

ANNUAL REPORT
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WITH THE GOVERNMENT OF INDIA
FOR 1934



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With Appendices

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CHARTS, GRAPHS, ETC.

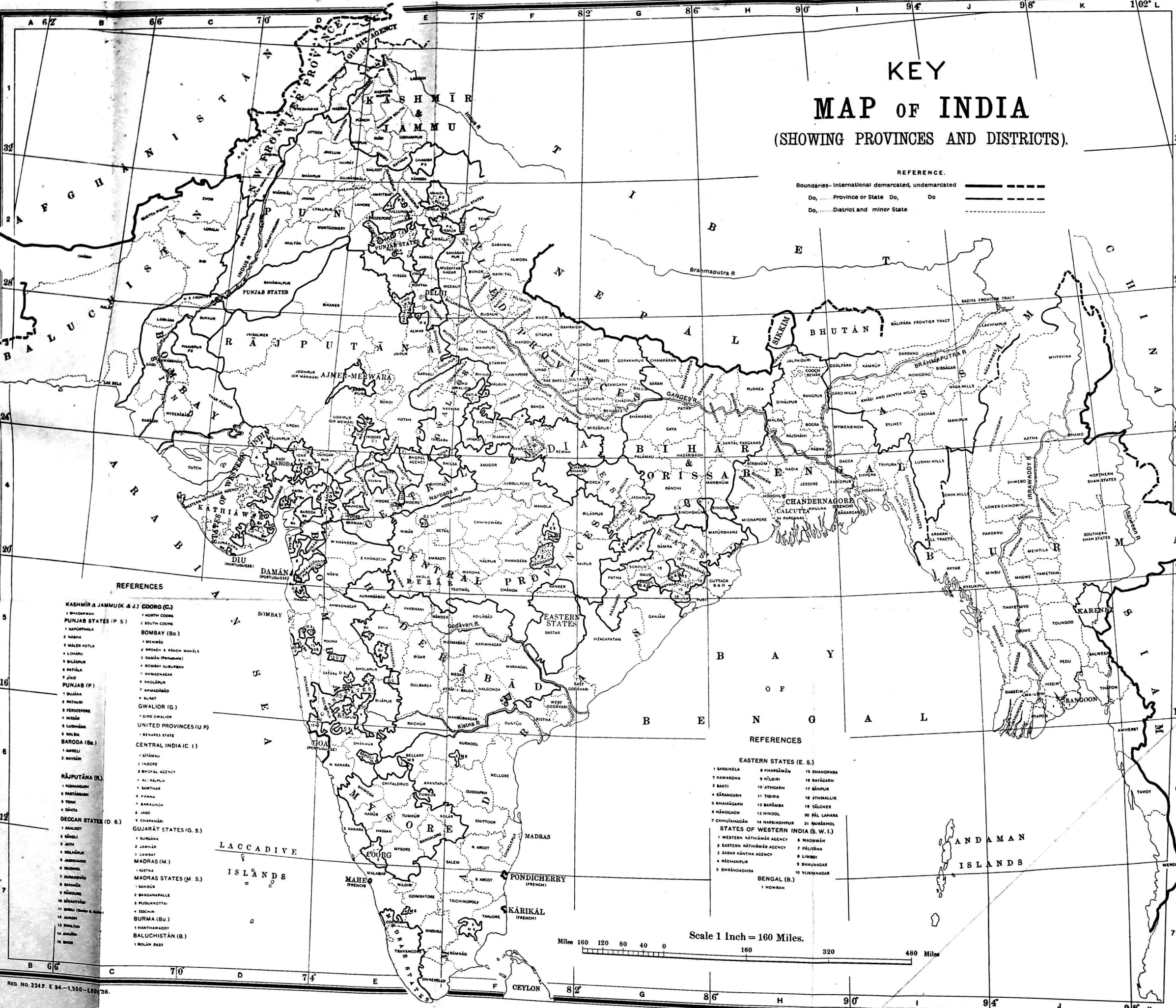
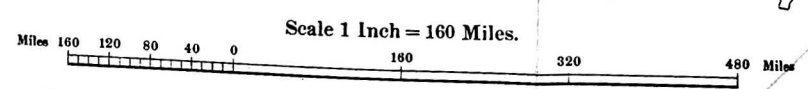
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KEY MAP OF INDIA (SHOWING PROVINCES AND DISTRICTS).

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

- REFERENCES**
- KASHMIR & JAMMU (K & J)**
 - PUNJAB STATES (P S)**
 - BOMBAY (Bo)**
 - RAJPUTANA (R)**
 - DECCAN STATES (D S)**
 - GUJARAT STATES (G. S.)**
 - MADRAS (M.)**
 - MADRAS STATES (M. S.)**
 - BURMA (Bu)**
 - BALUCHISTAN (B)**
 - COORG (C.)**
 - BOMBAY (Bo)**
 - GUWALIOR (G.)**
 - UNITED PROVINCES (U P)**
 - CENTRAL INDIA (C. I.)**
 - WESTERN STATES (W. S.)**
 - BENGAL (B.)**

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Annual Report of the Public Health Commissioner with the Government of India for 1934.

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 1934 are given below :—

Mid-year estimated population	275,753,570
Area (square miles)	890,116
Density per square mile	310
Births { Number	9,288,897
{ Rate p. m.	34
Deaths { Number	6,856,244
{ Rate p. m.	25
Infantile mortality per 1,000 live-births	187
Vital index	135.48

The year presented no markedly unusual features in regard to health conditions. The death rate is higher than last year and so is the infantile mortality rate, while the birth rate is lower, but such fluctuations in the recorded rates must be expected under our present system of registration and too much stress should not be laid on them. The natural increase of 9 *per mille* is well below the high figure of 14 recorded last year, but fluctuations in this figure also are a feature of India's statistics.

Mortality from the principal epidemic diseases has risen this year. Cholera deaths have been nearly three times what they were in 1933, plague mortality is almost doubled, but deaths from smallpox are low. The other principal causes of deaths show comparatively little change, although in the main the figures are higher, particularly under the heading "Fever" where there is an increase of over 400,000 deaths.

In previous reports attention has been called to the population problem in India and to the gravity of the position which will have to be faced if the rate of increase recorded in the decade, 1921-31, continues without a counterbalance in the shape of increased food production. In the following paragraphs it is proposed to note some of the difficulties encountered in attempting to estimate the dangers ahead and to comment upon some factors which may possibly operate to prevent a critical position from arising.

Population, as enumerated at the census, is the only accurate piece of information we have in India on which to base any opinions as to vital statistics. As we move away from the census figures we find ourselves less and less certain of our data. Birth rates, death rates and the like are compiled from records which, as has repeatedly been pointed out in these reports, are known to be incomplete and inaccurate, and calculations based upon them must therefore admit of no small margin of error. The most that can be claimed is that the available data give some indication of actual conditions.

In no direction is our lack of accurate data more evident than in a consideration of the population problem particularly in its relation to food production. We count our population every ten years and can watch the increase which is alarming enough. Unfortunately we know much less about food production. Existing data are not accurate enough to estimate what India's food production really is.

Crop production is estimated by multiplying together "area in acres", "standard yield" and "seasonal factor". One might think that the area in acres should be accurately known but in fact in Bengal, Bihar and Orissa and Assam which have the system known as "permanent settlement" there is considerable uncertainty as to the accuracy of the area statistics while these figures for Indian States are of very doubtful value. Were it accurately known, the area in acres would be of great value, for this factor is relatively static except for increases due to new irrigation projects. The seasonal factor which varies from year to year, is mainly dependent upon meteorological conditions and cannot therefore be standardised. There remains the standard yield, the most elastic of the three, on which depends mainly the answer to the question "Can increased population be balanced by increased food production". In dealing with this question there are several points to remember. Agricultural research is continuously showing the way to increased yields. There are areas under wheat yielding 14 *maunds* to the acre which could be made to yield double that amount. Apart from possible increases in standard yields there is a tendency to underestimate present yields. In a bad year standard yields are put down—they are seldom put up in a good year. Where figures can be checked, as in the case of cotton, estimates are found to be about 25 per cent. below the truth.

In the present state of our knowledge it is not safe positively to assert that food production cannot keep pace with population increase. Although there is evidence of widespread undernutrition in India there is no evidence to show that the "ryot" is worse fed now than he was in earlier days. Rather is it probable that the absorption of foodstuffs has, over a period of years, risen in proportion to the population. This cannot, however, be proved with our present statistics and there is a great need for a general survey of food production in India.

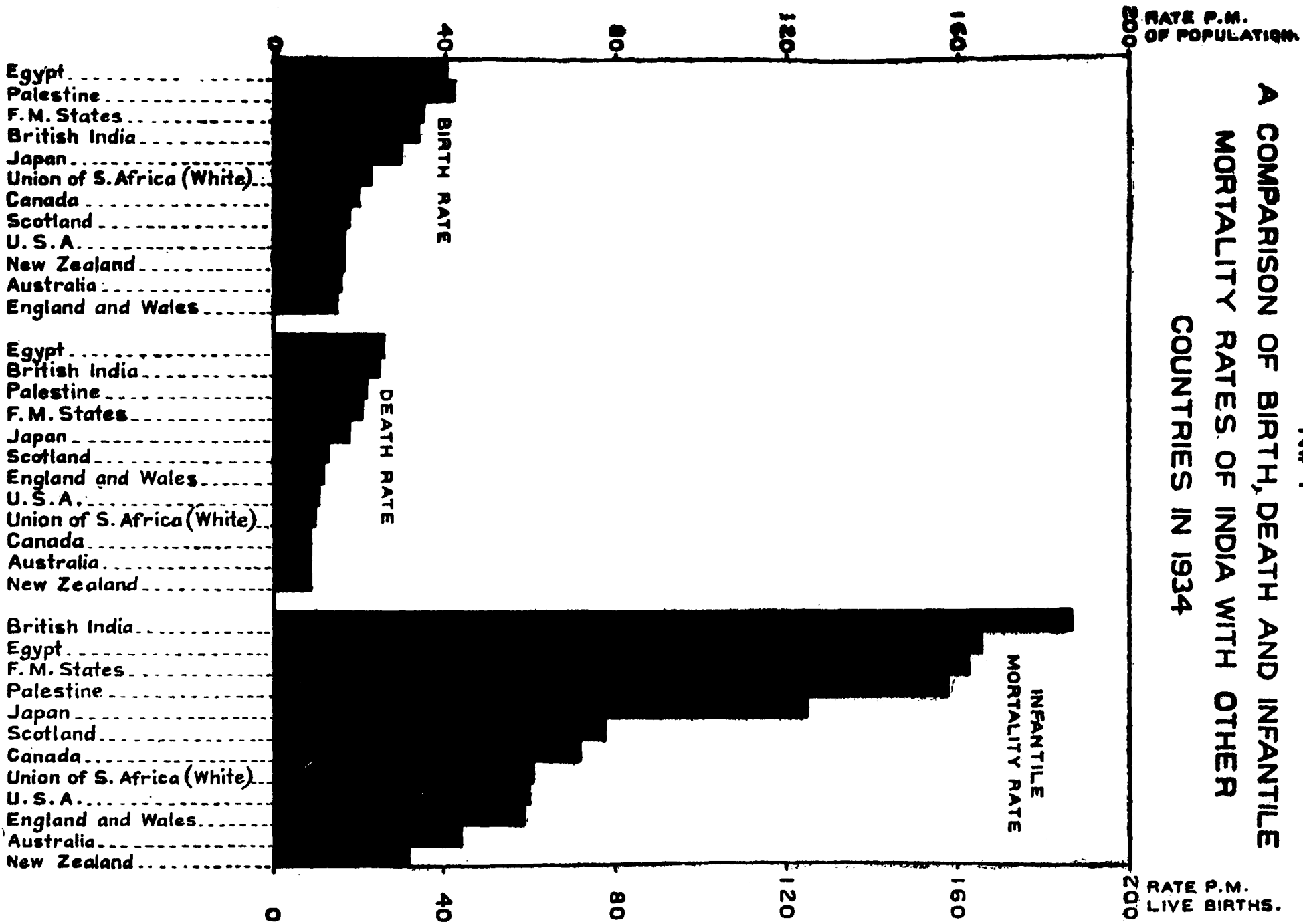
Until such a survey has been carried out, the question of population in relation to food supply cannot be satisfactorily determined.

Another factor which has a bearing on the population question is the relation of the birth and death rates. Among the many theories on this subject put forward by biologists and economists, and, working with data that are incomplete, the truth is not easy to discern. If the biological law holds good that the rate of reproduction is in direct proportion to the chances of death we at least know that the trend of our death rate is downwards. To those who believe that improved economic conditions or a rise in the standard of living will be followed by a drop in the birth rate there is some evidence that economic conditions are improving while, for those who hold that sooner or later increasing density will, by means which have not yet been satisfactorily demonstrated, lower fertility, there may be some consolation in the undoubted fact that population density is increasing in India.

One of the most important factors in connection with the birth rate is age at marriage. A rise in age at marriage especially in females will tend to reduce fertility and therefore to lower the birth rate. There is a considerable volume of opinion among those qualified to judge that the age of females at marriage is rising.

No 1

A COMPARISON OF BIRTH, DEATH AND INFANTILE MORTALITY RATES OF INDIA WITH OTHER COUNTRIES IN 1934



If food production keeps pace with population increase, a critical situation may be avoided, but India needs more than this. A higher standard of living, with all that this brings in the way of improved health and welfare, is a pressing need which can only be obtained, in a predominantly agricultural country, by a considerable increase in food production or a pronounced drop in the annual increment of population.

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

TABLE I (i).

Year 1934.	Birth rate per mille.	Death rate per mille.	Natural increase per mille.	Infantile death rate per 1,000 births.
British India	33·7	24·8	8·9	187
England and Wales	14·8	11·9	2·9	59
Scotland	18·0	12·9	5·1	78
Australia	16·4	9·3	7·1	44
New Zealand	16·5	8·5	8·0	32
Canada	20·4	9·4	11·0	72
Union of South Africa	23·4	9·7	13·8	62
Federated Malay States	35·4	21·4	14·0	163
Palestine	41·6	21·9	19·7	158
United States of America	17·1	11·0	6·1	60
Japan	20·0	18·1	11·9	125
Egypt	40·4	26·6	13·8	166

Population.

2. Tables I (ii) and I (iii) give the estimated mid-year population of British India by provinces and by sex and age.

TABLE I (ii).

Estimated population, 1934.

	Estimated population, 30th June 1933.	Excess of births over deaths.	Estimated population, 30th June 1934.	Percentage increase.		
				March 1932 to June 1933.	July 1933 to June 1934.	Total from March, 1931, to June 1934.
British India	272,613,830	3,139,740	275,753,570	1·4	1·2	3·8
N.-W. F. P.	2,412,406	20,605	2,433,011	0·9	0·9	3·2
Punjab	24,352,693	330,715	24,683,408	1·7	1·4	5·2
Delhi	660,238	7,922	668,160	1·8	1·2	5·0
U. P.	49,665,337	894,060	50,559,397	1·7	1·8	4·4
B. & O.	38,627,495	422,534	39,050,029	1·5	1·1	3·6
Bengal	50,602,842	234,336	50,837,178	0·7	0·5	1·9
C. P.	16,008,088	229,619	16,237,707	1·9	1·4	4·6
Bombay	22,430,565	239,718	22,670,283	1·3	1·1	4·0
Madras	46,599,849	552,287	47,152,136	1·6	1·2	4·4
Coorg	164,133	54	164,187	0·3	0·0	0·5
Assam	8,119,934	77,671	8,197,605	1·2	1·0	3·4
Burma	12,401,694	123,962	12,525,656	1·2	1·0	3·4
Ajmer-Merwara	568,556	6,257	574,813	0·9	1·1	2·6

TABLE I (iii).

Estimated population by sex and age.

	Males.	Females.	Total.
All ages	142,076,786	133,676,785	275,753,571
0—5 years	20,327,711	20,627,782	40,955,493
5—10 „	18,621,490	16,855,397	35,476,887
10—15 „	17,093,806	14,997,130	32,095,936
15—20 „	12,951,089	12,856,930	25,808,019
20—30 „	24,718,550	24,572,717	49,291,267
30—40 „	20,358,747	18,135,648	38,494,395
40—50 „	13,989,575	12,222,993	26,212,568
50—60 „	8,357,520	7,757,665	16,115,185
60 years and upwards	5,653,298	5,650,523	11,303,821

In the report for 1933 it was stated that by 1941, at a conservative estimate, the population of India will probably considerably exceed a figure of 400 millions. Since then estimates have been made by Dr. Raja of the All-India Institute of Hygiene and Public Health, Calcutta, of the probable population of India in 1941 using three methods, and his results are given below :

- (1) Assuming that the rate of increase in the period, 1921-31, will be repeated, the enumerated census population of 352,827,778 in 1931 will be 390,238,582 by 1941.
- (2) The growth of population in a country is determined by four factors, the birth and death rates and the figures for immigration and emigration. Migration has ceased to be of any great importance in view of restrictions that have been placed on the admission of Indians into other countries. During the decade, 1921-31, the outward balance of migration was about a million and three quarters or only about 5 per cent. of the total increase of nearly 34 millions during these ten years. The birth rate in British India has been steady from the beginning of the century while the death rate has shown a tendency to decline during the past ten or twelve years. Using the specific mortality rates corrected for growth of population, it has been shown that the trend is downwards for both sexes at all age-periods except 60 and beyond, during the years 1921 to 1933. Persons aged 60 and over constitute only about 4 per cent. of the total population of the country and Dr. Raja therefore thinks that it is safe to assume that, at least in the immediate future, the lowered death rate is likely to persist. When growth is not characterised by violent fluctuations, short term predictions of sufficient accuracy can be obtained by the use of equations which have no justification except that they describe past events satisfactorily. To the figures for natural increase curves of increasingly higher order were fitted by Professor R. A. Fisher's method of fitting regression lines and, as it was seen that the straight line and second order parabola gave better fits than the immediately higher ones, the expected increases in population between 1931 and 1941, as given by these two curves, were calculated. On the assumption that the rate of increase in British India, to which alone

the figures related, was applicable to the whole of the country, Dr. Raja estimated the population in 1941 to be 401,422,517 as given by the straight line and 399,522,174 by the second order parabola.

- (3) By fitting Professor Pearl's logistic curve to the enumerated populations of India for the census years 1872-1931, corrected for additions of territory and improvements in census methods. Taking 150 millions and 600 millions as the lower and upper limits, the logistic curve gives a very low rate of growth, *viz.*, 4.56% for the ten years 1931-41 and an expected population by 1941 of 368,922,362.

In considering the results of the three methods there can be little doubt that the prediction given by the logistic curve is a grave underestimate and that the figure of 400 millions mentioned in last year's report is, subject to abnormal visitations of epidemics or famines, likely to be near the mark.

Migration.—Following upon improved trade conditions the number of emigrants from Madras Presidency to Malaya rose from 38 in 1933 to 29,639 this year and those to Ceylon from 32,898 to 88,808. Immigrants from the same colonies numbered 4,189 exclusive of those who returned at their own expense. Immigrants to and emigrants from Burma by the sea-route numbered 256,004 and 226,698, respectively. In addition, large numbers of agricultural labourers crossed from Bengal to Arakan by the overland route. Coolies immigrating to Assam totalled 52,963.

Rainfall and other weather conditions.

3. Through the courtesy of the Director General of Observatories some of the important features are given below :—

Taking the year as a whole, rainfall was within 20% of normal over most of the country. In east Rajputana, west Central India, Berar and the west Central Provinces it was in excess by 21 to 34%, while in Kashmir and in the Madras Deccan it was in defect by 25% and 31% respectively.

During the cold weather period, January and February, rainfall was in moderate to large excess in Burma, Assam, Bengal and the Madras Presidency, normal in the United Provinces and Mysore, in slight defect in Bihar and Orissa and Central India and in moderate to large defect elsewhere. Over the plains of the country as a whole, the rainfall of this period was in defect by 10%.

The rainfall during the hot weather months, March to May, was in slight excess in Assam, normal in the Punjab and the North-West Frontier Province, in slight defect in Rajputana and in moderate to large defect elsewhere. Averaged over the plains of India, there was a defect of 27% in the season's rainfall.

No prolonged break in the monsoon occurred and the rainfall of the season, June to September, was fairly well distributed. It was in slight to moderate excess in Rajputana, Central India and the Central Provinces, in slight to moderate defect in Mysore and Madras Presidency and normal elsewhere. Over the plains as a whole, it was normal.

During the retreating southwest monsoon period, October to December, rainfall was in moderate to large excess in Assam and Bengal, normal in Burma, and Bombay Presidency outside Sind and Mysore, in large defect in the United Provinces and in slight to moderate defect elsewhere. On an average over the plains of the country, the rainfall of this period was normal.

TABLE I (iv).

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 .	0·9	1·0	3·7	5·1	38·5	36·7	4·8	5·0	47·9	+0·1
N. W. F. P. .	0·7	2·5	3·8	4·2	8·5	7·9	0·8	1·2	13·8	-2·0
Punjab . . .	0·7	1·9	1·9	2·0	13·9	15·4	0·4	0·8	16·9	-3·2
U. P.	1·4	1·4	1·0	1·4	36·7	33·5	0·5	1·8	39·6	+1·5
B. & O. . . .	1·2	1·5	1·3	4·1	43·8	42·7	3·1	3·9	49·4	-2·8
Bengal	1·8	1·3	8·5	12·7	49·5	54·4	8·1	6·0	67·9	-6·5
C. P.	0·1	1·3	0·3	1·7	50·2	40·5	2·4	2·8	53·0	+6·7
Bombay	0·1	0·2	0·6	1·5	42·5	39·7	3·3	3·4	46·5	+1·7
Madras	2·6	1·2	4·2	6·0	24·1	29·0	13·5	15·8	44·4	-7·6
Assam	3·8	2·2	30·3	25·1	71·9	66·1	11·3	7·1	117·3	+7·8
Burma	0·5	0·3	6·9	10·5	62·9	62·4	9·6	9·2	79·9	-2·5
Sind	0·0	0·5	0·2	0·5	6·5	5·9	0·1	0·2	6·8	-0·3
Rajputana . . .	0·2	0·6	0·7	0·9	24·9	19·0	0·4	0·8	26·2	+4·9
Central India .	0·6	0·8	0·4	0·9	44·6	33·1	1·1	1·6	46·7	+10·3
Hyderabad . . .	0·1	0·5	1·1	2·0	27·1	26·5	2·4	3·7	30·7	-2·0
Mysore	0·3	0·3	3·7	5·3	16·6	22·4	8·8	8·2	29·4	-6·8

Agricultural and Economic Conditions.

4. Table I (v) gives the cultivated and uncultivated acreage in British India and different provinces during the years 1933-34 and 1934-35. Those for the former year are revised totals.

TABLE I (v).

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	{ 1934-35	226,962,527	52,298,737	154,236,722	144,816,630
	{ 1933-34	232,246,100	47,452,937	153,448,712	144,650,401
N.-W. F. P. .	{ 1934-35	2,199,323	578,502	2,741,432	2,693,548
	{ 1933-34	2,290,767	532,900	2,706,826	2,690,925
Punjab . . .	{ 1934-35	26,504,016	4,619,933	14,215,656	12,862,386
	{ 1933-34	28,682,946	2,450,469	14,203,373	12,862,158
Delhi	{ 1934-35	204,696	23,098	60,522	86,214
	{ 1933-34	213,054	14,454	61,121	80,027
U. P.	{ 1934-35	35,662,051	2,910,102	10,217,742	9,900,572
	{ 1933-34	36,010,072	2,494,740	10,279,727	9,901,333

Abbreviations—

N.-W. F. P.	North-West Frontier Province.	P. M.	Per mille.
U. P.	United Provinces of Agra and Oudh.	R.	Rural.
B. & O.	Bihar and Orissa.	U.	Urban.
C. P.	Central Provinces and Berar.	M.	Male.
D.P.H.	Director of Public Health.	F.	Female.

		Cultivated.		Uncultivated.	
		Net area actually sown.	Current fallows.	Culturable waste other than fallow.	Not available for cultivation.
B. & O.	{ 1934-35	24,131,800	6,931,605	6,932,180	8,034,792
	{ 1933-34	24,179,900	6,930,987	6,951,121	8,014,594
Bengal	{ 1934-35	23,357,000	5,424,285	6,626,134	9,229,308
	{ 1933-34	24,002,400	4,763,330	6,255,188	8,920,219
C. P.	{ 1934-35	24,638,067	3,988,965	14,209,929	4,949,650
	{ 1933-34	24,988,652	3,773,525	14,107,740	4,946,445
Bombay	{ 1934-35	32,801,971	10,717,834	6,665,962	19,477,464
	{ 1933-34	33,245,929	10,263,999	6,584,789	19,522,658
Madras	{ 1934-35	32,830,795	11,165,710	13,442,650	19,792,886
	{ 1933-34	33,879,523	10,375,409	13,180,616	19,878,901
Coorg	{ 1934-35	137,421	171,919	11,690	334,045
	{ 1933-34	137,560	171,780	11,690	334,045
Assam	{ 1934-35	5,971,697	1,823,513	19,136,779	4,571,030
	{ 1933-34	6,026,569	1,869,163	19,070,364	4,571,030
Burma.	{ 1934-35	18,164,499	3,799,494	59,679,265	51,996,340
	{ 1933-34	18,239,159	3,651,288	59,755,221	52,045,325
Ajmer- Merwara.	{ 1934-35	359,186	143,777	276,781	894,395
	{ 1933-34	349,569	160,893	280,936	882,741

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

TABLE I (vi).

	Total	1934-35
		202,627,395
N.-W. F. P.		2,240,421
Punjab		20,878,521
U. P.		37,567,865
B. & O.		25,935,100
Bengal.		22,626,900
C. P.		20,371,556
Bombay*		24,331,068
Madras		29,761,120
Assam		5,099,385
Burma		13,815,459

*For the year, 1933-34.

Additional information extracted from provincial season and crop reports for 1934-35 is included in the following sub-paragraphs.

N. W. P. P.—The area sown aggregated 2,554,798 acres or 4% less than in 1933-34 and 3% less than the normal; that harvested amounted to 2,127,597 which was 6% more than in 1933-34 and slightly in excess of the mean, the balance failing to mature. The total estimated produce of rice was 19,469 tons, 12% above normal; *jowar* 9,506 tons or 34% below normal; *bajra* 13,584 tons or 57% below normal; maize 212,691 tons, 5% below normal; cotton 2,711 tons, 51% below normal; wheat 237,782 tons, 3% above normal; barley 40,523 tons, 59% below normal; gram 28,975 tons, 26% below normal; and rapeseed 8,649 tons, 55% below normal. Compared with normal, prices of food grains continued low and consequently the condition of the agricultural population was not prosperous. Stocks of foodgrains and fodder were generally sufficient.

Punjab.—Compared with the previous year, both the sown and the matured areas, 29,833,330 acres and 25,235,439 acres, were reduced by 14% and 12%, the *rabi* harvests suffering mainly; the balance of 4,597,891 acres failed to yield harvests. Sown and matured areas were lower than the decennial averages by 4% and 1% respectively; those under cereals and pulses by nearly 18% while areas under fodder crops (4,841,920 acres) rose by 2%.

The total estimated outturn of rice was 448,000 tons or 2% better than normal; wheat 3,042,400 tons or 4% above normal; barley 167,800 tons or 25% below normal; *jowar* 102,300 tons or 2% above normal; *bajra* 354,700 tons or 1% above normal; maize 411,600 tons or 15% above normal; and gram 798,300 tons or 26% below normal.

Prices generally showed a slight upward tendency. Stocks of food grains were generally sufficient.

The fall in water levels continued in the districts of Jullundur and Hoshiarpur. Continued deterioration due to hill torrents was reported in parts of Ambala and Jhelum districts.

Bihar and Orissa.—The harvested area totalled 29,547,400 acres, *bhadoi* crops occupying 7,567,100 acres, *aghani* 11,002,900 acres, *rabi* 10,396,100 acres, fruits and vegetables 581,300 acres. Of this total, 5,415,600 acres were sown more than once, and excluding these the net area sown amounted to 24,131,800 acres, of which 5,102,378 acres were irrigated. The gross outturn of winter rice of *bhadoi* crops was estimated at 3,750,700 tons, autumn rice 923,900 tons, maize 467,900, wheat 505,100, barley 570,100, gram 494,900; sugarcane 673,200 tons, jute 42,500 (bales) and rape and mustard 137,400 tons.

The *rabi* crops, which were 91% of the decennial average, totalled 505,100 tons of wheat or 97% of normal. Spring oilseeds 272,200 tons or 91% of normal, castor 7,700 tons or 90% of normal and summer rice, gram and barley, etc., 3,420,500 tons or 90% of normal. The cotton crop which was fair to good, was estimated to yield an outturn of 8,143 bales, or 1% more than in 1933-34. The gross outturn of the *aghani* crop was estimated at 99% of the average.

Prices of food-grains ruled higher, stocks being generally sufficient. The condition of the agricultural population was on the whole satisfactory. Owing to the prevailing trade depression the demand for labour was less except in the North Behar districts where it increased on account of house reconstruction work following the earthquake.

Bengal.—The net cropped area totalled 23,357,100 acres or 3,478,200 acres less than the normal; a total of 4,564,200 acres was cropped more than once.

The area under food-grains, amounting to 22,382,400 acres, was 14% less than normal and included 20,739,700 acres under rice, 206,900 acres under grain, 154,700 acres under wheat, 91,300 under barley and 75,200 under maize. The areas under linseeds and fibres were also lower than normal by 27% and 8% respectively. Those under sugar crops increased from 329,600 to 585,900 acres and those under drugs including narcotics from 511,200 to 980,200 acres.

The *bhadoi* crops estimated at 73% of the normal (79% in 1933) comprised jute 7,143,400 bales of 400 lbs. ; winter rice 85% of normal ; sugar-cane 86% of normal ; *rabi* crops 85% of normal and cotton 23,758 bales.

Although the prices of staple food-grains rose a little higher than in 1933, rural indebtedness was reported on the increase owing to the continued general low prices of agricultural produce. Wages remained much the same as in 1933.

Central Provinces and Berar.—The total area amounted to 38,575,850 acres in the C. P. proper and 11,377,694 acres in Berar. In the Central Provinces 23,889,918 acres or 48% and in Berar 8,317,097 acres or 26% were occupied for cultivation, but the area actually under crops was only 18,008,892 acres in the Central Provinces proper and 6,659,175 acres in Berar, the remaining areas failing to yield crops for various reasons. In the whole province, rice harvests (5,631,074 acres) yielded an outturn of 1,757,400 tons or 699 lbs. per acre as against a standard outturn of 648 lbs. per acre of cleaned rice. The *juar* and *tur* harvests (4,458,345 acres) aggregated 1,065,000 tons as against 1,114,800 in 1933-34 ; cotton (4,288,947 acres) 609,200 bales as against 732,700 in 1933-34 ; and *til* (337,912 acres) 19,900 tons as against 43,100 in the previous year.

Due to a rise in prices of certain commodities, the total estimated value of crops, which were 82% of the normal, rose by 3½ crores of rupees as compared with the previous year.

Bombay Presidency (1933-34).—In the Presidency proper, whilst the gross cropped area rose to 29,192,000 acres or by 0·1% chiefly in Gujarat and Decan, the net cropped area declined from 28,281,000 acres to 28,227,000 acres due to a great decrease of 118,000 acres in the Karnatak. The area under food crops (20,302,000 acres), *i.e.*, cereals, pulses, sugar cane, fruits and vegetables, increased by 91,000 acres or 0·5% over 1932-33 and by 578,000 acres or by 2·9% as compared with the average ; that under non-food crops comprising cotton, tobacco and oil seeds, fell by 54,000 acres or 0·6% as compared with 1932-33 and rose by 332,000 acres or 3·9% over the normal. The estimated yields of the principal food crops were—*bajri* 467,801 tons ; *ragi* 216,372 tons ; rice 901,744 tons ; wheat 328,468 tons ; *jowari* 1,528,236 tons ; other cereals 262,810 tons and pulses 508,543 tons.

In Sind both the gross and net cropped areas, 5,513,000 acres and 5,019,000 acres, increased by 5·9% and 6·2% respectively over the previous year due to the satisfactory working of the Barrage canal system. The increase occurred chiefly in areas under better paying crops like cotton (+52%), rice (+0·9%), wheat (+34·7%), gram (+7·4%), etc. The outturns of food crops which aggregated 1,065,509 tons included rice 461,534 tons, wheat 303,249 tons, *jowari* 105,815 tons, *bajri* 106,256 tons, and other cereals 7,176 tons and pulses 81,479 tons.

There was scarcely any improvement in prices, and slump conditions which commenced 4 years ago continued to operate adversely.

Madras Presidency.—The sown area (37,538,510 acres) was among the lowest reported since 1924-25; food crops occupying 29,761,120 acres or 79% of the total; and non-food crops 7,777,390 acres or 21%. The most important food crop was rice which occupied 11,055,587 acres or 3% less than the normal; other important food crops included cholam 5,142,734 acres or 7% above normal, cumbu 2,697,189, ragi 2,156,752, Korra 1,498,441, and varagu 1,014,174 acres.

For the Presidency as a whole, the yield of crops per acre was below normal, that of tobacco and sugar cane was 98% of the normal, of rice (7,434,450 tons) 96%, cotton (474,980 bales) 94%, ragi (938,030 tons) 93%, whilst in the case of cholam (1,275,560 tons), cumbu (627,300 tons), varagu (345,980 tons), samai (111,450 tons), maize (28,610 tons), horsegram (121,990 tons), and gingelly (78,640 tons) the outturn was 82%—90% of the normal.

The stocks of food grains and fodder were generally sufficient. The prices of food-grains and money crops were generally higher than in 1933-34 but not enough to improve the economic condition of the agricultural population substantially.

Assam.—The area sown aggregated 5,971,697 acres and included 5,099,385 acres or over 85% under food crops; 375,991 acres under oilseeds; 444,427 acres under drugs and narcotics and the rest under sugar, fibres, fodder crops, fruits and vegetables, etc. The outturns of principal crops were rice 1,481,300 tons, jute 303,900 bales, tea 103,800 tons, rape and mustard 54,200 tons, and sugar cane 35,000 tons. Wholesale prices were lower this year.

Burma.—Compared with 1933-34 the gross harvested area aggregating 18,066,045 acres diminished by 166,809, due mainly to low prices and insufficiency or early rains. Important decreases occurred under rice chiefly in Upper Burma (—232,511 acres) and sesamum (—190,477 acres); the areas under these two crops totalled 12,009,717 acres and 1,418,931 acres, respectively. Other crops mainly consisted of millet 597,322 acres, maize 218,185, gram 215,808 acres, *pegyi* 145,040 acres, *pebyugale* 125,509 acres, *pesingon* 186,766 acres, ground nuts 624,558 acres, condiments and spices 156,146 acres, sugar crops 58,393 acres and cotton 442,203 acres.

The outturn of rice aggregated 6,471,818 tons or 13% less than in the previous year; that of sesamum 53,500 tons of seed; cotton 16,500 tons and ground nuts 142,000 tons.

Prices ruled easier than in the preceding year; rubber restriction has resulted in the reopening of some rubber estates and good prices obtained for tin and wolfram have reduced employment in Tavoy and Mergui.

Famine conditions and their relief.

5. An outbreak of famine was reported in the districts of Anantapur and Bellary in Madras Presidency and relief works were carried out in these areas. Scarcity conditions prevailed in the districts of Bankura, Murshidabad, Birbhum and Tippera in Bengal and the situation was met by the opening of test relief works, distribution of gratuitous relief, loans, etc. Some provinces, especially Bengal, Assam and B. & O. suffered from floods; special grants aggregating to Rs. 1,25,000, Rs. 25,000 and Rs. 30,000, respectively, were

distributed in these three provinces for the relief of the distressed from the funds of the Indian People's Famine Trust.

Live-births.

6. *British India*.—Live-births registered during 1934 numbered 9,288,897 being 4% less than the figure of 1933 and 3% more than the quinquennial mean (9,025,065). The crude birth rate was 33·7 p. m. of total estimated population, as against 35·5 p. m. in 1933 and 35 p. m., the quinquennial mean. Including still-births, the rate was 34·3 p. m.

Compared with 1933, the Punjab recorded a decrease of 103,994 births or of 10%, United Provinces 119,742 or 7%, Bihar and Orissa 78,618 or 6% and Madras 70,249 or 4%; in Delhi, Bengal, Bombay, Assam and Ajmer-Merwara the reductions were inconsiderable. Small increases occurred in North-West Frontier Province, Central Provinces, Burma and Coorg. Table I (vii) gives the registered numbers and rates *per mille* according to sex for British India and the various provinces, Central Provinces recording the highest and Coorg, for oft repeated reasons, the lowest birth rate.

TABLE I (vii).

	Births.			Rate per mille.				Mean (1929-33.)		
	M.	F.	Total.	M.	F.	Total.		M.	F.	Total.
						1934.	1933.			
British India	4,827,379	4,461,518	9,288,897	17·5	16·1	34	36	18	17	35
N.-W.F. P.	41,004	31,713	72,717	17	13	30	29	16	12	28
Punjab	495,767	442,863	938,630	20	18	38	43	22	19	41
Delhi	12,750	11,885	24,635	19	18	37	44	24	22	46
U. P.	941,838	836,954	1,778,792	19	17	35	38	19	17	36
B. & O.	652,829	615,501	1,268,330	17	16	32	35	17	17	34
Bengal	759,722	704,798	1,464,520	15	14	29	29	14	13	27
C. P.	357,503	337,216	694,719	22	21	43	43	23	22	45
Bombay	404,571	375,950	780,521	18	17	34	35	19	18	37
Madras	836,444	797,552	1,633,996	18	17	35	37	19	18	37
Coorg.	2,134	1,984	4,118	13	12	25	25	12	11	23
Assam	125,740	117,016	242,756	15	14	30	30	15	14	29
Burma	186,503	179,225	365,728	15	14	29	29	14	14	28
Ajmer-Merwara	10,574	8,861	19,435	18	15	34	38	18	15	33

Table I (viii) gives the total births and the relative rural and urban rates for British India and for each province. The rural rate continued to exceed the urban in the Punjab (+6 p. m.), B. & O. (+13 p. m.), Bengal (+8 p. m.), Bombay (+2 p. m.) and Madras (+15 p. m.); in other provinces it was lower. The high rural rates in B. & O. and Bengal are mainly due to the fact that a large proportion of the rural population, who have migrated to urban centres, return to their rural homes for child-birth.

TABLE I (viii).

	Births.		Rate p.m.	
	Rural.	Urban.	Rural.	Urban.
British India	8,364,513	924,384	34	34
N.-W. F. P.	63,084	9,633	30	30
Punjab	829,652	108,978	39	33
Delhi	7,245	17,390	35	38
U. P.	1,602,627	176,165	34	45
B. & O.	1,238,757	29,573	33	20
Bengal	1,391,494	73,026	29	21
C. P.	619,439	75,280	43	43
Bombay	636,628	143,893	35	33
Madras	1,402,447	231,549	34	36
Coorg	3,727	391	24	41
Assam	236,497	6,259	29	31
Burma	319,968	45,760	29	32
Ajmer-Merwara	12,948	6,487	34	36

Birth rates for the chief communities are available for ten provinces and are given in Table I (ix). The birth rate of 219 p. m. for "other classes" in N. W. F. P., which is incredible, is ascribed to misclassification in registering births on the part of Municipal Committees and Cantonment authorities in Peshawar district.

TABLE I (ix).

	Hindus.	Muhammedans.	Christians.	Other classes-
N.-W. F. P.	28	31	31	219
Delhi	37	43	21	39
U. P.	37	37	10	17
B. & O.	34	33	21	20
Bengal	28	29	20	75
C. P.	40	41	19	91
Madras	36	38	33	36
Coorg	26	19	20	51
Burma	17	28	23	31
Ajmer-Merwara	35	34	7	9

The crude birth rate or ratio of recorded births to an estimated population of all ages, as shown in Table I (x) is the best indication at our disposal of reproduction and, in conjunction with the recorded death rate, of the natural increase. Unfortunately the number of married women of reproductive age is not recorded and therefore not available.

Birth rates have however been calculated on the basis of the estimated number of women of child-bearing age, taken as 15—40 years, and these ratios are shown in Table I (x). This period of 15—40 years is possibly pitched too high, particularly for the southern half of India, but it is probably correct in indicating a child-bearing period 5 years shorter than the European one.

