..	..	0.4	4.4	..	..	362.1	11.63
0.2	9.0	..	3.7	..	68.0	..	..	..	..	..	5.0	..	..	406.5	12.64
..	..	..	19.5	..	112.2	..	14.6	..	..	..	4.9	..	..	237.8	6.73
..	4.4	..	5.8	..	239.1	..	9.3	..	..	..	6.2	..	..	535.9	15.81
..	10.0	..	20.0	..	50.0	..	10.0	..	..	..	10.0	..	..	320.0	12.20
..	11.2	..	..	..	22.3	..	..	..	..	..	..	..	..	167.6	19.05
..	23.3	..	..	..	255.8	..	46.5	..	..	..	..	..	..	1,279.1	24.88
..	62.5	..	..	..	104.2	..	..	..	..	166.7	..	..	..	937.5	13.33
..	5.9	..	8.3	..	84.9	..	14.9	..	..	..	4.7	..	..	376.2	16.03
0.1	7.0	..	6.2	..	110.1	..	8.1	..	..	0.7	5.1	..	..	420.2	14.62
..	4.4	..	5.2	..	90.4	..	1.3	..	..	0.9	2.2	..	..	347.4	14.62
..	20.5	..	13.7	..	226.0	..	20.5	..	..	..	..	..	..	568.5	19.25
..	1.4	..	4.2	..	174.4	..	14.1	..	..	..	9.8	..	..	429.0	15.06
..	..	..	..	..	83.3	..	..	..	..	..	..	..	..	186.6	58.33
..	2.6	..	5.3	..	209.2	..	..	..	..	..	22.4	..	..	492.1	14.42
..	4.4	..	11.5	..	107.7	..	8.8	..	..	37.9	1.6	..	..	425.3	13.47
..	1.0	..	8.0	1.0	153.6	..	19.0	..	..	..	4.5	..	..	352.7	12.10
14.3	4.8	..	9.5	..	47.6	..	..	..	..	..	..	..	..	233.3	9.24
..	9.0	..	5.6	0.4	69.8	..	6.8	..	..	8.1	7.7	..	..	370.7	14.70
..	5.0	..	8.4	..	66.9	..	..	..	..	1.7	..	..	..	262.5	10.30
..	9.8	..	8.9	..	32.0	..	5.4	..	..	3.4	4.9	..	..	341.5	15.48
..	..	..	..	..	285.7	..	..	..	..	..	..	..	..	714.3	14.29

TABLE

Stations and Districts.	Average annual strength.	Enteric group of fevers.				Dysentery.				
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary.	Bacillary exudate.	Protozoal.	Clinical.
<i>Total Lahore District</i>	12,933	1·1	0·8	..	..	0·4	1·7	2·6	0·9	2·7
Bannu	2,024	0·5	1·0	..	..	0·5	11·4	..	1·0	4·0
D. I. Khan	117	..	..	..	..	..	8·5	..	..	..
Kalabagh and Mari Indus	153	13·1	..	..	..	6·5	..	6·5	..	6·5
Manzal	766	2·6	..	..	..	..	9·1	..	..	2·6
Mir Ali	776	..	..	..	..	..	1·3	2·6	1·3	5·2
Razmak	4,657	0·9	0·6	..	..	0·4	4·5	..	..	1·9
Wana	3,198	..	..	..	..	0·3	5·3	1·3	..	1·3
<i>Total Waziristan District</i>	11,691	0·8	0·4	..	..	0·4	6·0	0·6	0·3	2·4
Chaman	1,585	..	1·3	..	..	..	1·3	0·6	..	..
Quetta	7,015	0·9	0·3	0·1	..	0·4	3·7	2·4	0·6	7·6
Sibi	158	..	..	..	..	..	..	..	..	..
<i>Total Baluchistan District</i>	8,758	0·7	0·5	0·1	..	0·3	3·2	2·1	0·5	6·1
Fort Sandeman	2,111	..	0·5	..	..	..	0·5	1·4	..	0·5
Hindubagh	290	..	..	..	..	..	3·1	..	..	3·1
Loralai	641	..	..	..	..	..	..	..	..	..
<i>Total Zhob Bde. Area</i>	3,042	..	0·3	..	..	..	1·0	1·0	..	1·0
Hyderabad	126	..	..	..	..	..	7·9	..	..	..
Karachi	1,556	0·6	1·3	..	..	..	8·4	..	0·6	0·6
<i>Total Sind Bde. Area</i>	1,682	0·6	1·2	..	..	..	8·3	..	0·6	0·6
Bareilly	1,087	0·9	..	..	..	1·8	14·7	8·3	..	3·7
Dehra Dun	2,734	0·7	0·4	..	..	..	8·8	2·9	0·5	0·7
Jhansi	595	..	1·7	..	..	1·7	15·1	3·4	..	3·4
Landsdowne	1,876	1·1	0·5	..	..	0·5	0·5	6·9	1·1	8·5
Meerut	2,342	0·4	1·7	..	..	0·9	12·0	6·4	0·9	0·9
Nowgong	56	..	..	..	..	..	17·9	..	..	..
Roorkee	2,478	0·8	..	..	..	0·8	2·8	0·4	..	0·8
<i>Total Meerut District</i>	11,168	0·7	0·6	..	..	0·7	7·7	4·3	0·7	2·5
Almora	745	..	..	..	..	..	5·4	1·3	..	2·7
Allahabad	359	..	..	..	..	..	5·6	5·6	5·6	..
Benares	596	3·4	..	..	..	1·7	..	..	..	1·7
Cawnpore	89	..	..	..	..	..	..	..	..	..
Fatehgarh	676	..	..	..	..	..	..	1·5	..	3·0
Fyzabad	80	..	..	..	..	..	..	..	..	..
Gorakhpore	174	..	..	..	..	..	..	..	..	..
Lucknow	1,484	0·7	0·7	..	..	..	13·5	3·4	1·3	5·4
<i>Total Lucknow District</i>	4,203	0·7	0·2	..	..	0·2	6·2	2·1	1·0	3·1
Calcutta (Alipore)	761	..	1·3	..	..	..	13·1	2·6	1·3	..
Dinapore	40	..	..	..	..	..	..	..	..	..
Gyantse	91	..	..	..	..	..	..	..	..	..
Ghoom	73	..	..	..	..	..	..	..	..	..
Shillong	1,541	..	..	..	..	0·6	2·6	5·8	..	3·9
Bankura	355	..	2·8	..	..	..	..	..	..	..
Chittagong	543	..	..	..	..	..	9·2	1·8	5·5	1·8
Comilla	524	..	..	..	..	..	..	1·9	..	1·9
Dacca	205	..	..	..	..	..	4·9	..	..	..
Mymensingh	396	..	..	..	..	..	..	..	..	..
Midnapore	554	..	..	..	..	..	7·2	..	..	1·8
Saldpur	568	..	..	..	..	1·8	3·5	..	..	3·5

XXIII—contd.

Colitis.	Diarrhoea.	Cholera.	Veneral diseases.	Small-pox.	Malaria.	Dengue.	Sand-fly fever.	Plague.	Influenza.	Pneumonia lobar and lobular.	Heat-stroke.	Heat-exhaustion.	All causes.	Average number of persons standing sick.
0.2	5.5	..	7.4	0.2	101.1	..	7.5	..	7.6	5.3	..	..	371.9	13.93
..	10.9	0.5	10.4	..	155.1	..	50.9	..	3.0	5.9	..	..	841.8	23.87
..	13.1	..	25.6	..	341.9	..	..	..	..	13.1	..	6.5	555.6	18.97
..	..	..	6.5	13.1	176.5	..	6.6	..	..	..	..	..	1,137.3	29.87
1.8	6.5	..	15.7	1.3	113.6	1.3	11.7	..	..	7.8	..	..	347.3	12.08
..	..	..	9.0	..	154.6	..	24.5	..	3.9	..	..	..	341.5	7.01
..	5.2	..	10.5	..	57.8	..	..	..	0.6	5.4	..	..	311.6	14.97
0.8	10.9	..	6.6	..	436.5	..	0.6	..	0.9	5.0	..	..	729.5	20.71
0.2	7.5	0.1	9.8	0.3	192.7	0.1	11.5	..	1.3	5.2	..	0.1	500.6	17.60
..	8.2	..	3.2	..	122.4	..	6.9	..	3.2	6.3	..	..	321.8	9.09
0.1	3.1	..	6.4	0.1	180.8	..	0.1	..	8.0	6.3	..	..	428.5	19.42
..	6.3	..	..	..	506.3	..	..	..	..	6.3	..	..	708.9	16.52
0.1	4.1	..	5.7	0.1	176.1	..	1.4	..	7.0	6.3	..	..	414.2	17.50
..	11.4	..	3.8	..	243.5	..	7.1	..	..	5.7	..	..	465.7	10.46
..	6.9	..	3.4	..	134.5	..	17.2	..	..	3.4	..	..	279.3	4.24
..	1.6	..	4.7	1.6	276.1	..	3.1	..	..	3.1	..	..	435.3	11.31
..	8.9	..	3.9	0.3	240.0	..	7.2	..	..	4.9	..	..	441.5	10.05
0.6	1.3	..	2.6	..	71.4	..	3.2	..	0.6	2.6	..	..	150.8	5.56
..	..	..	..	..	50.8	..	..	..	..	..	..	..	272.5	12.37
0.6	1.2	..	2.4	..	52.3	..	3.0	..	0.6	2.4	..	..	263.4	11.86
..	1.8	..	7.4	..	93.8	..	..	..	..	5.5	..	..	431.5	22.25
..	..	..	16.5	..	105.7	..	1.1	..	1.1	7.7	..	..	478.1	25.31
1.7	6.7	..	6.7	..	247.1	..	..	..	3.4	6.7	6.7	3.4	716.0	27.24
..	9.1	..	25.6	..	187.6	..	..	..	23.5	3.2	..	..	535.2	27.35
..	3.0	..	14.5	1.3	91.4	..	0.4	..	0.9	10.3	..	..	359.0	18.05
..	..	..	17.9	..	160.7	..	..	..	..	..	..	..	410.7	6.07
..	3.6	..	9.3	..	74.0	..	..	..	..	2.0	..	..	261.5	8.06
0.1	3.5	..	14.6	0.3	116.0	..	0.4	..	4.6	5.9	0.4	0.2	422.4	20.01
..	4.0	..	33.6	..	143.6	..	..	..	..	4.0	..	..	445.6	18.07
..	..	..	33.4	..	80.8	..	2.8	..	2.8	5.6	..	..	515.3	22.34
..	1.7	..	11.7	1.7	85.6	1.7	16.8	..	..	1.7	..	..	523.5	21.85
..	..	..	..	11.2	101.1	..	11.2	..	..	11.2	..	..	337.1	11.01
..	4.4	..	4.4	..	187.9	..	5.9	1.5	4.4	8.9	..	..	492.6	16.85
..	..	..	12.5	..	150.0	..	12.5	..	..	..	..	..	400.0	12.50
..	..	..	34.5	..	201.1	..	..	..	..	17.2	..	..	402.3	10.17
2.0	6.7	..	15.5	..	74.1	..	6.7	..	11.5	6.1	..	..	462.9	23.21
0.7	4.0	..	18.3	0.5	114.2	0.2	6.4	0.2	5.0	5.9	..	..	471.3	20.01
..	1.3	..	23.7	..	43.4	34.2	..	..	14.5	11.8	..	1.3	404.7	31.50
25.0	..	..	..	..	50.0	..	..	..	..	..	..	..	225.0	5.75
..	..	..	..	..	54.9	..	..	..	..	..	..	..	175.8	4.51
..	..	..	27.4	..	82.2	..	..	..	..	..	..	..	164.4	14.33
..	1.9	..	6.5	0.6	83.1	..	0.6	..	13.0	5.8	..	..	506.8	19.55
..	14.1	..	14.1	..	42.3	..	..	..	..	..	..	..	245.1	7.83
..	..	..	9.2	..	206.3	..	..	..	57.1	3.7	..	..	609.6	17.42
..	..	..	26.7	..	126.0	..	..	..	..	3.8	..	..	292.0	8.15
..	..	..	19.5	..	68.3	..	..	..	34.1	4.9	..	..	365.9	11.90
..	..	..	10.1	..	48.0	..	..	..	7.6	5.1	..	..	330.8	9.22
3.6	1.8	..	12.6	..	75.8	..	1.8	..	3.6	5.4	..	..	404.3	11.23
..	8.8	..	7.0	..	109.2	..	..	..	14.1	7.0	..	..	331.0	9.60

TABLE

Stations and Districts.	Average annual strength.	Enteric group of fevers.				Dysentery.				
		Typhoid fever.	Para. A.	Para. B.	Para. C.	Enteric group.	Bacillary.	Bacillary exudate.	Protozoal.	Clinical.
<i>Total P. & A. District.</i>	5,651	..	0·4	..	..	0·4	4·6	2·3	0·7	1·9
Agra	93	..	..	..	..	0·5	2·4	1·9	..	7·7
Delhi	2,088	..	..	..	..	..	1·8	..	..	..
Muttra	541	5·5	..	..	..	..	..	..	..	..
<i>Total Delhi Bde. Area</i>	2,722	1·1	..	..	..	0·4	2·2	1·5	..	5·9
Ahmednagar	976	..	..	..	..	..	..	1·0	..	..
Aurangabad	1,021	..	..	..	..	..	2·9	..	..	..
Jubbulpore	2,188	..	..	..	..	0·5	15·6	8·7	0·5	..
Kamptee	471	..	..	..	..	..	4·2	6·4	..	2·1
Pachmarhi	361	..	5·5	..	..	..	..	8·3	..	..
Saugor	516	..	1·9	..	..	1·9	5·8	7·8	..	..
Trinawalgherry (Secunderabad).	3,117	..	0·3	..	..	1·3	15·4	4·2	1·0	0·6
<i>Total Deccan District</i>	8,645	..	0·5	..	..	0·7	10·4	5·0	0·5	0·3
Belgaum	1,090	..	..	..	..	0·9	..	1·8	..	0·3
Poona	3,816	..	..	..	..	0·9	9·2	3·7	..	0·3
<i>Total Poona Bde. Area</i>	4,906	..	..	..	..	0·6	7·1	3·3	..	0·2
Ahmedabad	569	..	..	..	..	..	1·8	3·5	..	3·5
Baroda	478	..	..	..	..	4·2	..	6·3	..	..
Bombay (Colaba).	557	..	..	..	..	..	..	3·6	..	1·8
Deolali	212	..	..	..	..	..	..	4·7	..	..
Mhow	868	1·2	..	..	..	1·2	3·5	21·9	..	2·3
Mt. Abu	20	..	..	..	..	..	..	..	..	..
Nasirabad	737	..	..	..	..	..	10·9	..	..	1·4
Neemuch	562	1·8	1·8	..	..	3·6	1·8	5·3	..	1·8
<i>Total Bombay District</i>	4,003	0·5	0·2	..	..	1·2	3·2	7·5	..	1·7
Bangalore	2,598	..	0·4	..	..	..	5·8	3·5	0·4	..
Cannanore	585	..	..	..	..	..	5·1	1·7	..	1·7
Madras, St. Thomas Mt.	524	..	..	..	..	1·9	5·7	3·8	..	..
Trichinopoly	136	..	..	..	..	..	..	..	..	..
Wellington	53	..	..	..	..	..	18·9	..	..	..
<i>Total Madras District</i>	3,896	..	0·3	..	..	0·3	5·6	3·1	0·3	0·3
Mandalay	842	1·2	..	..	..	..	4·8	11·9	2·4	1·2
Maymyo	1,458	..	..	..	..	0·7	3·4	7·5	0·7	4·8
Mingaladon	761	..	..	..	..	..	19·7	..	5·3	2·6
<i>Total Burma District</i>	3,061	0·3	..	..	..	0·3	7·8	6·9	2·3	3·3
<i>Total All-India</i>	116,984	0·5	0·4	0·0	..	0·5	5·1	3·5	0·4	3·2

XXIII—concl'd.