TABLE I (x).

	Female population, 15-40 years.	Total births.	Rate p.m.
British India	55,555,774	9,288,897	167
N. W. F. P.	465,380	72,717	156
Punjab	4,361,897	938,630	215
Delhi	125,041	24,635	197
U. P.	9,917,198	1,778,792	179
B. & O.	8,068,439	1,268,330	157
Bengal	10,535,972	1,464,520	139
C. P.	3,321,361	694,719	209
Bombay	4,518,284	780,521	172
Madras	9,980,831	1,633,996	163
Coorg	33,293	4,118	123
Assam	1,583,743	242,756	153
Burma	2,532,658	365,728	144
Ajmer-Merwara	111,677	19,435	174

For purposes of comparison, the crude birth rates in British India and those of a number of other countries are given in Table I (xi).

TABLE I (xi).

	Quinquennial.		Annual.				
	1921-25.	1926-30.	1930.	1931.	1932.	1933.	1934.
British India	33·4	35·7	36·0	34·3	33·7	35·5	33·7
England and Wales	19·9	16·7	16·3	15·8	15·3	14·4	14·8
Scotland	23·0	19·9	19·6	19·0	18·6	17·6	18·0
Belgium	20·4	18·6	18·8	18·3	17·7	16·5	16·0
Czechoslovakia	27·1	23·2	22·7	21·5	21·0	19·2	18·8
Denmark	22·3	19·4	18·7	18·0	18·0	17·3	17·8
France	19·3	18·2	18·0	17·4	17·3	16·3	16·1
Germany	22·1	18·4	17·5	16·0	15·1	14·7	18·0
Hungary	29·4	26·0	25·4	23·7	23·4	21·6	21·4
Italy	29·7	26·8	26·7	24·9	23·8	23·5	23·2
Netherlands	25·7	23·2	23·1	22·0	22·0	20·8	20·7
Norway	22·2	18·0	17·0	16·3	16·3	14·9	14·8
Portugal	33·2	31·2	29·8	29·7	29·9	29·0	28·4
Roumania	37·9	35·2	35·0	33·3	35·9	32·0	32·4
Spain	29·8	28·5	28·2	27·4	28·1	27·6	26·2
Sweden	19·1	15·9	15·4	14·8	14·5	13·7	13·7
Switzerland	19·5	17·6	17·2	16·7	16·7	16·4	16·2
Canada	27·4	24·1	23·9	23·2	22·4	20·9	20·4
New Zealand	22·2	19·7	18·8	18·4	17·1	16·6	16·5
South Africa (White)	27·1	26·1	26·4	25·4	24·3	23·0	23·5
U. S. A.	22·5	19·7	18·9	17·8	17·4	16·6	17·1
Japan	34·6	33·5	32·4	32·2	32·9	31·0	30·
Egypt	43·0	44·4	45·7	44·8	42·9	44·1	40·

In the Punjab the district birth rates varied between 47 p.m. and 27 p.m., the highest rates being registered in the districts of Gurdaspur, Jullundur, Amritsar, Sialkot and Ambala in the north and east and the lowest in Multan, Jhang, Muzaffargarh and D. G. Khan in the south and south west and in Attock. In the U. P. the ratios vary between 48 p. m. and 25 p. m. ; in B. & O. 45 p. m. and 26 p. m. ; in Bengal 37 p. m. and 21 p. m. ; C. P. 51 p. m. and 37 p. m. ; Bombay 50 p. m. and 14 p. m. ; Madras 44 p. m. and 28 p. m. ; Assam 35 p. m. and 18 p. m. ; and Burma 41 p. m. and 18 p. m.

Natural increases accruing from the excess of births over deaths for decennial periods from 1871 to 1930 and for individual years from 1927 to 1934 are given in Table I (xii).

TABLE I (xii).

	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
1927	8,516,706	35	6,009,729	25	2,506,977
1928	8,882,573	37	6,180,114	26	2,702,459
1929	8,565,341	36	6,267,391	26	2,297,950
1930	8,690,714	36	6,483,449	27	2,207,265
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	6,858,244	25	2,432,653

Table I (xiii) gives births by quarters of the year ; as usual, the largest number was recorded in the fourth and the lowest in the second quarter.

TABLE I (xiii).

	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.
British India	2,354,807	2,100,575	2,272,544	2,560,981
N.-W. F. P.	20,387	16,861	16,567	18,902
Punjab	250,424	188,648	211,113	288,445
Delhi	6,193	4,583	5,779	8,080
U. P.	457,495	397,534	466,246	457,517
B. & O.	313,748	304,971	310,089	339,522
Bengal	430,640	307,987	260,543	465,350
C. P.	164,409	160,099	191,743	178,468
Bombay	189,239	180,703	205,540	205,039
Madras	361,092	396,183	453,128	423,593
Coorg	1,020	1,098	1,120	880
Assam	70,322	46,905	50,868	74,661
Burma	85,169	90,827	94,987	94,745
Ajmer-Merwara	4,669	4,166	4,821	5,779

Table I (*xiv*) gives the proportion of male to female births for provinces and for British India as a whole. The excess of males over females born is a constant feature.

TABLE I (*xiv*).

	Males born per 100 females.		
	1934.	1933.	1929-33.
British India	108	108	108
N.-W. F. P.	129	130	130
Punjab	112	112	112
Delhi	107	107	108
U. P.	113	113	112
B. & O.	106	105	104
Bengal	108	107	108
C. P.	106	106	105
Bombay	108	108	108
Madras	105	105	105
Coorg	108	106	107
Assam	107	106	106
Burma	104	104	105
Ajmer-Merwara	119	113	116

Births exceeded deaths by 506,827 in Madras Presidency ; 483,698 in U. P. ; 288,855 in Punjab ; 287,633 in Bengal ; 286,731 in B. & O. ; 226,210 in Bombay Presidency ; 117,584 in C. P. ; 116,181 in Burma ; 87,055 in Assam ; 23,052 in N. W. F. P., and by 8,827 in Delhi, Ajmer-Merwara and Coorg. As usual, the birth rate exceeded the death rate in every province, the largest differences being recorded in the Punjab (+12 p. m.), Madras (+11), Assam (+11), N. W. F. P. (+10), Bombay (+10), U. P. (+9) and Burma (+9).

Deaths.

7. *British India*.—Compared with 1933 and the quinquennial mean, the registered deaths, 6,856,244, showed an increase of 759,457 or over 12% and of 1,596,566 or 30%, respectively. The death rate of 24.9 p. m. increased by roughly 3 *per mille* over the rate for 1933 and by 1 *per mille* over the 5-year mean. These figures reflect the relative unhealthiness of the year under report, particularly in B. & O., C. P., and U. P., where the rates exceeded those for 1933 by 13 p. m., 10 p. m. and 8 p. m., respectively. Slightly higher mortality was returned also in Madras, Burma and Ajmer-Merwara. Female mortality exceeded male mortality in the C. P., (+3 p. m.), B. & O. (+2 p. m.), N. W. F. P. (+1 p. m.), U. P. (+1 p. m.), Madras (+1 p. m.) and Burma (+1 p. m.). Table I (*xv*) gives registered deaths and the rates *per mille* according to sex for British India and for the various provinces.

TABLE I (xv).

	Deaths.			Rate p.m.				Mean (1929-33).		
	M.	F.	Total.	M.	F.	Total.		M.	F.	Total.
						1934.	1933.			
British India .	3,570,543	3,285,701	6,856,244	25.1	24.6	24.9	22.4	24	23	24
N.-W. F. P. .	27,389	22,276	49,665	21	20	20	21	21	20	21
Punjab . .	346,156	303,619	649,775	26	27	26	27	25	27	26
Delhi . .	10,039	9,020	19,059	26	32	29	32	25	33	29
U. P. . .	684,543	610,551	1,295,094	26	25	26	18	24	23	24
B. & O. . .	509,759	471,840	981,599	26	24	25	22	25	23	24
Bengal . .	610,731	566,156	1,176,887	23	23	23	24	22	22	22
C. P. . .	302,031	275,104	577,135	37	34	36	26	34	30	32
Bombay . .	285,713	268,598	554,311	24	25	24	24	26	27	26
Madras . .	570,915	556,254	1,127,169	24	23	24	23	25	24	24
Coorg . .	1,906	1,890	3,796	21	20	23	24	13	11	24
Assam . .	81,947	73,754	155,701	19	19	19	20	19	19	19
Burma . .	130,725	118,822	249,547	20	19	20	18	20	9	19
Ajmer-Merwara	8,689	7,817	16,506	29	29	29	28	26	26	26

From Table II (i) on page 28 it will be apparent that, smallpox excepted, all the chief groups of diseases, under which deaths are registered, showed increased mortality during the year, notably the fevers group (+426,778 deaths), cholera (+131,390) and "other causes" (+104,843). Health conditions for the rural population were especially unfavourable owing to the greater prevalence of fevers and cholera among them. The death rates exceeded those for urban areas by 9 p. m. in Delhi, 8 p. m. each in Bihar and Orissa and Madras, 7 p. m. in Punjab, 4 p. m. in Ajmer-Merwara, 3 p. m. in North-West Frontier Province, 2 p. m. each in Bengal and Assam and 1 p. m. in Central Provinces. Table I (xvi) gives the recorded deaths and rates *per mille* in rural and urban areas in British India and in the provinces.

TABLE I (xvi).

	Deaths.		Death rate p. m.		Mean (1929-33).	
	R.	U.	R.	U.	R.	U.
British India	6,192,544	663,700	24.9	24.4	24	27
N. W. F. P.	43,758	5,907	21	18	22	21
Punjab	582,821	66,954	27	20	27	22
Delhi	7,235	11,824	35	26	33	27
U. P.	1,147,253	147,841	25	38	23	36
B. & O.	956,519	25,080	25	17	26	17
Bengal	1,104,087	72,800	23	21	22	20
C. P.	516,615	60,520	36	35	37	36
Bombay	443,048	111,263	24	26	25	26
Madras	1,017,966	109,203	25	17	24	27
Coorg	3,385	411	22	43	22	42
Assam	152,246	3,455	19	17	19	17
Burma	207,125	42,422	19	30	30	19
Ajmer-Merwara	10,486	6,020	27	23	30	34

Seasonal incidence of mortality is given in Tables (G.—J.) on pages 289—91. Registered deaths in the 2nd half of the year were 18% more than those in the first half, the maxima being reached in six provinces in December, in three in August and September.

For purposes of comparison, the death rates in British India and those of a number of countries are given in Table I (xvii).

TABLE I (xvii).

	Quinquennial.		Annual.				
	1921-25.	1926-30.	1930.	1931.	1932.	1933.	1934.
British India	27·5	26·0	26·8	24·9	21·6	22·4	24·9
England and Wales	12·2	12·1	11·4	12·3	12·0	12·3	11·8
Scotland	13·9	13·6	13·3	13·3	13·5	13·2	12·9
Belgium	13·4	13·7	13·3	13·3	13·2	13·1	12·2
Czechoslovakia	16·1	15·3	14·1	14·4	14·1	13·7	13·2
Denmark	11·3	11·1	10·8	11·4	11·0	10·6	10·4
France	17·2	16·8	15·6	16·3	15·8	15·8	15·1
Germany	13·3	11·8	11·1	11·2	10·8	11·2	10·9
Hungary	19·9	17·0	15·5	16·6	17·8	14·7	14·4
Italy	17·3	16·0	14·1	14·8	14·6	13·5	13·1
Netherlands	10·4	9·9	9·1	9·6	9·0	8·8	8·4
Norway	11·5	11·0	10·6	10·9	10·7	10·2	9·8
Portugal	20·4	18·4	17·1	16·8	17·1	17·2	16·6
Roumania	23·0	21·2	19·4	20·8	21·7	18·7	20·7
Spain	20·2	17·9	16·8	17·3	16·3	16·3	15·9
Sweden	12·1	12·1	11·7	12·5	11·6	11·2	11·2
Switzerland	12·5	12·1	11·6	12·1	12·1	11·4	11·3
Canada	11·2	11·1	10·7	10·1	9·9	9·6	9·4
New Zealand	8·6	8·6	8·6	8·3	8·0	8·0	8·5
South Africa (White).	9·7	9·7	9·7	9·4	9·9	9·3	9·7
U. S. A.	11·8	11·8	11·3	11·1	10·9	10·6	11·0
Japan	21·8	19·3	18·1	19·0	17·7	17·8	18·1
Egypt	25·4	26·2	25·0	26·8	28·8	27·8	26·6

The death rate for the age-period, 15—40 years, was as usual higher among females than among males and the excess is ascribable to the greater risk of death to which women are exposed during child-bearing ages. The subject of maternal mortality has been dealt with in Section III on page 114.

TABLE I (xviii).

	Deaths, 15—40 years.		Death rates, 15—40 years.	
	Male.	Female.	Male.	Female.
British India	588,100	648,606	10·7	12·4
N.-W. F. P.	5,703	5,534	11	12
Punjab	58,550	56,402	11	13
Delhi	1,854	1,994	10	16
U. P.	103,865	114,853	9	12
B. and O.	102,314	102,937	13	13
Bengal	134,131	152,303	12	14
C. P.	Not available.		Not available.	
Bombay	46,125	52,702	8	12
Madras	91,722	113,997	10	11
Coorg	610	698	13	21
Assam	16,384	20,659	10	13
Burma	25,672	25,116	9	10
Ajmer-Merwara	1,170	1,411	9	13

Death rates for the chief communities are given in Table I (xix).

TABLE I (xix).

	Hindus.		Mubammedans.		Christians.		Other Classes.	
	Deaths.	Rate. p. m.	Deaths.	Rate. p. m.	Deaths.	Rate. p. m.	Deaths.	Rate. p. m.
British India	4,742,806	23·0	1,607,194	24·2	62,523	17·5	443,718	25·6
N.-W. F. P.	2,617	15	46,984	21	58	14	6	82
Punjab	272,575	29	362,872	27	10,433	25	3,895	10
Delhi	13,654	33	5,232	25	173	10	..	..
U. P.	1,082,989	26	209,295	29	1,079	5	1,731	15
B. and O.	826,314	27	96,539	23	5,651	17	53,095	26
Bengal	490,383	23	650,705	24	2,603	14	33,196	48
C. P.	449,673	34	21,886	32	..	..	105,576	71
Bombay	470,687	28	73,847	17	4,218	14	5,559	4
Madras	1,018,502	34	74,245	22	32,970	19	1,449	19
Coorg	3,261	22	367	27	..	..	163	47
Assam	87,828	18	54,082	20	1,453	18	12,338	44
Burma	10,700	21	8,475	15	3,865	14	226,507	21
Ajmer-Merwara	13,623	31	2,665	27	20	3	198	9

Table II(i) at page 28 of Section II shows death rates according to disease groups.

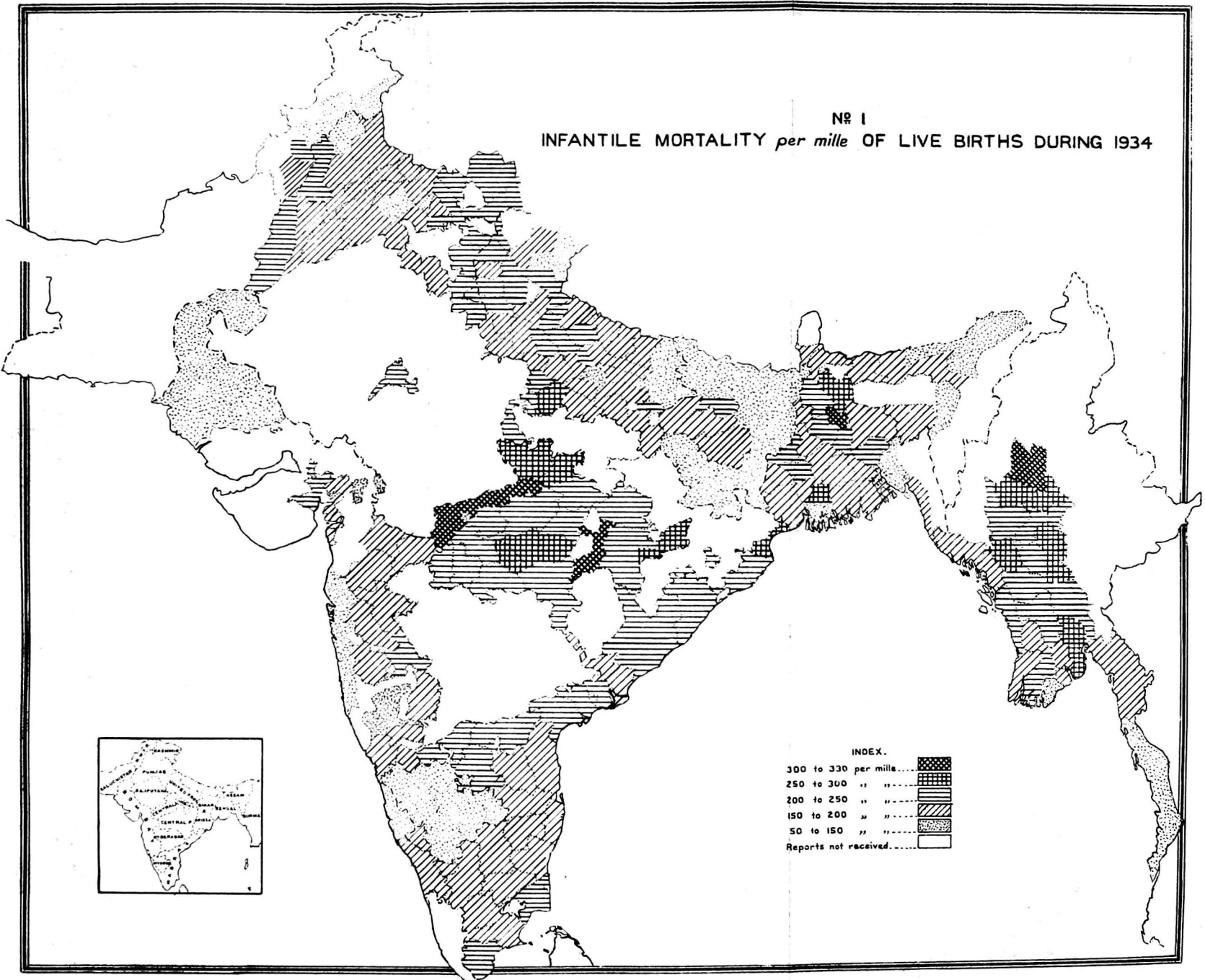
Infantile mortality.

8. The year, 1934, was comparatively unhealthy for the infant population in India; and 187 out of every 1,000 born are reported to have died. This compares with a rate of 171 in 1933 and 176, the 5-year mean. The persistent high mortality of infants may be ascribed in part to defective registration not only of births but of infant deaths, through the inclusion of still-births, since a distinction between the two is not always made by the illiterate *Chowkidar* and police *Moharrar*, and partly to the tendency of the more illiterate of the population to underestimate the age of deceased infants. In this respect the remarks of the Director of Public Health, Central Provinces are noteworthy :—

“A study of death registers maintained in urban areas leads one to conclude that more deaths are entered under one year of age than is actually the case. Information given as to the age of children, when reporting their deaths, is usually vague with the result that many deaths over one year of age are returned as under one year. This is clearly shown by the discrepancy usually met with between the vaccination birth registers (which are reliable as the date of death of child is entered against the birth entry) and the general death registers. The former invariably show a much smaller number of deaths in infants under one than recorded in the general death registers.”

The provinces chiefly contributing to the increased mortality were the U. P. (+39%), B. & O. (+11%), C. P. (+26%), Burma (+14%) and Ajmer-Merwara (+14%). Minor increases also occurred in Bombay and Madras Presidencies and in Assam. The recorded deaths, 1,734,516, were 9% more than in 1933 and 10% higher than the quinquennial mean of 1,582,282 deaths (176 p. m.).

№ 1
 INFANTILE MORTALITY *per mille* OF LIVE BIRTHS DURING 1934



INDEX.

300 to 330 per mille.....	
250 to 300 " ".....	
200 to 250 " ".....	
150 to 200 " ".....	
50 to 150 " ".....	
Reports not received.....	



Table I (xx) gives details of infantile mortality for British India and for the individual provinces.

TABLE I (xx).

	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.		1934.	1933.
British India	780,918	45	539,666	31	413,932	24	1,734,516	187	174
N. W. F. P.	2,977	30	3,282	34	3,506	36	9,765	134	137
Punjab	75,732	43	50,136	29	50,027	28	175,895	187	193
Delhi	1,768	34	1,960	37	1,505	29	5,233	212	226
U. P.	127,310	39	110,813	34	90,310	27	328,433	185	193
B. & O.	92,128	48	61,478	32	36,586	20	190,192	150	135
Bengal	156,981	57	74,901	27	45,312	16	277,194	189	200
C. P.	73,569	42	51,152	29	51,369	29	176,090	253	200
Bombay	50,819	39	46,048	35	33,768	26	130,635	167	161
Madras	159,356	51	77,735	24	78,265	25	315,356	193	185
Coorg	419	54	199	25	162	21	780	189	211
Assam	20,632	51	13,131	33	6,380	16	40,143	165	163
Burma	18,031	22	46,989	58	15,218	20	80,238	219	192
Ajmer-Merwara	1,196	26	1,842	40	1,524	34	4,562	235	207

The foregoing table shows that the wastage of infant life, calculated on live-births, was highest in the Central Provinces, Ajmer-Merwara, Burma and Delhi; in these provinces one child in every 4 or 5 recorded births failed to survive the first year of life. Whilst the percentage of deaths of one week old babies was high in Bengal, Madras, Coorg and Assam, that in Burma was high among infants aged 1—6 months, probably due in part to the local custom of partial feeding at too young an age with rice pre-masticated by the mother. As in previous years, a steady fall in mortality accompanies the monthly increase in age of infants from 1 to 12 months. These figures suggest that besides defective registration, alluded to previously, skilled maternity or midwifery service is inadequately or poorly provided especially in the rural tracts and that the indigenous *dai*, as it is much cheaper, is still in popular demand; on the other hand, in certain areas, e.g., Hlegu in Burma and Partabgarh in the United Provinces intensive public health measures, as a means of reducing infantile mortality rate has been proved beyond all doubt. The uniformly low death rate among Christians *c.f.* Table I (xxiv) lends support to this view as majority of Hindus and Muslims still follow primitive methods.

The poor nutrition of the mother, overcrowding, a high birth rate and high maternal mortality rate, frequent prematurity and the prevalence of respiratory diseases, convulsions, malaria and syphilis, combined with widespread ignorance of infant management, all contribute to the great loss of infant life in India. Birth rate, as also infantile death rate, is high among the poor classes, owing to the inaccessibility to them of efficient medical service. For instance, the aboriginal tribes in the Central Provinces, forming about 9% of the total population, live in unusually unfavourable primitive conditions, mostly in highly malarious forest tracts where there is no medical or public health relief at all.

The infantile mortality rate in British India is compared in Table I (xxi) with corresponding rates recorded in other countries. The only countries, having rates at all comparable with those of India, are Roumania, Hungary, Egypt, Portugal, Czechoslovakia and Japan.

TABLE I (xxi).

	Quinquennial.		Annual.				
	1921-25.	1926-30.	1930.	1931.	1932.	1933.	1934.
British India	182	178	181	179	169	171	187
England and Wales	76	68	60	66	65	64	59
Scotland	92	85	83	82	86	81	78
Belgium	100	95	93	82	87	85	82
Czechoslovakia	155	147	137	134	138	127	126
Denmark	82	82	80	81	72	68	64
France	95	89	78	76	76	75	69
Germany	122	94	85	83	79	76	66
Hungary	187	172	152	162	184	139	150
Italy	126	119	106	113	110	100	99
Netherlands	64	56	51	50	46	44	43
Norway	52	49	46	46	47	..	..
Portugal	146	146	144	146	144	149	..
Roumania . . . . .	..	192	176	180	185	174	182
Spain	143	124	117	116	111	112	113
Sweden	60	58	55	57	51	50	47
Switzerland	65	54	51	49	51	48	46
Canada	98	93	89	85	73	73	72
New Zealand	43	37	34	32	31	32	32
South Africa (White)	73	67	67	63	69	61	62
U. S. A.	74	68	65	62	59	58	60
Japan	159	137	124	132	118	121	125
Egypt	144	152	151	160	174	162	166

Table I (xxii) gives details of infant deaths aged under one week.

TABLE I (xxii).

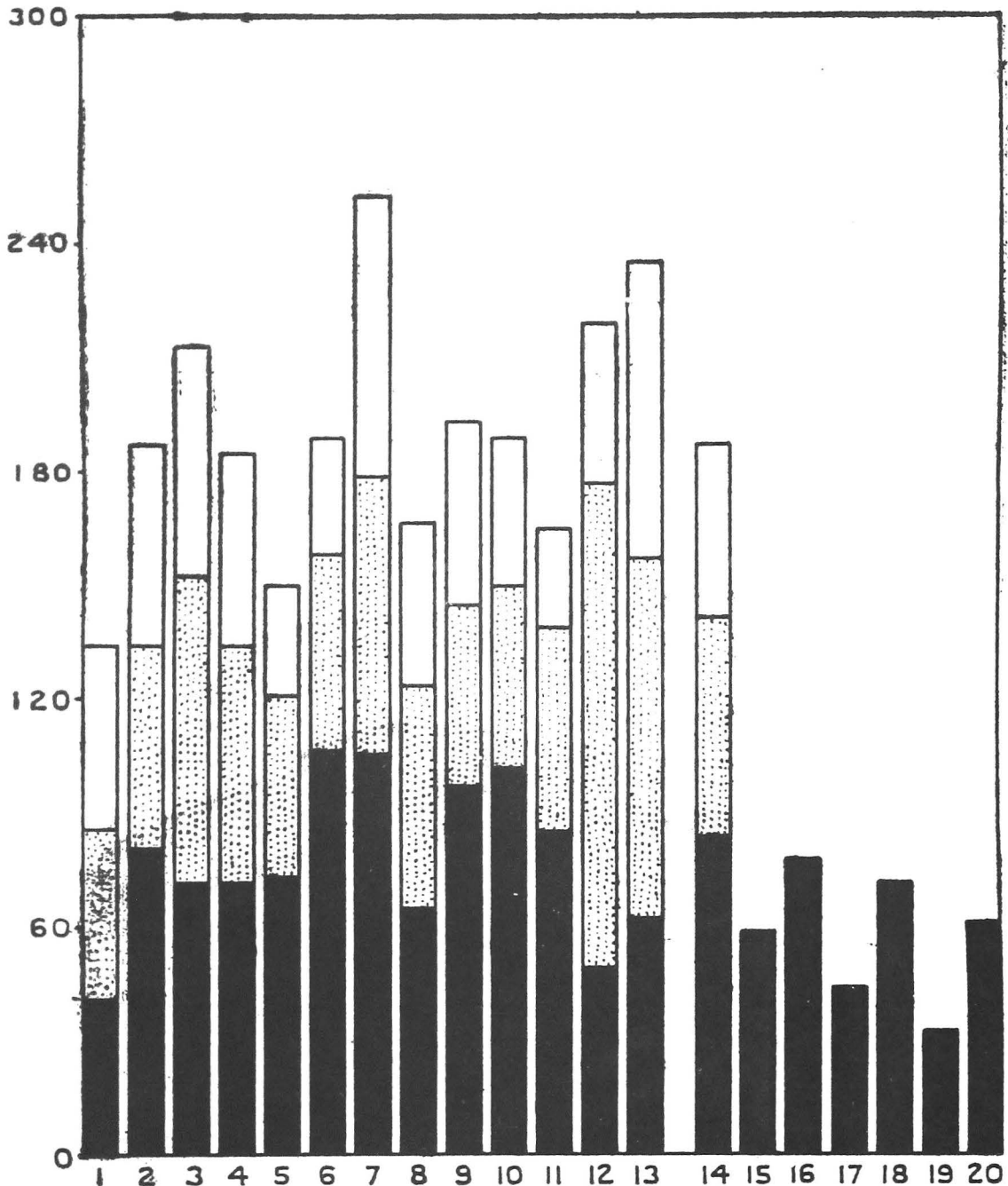
	Deaths under one week.	Rate p. m. live-births.	Percentage of	
			Deaths under one month.	Total infant deaths.
British India*	429,814	50	61	28
N.-W. F. P.	1,540	21	52	16
Punjab	41,579	44	55	24
Delhi	1,009	41	57	19
U. P.	78,933	44	62	24
B. & O.	63,326	50	70	33
Bengal	81,333	56	52	22
C. P.		Not available.		
Bombay	28,185	36	55	22
Madras	114,331	70	72	36
Coorg	257	62	61	33
Assam	8,911	37	43	22
Burma	9,729	27	54	12
Ajmer-Merwara	681	35	57	45

*Excluding Central Provinces and Berar.

No 2

INFANTILE MORTALITY PER MILLE OF BIRTHS
IN BRITISH INDIA, ENGLAND AND WALES
AND BRITISH DOMINIONS IN 1934

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) |

Table I (*xxiii*) shows the deaths of children and their rates per cent. of total deaths for British India and for the individual provinces. Of the 6,856,244 registered deaths, 42% as against 45% in 1933 occurred among children under 5 years of age and 6% among those aged 5—10 years. In other words 48%, as against 50% in 1933, of the deaths were of children under 10 years of age, a drop of 2% from last year's figure.

TABLE I (*xxiii*).

	Under one year.	% of total deaths.	1—5 years.	% of total deaths.	Total under 5 years.	% of total deaths.	5—10 years.	% of total deaths.	Total 10 years.	% of total deaths.
British India	1,734,516	25	1,186,656	17	2,921,172	42	379,531	6	3,800,703	48
N.-W. F. P.	9,765	20	8,672	17	18,437	37	3,037	6	21,474	43
Punjab	175,895	27	109,159	17	285,054	44	40,561	6	325,615	50
Delhi	5,233	28	3,273	17	8,506	45	850	4	9,356	49
U. P.	328,433	25	200,868	16	529,301	41	60,699	5	590,000	46
B. and O.	190,192	20	218,254	22	408,446	42	61,558	6	470,004	48
Bengal	277,194	24	171,682	14	448,876	18	86,809	7	535,685	45
C. P.	176,090	30	131,001	23	307,091	53	25,767	4	332,858	57
Bombay	130,635	23	110,904	20	241,539	43	26,789	5	268,328	48
Madras	315,356	28	176,133	15	491,489	43	51,712	5	543,201	48
Coorg	780	21	461	12	1,241	33	198	5	1,439	38
Assam	40,143	26	23,251	15	63,394	41	10,445	7	73,839	48
Burma	80,238	32	29,148	12	109,386	44	10,488	4	119,874	48
Ajmer-Merwara	4,562	28	3,850	23	8,412	51	618	4	9,030	55

Infant mortality figures for the different classes of population are again recorded in 7 provinces only and are given in Table I (*xxiv*). A uniform low death rate among Christians continued to be reported in these provinces.

TABLE I (*xxiv*).

	Hindus.		Muhammedans.		Christians.		Other classes.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.
N.-W. F. P.	886	181	8,869	132	10	77	..	..
Punjab.	77,679	194	93,943	183	2,837	165	1,436	214
Delhi	1,388	237	295	171	10	145	..	..
B. & O.	162,709	155	19,352	136	1,008	138	7,123	100
Madras	23,607	209	3,627	183	1,151	127	208	188
Coorg	692	187	58	218	5	75	25	321
Ajmer-Merwara	3,638	231	889	258	5	102	30	148

Of the total, 942,190 deaths were of male and 792,326 of female infants. Provincial details are given in Table I (*xxv*). High death rate among female infants in Ajmer-Merwara is a noteworthy feature.

TABLE I (xxv).

	Deaths.		Rate per mille.	
	Males.	Females.	Males.	Females.
British India	142,160	762,316	195	178
N.-W. F. P.	5,621	4,144	137	131
Punjab	95,359	80,536	192	182
Delhi	2,799	2,434	219	205
U. P.	180,777	147,656	192	176
B. and O.	104,083	86,109	159	140
Bengal	148,592	128,602	196	182
C. P.	95,888	80,202	268	236
Bombay	70,727	59,908	175	159
Madras	170,448	144,908	204	182
Coorg	405	375	190	189
Assam	21,893	18,250	174	156
Burma	43,223	37,015	232	207
Ajmer-Merwara	2,375	2,187	225	247

Provincial rural and urban infantile death rates are given in Table I (xxvi). Rural death rates were higher than urban in Coorg, Delhi, Assam, Burma and the Punjab. The persistent low urban death rate in Coorg, *viz.*, 36 p. m., is apparently due to the large number of plantation labourers from the adjoining districts of Mysore State and the Madras Presidency who generally leave their families at home. High urban mortality rates particularly in Ajmer-Merwara, where it exceeded the rural rate by 149 p. m. and where it is due presumably to defective registration, in the United Provinces (+96 p. m.) and Bombay Presidency (+63 p. m.) require attention. The urban mortality of infants in the Punjab has declined steadily during the last three years.

TABLE I (xxvi).

	Rural.		Urban.	
	Deaths.	Rate p. m. live births.	Deaths.	Rate p. m. live births.
British India	1,532,644	183	201,872	218
N.-W. F. P.	8,379	133	1,386	144
Punjab	155,650	188	20,245	186
Delhi	1,693	234	3,540	204
U. P.	280,722	175	47,711	271
B. & O.	185,092	150	5,100	172
Bengal	262,804	189	14,390	197
C. P.	156,621	253	19,469	259
Bombay	99,125	156	31,510	219
Madras	269,448	192	45,908	198
Coorg	766	206	14	36
Assam	39,362	167	781	125
Burma	70,586	221	9,652	211
Ajmer-Merwara	2,396	185	2,166	334

Causes of Infantile mortality.

9. Table I (*xxvii*) gives the chief causes of infantile mortality in Delhi Province. Febrile and respiratory diseases were again responsible for the largest number of deaths.

TABLE I (*xxvii*).

	1933.	1934.
Smallpox	297	3
Fever	2,799	2,408
Malaria	17	12
Measles	44	2
Diarrhoea	178	178
Respiratory diseases	1,090	1,040
Infantile convulsions	11	10
" debility	929	756
Ulcer and boils	17	12
Premature birth	42	46
Whooping cough	181	..
Pneumonia	235	301
Typhoid fever	78	55
Injuries . . . . .	..	8
Sunstroke . . . . .	..	6
Phthisis	1	1
Dysentery	32	45
C. S. fever . . . . .	..	2
Other causes	540	348

In the C. P., debilitating influences, dietetic errors and deficiencies, malaria, maternal prenatal weakness and neglect, bad housing, high birth rate, lack of medical aid and ignorance of the bringing up of infants are stated to be the main contributory factors.

Table I (*xxviii*), which gives figures for the chief causes of infantile mortality in Bombay city, is reproduced from the Annual Report of the Health Officer.

TABLE I (*xxviii*).

	1930.	1931.	1932.	1933.	1934.	Mean 1930-34.
All causes	7,506	7,401	6,298	8,320	8,253	7,556
Smallpox	449	2	69	717	33	254
Measles	41	15	16	18	27	23
Malaria	13	5	4	9	9	8
Remittent and undefined fever	203	198	147	167	186	180
Diarrhoea and enteritis	350	366	280	414	455	373
Dysentery	39	34	27	19	40	32
Debility, malformation and premature birth.	2,791	2,987	2,685	3,019	3,384	2,973
Respiratory diseases	2,529	2,646	2,217	2,828	2,983	2,641
Convulsions	626	620	422	594	562	565
Other causes	465	528	431	535	574	507

Table I (*xxix*) gives the causes of infant deaths registered in Rangoon town.

TABLE I (*xxix*).

	Total.		Infant deaths by classes.				
	1933.	1934.	Burmese.	Hindus.	Muham- medans.	Chinese.	Other classes.
Premature birth	462	410	173	139	54	20	24
Mainnutrition	207	66	30	27	6	2	1
Convulsions	586	634	357	164	87	43	33
Bronchitis and pneumonia	668	812	266	291	115	79	61
Enteritis	94	66	25	25	11	2	3
Dysentery and diarrhoea	133	146	45	64	16	10	11
Obstruction of bowels	50	101	31	36	20	2	12
Marasmus	84	81	39	28	10	3	1
Whooping cough	3	1	...	...	...	...	1
Fever	40	16	8	5	...	1	2
Diphtheria . . . . .	...	1	...	1	...	...	...
Influenza . . . . .	...	2	...	2	...	...	...
Smallpox	2	10	6	3	1	...	...
Other causes	89	255	87	86	53	15	14
Total	2,423	2,651	1,067	871	373	177	163

Still-births.

10. Table I (*xxx*) gives the numbers of recorded still-births in the different provinces but many still-births are not recorded as such and owing to defective registration are included in the infantile mortality returns.

TABLE I (*xxx*).

	Number.	Rate p. m. live- births.
British India	184,491	19.9
N.-W. F. P.	187	2.6
Punjab	10,190	10.9
Delhi	336	13.6
U. P.	15,809	8.9
B. & O.	42,519	33.5
Bengal	53,580	35.3
C. P.	16,165	23.3
Bombay	12,308	16.0
Madras	20,805	12.7
Coorg	160	39.0
Assam	8,682	35.7
Burma	3,644	10.0
Ajmer-Merwara	106	5.5

In Bombay Presidency the percentage of still to live-births varied from 7 in Bombay city to 10 in Thar and Parkar district. In Burma urban areas recorded 2,720 and rural areas 924 still-births, which correspond to rates of 59.4 and 2.9 p. m. ; in Madras Presidency 14,236 and 6,569 or 9.6 and 46.0

per mille of live-births. Table I (xxxi) gives the numbers of still-births for the chief communities in some provinces which record them.

TABLE I (xxxi).

		Christians.		Hindus.		Muhammedans.		Other class.	
		M.	F.	M.	F.	M.	F.	M.	F.
Bihar & Orissa	R	202	185	20,067	15,040	3,105	2,237	506	434
	U.	3	5	363	247	71	52	2	...
Punjab		183	109	1,954	1,443	3,591	2,718	72	110
U. P.		32		12,541		3,204		32	
N. W. F. P.		...	1	6	6	108	66	...	...
Delhi		4	...	105	76	88	63	...	...

Registration.

11. In estimating the state of public health of any country or community vital statistics have a very definite value and therefore these should be as complete and accurate as possible. The defects in the existing system of registration of births and deaths in India are well known to all public health officers and from time to time improvements have been made here and there with good results, but the attainment of accuracy is a slow process and is largely dependent upon the education of the masses.

In the *N. W. F. P.* the omission of 14,840 births (24%) and 3,550 deaths (7%) was detected on verification. In *Delhi Province* registration has been in force in Delhi city from 1890, in the notified area from 1914, in Delhi Cantonment from 1916 and in New Delhi from 1925. In *Bihar and Orissa* registration is compulsory in all the 58 municipal towns but not in rural areas where, however, voluntary registration is attempted; the police are the reporting agency in the latter areas and also in most municipalities. As stated in the Report for 1933, the collection, tabulation and verification of vital statistics are now controlled by the public health staff in the bigger municipalities. During the year 1934, the scheme was extended partially to the municipal towns of Ranchi, Puri, Gaya, Chapra and Muzaffarpur where both the municipal health and police staffs reported vital statistics separately. Verification of statistics is carried out in those rural areas where health staffs are employed. In *Bengal* the system of registration, collection and transmission of vital statistics continued to work unsatisfactorily in rural areas, detected omissions to register births and deaths totalling 7,878 and 3,624, respectively, in the Province. In *Madras Presidency* registration was reported to be still defective in most districts due to laxity in the enforcement of the provisions of the Madras Registration of Births and Deaths Act (III of 1899) and this is evident from the fact that during non-epidemic periods the district health staffs detected 22,661 births and 8,148 deaths unregistered in rural areas. In *Assam*, there was no change in the agencies for the collection of vital statistics; registration is compulsory in 26 municipal towns but not in rural areas; in hill districts it is only partially carried out.

Indian States.

12. *General.*—Only a few Indian States submit vital statistics and these have been summarised in Table I (xxxi).

TABLE I (xxxii).