Colitis.	Diarrhoea.	Cholera.	Veneral diseases.	Small-pox.	Malaria.	Dengue.	Sand-fly fever.	Plague.	Influenza.	Pneumonia, lobar and lobular.	Heat-stroke.	Heat-exhaustion.	All causes.	Average number constantly sick.
0.5	2.7	..	12.9	0.2	89.2	4.6	0.4	..	14.5	5.7	..	0.2	409.7	15.94
10.8	43.0	..	..	..	75.3	..	..	..	..	..	..	..	763.4	25.05
..	6.2	..	14.8	..	135.5	..	..	..	..	..	..	..	571.8	17.13
..	12.9	..	3.7	5.5	134.9	..	..	..	..	1.8	..	..	602.6	17.49
0.4	8.8	..	12.1	1.1	133.4	..	..	..	..	5.9	..	..	584.5	17.47
..	2.0	..	8.2	..	42.0	..	..	..	..	2.0	..	..	292.0	8.51
..	2.0	..	1.0	..	61.7	..	..	..	1.0	2.0	..	..	177.3	7.36
..	6.9	..	2.8	0.5	72.4	..	..	..	..	0.9	..	..	357.3	13.90
..	6.4	..	12.7	..	72.2	..	42.5	..	..	4.2	..	..	439.5	13.99
..	..	..	11.1	..	97.0	..	..	..	2.8	2.8	..	..	196.7	4.65
..	..	..	9.7	..	104.6	..	..	..	3.9	5.8	..	..	418.6	12.36
..	1.9	..	6.1	..	18.9	..	..	..	2.2	2.9	..	..	390.8	13.79
..	3.2	..	5.6	0.1	51.4	..	2.3	..	1.3	2.4	..	..	342.2	12.01
1.8	11.9	..	17.4	0.9	37.6	..	..	..	2.8	2.8	..	..	470.6	12.00
..	2.1	0.3	11.8	..	88.6	..	..	..	2.1	5.5	..	0.3	324.4	13.40
0.4	4.3	0.2	13.0	0.2	77.3	..	..	..	2.2	4.9	..	0.2	356.9	13.09
..	..	..	1.8	..	205.6	7.0	3.5	..	5.3	1.8	..	..	423.6	10.25
..	..	..	20.9	..	265.7	..	..	..	4.2	2.1	..	..	439.3	11.17
..	3.6	..	19.7	..	219.0	..	..	..	12.6	7.2	..	..	535.0	28.78
..	..	..	4.7	..	70.8	..	..	..	..	..	..	..	339.6	13.30
..	2.3	..	8.1	..	1.5.2	..	..	..	..	2.3	..	..	308.8	13.51
..	..	..	..	..	150.0	..	..	..	50.0	..	..	..	200.0	4.50
..	6.8	..	1.4	..	164.2	..	..	..	..	2.7	..	..	356.9	16.00
..	3.6	..	..	..	368.3	..	..	..	..	..	..	..	613.9	14.43
..	2.7	..	7.7	..	202.8	1.0	0.5	..	3.2	2.5	..	..	424.9	15.43
..	9.2	..	14.6	..	26.9	0.4	..	..	27.3	3.5	..	..	406.9	19.80
..	3.4	..	17.1	..	22.2	1.7	..	..	..	1.7	..	..	336.8	13.69
..	5.7	..	17.2	..	19.1	398.9	..	..	19.1	1.9	..	..	839.7	21.70
..	7.4	..	..	..	7.4	58.8	..	..	7.4	..	..	..	477.9	16.91
..	..	..	18.9	..	18.9	..	..	..	18.9	..	..	..	169.8	5.23
..	7.7	..	14.9	..	24.4	56.2	..	..	21.3	2.8	..	..	453.8	18.84
..	20.2	..	114.0	..	121.1	90.3	..	..	..	4.8	1.2	2.4	649.6	31.54
..	8.9	..	26.1	..	182.4	2.7	..	..	2.1	2.7	..	..	741.4	28.05
..	1.3	..	32.9	..	74.9	84.1	..	..	..	9.2	..	..	613.7	23.59
..	10.1	..	51.9	..	138.8	47.0	..	..	1.0	4.9	0.3	0.7	684.4	27.90
0.2	5.6	0.0	10.1	0.2	125.9	3.4	7.5	0.0	5.4	4.9	0.0	0.1	422.7	15.71

TABLE XXIV.

BRITISH OFFICERS OF THE INDIAN ARMY.

Table showing the average strength, admissions into hospital, deaths, numbers invalided and average constantly sick, during the year 1935, with ratios per 1,000 of the strength.

Diseases.	Actuals.				Ratio per 1,000.			
	Admissions.	Deaths.	Invalids, sent home.	Average number constantly sick.	Admissions.	Deaths.	Invalids, sent home.	Constantly sick.
Average strength, 2,053.								
<i>Specific Diseases due to infection or infestation.</i>								
Common Cold	5	...	...	0·05	2·4	...	...	0·02
Diphtheria	4	...	...	0·39	1·9	...	...	0·19
Dysentery	36	...	...	1·32	17·5	...	...	0·64
Enteric fever (Inclusive of typhoid, Para. A, B & C and enteric group).	8	...	...	1·04	3·9	...	...	0·51
Erysipelas . . . . .	...	...	...	...	...	...	...	...
Influenza	13	...	...	0·20	6·3	...	...	0·10
Malaria	82	1	1	1·91	39·9	0·49	0·49	0·93
Measles	1	...	...	0·04	0·5	...	...	0·02
Meningococcal infection (cerebro-spinal fever)	...	...	...	...	...	...	...	...
Mumps	2	...	...	0·04	1·0	...	...	0·02
Pneumonia	7	1	2	0·43	3·4	0·49	0·97	0·21
Pyrexia of uncertain origin	1	...	...	0·03	0·5	...	...	0·01
Rheumatic fever	1	...	...	0·20	0·5	...	...	0·10
Sand-fly fever	20	...	...	0·23	9·7	...	...	0·11
Scarlet fever . . . . .	...	...	...	...	...	...	...	...
Small-pox . . . . .	...	...	...	...	...	...	...	...
Tuberculosis { Pulmonary . . . . .	...	...	...	...	...	...	...	...
{ Other . . . . .	...	...	...	...	...	...	...	...
Venereal diseases. { Gonorrhœa	3	...	...	0·47	1·5	...	...	0·23
{ Soft chancre . . . . .	...	...	...	...	...	...	...	...
{ Syphilis . . . . .	...	...	...	...	...	...	...	...
{ Other V. D. . . . .	...	...	...	...	...	...	...	...
Other diseases due to infection	34	3	...	1·29	16·6	1·46	...	0·63
Diseases due to infestation by { Scabies . . . . .	...	...	...	...	...	...	...	...
{ Metazoan parasites. { Other diseases	4	...	...	0·06	1·9	...	...	0·03

Other diseases classified under systems.

Diseases of the nervous system	13	1	1	0.53	6.3	0.49	0.49	0.26
Mental diseases	11	...	2	0.67	5.4	...	0.97	0.33
Diseases of the eye . . . . .	...	...	...	...	...	...	...	...
Diseases of the ear and nose	33	...	...	0.91	16.1	...	...	0.44
Diseases of the circulatory system. {								
Valvular diseases of the heart . . . . .	...	...	...	0.01	...	...	...	0.00
Disordered action of the heart	2	...	...	0.05	1.0	...	...	0.02
Other diseases	7	2	1	0.32	3.4	0.97	0.49	0.16
Diseases of the blood and blood forming organs	4	1	...	0.28	1.9	0.49	...	0.14
Diseases of ductless or endocrine glands . . . . .	...	...	...	...	...	...	...	...
Diseases of the breast . . . . .	...	...	...	...	...	...	...	...
Diseases of the respiratory system. {								
Larynx and trachea	2	...	...	0.03	1.0	...	...	0.01
Bronchi & bronchioles	20	...	...	0.41	9.7	...	...	0.20
Other diseases	1	...	...	0.01	0.5	...	...	0.00
Diseases of the teeth and gums	3	...	...	0.02	1.5	...	...	0.01
Diseases of the digestive system. {								
Inflammation of the tonsils	32	...	...	0.64	15.6	...	...	0.31
Inflammation of pharynx	8	...	...	0.10	3.9	...	...	0.05
Inflammation of stomach	13	...	...	0.37	6.3	...	...	0.18
Gastric ulcer	1	...	...	0.01	0.5	...	...	0.00
Duodenal ulcer	2	...	1	0.22	1.0	...	0.49	0.11
Liver diseases	9	...	...	0.50	4.4	...	...	0.24
Other diseases	110	1	...	3.65	53.6	0.49	...	1.78
Diseases due to disorders of nutrition or of metabolism	1	...	...	0.04	0.5	...	...	0.02
Diseases of the generative system	5	...	...	0.14	2.4	...	...	0.07
Diseases of bones, joints, muscles, fasciae and bursae	29	...	...	0.92	14.1	...	...	0.45
Diseases of the areolar tissue	54	...	...	1.38	26.3	...	...	0.67
Diseases of the skin	4	...	...	0.25	1.9	...	...	0.12
Diseases of the urinary organs	10	...	...	0.53	4.9	...	...	0.26
Injuries . {								
General	8	...	2	0.22	3.9	...	0.97	0.11
Local	103	4	4	4.16	50.2	1.95	1.95	2.03
In action . . . . .	...	...	...	...	...	...	...	...
Tumours and cysts	2	1	...	0.07	1.0	0.49	...	0.03
Poisons . . . . .	...	...	...	...	...	...	...	...
No appreciable disease	†4	...	...	0.02	1.9	...	...	0.01
Suicides* . . . . .	...	2	...	...	...	0.97	...	...
Total	712	15	14	24.16	346.8	7.31	6.82	11.77

* The figures against "Suicides" having already been shown under the heading of the injury, etc., which caused death, are not included in the total.

† Includes 2 cases of malformations.

TABLE XXV.

INDIAN OFFICERS AND INDIAN OTHER RANKS.

Table showing admission and death ratios per 1,000 of strength by Commands contrasted with the previous year, and the average for the previous 5 years.

Commands.	Years.	Enteric group of fevers.		Influenza.		Cholera.		Small-pox.		Malaria.		Dysentery.	
		A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Northern Command	1930-34	2.2	0.19	9.5	0.01	0.1	0.02	0.2	0.02	203.7	0.11	15.2	0.03
	1934	1.7	0.18	12.7	..	..	..	0.1	0.02	192.4	0.09	12.3	0.02
	1935	1.8	0.09	5.4	0.04	0.0	0.02	0.2	0.02	137.0	0.05	11.8	0.04
Western Command	1930-34	2.7	0.14	4.9	..	0.01	..	0.2	..	191.4	0.03	25.6	0.08
	1934	2.6	..	3.0	..	..	..	0.1	..	207.5	..	23.9	0.16
	1935	1.3	0.07	4.6	0.07	..	..	0.1	..	175.0	0.22	9.5	..
Eastern Command	1930-34	2.1	0.17	9.2	0.01	0.05	0.03	0.3	0.01	117.8	0.10	14.6	0.05
	1934	2.1	0.08	10.4	0.04	..	..	0.3	0.04	113.3	0.04	11.6	0.08
	1935	1.5	0.13	6.5	..	..	..	0.4	..	111.3	0.08	12.7	..
Southern Command	1930-34	1.9	0.13	9.2	..	0.01	0.02	0.2	0.02	85.8	0.04	17.0	0.06
	1934	1.9	0.14	8.5	..	..	..	0.4	..	83.4	..	15.5	0.05
	1935	1.1	0.19	5.5	..	0.0	0.05	0.1	0.09	80.7	..	13.0	..
Burma District	1930-34	2.6	0.10	21.4	..	0.05	..	0.2	..	158.4	0.25	11.8	..
	1934	1.9	..	16.5	..	..	..	0.3	..	117.4	..	8.7	..
	1935	0.7	..	1.0	..	..	..	..	..	138.8	0.33	20.3	..
All-India	1930-34	2.2	0.17	9.2	0.01	0.04	0.02	0.2	0.01	162.9	0.09	16.5	0.04
	1934	1.9	0.13	10.5	0.01	0.0	..	0.2	0.02	156.5	0.05	13.9	0.05
	1935	1.4	0.11	5.4	0.03	0.0	0.02	0.2	0.03	125.9	0.08	12.2	0.02

		Pyrexia of uncertain origin.		Pneumonia lobar and lobular.		Venereal diseases.		Dengue.		Sand-fly fever.		Plague.	
		A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
Northern Command	{ 1930-34 .	0·1	0·01	9·1	1·10	7·8	0·02	0·01	..	21·5	..	..	0·00
	{ 1934 .	0·1	..	7·4	0·62	7·8	0·04	..	..	14·8	..	..	..
	{ 1935 .	0·1	..	5·1	0·65	7·4	..	0·0	..	14·8	..	..	..
Western Command	{ 1930-34 .	0·02	..	7·1	1·01	5·6	0·01	0·08	..	10·8	..	..	..
	{ 1934 .	0·1	..	4·0	0·31	5·5	..	..	..	4·1	..	..	..
	{ 1935 .	..	..	5·5	0·82	4·9	..	..	..	2·9	..	..	..
Eastern Command	{ 1930-34 .	0·2	0·01	6·9	0·63	13·6	..	0·9	..	3·3	..	..	..
	{ 1934 .	0·1	..	5·6	0·51	12·1	..	0·6	..	1·1	..	..	..
	{ 1935 .	0·0	..	5·9	0·25	14·6	..	1·1	..	1·4	..	0·0	0·04
Southern Command	{ 1930-34 .	0·5	0·02	4·9	0·50	13·5	..	3·9	..	2·2	..	0·1	0·09
	{ 1934 .	0·2	0·05	4·1	0·28	10·5	0·05	3·4	..	2·5	..	..	..
	{ 1935 .	0·0	..	3·1	0·33	9·4	0·05	10·4	..	1·0	..	..	..
Burma District	{ 1930-34 .	0·05	..	6·4	0·76	39·3	..	27·4	..	0·6	..	0·05	..
	{ 1934 .	..	..	4·5	0·32	35·9	..	65·3	..	..	..	..	..
	{ 1935 .	0·3	..	4·9	..	51·9	..	47·0	..	..	..	..	..
All-India	{ 1930-34 .	0·2	0·01	7·6	0·88	10·7	0·01	1·8	..	12·5	..	0·02	0·02
	{ 1934 .	0·1	0·01	6·0	0·49	9·6	0·03	2·5	..	8·3	..	..	..
	{ 1935 .	0·1	..	4·9	0·51	10·1	0·01	3·4	..	7·5	..	0·0	0·01

TABLE XXVI.
DETAIL OF DISEASES.
1935.