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	6,722	6,051	12,773	39	8,035	25
Suket . . .	29,859	28,549	58,408	633	617	1,250	21	1,216	21
Kalsia . . .	33,306	26,542	59,848	1,097	1,009	2,106	37	1,458	24
Maler Kotla . . .	45,883	37,189	83,072	1,071	836	1,907	23	1,435	17
Baghat . . .	5,744	3,981	9,725	48	64	112	12	106	11
Jawhar . . .	29,502	27,759	57,261	1,055	1,050	2,105	37	1,403	25
Dhrol . . .	13,614	14,039	27,653	632	535	1,167	42	563	20
Kolhapur . . .	476,105	453,153	929,258	17,424	16,961	34,385	37	23,712	26
Mysore . . .	3,385,049	3,227,438	6,612,486	60,484	56,818	117,302	18	113,591	17

Mysore State.—The highest birth rate, 21·3 p. m., was reported in Bangalore district and the lowest 13·3 p. m. in Chitaldrug district. The urban birth rate of 27·4 p. m. exceeded the rural by 11·3 p. m. The ratio of male to female births was 106 to 100. The death rate varied between 22 p. m. in Chitaldrug and 14 p. m. in Kolar district. The rural death rate was 17 p. m. and the urban rate 20 p. m. Infant deaths numbered 14,226, with a rate of 121 p. m. of live-births, the highest number being recorded in December and the lowest in May.

SECTION II. HISTORY OF CHIEF DISEASES.

Chief causes of mortality.

13. Judging by the recorded statistics, imperfect though these are, the year 1934, was a moderately healthy one, the death rate, though in excess of that for 1933, was the second lowest during the past decade. As before, the "fevers" group contributed the largest number of deaths, *i.e.*, 58% of the total, "other causes" following with 26%. The percentage mortality under other disease headings was low, 16% of the total deaths being attributed to these. The major epidemic diseases of cholera, plague and smallpox together accounted for 4% and a combined death rate of 1.3 p. m. Compared with 1933, deaths from cholera increased by over 192%, those from plague by 90%; fevers by 12%; dysentery and diarrhoea combined by 16%, respiratory diseases by 9% while those from smallpox decreased by 19%. Table II(i) and diagram No. 3 facing page 28 give total deaths and rates *per mille* for the chief groups of diseases under which deaths are registered in British India. These figures cannot be regarded as giving an accurate picture of mortality conditions since nowhere in India is complete registration of deaths by causes carried out and medical certification is almost entirely absent in rural areas and very imperfect in most urban areas.

Table II (ii) gives the male and female deaths and rates *per mille* of the more important registered groups of diseases for British India and for various provinces. The incidence of these diseases is more fully discussed in later paragraphs.

As conditions exist, the present classification is the only practicable one for general adoption in India. During the last 10 or 15 years an effort has been made in a few provinces to analyse the mortality recorded under fevers, respiratory diseases and dysentery and diarrhoea, *cf.* Table II (xxii), but the value of such a sub-classification is doubtful so long as the present system of registration remains. Since the introduction of registration, responsibility for recording vital statistics has lain with the *Chowkidar* or the *thana Moharrar* or village headman in rural areas and with the municipal clerk or the attendant at the cremation or burial grounds in urban areas. Medical verification of causes of death is for the most part impracticable and wherever attempts at this have been made gross errors or omissions have been detected. The only reliable records are those maintained in such large municipalities as employ qualified M. O. Hs. with reasonably literate subordinate staffs. Recent verification work in the Hlegu Health Unit in Burma which is mainly a rural area shows an error of 76.2% in the death rate during the quinquennium preceding the inception of the Unit. Evidence is abundant to show that throughout the country especially among the lower and middle classes there is always the tendency to conceal cases of cholera, smallpox, plague, enteric fever, leprosy, cerebro-spinal fever and lung tuberculosis for fear of quarantine or segregation in infectious diseases hospitals. Table II (iii) which has been prepared by the D. P. H. of the U. P. shows possible variations in the recorded and verified figures in that province during 1934.

Abbreviations :—

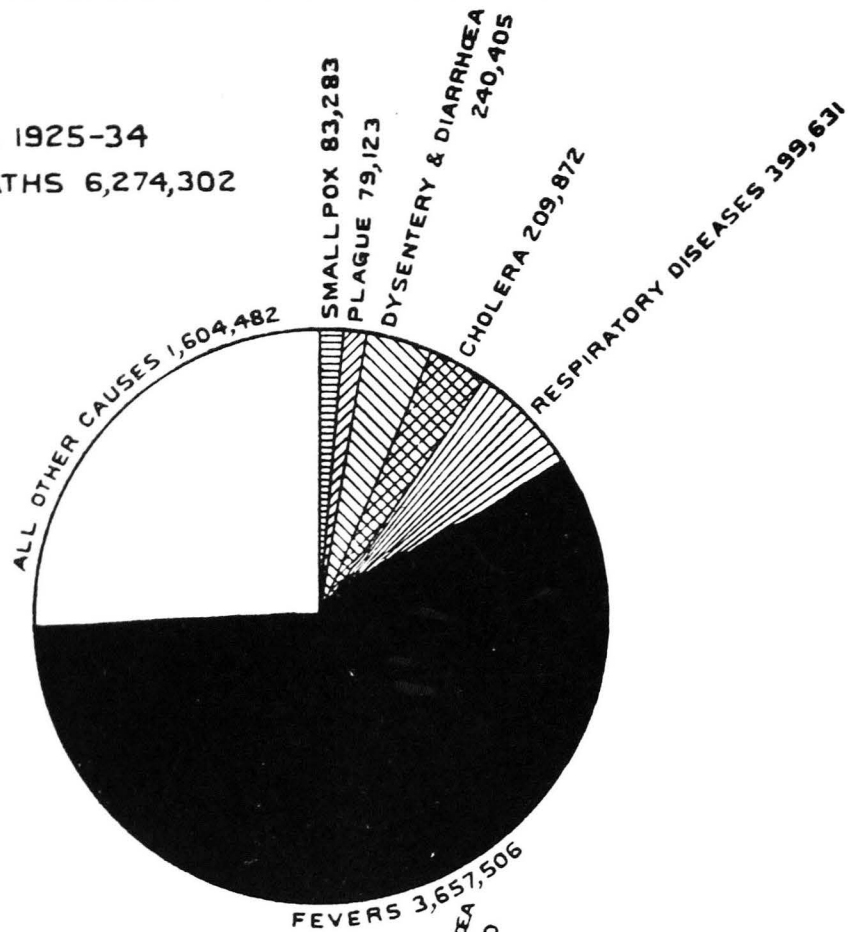
- P. M.—*Per mille.*
- C. P.—Central Provinces and Berar.
- B. & O.—Bihar and Orissa.
- U. P.—United Provinces of Agra and Oudh.
- M. O. H.—Medical Officer of Health.
- D. P. H.—Director of Public Health.
- B. E. L. R. A.—British Empire Leprosy Relief Association.
- C. S. M.—Cerebro-spinal meningitis.
- P. H. Deptt.—Public Health Department.

TABLE II (i).

	Cholera.		Smallpox.		Plague.		Fevers.		Dysentery and Diarrhoea.		Respiratory Diseases.		Other causes.		Total.		
	Deaths.	Rate	Deaths.	Rate	Deaths.	Rate	Deaths.	Rate	Deaths.	Rate	Deaths.	Rate	Deaths.	Rate	Deaths.	Rate	
		p.m.		p.m.		p.m.		p.m.		p.m.		p.m.		p.m.		p.m.	
British India	1934	199,708	0·7	83,928	0·3	80,131	0·3	3,957,077	14·4	285,110	1·0	483,018	1·8	1,767,272	6·4	6,856,244	24·9
	1933	68,318	0·3	103,641	0·4	42,631	0·2	3,530,299	12·9	246,164	0·9	443,305	1·6	1,662,429	6·1	6,096,787	22·4
N.-W. F. P.	615	0·3	..	..	40,873	16·8	285	0·1	3,151	1·3	4,741	1·9	49,665	20·4
Punjab	..	178	..	1,692	0·1	8,069	0·3	461,317	18·7	12,411	0·5	55,570	2·3	110,538	4·4	649,775	26·3
Delhi	..	19	..	22	..	2	..	10,457	15·7	800	1·2	4,480	6·7	3,279	4·9	19,059	28·5
U. P.	..	31,903	0·6	14,817	0·3	47,688	0·9	970,289	19·2	18,140	0·4	46,567	0·9	165,690	3·3	1,295,094	25·6
B. & O.	..	57,289	1·5	30,310	0·8	5,411	0·1	670,389	17·1	23,481	0·6	7,348	0·2	187,371	4·8	981,599	25·1
Bengal.	..	50,742	1·0	8,296	0·2	1	..	764,492	15·0	53,947	1·1	85,113	1·7	214,296	4·2	1,176,887	23·2
C. P.	..	27,329	1·7	2,282	0·1	967	0·1	302,119	18·6	38,075	2·3	45,181	2·8	161,182	9·9	577,135	35·5
Bombay	..	11,362	0·5	5,516	0·2	13,307	0·6	201,405	8·9	26,301	1·2	106,568	4·7	189,852	8·4	554,311	24·5
Madras	..	18,158	0·4	18,088	0·4	2,353	..	325,050	6·9	97,844	2·1	107,742	2·3	557,929	11·8	1,127,169	23·9
Coorg	..	1	..	45	0·3	10	0·1	2,801	17·0	177	1·1	152	0·9	610	3·7	3,796	23·1
Assam	..	1,904	0·2	206	..	..	..	101,779	12·4	8,195	1·0	6,440	0·9	37,177	4·5	155,701	19·0
Burma.	..	822	0·1	1,601	0·1	2,318	0·2	94,167	7·5	5,031	0·4	12,991	1·0	132,617	10·6	249,547	19·9
Almer-Merwara	..	1	..	438	0·8	..	..	11,939	20·8	423	0·7	1,715	3·0	1,990	3·5	16,506	28·8

№ 3
BRITISH INDIA
COMPARATIVE DIAGRAMS OF DEATHS BY CAUSES

MEAN 1925-34
 TOTAL DEATHS 6,274,302



YEAR 1934 -
 TOTAL DEATHS 6,856,244

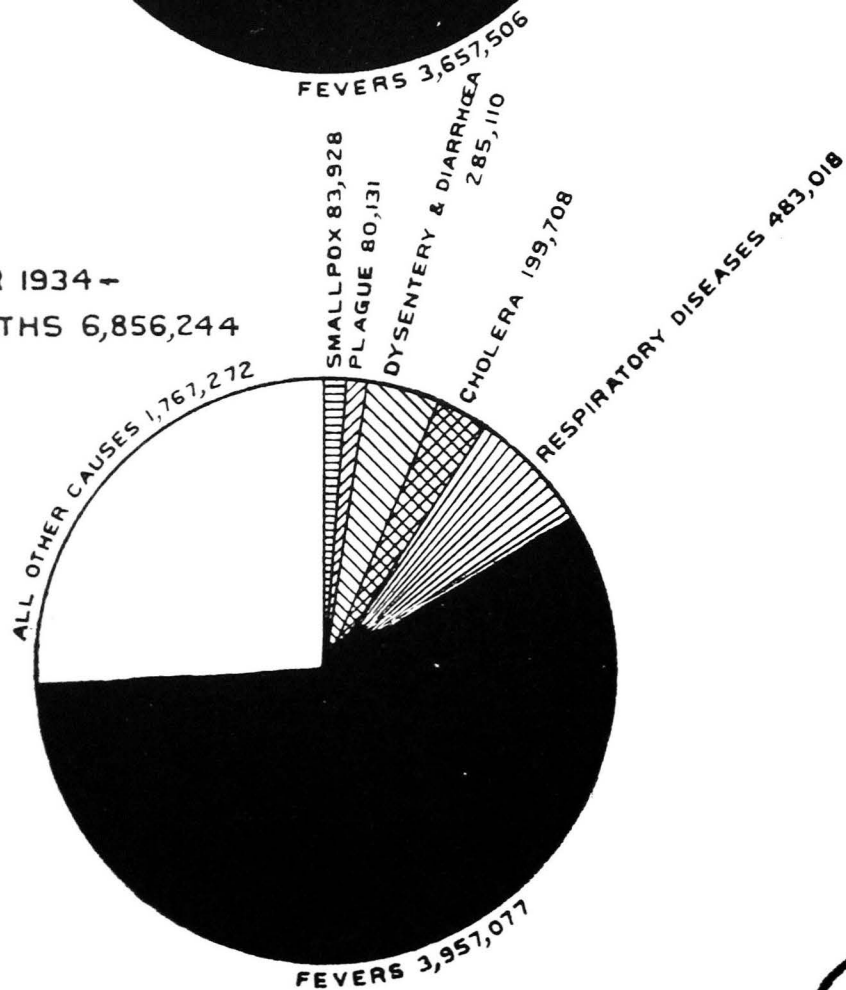


TABLE II (ii).

	Cholera.				Smallpox				Plague.			
	Deaths.		Rate p.m.		Deaths.		Rate p.m.		Deaths.		Rate p.m.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British India	102,563	97,145	0·7	0·7	42,723	41,205	0·3	0·3	34,923	45,208	0·2	0·3
N.-W. F. P.	...	...	...	...	323	292	0·2	0·3	...	...	...	...
Punjab	113	65	...	...	897	795	0·1	0·1	3,512	4,557	0·3	0·4
Delhi	11	8	...	...	12	10	...	...	2	...	...	...
U. P.	16,353	15,550	0·6	0·6	7,582	7,235	0·3	0·3	20,696	26,992	0·8	1·1
B. & O.	29,386	27,903	1·5	1·4	15,575	14,735	0·8	0·8	2,066	3,345	0·1	0·2
Bengal	26,617	24,125	1·0	0·9	4,229	4,067	0·2	0·2	1	...	...	...
C. P.	13,712	13,617	1·7	1·7	1,142	1,140	0·1	0·1	437	530	0·1	0·1
Bombay	5,595	5,767	0·5	0·5	2,676	2,840	0·2	0·3	5,921	7,386	0·5	0·7
Madras	9,286	8,872	0·4	0·4	9,023	9,065	0·4	0·4	1,042	1,316	...	...
Coorg.	1	...	...	...	18	27	0·2	0·4	6	4	0·1	...
Assam	988	916	0·2	0·2	108	98	...	...	...	...	...	...
Burma	500	322	0·1	...	909	692	0·1	0·1	1,240	1,078	0·2	0·2
Ajmer-Merwara	1	...	...	...	229	209	0·8	0·7	...	...	...	...

	Fevers.				Dysentery and Diarrhoea.				Respiratory Diseases.			
	Deaths.		Rate p.m.		Deaths.		Rate p.m.		Deaths.		Rate p.m.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British India	2,062,076	1,895,001	14·5	14·2	148,316	136,794	1·0	1·0	272,411	210,607	1·9	1·6
N.-W. F. P.	22,282	18,591	16·9	16·6	172	113	0·1	0·1	1,842	1,309	1·4	1·1
Punjab	244,019	217,298	18·1	19·3	6,627	5,784	0·5	0·5	31,362	24,208	2·3	2·2
Delhi	5,354	5,103	18·9	18·1	435	365	1·1	1·3	2,459	2,021	6·4	7·2
U. P.	516,826	453,463	19·5	18·9	9,294	8,846	0·4	0·4	24,546	22,021	0·9	0·9
B. & O.	347,594	322,795	17·8	13·5	12,463	11,018	0·6	0·6	4,365	2,983	0·2	0·2
Bengal	390,700	373,792	14·8	15·3	28,408	25,539	1·1	1·0	53,272	31,841	2·1	1·3
C. P.	157,005	145,114	19·3	17·9	19,532	18,543	2·4	2·3	26,579	18,602	3·3	2·3
Bombay	102,507	98,808	8·6	9·2	13,686	12,615	1·2	1·2	58,272	48,296	4·9	4·5
Madras	164,177	160,873	7·0	6·8	50,155	47,689	2·1	2·0	57,440	50,302	2·5	2·1
Coorg.	1,382	1,419	15·2	19·4	101	76	1·1	1·0	105	47	1·2	0·6
Assam	54,189	47,590	12·5	12·3	4,395	3,800	1·0	1·0	3,822	2,618	0·9	0·7
Burma	49,713	44,454	7·8	7·2	2,849	2,182	0·4	0·3	7,466	5,525	1·2	0·9
Ajmer-Merwara	6,328	5,611	20·8	20·7	199	224	0·7	0·8	881	834	2·3	3·7

TABLE II (iii).

	Percentage of total deaths reported by		Calculated number of deaths on the data supplied by professional agency.	Actual No. of deaths reported by ordinary agency.
	Verified agency.	Unverified agency.		
Cholera	2·57	2·46	32,205	31,903
Smallpox	0·18	1·14	2,285	14,817
Plague	0·11	3·68	1,428	47,688
Dysentery	4·72	0·60	61,113	7,739
Enteric fever	1·78	0·63	19,134	8,143
Relapsing fever . . . . .	..	0·05	..	613
Malaria	1·12	67·42	14,564	873,056
Kala-azar	0·24	0·03	3,151	423
Pneumonia	10·08	1·16	131,080	15,039

It is to be hoped that this Table is not representative of the country as a whole.

Far too many deaths continue to be included under the heading "all other causes". Of a total of 1,767,173 deaths included in this group, details of causes are available in the records of the various provinces for 102,820. Thus still there remain 1,664,353 deaths, the causes of which remain almost unknown. Table II (iv) gives details.

TABLE II (iv).

	Injury.					Other causes.	Total other causes.	
	Saicide.	Wounds or accidents.	Snake bite or killed by wild beasts.	Rabies.	Total.			
	M.	F.						
British India	6,368	7,407	62,816	23,100	3,129	102,820	1,664,353	1,767,173
N. W. F. P.	13	9	787	23	2	834	3,907	4,741
Punjab	187	198	5,333	707	160	6,585	103,953	110,538
Delhi	13	12	253	17	2	297	2,982	3,279
U. P.	624	1,207	13,941	4,436	660	20,868	144,822	165,690
B. & O.	876	1,309	8,935	5,580	176	16,876	170,356	187,232
Bengal	1,540	1,740	13,138	4,796	830	22,044	192,292	214,336
C. P.	827	735	3,974	1,314	134	6,984	154,198	161,182
Bombay	381	250	5,631	1,591	206	8,059	181,793	189,852
Madras	1,558	1,696	6,369	2,672	412	12,707	545,222	557,929
Coorg	7	2	37	4	..	50	560	610
Assam	212	160	1,578	77	290	2,317	34,860	37,177
Burma	128	79	2,666	1,824	257	4,954	127,663	132,617
Ajmer-Merwara	2	10	174	59	..	245	1,745	1,990

Some provinces are trying to analyse the mortality recorded under this *omnibus* heading in selected areas. For example, for Delhi Province, the ascertained causes of 2,982 deaths due to "other causes" have been given in Table II (v).

TABLE II (v).

	No. of deaths.
Osteomalacia	3
Post-partum haemorrhage	3
Heat-stroke	4
Diphtheria	5
Eclampsia	7
Infantile convulsions	10
Sunstroke	11
Puerperal septicaemia	18
Heart failure	24
Premature birth	46
Other deaths from child-birth	110
Infantile debility	756
Other causes	1,985

In 15 municipal towns, employing M. O. Hs., in Madras Presidency a similar analysis has been attempted for some years now, and this year in these towns the death rate under "other causes," was after verification reduced from 32 p.m. to 2 p.m.

No addition was made to the lists of notifiable diseases, except in the Bombay Presidency and U. P. where cerebro-spinal fever was added.

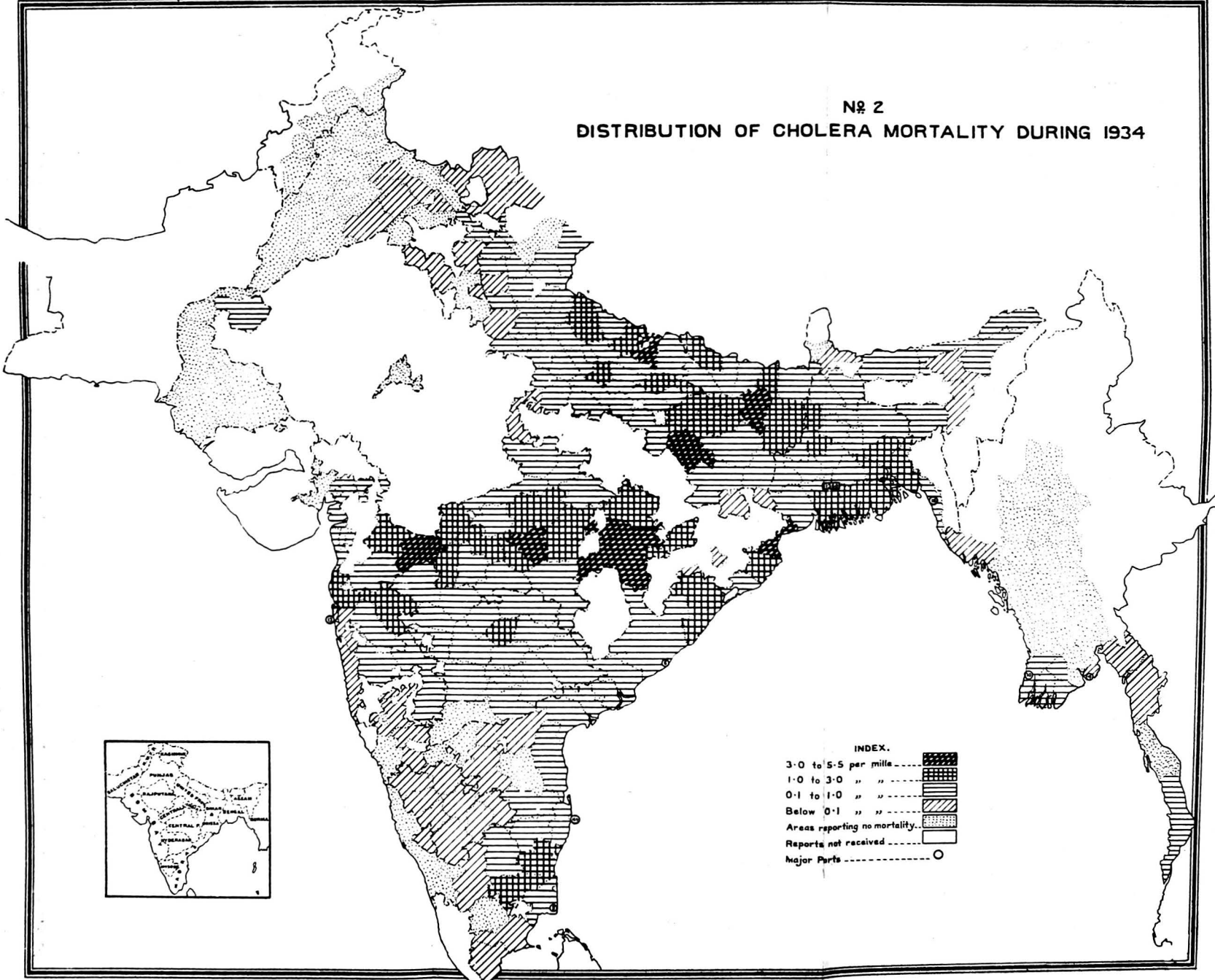
Cholera.

(a) General.








14. The forecast was made in the Annual Report for 1933 that "during the next two to three years, there is every hope that the cholera mortality figures will not reach undue dimensions". Whilst the number of recorded deaths rose from 68,318 in 1933 to 199,708 and the rate *per mille* from 0.3 to 0.7, these figures are below the decennial averages of 219,272 and 0.9 p.m. respectively, though they exceed the five-year means. The provisional data for the first nine months of 1935 show that this upward trend has been maintained.

A table published at page 33 of last year's report showed the recorded cholera deaths by quinquennial periods from 1877 onwards. As it tended to show that the violent outbreaks of the past are becoming less frequent, a feature which seemed probable in view of the development of the public health services, and the powerful prophylactic now available in cholera vaccine, the occasion has been taken to examine whether there has yet been an appreciable decline in cholera mortality and to examine the part played by festivals in cholera incidence over the period, 1877 to 1933. A statistical analysis has been made by Dr. Raja of the All-India Institute of Hygiene and Public Health based on data taken from the Public Health Commissioner's Annual Reports. The investigation indicates that within the period examined, there is no clear evidence of a significant fall in cholera mortality in British India. A possible explanation for this result is that, with the development of Provincial Public Health Departments, the beneficial effects of preventive work may have been neutralised by improvement in the registration of vital statistics. If this be so, a longer range of data made available after the lapse of some years, should show a decline. In any case, the significance of the record low figures of 1932-34 remains to be seen.

№ 2
DISTRIBUTION OF CHOLERA MORTALITY DURING 1934



INDEX.

3.0 to 5.5 per mille	-----	
1.0 to 3.0 " "	-----	
0.1 to 1.0 " "	-----	
Below 0.1 " "	-----	
Areas reporting no mortality	-----	
Reports not received	-----	
Major Ports	-----	



With regard to the part played by great festivals, a comparison between festival and non-festival years in the U. P. and Punjab shows that the mean cholera incidence is higher in festival years than in non-festival years, and also that in the former the curve of seasonal incidence rises more sharply than in the latter years.

A marked increase of cholera occurred in its endemic home in Northern India, *i.e.*, in the provinces of U. P., B. & O. and Bengal, which together reported 139,934 deaths or 70% of the total as against 48,671 or 71% in 1933, yielding rates of 1.0 p. m. and 0.4 p. m., respectively. The mortality curve reached a high level in the C. P. and Berar where the death rate was 17 times higher than the mean. In the C. P. and Berar infection was imported from Puri, a festival centre in Orissa, and spread rapidly. Madras Presidency in the extreme south and Bombay Presidency also experienced severe epidemics, though the death rate did not exceed the mean. The Punjab, Delhi, Assam and Burma were lightly or sporadically infected. The decrease in Assam was notable, the death rate being less than one third of that for 1933 and one fourth of the quinquennial mean. The N. W. F. P., Ajmer-Merwara and Coorg remained free, except for one death each in the latter two provinces.

The quinquennial averages for the period, 1877-1931, and the triennial averages for the years, 1932 and 1933, are given below:—

Periods.	Total deaths.	Annual average.
1877—81	1,468,487	293,697
1882—86	1,457,114	291,423
1887—91	2,030,020	406,004
1892—96	2,243,590	448,718
1897—01	1,942,016	388,403
1902—06	1,862,132	372,426
1907—11	2,023,514	404,703
1912—16	1,675,833	335,167
1917—21	1,986,978	397,296
1922—26	724,184	148,437
1927—31	1,509,680	301,936
1932	67,219	111,748
1933	68,318	
1934	199,708	

Table II (vi) gives the recorded deaths for British India and the various provinces.

	1932.	1933.	1934.	Quinquennial mean (1929-33).
Total	67,219	68,318	199,708	197,841
N. W. F. P.	70	..	..	131
Punjab	614	160	178	931
Delhi	4	..	19	53
U. P.	9,734	1,915	31,903	31,005
B. & O.	9,348	17,514	57,289	65,411
Bengal	33,910	29,242	50,742	55,656
C. P.	854	2,152	27,329	9,312
Bombay	1,353	7,797	11,362	10,404
Madras	5,278	3,851	18,158	16,791
Coorg . . . . .	..	..	1	28
Assam	4,971	5,508	1,904	6,020
Burma	1,082	179	822	2,085
Ajmer-Merwara	1	..	1	19

Table II (vii) gives the numbers of registered cases during each quarter in 1933 and 1934.

TABLE II (vii).

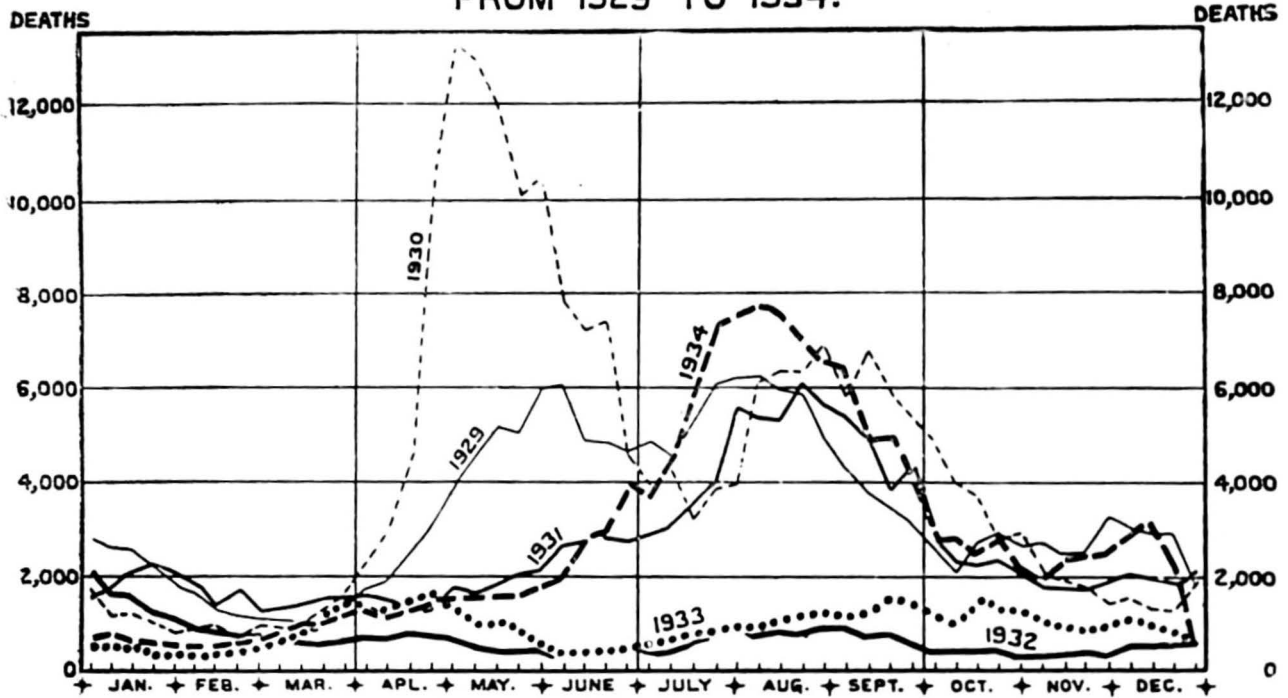
	1st		2nd		3rd		4th	
	1933.	1934.	1933.	1934.	1933.	1934.	1933.	1934.
Total . . .	51,582	19,650	24,220	47,933	30,068	152,002	27,209	62,201
N.-W. F. P. . .	..	..	..	..	..	..	..	1
Kashmir . . .	..	..	..	..	..	..	..	..
Punjab . . .	3	..	42	71	139	165	107	..
Punjab States . .	..	..	8	..	..	208	..	57
Delhi . . .	..	..	1	3	1	18	..	..
U. P. . . .	244	53	1,291	4,602	194	17,800	31	4,750
B. & O. . . .	1,411	2,855	1,353	12,039	5,786	38,980	5,022	7,666
Bengal	12,287	12,131	12,975	18,362	1,351	7,405	2,930	21,276
Bengal States . .	2	..	69	15	..	3	1	191
C. P.	85	51	614	4,894	3,647	38,442	1,700	7,262
C. I. Agency . .	22	3	40	941	1,487	6,944	327	917
Bombay	1,061	743	3,186	2,477	8,820	20,387	3,714	3,144
Bombay States	8	98	198	9	1,316	223	473	293
Hyderabad State . .	164	311	3,408	1,466	4,721	5,700	1,144	2,995
Mysore State . .	..	6	4	5	5	14	7	62
Madras	141	3,059	65	2,552	2,230	13,137	5,699	10,679
Assam	138	300	720	180	225	166	6,023	1,607
Burma	14	5	179	243	143	68	8	476
Ajmer-Merwara . .	2	..	..	1	..	..	..	2
Other Indian States . .	..	35	67	73	3	2,344	23	823

Early in 1934 the mortality curve, as judged from the weekly recorded figures, was identical with that in 1933, and of the 13,172 cases recorded up to the 22nd April, 59 % were in Bengal and 15 % in B. & O. In the former province the seasonal maximum was reached in May and the downward tendency was slower than in previous years. Towards the end of May, cholera invaded the districts of Bihar on the right bank of the Ganges, *viz.*, Shahabad, Santal Parganas and Palamau, by the middle of June it spread upstream to the districts of Azamgarh, Ghazipur and Ballia in the U. P. as well as towards the south-west infecting the districts of Raipur, Bilaspur and Drug in the C. P. Up to this time Madras Presidency had suffered only slightly but the districts of Ganjam (bordering on Orissa) and Chingleput were infected in June and during July and August, the disease spread to Vizagapatam in the north and Chittoor and Arcot in the South. During the first six months of the year, the incidence was higher than in 1933 and particularly high in Bengal, B. & O and U. P. in May and June, these provinces reporting 35,003 cases or 73 % during the 2nd quarter of the year.

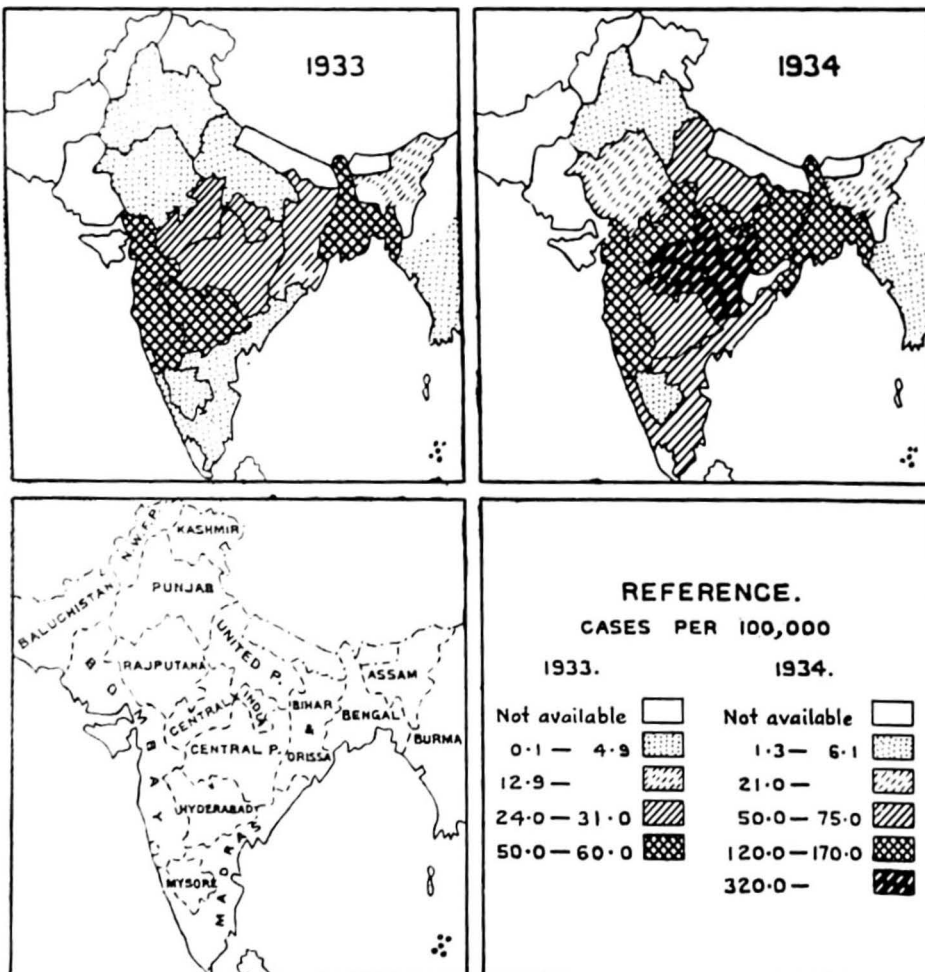
During the 3rd quarter the incidence curve maintained an upward trend, 42 % more cases than in the corresponding period of 1931. The areas most affected were those of the Ganges Valley, the C. P. and C. I. Agency.

During the last three months of the year a high increase occurred in Bengal, and incidence was also high in the U. P. and Madras Presidency.

WEEKLY NUMBER OF DEATHS FROM CHOLERA IN INDIA FROM 1929 TO 1934.



CHANGES IN THE GEOGRAPHICAL DISTRIBUTION OF CHOLERA IN INDIA DURING 1933 & 1934 (CASES REPORTED PER 100,000 INHABITANTS IN EACH PROVINCE.)



NOTE: -Based on data published in the League's Epidemiological reports for the year 1936.

The seasonal maximum for India as a whole occurred at the beginning of August which was the period of high prevalence in most infected provinces. Table II (vi) and graph No. (4) should be studied for further details.

Table II (viii) gives details for rural and urban rates for each province. The former were again the higher. In India, the spread of cholera is closely associated with pilgrimages such as occur at Hardwar, Allahabad, Nasik, Ganga Sagar, etc., which draw large numbers from the rural areas.

TABLE II (viii).

	Rural.		Urban.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.
Total	187,502	0·8	12,206	0·4
N. W. F. P. . . . .	..	..	..	..
Punjab	140	..	38	..
Delhi . . . . .	..	..	19	..
U. P.	30,251	0·6	1,652	0·4
B. & O.	55,883	1·5	1,406	1·0
Bengal	47,546	1·0	3,196	0·9
C. P.	24,559	1·7	2,770	1·6
Bombay	10,399	0·6	963	0·2
Madras	16,133	0·4	2,025	0·3
Coorg	1	..	..	..
Assam	1,884	0·2	20	0·1
Burma	706	0·1	116	0·1
Ajmer-Merwara . . . . .	..	..	1	..

The Director, Eastern Bureau of the League of Nations, Singapore, reported that during 1934 eight ships were infected with cholera. Although the source of infection was uncertain in most cases, it was believed to be from ports in British India.

Details of cholera research will be found in Section VIII on page 209.

(b) *Provincial.*

N. W. F. P.—The disease was again absent.

Punjab.—Cholera incidence was again one of the lowest recorded, attacks numbering 279 and deaths 178. Of the 29 districts, 11 remained free. The largest number of deaths reported in any one district was 38 in Ambala where infection was imported from the neighbouring state of Kalsia. In Karnal district also infection was imported from Hardwar.

Delhi.—Seizures and deaths numbered 21 and 19, respectively, from April to September. Of these 18 cases with 15 deaths were recorded in Delhi city; 3 deaths were reported in the Notified Area and one in New Delhi.

U. P.—This province experienced a severe epidemic and 3 out of every 100 deaths registered were ascribed to this cause. Basti and Azamgarh districts in the Gorakhpur division recorded over 30 % of the total provincial mortality; after which Ballia and Ghazipur in the Benares Division, Rae Bareli, Sitapur and Kheri in the Lucknow division and Gonda in the Fyzabad division were the chief sufferers (*cf.* map facing page 32). In order to prevent further importation of infection and to intercept cases from Nepal

a scheme, called the "barrier scheme", was instituted at Basti and Gorakhpur on the Nepal border. More deaths occurred in rural than in urban areas. The larger towns with a population of 30,000 or over however did not enjoy that comparative immunity which was noticeable in previous years. The infection in almost every city was reported to be brought by pilgrims returning from fairs. The highest mortality occurred in August and the lowest in January. Nearly 90 % of the total deaths were recorded between June and October.

B. & C.—It was a bad cholera year for South Bihar, Orissa and Chota Nagpur. Rural areas were badly affected, the low urban rate being ascribed to better standards of sanitation.

Cholera started in epidemic form in the districts of Balasore, Cuttack and Puri in the beginning of the year and remained prevalent throughout the year in these districts. From the beginning of May, 1934, the disease assumed a definitely epidemic character in most of the districts of South Bihar and Chota Nagpur. The districts of North Bihar, although they were the worst affected by the earthquake, remained comparatively free from cholera.

Bengal.—Eleven districts reported death rates in excess of the provincial average. The highest mortality was recorded in Faridpur (2·3 p. m.), Bakarganj, (2·2 p. m.) and Murshidabad (2·1 p.m.); in the remaining 8 districts the rates varied between 1·1 p. m. and 1·7 p. m.

In January, 1,912 deaths were registered; in April the number rose to 6,473; fell down to 919 in September but flared up again to attain its maximum (11,702 deaths) in December.

C. P.—The D. P. H. reports :—

"The disease first appeared during February in Raipur district, the source of infection being Jagan Nath, Puri.