Diseases.	European Army of India.												Indian Army.						
	British officers attached to European troops.			Men.				Women.		Children.			British officers attached to Indian troops.			Men present.			
	2,227.			52,646.				4,178.		6,522.			2,053.			116,984.			
	A.	D.	Inva- lds.	A.	Constant- ly sick.	D.	Inva- lds.	A.	D.	A.	D.		A.	D.	Inva- lds.	A.	D.	Inva- lds.	Constant- ly sick.
<i>Diseases caused by infection or infestation.</i>																			
Anthrax . . . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0'01
Blackwater fever . . . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	9'28
Chicken-pox	8	..	..	5	0'44	..	..	1	..	23	..	..	..	..	141	..	..	..	11'01
Common cold	11	..	..	342	5'97	..	..	12	..	13	..	..	..	5	..	..	..	..	0'02
Cholera . . . . .	..	..	..	2	0'16	..	..	..	..	1	..	..	..	..	2	2	..	..	0'04
Cow-pox . . . . .	..	..	..	6	0'11	..	..	..	..	1	..	..	..	..	1	..	..	..	8'51
Dengue	10	..	..	262	6'38	..	..	5	..	19	..	..	..	8	..	..	..	..	0'19
Diphtheria	2	..	1	66	5'09	..	..	3	..	24	3	..	..	4	..	..	..	..	..
Dysentery . . . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(a) Protozoal	8	..	..	158	12'05	..	2	6	..	10	..	..	..	8	..	..	..	..	3'72
(b) Bacillary	27	1	..	637	26'46	1	..	31	..	101	5	..	..	17	..	..	..	..	20'90
(c) Bacillary exudate.	16	..	1	353	13'79	..	2	14	..	58	..	..	..	5	..	..	..	..	14'55
(d) Clinical	13	..	..	388	14'86	..	..	9	..	23	..	..	..	6	..	..	..	..	13'88
Encephalitis (Lethargica) . . . . .	..	..	..	1	0'11	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Enteric Fevers—	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(a) Typhoid fever	3	1	3	27	3'72	8	..	..	..	6	..	..	..	5	..	..	..	..	9'14
(b) Paratyphoid A. . . . .	..	..	..	13	2'22	..	..	2	..	1	..	..	..	2	..	..	..	..	6'30
(c) Paratyphoid B. . . . .	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	0'10
(d) Paratyphoid C. . . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(e) Enteric Group	10	..	2	66	8'44	1	1	1	..	5	..	..	..	1	..	..	..	..	9'74
Enteritis infective. (Includ- ing food poisoning)	..	..	..	11	0'32	..	..	..	..	1	..	..	..	..	..	1	..	..	0'09
Erysipelas . . . . .	..	..	..	8	0'38	..	..	3	..	1	1	..	..	..	10	..	..	..	0'45
Gangrene, acute infective . . . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	0'81
Hydrophobia (Rabies) . . . . .	..	..	..	1	0'00	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Influenza	30	..	..	560	15'83	..	..	5	..	17	..	..	..	13	..	..	..	..	15'62
Jaundice epidemic catarrhal	74	..	..	342	18'77	..	..	4	..	31	..	..	..	16	..	..	..	..	12'15
Jaundice spirochaetal	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Leishmaniasis:—																		
(a) Kala-azar	3	0.59	..	..	..	..	..	..	..	..	..	..	..	..	19	2	4	2.85
(b) Oriental sore	7	0.36	..	..	..	..	..	..	..	..	..	..	..	..	67	..	..	4.13
Leprosy	79	107.66	4	..	99	..	103	..	82	1	1	14,723	9	13	..	..	..	1.83
Malaria	1	1.08	..	..	2	..	56	..	1	..	..	260	..	..	..	..	..	358.81
Measles	1	1.08	..	..	2	..	56	..	1	..	..	260	..	..	..	..	..	12.41
Meningococcal infection (Cerebro-spinal fever)																		
Mumps	1	0.09	..	..	1	..	23	..	2	..	..	19	7	..	..	..	..	1.88
Plague	4	1.08	..	..	1	..	23	..	2	..	..	799	..	..	..	..	..	39.91
Pyæmia	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	0.03
Pyrexia of Uncertain Origin	1	0.07	1	..	..	..	..	..	..	..	..	3	..	..	..	..	..	0.90
Relapsing fever	1	2.72	..	..	..	..	..	..	1	..	..	11	..	..	..	..	..	1.60
Rheumatic fever	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..	..	0.28
Rubella (German measles)	2	7.26	1	4	6	..	11	1	1	..	..	96	..	3	..	..	..	7.77
Sand-fly fever	3	0.74	..	..	7	..	33	..	1	..	..	6	..	..	..	..	..	0.23
Scarlet fever	60	39.53	..	..	15	..	26	..	20	..	..	882	..	..	..	..	..	14.60
Septicæmia	1	0.32	..	..	2	..	27	..	..	..	..	1	..	..	..	..	..	0.10
Small-pox	1	0.67	2	2	..	..	1	1	3	2	..	8	5	..	..	..	..	0.80
Tetanus	..	0.43	..	..	3	1	2	..	..	..	..	22	3	..	..	..	..	1.93
Tuberculosis Pulmonary	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	0.09
Tuberculosis Other cases	1	19.84	3	35	3	..	..	..	..	..	..	219	15	194	..	..	..	24.75
Typhus fever	..	4.50	..	9	3	..	3	..	..	..	..	56	8	25	..	..	..	6.41
Undulant fever	2	2.01	..	..	1	..	..	..	..	..	..	45	1	..	..	..	..	4.43
Veneral diseases—	..	0.13	..	..	..	..	..	..	3	..	..	4	..	1	..	..	..	0.72
(a) Gonorrhœa	1	175.57	..	1	..	..	8	..	3	..	..	543	1	4	..	..	..	58.27
(b) Soft chancre	..	36.33	..	..	..	..	..	..	..	..	..	210	..	..	..	..	..	22.57
(c) Syphilis	..	27.34	1	1	1	..	..	..	..	..	..	33	..	3	..	..	..	38.00
(d) Other cases	..	0.96	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Whooping-cough	..	..	..	..	..	..	10	..	..	..	..	..	..	..	..	..	..	..
Other diseases caused by infection	1	0.13	..	..	3	..	5	..	2	1	..	23	..	2	..	..	..	1.81
<i>Diseases due to infestation by Metazoan Parasites.</i>																		
Ankylostomiasis	..	0.83	..	..	..	..	1	..	..	..	..	846	..	1	..	..	..	29.97
Ascariasis	2	0.08	..	..	..	..	4	..	..	..	..	126	..	..	..	..	..	4.76
Bilharziasis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dracontiasis (Guinea-worm)	..	0.41	..	..	..	..	..	..	..	..	..	202	..	3	..	..	..	16.96
Intestinal tæniasis—	..	0.35	..	..	..	..	..	..	..	..	..	5	..	..	..	..	..	0.22
(a) Tænia Solium	2	0.67	..	..	10	..	1	..	1	..	..	36	..	..	..	..	..	1.66
(b) Tænia Saginata	..	2.06	..	..	..	..	38	..	3	..	..	48	..	..	..	..	..	1.52
Other Intestinal parasites	..	0.50	..	5	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Pediculosis	..	0.16	..	..	..	..	3	..	..	..	..	1	..	..	..	..	..	0.02
Scabies	..	2.06	..	..	..	..	..	..	..	..	..	1,126	..	..	..	..	..	33.78
Other diseases due to infestation	1	0.31	..	..	..	..	9	..	..	..	..	68	..	..	..	..	..	3.40

A.—Admissions. D.—Deaths. *Includes one death from hæmorrhage encephalitis.

TABLE XXVI—contd.

Diseases.	European Army of India.										Indian Army.							
	British officers attached to European troops. 2,227			Men. 52,646				Women. 4,178		Children. 6,522		British officers attached to Indian troops. 2,058			Men present. 116,984			
	A.	D.	Inva- lds.	A.	Constant- ly sick.	D.	Inva- lds.	A.	D.	A.	D.	A.	D.	Inva- lds.	A.	D.	Inva- lds.	Constant- ly sick.
<i>Diseases of the nervous system.</i>																		
Aphasia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	0·19
Cerebral hæmorrhage	...	...	...	2	0·43	1	1	...	...	1	...	...	...	...	...	...	...	...
Chorea	...	...	...	3	0·24	...	...	...	...	1	...	...	...	...	...	...	...	...
Convulsion	...	...	...	6	0·45	...	1	1	...	8	4	...	...	...	1	...	...	0·06
Diseases of the spinal cord	...	...	...	8	1·98	2	4	...	...	...	...	...	...	8	1	3	...	0·61
Epilepsy	2	...	1	26	3·37	...	13	7	...	1	...	...	1	37	...	21	...	2·56
Vertigo	...	...	...	23	0·77	...	...	1	...	...	...	1	...	24	...	...	...	0·62
Meningitis	...	...	...	...	...	...	...	...	...	4	2	...	...	...	8	4	...	0·99
Headache	...	...	...	199	5·07	...	...	8	...	2	...	3	...	14	...	...	...	0·35
Neuralgia	1	...	...	23	0·80	...	...	1	...	...	...	...	...	22	...	...	...	0·69
Neuritis	...	...	...	25	2·29	...	1	...	...	1	...	2	...	32	...	1	...	1·45
Paralysis	...	...	...	13	1·35	...	...	...	...	1	...	1	...	...	43	...	4	4·26
Sciatica	4	...	1	33	3·28	...	...	...	...	...	...	2	...	126	...	4	...	6·60
Other diseases of the nervous system	11	...	1	43	3·60	1	7	2	...	9	1	2	1	...	52	2	6	2·04
<i>Mental diseases.</i>																		
Feeble-mindedness	...	...	...	7	3·69	...	3	2	...	...	...	...	...	...	1	...	...	0·02
Hysteria	1	...	1	63	7·10	...	9	12	...	...	...	...	...	38	...	7	...	2·42
Involution (Melancholia)	...	...	...	7	2·25	...	1	...	...	...	...	...	...	...	...	...	...	...
Mania	...	...	...	...	0·19	...	...	...	...	...	...	...	...	8	...	7	...	1·01
Mental deficiency	...	...	...	2	0·34	...	...	...	...	...	...	...	...	...	...	...	2	...
Neurasthenia	2	...	1	24	1·38	...	3	9	...	...	...	6	...	18	...	1	...	1·31
Schizophrenia (Dementia præcox)	...	...	...	23	11·42	...	20	...	...	...	...	1	...	1	3	...	2	0·47
Other mental diseases	3	...	1	47	10·36	...	17	3	...	1	...	4	...	25	...	11	...	1·56
<i>Diseases of the eye.</i>																		
Amblyopia and amaurosis	...	...	...	3	0·14	...	...	...	...	...	...	...	...	4	...	3	...	0·36
Anomalies of refraction	...	...	...	10	0·27	...	6	...	...	2	...	...	...	9	...	7	...	0·29
Blephritis	...	...	...	8	0·51	...	1	...	...	...	...	...	...	8	...	...	...	0·25
Conjunctivitis	...	...	...	86	3·05	...	...	1	...	10	...	...	...	752	...	...	...	21·71
Conjunctivitis granular (Trachoma)	...	...	...	3	0·14	...	...	...	...	...	...	...	...	237	...	8	...	12·95
Cataract	...	...	...	3	0·32	...	3	...	...	...	...	...	...	11	...	3	...	0·63
Glaucoma	...	...	...	1	0·17	...	...	...	...	...	...	...	...	2	...	...	...	0·11