"During March, it started in Bilaspur from the same source. From there it spread to Bhandara, Drug and Nagpur districts. During July Saugor was infected from Allahabad and the disease spread to the neighbouring districts of Jubbulpore and Mandla. During August, Berar districts were infected from Nasik and Khandesh. By August the disease was well established in every district in the province and remained in an intense form during September and October. It began to subside during November and had gradually disappeared by the end of December. The chief sources of dissemination were fairs, wandering tribes, marriage parties and the extensive road motor traffic. Bad water supplies, inefficient and defective conservancy and drainage assisted in the quick spread of infection."

Bombay.—Severe epidemic conditions prevailed throughout the year, and recorded mortality increased by 46% and 9% compared with 1933 and the quinquennial mean. The Northern Registration District was worst affected, incidence being very high as compared with 1933, particularly in East Khandesh district which returned 18,057 attacks and 4,171 deaths or 73% of the total mortality in this Registration District and 37 % of the provincial total. Meteorological conditions being favourable, the intensity of infection was greatest from July to September. The districts of West Khandesh, Surat and Panch Mahals were less severely infected. In East Khandesh district which was first infected the source of infection was uncertain; West Khandesh with 2,777 attacks and 854 deaths was infected later and here the infection was imported from Baroda territory. In the Central Registration District with 3,972 deaths, infection was carried over from the previous year and was severe in the districts of Ahmednagar (2,338 attacks and 1,158 deaths); Poona (2,193 and 1,126); Thana (1,315 and 917) and Nasik (1,587 and 725). The period of greatest prevalence in the Central Registration District was April

to September. The epidemic of 1933 carried over in the Southern Registration District in a mild form, the bulk of the cases occurring in the districts of Satara (1,045 deaths) and Sholapur (458 deaths). Sind Registration District was practically free, only 2 cases with one death being recorded. Bombay city recorded 13 deaths.

Madras.—Mortality showed a phenomenal rise during the year, the deaths increasing by 14,307. During the first half of the year, prevalence was slight but in the latter half infection became widespread, and over 80% of the total deaths were reported during this period. In the northern group of districts Ganjam was severely infected almost throughout the year; in other districts the epidemic was mild. Among the central group, the ceded districts were practically free; Chittoor was mildly infected; Nellore, Chingleput and North Arcot suffered rather heavily while the endemic deltaic districts of Trichinopoly, South Arcot and Tanjore bore the brunt of the infection during the year, about 50% of the total deaths occurring in these three districts. Whilst in South Arcot the epidemic prevailed in a severe form throughout the year, in Trichinopoly and Tanjore a winter epidemic was experienced. The southern group of districts and the west coast districts were practically free, except Salem, which suffered from a mild outbreak in December.

Assam.—Epidemic cholera in a serious form was absent, although the usual bi-annual visitation occurred in the form of small local outbreaks scattered over wide areas, which however in no case assumed epidemic proportions.

Burma.—This province recorded a low incidence. Unlike previous epidemics which occurred in spring this year, the disease appeared in a mild epidemic form in autumn and continued with increasing severity up to the end of the year. Starting in Myaungmya district in October, it spread to the adjacent districts of Maubin and Pyapon and reached Bassein in November. These four districts, situated in the delta of the Irrawaddy river, are characterised by a net-work of water-ways with a large proportion of the population living and moving about in boats. The fact that this river in many cases fulfils the threefold function of a water-supply, a washing place and a latrine is an important feature of the epidemiology of cholera in these areas.

(c) *Anti-cholera measures.*

Routine sanitary measures, such as, improvement and disinfection of water supplies in villages and at *mela's*, etc., improvement of conservancy, medical inspection at railway stations of pilgrims, the enforcement of temporary regulations under the Epidemic Diseases Act, the 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. By its use alone it is possible to prevent or suppress an outbreak and those, who have most experience of its employment value it most highly. Unfortunately many still prefer to run the risk of infection otherwise our figures for cholera deaths would be far lower than they are.

The great gift of anti-cholera inoculation must not however be allowed to impede the execution of measures for the removal of those conditions of gross insanitation in which alone cholera can flourish.

Table II (ix) gives the numbers of anti-cholera inoculations performed during 1933-34.

TABLE II (ix).

	1933.	1934.
British India	1,949,244	5,835,787
N.-W. F. P. . . . .	..	464
Punjab	30,077	22,091
Delhi	22	406
U. P.	26,629	355,621
B. & O.	20,000	1,022,353
Bengal:	1,036,643	2,106,269
C. P.	103,118	619,978
Bombay	110,639	218,289
Madras	174,786	770,089
Coorg . . . . .	..	..
Assam	413,282	93,998
Burma	34,029	96,224
Ajmer-Merwara	19	5

Experiments with cholera bacteriophage were continued in Assam and the Madras Presidency. No definite conclusions have been arrived at either for or against the value of bacteriophage when used alone on a large scale as a preventive of cholera.

In North Arcot district, in Madras Presidency, experiments were continued in 1934 in villages having wells as exclusive sources of drinking water supplies, in order to determine the prophylactic and curative value of bacteriophage, the dosage being increased to nine times the dose used in 1933.

The provisional conclusions may be summarised as follows:—

- (1) Prophylactic administration of 'phage appeared to be effective in reducing the incidence rate.
- (2) 'Phage administered prophylactically did not show any reduction on the mortality rate.
- (3) The superiority of the curative value of bacteriophage over pro-diarrhoea mixture was not established.

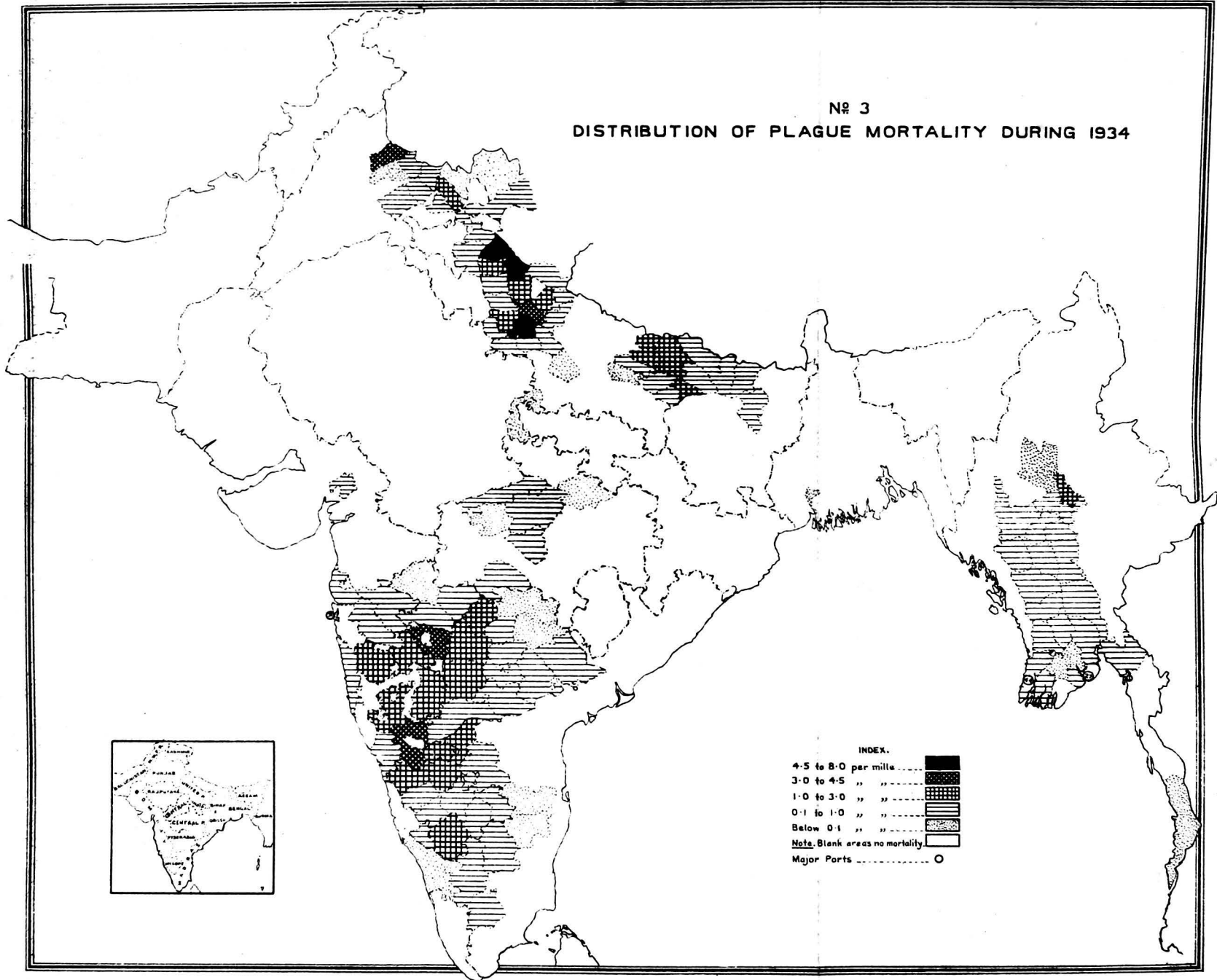
Plauge.

(a) General.

15. The provisional figures for 1934 which were available, when the 1933 report was published, indicated a rise in plague incidence in its northern endemic home. The final figures now available show that both morbidity and mortality were higher than in the preceding two years, cases and deaths increasing from 93,122 and 42,631 in 1933 to 103,271 and 80,131 respectively.

Whilst increased mortality was reported in all provinces except Madras, C. P. and Coorg, the death rate for British India as a whole, *viz.* 0.3 p.m. was still well below the decennial mean of 0.5 p.m. The most noteworthy feature of the epidemic was, that the disease again remained confined to its important haunts in the provinces of Northern India, which suffered heavily as is evident from Chart No. 5. The increase was particularly important in the U. P. where no less than 47,688 deaths (60% of total plague deaths) as against 9,335 in 1933 were recorded. In other parts of Northern India, 8,069 deaths were reported in the Punjab and 5,411 in B. & O. The N.-W. F. P. remained

№ 3
 DISTRIBUTION OF PLAGUE MORTALITY DURING 1934



INDEX.

- 4.5 to 8.0 per mile [Solid black box]
- 3.0 to 4.5 " " [Cross-hatched box]
- 1.0 to 3.0 " " [Horizontal lines box]
- 0.1 to 1.0 " " [Vertical lines box]
- Below 0.1 " " [Dotted box]
- Note. Blank areas no mortality [Blank box]
- Major Ports [Circle]

free while Delhi reported two deaths and Bengal one. In the Punjab the sub-montane districts of Gujrat and Hoshiarpur returned 80% of the total deaths in that province. The principal plague foci in the U. P. included the western districts of Dehra Dun and Saharanpur and the eastern districts of Ballia, Gorakhpur, Basti and Azamgarh; Etah and Aligarh in the Agra division; Bijnor, Badaun, Moradabad and Bareilly in the Rohilkhand division. These 12 out of 48 districts in the whole province reported 43,904 deaths or 92% of the total. In B. & O. the incidence was mostly confined to the endemic foci in the districts of Muzaffarpur, which alone contributed one-third of the total deaths, Saran and Darbhanga. In certain isolated tracts in these districts the disease starts on the approach of the winter, reaches its maximum intensity during February and March and subsides with the advent of summer.

The position in the Deccan Plateau comprising the C. P., the Bombay and Madras Presidencies was not so bad. Compared with 1933 and the quinquennial mean, the recorded death rates in these provinces were lower except for an increase in the Madras Presidency. The most heavily infected districts in the Bombay Presidency were, as usual, Dharwar, Satara, Bijapur and Belgaum, which together contributed 11,159 deaths or 80% of the provincial total. Those in Madras Presidency included Bellary and Madura which registered 1,933 deaths or 82% of the provincial total. In the C. P., where the case mortality was 14%, the incidence was mild. The increase in Burma of 1,346 deaths is significant, more than doubling the previous year's figure.

The intensity of the epidemic in Indian States was less severe this year and 92% of the total deaths were registered in the Hyderabad and Mysore States and in the states in Bombay Presidency. Details of mortality for Indian States are included in Appendix II (page 302).

Except in Burma the female death rate was higher than the male in all provinces. Map No. 3 showing the distribution of mortality by districts during 1934 has again been included and should be consulted for further details, but it continues to confirm the comparative freedom of the whole eastern seaboard of India, of northern Burma, Assam, Bengal, the south eastern parts of Bihar, the western areas of the Punjab and Upper Sind.

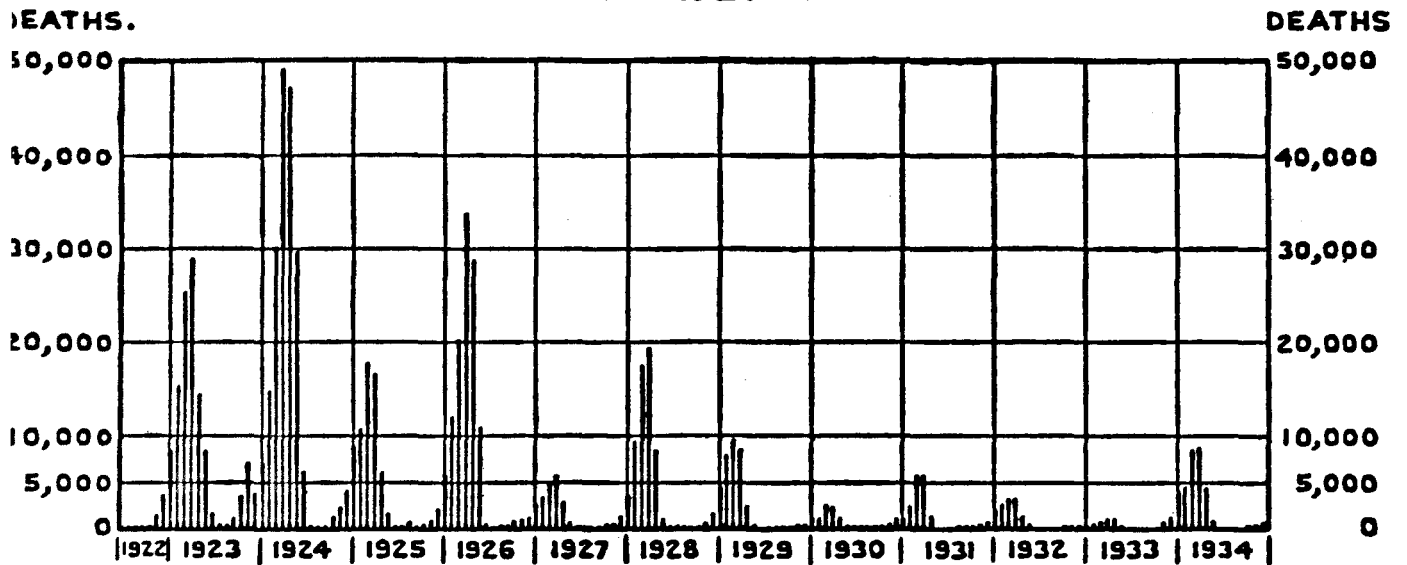
Table II (x) gives the numbers of deaths and rates *per mille* in British India and in individual provinces for the period, 1931-34.

Table II (xi) gives details of cases by quarters for the different provinces. With the change of the centre of intensity of infection to northern India the maximum mortality was recorded in March and the minimum in July. Detailed figures showing seasonal mortality for the different provinces are given in Appendix II (page 302).

TABLE II (x).

	1931.		1932.		1933.		1934.		Mean (1929-33).	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate
British India	45,626	0·2	46,504	0·2	42,631	0·2	80,131	0·3	46,418	0·2
N. W. F. P. . . . .	..	..	..	..	..	..	..	..	..	..
Punjab	1,150	..	2,003	0·1	1,789	0·1	8,069	0·3	1,510	0·7
Delhi	1	..	..	..	..	..	2	..	..	..
U. P.	31,225	0·6	21,497	0·4	9,835	0·2	47,688	0·9	22,219	4·5
B. & O.	5,429	0·1	3,374	0·1	1,635	..	5,411	0·1	4,562	0·1
Bengal	1	..	1	..	1	..	1	..	1	..
C. P.	1,649	0·1	2,058	0·1	1,200	0·1	967	0·1	1,716	0·1
Bombay	3,506	0·2	14,446	0·7	24,560	0·1	13,307	0·6	13,110	4·5
Madras	1,073	..	1,561	..	2,591	0·1	2,358	..	1,697	0·4
Coorg	25	0·1	8	..	48	0·3	10	0·1	17	0·9
Assam . . . . .	..	..	..	..	..	..	..	..	..	..
Burma	1,574	0·1	1,556	0·1	972	0·1	2,318	0·2	1,586	0·1
Ajmer-Merwara . . . . .	..	..	..	..	..	..	..	..	..	..

No 5
**PLAGUE DEATHS REPORTED IN NORTHERN INDIA,*
 BY FOUR-WEEK PERIODS, FROM JULY 1922 TO
 DECEMBER 1934.**



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

NOTE- Reproduced from the League's Weekly Epidemiological Record
 dated 23rd August 1934. No 34. (R.H. 443) and other League's publications.

TABLE II (xi).

	1st Quarter.		2nd Quarter.		3rd Quarter.		4th Quarter.		Total.	
	1933.	1934.	1933.	1934.	1933.	1934.	1933.	1934.	1933.	1934.
Total	20,955	58,651	7,688	19,323	25,740	10,745	38,739	14,549	93,122	103,271
Punjab, Delhi and Punjab States	364	4,032	1,990	5,479	26	..	724	142	3,104	9,653
Bengal	1	..	..	..	..	..	..	..	..	..
U. P.	1,807	18,936	1,496	8,826	97	206	1,854	1,342	5,254	28,860
B. & O.	708	1,708	75	826	32	55	180	242	995	2,831
C. P.	1,161	4,884	207	222	1,646	640	6,073	1,528	9,087	7,254
Bombay	8,238	10,400	1,693	1,063	11,013	3,847	15,023	4,638	35,937	19,948
Madras	1,302	2,101	213	115	2,373	1,081	1,889	855	5,777	4,152
Burma	475	1,657	107	178	246	296	463	284	1,291	2,415
Hyderabad State	4,006	8,724	969	1,154	5,315	2,057	6,764	2,793	17,054	14,728
Mysore State	781	1,653	323	185	1,642	1,381	2,072	1,136	4,818	4,355
Bombay Presidency States	1,651	2,560	522	491	3,213	1,027	3,403	1,275	8,794	5,353
Other Indian States	457	1,968	93	1,287	137	155	294	314	981	3,722

Whilst the rural populations suffered more in the Punjab, the U. P., B. & O. and Bombay, the urban centres in the C. P., Madras, Coorg and Burma reported the higher mortality. Table II (xii) gives deaths and their rates *per mille* in rural and urban areas in each province for the years 1933 and 1934.

TABLE II (xii).

	Rural.				Urban.			
	1933.		1934.		1933.		1934.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.	Deaths.	Rate p. m.
British India	38,448	0·2	72,008	0·3	4,183	0·2	8,128	0·3
N.-W. F. P.	..	..	..	..	..	..	..	..
Punjab	1,680	0·1	7,751	0·4	109	..	318	0·1
Delhi	..	..	..	..	..	..	2	..
U. P.	9,299	0·2	44,247	1·0	536	..	3,441	0·9
B. & O.	1,617	..	5,294	0·2	18	..	117	0·1
Bengal	..	..	..	..	1	..	1	..
C. P.	1,029	0·1	670	..	171	0·1	297	0·2
Bombay	22,051	1·2	11,858	0·6	2,509	0·6	1,449	0·3
Madras	2,284	0·1	1,599	..	307	..	759	0·1
Coorg	14	0·1	2	..	34	3·5	8	0·8
Assam	..	..	..	..	..	..	..	..
Burma	474	..	582	..	498	0·3	1,736	1·2
Ajmer-Merwara	..	..	..	..	..	..	..	..

Research work.—This has been reviewed on page 208.

(b) *Provincial.*

N. W. F. P.—This area remained free for the seventh year in succession.

Punjab.—As already mentioned, the upward tendency of the mortality curve evidenced towards the last quarter of 1933, persisted throughout the first half of 1934. This not only marred the comparative quiescence enjoyed since 1928, but the abrupt rise of the curve to 8,069 deaths as against 1,789 in 1933 foreshadows the possibility of a severe outburst of the disease. The infection flared up in the sub-montane districts of Gujrat and Hoshiarpur, two of the notorious centres of endemic infection, which recorded 3,469 and 2,863 deaths respectively. Fourteen other districts were also involved, the numbers of deaths in those badly affected being 124 in Jullundur, 283 in Gurdaspur, 427 in Sialkot and 625 in Amritsar.

The peak was reached in May, with 2,788 deaths or nearly 35% of the total, September recording the lowest mortality. Cases continued to occur in one or the other part of the province throughout the year, Hoshiarpur being the only district which reported infection at the time of the close of the year (40 deaths in December). In regard to this district, the D. P. H. remarks:—

“Infection has become almost endemic in Hoshiarpur district now and has formed a focus which under favourable meteorological conditions would be capable of infecting the surrounding districts also. The apathy and indifference engendered by familiarity with the disease in this endemic area together with the density of the population characteristic of the district makes the problem of the control of infection very difficult.”

Rural areas suffered more than urban. The female death rate, 0·4 p.m. as usual exceeded the male rate, 0·3 p. m.

Delhi.—Only four imported cases, of which two were fatal, were recorded in Delhi city.

U. P.—Like the Punjab, this province experienced the severest epidemic during the last quinquennium. The death rate was nearly five times that in 1933 and double the 5-year mean. As usual, the months of January, February and March showed increased mortality, the peak occurring in March with 14,087 or nearly 30% of the total deaths. The mortality curve fell steadily during the following three months until the minimum was reached in July (61 deaths). In December infection flared up again and 1,374 deaths were reported of which 506 or 37% occurred in Gorakhpur district. The main foci of infection included the rural areas of Saharanpur (7,929 deaths), Bijnor (5,196), Etah (4,992), Budaun (3,500), Moradabad (3,652), Basti (3,198), Gorakhpur (7,649) Azamgarh (1,642), Ballia (1,423) Bareilly (1,386), Aligarh (1,503) and Muzaffarnagar (1,834) districts. Female deaths were 130 for every 100 of males. The death rate in rural areas was slightly higher than that in urban.

B. & O.—Although an upward trend in the mortality curve was recorded, the infection remained confined to the endemic foci. The death rate, which was $2\frac{1}{2}$ times that of 1933, was still half the decennial mean. In this province, there are certain isolated tracts in the districts of Muzaffarpur, Saran, Darbhanga and Northern Monghyr where the disease starts with the approach of the winter, reaches its maximum intensity during February and March and subsides with the advent of summer. In these four districts nearly the whole mortality occurred, the death rates p.m. being 0.6, 0.6, 0.4 and 0.2, respectively. The rest of the province, except for 107 deaths in the district of Champaran and 13 in Shahabad, remained entirely free. Of the total deaths 86% occurred in the months of January to April.

Bengal.—Only one death occurred in April in Howrah town.

C. P.—The downward tendency, which was a feature of the mortality curve last year, was continued, the infection being mainly confined to the districts of Hoshangabad, Yeotmal, Chhindwara and Nagpur, which together were responsible for 97% of the total deaths. In the districts of Betul, Mandla and Buldana, only sporadic cases were reported.

Attacks and deaths numbered 6,976 and 967, giving a case mortality of 14%.

Bombay.—There was a reduction in plague mortality, but the death rate in infected areas was as high as 5 p.m., the provincial rate being 0.6 p.m.

The D. P. H. says :—

“ it will be seen that since 1917 in which year the highest mortality from plague was registered, there is definite decline in the incidence of the disease. The decrease is on the whole progressive ; epidemic waves continue to occur but the peaks do not reach the height of the former severe epidemics ”.

As in 1933, practically the whole mortality, i.e., 12,276 deaths or 92% of the total, was reported from the Southern Registration District, but the death rate there (2.2 p.m.) remained below that for 1933 and the quinquennial mean. The worst affected districts were Dharwar with 3,716 deaths, Satara 2,633, Bijapur 2,542 and Belgaum 2,268. In the Central Registration District 858 deaths were registered. The Northern and Sind Registration Districts remained free except for 142 deaths in Kaira district in the former. Thirty-one deaths were recorded in Bombay city.

Madras.—The incidence was mild. Bellary and Madura were the only districts severely affected, returning 1,933 or 82% of the total deaths. Seven other districts were also mildly infected, but the number of deaths did not exceed 154 in any one.

Cases of pneumonic plague occurred in the districts of North Arcot and Chittoor, infection in both cases being imported from Mysore State.

Assam.—As usual remained free.

Burma.—The death rate was 0·11 p. m. higher than that in 1933 and 0·05 p.m. more than the five-year mean. Of the total, 1,736 deaths or 75% occurred in towns. Mandalay town alone contributed 918 or nearly 40% of the total provincial mortality and recorded a death rate of 6·8 p. m., nearly thrice the quinquennial average. In other districts the incidence of mortality was mild or sporadic. As usual, the sea-board districts of Arakan, Tavoy and Mergui remained free; as also Pyapon and Lower Chindwin districts. Among rural districts, Sagaing, which has been infected each year during the last two decades, was most heavily infected, 21 village tracts being involved; the recorded attacks and deaths in this district numbered 131 and 101, respectively. The disease is also endemic in Mæiktila district which reported 119 attacks and 86 deaths.

(c) *Anti-plague measures.*

Inoculation.—Table II (xiii) gives the numbers of anti-plague inoculations performed in the various provinces. These, as a routine, are performed in the infected localities and their numbers depend on the severity of the epidemic.

TABLE II (xiii).

	1933.	1934.
N. W. F. P. . . . .	..	145
Punjab	133,747	307,823
Delhi . . . . .	..	39
U. P.	99,983	329,959
B. & O.	25,154	97,506
C. P.	51,500	44,917
Bombay	559,723	276,375
Madras	129,191	123,938
Coorg	15,961	4,432
Burma	70,924	103,667
Ajmer-Merwara . . . . .	..	..

Rat destruction : Punjab.—The Local Government gave a grant-in-aid of Rs. 5,570 for extensive deratting operations in Gujrat district and Rs. 9,200 in the Hoshiarpur district. Cyanodust, *bhoosa batties* and barium carbonate pills were used.

Delhi.—Systematic rat-killing was continued both in rural and urban areas, especially in grain and food markets and 416,516 and 354,461 rats, respectively, were destroyed in these areas. Expenditure in rural areas totalled Rs. 13,942, in urban areas Rs. 23,346.

U. P.—Altogether 889,180 rats were killed by means of barium carbonate in 19 districts, 40 municipalities and several notified areas and other towns.

C. P.—Rats destroyed totalled 609,829 at a total cost of Rs. 36,194. Temporary plague regulations under the Epidemic Diseases Act were enforced in the districts of Nagpur, Chhindwara and Nimar and in 13 towns.

Bombay.—Field trials of cyanogas fumigation as a plague preventive measure were begun during 1934. Altogether 10,000 lbs. of cyanogas "A" were purchased for supply at cost price to local bodies and for experiments. In Bijapur town 1,858 lbs. were used in the fumigation of 213 godowns, 250 shops and 349 dwelling houses. Before entry into the town, loaded carts from infected localities were fumigated under tarpaulins.

Madras.—Encouraged by previous results, it was decided to conduct a scheme of cyanogas fumigation in the districts of Coimbatore, Salem, Bellary and Anantapur and in the municipalities of Hospet and Bellary at a cost of Rs. 8,800, to be borne partly by the local government and partly by the local bodies concerned.

Studies on plague problems were continued at Cumbum, but the year, 1934, did not offer favourable opportunities owing to the absence of a definite offseason (April-July). Evidences of epizootics in rats were obtained in 3 villages during routine examinations. A method of examining specimens by means of group animal tests was attempted, which proved very useful as compared to the usual smear examination and helped in the detection of villages threatened with infection and in the organisation of preventive measures, such as cyanogas fumigation. Altogether 4,887 specimens of house rats (*R. rattus*), bandicoots (*B. malabarica*) and house mice (*M. urbanus*) which were the species chiefly concerned in local epizootic plague were examined both singly by smears and also by animal group tests. Three positive results by the former and 12 positives by the latter method were obtained. Of 154 carcasses of rodents examined, 81 were found positive. Resolving plague lesions were noted in a few specimens of *R. rattus*, *Mus urbanus* and *Bandicota Malabarica*, but virulent *B. pestis* could not be isolated from any. Of 3,005 wild rodents examined, only two *Golunda ellioti*, obtained a mile away from Cumbum town, gave evidence of plague. Although *X. astia* was found to be the predominating flea infesting all species of field rats, *X. cheopis*, *Stivalius ahalae* and *Ctenocephalus* fleas were also obtained from these field rodents. Experiments regarding the rôle played by *Ctenocephalus* in the transmission of plague gave negative results, but these were found to retain viable *B. pestis* for as long as 8 days after infection. The carry-over experiments in model houses were repeated and infected fleas were given occasional short feeds on normal Madura rats introduced in cages and removed before they could develop septicaemia. This test proved plague transmission by fleas at intervals of 16-30 days after the original infection.

Rat flea surveys were continued. *X. cheopis* was, as before, found to predominate during all months, the index varying from 3.3 in September to 1.2 in April. *X. braziliensis* was found for the first time in the Cumbum Valley in one of the frontier camps at an elevation of about 5,000 ft. Repeated attempts were made to detect loose fleas in grain consignments at the Kumili frontier but were all negative, perhaps due to the fact, that most of these consignments were ex-rat proof godowns at Cumbum. However the possibility of such transference of fleas was indirectly proved on three occasions by artificially infesting grain carts with fleas and recovering over 50% of them after a night's journey. The possibility of importation of fleas in grain is

further demonstrated by finding heavy *cheopis* infestation of rats in the northern half of the Plermade taluk, adjoining the Cumbum Valley, which was conspicuously absent in the southern half. The study of the climatology of rat burrows showed that their atmosphere was only slightly affected by the large diurnal variations outside and that their saturation deficiency was uniformly low compared with that of outside air, thus providing conditions uniformly favourable for *cheopis* multiplication and survival of infected fleas.

Further work on cyanogas fumigation of rat burrows was continued. All villages, reporting rat falls, were promptly fumigated and infection was either aborted or the epidemic considerably delayed. Better results were obtained in small villages because more thorough work was possible in a limited time. Altogether 183,807 rat holes in 25 different localities comprising 15,535 houses were fumigated. Attempts were also made to evolve a suitable method for the disinfection of grain consignments under field conditions. Tarpaulin sheets were used to cover the consignments which were fumigated by cyanogas or calcid. The chief difficulty, *viz.*, rendering the tarpaulin airtight, was remedied by smearing with crude oil. It was found that period of exposure was important than concentration or dosage of gas, three hours exposure being generally sufficient, provided the floor was dry.

Burma.—Of 802,185 rats killed, 734,689 or over 91% of the total were in Rangoon. The only other towns practising rat killing were Minbu, Syriam, Moulmein and Henzada. Except in the Hlegu rural health unit and in the districts of Myaungmya and Katha, rat trapping was not carried out in rural areas. Fumigation of rat burrows was carried out with cyanogas, first in Mandalay and later in 44 municipalities and 19 rural districts. In Mandalay alone, 43,500 rat holes in 5,920 premises were dealt with.

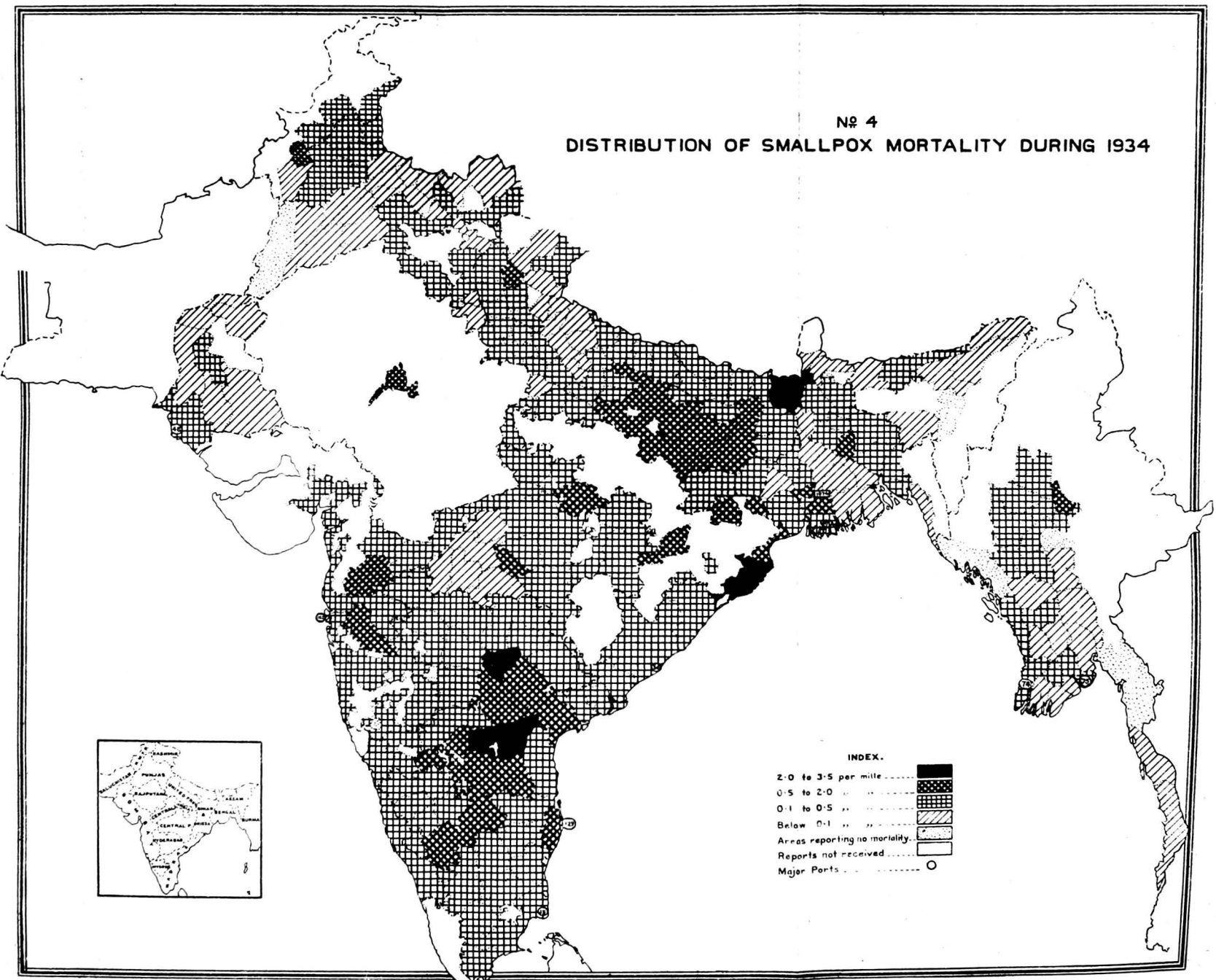
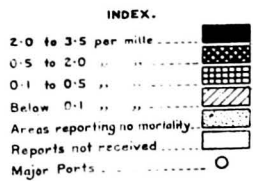
Smallpox.

(a) General.

16. The disease was moderately prevalent this year. Reported cases rose by 4% from 250,366 in 1933 to 261,242 whilst the deaths dropped from 103,641 in 1933 to 83,928 and the death rate from 0·4 p. m. to 0·3 p. m. The quinquennial mean, 1930-34, is the second lowest in the last half century. The epidemic wave that reached its crest in 1926 and 1927 with death rates of 0·48 and 0·49 p. m. has been followed by a trough with falling rates of 0·40 p. m. in 1928, 0·30 p. m. each in 1929 and 1930 and 0·1 p. m. in 1931 rising again to 0·2 p. m. in 1932, and 0·4 p. m. in 1933, the rise being interrupted in 1934 by a drop to 0·3 p. m. The provisional data for the first 6 months of 1935 show resumption of the rise. The striking feature of Table II (*xiv*) below is that the severe outbreaks which characterised the years, 1877-1900, are now rare. The downward trend of the mortality curve since 1920 is encouraging. What is required further is an extension of compulsory vaccination to all areas, rural as well as urban, and the wide practice of revaccination at school age.

The degree and duration of immunity against smallpox conferred by infant vaccination has been investigated at the Belgaum Vaccine Institute and found to be much shorter than was formerly believed, *viz.* 4 years in 1/5 of the children and 7 years in half. In India the facilities for vaccination are

№ 4
 DISTRIBUTION OF SMALLPOX MORTALITY DURING 1934



excellent. Governments or local authorities maintain adequate staffs of vaccinators throughout the country and all may obtain vaccination, and revaccination free. In spite of this, the disease remains endemic in the country and is responsible for something like 1·2% of all deaths.

The continued prevalence of this easily preventible disease is a measure of the passive resistance to public health improvement, which every health officer knows so well.

TABLE II (*xiv*).

	Average Number of deaths.	Mean rate. p. m.
1880—84	154,933	0·8
1885—89	79,344	0·4
1890—94	81,447	0·4
1895—99	89,444	0·4
1900—04	83,264	0·4
1905—09	111,276	0·5
1910—14	74,790	0·3
1915—19	87,071	0·4
1920—24	56,415	0·2
1925—29	98,051	0·4
1930—34	68,516	0·3
1930	72,813	0·3
1931	37,272	0·1
1932	44,925	0·2
1933	103,641	0·4
1934	83,928	0·3

Except for small increases in the U. P., the C. P., Madras Presidency and Coorg, all provinces recorded low death rates. Centres of infection included the 4 districts of Allahabad, Azamgarh, Fyzabad and Benares in the U. P., these contributing 38% of the total deaths. Madras Presidency had a fairly severe epidemic and the mortality was the highest since 1926, the districts of Kurnool, Guntur, South Arcot, Tanjore, Cuddapah, Anantapur and Bellary recording nearly 51% of the total deaths.

The decreases in the N. W. F. P., the Punjab, Delhi, B. & O., Bombay Presidency and Ajmer-Merwara were notable. In the N. W. F. P. the case-mortality was 50%, in the Punjab the mortality was the lowest since 1923, although the infection lingered on throughout the year; in Delhi owing

to the epidemic in 1933 and the large number of vaccinations performed then, there were only a few sporadic cases this year.

Table II (*xv*) gives the total smallpox deaths, death rates and rates of successful vaccination per 1,000 of the population for British India and the individual provinces.

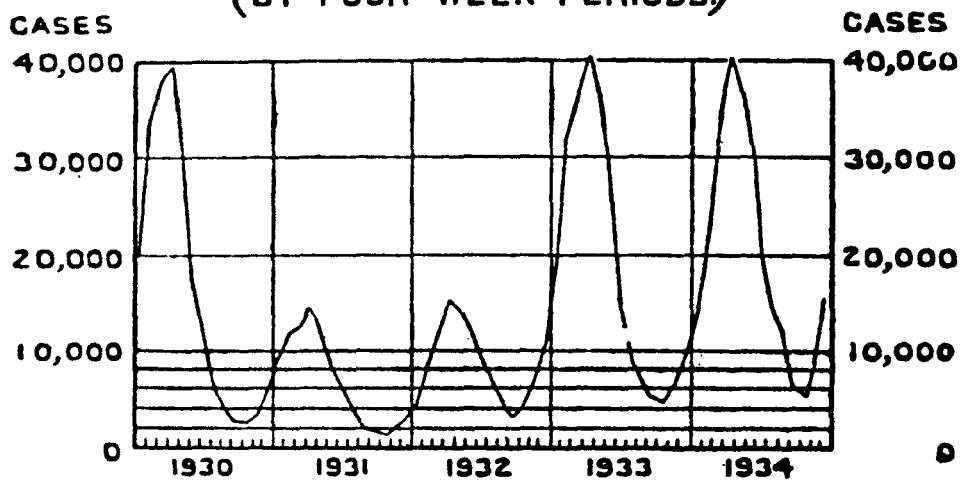
TABLE II (*xv*).

	Deaths.		Mean (1929-33.)	Death rate p. m.		Mean (1929-33.)	Rate of successful vaccinations per 1,000 of population.	
	1933.	1934.		1933.	1934.		1934- 35.	1933- 34.
British India	103,611	81,923	66,307	0.4	0.3	0.3	51	52
N.-W. F. P.	1,532	615	553	0.7	0.3	0.2	59	86
Punjab	11,626	1,692	6,712	0.5	0.1	0.3	85	91
Delhi	948	22	358	1.4	..	0.5	38	42
U. P.	9,844	14,817	7,755	0.2	0.3	0.2	33	32
B. & O.	42,674	30,810	16,259	1.1	0.8	0.4	35	37
Bengal	15,426	8,293	12,844	0.3	0.2	0.3	80	80
C. P.	561	2,282	2,413	..	0.1	0.2	38	37
Bombay	7,741	5,516	8,858	0.4	0.2	0.5	35	34
Madras	10,745	18,088	7,700	0.2	0.4	0.2	44	45
Coorg	14	45	13	0.1	0.3	0.1	103	69
Assam	247	206	866	..	..	0.1	56	55
Burma	1,506	1,601	1,448	0.1	0.1	0.1	56	54
Ajmer-Merwara	777	438	528	1.4	0.8	0.1	48	44

Case mortality, which was low this year being 32% as against 41% in 1933, compares unfavourably with Siam, Egypt, Ceylon, Norway, Japan and England and Wales in which countries it was 20%, 19%, 18%, 11%, 11% and 3% respectively.

Map No. 4 shows the geographical distribution of smallpox mortality in India during 1934 and chart No. 6 demonstrates the periodicity of the disease during the last 4 years. The peak of the mortality during 1934 occurred in April and May; the minimum in September and October. Details of seasonal incidence in each province are included in Table E on page 303. Reported cases during each quarter are given in Table II (*xvi*).

No 6
CASES REPORTED DURING THE
YEARS 1930-1934
(BY FOUR-WEEK PERIODS.)



NOTE.-Reproduced from the league's Weekly Epidemiological Record for
February 14th, 1935 R. H. 468.

TABLE II (xvi).

	1st Quarter.		2nd Quarter.		3rd Quarter.		4th Quarter.	
	1933.	1934.	1933.	1934.	1933.	1934.	1933.	1934.
Total	95,948	80,923	105,074	109,470	26,568	39,421	22,776	31,428
N.-W. F. P.	1,095	615	1,159	343	468	190	539	203
Kashmir	87	..	..	109	..	..	..	..
Punjab	12,291	985	6,858	979	1,477	267	598	349
Punjab States	109	35	266	69	36	16	20	248
Delhi	3,855	7	519	22	14	9	..	11
U. P.	4,089	4,435	6,168	7,114	651	1,228	746	1,914
B. & O.	27,311	23,092	43,576	23,751	7,147	6,805	5,273	4,850
Bengal	12,600	6,536	13,329	6,619	1,901	1,305	1,800	810
Bengal States	98	108	46	211	100	31	50	163
Madras	12,485	21,801	10,080	22,454	8,605	11,016	8,190	9,323
Hyderabad	1,947	5,551	1,310	15,298	683	8,293	599	4,578
Mysore	415	411	838	1,563	219	1,789	156	1,819
Bombay	11,716	7,911	11,074	9,273	3,006	3,182	2,481	4,250
Bombay States	263	800	1,023	857	442	581	211	457
Assam	190	105	247	89	61	38	19	6
Burma	4,136	1,543	3,740	2,817	610	611	414	216
Other Indian States.	2,296	1,873	2,294	1,519	514	170	734	1,064
Ajmer-Merwara	65	125	452	82	43	8	8	17
C. P.	567	2,592	1,170	6,689	379	1,680	333	508
C. I. Agency	333	2,449	925	6,621	212	2,202	605	642

The smallpox situation in the first half of the year was on the whole an improvement on the corresponding period of 1933, especially in Northern India including the Ganges Valley. The only areas recording increased incidence were the Central Provinces, the Central India Agency, Hyderabad State and Madras Presidency. During the period, July to September, the incidence dropped throughout India, and remained low during the last 3 months except for small increases in Bombay Presidency and Hyderabad State.

In so far as the figures can be trusted, Table II (xvii) indicates the deficiencies in infant and child vaccination throughout the provinces. Low mortality of infants is a feature in Assam, B. & O., Burma, Bengal and Delhi while the rates calculated *per mille* of population give a more accurate representation of the incidence of child mortality from this disease.

TABLE II (xvii).

	Deaths.		% of total smallpox deaths.			Death rate per mille of population.		
	Under 1 year.	1-10 years.	Under 1 year.	1-10 years.	Total.	Under 1 year.	1-10 years.	Total.
British India	16,033	22,280	19	27	46	1.7	0.3	0.5
N.-W. F. P.	162	324	26	53	79	2.2	0.5	0.7
Punjab	514	740	30	44	74	0.5	0.1	0.2
Delhi	3	13	14	59	73	0.1	0.1	0.1
U. P.	4,316	5,587	29	38	67	2.4	0.5	0.7
B. & O.	2,455	5,138	8	17	25	1.9	0.5	0.7
Bengal	377	966	12	4	16	0.3	0.1	0.1
C. P.	822	1,011	36	44	80	1.2	0.3	0.4
Bombay	1,604	2,594	29	47	76	2.1	0.5	0.7
Madras	5,593	5,516	31	30	61	3.4	0.5	0.8
Coorg	17	5	38	11	49	4.1	0.1	0.6
Assam	15	14	7	7	14	0.1	..	..
Burma	155	372	10	23	33	0.4	0.1	0.2

Although this year, the rural death rate exceeded the urban in N.-W. F. P., B. & O., and Ajmer-Merwara, the town dwellers in British India as a whole were more severely infected. In the Punjab the rural and urban rates were equal. Table II (xviii) compares the death rates in rural and urban areas in the different provinces during the years 1933 and 1934.

TABLE II (xviii).

	Rural.				Urban.			
	1933		1934		1933		1934	
	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
British India	82,154	0.3	71,415	0.3	21,537	0.8	12,513	0.4
N.-W. F. P.	1,283	0.6	574	0.3	249	0.8	41	0.1
Punjab	9,980	0.5	1,501	0.1	1,646	0.5	191	0.1
Delhi	85	0.4	1	..	863	1.9	21	..
U. P.	7,450	0.2	12,792	0.3	2,394	0.6	2,025	0.5
B. & O.	40,232	1.1	29,434	0.8	2,442	1.7	876	0.6
Bengal	9,928	0.2	6,798	0.1	5,498	1.5	1,498	0.4
C. P.	446	..	1,171	0.1	115	0.1	1,111	0.6
Bombay	3,807	0.2	3,651	0.2	3,934	0.9	1,865	0.4
Madras	7,206	0.2	14,251	0.4	3,539	0.6	3,837	0.6
Coorg	14	0.1	41	0.3	..	..	4	0.4
Assam	234	..	200	..	13	0.1	6	..
Burma	1,116	0.1	664	0.1	390	0.3	937	0.7
Ajmer-Merwara	323	0.8	337	0.9	454	2.5	101	0.6

(b) Provincial.

N.-W. F. P.—Prevalence was mild this year, although a higher fatality rate was recorded, viz. 50% as against 47% in 1933. Recorded cases and deaths totalled 1,227 and 615 in the settled districts as compared with 3,288 and 1,532, respectively, in 1933. Over 90% of the total deaths were reported in the districts of Peshawar, Bannu and Hazara. In Peshawar where 235 deaths were registered, about 58% were amongst children under 10 years of age. The other two districts reported light infection. Of the 104 cases and 33 deaths reported from the agencies, 50 and 18 occurred in South Waziristan; 23 and 8 in Malakand; 20 and 6 in Kurram and 11 and 1 in Chitral.

Punjab.—Recorded mortality was the lowest on record since 1923. The decline from September to November was conspicuous. Every district reported infection except D. G. Khan on the south-west border along the Indus but the highest death rate of 0.5 p.m. was reported in Hoshiarpur.

Delhi.—Only sporadic infection was recorded, due partly to the large number of vaccinations performed in 1933 and partly to the elimination of many susceptible persons during the last years epidemic.

U. P.—Although the number of deaths recorded from this disease by the ordinary agencies was 14,817, the data furnished after verification again indicated a much lower figure (2,285). Further investigation is required to reveal the truth. The fact that nearly 30% of the total smallpox mortality occurred among infants and 40% among children, aged 1-10 years, points to poor vaccination. Altogether 619 registration circles, out of a total of 1,166 in the province, reported deaths.

B. & O.—The lower death rate recorded during 1934 follows the epidemic of the previous year. Rural areas suffered more than the urban areas, the districts of Cuttack and Purnea being chiefly involved.

Bengal.—Compared with 1933 and the quinquennial mean, the death rate during 1934 fell by 33.3%. With 806 deaths in January, smallpox prevalence rose steadily to its maximum in April (1,597 deaths). From May it tended to decline, reaching its lowest in October, but in December the curve rose again. Compared with 1933 and the previous decennium, the death rate in 1934 was lower in every month. Calcutta was responsible for 1,074 or 72% of the 1,498 deaths recorded in the whole urban population.

C. P.—Compared with 1933, a higher incidence was recorded. Since nearly 80% of the total deaths from smallpox occurred among children, 36% among infants and 44% among children, aged 1-10, it is evident that primary and re-vaccination are neglected. Berar division reported a low mortality, elsewhere the quinquennial mean was exceeded. The D. P. H. has reasons to believe that many deaths recorded as due to chickenpox were actually cases of smallpox. He suspects that "there was a good deal of suppression of information and concealment with regard to this disease."

Bombay.—The highest incidence was reported in the Central Registration District where 2,684 deaths (0.4 p.m.) were recorded, Nasik district being the chief sufferer with 1,172 deaths. The Southern Registration District registered 1,365 deaths of which 494 and 326 deaths, respectively, occurred in the districts of Satara and Belgaum. The Northern Registration District returned 1,106; Sind 209; and Bombay city 152 deaths. Continued high mortality among children, aged 1-10 years, i.e., 76% of the total, stress the

necessity for a more vigorous vaccination campaign; this view is further confirmed by the high female death rate of 0·3 p. m. as compared with 0·2 p. m. among males.

Madras.—A fairly severe epidemic of smallpox occurred in this presidency and the number of deaths (18,088) and the death rate (0·4 p. m.) were the highest on record since 1926. Over 38% of the deaths were registered in the districts of Guntur, South Arcot, Tanjore, Cuddapah, Anantapur and Bellary. The D. P. H. has compiled a statement giving the number of attacks and deaths from smallpox in 8 districts and the case mortality rates arranged according to the number of vaccination marks. This is reproduced below as Table II (*xix*).

The figures, so far as they go, do not indicate any advantage in multiple insertions.

TABLE II (*xix*).

Number of marks.	Attacks.	Deaths.	Percentage of deaths to attacks.
<i>Nil</i>	6,474	1,510	23·3
1	1,465	63	4·3
2	1,951	88	4·5
3	1,176	48	4·1
4	2,396	68	2·8

In commenting on the infantile and child mortality from smallpox, the D. P. H. says—

“The percentage of deaths from smallpox under one year has fallen during the decade though the fall has not been steady. The percentage of mortality in the age-period one to ten years does not show any definite trend, while in the age-period above 10 years there is a noticeable increase in the percentage of mortality during the period. As the total number of deaths during 1925-34 is less than that during 1915-24, the increased percentage of deaths in the age-period above 10 years does not mean that the number of men protected is less than that in the previous decade, but that the degree of immunity in the adults is less than that in the infants. This shows the need for re-vaccination among the adults. Re-vaccination has been made compulsory throughout the Presidency in all the *compulsory* areas except the town of Madras. It is understood that compulsory re-vaccination will be introduced into the town of Madras also.”

Coorg.—Of the 17 infant deaths due to smallpox 6 were among males and 11 among females; all the 5 deaths among children, aged 1-10 years, were among females.

Assam.—In this province the gradual fall in mortality from this disease is attributed to prompt preventive measures taken to deal with isolated small outbreaks and to the thoroughness with which vaccination is carried out. The death rate of 0·03 p. m. was nearly one twelfth of the decennial mean (0·34 p. m.). Only 87 out of 28,333 villages and 49 of the 147 rural circles in the province reported infection; the highest death rate recorded in any district was 0·08 p. m. in Kamrup and 0·07 p. m. in Darrang.

Burma.—Owing to the widespread prevalence of smallpox, involving 29 districts, the incidence was slightly in excess of the rate for 1933 and the quinquennial mean. The seasonal distribution of most of the cases was, as usual, from March to May, the lowest figure being recorded in October. Over 67% of the cases were among people over 10 years of age. The D. P. H. says that “It is reasonable to believe that many of these were vaccinated in childhood and the figure shows how necessary it is in this province to get people revaccinated in order to keep up immunity against the disease”.

The urban death rate was 11 times that in rural areas. Among rural areas, Sagaing district to which the Vaccination Act was applied only during the year under review, reported the highest incidence of 642 cases with 156 deaths in 86 out of 287 villages in the district.

(c) *Isolation hospitals.*

In British India there are no hospitals reserved exclusively for the isolation of smallpox patients or accommodation provided for their contacts. Such information, as is available of the vaccinal history of smallpox cases treated in infectious diseases or other hospitals or contagious diseases or isolation wards in civil hospitals, etc., is given in Table II (xx).

The vaccinal condition of cases treated in medical institutions in Bengal is included in Table II (xxi.)

TABLE II (xx).

	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 of smallpox.	Stated to have been successfully re-vaccinated.
Total	2,385	1,312	230	739	8	85
U. P.	352	220	6	124	..	2
Bengal	631	257	36	309	8	21
C. P.	216	129	3	22	..	62
Bombay	187	91	83	13	..	..
Madras	505	313	102	90	..	..
Assam	13*	2	..	..	..	..
Burma	481	300	..	181	..	..

* Particulars re : 11 cases not available.

TABLE II (xxi).

Vaccinal condition of patients treated at medical institutions in Bengal.

Districts.	Total number of admissions from smallpox.	Number vaccinated as shown by the presence of one or more vaccination cicatrices.	Number stated to have been successfully vaccinated but bearing no vaccination cicatrices.	Number stated to be unvaccinated or vaccinated unsuccessfully bearing no vaccination mark.	Number previously unvaccinated but vaccinated during incubation of smallpox.	Number stated to have been unsuccessfully revaccinated.	Type.					Age				
							Modi-fied.	Dis-crete.	Con-fluent.	Semi-con-fluent.	Hæmo-rrhagic.	Under 1 year.	1 year and under 10.	10 years and under 20.	20 years and under 30.	Upwards.
Total . . .	631	257	36	309	8	21	107	184	219	77	44	5	34	125	284	183
Burdwan . . .	63	22	14	18	4	5	18	29	5	9	2	1	13	20	23	6
Hooghly . . .	22	...	...	16	...	6	15	...	4	...	1	...	...	2	16	4
Howrah . . .	20	5	6	9	...	...	1	3	11	4	1	...	...	2	11	7
Calcutta (Campbell Hospital)	438	186	4	239	2	7	27	130	183	61	37	3	14	89	195	137
Nadia . . .	3	1	...	...	2	...	2	...	1	...	...	...	1	...	...	2
Murshidabad . . .	4	3	...	1	...	...	3	1	...	...	...	1	...	...	3	...
Khulna . . .	4	2	...	2	...	...	1	1	1	...	1	...	...	...	4	...
Dinajpur . . .	7	7	...	...	...	...	1	4	...	2	...	...	...	1	2	1
Jalpaiguri . . .	1	1	...	...	...	...	1	...	...	...	...	...	...	...	...	1
Darjeeling . . .	7	4	1	2	...	...	2	4	1	...	...	...	1	...	4	1
Pabna . . .	2	...	2	...	...	...	...	...	1	1	...	...	...	...	...	1
Dacca . . .	13	9	2	7	...	...	14	3	...	...	1	...	...	1	10	1
Mymensingh . . .	15	6	4	5	...	...	9	5	1	...	...	...	2	3	6	4
Bakarganj . . .	18	3	3	10	...	2	7	...	11	...	...	...	2	5	7	4
Chittagong . . .	1	...	...	...	...	1	1	...	...	...	...	...	...	...	...	1
Tippera . . .	8	8	...	...	...	...	3	4	...	...	1	...	1	2	3	4

Fevers.

(a) General.

17. A total of 3,957,077 deaths was ascribed to this cause, against 3,530,299 in 1933 and 3,662,565, the decennial mean. Of this total, 2,917,817 deaths or 74% were recorded in northern India comprising the N.-W. F. P., Punjab, Delhi, U. P., B. & O. and Bengal. As usual, the Madras and Bombay Presidencies, Burma and Assam recorded low mortality. In rural areas 3,761,695 deaths were registered and 195,241 in urban areas, as against 3,349,586 and 180,713, respectively, in 1933; male deaths were 2,062,076 and female 1,895,001. As usual, rural rates much exceeded urban in all provinces. The female death rate was higher than the male in the Punjab, Delhi, Bombay Presidency and Coorg.

Table II (xxii) on page 57 gives an analysis of the "fevers" figures for certain provinces.

(b) Provincial.

N.-W. F. P.—The death rate was 16·8 p. m. or slightly lower than the quinquennial mean. Maximum mortality occurred in January and February with 4,674 and 4,305 deaths, respectively, and the minimum in July with 2,593 deaths. The districts of D. I. Khan, Bannu and Kohat recorded the highest death rates.

Punjab.—The fever death rate of 20 p. m. was in excess of that for 1933 and the quinquennial mean. The highest mortality was registered in December and January suggesting a high incidence of pneumonia at this time, a feature common to the Punjab and the N.-W. F. P. An unusually large number of fever deaths in May calls for comment.

Delhi.—The death rate exceeded the quinquennial mean by 1·6 p.m. The rural and urban rates were 27 p. m. and 12 p. m., respectively. Maximum mortality occurred in September and October; also in June.

U. P.—The death rate was higher than that in 1933 and the quinquennial mean. The peak was reached in May and the minimum in February in contrast to the Punjab and N. W. F. P. The district of Bulandshahr again recorded the highest death rate of 34 p. m., being 7 p. m. in excess of the rate for 1933. Both the rural and urban death rates were high.

B. & O.—The death rate was well in excess of the rate for 1933 and the decennial mean, the rise being in the rural areas. The urban population recorded a low death rate compared with the decennial average. Maximum mortality was recorded in September and minimum in February.

Bengal.—Fevers accounted for 65% of the total mortality. The death rate was reduced by 6% as compared with that in 1933, but still remained 5% in excess of the quinquennial average. From a maximum of 100,288 deaths in December, 1933, the mortality curve fell to a minimum of 47,607 deaths in June, 1934. Autumnal prevalence of fevers was low this year. Sixteen districts registered rates in excess of the provincial mean; 6 districts headed by Birbhum (26 p.m.) returned rates between 20 p.m. and 26 p.m., Calcutta recording the lowest mortality.

C. P.—Fever deaths increased by 70,268 in the year, the highest number being recorded in September (32,776) and October (31,727) and the lowest in January (18,736) and February (17,813). The districts of Raipur and Bilaspur suffered most.

Bombay.—The incidence of fevers was higher than in 1933 but was well below the average of the previous five years. High urban death rates continued to be recorded in the Presidency proper. The district mortality varied between 17 p.m. in East Khandesh and 9 p.m. in Poona. Maximum mortality occurred in March and minimum in June.

Madras.—Although the number of deaths increased by 24,868 or by 8%, the death rate remained below the quinquennial mean. The highest mortality was recorded in August and the lowest in June. Districts returning high fever death rates included East Godavari, Vizagapatam, Ganjam, Kurnool and Bellary, the death rates varying between 18 p.m. and 11 p.m. Low mortality in Tanjore district was continued. The rural rate was again nearly double that for urban areas.

Assam.—Fevers accounted for 65·4% of the total provincial mortality (64·5% in 1933). The death rate, which was lower than in 1933, was still in excess of the decennial mean. Highest mortality occurred in June and the lowest in March. Goalpara district again reported the highest death rate of 22 p.m., and the lowest of 9 p.m. was recorded in Nowgong district.

Burma.—Of the total deaths, 38% were ascribed to fevers. The death rate showed an increase of 0·7 p. m. over the rate for 1933 and of 0·9 p.m. over the quinquennial mean. The largest number of deaths was reported in December and the lowest in June. The rural death rate was nearly thrice the urban rate, the districts reporting the highest mortality, being Shwebo 16 p.m., Minbu 15 p. m., Tavoy, Akyab and Prome 13 p. m. each, Mandalay 12 p.m. and Pakokku 11 p. m.

TABLE II (xxii).

		Enteric fever.		Malaria.		Relapsing fever.		Kala-azar.		Measles.		Other fevers.	
		Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
Delhi . . .	{ R. . .	66	0·3	28	0·1	..	..	..	..	..	..	5,273	25·5
	{ U. . .	284	0·6	47	0·1	..	..	..	..	13	..	4,426	9·6
	{ Total . .	350	0·5	75	0·1	..	..	..	..	13	..	9,699	14·5
U. P. . . .	{ R. . .	6,102	0·1	853,477	18·3	499	..	382	..	12,763	0·3	43,337	0·9
	{ U. . .	2,041	0·5	19,579	5·0	114	..	41	..	3,277	0·8	28,677	7·3
	{ Total . .	8,143	0·2	873,056	17·3	613	..	423	..	16,040	0·3	72,014	1·4
Bengal . . .	{ R. . .	7,995	0·2	384,376	8·1	2,717	0·1	14,124	0·3	3,670	0·1	336,995	7·1
	{ U. . .	1,759	0·5	2,815	0·8	3	..	639	0·2	275	0·1	9,124	2·6
	{ Total . .	9,754	0·2	387,191	7·6	2,720	0·1	14,763	0·3	3,945	0·1	346,119	6·8
Bombay . . .	{ R. . .	5,469	0·3	28,000	1·5	..	..	..	..	1,666	0·1	144,095	7·8
	{ U. . .	1,215	0·3	2,893	0·7	..	..	..	..	1,150	0·3	16,025	3·7
	{ Total . .	6,684	0·3	30,893	1·4	..	..	..	..	2,816	0·1	160,120	7·1
Coorg . . .	{ R. . .	..	..	..	..	..	..	..	..	2	..	2,738	17·7
	{ U. . .	..	..	..	..	..	..	..	..	..	..	63	6·6
	{ Total . .	..	..	..	..	..	..	..	..	2	..	2,801	17·1
Burma . . .	{ U. . .	267	0·2	1,604	1·1	..	..	9	..	29	..	2,579	1·8

R.=Rural. U.=Urban.

Malaria.*(a) General.*

18. Apart from deaths in hospitals and dispensaries, information as to mortality from malaria is scanty and unreliable. The statistical value of even the recorded deaths in medical institutions is vitiated by the fact that only a minority are treated by practitioners of modern medicine. Registration of the cause of death remains largely guess work in the rural areas, where malaria is most prevalent and where there are few registered medical practitioners. There has been for long a general belief that approximately 1/3 of all deaths recorded as due to "fevers" are in fact due to malaria. Enquiries recently made from D. P. Hs. of provinces indicate very general agreement that this estimate is not an over-statement of the position.

Probable malaria mortality calculated on these estimates together with the recorded deaths has been included in Table II (*xxiii*).

TABLE II (*xxiii*).

	Estimated deaths from malaria.	Deaths recorded by ordinary agency.
Total	1,319,026	..
N.-W. F. P.	8,175	..
Punjab	161,461	..
U. P.	407,521	873,191
B. & O.	227,932	..
Bengal	252,272	387,191
C. P.	120,848	285,017
Bombay	34,239	30,893
Madras	65,010	..
Assam	50,889	..
Burma	37,667	..

These figures exclude the mortality caused by malaria indirectly and this is believed to be fairly high. The debilitating effects of malaria are partly responsible for the exceedingly high mortality recorded as due to influenza, pneumonia, dysentery, etc.

Lt.-Colonel Sinton, Director of the Malaria Survey of India has recently dealt with the malaria problem in India in three* papers published in the Records of the Malaria Survey of India for September and December, 1935 (Vol. V, Nos. 3 and 4 and Vol. VI, No. 1). His main theme is "What malaria costs India, nationally, socially and economically". He has described the effects of malaria upon : (i) natural increase of the population, (ii) health, vitality and physical development of the population, and (iii) social, intellectual and political progress. He has also dealt with the financial loss, direct and indirect, which malaria causes to India and with anti-malarial measures as paying propositions as well as with the prevalence of the disease, in its relationship to the problems of food supply and increasing population in India.

He summarises the position in regard to mortality from malaria in the following tentative conclusions :—

* Records of the Malaria Survey of India, Vol. V, Nos. 3 and 4 ; Vol. VI, No. 1. Thackers Press and Directories Ltd. Calcutta, price Rs. 3 per copy.

"(1) In ordinary years, malaria is responsible directly for at least 1,000,000 deaths each year, and, in years when severe regional epidemics occur, this figure may be increased by another quarter to half a million. The fatal effects of the disease fall chiefly on children and infants. The local distribution of the mortality may be markedly increased by conditions of economic stress."

"(2) Apart from direct mortality due to malaria, it has also a marked indirect action by lowering the general vitality of its victims, whereby many of them become more liable to contract other diseases, from the effects of which many of them die at a later date."

"(3) There seems little doubt that malaria, by its combined direct and indirect actions, is responsible for at least 2,000,000 deaths each year in India."

There is some reason to believe that not more than 1/10th of the persons suffering from malaria in India actually receive treatment in hospitals and dispensaries. If this be so, then the total cases of malaria must have been over 110 millions in 1934. The Director of the Malaria Survey of India considers "there is very considerable evidence to show that, at least, 100,000,000 individuals suffer yearly from malaria in British India alone, and that this is probably a moderate estimate. In addition to these, there is an indirect morbidity predisposed to by this disease which may be between 25 and 75 million cases".

Major-General Sir John Megaw, late Director-General, I.M.S. on the basis of an enquiry made by him in 1933 from medical officers stated "the number of persons who suffer every year from malaria in India is not less than 50 millions and may easily exceed 100 millions in some years".

Table II (*xxiv*) gives hospital attendances for malaria by provinces for 1933 and 1934.

TABLE II (*xxiv*).

	Cases.		Percentage to total cases treated.	
	1934.	1933.	1934.	1933.
Total . . .	11,356,538	12,602,145	15.0	16.8
N.-W. F. P. . .	544,696	627,024	25	29
Punjab . . .	2,174,764	3,62,837	14	20
Delhi . . .	129,063	165,439	14	15
U. P. . .	1,091,195	1,076,445	12	13
B. & O. . .	1,016,176	882,463	14	12
Bengal . . .	3,098,353	3,424,800	31	34
C. P. . .	390,042	386,142	11	11
Bombay . . .	693,587	690,551	22	18
Madras . . .	1,094,553	1,050,146	6	6
Coorg . . .	99,922	98,760	32	29
Assam . . .	617,763	737,721	26	30
Burma . . .	406,424	399,817	12	12

Whether the figures in Table II (*xxiv*) are reliable or not, the fact remains that of all diseases, this is the most general cause of human distress and economic loss in India.

From a study of the following paragraph it will be seen that whilst large parts of India are malarious, all are not equally so. The plains of central and western Bengal, most of Assam, the Dooars, the Terai of the U. P., the hilly submontane slopes of the eastern and western *ghats* are all very malarious places, whilst the plains of the U. P. and the Punjab, though they may be at times extremely malarious, are not always so. Malaria rarely occurs in the hills above 5,000 feet but several of the most malarious parts of India are in the valleys running into the hills at a level of 1,500 to 2,000 feet.

Now that the Sind Malaria Enquiry is drawing to a close, it is possible to give some conclusions on the effects produced by the operation of the Lloyd Barrage scheme on the incidence of malaria in Sind. These have been summarised in a paper which has been prepared for publication in the records of the Malaria Survey of India by Covell and Baily as follows :—

“(1) Before the Lloyd Barrage Scheme commenced operations, many parts of Sind were highly malarious, and the province was subject to periodical epidemics of malaria, more especially affecting the northern areas. The contention put forward in certain quarters that most, if not all of the malaria now existing in Sind is due to the operation of the Barrage Scheme, is thus unsupported by facts.

(2) Nevertheless it is a fact that malarial conditions in Sind have become considerably worse since the Barrage Scheme began to operate, and we consider that this is due mainly to conditions brought about by the operation of the Project.

(3) The principal factors which have produced this adverse effect are :—

- (i) A rise in the subsoil water level in many areas.
- (ii) Actual or threatened water-logging of the soil in certain areas.
- (iii) Seepage from some of the new canals.
- (iv) The cutting off of sections of certain of the old canals thus forming prolific anopheline breeding grounds.
- (v) The formation of a “lake” above the Barrage, with a corresponding rise of the subsoil water level along the course of the Indus.
- (vi) An extension in rice cultivation in areas outside the Barrage Command in northern Sind, due to the increased supply of water made available by the presence of the Barrage lake, and the remodelling of pre-existing canals.

(4) The future course of events as regards the incidence of malaria depends on the degree of success attained by the Irrigation Department in providing efficient drainage, and preventing the evils of water-logging.

(5) It is strongly urged that increased facilities for the treatment of malaria be provided throughout the area affected by the Barrage Scheme.

(6) We recommend that where possible all rest-houses provided for officials touring in Sind be rendered mosquito proof and equipped with electric light and fans.

(7) Attention is drawn to the importance of making a soil and subsoil survey of the area involved, as well as providing an efficient scheme of drainage, before any large irrigation project is undertaken.”

(b) *Provincial.*

N.-W. F. P.—The incidence of malaria was not severe. The seven municipal towns recorded 74 deaths including 39 in Peshawar and 29 in Bannu. In Peshawar district alone 184,585 cases were treated in hospitals and dispensaries while the special malaria staff treated 1,809 in the rural areas, 79,262 cases in Hazara, 65,802 in Bannu and 51,993 in Kohat. In other districts the infection was mild.

Punjab.—The usual malaria forecast issued on September 15th predicted localised epidemic foci of mild intensity in parts of Gurgaon, Karnal, Ambala, Ferozepore, Sialkot, Gujranwala, Gujrat, Shahpur and Attock districts. The forecast proved fairly accurate.

Only in 13 municipal towns, having full time M. O. Hs. were deaths from malaria recorded, the figures being 411 deaths in all, of which 183 were in Kasur town and 71 in Multan.

Delhi.—The incidence of malaria is high in many rural tracts particularly in the riverine areas, the spleen index in some places being as high as 80%. The eastern zone near Jumna river and the northern zone irrigated by the western Jumna canal are heavily infected, the rocky areas in the southern zone are less affected, and the sandy tracts in the western zone are little affected. Recorded deaths (75) are a gross underestimate owing to defective registration. No less than 129,063 patients attended hospitals and dispensaries on account of malaria during the year.

U. P.—Nearly 90% of the total fever mortality in the province was classified as malaria, but the incredibility of this high figure is strengthened by a knowledge of the present defective registration of cause of death. On investigation into the reporting of excessive malaria mortality in the municipal towns of Fyzabad, Badaun, Moradabad, Muttra and Mirzapur indicated that malaria mortality was exaggerated by 20% to 30%. Probably the same would apply to many other centres.

Districts which reported epidemic malaria were Benares, Ballia, Gorakhpur, Muzaffarnagar, Muttra, Allahabad, Saharanpur, Meerut and Bulandshahr where 1 in every 10 villages was affected. The outbreak was widespread in the districts of Gorakhpur and Muzaffarnagar, due to extensive floods in the former and waterlogging in the Ganges and the Jumna *Khadirs* in the latter. In other districts outbreaks were localised and in Muttra, only the canal zone near Kosi was involved. In the Sarada canal area, the average spleen rate was 9.2% in villages under canal irrigation and 5.4% elsewhere. The areas along the main Hardoi canal branch in the Shahjahanpur and Pilibhit districts were found to have developed hyperendemic conditions and spleen rates varied from 60% to 100%. The spleen census in 28 districts having health organisations showed average rates of 3.1% in the spring and 3.3% in the autumn, as against 3.4% and 3.5% in 1933, the highest rates being in the districts of Nainital, Mirzapur and Bulandshahr.

B. & O.—Large portions of Orissa and the districts of Singhbhum, Purnea and North Bhagalpur are known to be malarious. Of 2,764 children examined in the districts of Muzaffarpur, Darbhanga, Champaran, Purnea and North Monghyr, 72 or nearly 3% showed enlarged spleens, the rate varying from 17% in Muzaffarpur to 0.2% in North Monghyr.

Bengal.—Recorded deaths numbered 387,191, being 26,731 less than in 1933, and give a rate of 8 p.m. High death rates were recorded in Rajshahi (18), Nadia (16), Murshidabad, Birbhum and Malda (15 each), Jessore (14), Dinajpur, Pabna and Rangpur (13 each), Bogra (12) and Faridpur (10). Urban mortality decreased by 11% and rural by 6%. Maximum incidence occurred in October and November and minimum in February.

C. P.—Deaths totalled 285,017 or over 94% of the total fever mortality, giving a death rate of 18 p.m. The district of Raipur reported the largest number *viz.* 35,588, followed by Bilaspur 29,717, Drug 24,137, Hoshangabad 21,135, Saugor 21,060, Chhindwara 19,263, Bhandara 15,669 and Nimar 15,171 deaths.

Bombay.—A total of 30,893 deaths was recorded being 15% of the fever deaths for the Presidency. In Bombay city, with a census population of 1,161,383, only 97 deaths were registered. The provincial death rate was 1·4 p.m., the rural rate 1·6 p.m. and the urban rate 1·4 p.m.

Madras.—Large tracts in the districts of East Godavari, Vizagapatam, Ganjam and Kurnool are malarious. Continued high fever mortality in these districts has been mentioned in a previous paragraph.

Assam.—Malarial fever is by far the greatest scourge of this province. It is prevalent throughout and almost constantly present in epidemic form. A total of 665,983 cases was treated in the plains districts.

Burma.—Malaria continued to be the principal cause of ill-health and mortality in rural areas. In some parts the infection is widespread. It is known to be highly endemic in parts of the districts of Shwebo, Minbu, Tavoy, Akyab, Prome, Mandalay and Pakokku. A severe outbreak occurred in Hanthawaddy district in the Kyauktan, Thongwa, Kungyangone and Twante townships. In the urban areas, deaths from malaria totalled 1,604 with a death rate of 1·1 p.m., which was 0·07 p.m. less than that in 1933 and 0·35 p.m. lower than the quinquennial mean.

Anti-Malarial Measures.

19. Table II (*xxv*) shows the sums spent on these measures in nine provinces for which figures are available. Most of the expenditure was on quinine.

TABLE II (*xxv*).

	1930.	1931.	1932.	1933.	1934.
	Rs.	Rs.	Rs.	Rs.	Rs.
Delhi	23,080	17,880	31,866	32,280	30,530
B. & O.	2,500	2,500	..	..	..
Bengal	2,10,488	2,02,579	1,90,350	3,03,503	3,00,000
C. P.	43,738	45,323	31,621	48,912	41,821
Bombay	58,801	42,291	42,231	52,344	55,185
Madras	47,692	54,176	28,028	45,822	56,681
Coorg	18,450	11,824	6,719	6,951	6,975
Assam	29,646	48,136	69,285	70,274	66,989
Burma	40,682	41,000	43,155	43,419	46,872

Figures for other provinces are not available, but a total of Rs. 79,725 was spent in N.-W. F. P. and Rs. 4,35,305 in the Punjab during the last ten years.

The more important details of these measures carried out during 1934 in the various provinces are mentioned below :

N.-W. F. P.—The military authorities continued Paris green treatment of the cultivated lands in and near Peshawar and Kohat cantonments, other water collections being oiled.

Punjab.—On the basis of the malaria forecast arrangements were made for preventive measures, consisting chiefly of quinine distribution in the districts considered likely to be affected. Malaria surveys of certain areas in the districts of Mianwali, Gujranwala, etc. were conducted.

Delhi.—The measures carried out were similar to those of 1933.

U. P.—In the Banbassa headworks of the Sarda Canal, the usual “blanket” treatment referred to in previous reports was given to all residents, including newcomers. Malaria conditions in the Terai and Bhabar estates were reported on to the estate authorities. Field demonstrations on the use of Paris green were given and anti-larval measures carried out in 36 villages in these estates. Mass treatment of 25 villages was a feature in the autumn.

Advanced courses of instruction in malariology were given to 12 officers of the Public Health Department. Other instructional work included (a) a course in malariology to 7 candidates for the License in Public Health; (b) a short advanced course in practical anti-malarial methods to 9 candidates for the chief sanitary inspector’s examination; and (c) a short course to 30 students for the sanitary inspectors certificate. Boy scouts and members of minor Red Cross groups numbering 9,355 were trained in the principles of causation and prevention of malaria at 156 centres, and these carried out minor anti-mosquito measures in various parts of the province. Model bye-laws were adopted in three more municipalities.

B. & O.—Treatment centres in Purnea town were continued. A field experiment carried out in Puri from October to December to demonstrate the effect of Paris green on the yield of paddy crops showed that 2% of Paris green, sprayed carefully after 4 p.m. during the fertilisation season was not injurious. The experiment also showed that paddy obtained from land, treated with Paris green, was not inferior to that obtained from the “control” plots.

Bengal.—In connection with the *A. ludlowi* menace in Calcutta, both survey and control work was continued. The malaria research laboratory at Sali Tea Estate in the Jalpaiguri Duars continued its study of the vector of malaria in the locality and of the seasonal infectivity rate. The examination of 1,740 mosquitoes of 12 different species showed *A. phillipinensis* and *A. minimus* to be the carriers.

C. P.—Routine anti-malarial measures were continued in Pachmarhi, Nagpur (civil station), Khandwa and Burhanpur. An epidemic dispensary was at work in the Melghat forest area and the adjoining *ryotwari* tract in Amraoti district.

Bombay.—Five specially trained medical officers were detailed during the malaria season for anti-malaria work. Altogether 4,199 villages were visited and 76,849 cases of malaria were treated. Of 87,153 children examined, 30,904 or over 35% had enlarged spleen.

Madras.—In addition to surveys of eight *taluks*, anti-larval measures were continued in seven centres in the Vizagapatam Agency. These have proved a great success and the spleen rate in some of these places has been markedly reduced. Quinine distribution has been dealt with in a later paragraph.

Coorg.—Systematic anti-larval measures were regularly carried out by the special malaria officer and his staff in Mercara, Virajpet and 13 other centres. In rural areas these measures were attended to by the Cooperative and village *Panchayat* staffs and quinine was distributed. Plasmoquine and atebirin were tried in Fraserpet.

Training in anti-malaria measures was given by the dispensary staffs to the public within their respective areas.

Assam.—A sum of Rs. 24,500 was provided by the local Government for anti-malarial measures in 32 different areas in the districts. With funds provided by the Government of India, anti-malarial measures were also carried out at Pasighat and two other places.

Burma.—In the Hanthawaddy district, which provides grounds for the breeding of *A. aconitus*, a special sub-assistant surgeon was detailed in affected areas and cinchona febrifuge was widely distributed. In addition, larvivorous fish, *H. panchax* and *gambusia affinis* was tried in village tanks breeding *A. aconitus*. Similar measures were also carried out in Shwebo district and Taungdwingyi township which areas did not experience severe malaria this season. In Kyaukpyu, Akyab, Lashio, Maymyo, Bhamo and Sahmaw, measures carried out included reclamation of borrow pits and lowlying areas, clearing and grading of drains, oiling and treatment with Paris green, jungle clearing, etc. The spleen rate in Kyaukpyu was further reduced, being 10·5% in June and 4·2% in December, that in Lashio was 22% in the “protected” area as against 40% before the commencement of control measures and 70% in the “unprotected” area; and that in Sahmaw was 24% as against 29% in 1933 and 73% five years ago.

Quinine.

20. Under present arrangements, the quinine and cinchona febrifuge requirements of Bengal, B. & O. and Assam and as well as the Indian States within their geographical limits are met from the Bengal Government Quinine Factory at Mungpoo. The Punjab and U. P. also obtain a part of their supplies from this factory. The main supplies for the Punjab, including its states and for the U. P., Rajputana, N.-W. F. P., Baluchistan, Delhi and Gwalior State come from the Government of India stock under the control of the Director, Botanical Survey of India (Calcutta). For the rest of British India and the remaining Indian States supplies are obtained from the Madras Government's factory at Naduvattam.

The issues from the Bengal Factory, during the year, 1934-35, are given in Table II (*xxvi*).

TABLE II (*xxvi*).