Iritis . . . . .	...	...	...	8	0.57	...	...	1	...	...	...	...	...	12	...	...	0.94
Keratitis	1	...	...	37	2.60	...	1	...	...	1	...	...	...	166	...	5	10.37
Retinitis . . . . .	...	...	...	3	0.22	...	...	...	...	...	...	...	...	1	...	1	0.10
Other diseases of the eye .	5	...	...	28	2.52	...	3	5	...	3	...	...	...	155	...	11	6.95

Diseases of the ear.

Inflammation of the external ear	1	...	...	251	6.03	...	...	3	...	5	...	4	...	111	...	...	2.93
Diseases of the middle ear	3	...	...	180	7.57	...	14	3	...	20	...	2	...	322	1	18	16.53
Furunculosis . . . . .	...	...	...	221	5.88	...	...	5	...	5	...	4	...	57	...	...	2.02
Diseases of the mastoid process . . . . .	...	...	...	35	2.95	...	...	3	...	6	...	1	...	20	...	1	2.58
Other diseases of the ear	10	...	...	2	0.09	...	...	...	...	...	...	...	...	12	...	...	0.35

Diseases of the nose.

Diseases of the Mucous membrane	11	...	...	260	5.72	...	...	5	...	19	...	6	...	625	...	...	11.23
Diseases of the bone and cartilage . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sinusitis . . . . .	...	...	...	118	7.01	1	1	4	...	1	...	9	...	34	...	...	1.18
Other diseases of the nose	13	1	...	80	3.05	...	...	4	...	...	...	7	...	8	...	...	0.25

Diseases of the circulatory system.

Diseases of the Valves . . . . .	...	...	1	24	3.26	2	10	2	1	1	...	...	...	14	1	13	1.66
Disordered Action of the Heart	2	...	...	125	6.87	1	11	7	1	3	1	2	...	41	4	6	1.66
Diseases of Blood vessels	5	...	3	76	5.99	...	5	14	...	...	...	6	...	33	3	4	1.91
Endocarditis	1	...	1	5	0.64	1	...	...	...	5	1	...	...	5	...	2	0.80
Myocarditis . . . . .	...	...	1	...	...	...	...	3	...	1	...	...	...	4	2	1	0.18
Pericarditis . . . . .	...	...	...	2	0.14	...	1	...	...	...	...	...	...	1	...	1	0.23
Other diseases of the Circulatory system . . . . .	...	...	...	2	0.02	1	...	...	1	...	...	1	2	4	3	...	0.11

Diseases of the Blood and blood forming organs.

Anæmia primary . . . . .	...	...	...	11	0.44	...	...	9	...	2	...	...	...	15	1	...	0.66
Anæmia pernicious . . . . .	...	...	...	2	0.47	1	1	1	...	...	...	...	...	15	1	1	1.13
Anæmia secondary	2	...	...	17	0.81	...	...	5	...	...	...	...	...	140	...	4	8.31
Diseases of the spleen . . . . .	...	...	...	6	0.54	...	1	...	...	...	...	...	...	27	1	1	1.68
Lymphadenitis	10	...	...	223	12.83	...	...	1	...	18	...	2	...	165	...	8	12.22
Lymphangitis . . . . .	...	...	...	9	0.73	...	...	1	...	...	...	...	...	1	...	...	0.02
Other blood diseases	1	...	...	5	0.64	...	1	1	1	1	...	2	1	4	1	2	0.28

TABLE XXVI—contd.

Diseases.	European Army of India.											Indian Army.						
	British officers attached to European troops. 2,227			Men. 52,646				Women. 4,178		Children. 6,552		British officers attached to Indian troops. 2,053			Men present. 116,984			
	A.	D.	In- valids.	A.	Con- stantly sick.	D.	In- valids.	A.	D.	A.	D.	A.	D.	In- valids.	A.	D.	In- valids.	Con- stantly sick.
<i>Diseases of Glands of internal Secretion.</i>																		
Goitre . . . . .	...	...	...	12	0·97	...	...	...	...	...	...	...	...	...	19	...	1	0·75
Hyperthyroidism . . . . .	...	...	...	5	1·00	...	5	2	...	...	...	...	...	1	...	...	0·11	
Other diseases . . . . .	...	...	...	5	0·33	...	1	3	1	...	...	...	...	2	...	...	0·21	
<i>Diseases of the Breast.</i>																		
Mastitis . . . . .	...	...	...	11	0·25	...	...	15	...	...	...	...	...	6	...	...	0·28	
Other diseases . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Diseases of the Respiratory System.</i>																		
Asthma . . . . .	...	...	...	52	3·84	...	5	10	...	9	...	1	...	76	...	7	3·46	
Bronchitis	10	...	...	757	26·04	...	1	31	...	148	...	19	...	1,320	...	3	44·42	
Empyema . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Laryngitis	1	...	...	38	1·17	...	1	3	...	6	...	1	...	106	...	...	3·14	
Pleurisy	2	...	1	93	7·04	...	6	10	...	4	3	1	...	221	1	21	21·70	
Pneumonia:—																		
(a) Lobar	4	...	...	164	15·62	19	...	4	1	6	1	5	1	1	472	47	...	38·33
(b) Lobular (Broncho- pneumonia)	1	...	1	58	5·69	2	1	1	...	18	2	2	...	1	104	13	...	7·49
Other diseases	3	...	...	55	3·49	1	6	2	...	...	...	1	...	...	23	1	2	1·72
<i>Diseases of the Teeth and Gums.</i>																		
Caries of the enamel, dentine and cementum.	3	...	...	32	1·01	...	...	16	...	35	...	1	...	...	73	...	...	1·43
Gingivitis . . . . .	...	...	...	25	0·55	...	...	1	...	6	...	...	...	128	...	...	...	3·14
Pyorrhoea alveolaris	1	...	...	66	1·75	...	...	...	...	2	...	2	...	...	80	...	1	2·56
Other diseases	1	...	...	25	0·52	...	...	...	...	1	[...	...	...	...	57	...	...	1·78

Diseases of the Digestive System.