	Assam.	Bengal.	B. & O.	Other areas.	Total.
	lbs.	lbs.	lbs.	lbs.	lbs.
Quinine salts	1,647	9,562	1,538	231	12,978
„ Sulphate	91	2,925	25	73	3,114
„ tablets	3,888	71,802	2,917	366	78,473
Cinchona febrifuge	2,268	16,085	1,580	5,506	25,439
Cinchona and cinchonidine salts . . . . .	..	..	11	13	24
Quinidine salts and quinodine	8	11	3	109	131
Cinchona bark . . . . .	..	1,600	..	200,000	201,600
				(to Madras Govt.).	
Totaquina . . . . .	..	..	..	42	42

Issues from the Botanical Survey of India included 77,351 lbs. of quinine sulphate and 2,718 lbs. of cinchona febrifuge.

The aggregate value of sales by the factory at Naduvattam, which had averaged Rs. 4,50,000 during the preceding three years, rose to Rs. 5,75,000 during 1934-35. The Madras Government have issued orders to limit quinine stocks at this factory to lbs. 18,500 which is considered to be far below the actual annual requirements and it is to be hoped that the local Government will raise the figure to 27,000 lbs. The total quantities of all cinchona products issued from the Naduvattam factory during 1934-35 are given in Table II (*xxvii*).

TABLE II (xxvii).

Details of Quinine Salts issued during the year, 1934-35.

Particulars.	Quinine	Cinchona	Cinchona	Quinine	Quinine	Quinine	Quinine	Totaquina	Cinchona
	sulphate.	febrifuge.	febrifuge.	sulphate	hydro-	bi-hydro-	bisulphate	and	bark.
	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.
Government hospitals	1,037 8	144 8	311 0	1,874 8	12 0	16 0	..	1,732 8	..
Local fund medl. institutions	1,069 8	282 8	3 0	87 0	1 0	..	1 0	1,125 8	..
Municipal medical institutions	379 0	43 8	..	..	10 8	..	..	128 0	..
Medical Store Depots—									
Madras	900 0	50 0	..	..	15 0	346 0	..	160 0	580 0
Bombay	4,800 0	300 0	..	..	50 0	550 0	..	550 0	300 0
Calcutta . . . . .	..	..	..	..	..	..	..	470 0	..
Lahore . . . . .	..	..	..	..	..	..	..	650 0	..
Assam	4 0	264 0	..	..	..	..	..	..	..
Burma	2,700 0	1,660 0	..	..	5 0	80 0	..	..	..
Bombay	3,835 0	200 0	..	..	310 0	..	..	..	..
United Provinces . . . . .	..	798 0	..	..	..	..	..	..	..
Central Provinces	1,275 0	370 0	..	..	15 0	..	..	..	..
Coorg	168 0	112 0	103 0	97 0	..	..	..	20 0	..
M. & S. M. Railway	120 0	30 0	300 0	..	..	..	..	..	..
Public . . . . .	..	1,297 0	56 0	..	..	..	..	..	..
Local sales	117 0	473 0	12 0	11 4	..	..	160 8	67 8	..
Indian States—									
Hyderabad	100 0	325 0	..	6 0	20 0	..	..	5 0	..
Mysore	310 0	1,020 0	..	..	..	..	..	..	..
Baroda	2,260 0	..	..	200 0	..	..	..	..	..
Travancore	401 0	..	..	..	..	..	..	..	..
Cochin . . . . .	..	..	..	..	..	..	..	..	..
Total	19,476 0	7,369 8	785 0	2,275 12	438 8	992 0	161 8	4,908 8	880 0

Amounts of quinine, cinchona febrifuge, etc. sold or issued free from all sources during the year, 1934, are given in Table II (xxviii). Detailed consumption of these drugs per head of population in every district in British India, in so far as figures are available, is shown in Table M on pages 307—313.

TABLE II (xxviii).

Issues of quinine, cinchona febrifuge etc., from all sources during the year, 1934.

	Quinine.		Cinchona febrifuge.		Totaquina.	
	Sold.	Issued free.	Sold.	Issued free.	Sold.	Issued free.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Total	11,202	26,244	3,656	18,886	2,415	20
N.-W. F. P.	..	1,185	..	991	..	..
Punjab	2,406	1,089	..	208	..	..
Delhi	..	307	..	238	..	..
U. P.	903	1,724	1,137	2,835	..	..
B. & O.	339	..	..	..	..	..
Bengal	..	14,080	..	12,253	..	..
C. P.	..	1,945	..	706	..	..
Bombay	..	2,994†	..	..	..	..
Madras	4,296	1,530	490	..	2,415	..
Coorg	26	306	..	215	..	20
Assam	227	1,001	102	1,276	..	..
Burma	3,005*	..	1,927	124	..	..
Ajmer-Merwara	..	83	..	40	..	..

*From the Medical Store Depot, Rangoon.

† In addition 7½ lbs. were issued on railways presumably free; quinine worth Rs. 38,697 was sold.

N.-W. F. P.—Quinine and cinchona febrifuge were distributed free amongst the poor. Malaria carriers were treated with malaria and plasmoquine.

Punjab.—A total of 1,089 lbs. of quinine and 208 lbs. of cinchona febrifuge was distributed by the Public Health Department.

Delhi.—The total amounts of quinine and cinchona consumed during the year were 307 lbs. and 238 lbs., respectively. The low incidence of malaria in the endemic riverine tracts was ascribed to the distribution and consumption of quinine.

U. P.—The Government quinine tablet factory manufactured and issued 903 lbs. of quinine and 1,138 lbs. of cinchona and the total amount realised from sales was Rs. 33,872. To replenish stocks in 10 districts, 223 lbs. of cinchona were issued from reserve stock. The total consumption of quinine and cinchona per head varied from 0.18 grains in Azamgarh district to 18 grains in Nainital district.

In 9 districts, in which malaria epidemics occurred, 325 lbs. of quinine and cinchona tablets were distributed for the treatment of 48,537 cases. Free mass treatment with cinchona and plasmoquine was continued in 20 village groups in the districts of Lucknow, Hardoi and Unao and 1,649 cases were treated, the clinical seasonal relapse rate being 5.6 per cent as compared with 6.3 per cent. in 1933.

Ten lbs. of cinchona and 8,550 tablets of plasmoquine were supplied for "blanket" treatment courses in primary schools in Kosi notified area and 5 lbs. of cinchona and 300 tablets of plasmoquine in Brindaban.

A total of 37 lbs. of cinchona was distributed by the Shahjahanpur rural uplift association, and 21 lbs. of cinchona and 8 ounces of quinine by the *Taraqi Sabha*, Pilibhit district. A rural sale scheme of cinchona products, subsidised by local agencies was in operation in Gorakhpur district, 26 lbs. of cinchona tablets being sold.

B. & O.—A total of 339 lbs. of quinine in tablets form was sold through post offices principally in the districts of Purnea, Cuttack, Santal Parganas, Balasore, Bhagalpur and Muzaffarpur.

Bengal.—Altogether 8,589 lbs. of quinine were issued by the Public Health Department, the consumption varying between 3 grains per head in Chittagong to 0.2 grains in Howrah and Darjeeling.

C. P.—Altogether 1,900 lbs. of quinine sulphate, 570 lbs. of cinchona febrifuge and 25 lbs. of quinine hydrochloride were purchased from the Madras factory and supplied to the Nagpur jail factory for manufacture into tablets. Free distribution of quinine in hyperendemic areas in the districts of Betul, Mandla and Nimar was continued and steps were being taken to reach every village in the province.

Bombay.—In Sind, 585,800 five-grain and 2,446,300 two-grain quinine tablets were distributed free; in the Southern Registration district 205,066 five-grain and 164,999 two-grain tablets, in addition to 115,000 tablets issued by the revenue staff; and in the Central Registration district 125,028 five-grain and 147,375 two-grain tablets.

The local Government continued its grant of Rs. 30,000 for free distribution and Rs. 30,000 for sale of quinine sulphate, and Rs. 9,700 for cheap sale of quinine hydrochloride in treatment packets. Of these grants Rs. 30,973, Rs. 30,892 and Rs. 7,805 were actually expended. Quinine worth Rs. 22,528 and Rs. 20,639 was distributed free through district school boards and Assistant Directors and collectors, respectively. Following a malaria survey of the area surrounding Poona city, a six weeks course of treatment with plasmoquine was given to infected persons and beneficial results were reported.

Madras.—The Public Health Department made a free issue of 1,385 lbs. of quinine to 108,296 persons in 13 districts.

Coorg.—The distribution of quinine to school children and *ryots* was continued. In addition, limited supplies of atebriin and plasmoquine were used in selected areas.

Assam.—Up to June, quinine was sold at below cost price *i.e.*, at Re. 0.4-6 per treatment. From July, "quinine reinforced cinchona febrifuge" in tablet form was substituted and was sold at Re. 0.3-9 per treatment. Sales through post offices amounted to 7,965 parcels of quinine treatments, whilst 101 lbs. of quinine sulphate and 291 lbs. of cinchona were obtained for free distribution in the districts of Cachar, Sylhet, Goalpara, Kamrup, Darrang, Nowgong and Sibsagar.

Burma.—Cinchona febrifuge tablets continued to be manufactured at the Rangoon jail; 3,371,580 tablets were sold through treasuries and 208,980 were distributed free in 12 districts, 66 per cent. being issued in the districts of Chin Hills (54,000 tablets), Shwebo (45,360) and Hanthawaddy (37,620). The average provincial consumption per head of population was one grain, the highest being in Bhamo district (13.3 grains).

The districts, showing high fever mortality, are, those in which the consumption of cinchona febrifuge was generally low. For example, in Shwabo with a fever death rate of 16 p.m. consumption was only 0·55 grain per head. The figures in other fever districts were : Akyab 12 p.m. and 0·96 grain, Prome 12 p.m. and 0·53 grain, Pakokku 11 p.m. and 0·23 grain ; Sandoway 11 p.m. and 0·13 grain ; and Lower Chindwin 11 p.m. and 0·18 grain. In some other districts, *e.g.*, Minbu, with a fever death rate of 15 p.m., Tavoy (13 p.m.) and Mergui (11 p.m.), the consumption per head, though somewhat higher, was still far short of what is accepted as the minimum amount necessary to prevent or cure malaria.

Dysentery and Diarrhoea.

21. Owing to difficulties of diagnosis and inadequacy of medical supervision, especially in rural areas, dysentery and diarrhoea are classified together. The mortality from these diseases during 1934 continued to maintain the upward tendency evidenced during the previous year. The increase was reported chiefly in the U. P., B. & O., Bengal, C. P. and Bombay, registered deaths being 16 per cent. more than in 1933 and 18 per cent. more than the quinquennial mean. Mortality was especially high in the female population of Delhi, U. P., B. & O., Bombay and Ajmer-Merwara. Table II (xxix) gives the recorded deaths from dysentery and diarrhoea by sexes and by provinces.

TABLE II (xxix).

	Deaths.			Death rate <i>per mille</i> .			
	Male.	Female.	Total.	Male.	Female.	Total.	
						1934.	1933.
British India .	148,316	136,794	285,110	1·0	1·0	1·0	0·9
N. W. F. P. .	172	113	285	0·1	0·1	..	..
Punjab . .	6,627	5,784	12,411	0·5	0·5	1	1
Delhi . . .	435	365	800	1·1	1·3	1	1
U. P. . . .	9,294	8,846	18,140	0·3	0·4	..	..
B. & O. . .	12,463	11,018	23,481	0·6	0·7	1	..
Bengal . . .	28,408	25,539	53,947	1·1	1·0	1	1
C. P. . . .	19,532	18,543	38,075	2·4	2·3	2	1
Bombay . . .	13,686	12,615	26,301	1·1	1·2	1	1
Madras . . .	50,155	47,689	97,844	2·1	2·0	2	2
Coorg . . .	101	76	177	1·1	1·0	1	1
Assam . . .	4,395	3,800	8,195	1·0	1·0	1	1
Burma . . .	2,849	2,182	5,031	0·4	0·4	..	..
Ajmer-Merwara .	199	224	423	0·6	0·8	1	1

Conditions of urban life seem to favour the spread of these diseases and amongst such may be mentioned defective conservancy arrangements, bad water supplies and overcrowding of the city life. Except in Delhi Province, the urban death rate was as usual higher than the rural in every province. Table II (xxx) gives the rural and urban death rates during 1933 and 1934.

TABLE II (xxx).

	1934		1933.	
	Rural.	Urban.	Rural.	Urban.
British India	0·9	2·1	0·8	1·7
N. W. F. P. . . . .	..	0·6	..	0·6
Punjab	0·4	1·1	0·4	1·2
Delhi	0·5	1·5	0·6	1·1
U. P.	0·1	3·0	0·1	1·9
B. & O.	0·6	1·0	0·4	0·7
Bengal	1·0	2·2	0·8	1·9
C. P.	2·3	2·7	1·4	1·6
Bombay	1·1	1·4	1·0	1·2
Madras	2·0	2·7	2·0	2·8
Coorg	0·9	3·8	0·5	4·7
Assam	1·0	1·5	1·1	1·7
Burma	0·3	1·2	0·3	1·3
Ajmer-Merwara . . . . .	..	2·3	..	2·1

Table II (xxxi) gives the number of deaths from this group of diseases for each quarter during the quinquennium, 1930-34. As usual, the third or monsoon quarter occasioned the largest number of deaths. Further details of mortality by months in British India and in provinces will be found in Appendix II (page 305).

TABLE II (xxxi).

	1930.	1931.	1932.	1933.	1934.
Total	237,892	268,331	222,804	246,164	285,110
1st Quarter	49,237	50,386	50,976	51,043	57,667
2nd Quarter	54,483	54,267	47,089	57,890	63,465
3rd Quarter	70,143	89,694	64,514	67,472	90,353
4th Quarter	64,029	73,984	60,225	69,759	73,685

In the *Punjab* the maximum mortality from dysentery and diarrhoea combined occurred during autumn and is said to be partly associated with the prevalence of malaria at that season. The sub-Himalayan districts of Simla, Kangra and Rawalpindi again recorded the highest mortality. The D. P. H. remarks that dysenteries are more common in the towns and no appreciable reduction of mortality from the disease is to be expected until conservancy methods are improved. He notes that most of the municipalities in the province which are content to entrust their conservancy arrangements to contractors record a comparatively higher dysentery death rate than those which carry out the work themselves. This is a common experience in towns in India and the moral is obvious.

In the *U. P.* maximum incidence occurred in August and minimum in February. The mountainous district of Garhwal, the submontane districts of Moradabad and Dehra Dun, also Lucknow and Benares reported the highest death rates. In *B. & O.* the death rate (0·6 p.m.) was higher than that in 1933 and the quinquennial mean, Orissa division registering nearly 80 per cent. of the total deaths. Compared with the average of the previous decennium, all districts in *Bengal*, except Calcutta and Jessore, returned a higher mortality, the largest increase occurring under dysentery in Darjeeling, a hilly district and under diarrhoea in Howrah. In the *C. P.*, the Berar districts recorded the largest number of deaths, 16,852 or 44 per cent. of the total, the death rates varying between 6·2 p.m. in Akola and 3·2 p.m. in Yeotmal district. In *Bombay Presidency* the highest mortality occurred in August and September; and in *Madras Presidency* in January, August and December. In the latter province, the highest death rate was reported from the districts of Nilgiris (3·5 p.m.) and Madura (3·7 p.m.). The districts returning the highest mortality in *Assam* were again Sibsagar (2·2 p.m.), Lakhimpur (2·0) and Darrang (1·3). The effect of bacteriophage on the incidence of these diseases in Nowgong district "does not appear to be very striking". In *Burma* the largest number of deaths occurred in July and August and the lowest in February.

Such figures as are available for dysentery and diarrhoea separately are given in Table II (xxxii).

TABLE II (xxxii).

	Deaths from diarrhoea.	Death rate p. m.	Deaths from dysentery.	Death rate p. m.
Punjab	1,368*	4	712*	2
Delhi	541	1	259	..
U. P.	10,401	..	7,739	..
Bengal	24,273	1	29,674	1
C. P.	31,362	2	6,713	..
Bombay	22,380	1	3,921	..
Coorg	66	..	111	1
Assam	75†	..	184†	1
Burma	966‡	1	807‡	1

* For 13 towns having whole time M. O. Hs.

† For 13 large towns.

‡ For towns only.

Enteric Fever.

22. Table II (xxxiii) gives the numbers of cases treated in hospitals and dispensaries in the different provinces.

TABLE II (xxxiii).

	1934.	1933.
British India	86,044	72,804
N.-W. F. P.	1,845	1,290
Punjab	22,841	21,826
Delhi	841	1,118
U. P.	10,007	6,372
B. and O.	8,537	6,481
Bengal	13,695	12,446
C. P.	2,142	1,672
Bombay	6,401	5,266
Madras	17,699	14,344
Coorg	143	85
Assam	516	503
Burma	1,377	1,350
Baluchistan	Not available.	251

N. W. F. P.—Thirty deaths, with a rate of 0·1 p. m., were registered in municipal towns.

Punjab.—Of the 610 deaths notified in 13 municipal towns, which record them, 175 deaths were in Kasur and 150 in Multan.

Delhi.—The disease is said to be endemic in the urban areas, particularly in Delhi city where it is ascribed to infected water supply, contaminated food and flies. Verified deaths in these areas totalled 424, of which 400 occurred in Delhi city, 19 in New Delhi and 5 in the Notified area. In the rural areas, the disease is not notifiable. Table II (xxxiv) gives deaths by months.

TABLE II (xxxiv).

	Delhi City.	New Delhi.	Notified Area, Civil Lines.	Total
Total	400	19	5	424
January	8	1	..	9
February	8	..	..	8
March	12	3	..	15
April	23	1	..	24
May	55	1	2	58
June	55	1	..	56
July	45	6	..	51
August	57	1	2	60
September	56	1	..	57
October	55	2	..	57
November	20	1	..	21
December	8	1	1	10

U. P.—Although 8,143 deaths were ascribed to enteric fever, the actual mortality based on verification work is believed to be over 19,000 deaths. Recorded deaths numbered 2,041 in towns and 6,102 in rural areas, yielding rates of 0·6 p.m. and 0·1 p.m., respectively. Among rural districts Nainital and Jalaun reported the highest mortality of 1·3 p.m. each.

B. & O.—Hospitals and dispensaries in the districts of Monghyr and Bhagalpur returned the highest numbers treated for this disease, *i.e.*, 1,273 and 1,063 cases. Other high figures were Saran 793 cases, Gaya 740, Patna 713 and Santal Parganas 670.

Bengal.—Although the urban areas reported a slight increase, the provincial mortality was less this year, deaths totalling 9,754, rural 7,995 and urban 1,759, yielding rates of 0·2 p. m., 0·2 p. m. and 0·5 p.m., respectively.

C. P.—The 8,681 registered deaths give a rate of 0·6 p. m., the worst affected districts being Yeotmal with 1,849 deaths and Nagpur with 1,192. High figures for other districts were 745 deaths in Wardha, 716 in Amraoti and 711 in Bhandara. The D. P. H. remarks :

“ I have reason to believe that the disease is far more prevalent than reported. The generally unsatisfactory condition of water supplies, conservancy and drainage are all important factors in this connection. It is suspected that many deaths from enteric fever are attributed to malaria, influenza and relapsing fever.”

Bombay.—Of the 6,684 deaths ascribed to enteric fever 5,469 were in rural and 1,215 in urban areas, the death rates being 0·3 p.m. and 0·3 p.m. Bombay city recorded 235 deaths, Sholapur 111, Poona 99 and Surat 60. High mortality occurred in the rural districts of Kolaba 907, West Khandesh 885, Thana 650, Dharwar 530, Nasik 397, Kanara 338, Ahmednagar 330, Belgaum 324 and East Khandesh 300.

Madras.—There were 1,393 deaths in municipal towns.

Assam.—Of the cases treated for this disease in medical institutions 286 or more than 50 per cent. were in the districts of Sylhet and Goalpara. The P. H. Department recorded 42 deaths from typhoid fever in 10 towns. Contacts were protected with T. A. B. inoculation, and other preventive measures were also carried out.

Burma.—The D. P. H. reported—

“ The total number of deaths recorded is 267, which, it is considered, does not represent the true incidence of this type of fever. Bacteriological diagnosis is only resorted to by private practitioners in a small proportion of the cases of fever, and it is believed that a number of enteric infections are missed. The disease is notifiable in towns. Of the cases reported from Mandalay, 76 per cent. had a fatal ending, which high figure suggests that many non-fatal cases probably went unreported. High rates of mortality from enteric fever have been reported in Magwe 0·97, Ngathainggyaung 0·93, Mawlaik 0·88, Maymyo 0·84, Kyaikto 0·76, Sagaing 0·64, Myitkyina 0·68, Moulmein 0·56 and Mandalay 0·50.”

Respiratory Diseases.

23. Table II (xxxv) gives the recorded deaths and rates *per mille* for British India and the provinces.

TABLE II (xxxv).

	Deaths.		Rate per mille.		
	1934.	1933.	1934.	1933.	1929-33.
British India	483,018	443,305	1·8	1·6	1·6
N.-W. F. P.	3,151	2,754	1	1	1
Punjab	55,570	55,337	2	2	2
Delhi	4,480	4,463	7	7	7
U. P.	46,567	34,898	1	1	1
B. and O.	7,348	6,295	..	..	..
Bengal	85,113	82,173	2	1	1
C. P.	45,181	32,134	3	2	2
Bombay	106,568	100,200	5	5	5
Madras	107,742	105,828	2	2	2
Coorg	152	179	1	1	2
Assam	6,440	5,444	1	..	1
Burma	12,991	12,043	1	1	1
Ajmer-Merwara	1,715	1,557	3	3	1

Table II (xxxvi) gives the recorded deaths and rates *per mille* by sex and in rural and urban areas.

TABLE II (xxxvi).

	Male.		Female.		Rural.		Urban.	
	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
British India	272,411	1·9	210,607	1·6	332,581	1·3	150,427	5·5
N.-W. F. P.	1,842	1·4	1,309	1·1	1,732	0·8	1,419	4·4
Punjab	31,362	2·3	24,208	2·2	41,808	2·0	13,762	4·2
Delhi	2,459	6·4	2,021	7·2	1,406	6·8	3,074	6·7
U. P.	24,546	0·9	22,021	0·9	12,367	0·3	34,200	8·7
B. and O.	4,365	0·2	2,983	0·2	6,404	0·2	944	0·6
Bengal	53,272	2·1	31,841	1·3	67,143	1·4	17,970	5·1
C. P.	26,579	3·3	18,602	2·3	38,559	2·7	6,622	3·8
Bombay	58,272	4·9	48,296	4·5	71,230	3·9	35,338	8·2
Madras	57,440	2·5	50,302	2·1	81,537	2·0	26,205	4·1
Coorg	105	1·2	47	0·6	88	0·6	64	6·7
Assam	3,822	0·9	2,618	0·7	5,950	0·7	490	2·4
Burma	7,466	1·2	5,525	0·9	4,352	0·4	8,639	6·1
Ajmer-Merwara	881	2·3	834	3·7	5	..	1,710	9·5

N. W. F. P.—The urban rate continued to be nearly five times the rural rate. Urban rates were 9 p.m. in Tank, 6 p. m. in Peshawar, 5 p. m. in D. I. Khan and 0·3 p.m. in Charsadda.

Punjab.—The provincial death rate was exceeded in 11 districts, the excess being most marked in Simla, Amritsar, Kangra, Sialkot and Ludhiana. The urban death rate, as usual, was higher than the rural.

Delhi.—This province shows very little difference in the rural and urban death rates. Delhi city and the notified area reported the highest mortality *viz.*, 7·6 p. m. and 6·5 p. m., respectively. Maximum mortality occurred in December and January.

U. P.—Attention is again drawn to the continued high mortality in the districts of Hamirpur, Lucknow, Agra and Cawnpore and low mortality in the districts of Mainpuri, Basti and Kheri. This year, Dehra Dun district also reported a high death rate. The urban rate was 33 times the rural. Maximum mortality occurred in March and minimum in July.

B. & O.—The urban death rate continued to be higher than the rural, rates being 0·6 p. m. and 0·2 p. m., respectively. Compared with most other provinces, these rates are very low. The Orissa division reported the highest mortality, *viz.*, 4,326 deaths or nearly 60 per cent. of the total.

Bengal.—Compared with 1933, the recorded mortality from respiratory diseases, which was 7·2 per cent. of the total mortality, increased by over 6 per cent. and the death rate exceeded the quinquennial mean by 31 per cent. This increase was attributed to the greater prevalence of influenza which alone was responsible for over 48 per cent. of the total deaths classified as respiratory diseases. The highest mortality occurred during December and January to April and the lowest in June. Compared with the decennial mean, increased mortality was registered in every month. Eleven districts returned death rates in excess of the provincial average, Calcutta reporting the highest (9 p. m.), followed by Jalpaiguri (5 p. m.), Howrah (4), Hooghly (4) and Darjeeling (4). The death rate in towns increased by 2 per cent. that in rural areas by 21 per cent; the urban rate was about thrice the rural.

C. P.—Mortality was highest in March and lowest in July. Jubbulpore district again returned the highest death rate, 12·1 p. m. as against 8·5 p. m. in 1933. Other high district rates were Saugor 7 p.m., Betul and Nimar 6 p.m. each, Buldana and Akola 4 p.m. each. The urban death rate, 3·9 p. m., exceeded rural death rate, 2·8 p.m.

Bombay.—In this Presidency also, increased mortality was reported. The Table below shows the figures of the last 4 years and the means of the previous three decennia.

(TABLE II xxxvii).

	Deaths.	Rate p.m.
1901-10 (mean)	57,723	3
1911-20 (")	79,625	4
1921-30 (")	92,250	5
1931	97,969	4
1932	93,524	4
1933	100,200	5
1934	106,568	5

The districts of Kaira, Surat, Ahmedabad, Kolaba, Ahmednagar, Thana Broach, Poona, Bombay Suburban, Bijapur and Karachi reported high death rates varying between 10 p. m. and 5 p. m. The rate of mortality in towns was double that in rural areas.

Madras.—The steady increase in the mortality curve in this Presidency, which has been a feature during the last decade, was maintained. Mortality was high in the cold months of January, November, and December. As usual, the Nilgiris district registered the highest death rate of 5 p. m. Other high death rates were East Godavari (hills) 4 p. m., Madura 4 p. m., Bellary 4, Kistna 3 and East Godavari (plains) 3. The urban death rate was 6 p. m. and the rural 2 p. m.

Assam.—Mortality was highest in March and lowest in May. Lakhimpur district continued to record the highest death rate and Goalpara the lowest.

Burma.—The months of April to June showed the lowest mortality. In other months, the deaths were scattered fairly evenly. The death rate in urban areas was 15 times that in rural areas.

Pneumonia.

24. Table II (xxxviii) gives the numbers of deaths and the rates p. m. in a few provinces which record them.

TABLE II (xxxviii).

	Deaths.	Rates p.m.
N. W. F. P.	190†	0·7
Punjab	4,301*	..
Delhi	1,463	2·3
U. P.	15,039	0·3
Bengal	41,006	0·8
C. P.	24,197	1·0
Madras	4,637†	..
Assam	263*	..
Burma	3,764‡	2·7

* In 13 municipal towns.

† In municipal towns.

‡ In urban areas.

Table II (xxxix) gives death rates *per mille* for some of the larger towns:—

TABLE II (xxxix).

	1934.	1933.		1934.	1933.
N. W. F. P.—			Bombay Presidency—		
Peshawar	1	Not available.	Bombay	7	6
			Hyderabad	6	5
Punjab—			Poona	7	5
Lahore	3	„	Ahmednagar	4	3
Ambala	4	„	Karachi	5	7
Rawalpindi	4	„	Nasik	3	2
			Ahmedabad	3	2
Simla	11	„			
Jullundur	3	„	Coorg—		
Multan	7	„	Mercara . . . . .	..	12
Delhi Province—			Assam—		
Delhi city	2	2	Shillong	3	4
			Dibrugarh	2	1
United Provinces—			Nowgong	4	3
Lucknow	12	9	Gauhati	2	2
Agra	11	11			
Cawnpore	9	12	Burma—		
Aligarh	5	..	Rangoon	4	4
			Mandalay	3	3
Bengal Presidency—			Meiktila	2	6
Howrah	3	3			
Calcutta	2	2			

Tuberculosis.

(a) General.

25. The question of the period over which tuberculosis has been endemic in India is not easy to determine. "Charaka" and "Sushruta", writing about 500 B. C., gave descriptions of this disease. It seems unlikely however, that tuberculosis could have been widespread at this early period, when it was more probably confined to a few of the larger urban centres of population. The wide distribution of tuberculosis of recent years must in a considerable measure be due to increase of urbanization and the environmental factors associated therewith, producing overcrowding and other conditions which predispose to this disease. The present position would appear to be that, whereas our towns are heavily infected, and their residents tuberculised to some extent, the rural population for the most part have not yet experienced the full force of the disease. If this assumption be correct, we must anticipate a much greater spread of tuberculosis among the rural population which will be facilitated by the rapidly increasing means of communications from town to village and from village to village.

Our data in regard to the incidence of tuberculosis are lamentably deficient. Only in some urban centres has it been practicable to make the disease notifiable. There is no use in introducing compulsory notification unless it can be enforced in practice, and there are many obstacles in the way, including paucity of qualified medical practitioners, the *purdah* system, ingrained prejudice against hospitals, and the tendency to conceal disease until the development of symptoms makes concealment no longer possible. Generally speaking, the population of India are highly susceptible to tuberculosis and among most of them the disease takes a virulent form and runs a rapid course. Public health officers may well-nigh despair of tackling this vast problem satisfactorily within the life-time of the present generation. Environmental sanitation in India is definitely backward, and in particular the housing problem is exceedingly difficult. Many urban areas have bad or indifferent building byelaws and these, such as they are, tend to be inadequately enforced. We are witnessing to-day in many towns the creation, year by year, of housing conditions favourable to the rapid spread of tuberculosis. Until this problem is dealt with, we shall continue to create new slums within our towns and to add to the magnitude of the tuberculosis problem. First and foremost, the problem resolves itself into one of improving housing in urban areas with all that this connotes in the way of space, sunlight and fresh air. To tackle the problem from any other aspect than this is to begin at the wrong end. It is beyond the financial resources of the country to build hospitals and sanatoria to house our countless cases of tuberculosis, unless we can reduce markedly the number of fresh cases infected each year, by improvement of environmental conditions. Energetic propaganda is therefore required, particularly among the members of Municipal Committees and the like, to impress upon them the importance of improved housing in their towns and the provision of parks and playgrounds.

The importance of good nutrition in the prevention of tuberculosis cannot be overstressed. This however is a problem by itself. Here it may only be noted that there is evidence of increased attention being paid to this vitally important subject.

Last year the Director-General, Indian Medical Service (Sir John Megaw) on the basis of data collected by him from medical officers and others

throughout India, reported that there are probably two million cases of tuberculosis in India. His conclusions are given below.

"Tuberculosis is evidently very widespread throughout the villages of India but is specially serious in Bengal, Madras, the Punjab and Bihar and Orissa. Pulmonary tuberculosis seems to be much more common than extra-pulmonary except in the United Provinces and Bombay. The low incidence in the Central Provinces is remarkable and is perhaps associated with the sparse distribution of the population and with defective means of communication".

"Tuberculosis is well known to be exceedingly prevalent in the cities and large towns but little is known as to its incidence in rural areas. The evidence of the dispensary doctors goes to show that the disease is very widely disseminated throughout India. From other sources of information it seems likely that the disease is increasing steadily and rather rapidly. The estimate of just over two million cases of tuberculosis in India as a whole is probably much too low: every large town is known to be very heavily infected, and therefore an estimate which is based solely on the incidence of the disease in the agricultural villages must be unduly favourable".

"Tuberculosis is a disease which has very special importance in India for the reasons— (1) it is likely that many villagers have never come in contact with infection and therefore are "virgin soil" on which the disease is likely to thrive, (2) the infection is being steadily spread from the large towns to the villages, (3) the disease constitutes a reliable index of the standards of life which prevail in countries in which it has become established for long periods of time; it spreads rapidly among ill-nourished and badly housed populations and correspondingly diminishes when the people are well fed, well housed and cleanly in their habits."

Statistics of deaths from tuberculosis are, as has already been stated very scanty. Table II (xl) shows the information in so far as it is available from provinces.

TABLE II (xl).

	Deaths from tubercle of lungs.			Percentage of total deaths.		
	Rural.	Urban.	Total.	Rural.	Urban.	Total.
Total	30,619	20,451	51,070	..	..	..
N. W. F. P. . . . .	..	70	70	..	0.3	..
Delhi	73	403	476	1.0	3.4	2.5
U. P.	569	5,402	5,971	0.1	3.7	0.5
B. & O. . . . .	..	..	..	..	..	..
Bengal	10,928	3,917	14,845	0.9	5.4	1.3
C. P.	3,205	905	4,110	0.6	1.5	0.7
Bombay	15,843	7,406	23,249	3.6	6.7	4.2
Madras . . . . .	..	..	..	..	..	..
Coorg	1	2	3	0.1	0.0	0.0
Assam . . . . .	..	125	125	..	..	..
Burma (Urban) . . . . .	..	2,221	2,221	..	5.2	..

Only Bombay, Bengal, the Central Provinces, the United Provinces and Delhi record any figures from rural areas, and these statistics cannot be relied on.

In Delhi city statistics of mortality from tuberculosis have been carefully collected for a number of years and are given below.

	Total deaths.	Deaths from tuberculosis.	Per cent. of total deaths.
1927	8,096	624	7.6
1928	8,535	759	8.6
1929	11,749	889	7.5
1930	9,400	1,241	13.2
1931	9,143	1,194	13.1
1932	9,589	898	9.3
1933	11,489	850	7.3
1934	10,528	884	8.3
1935 (9 months)	9,750	735	7.5

Imperfect though they must be, the figures show the heavy toll which this disease exacts in an overcrowded Indian town.

In Bombay city, where 74 per cent. of the population lived in single rooms at the time of the 1931 census, the recorded figures are as follows.

	Death rate <i>per mille</i> .		
	Pulmonary.	Other forms.	Total.
1924-33	1.2	0.1	1.3
1929-33	1.1	0.1	1.2
1933	1.2	0.2	1.4
1934	1.4	0.2	1.6

From Rangoon also figures are available and they are given below.

	Male.		Female.	
	Deaths.	Rate p.m.	Deaths.	Rate p.m.
1930	519	2.2	242	2.3
1931	538	2.0	239	1.9
1932	569	2.1	265	2.1
1933	561	2.1	256	2.0
1934	572	2.1	259	2.0

Madras city records a death-rate of 1.4 *per mille* for tuberculosis of the lungs, while in part of Lahore, where a tuberculosis survey has recently been carried out, 311 cases were detected in a population of 8,269 which works out at 3.75 per cent.

Although mortality figures, differentiated according to sex, are not available, the fact that females are more severely infected than males is evident from the high female death rates from respiratory diseases given in Table II (xxxvi). A table at page 87 of last year's report indicates that, between the ages of 15 and 40, female mortality rates are much higher than the corresponding rates for males. Unfortunately no other data showing the distribution of the disease by age-groups are available.

Table II (xli) gives the number of tuberculosis cases treated in hospitals and dispensaries. The ratio of tuberculosis cases to total cases treated is probably the best indication we have of relative incidence of tuberculosis.

TABLE II (xli).

	1934.				1933.			
	Pulmonary.	Other types.	Total.	% of total.	Pulmonary.	Other types.	Total.	% of total.
Total	188,985	88,588	257,583	0·3	158,291	86,978	245,269	0·3
N.-W. F. P.	6,429	4,974	11,403	0·6	5,760	4,100	9,860	0·5
Punjab	16,622	15,455	32,077	0·2	16,253	13,673	29,926	0·2
Delhi	3,647	4,136	7,788	0·9	4,210	4,441	8,651	0·8
U. P.	22,205	17,082	39,287	0·5	20,149	18,281	38,430	0·5
B. & O.	18,383	6,774	25,157	0·4	18,721	7,229	25,750	0·4
Bengal	27,661	8,537	36,198	0·5	24,730	7,077	31,807	0·3
C. P.	3,482	2,472	5,954	0·2	3,481	2,600	6,081	0·2
Bombay	16,059	7,402	23,461	0·6	15,516	8,524	24,040	0·6
Madras	46,454	20,024	66,478	0·4	41,171	18,728	59,899	0·4
Coorg	81	78	159	0·1	120	57	177	0·1
Assam	1,573	230	1,803	0·1	1,447	239	1,736	0·1
Burma	6,389	1,424	7,813	0·2	6,291	1,628	7,919	0·3
Baluchistan.	Not available.		Not available.		442	551	993	0·1

Anti-tuberculosis Organizations.—The King George's Thanksgiving (anti-tuberculosis) Fund is the only all-India organization dealing with tuberculosis. This Fund has a Central Committee and branches in the provinces, and concerns itself both with prevention and treatment, and, in addition to carrying out propaganda, provides training for medical men in tuberculosis work. Its activities are invaluable, but unfortunately its funds are too restricted to enable it to carry out work on a large scale. A list of local voluntary organizations existing in the provinces and elsewhere is given below.

1. Indian Red Cross Society, Ajmer-Merwara District Branch, Ajmer.
2. Anti-Tuberculosis Sub-Committee, Assam Provincial Branch, Director of Public Health's Office, Shillong.
3. Anti-Tuberculosis Sub-Committee, Civil and Military Station Local Branch, Bangalore.
4. Anti-Tuberculosis Sub-Committee, Indian Red Cross Society, Baroda State Branch, Baroda.
5. Tuberculosis Association of Bengal, Calcutta.
6. Anti-Tuberculosis Sub-Committee, Bihar Provincial Branch, Director of Public Health's Office, Patna.
7. Propaganda and Health Sub-Committee, Indian Red Cross Society, Bombay.
8. Anti-Tuberculosis Committee, Indian Red Cross Society, Nagpur City.
9. Anti-Tuberculosis Sub-Committee, Delhi Provincial Branch, Silver Jubilee Tuberculosis Hospital, Delhi.
10. Anti-Tuberculosis Sub-Committee, Hyderabad British Administered Areas, Hyderabad, Deccan.
11. Anti-Tuberculosis Sub-Committee, Indian Red Cross Society, Jodhpur.
12. Anti-Tuberculosis Sub-Committee, Madras Presidency Branch, Director of Public Health's Office, Madras.

13. Indian Red Cross Society, Mysore State Branch, Bangalore.
14. Anti-Tuberculosis Sub-Committee, Punjab Provincial Branch, 2 Birdwood Road, Lahore.
15. Anti-Tuberculosis Committee, Jullundur City, Punjab.
16. Anti-Tuberculosis Committee, Women's Christian Medical College, Ludhiana City, Punjab.
17. Health and Sanitation Sub-Committee, Municipality, Simla.
18. Indian Red Cross Society, Sind Provincial Branch, Karachi.
19. Anti-Tuberculosis League, 8, Shahmina Road, Lucknow, U. P.
20. Anti-Tuberculosis League, Bharti Bhawan Street, Allahabad City, U. P.
21. Anti-Tuberculosis Sub-Committee of the Agra Citizen ' Association, Agra, U. P.
22. Anti-Tuberculosis League, Cawnpore, U. P.
23. Anti-Tuberculosis League, Bareilly, U. P.
24. Anti-Tuberculosis League, Benares, U. P.

An attempt has also been made to collect as complete a list as possible of institutions for the treatment of tuberculosis in India, and this information is also supplied beneath.

Sanatoria.

Bengal.—Lowis Jubilee Sanatorium, Darjeeling. Tuberculosis Hospital and Sanatorium, Jadabpur.

Bihar.—Itki State Sanatorium, Itki.

Bombay—

In Bomby City—

Adams Wyllie Hospital.

St. Joseph's Foundling House (for R. C. patients only), Agrepada Road.

Bhoiwada Hill Sanatorium, Parel (32 beds).

Turner Sanatorium, Princes Street (32 beds).

In the Mofussil—

Bahadurjee Sanatorium, Deolali (28 beds).

Hindu Sanatorium, Karla, Poona (40 beds).

Bel-Air Sanatorium, Panchgani (90 beds).

American Presbyterian Mission Sanatorium, Vengurlu (25 beds).

Wanless Tuberculosis Sanatorium, Miraj, S. M. C. (50 beds).

Maharashtra Tuberculosis Sanatorium, Panchwati, Nasik.

Central India.—Sanatorium for the Treatment of Tuberculosis, Rao Indore Durbar, Indore.

Central Provinces.—Nirmalendu Tuberculosis Sanatorium, Pendra Road, Bilaspur.

Madras.—Union Mission Tuberculosis Sanatorium, Arogyavaram, Madanpalle, Chittoor.

Edward VII Tuberculosis Institute, Egmore, Madras.
 Visranthipuram Tuberculosis Sanatorium, Rajahmundry, E: Godavari District (South India).
Mysore.—Princess Krishnajammani Sanatorium, Mysore.
Punjab.—Patiala State Sanatorium, Dharampur, Simla Hills.
 King Edward Sanatorium, Dharampur (Simla Hills).
 Lady Irwin Sanatorium, Sanawar (Simla Hills).
 Jubilee (Mohd. Hussain) Sanatorium, Samli (Murree Hills).
 Gulabdevi Tuberculosis Sanatorium, Ferozepore Road, Lahore.
 Hindu Tuberculosis Sanatorium, Multan.
Rajputana.—Mary Wilson Tuberculosis Sanatorium, Tilaunia.
United Provinces.—King Edward VII Sanatorium, Bhowali, District Naini Tal.
 Sanatorium, Almora.
 Tuberculosis Sanatorium, Keralabad, Allahabad.

The relation of tuberculosis to overcrowding is well established, but few figures are available for India. This makes the data compiled in a recent Lahore investigation of interest. These are shown in Table II (xlii) and clearly indicate the close connection between overcrowding and high incidence of tuberculosis.

TABLE II (xlii).

Families occupying.	All families.	Infected with T. B.	Percentage incidence of tuberculosis.
1 living room	1,018=51%	121=59%	12
2 living rooms	606=30%	63=31%	10
3 living rooms	191= 9%	14= 7%	7
4 living rooms	97= 5%	4= 2%	4
More than 4	97= 4%	2= 1%	2

(b) *Provincial.*

N. W. F. P.—Judging from hospital attendances, the districts of Peshawar with 2,752 cases and 45 deaths, Hazara with 1,061 cases and 4 deaths and Bannu with 1,048 cases and 13 deaths are highly infected.

Punjab.—In the 13 municipal towns employing M. O. Hs., a total of 1,547 deaths was ascribed to pulmonary tuberculosis; these included 496 in Lahore (1·3 p. m.), 272 in Amritsar (1·0), 196 in Ludhiana (3·0), 179 in Multan (1·7) and in 9 other towns the deaths numbered from 8 each in Lyallpur (0·2) and Sargodha (3·0) to 89 in Jullundur (1·2) and 98 in Sialkot (1·2).

The enquiry into the incidence of tuberculosis and the environmental and economic conditions associated therewith started in 1932 in a suburb of Lahore was concluded. Tuberculosis cases found in this survey totalled 311, which, based on the 8,269 persons examined, show a morbidity rate of 3·8 per cent. The age distribution of these cases was as given in Table II (xliii).

TABLE II (xliii).

Age groups.	Cases.			Per cent. of total examined.		
	M.	F.	Total.	M.	F.	Total.
0-5 years	10	8	18	1.4	1.0	1.2
5-10 years	23	15	38	3.0	2.6	2.8
10-15 years	18	20	38	4.7	6.2	5.4
Total children	51	43	94	2.7	2.5	2.6
15-25 years	23	65	88	2.6	6.6	4.7
25-35 years	29	28	57	4.3	5.3	4.8
35-45 years	11	23	34	3.1	6.5	4.8
45-60 years	11	14	25	3.7	3.9	3.8
60 years and over	6	7	13	4.0	6.7	5.1
Total adults	80	137	217	3.4	5.9	4.6
Grand Total	131	180	311	3.1	4.5	3.8

Table II (xliv) gives these cases in relation to available open spaces in houses.

TABLE II (xliv).

Open space available.	All families.	Tuberculous families.	Incidence of tuberculosis based on families in the group.
No open space	558	73	13%
Less than 100 sq. ft.	460	56	12%
100-200 sq. ft.	342	34	10%
200-500 sq. ft.	370	29	8%
Above 500 sq. ft.	269	12	4%

In the surveyed area, 31 per cent. of "un-detached" houses showed the disease, 18 per cent. of "semi-detached" and 4 per cent. of bungalows.

For further details the original report should be consulted.

Delhi Province.—Table II (xlv) gives the registered deaths by sexes and communities.

TABLE II (xlv).

	Deaths.			Rate per mille.		
	M.	F.	Total.	M.	F.	Total.
All classes	345	632	977	0.9	2.4	1.5
Hindus	202	285	587	0.9	1.7	1.4
Muhammedans	140	243	383	1.1	3.0	1.9
Christians	3	4	7	0.3	0.5	0.4

The high incidence of pulmonary tuberculosis has been ascribed to the appalling conditions of overcrowding in Delhi city.

Since the close of the year, however, the Delhi municipality have sanctioned the opening of a tuberculosis clinic and dispensary. An officer has also been deputed to make a special study of the extent of congestion in Delhi city and to suggest ways and means to relieve it.

U. P.—Of the deaths classified under the respiratory diseases group, 5,971 or 13 per cent. were attributed to phthisis. Deaths in towns totalled 5,402; those in rural tracts 569.

Of the 5 tuberculosis clinics which have been at work in this province for some years past, that at Benares has been transferred to the sanatorium at Sarnath, a suburb of Benares; those at Agra, Allahabad and Cawnpore proved failures and were closed and that of Lucknow has been merged in the King George's Hospital. It was proposed to open a central clinic on modern lines at Allahabad entirely with Government funds. Cases treated at these clinics numbered 2,272 at Agra, 2,490 at Lucknow, 436 at Allahabad, 94 at Sarnath and 82 at Cawnpore.

The Anti-tuberculosis League, Lucknow, have built a tuberculosis hospital with 40 beds in the general and 4 in private wards; the local Government propose to meet the recurring expenses, when funds permit.

B. & O.—This disease together with influenza and pneumonia is the main cause of increased mortality from respiratory diseases. An anti-tuberculosis sub-committee has been conducting for some years a campaign against the spread of this disease by means of intensive propaganda and medical inspection of school children. Financial stringency has not permitted further expansion of the activities of this committee.

The I. G. C. H. notes the economic nature of the tuberculosis problem and states that efforts will shortly be made to open outdoor tuberculosis clinics where cases can be examined and treated, given advice and followed to their homes by health visitors.

Bengal.—Deaths in rural areas decreased by 202 or over 4 per cent., but in urban areas increased by 245 or 7 per cent. Seven per cent. of the total urban mortality from phthisis (2·3 p.m.) was recorded from Calcutta. Other high death rates were registered in the districts of Darjeeling 1·5 p.m., Howrah 0·7 p. m., Jalpaiguri 0·6, and Hooghly 0·5.

C. P.—Deaths from pulmonary tuberculosis (4,110) increased by 77 per cent. as compared with 1933. The death rate was 0·3 p.m. The district of Nagpur again reported the largest number of deaths, 1,117 or 27 per cent. of the total and 96 per cent. more than in 1933. Figures for other districts were Wardha 638 deaths, Amraoti 472, Bhandara 458 and Saugor 410. As usual, the prevalence of the disease was greater in urban than in rural areas, the death rates being 0·5 p.m. and 0·3 p. m. respectively. Of the 3,053 cases treated in hospitals and dispensaries, 1,671 attended medical institutions in Nagpur district, 442 in Nimar, 319 in Saugor, 300 in Amraoti, 290 in Akola and 106 in Chhindwara districts. The Nirmalendu tuberculosis sanatorium treated 19 old and 50 new cases; of these 5 died and 20 were cured and in 13 the disease was arrested. Patients treated in the tuberculosis ward in the Main Hospital, Nagpur, totalled 945. Proposals to provide clinics and sanatoria were under consideration of the local Government.

Deaths due to other forms of tuberculosis numbered 1,512 (0·10 p.m.) as against 890 (0·06 p.m.) in 1933. Of the total, 225 deaths were recorded in Nagpur, 188 in Saugor, 185 in Buldana, 146 in Akola, 126 in Bhandara and 101 in Jubbulpore.

Bombay.—Deaths ascribed to phthisis increased by 3 per cent. Among rural areas, incidence continued high in the Konkan for reasons stated in previous reports, the district of Kolaba recording a rate of 3 p.m., Kaira 2 p.m., Ratnagiri 2 p. m., Thana, Bombay Suburban and Ahmedabad 1 each.

In addition to the 4 sanatoria in Bombay City and 6 in the *muff-assal* there are special clinics or dispensaries at Bombay, Ahmedabad, Hyderabad and Karachi. In addition to the Turner sanatorium, the Bombay municipality continued to maintain two outdoor dispensaries for tuberculous patients, one at the Sanitary Institute, Princess Street and the other at Foras Road. Pulmonary cases treated at these dispensaries totalled 1,174 and other types 201. Of the 176 cases treated in the Turner sanatorium, 65 in the first stage (congestion), 101 in the 2nd stage (consolidation) and 10 in the 3rd stage (cavitation), 135 or 77 per cent. showed improvement. The municipal tuberculosis dispensary in Karachi city attended 54,809 including 881 new cases. The 2 lady health visitors attached to this dispensary detected 668 suspicious cases, of which 404 were found to be suffering from tuberculosis. In Hyderabad town (Sind) 1,625 cases were admitted in the K. T. tuberculosis dispensary. An anti-tuberculosis centre was opened in Shikarpur town.

Madras.—Altogether 704 in-patients were treated in the tuberculosis hospital, Madras city and 9,226 outpatients in the tuberculosis institute, Madras. The Surgeon General remarks:—

“The treatment of tuberculosis is still in its infancy in the Presidency as regards the provision of beds in special hospitals or sanatorium, dispensaries and clinics. A sanatorium on the lines of that at Madanapalle is needed in various groups of districts within easy distance of the largest towns; one is badly needed outside Madras. A sanatorium is proposed at Perundurai some 48 miles from Coimbatore and local efforts are well advanced in this direction.”

Detailed returns of vital statistics submitted by health officers of 15 municipalities give a total of 2,247 deaths or 2 p.m. from tuberculosis of lungs; one among those under one year of age, 9 among those aged between 1-5 years; 10 between 5-10 years, 27 between 10-15 years, 178 between 15-20 years, 601 between 20-30 years; 537 between 30-40 years; 460 between 40-50 years; 283 between 50-60 years; and 141 among those aged 60 years and above.

Assam.—Lung tuberculosis is very prevalent in Sylhet district. The local Government in their resolution on the Report on the working of Hospitals and Dispensaries in Assam for the triennium ending 1934 say:—

“Consciousness of the presence of tuberculosis in urban communities has awakened considerable public anxiety about this disease in Assam as elsewhere in India. There were 4,433 cases of tuberculosis of the lungs treated during the period under review against 4,010 in the previous triennium. Special lectures, demonstrations and propaganda work on the subject are being undertaken under the supervision of a special committee of the Red Cross, with the help of the King George Thanksgiving Fund and money provided by the Public Health Department. The question of a tuberculosis sanatorium in the province for early and curable cases and of means to make knowledge as to the mode of dissemination of this disease more widely spread have been engaging the attention of Government. Lack of funds stands in the way of an attempt to solve the first problem. The solution of the second is rendered difficult by the widespread ignorance of the ordinary laws of health even amongst the residents of urban areas. It is hoped that the propaganda work undertaken will bear some fruit and this is by far the best and the most hopeful method of combating the menace.”

Burma.—Thamaing town, a suburb of Rangoon, which is becoming an increasing industrial town, continued to report the highest death rate from pulmonary tuberculosis. This disease is said to be common in the Northern Shan States chiefly among the alien population of Ooriyas, Chinese, Gharwalis and Gurkhas; in these states although climatic conditions are not favourable for consumption, the prevalence of malaria is reported to be an important predisposing cause.

Table II (xlvi) gives figures for a number of towns where a high death rate from tuberculosis of the lungs was recorded.

TABLE II (xlvi).

	Death rate p.m.		Death rate p.m.	
	1934.	1933.	1934.	1933.
Delhi Province—				
Delhi City	1	1		
United Provinces—				
Cawnpore	4	3		
Lucknow	2	3		
Agra	3	2		
Farrukhabad	1	1		
Benares	1	2		
Bareilly	3	2		
Allahabad	2	2		
Bengal—				
Calcutta	2	2		
Howrah	1	1		
Dacca	1	1		
Bombay Presidency—				
Bombay			2	1
Ahmedabad			4	3
Surat			3	3
Ahmednagar			2	2
Poona			3	3
Nasik			3	3
Karachi			2	2
Hyderabad			2	2
Burma—				
Rangoon			2	2
Myaungmya			2	4
Mandalay			2	2
Meiktila			1	2
Yenangyaung			2	3
Pegu			2	2

Beri-beri.

26. Table II (xlvii) gives the numbers of cases treated in hospitals and dispensaries in British India and in the various provinces during 1933 and 1934. These figures do not indicate the true incidence of the disease in the general population, but even so they demonstrate the higher incidence of the disease in the rice consuming provinces.

TABLE II (xlvii).

	Total	1933.		1934.	
		Cases.	Deaths.	Cases.	Deaths.
		27,583	178	40,085	189
N. W. F. P.					
Punjab		25	..	36	..
Delhi		41	..	38	..
U. P.		122	..	276	2
B. & O.		280	1	1,834	4
Bengal		4,078	12	13,236	22
C. P.		5	..	13	..
Bombay		14	..	12	..
Madras		21,335	57	23,071	47
Assam		125	1	88	1
Burma		1,557	107	1,431	113
Baluchistan		1	..	..	..

B. & O.—Only in Manbhum district was there a severe outbreak which reported 1,393 cases or 76 per cent. of the total.

Bengal.—Judging from hospital attendances the incidence was high in 1934, particularly in Calcutta city with 6,054 cases and in the 24-Parganas district in the Presidency division with 1,824 cases. In Burdwan and Dacca divisions cases numbered 1,993 and 1,401, respectively.

Madras.—Beri-beri is said to be endemic in Vizagapatam and in the neighbouring districts. Over 91 per cent. of the total cases treated in hospitals and dispensaries were in the districts of Vizagapatam, East and West Godavaris, Kistna, Guntur and Nellore.

Burma.—Deaths totalled 176 in towns with a rate of 0·1 p.m. The highest rates were registered in Ngathainggyaung 1·3 p.m., Mergui 0·9, Allanmyo 0·6, Danubyu 0·6 and Yandoon 0·6. In Mergui and Moulmein the incidence was chiefly among Telegu coolies. In Syriam also most of the cases were among Indian coolies. In the rural areas, the prevalence of the disease among the *Mahouts* of timber camps in the Upper Chindwin and Toungoo districts appears to be associated with cold and damp and—perhaps in consequence—with deteriorated rice.

Ankylostomiasis.

27. Table II (xlviii) 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 (xlviii).

	1932.		1933.		1934.	
	Cases.	Rate per 10,000 of total.	Cases.	Rate per 10,000 of total.	Cases.	Rate per 10,000 of total.
Total	152,972	20·8	164,480	22·0	210,744	28·0
N. W. F. P.	426	2	661	3	947	4
Punjab	1,976	1	2,296	1	3,424	2
Delhi	103	1	59	..	43	..
U. P.	1,200	1	1,414	2	3,354	4
B. & O.	19,439	27	18,000	25	21,966	31
Bengal	4,351	5	4,544	4	6,062	6
C. P.	97	..	309	1	1,794	5
Bombay	1,127	2	388	1	411	1
Madras	122,405	76	131,258	79	166,438	90
Coorg . . . . .	..	..	3,463	120	2,965	96
Assam	901	4	930	4	1,848	8
Burma	945	3	1,152	3	1,492	4
Baluchistan	2	..	6	..	..	..

Punjab.—Anti-hookworm measures were continued in Shakargarh *tehsil* up to July, 1934, when the local Government sanctioned a scheme of mass treatment campaign in that *tehsil* and a survey of the rest of the province. This was done with the aid of one laboratory, two investigation and four treatment units. The treatment units dealt with 489 villages and treated, 43,942 persons; the investigating units conducted a detailed survey in the *tehsils* of Shakargarh and Batala in Gurdaspur district and in the districts

of Hoshiarpur, Sialkot and Ambala ; the laboratory unit examined specimens of stools by the D. C. F., and Stoll's methods.

C. P.—Investigation into the prevalence of hookworm was carried out in Nagpur, Jubbulpore, Raipur, Narsinghpur, Akola and Amraoti jails.

Madras.—The rural sanitation campaign continued its anti-hookworm activities. Six units were at work in the districts of Vizagapatam, West Godavari, Coimbatore, Tinnevely, Tiruvallur rural development area, South Arcot, Madura and Salem. The survey in Tiruvallur revealed a very high incidence rate, hookworm eggs being found in 90 per cent. of the stool specimens examined, the intensity of infection determined by egg counts in 1,877 cases was on the average 700 eggs per gram of faeces. In Saidapet also, an incidence rate of 45 per cent. among students of Y. M. C. A. School of physical education was noted.

Cinema shows, lantern lectures and talks were given to huge audiences. Over 193,000 treatments for hookworm were given by the rural sanitation dispensary and other staffs, while 2,512 new latrines were built mainly in Madura district.

Leprosy.

(a) General.

28. Although leprosy has been known in India for over 3,000 years, census enumerations have been the sole index of the extent of its prevalence since 1872, when the first census was taken. By these means, only advanced and obvious cases were registered by the lay census enumerators and many mistakes were made. The *pardah* system amongst Muhammedans and to a lower extent among Hindus prevented the detection of many female cases, and other cases were concealed for fear of social disabilities. The need for a better method of ascertaining the incidence of the disease became evident when shortly after the 1921 census, Dr. E. Muir, leprosy specialist at the Calcutta School of Tropical Medicine and Hygiene, enquired of 30 lepers whether they had been returned as such at the last census and found that only two of them had been so reported. Were the same proportion applicable throughout India, it followed that there were about 1,500,000 lepers in India instead of 102,513 actually recorded by the census staffs.

The year 1925 saw the formation of an Indian Council of the British Empire Leprosy Relief Association, a private organisation, with an endowment yielding an annual income of nearly 1½ lakhs of rupees, having before it the following four methods of dealing with leprosy problem in India.

- (1) Educational propaganda.
- (2) Training of doctors in the diagnosis and modern treatment of leprosy ;
- (3) Research into the nature of the disease ; its prevention and methods of treatment;
- (4) Surveys of endemic cases in order to obtain correct data about the incidence of leprosy, which may lead to the opening of treatment centres.

In early years this organisation, through its provincial branches, confined its activities to research, propaganda and the training of doctors, but in 1927 it began experimental surveys of selected areas to find out the relative incidence of leprosy in different parts of India, the classes of people among

whom it was most rife, and the causes of high incidence. These surveys, lasting from 2-12 days in each locality visited, have yielded surprising results, and have thrown considerable light on the magnitude of the problem, facing the provincial administrations, both Medical and Public Health. The areas surveyed included 4,560 villages in 30 districts and 66 *taluks* or municipal towns in ten British provinces and four Indian States. The main conclusions arrived at were:—

- (i) Leprosy is much more prevalent in India than was formerly supposed; probably a million cases would not be an overestimate.
- (ii) Leprosy is most common among semi-aboriginals, or aboriginals who leave their tribal seclusion and hire themselves out to agriculturists or to industrial concerns.
- (iii) Infection of other more advanced classes of the community is in the first place largely through the employment of servants in an infectious stage. Once the infection has entered a family, it tends to spread in that family and is often transmitted to friends and acquaintances.
- (iv) Infection is probably very widespread and only develops into a clinically or bacteriologically recognizable case in a fraction of those infected, the natural resistance of the remainder being sufficient to prevent the disease developing.
- (v) When leprosy does develop, it indicates either hyper-infection, or probably, more commonly, lowered resistance. This lowered resistance appears to be due chiefly to various factors affecting the general health, among which are diseases generally, improper diet, unhealthy habits, bad climate and bad surroundings.
- (vi) Movements of population, which have increased on account of improved education, better transport, etc., in recent years, are a potent factor in spreading the disease and in infecting new areas.

During these surveys, as circumstances permitted, 287 doctors were trained and 100 clinics were set up in order to carry on the work, *viz.*, treatment, propaganda and detection of new cases. Thus a foundation has been laid for a campaign against this disease. Although even now the major portion of this campaign is on the shoulders of the Indian Council of the British Empire Leprosy Relief Association, provincial governments are taking more interest in the question of leprosy and are allocating funds for its prevention and treatment.

In the Madras Presidency the full seriousness of the leprosy problem was not realised till 1929, when the survey party of the B. E. L. R. A. demonstrated a high prevalence of the disease in certain areas. In 1930 a rough survey by the Public Health Department revealed 56,000 cases against 32,127 recorded in the previous census, and led to the inception of a group leprosy scheme. Under this scheme 6 special leprosy officers, each in charge of a group of districts, and one chief leprosy officer have been appointed. Through 400 clinics, no less than 120,000 leprosy cases have to date been registered in this Presidency. The distribution of the disease is irregular but there are four principal foci: the North, Guntur, the Arcots and Salem and South East Malabar.

In Bihar and Orissa between 1929 and 1932, surveys were carried out in the districts of Puri, Muzaffarpur and Champaran and partial surveys in the districts of Monghyr, Cuttack, Sambalpur, Patna, Gaya, Palamau and Hazaribagh. These showed that the disease is confined to the poor living in overcrowded villages, amidst unhealthy surroundings and to the under-nourished.

In the C. P., an intensive survey carried out in 1929 in 2,868 villages with a population of 1,367,113 in the Chhattisgarh division showed about 4,790 or 3 p. m. as against 3,135 lepers registered for the whole province during the last census ; on re-surveys 701 new cases were discovered in 1930.

In the Punjab, in 1931, a partial survey in Kangra district revealed a widespread prevalence of this disease, the leprosy officer detecting 44 lepers in 199 villages out of 956 surveyed. In 1932 a more detailed survey of endemic areas in this district detected 900 new cases.

In Burma a survey of the Minbu and Meiktila districts and of the Hlegu Health Unit area in 1932 showed that in these areas 16·49 *per mille* of population were infected, suggesting a figure of 241,537 lepers in the whole province, as against 11,127 recorded at the last census.

Since 1930, leprosy surveys have also been carried out in all the districts of Bengal, these have shown that the disease is endemic in every district and that in some districts the incidence is as high as 7 per cent., whilst the provincial rate has been recorded as about 1 per cent. In 1934, concentrated work in the most highly infected district of Bankura was commenced and a rural investigation centre was established to examine the possible control of leprosy in a limited area by concentrated work and to investigate the epidemiology of the disease by a careful study of its spread in villages over a prolonged period. A systematic survey of 150 villages of different unions of the Bankura, Raipur and Simlapal *thanas* has shown that (a) more than 78 per cent. of the villages are infected ; (b) one in every 6 families harbours leprosy cases ; 4·1 per cent. of the population are lepers. In round figures an estimate of 45,000 lepers in this district is not unjustifiable. Since on an average 2 of every 5 lepers are infectious and one in every 5 lepers is highly infectious, there must be approximately 18,000 infectious lepers in the district of whom 9,000 are highly infectious. The following five principal castes, in each of whom more than 1,000 persons were examined, showed the infection rate as given below :—

TABLE II (xlix).

	Families examined.	Families affected.		Persons examined.	Persons affected.	
		Number.	Percent.		Number.	Percent.
Muhammedans	175	62	35·4	1,013	80	7·0
Tili	235	58	24·6	1,399	71	5·0
Bauri	582	106	18·2	2,859	136	4·7
Brahmin	327	55	16·8	2,000	62	3·1
Goala	459	52	11·3	2,535	62	2·4

These remarkable figures have aroused much interest in provinces and many local Governments have either undertaken or propose to continue the survey work begun by the Indian Council of the B. E. L. R. A. In many provinces, grants-in-aid have been given by local Governments for the maintenance of asylums, homes and clinics. In Madras Presidency many district

boards have appointed their own leprosy officers, who conduct surveys in their respective areas, open clinics, train doctors, carry out propaganda and inspect school children for early signs of the disease.

As a sequel to these surveys, a network of clinics has sprung up in endemic areas and the numbers at work in 1934 are shown in the Table below :—

TABLE II (l).

Punjab	34
U. P.	118
B. & O.	50
Bengal	164
C. P.	28
Bombay	36
Madras	405
Assam	171
Burma	A few.

Through the generosity of the Indian Council of the B. E. L. R. A. and the authorities of the Calcutta School of Tropical Medicine, training in the modern methods of treatment has for some years been provided in Calcutta and the numbers of doctors trained hitherto is given in Table II (li). These officers have in turn trained numerous others in their respective areas.

TABLE II (li).

	1929-34.		1929-34.
Delhi	1	Baluchistan	4
Assam	31	Bangalore	1
Bengal	*94	Indian States—	
B. & O.	60	Hyderabad.	2
Bombay	8	Rajputana	13
Burma	13	Central India	32
C. P.	45	Western India	23
Madras	49	Bhopal	1
Punjab	19	Mysore	3
U. P.	32	Travancore.	2
N. W. F. P.	2		
		Total	436

* Includes 8 doctors from Jute Mills.

NOTE.—In addition, the leper home and hospital, Dichpalle (Hyderabad), has provided training for a total of 142 doctors to date.

Research.—The Calcutta School of Tropical Medicine first organised a research department in 1920, under Dr. E. Muir, assisted by Dr. J. M. Henderson and later by Dr. John Lowe. This Deptt. has been partly financed by the I. R. F. A. This department has studied a variety of problems in relation to the causation and cure of leprosy. In testing the relative efficacy of hydnocarpus and chaulmoogra oils, the former have been found more efficacious,

hydnocarpus esters are preferable to morrhuate ones and pure oil of *hydnocarpus wightiana* given by infiltration has been found to be less painful than esters. The study of syphilis as a complication of leprosy has shown that leprosy in itself does not cause a positive Wassermann reaction and such a positive reaction in a leper indicates the co-existence of syphilis. In these cases syphilis must be eliminated before leprosy is treated. It has been possible to produce primary lesions of leprosy in *rhesus* monkeys, if the animals undergo a preliminary sub-total thyroidectomy, but the disease was not found to generalise. Vaccines and metallic drug preparations proved less useful than hydnocarpus oil.

The "Mission to lepers" founded by Mr. Wellesley Bailey, 60 years ago, is another important private organisation which has devoted itself to the care and treatment of lepers. Although its activities now include more than 20 countries, India still remains its main field of work. There are at present 36 homes maintained from funds provided by the Mission; whilst 15 other homes received grants-in-aid from the Mission. Details of cases housed in the 36 homes maintained or managed by the Mission are included in Table II (lii) by provinces.

TABLE II (lii).

	No. of asylums.	Lepers.			Untainted children.	Total.
		M.	F.	C.		
Punjab	3	314	162	4	116	596
U. P.	3	349	284	22	221	876
B. & O.	4	716	486	104	100	1,406
Bengal	2	169	152	22	38	381
C. P.	6	731	782	44	195	1,752
Bombay	7	411	270	53	76	810
Madras	6	682	190	82	94	1,048
Burma	2	269	88	57	14	429
Travancore	2	152	55	12	11	230
Central India	1	20	9	1	6	36
Total	36	3,813	2,479	401	871	7,564

M=Male. F=Female. C=Childern.

As a result of the detailed research and survey work carried out in India during the past ten years the leprosy problem has been defined and its dimensions gauged. Treatment has been substantially improved and early cases now come forward far more readily than formerly. Leper colonies are overcrowded and many lepers have to be refused admission for want of accommodation. The problem now facing those responsible for the management of these asylums, is to reduce the existing congestion by providing outside for the "burnt out" cases. Many local Governments and district authorities contribute towards the maintenance of these institutions in the form of capitation or other grants.

We still lack a sure satisfactory cure for the disease and a solution of the segregation problem: research must needs continue.

(b) Provincial.

N. W. F. P.—The Indian Council of the B. E. L. R. A. continued its contribution of Rs. 550 for anti-leprosy work. Of the 90 cases treated in hospitals, 68 were in Peshawar district alone, 15 in Dir, Swat and Chitral, 5 in Hazara and 2 in other places.

Punjab.—Under the auspices of the B. E. L. R. A. (Punjab branch), intensive surveys have been carried out in certain districts by a special officer. The province has now a total of 129 trained doctors. Medical students are given special courses in methods of diagnosing and treating leprosy. The five leper homes at Subathu, Ambala, Palampur, Tarn Taran and Rawalpindi under trained medical officers continued to be maintained by missions, the local Government giving grants-in-aid on a *per capita* basis. Inadequacy of accommodation has been reported due partly to “burnt out” non-infectious cases remaining in these institutions and partly to lepers from other provinces being admitted. Proposals to provincialise the post of leprosy officer, at present paid for by the B. E. L. R. A., were under consideration.

Anti-leprosy committees were formed at Kangra, Ludhiana and Murree. The number of clinics was 34 including 15 opened during the year.

U. P.—The skin (leprosy) dispensaries at Cawnpore, Benares and Lucknow continued to be maintained under the auspices of the provincial branch of the B. E. L. R. A., treating 738, 11,119 and 1,036 leprosy cases, respectively. Treatment was also provided at 118 dispensaries. For the maintenance of the Shrimati Bhagwan Devi leper home, the Municipal Board, Cawnpore, pays one-third and the local Government two-thirds of the cost.

B. & O.—There are six leper asylums, at Gaya, Cuttack, Deoghar, Purulia, Muzaffarpur and Bhagalpur, two leper colonies at Puri and Saldaha in the Santal Parganas district, and 50 clinics. The asylum at Deoghar and the colony at Puri are maintained by public bodies; other institutions by missions, private donations and grants-in-aid from Government and local bodies. Of the clinics, 3 are maintained by the local Government, 3 by the Bettiah *Raj* and the rest by local bodies, the provincial committee of the B. E. L. R. A. giving grants-in-aid. The asylums and colonies, providing accommodation for 2,105, treated 2,198 patients at a total cost of Rs. 1,82,498.

Bengal.—Of the total, 1,109 cases were treated in medical institutions in Calcutta and 5,015 in the *mufassal*. The latter included 1,825 cases in the Burdwan division; 1,560 in Rajshahi division; 1,069 in Presidency division; 438 in Dacca division; and 123 in the Chittagong division.

C. P.—The anti-leprosy staff comprised a specialist and 17 specially trained medical officers. These latter were also employed on general anti-epidemic work which gave a serious setback to the anti-leprosy work, as only 537 villages were visited, not more than 52,709 injections could be given and the attendance at the 28 clinics and 32 sub-centres diminished from 71,189 in 1933 to 70,619.

The provincial Leprosy Fund, out of a total income of Rs. 16,483, gave grants totalling Rs. 2,472 to 7 leper asylums for the purchase of specific remedies and Rs. 4,835 for the five leprosy centres at Akot, Anjangaon, Morsi, Burhanpur and Khandwa.

In addition to 16 private practitioners, the trained staff consists of 1 assistant surgeons and 68 assistant medical officers.

Madras.—The anti-leprosy campaign was continued by the Medical and Public Health Deptts. Altogether 405 clinics were in operation as against 322 in 1933, 135 maintained by Govt., 199 by local bodies, 40 by subsidies, 23 by missions, and 8 private-aided. A total of 49,350 cases, or 11% more than those in 1933, attended, and injections given (903,050) showed an increase of 31%. Cutaneous cases with a high concentration of acid fast bacilli are reported to have responded very well to the “esters cum oil mixture”. The D. P. H. remarks :—

“It is reported that about 15% of the cases treated at the clinics underwent treatment, long enough to be benefitted by it, while the rest discontinued after a few injections for various reasons, chief of which were (1) failure on the part of patients to see marked improvement within a short time, (2) the long course of treatment necessary ; (3) the pain caused by the injections ; (4) the fear of social boycott ; (5) the loss of daily wages on the days they attended the clinics ; (6) the indifference to the disease as it does not cause serious inconvenience.”

The 12 leper asylums provided accommodation for 2,100 lepers, the most important being the Lady Willingdon leper settlement at Tirumani in Chingleput district, capable of housing 750 patients.

The group leprosy officers, trained 107 doctors in anti-leprosy work opened new clinics and supervised the work of old ones ; conducted survey and attended to propaganda, registered cases and carried out medical examination of school children. The group leprosy scheme was extended for a further two years.

In order to ensure co-ordination, “leprosy relief councils” were at work in 19 of the 26 districts and these devised ways and means for the maintenance of the clinics. The Council in Salem district has under consideration a proposal to open a home for tainted children as well as demonstration centres for survey work and the follow-up of cases and possibly for voluntary village isolation.

Assam.—There were 126 clinics under the Medical Department and 52 under the Public Health Department, the latter receiving substantial financial support from the provincial leprosy relief committee. In addition, treatment was provided in the leper hospital, Kohima and the special ward at Dhubri, and lepers were housed in the asylums at Sylhet and Gauhati and the colonies at Tura and Jorhat. The Gauhati municipal asylum, constructed with grants from Government and the provincial relief fund, was opened in January. Treatment consisted of injections of hydnocreol, sodium hydno-carbate, E. C. C. O. and potassium iodide. Cases treated during the triennium, 1932-34, were of the following types:—

	Nodular.	Anaesthetic.	Mixed.
Gauhati leper asylum (figures for one year only)	18	31	38
Sylhet leper asylum	104	159	32
Kohima leper hospital	5	50	39
Jorhat leper hospital	13	25	15

Seven medical officers were trained locally in methods of treatment.

Of the 945 cases treated in hospitals and dispensaries, 310 were in the district of Kamrup, 218 in Goalpara, 176 in Sylhet, 71 in Sibsagar and 170 in certain other districts.

Burma.—Anti-leprosy activities in this province were confined to the consolidation of the progress already made in the districts of Minbu and Meiktila under the supervision of special officers and to the maintenance of colonies in Monywa and Kengtung (Southern Shan States). The leper colony opened in Minbu in December, 1933, had 34 leper inmates and that in Monywa 60, while the clinics in the towns of Sagu, Pwinbyu, Salin and Syinbyugyun in the former district did not draw sufficient attendances owing to their not being within reach of everyone. In Meiktila district, where a survey had revealed an incidence rate of 16·6 *per mille*, clinics were at work in Meiktila town, Mahlaing, Wundwin, and Thazi. but funds were being raised for the establishment of a leper colony. The Mission leper colony in the Shan States housed 82 patients.

Rabies and Hydrophobia.

29. Table II (liii) gives the number of deaths from rabies in the rural and urban areas of British India and the provinces.

TABLE II (liii).

	Deaths.		Total.	
	Rural.	Urban.	1934.	1933.
Total	2,561	355	2,916	2,684
N.-W. F. P.	1	1	2	5
Punjab	125	35	160	159
Delhi . . . . .	..	2	2	1
U. P.	623	37	660	551
B. & O.	158	18	176	172
Bengal	787	43	830	610
C. P.	103	25	134	201
Bombay	172	34	206	201
Madras	302	110	412	464
Coorg . . . . .	..	..	..	..
Assam	74	3	77	50
Burma	210	47	257	270

N. W. F. P.—A total of 268 cases attended the local centres.

Punjab.—Deaths of males numbered 116 and females 44. A total of 5,384 cases were treated at the different centres, *viz.*, Pasteur Institute, Kasauli, 1,730, King Edward Medical College, Lahore, 3,305 and Rawalpindi centre 349, against 2,729, 3,669 and 309 respectively during the previous year. The D. P. H. remarks :—

“The large number of cases under this head emphasises once more the pressing need of adequate arrangements being made under the local bodies in the province for the destruction of stray dogs, in regard to which frequent complaints are brought to the notice of the officers of the Department.”

C. P.—Of the cases treated at various centres, Nagpur had 561, Jubbulpore 221, Akola 193, Raipur 105 and Hoshangabad 91. Out of a total of

938 dog-bite or other bite cases recorded in municipalities and 393 cases in rural areas, 837 and 386 respectively were sent for treatment; of these 6 died, the condition of the others was unknown. The number of stray dogs destroyed during the year was 16,961.

Burma.—The death rate was 0·02, the same as in 1933 and the five-year mean. The number of persons treated for rabies during the year in all the treatment centres was 3,303, and the daily average attendance for treatment at the Pasteur Institute, Rangoon, was 74, compared with 64 in the previous year. Destruction of stray dogs was carried out in certain towns of the province, about 10,000 being destroyed.

Venereal Diseases.

30. As repeatedly stated in previous reports statistics of the incidence of "V. D.*" are not recorded for the general population nor it is possible to do so owing to certain practical difficulties, the more important being concealment which, in the present state of education, renders notification impracticable. Satisfactory facilities for the treatment of these diseases have not been extended beyond headquarter towns in most provinces and except in Bombay, Madras and Bengal, specialist staffs have not yet been employed. In order to obtain some idea of prevalence, inferences have to be based on indirect evidence consisting chiefly of reports of Public Health Officers; attendances at hospitals and dispensaries; incidence in the Army and in jails. In addition, the high rates of still-births, and infantile mortality in India suggest a high prevalence of venereal infection in this country. Also some of the blindness in India must be attributed to venereal disease.

The indications are that high incidence occurs mainly among the poorer classes; in the great seaport cities, in other large towns in the interior and in certain hill tracts especially the Himalayas.

There is evidence that these infections are commoner in Madras, Bengal, U. P., C. P. and B. & O. than in other provinces in India. The Surgeon General, Madras, in his Annual Report on Hospitals and Dispensaries for 1934, says:—

"From all the evidence available it appears that the incidence of venereal diseases in rural parts of this province is very heavy and an attempt is being made to ascertain its actual gravity. Among the poorer classes it is probably over 50% and in some places more. The treatment of the disease is not on a very satisfactory basis partly because many patients will not attend owing to ignorance and shame and partly because proper clinics are not sufficiently widespread."

Treatment, education and propaganda are the greatest needs. In certain areas, a drive against commercialised prostitution has been launched and in several large towns brothels have been declared illegal. Many infections must occur at fairs and festivals. During the Sonapore fair in Behar in 1934 a census of prostitutes showed the presence of 276 within the *mela* area. In other large *melas* and fairs conditions are similar. The campaign against commercialised prostitution, *i.e.*, against the brothel keepers and kidnappers of girls and their financial backers, is sound and requires to be pursued with determination. Victimisation of the prostitutes themselves can do no good.

Hospitals returns of cases treated during 1934 show a decrease except in Madras, Bengal and N. W. F. P. Cases treated are shown in Table II (liv). A fairly large proportion of the syphilitic cases are congenital.

* "V. D." = Venereal diseases.

TABLE II (liv).

	1933.				1934.			
	Gono- coccal infection.	Syphilis.	Total.	% of total.	Gono- coccal infection.	Syphilis.	Total.	% of total.
Total . . .	291,351	335,439	626,790	0·8	295,451	333,691	629,142	0·8
N.-W. F. P. . .	1,731	7,196	8,927	..	2,078	7,571	9,649	..
Punjab . . .	13,472	18,178	31,650	..	13,662	17,703	31,365	..
Delhi . . .	6,976	7,299	14,275	1	4,902	4,542	9,444	1
U. P. . .	27,343	40,280	67,623	1	26,141	41,309	67,450	1
B. & O. . .	27,053	39,200	66,253	1	25,895	38,697	64,592	1
Bengal . . .	48,024	35,916	83,940	1	49,663	36,576	86,239	1
C. P. . .	14,247	18,081	32,328	1	11,712	15,373	27,085	1
Bombay . . .	21,188	28,216	49,404	1	22,157	28,247	50,404	1
Madras . . .	103,118	107,019	210,137	1	112,735	111,481	224,216	1
Coorg . . .	311	168	479	..	289	109	398	..
Assam . . .	4,743	2,234	6,977	..	4,476	2,141	6,617	..
Burma . . .	23,140	31,652	54,792	2	21,741	29,942	51,683	2

In addition, 2,892 cases were treated in the Punjab for other "V. D.", 4,175 in the U. P., 3,811 in the C. P. and 77 in Coorg.

In 1933, Sir John Megaw, the then Director General, Indian Medical Service, on the basis of an investigation reported the incidence of syphilis as 5,506,800 cases or 16 *per mille* and of gonorrhoea 7,589,500 or 22 *per mille* in the rural areas.

Separate figures for rural and urban areas are not available but incidence in the large towns is probably considerably higher than that in the country districts.