Appendicitis	14	...	1	423	29.08	3	2	41	...	12	...	25	1	...	189	3	3	10.85
Cholecystitis and cholangitis	3	...	1	36	3.24	...	...	12	...	1	...	6	...	...	31	...	1	2.01
Colic	7	...	...	160	3.77	...	...	9	...	4	...	4	...	...	136	...	...	2.86
Colitis	4	...	...	19	0.94	...	...	4	1	5	...	3	...	...	21	...	...	0.86
Constipation	8	...	...	332	7.24	...	...	40	...	57	...	3	...	...	377	...	...	6.47
Diarrhoea	44	...	...	734	18.18	...	...	44	...	136	...	25	...	...	651	...	...	14.13
Enteritis	9	...	1	61	1.75	1	...	1	...	66	16	4	...	...	14	...	...	0.39
Fistula in ano.	...	...	...	3	1.64	...	...	1	...	...	...	...	...	...	49	...	...	4.16
Gastritis	16	...	...	307	12.87	...	1	33	...	7	...	13	...	...	101	1	1	2.96
Glossitis	...	...	...	4	0.18	...	...	...	...	...	...	...	...	...	5	...	...	0.16
Haemorrhoids (Piles)	8	...	...	195	7.78	...	...	5	...	...	...	5	...	...	177	...	2	9.39
Hepatitis acute	6	...	...	52	3.99	...	1	3	...	5	...	4	...	...	54	...	2	3.04
Hepatic abscess (Tropical abscess)	...	...	...	4	0.57	1	1	...	...	...	...	...	...	...	6	...	...	0.67
Hepatitis chronic (Cirrhosis)	1	...	...	...	0.10	...	...	1	...	...	...	...	...	...	...	...	...	...
Hernia	4	...	...	131	10.14	...	...	6	...	11	...	6	...	...	111	1	6	9.08
Hypertrophy of the tonsils	3	...	...	104	2.68	...	...	12	...	169	...	7	...	...	9	...	...	0.41
Indigestion	10	...	...	152	5.66	...	...	13	...	10	...	13	...	...	423	...	1	10.61
Intestinal obstruction	1	1	1	4	0.25	1	...	...	...	...	...	...	...	...	4	1	...	0.09
Inflammation of the palate and pillars of the fauces	...	...	...	1	0.02	...	...	...	...	...	...	...	...	...	4	...	...	0.07
Jaundice	3	...	...	11	0.63	...	...	1	...	1	...	5	...	...	77	...	...	3.98
Pharyngitis	19	...	...	420	9.20	...	...	8	...	24	...	8	...	...	1,926	...	...	37.97
Peritonitis	...	...	...	11	0.98	2	1	6	...	...	...	...	...	...	1	...	...	0.11
Quinsy	...	...	...	131	3.79	...	...	5	...	1	...	1	...	...	41	...	...	1.21
Sprue	2	...	3	8	2.13	...	3	1	...	...	...	...	...	...	11	...	3	1.89
Stomatitis	...	...	...	5	0.18	...	...	1	...	7	...	...	...	...	18	...	...	0.51
Tonsillitis	51	...	...	1,494	37.45	...	...	56	...	188	...	32	...	...	609	...	3	15.17
Other diseases	27	...	6	207	16.56	4	13	25	...	29	1	11	...	1	167	7	4	9.55
<i>Diseases due to disorders of Nutrition or of Metabolism.</i>																		
Beri-beri	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	0.19
Diabetes mellitus	...	...	...	4	0.41	3	1	2	...	2	...	...	...	...	5	...	4	1.10
Gout	...	...	...	3	0.12	...	...	...	...	...	...	1	...	...	2	...	...	0.11
Inanition	1	...	1	5	0.13	...	...	3	...	23	3	...	...	...	6	...	...	0.19
Rickets	...	...	...	...	...	...	...	...	...	2	1	...	...	...	...	...	...	...
Scurvy	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other diseases	...	...	...	2	0.09	1	...	3	...	10	...	...	...	...	1	...	1	0.09
<i>Diseases of the Male Organs of Generation.</i>																		
Balanitis	...	...	...	122	3.64	...	...	...	...	...	...	1	...	...	14	...	...	0.48
Epididymitis	...	...	...	52	2.40	...	...	...	...	...	...	...	...	...	25	...	1	1.20
Hydrocele of tunica vaginalis	1	...	...	28	1.54	...	...	...	...	...	...	...	...	...	17	...	...	0.89
Hypertrophy of the prostate	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	0.22
Orchitis	...	...	...	61	2.43	...	...	...	...	...	...	...	...	...	66	...	...	2.61
Paraphimosis	...	...	...	12	0.57	...	...	...	...	1	...	...	...	...	8	...	...	0.38

TABLE XXVI—contd.

Diseases.	European Army of India.										Indian Army.							
	British officers attached to European troops. 2,227			Men. 52,646				Women. 4,178		Children. 6,522		British officers attached to Indian troops. 2,053			Men present. 116,984			
	A.	D.	In-valids.	A.	Con-stantly sick.	D.	In-valids.	A.	D.	A.	D.	A.	D.	In-valids.	A.	D.	In-valids.	Con-tantly sick.
<i>Diseases of the Male Organs of Generation—contd.</i>																		
Phimosi	80	3·97	...	...	...	...	23	...	...	...	...	36	...	...	1·71
Prostatitis	8	0·49	...	...	...	...	...	...	2	...	...	...	...	...	...
Stricture of the urethra	1	0·07	...	...	...	...	...	...	...	...	...	3	...	...	0·59
Urethral fistula	1	0·05	...	...	...	...	...	...	...	...	...	...	...	...	...
Urethritis	210	12·87	...	...	...	...	...	...	1	...	...	103	...	...	3·57
Varicocele	59	3·72	...	...	...	...	...	...	1	...	...	12	...	1	0·38
Other diseases	1	...	...	21	1·16	...	...	...	...	...	...	...	...	...	22	...	...	1·11
<i>Diseases of the Female Organs of Generation.</i>																		
Abortion	114	...	2	...	...	...	...	...	...	...	...
Affection connected with pregnancy and Parturition and consequent on parturition
Diseases of the ovary	39	3	...	...	...	...	...	...	...	...	...
Diseases of the fallopian tube	7	1	...	...	...	...	...	...	...	...	...
Displacements and distortions of the uterus	8	...	...	...	...	...	...	...	...	...	...
Dysmenorrhœa	5	...	...	...	...	...	...	...	...	...	...
Endometritis
Haemorrhage connected with parturition	3	...	...	...	...	...	...	...	...	...	...
Inflammation of vagina	2	...	5	...	...	...	...	...	...	...	...
Menorrhægia	21	...	1	...	...	...	...	...	...	...	...
Metrorrhægia	16	...	...	...	...	...	...	...	...	...	...
Pelvic peritonitis	1	...	...	...	...	...	...	...	...	...	...
Other diseases peculiar to women	57	...	...	...	...	...	...	...	...	...	...

Diseases affecting Child—

Asphyxia of child . . . . .	...	...	...	...	...	...	...	...	...	...	2	2	...	...	...	...	...	...	...
Injury to child . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Premature birth . . . . .	...	...	...	...	...	...	...	...	...	...	4	4	...	...	...	...	...	...	...
Still-birth . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Diseases of Bones, Joints, Muscles, Fasciae and Bursae.

Arthritis	2	...	1	51	5.40	...	6	2	...	1	...	1	...	...	58	1	6	4.65
Diseases of the spine . . . . .	...	...	...	6	0.76	1	2	...	...	...	...	...	...	...	4	...	3	0.85
Flat foot . . . . .	...	...	...	6	0.26	...	10	1	...	...	...	2	...	...	3	...	1	0.12
Hammertoe . . . . .	...	...	...	25	1.56	...	...	...	...	...	...	...	...	...	...	...	...	...
Myalgia	3	...	...	149	4.08	...	...	18	...	2	...	4	...	...	292	...	...	5.78
Osteo-myelitis . . . . .	...	...	...	9	1.42	...	3	1	...	1	...	...	...	...	12	...	2	2.14
Periostitis . . . . .	...	...	...	24	1.10	...	...	1	...	1	...	...	...	...	19	...	1	1.11
Synovitis	10	...	...	578	24.53	...	...	...	...	1	...	4	...	...	361	...	5	18.31
Other deformities of limbs . . . . .	...	...	...	16	1.39	...	3	1	...	5	...	...	...	...	3	...	3	0.11
Other diseases	17	...	1	391	27.28	...	18	6	...	2	...	18	...	...	315	...	13	16.40

Diseases of the areolar tissue.

Boil	7	...	...	473	13.29	...	...	3	...	8	...	6	...	...	692	...	...	19.63
Carbuncle	3	...	...	22	0.60	...	...	...	...	...	...	2	...	...	23	...	...	1.10
Cellulitis	65	...	...	2,094	70.73	...	...	33	1	68	...	41	...	...	2,701	...	...	92.69
Cellulitis suppurative (abscess). . . . .	...	...	...	207	8.26	...	...	5	...	9	...	5	...	...	411	1	3	15.28
Other diseases . . . . .	...	...	...	13	0.48	...	...	1	...	2	...	...	...	...	18	...	1	0.51

Diseases of the Skin.

Acne . . . . .	...	...	...	13	0.51	...	...	...	...	...	...	...	...	...	15	...	...	0.51
Dermatitis	7	...	1	229	12.61	...	2	...	...	3	...	2	...	...	331	...	1	13.70
Eczema . . . . .	...	...	...	96	5.26	...	...	1	...	1	...	...	...	...	237	...	1	11.85
Favus . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	...	0.24
Herpes Zoster . . . . .	...	...	...	35	1.08	...	1	...	...	...	...	1	...	...	111	...	...	3.24
Impetigo	4	...	...	374	16.62	...	...	1	...	19	...	...	...	...	96	...	...	4.21
Ingrowing toe nail	2	...	...	117	3.99	...	...	...	...	2	...	...	...	...	2	...	...	0.05
Onychia . . . . .	...	...	...	10	0.28	...	...	...	...	...	...	...	...	...	3	...	...	0.13
Prickly heat	1	...	...	17	0.38	...	...	...	...	...	...	...	...	...	8	...	...	0.20
Psoriasis . . . . .	...	...	...	35	1.39	...	...	...	...	...	...	...	...	...	26	...	...	1.74
Sycosis (Folliculitis) . . . . .	...	...	...	28	3.13	...	...	...	...	...	...	...	...	...	18	...	...	2.04
Tinea	1	...	...	378	11.74	...	1	2	...	1	...	...	...	...	304	...	...	9.52
Urticaria . . . . .	...	...	...	31	0.64	...	1	4	...	4	...	1	...	...	98	...	...	2.43
Wart . . . . .	...	...	...	40	2.36	...	...	...	...	...	...	...	...	...	9	...	...	0.53
Whitlow . . . . .	...	...	...	64	2.40	...	...	...	...	...	...	...	...	...	102	...	...	4.17
Other diseases	2	...	...	104	5.24	...	1	1	...	5	...	...	...	...	74	1	1	4.78

TABLE XXVI—concl'd.

Diseases.	European Army of India.										Indian Army.							
	British Officers attached to European troops. 2,227			Men. 52,646				Women. 4,178		Children. 6,522		British Officers attached to Indian troops. 2,053			Men present. 116,984			
	A.	D.	In- valids.	A.	Con- stantly sick.	D.	In- valids.	A.	D.	A.	D.	A.	D.	In- valids.	A.	D.	In- valids.	Con- stantly sick.
<i>Diseases of the Urinary Organs.</i>																		
Calculus—																		
(a) Bladder . . . . .	...	...	...	14	1·22	...	2	...	1	...	...	1	...	...	8	...	1	0·42
(b) Kidney . . . . .	...	...	...	10	0·82	...	1	...	1	...	...	1	...	...	4	...	1	0·68
(c) Ureter	5	...	1	...	...	...	...	...	...	...	...	...	...	7	...	...	...	0·70
Cystitis	3	...	...	53	3·27	...	...	13	...	4	...	1	...	...	35	...	1	2·11
Haematuria	1	...	...	43	2·23	...	...	2	...	4	...	1	...	...	5	...	...	0·22
Incontinence of urine . . . . .	...	...	...	6	0·26	...	2	...	...	...	...	...	...	...	3	...	...	0·09
Nephritis acute . . . . .	...	...	...	11	1·44	4	4	2	1	6	...	4	...	...	21	1	6	2·67
Nephritis chronic	2	1	2	1	0·21	...	...	...	...	...	...	...	...	...	...	...	...	0·10
Renal colic	3	...	...	36	1·62	...	...	2	...	...	...	1	...	...	108	...	...	3·15
Other diseases	6	...	...	111	10·37	...	8	37	...	17	...	...	...	...	91	...	...	4·83
<i>General Injuries.</i>																		
Burns and scalds . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Effects of anti-rabic treat- ment. . . . .	...	...	...	2	0·61	...	...	...	...	...	...	...	...	...	2	...	...	0·05
Effects of inoculation . . . . .	...	...	...	23	0·31	...	...	...	...	...	...	1	...	...	2	...	...	0·04
Heat exhaustion	3	2	..	78	2·27	4	2	...	...	2	1	2	...	2	13	...	...	0·22
Heat stroke . . . . .	...	...	...	11	0·56	4	...	...	...	...	...	...	...	...	5	1	...	0·13
Sun stroke . . . . .	...	...	...	1	0·08	...	...	...	...	...	...	...	...	...	...	...	...	...
Other injuries	3	2	3	22	0·54	11	1	...	...	1	...	5	...	...	19	24	...	0·76
<i>Local Injuries.</i>																		
Abrasions	6	...	...	183	5·32	...	...	1	...	6	...	4	...	...	237	...	...	7·06
Burns and scalds . . . . .	...	...	...	58	2·47	...	...	...	...	9	...	...	...	...	191	...	...	9·14
Concussions	22	1	...	111	5·00	2	...	1	...	1	...	13	...	...	41	3	1	2·31

Concussions	28	...	...	677	20.04	...	...	8	...	10	...	21	...	1	1,926	3	6	60.98
Dislocations and displacements.	8	...	...	182	11.45	...	6	1	...	...	...	5	...	...	97	...	5	6.10
Fractures	43	2	3	710	49.69	9	9	14	...	37	1	35	2	2	1,212	9	68	115.01
Sprains and strains	19	...	...	947	29.58	...	5	3	...	2	...	12	...	...	805	1	2	25.43
Wounds gun-shot	2	1	1	30	2.84	6	1	...	...	1	...	...	2	...	35	9	2	2.65
Wounds others	24	2	1	303	10.49	1	4	3	...	23	...	10	...	...	1,587	2	8	59.56
Injuries self inflicted . . . . .	...	...	...	3	0.13	9	...	...	...	...	...	...	...	...	...	10	...	...
Other injuries	9	...	1	71	3.73	6	5	...	...	2	...	5	...	1	93	3	9	5.18

Tumours and Cysts.

Carcinoma . . . . .	...	...	...	3	0.27	2	2	4	...	...	...	1	1	...	2	1	...	0.25
Cysts . . . . .	...	...	...	68	2.08	...	1	4	...	3	...	...	...	...	94	...	...	3.08
Sarcoma . . . . .	...	...	...	7	1.37	2	5	...	...	...	...	...	...	...	2	...	1	0.89
New growths malignant (other cases).	...	...	...	2	0.40	...	1	5	...	...	...	...	...	...	14	...	...	1.23
New growths non-malignant	3	...	1	52	3.33	...	1	5	...	1	...	1	...	...	47	1	2	2.48
Malformations . . . . .	...	...	...	11	0.61	...	4	...	...	5	3	2	...	...	4	...	2	0.44

Poisons.

Alcohol	1	...	...	1	0.01	...	...	...	...	...	...	...	...	...	...	...	...	...
Arsenic . . . . .	...	...	...	1	0.04	...	...	...	...	...	...	...	...	...	...	...	...	...
Chloroform . . . . .	...	...	...	1	0.01	...	...	...	...	...	...	...	...	...	...	...	...	...
Other chemical poisons . . . . .	...	...	...	1	0.04	1	...	2	...	...	...	...	...	...	3	2	...	0.10
Opium . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	1	...	0.04
Venom of insects	1	...	...	6	0.14	...	...	...	...	...	...	...	...	...	7	...	...	0.15
Venom of Ophidia (Snake bite).	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13	1	...	0.43
Other poisons . . . . .	...	...	...	1	0.03	...	...	...	...	2	...	...	...	...	3	1	...	0.03
No appreciable diseases	5	...	...	129	4.57	...	...	27	...	21	...	2	...	...	50	...	1	1.56
All other causes	1	...	...	20	1.12	...	...	...	...	1	...	...	...	...	1	2	...	0.11
Total	1,048	15	54	29,858	1,407.76	134	363	1,305	15	2,180	63	712	15	14	49,452	252	648	1,837.30