The provincial Medical and Public Health Administrations continued their activities, though on a very modest scale, to combat the spread of these diseases. In Delhi Province a venereal diseases hospital was opened in Delhi city. In Madras arrangements for treatment exist at all hospitals and dispensaries, but the venereal department of the Government General Hospital, Madras, is the largest clinic in South India, providing for both in and out-patients for both sexes. Nineteen medical men and women have been specially trained in V. D. work during the three years, 1932—34, in the hospital where 6,708 new cases, comprising 5,474 men, 1,102 women and 132 children were treated. Of these cases, 554, *viz.*, men 312, women 215 and children 27 were in-patients while the daily outdoor attendance averaged 142. During the last three years, 27 merchant seamen were also given treatment in this clinic. In Assam an anti-syphilitic campaign has been concentrating on treatment. Prior to 1932, venereal clinics were maintained by the local Government in 27 Government and local fund hospitals in Burma but only a few of these in Government institutions survived the financial stringency. In Bengal, free expert treatment is provided in Government hospitals. In some hospitals, whilst diagnosis is made free, drugs are paid for.

Treatment of government servants and of seamen continued to be provided at the hospitals listed on page 90 of the Report for 1933.

Yaws.

31. *C. P.*—The prevalence of the disease was reported in the contiguous areas of the northern parts of the Nizam's Dominions, the south western parts of Bastar State and the periphery of Chanda district in the C. P. bordering on the former two areas.

Assam.—Cases treated in hospitals and dispensaries totalled 2,739 as against 260 in 1933 and included 1,826 in Goalpara, 208 in Cachar and 85 in Kamrup district. In addition, the public health staffs treated 3,089 cases (1,215 in 1933). The increase in these figures is the result of intensive propaganda.

Burma.—The disease is very prevalent in the districts of Mergui and Tavoy and was confined to the Salons, Malaya and Siamese in the former district. In Upper Chindwin district it is common in the old Maingkaing and Mingin townships. In the districts of Sagaing, Lower Chindwin, Katha and the Chin Hills, it is also reported to be fairly common.

Kala-azar.

32. *U. P.*—Of a total of 423 recorded deaths, 382 were in rural and 41 in urban areas. Amongst rural districts high mortality occurred in Basti 107 deaths (0·05 p.m.) and Allahabad 86 (0·06 p.m.).

B. & O.—The disease is most prevalent in North Bihar, in the districts of Saran, Muzaffarpur and Darbhanga in Tirhut division and in Purnea district in Bhagalpur division. Other districts in Bihar proper are moderately infected while the Orissa and Chota Nagpur divisions are practically free. The local Government continued its annual grant of Rs. 10,000 for the purchase of urea stibamine and other allied drugs for the treatment of kala-azar cases, which numbered 58,547 in 1934.

Bengal.—Deaths totalled 14,763—14,124 in rural and 639 in urban circles. The largest number of deaths occurred in the rural districts of Dinajpur 2,175, Tippera 1,859, Bakarganj 1,543, Dacca 1,175, Rangpur 1,120 and Noakhali 1,032. Of the urban mortality 110 deaths were reported in Dacca and 210 in Calcutta. Compared with 1933, urban mortality decreased by 10%, that in Calcutta by 10·5% ; whilst in rural areas an increase of 11% in the death rate was recorded.

Madras.—Of the 4,327 cases treated in hospitals and dispensaries, 1,155 were recorded in Tinnevely district alone ; other high figures included 752 cases in Madras town and 716 in Vizagapatam.

Assam.—Of the 5,558 patients who attended medical institutions, 1,541 and 1,137 or over 48% of the total were treated in the districts of Sylhet and Kamrup. In other districts the numbers treated were 723 in Sibsagar, 621 in Goalpara, 578 in Nowgong and 3 and 5 cases, respectively, in Sadiya and Balipara Frontier Tracts.

Altogether 13,398 cases were treated in 1934 with 770 deaths compared with 12,650 cases and 749 deaths in 1933. Increased incidence was reported in the districts of Cachar, Sylhet, Darrang, Nowgong, Sibsagar and Garo Hills, and civil surgeons have been instructed to report promptly all recrudescences so that preventive measures may be taken. Table II (lv) gives the figures for 1932—34.

TABLE II (lv).

	1932.		1933.		1934.	
	C.	D.	C.	D.	C.	D.
Total	11,958	987	12,650	749	13,398	770
Cachar	391	4	472	2	529	6
Sylhet	4,719	296	4,210	146	4,612	22
Goalpara	1,089	122	1,159	92	1,107	61
Kamrup	2,061	152	2,223	129	2,197	151
Darrang	665	155	757	167	878	136
Nowgong	1,075	132	1,663	110	1,726	78
Sibsagar	1,269	78	1,251	64	1,372	84
Lakhimpur	12	2	13	4	18	..
Khasi and Jaintia Hills	..	..	1	..	5	4
Naga Hills	16	1	12	1	14	..
Lushai Hills	2	1	1	..	..	..
Garohills	605	43	850	34	927	23
Sadiya Frontier Tract .	1	1	2	..	1	..
Manipur State	53	..	36	..	14	..

Other provinces.—Thirty-eight cases were treated in the Punjab, 9 in C. P. and 102 in Burma. Bombay Presidency, N. W. F. P. and Delhi had no cases.

Relapsing fever.

33. Table II (lvi) gives the numbers of cases treated in hospitals and dispensaries in the different provinces.

TABLE II (lvi).

	1934.	1933.
Total	7,588	4,982
N. W. F. P.	41	20
Punjab	379	236
Delhi	14	23
U. P.	2,280	446
B. & O.	1,109	635
Bengal	2,116	2,078
C. P.	170	149
Bombay	151	103
Madras	1,166	1,221
Coorg . . . . .	..	..
Assam . . . . .	..	7
Burma	162	61
Baluchistan . . . . .	..	3

N. W. F. P.—A total of 27 cases attended medical institutions in North Waziristan, 8 in Kurram and 6 in other areas.

Punjab.—The Public Health Department detected 12 cases in Amritsar and Montgomery each, 3 in Mianwali and one in Sialkot. Of the cases treated in medical institutions 151 were recorded in Jhelum, 58 in Gujranwala, 27 in Attock, 23 in Lahore and 20 in Shahpur district.

U. P.—Whilst the ordinary registration agency reported 449 deaths in rural and 114 in urban areas as due to this disease, special reports by civil surgeons and District M. O. Hs. indicated that no epidemic occurred in any district. On the other hand, 1,751 cases or 77% of the total treated in hospitals and dispensaries were recorded in Lucknow district alone.

B. & O.—Judging from hospital returns, incidence was high in the districts of Bhagalpur 204 cases, Gaya 151, Muzaffarpur 125 and Palamau 118.

Bengal.—Compared with 1933, the number of recorded deaths 2,720 decreased by 90% due to improved registration. In previous years most of the so-called relapsing fever cases registered in this Presidency were due to malaria or other fevers in which relapses are a common feature. Only 3 deaths were recorded in urban areas.

Of the total, 730 attended hospitals and dispensaries in districts in the Presidency division; 489 in Dacca division; 349 in Burdwan division; 282 in Rajshahi division; 186 in Calcutta; and only 80 in Chittagong division.

C. P.—A total of 6,090 deaths was ascribed to relapsing fever, but the D. P. H. has reasons to treat this figure as incredible. He says:

“This is altogether erroneous and unreliable as, during the course of my inspection of towns, I discovered that in the absence of a separate column for deaths from undiagnosed fevers in the old form of death register used, all such deaths were wrongly shown in the column for relapsing fever.”

Even the 170 patients treated as relapsing fever in medical institutions are doubtful cases as none were microscopically confirmed.

Madras.—Over 63% of the total cases treated in medical institutions (1,166) were in the districts of Vizagapatam (102), West Godavari (165), Chingleput (365) and Salem (105).

Assam.—Only one death was reported in Jorhat town.

Influenza.

34. Most of the influenza deaths during a mild epidemic are included under the convenient heading of “fevers” or are recorded under respiratory diseases, as death frequently results from complications of this nature. In Bengal, mortality from this cause decreased by 20%; deaths numbered 4,124—3,454 in rural areas, 597 in Calcutta and 73 in other towns. The Punjab, where the infection was localised, reported an increased incidence, 6,986 attacks and 17 deaths in 14 out of the 29 districts. The districts of Montgomery (2,614) and Muzaffargarh (1,352), reporting 57% of the total cases, were severely affected; Amritsar, Sialkot, Mianwali, Kangra and Sheikhpura, recording 42% of the total, reported less severe infection. In the U. P. mild outbreaks occurred in several districts. In Bombay Presidency with 329 recorded deaths, the type of the disease was mainly respiratory. In the C. P., the disease prevailed in a mild form, causing 2,331 deaths; recorded cases in the affected tracts numbered 12,823 in Jubbulpore, 12,341 in Nagpur, 8,879 in Akola, 6,448 in Nimar, 6,158 in Buldana, 5,781 in Yeotmal and 5,377 in Amraoti. In Burma 73 deaths were reported in towns.

Goitre.

35. *U. P.*—Cases were recorded among school children in the districts of Ballia (5), Garhwal (8) and Gorakhpur (82) and in the towns of Pilibhit (38) and Bahraich (149). Lt.-Col. H. Stott, I.M.S., Professor of Pathology, King George's Medical College, Lucknow, who has made a study* of the incidence of the disease in the super-endemic areas of Gonda and Gorakhpur reports:—

“Goitre is rare below the age of three years. Between 3 and 5 years the rate in the two super-endemic areas visited is less than 5%, though this percentage rises higher in severely affected areas. Children between 6 and 14 years were examined in many schools and the incidence was 10—20 per cent., but the rate may reach 80 per cent. in areas of greatest endemicity. Between 15 and 30 years the rate rose to 60% and fell again above 30 years. In the most severely affected areas of Padrauna (*tehsil*) the rate was 90% above the age of 5 years.”

He further reports that very few educated and well-to-do persons acquire this disease, which is definitely more prevalent among females, probably for every one male 3 females are infected.

Assam.—During a survey of two villages in the Naga Hills and of 26 villages along the banks of Dikhu river in Sibsagar district 228 and 747 cases, respectively, were detected. The latter included 474 females.

Burma.—Goitre is reported to be prevalent amongst the Palaungs and the Kachins living at comparatively high altitudes in the Northern Shan States, very common in the Falam sub-division in the Chin Hills; common in the townships of Tilin, Saw, Gangaw and Pauk in Pakokku district and in the Leiktho township in Toungoo district.

Guineaworm.

36. *U. P.*—Cases treated in hospitals and dispensaries in the province during the year 1934 totalled 2,553.

Punjab.—Cases treated in medical institutions totalled 2,518 including 868 in Hoshiarpur, 391 in Hissar and 217 in Attock. Presence of the disease was reported from many other districts.

C. P.—Cases treated in hospitals and dispensaries numbered 495 including 213 in Chanda, 37 in Chhindwara, 36 in Saugor, 26 in Yeotmal, 23 in Jubbulpore and 21 in Buldana. The abolition of step-wells was under consideration and instructions for purification and prevention of water pollution were issued.

Diphtheria.

37. *Punjab.*—The disease was reported in 19 districts; cases and deaths totalled 162 and 60, respectively. The case mortality was 37%.

Rawalpindi district recorded 28 cases and 6 deaths; Lahore district 25 and 6; Kangra 19 and 5; Simla 18 and 3; Amritsar 15 and 13; Lyallpur 10 and 4, and 47 and 23 in 13 other districts.

U. P.—Malignant forms of the disease are entirely absent. Overcrowding in dormitories in schools is mentioned as a factor in the spread. Paralysis incidence is moderate.

* I. J. M. R., Vol. XXI, No. 3, January, 1934.

Bengal.—In Calcutta the virulent form of the disease prevails to a moderate extent. *Streptococcus haemoliticus*. is so prevalent that it is now the routine to administer 10 c.c. of anti-streptococcus serum with the first anti-toxin injection. Almost all diphtheria cases show some degree of myocarditis, while the various forms of heart block are not uncommon.

C. P.—Of the 150 cases (deaths 5) recorded, 79 were in Hoshangabad, 15 in Bilaspur, 13 each in Jubbulpore and Raipur and 6 each in Nagpur, Saugor and Nimar.

In B. & O. and Assam the disease is not common.

Bombay.—In Karachi town where this disease is notifiable, 177 cases with 30 deaths occurred. Inoculations (4,036) were performed especially among school children and other contacts. Six deaths were recorded in the Northern Registration district—4 in Surat and 2 in Ahmedabad towns. Diphtheria is more or less endemic but malignant forms are noticed only during epidemic periods. The disease is seasonal and assumes epidemic form during or after the rains, important factors being the presence of large number of carriers and many children with neglected or untreated throat conditions. Anti-diphtheritic vaccination has been used fairly widely among school children.

Typhus Fever.

38. *Punjab.*—One case of typhus fever (louse variety) was treated in a hospital in Jullundur district.

U. P.—A total of 1,111 cases with 10 deaths was recorded in hospital returns—16 louse borne, 117 tick typhus and in 978 the vector was unknown. The largest number of cases were treated in the districts of Agra 186 cases, Allahabad 44, Benares 45, Basti 95, Moradabad 134, Unao 131 and Pilibhit 66.

C. P.—Two cases of tick typhus in the districts of Nimar and Amraoti and 33 other cases in which the vector was unknown were treated in Drug district.

Burma.—The D. P. H. reports—

"In the year 1933, the Director, Pasteur Institute, Rangoon, reported a certain number of positive findings when the Weil Felix test was done on blood specimens submitted to him. This drew attention to the possible prevalence of typhus or typhus-like fevers in the province, and all civil surgeons were asked by the Inspector General of Civil Hospitals, Burma, to send specimens of blood serum for examination from cases which possibly suggested typhus or typhus-like fevers. Between January and April 1934, the Civil Surgeon, Henzada, sent specimens from 7 suspected cases, and of these 3 were reported by the Director of the Pasteur Institute as positive typhus of the "shop" type. The remaining cases are stated to be probably typhus of the "scrub" type. Altogether 18 positive findings were reported during the year by the Pasteur Institute. With a view to obtaining data regarding the prevalence of this disease in Burma, the Local Government has declared this group to be a dangerous disease notifiable within all municipalities and notified areas in Burma. An investigation into the history of most of the cases has up to now failed to reveal any particular factor which might be concerned in the infection."

Osteomalacia.

39. *Delhi Province.*—Although the incidence of this disease is not known, it is present in this province. In the St. Stephen's and Lady Hardinge College

Hospitals, 179 cases were treated, of whom 10 died. Table II (lvii) gives the distribution by communities of the 61 cases treated in St. Stephen's Hospital. Figures for 1933 have been included for comparison.

TABLE II (lvii).

	1933.		1934.	
	C.	D.	C.	D.
Hindus	51	3	39	6
Muhammadans	17	1	16	..
Christians	3	..	..	..
Total	71	4	55	6

The frequency distribution of these cases by pregnancies is given in Table II (lviii).

TABLE II (lviii).

Order of Pregnancy—	1933.		1934.	
	C.	D.	C.	D.
1st	24	1	10	..
2nd	11	2	8	..
3rd	9	1	15	2
4th	7	..	3	1
5th	8	..	9	1
6th	6	..	2	..
7th	2	..	2	..
8th	1	..	2	..
and over	3	..	4	2
Total	71	4	55	6

The principal aetiological factors are said to be (a) unbalanced and poor diet, (b) early marriage and conceptions, and (c) unhygienic living conditions.

Punjab.—Cases treated in medical institutions totalled 971 and included 284 in Amritsar and 402 who attended the Lady Willingdon Hospital, Lahore.

U. P.—Hospital returns showed a total of 2,723 cases, the largest numbers being recorded in the districts of Meerut 1,066, Benares 293, Aligarh 114, Bulandshahr 122, Fyzabad 167, Lucknow 196 and Shahjahanpur 193.

C. P.—The distribution of the 283 cases treated in 10 out of 19 districts was Drug 73, Jubbulpore 54, Saugor 53, Akola 35, Nagpur 27 and others 41.

Diabetes.

40. This disease is not recorded as a cause of death in the general population in India, not even in the larger towns and cities but it is believed to be fairly widely prevalent especially among the rich and educated classes. Cases treated in hospitals and dispensaries only are available and these are given in Table II (lix).

TABLE II (lix).

	1934.	1933.	1932.
British India	31,321	28,264	27,560
N.-W. F. P.	623	778	354
Punjab	2,800	2,504	2,454
Delhi	128	120	138
U. P.	2,402	2,182	2,059
B. & O.	2,796	2,760	2,873
Bengal	3,645	3,100	3,111
C. P.	541	554	508
Bombay	2,359	2,117	2,234
Madras	14,944	12,932	12,846
Coorg	34	..	19
Assam	162	242	203
Burma	884	941	682
Baluchistan	Not available.	34	79

The correlation between the incidence of diabetes and the dietetic habits of the people has been the subject of study by Dr. J. P. Bose at the Calcutta School of Tropical Medicine and by Dr. K. C. Paul, diabetic specialist at the Government General Hospital, Madras.]

(a) In Calcutta, an attempt was made to collect statistics of mortality in the registered areas of Calcutta and suburbs for the last few years in order to study the correlation, if any, between the sugar content and the cholesterol content of the blood in normal healthy Indians on different diets and also in cases of diabetes treated by different systems of dieting. It was reported that the diet of the Bengalees can usually be divided into three distinct classes :—

- (1) That of the rich class (the class which get diabetes most)—usually a very high carbohydrate, very high fat and a high caloric diet.
- (2) That of the middle class—a high carbohydrate, low protein and low caloric diet.
- (3) That of the poor class—a high carbohydrate, low protein, low fat and a low caloric diet—the incidence of diabetes among this class is very rare.

Undoubtedly the incidence of diabetes is highest amongst the Bengalee Hindus of the rich and indolent classes. Statistics of 1,500 cases of diabetes amongst the different races in India show that the percentage of incidence is 66·2% among the Hindus* and amongst these about 56% are Bengalee Hindus.

Table II (lx) gives the mortality from diabetes in relation to sex, nationality and age in Calcutta including suburbs during the years 1929-33.

* Bose, J. P., Handbook of Diabetes Mellitus and its modern treatment, 2nd Edition, 1934, pp. 31, 32.

TABLE II (1x).

For the year.	Total Diabetic mortality.	Sex.		Nationality.			
		Male.	Female.	H.	M.	A. I.	O. C.
1929	57	53	4	52	3	...	2.
1930	89	69	20	74	10	3	2.
1931	105	91	14	76	24	3	2.
1932	93	83	10	75	12	2	1.
1933	125	95	30	92	31	1	1.

Age (in years).								Death rate per cent. in relation to total deaths.	Rate per 100,000 population.
Below 15.	15—20.	20—30.	30—40.	40—50.	50—60.	60 and upwards.			
M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.			
...	6 1	10 ...	18 2	19 1	0.17	5.2	
...	5 2	7 1	31 10	16 7	0.27	8.3	
...	9 4	42 4	40 6	0.34	8.7	
...	...	1 2	6 ...	...	17 4	59 4	0.31	7.7
...	60 10	35 20	0.35	10.4	

H.-Hindus. M.-Muhammadans. A. I.-Anglo-Indians. O. C.-Other Classes.

(b) The Madras report, based on a careful analysis of a series of 680 cases, is interesting and its main conclusions are summarised below:—

(1) Incidence is higher in persons whose body weight is above the optimum for age and height. Overweight, as an antecedent factor, was present in 494 of the 680 cases.

(2) The cause of the overweight is uncertain since an analysis of dietary habits does not show an excess of fat in the diets of the majority. Excess carbohydrates intake was noted in 436 cases in conjunction with sedentary habits. Excess of sweets, which contain much *ghee* is taken by the wealthier *Brahmins*, *Nattukoti Chettiars*, Muhammadan merchants and landowners who consume from 2 to 4 oz. of *ghee* daily.

(3) A family history of diabetes was present in 53% of cases—parent in 34% and brother and sister in 19%. The diabetic tendency is traceable to the family environment, which often remains the same through several generations.

(4) Probably 1% of the population of South India is diabetic, the distribution among cases from districts being—

Madras city and Chingleput	188
Malabar, Cochin and Travancore	89
Tanjore	67
Coimbatore.	49
Madura	44
Guntur	27
Godavari	23
North Arcot	22
South Arcot	18
Tinnevelly	15
Kistna	9
Ouddapah	5
Coorg.	4
Ganjam	3
Mysore	39

(5) It is noted that in the non-vegetarian, diabetes tends to be of a severer type than in the vegetarian.

Cancer.

41. Table II (lxi) gives the number of cases of new growths treated in hospitals and dispensaries in the different provinces.

TABLE II (lxi).

	Malignant.		Non-malignant.	
	Cases.	Deaths.	Cases.	Deaths.
Total	39,773	839	70,167	203
N.-W. F. P.	306	9	1,028	5
Punjab	7,241	67	12,763	32
Delhi	452	11	550	6
U. P.	1,196	21	7,947	41
B. & O.	2,694	50	6,876	15
Bengal.	4,053	170	7,990	35
C. P.	1,234	26	1,762	8
Bombay	2,852	167	3,516	13
Madras	16,367	230	24,374	37
Coorg	1,819	..	30	..
Assam	227	4	627	..
Burma.	1,332	84	2,704	11

The Radium Institute in Bihar and Orissa has been moved from Ranchi to Patna and provides for 18 patients (males 12 and females 6). Of 804 cases treated, 109 became clinically free, 26 were cured, 293 were improved and 25 died.

Of the 204 deaths recorded in urban areas of Burma, 69 were in Rangoon, 24 in Mandalay, and 111 in other urban centres. Mortality in Rangoon by classes and age is included in Table II (lxii). Of the total, 64 (males 38 and females 26) were local and 5 (males 4 and female 1) were imported cases.

TABLE II (lxii).

Ages.	Burmese.		Hindus.		Muham- madans.		Chinese.		Anglo- Indians.		Others.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Under 30 yrs. . . . .	..	..	3	..	..	..	..	..	..	..	..	..
30—40 „	2	1	4	..	1	..	1	1	..	..	..	1
40—50 „	1	6	3	1	2	2	1	1	1	..	1	..
50—60 „	3	2	3	2	3	..	5	..	..	..	..	..
Above 60 „	4	5	3	2	..	..	..	2	..	..	1	1
Total	10	14	16	5	6	2	7	4	1	..	2	2

In Bombay city 31 deaths were due to cancer of the buccal cavity, 64 of the pharynx, oesophagus, stomach and liver; 16 of the peritoneum, intestines and rectum, 21 of the female genital organs; 13 of the breast; 3 of skin; and 111 of other unspecified organs.

The inquiry into the incidence of cancer under Dr. Vishwanath, Professor of Pathology, King Edward Medical College, Lahore, financed by the I. R. F. A. was pursued in Madras and Rangoon. Records of 3,150 medico-legal and 2,454 pathological autopsies in Rangoon were studied. The incidence of malignant disease worked out at 5.4 *per mille* in the former group

and 39.0 *per mille* in the latter. Of 2,814 biopsy examinations made in the same institution, as many as 740 showed malignant disease. Of 58,972 in-patients treated in the Rangoon General Hospital 854 suffered from malignant neoplasms.

In Madras records of 13,874 pathological post-mortems were studied. The incidence of malignant disease in this group proved to be as high as 2,229. From hospital records of 192,939 in-patients, malignant disease was found to be recorded in 5,035 cases.

A paper embodying the results of this investigation has been published in the I. J. M. R. July 1935.

C. S. Meningitis.

42. *N.-W. F. P.*—Of the 64 cases registered 26 or 41% were fatal. These cases were distributed as follows:—32 cases with 11 deaths in Peshawar; 27 and 13 in D. I. Khan; 4 and 1 in Hazara; and 1 fatal case in South Waziristan.

Punjab.—The epidemic was mild and was responsible for 275 attacks and 152 deaths which gave a case mortality of over 55%. Although every district was infected, the districts in Ambala division in which infection was said to have been imported from Delhi Province, suffered most with 464 cases and 318 deaths, giving a case mortality of 69%. Ten cases, of which 7 proved fatal, were recorded in Simla town; 57 cases with 28 deaths in jails were distributed as follows: Lahore Borstal Institution, 34 and 10; Jhang district, 10 and 10; Lahore central, 5 and 3; Multan central, 3 and 3; Sialkot district, 3 and 1; and Ferozepore district 2 and 1.

Delhi.—Delhi city with its congested areas and conditions peculiar to itself recorded 411 cases and 290 deaths out of 464 cases and 320 deaths recorded in the whole province. The incidence in New Delhi was 27 cases with 9 deaths; notified area, 23 and 20; Shahdara 2 and 1; and the rural areas reported one non-fatal case. Tables II (Ixiii) and (Ixiv) give the incidence by months, community and sex.

TABLE II (Ixiii).

Months.	Delhi City.		New Delhi.		Notified area Civil Lines.		Delhi-Shahdara.		Rural Areas.		Total.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Total	411	290	27	9	23	20	2	1	1	...	464	320
January	16	16	3	1	...	...	...	...	...	...	19	17
February	28	21	1	...	...	...	...	...	...	...	29	21
March	69	42	6	3	11	4	...	...	1	...	87	49
April	62	40	5	1	3	5	...	...	...	...	70	46
May	72	52	5	3	1	2	...	...	...	...	78	57
June	30	22	1	...	...	...	...	...	...	...	31	22
July	28	16	...	...	1	1	...	...	...	...	29	17
August	26	22	3	...	2	3	1	...	...	...	32	25
September	17	12	...	1	2	3	...	...	...	...	19	16
October	21	17	...	...	...	...	...	...	...	...	21	17
November	20	13	2	...	2	1	1	...	...	...	25	14
December	22	17	1	...	1	1	...	1	...	...	24	19

TABLE II (lxiv).

Classes and Sex.	Delhi City.		New Delhi.		Notified Area Civil Lines.		Delhi-Shahdara.		Rural Areas.		Total.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
All Classes .	411	290	27	9	23	20	2	1	1	...	464	320
Males .	309	207	17	6	18	17	2	1	1	...	347	231
Females .	102	83	10	3	5	3	...	...	...	...	117	89
Hindus .	252	187	15	6	10	10	2	1	...	...	279	204
Males .	190	135	8	4	10	10	2	1	1	...	190	135
Females .	62	52	7	2	..	..	...	...	...	...	89	54
Muhammadans.	158	102	12	3	9	8	...	...	...	...	179	118
Males .	119	72	9	2	8	7	...	...	...	...	136	81
Females .	39	30	3	1	1	1	...	...	...	...	43	32
Christians .	1	1	...	...	4	2	...	...	...	...	5	3
Males .	...	...	...	...	...	...	...	...	...	...	...	...
Females .	1	1	...	...	4	2	...	...	...	...	5	3

The male morbidity and mortality were more than double the females. Muhammadans suffered more (9 per 10,000) than Hindus (7 per 10,000).

U. P.—The disease was made notifiable in April. From January it was present in sporadic form in Agra and Cawnpore. Nowhere was it epidemic but cases kept being reported from the towns of Aligarh, Meerut, Bareilly, Fyzabad, Lucknow, Benares, Farrukhabad, Brindaban, Hapur, Amroha, Jhansi, Muttra, Naini Tal, Allahabad, Moradabad, Saharanpur, etc. Distribution was irregular and sudden. Proved cases of direct contagion were few. Case mortality ranged from 35—50%.

All communities were attacked but males have been more susceptible than females. The rate of mortality amongst Hindu females was greater than that amongst the males. People between the ages of 10 to 25 have been mostly attacked and Muhammadans of ages between 10 and 20 appear to be more susceptible than Hindus of the same age.

Table II (lxv) gives recorded deaths by age, sex and class.

TABLE II (lxv).

	Hindus.				Muhammadans.				Christians.				Others.				Total.			
	Male.		Female.		Male.		Female.		Male.		Female.		Male.		Female.		Male.		Female.	
	C. D.		C. D.		C. D.		C. D.		C. D.		C. D.		C. D.		C. D.		C. D.		C. D.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
Total	152	86	39	24	93	52	25	13	2	1	..	..	2	..	..	..	249	139	64	37
Under one year	1	1	2	1	1	1	..	..	..	..	..	..	..	..	..	..	2	2	2	1
1—5 years	12	5	3	3	8	..	2	1	..	..	..	..	..	..	..	..	20	5	5	4
5—10 „	18	11	8	3	8	11	12	5	..	..	..	..	..	..	..	..	26	22	20	8
10—15 „	39	20	6	4	21	16	4	4	..	..	..	..	1	..	..	..	61	36	10	8
15—20 „	31	18	5	4	25	12	4	2	2	1	..	..	1	..	..	..	59	31	9	6
20—25 „	22	10	5	3	15	4	3	1	..	..	..	..	..	..	..	..	37	14	8	4
25—30 „	11	8	6	3	5	4	..	..	..	..	..	..	..	..	..	..	16	12	6	3
30—35 „	8	6	2	..	4	3	..	..	..	..	..	..	..	..	..	..	12	9	2	..
35—40 „	4	2	1	1	3	1	..	..	..	..	..	..	..	..	..	..	7	3	1	1
40—50 „	5	4	..	1	3	..	..	..	..	..	..	..	..	..	..	..	8	4	..	1
Over 50 „	1	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1	1

B. & O.—Reported cases numbered 31 with 12 deaths and included 18 cases with 6 deaths in Muzaffarpur district; one non-fatal case in Gaya; two fatal cases in Ranchi; 7 and 3 in Patna; and 3 and 1 in Cuttack.

Bengal.—Cases totalled 828 in Calcutta; 33 (males 31 and females 2) in Howrah; and 6 (males 4 and females 2) in Baranagar. Table II (lxvi) gives the cases treated in the Campbell Hospital, Calcutta, by age, sex and months.

TABLE II (lxvi).

	Hindus.		Muslims.		Other castes.		Total.
	M.	F.	M.	F.	M.	F.	
Total	535	87	136	7	6	1	772
January	44	1	8	..	1	..	54
February	70	5	17	..	..	..	92
March	48	16	15	1	1	..	81
April	35	9	15	3	1	..	63
May	47	6	12	..	..	..	65
June	27	3	7	1	1	1	40
July	30	6	8	..	..	..	44
August	45	5	7	..	1	..	58
September	52	9	13	1	..	..	75
October	30	6	6	..	..	..	42
November	42	11	9	..	..	..	62
December	65	10	19	1	1	..	96

C. P.—Only 18 cases with 3 deaths were reported—8 each in Nimar and Akola and one each in Nagpur and Chhindwara.

Bombay.—A total of 555 deaths was ascribed to c. s. fever and the death rate was 0·02 p. m. There were 528 deaths (0·1 p. m.) in urban areas out of which an epidemic in Ahmedabad town provided 344; Poona reported 87 deaths. Eighty one cases with 63 deaths, registered in Sind, were chiefly from the Sukkur and Hyderabad jails. Only 27 deaths occurred in rural areas.

The epidemic in Ahmedabad city reached its peak in March, with 285 cases and 109 deaths. All castes were affected and the proportion of attacks among males and females was about 4 to 1. Incidence was high between the ages 20—30 years and the case mortality was 47%. Preventive measures taken included the prohibition of assemblies of more than 50 persons; the closure of schools, cinemas and theatres; disinfection of infected premises; prophylactic inoculation, etc.

Burma.—Only ten deaths were reported in towns and none in rural areas. The notification of this disease is compulsory in Rangoon and Maymyo towns only.

Vaccine.—Altogether 61,313 c. cs. of anti-meningococcus vaccine sufficient to inoculate 17,000 adults were issued from the Central Research Institute, Kasauli. The incidence of the disease among the inoculated and the uninoculated is given in Table II (lxvii).

TABLE II (lxvii).

	Number.		Cases.		Deaths.	
	Inocu- lated.	Uninocu- lated.	Inocu- lated.	Uninocu- lated.	Inocu- lated.	Uninocu- lated.
Total	9,017	396,324	7	374	3	228
Aligarh	472	1,678	..	57	..	34
Bhagalpore central jail	1,017	1,196	1	1	1	1
Fatehpur district jail	431	112	3	12	1	9
Gurgaon	52	14,000	..	28	..	14
Cawnpore	109	8,916	..	7	..	35
Benares	32	768	..	4	..	2
Agra	4,283	205,487	..	206	..	109
Multan	26	108,000	..	3	..	2
Ajmer	94	6	1	..	..	..
Delhi (N. W. R.) Epidemiological Bureau,	456	2,000	..	8	..	2
Punjab	1,841	17,375	2	37	1	19
Simla	204	36,786	..	11	..	2

In two fatal cases the vaccine had been given on the day on which symptoms appeared. A large number of the inoculated persons were contacts of c. s. m. cases and many were in personal attendance on such cases. Secondary cases in the same household were notably uncommon. It cannot be said that the figures available prove anything. Severe reactions were uncommon but mild or moderate local and general reactions were experienced in most cases, these being local pain and tenderness with headache and fever.

Trachoma and other eye diseases.

43. Captain P. Shannon*, I.M.S., specialist in ophthalmology for the Baluchistan district, has studied the incidence of trachoma in Baluchistan and elsewhere in India. The conclusions to be drawn from his work are summarised below :—

1. Trachoma in India is practically limited to the indigenous population.

2. Incidence varies greatly in different districts being highest in the Punjab and lowest in southern India.

3. The disease occurs among the different classes of the same community in a fairly constant ratio.

4. Of the various religions and castes, Sikhs, in whom the incidence is at least 75%, are those mainly affected, while southern India Hindus are practically free.

5. Most of the cases met with in the Indian Army are old, the disease having begun in early life and a large proportion being healed before reaching adult life.

6. The scheme of enlisting recruits suffering from trachoma—which differs from the policy in the armies of other trachoma-endemic countries—is safe and justified, and is unlikely to cause any serious spread to healthy troops on account of (a) the better hygienic life of the sepoys in comparison with the overcrowding, etc., of Indian village life, (b) the rigid caste system which prevails in Army life even when men of different communities are brought together in barrack life, and (c) most of the trachoma being healed or almost healed before enlistment.

*Indian Medical Gazette, Vol. LXIX, page 672.

7. As in Egypt, most of the infections occur in the homes of the agricultural classes among young children even before school life.

8. Fresh cases in adults are similarly derived from their infected families; especially during epidemics of Koch-Weeks ophthalmia.

9. A treatment measure, such as Salisberry's sodium chloride massage which is cheap, simple, quickly effective and safe in application, is required if the disease is to be effectively treated by any other than a few ophthalmic experts.

10. A national anti-trachoma scheme is necessary, involving wide propaganda on the nature and results of the disease amongst —

- (a) Indian practitioners who practise European methods in this country,.
- (b) school teachers and educated social workers, and
- (c) the agricultural classes themselves, especially the womenfolk, by means of the two channels above mentioned.

Such a scheme should enlist the co-operation of (a) existing research institutions wherein animal and human experiments could be carried out to improve our present knowledge, (b) large military and civil hospitals and institutions where new treatments could be investigated, (c) medical colleges and universities where the rank and file might be taught the manifestations of the disease in a practical form to enable them to distinguish the disease and practise its prevention and treatment with safety, and (d) village and bazar doctors, who alone can carry the treatment campaign to the masses of the people, in the form of some simple standard treatment of sufficient prophylactic and curative value, while serious or complicated cases could be treated under the supervision of a district trachoma authority, or operated on in one of the district centres.

11. If in the beginning such a scheme were confined to the most heavily infected province and limited to children as a child welfare scheme, it would serve as an introduction.

Punjab.—Altogether 1,127,870 cases attended hospitals and dispensaries for the treatment of trachoma. The distribution of the cases by districts is given in Table II (lxviii). Operations for the extraction of lens numbered 28,411.

TABLE II (lxviii).

Hissar	18,696	Gujranwala	26,850
Rohatak	29,593	Sheikhupura	50,367
Gurgaon	24,090	Gujrat	39,460
Karnal	36,432	Shahpur	56,814
Ambala	28,970	Jhelum	14,954
Simla	163	Rawalpindi	12,738
Kangra	19,634	Attock	19,710
Hoshiarpur	258	Mianwali	54,849
Jullundur	15,029	Montgomery	77,291
Ludhiana	53,529	Lyallpur	62,531
Ferozepore	77,513	Jhang	52,509
Lahore	57,998	Multan	53,537
Amritsar	57,725	Muzaffargarh	30,787
Gurdaspur	49,841	D. G. Khan	24,928
Sialkot	69,895		

Cases treated in hospitals and dispensaries in the U. P. numbered 257,949 and in C. P. 28,081.

Delhi Province.—Eye diseases, including trachoma, are very prevalent. Table II (lxix) gives the cases treated in hospitals and dispensaries during 1933 and 1934.

TABLE II (lxix).

	1933.	1934.
Trachoma	19,656	16,554
Eye diseases	108,660	84,679
Percentage of trachoma cases to total eye diseases	18	20
Percentage of eye diseases to "all causes"	10	9

A survey of the rural areas in December, 1934, showed 3-4 blind persons per 1,000 of population, most cases being among agriculturists. The principal causes are given in Table II (lxx).

TABLE II (lxx).

	Hindus.		Muhammadans.		Christians.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.
Total	293	260	77	55	..	..	370	315
Congenital	21	14	4	2	..	..	25	16
Cataract	32	27	9	7	..	..	41	34
Glaucoma	3	2	..	1	..	..	3	3
Injuries	25	17	8	9	..	..	33	26
Old age	80	83	19	9	..	..	99	92
Other eye diseases	41	32	12	11	..	..	53	43
Small-pox	38	30	12	7	..	..	50	37
Syphilis . . . . .	..	..	..	..	..	..	..	..
Trachoma	53	55	13	9	..	..	66	64

B. & O.—Diseases of the eye are very common, especially in Bihar proper. Altogether 431,160 patients were treated, operations for extraction of lens numbering 3,124, against 3,916 in 1933.

Lead Poisoning.

44. *Burma.*—Five cases of lead poisoning among employees of the Burma Corporation, Ltd., Nanttu, were treated, of these 4 improved and one was discharged with compensation.

SECTION III.

MATERNITY AND CHILD WELFARE.

General.

45. Development of maternity and child welfare work along modern lines began in 1918. The early workers in the field were for the most part the voluntary workers and associations. These worked with zeal and enthusiasm and accomplished much ; they tried out schemes of widely varying types, accumulated experience and prepared the way for a more permanent type of service by demonstrating at once the usefulness and the limitations of the schemes they inaugurated.

The limitations are those imposed by lack of expert advice and technical guidance, by lack of contacts with other public health and social services, and by confinement to small and segregated communities, too poor financially to employ an adequate and well trained staff or to maintain a complete scheme providing continuity in observation and care from conception to adolescence. Even where small self-contained schemes are economically possible, it is inexpedient to allow them to continue unrelated to other welfare services. Expert organisation, planning on a wide basis and co-ordination of work, are essential for progress, and the co-ordinating and unifying agency should be the public health department of provinces and large cities.

Public attention is focussing more and more upon the continuing high rates of infantile and maternal mortality. Schemes for control are being pressed on local bodies and evidence is not lacking that the Public Health Departments, notably in Madras, Burma and the Punjab, are alive to their responsibilities.

In view of this increasing interest in the subject, the year 1934 seemed propitious for a review of the maternity and child welfare situation, and a special report form was drawn up and circulated to all Directors of Public Health. The information collected from the completed form is summarised in subsequent sections of this chapter.

Unfortunately the completeness of the returns varied greatly in the different provinces. The form of report was new and information related to a year already gone, so that accuracy and detail in the replies was hardly to be expected. Few provinces were able to collect accurate information on the number of maternity beds available or the distribution of the beds in civil, military, mission or private hospitals and homes. The numbers of trained *dais* and midwives recorded as practising in the provinces is also inaccurate, yet sound planning is impossible in the absence of such fundamental data and the first step towards placing maternity and child welfare on a sound basis is a survey in each province of the facilities existing for the care of the mother and child. Now that a beginning has been made it is expected that this survey will be generally undertaken and more accurate and complete information will become available in subsequent reports.

Vital Statistics.

46. Table III (i) shows the recorded provincial rates for maternal mortality. Figures for B. & O. and Punjab are not available.

The notes for this section have been supplied this year by Dr. Jean M. Orkney, W.M.S., Director, Maternity and Child Welfare Bureau, Indian Red Cross Society.

TABLE III (i).

	Urban.	Rural.
N.-W. F. P.	11.0§	..
Delhi	7.0	2.2
United Provinces	9.6	0.5
Bengal	9.0	9.4
Central Provinces	11.7	6.2
Bombay	9.1	5.1
Assam	15.1*	..
Burma	10.5	3.6
Madras	13.4	7.7

* For 13 towns.

§ (Peshawar town only.)

The method of calculating the maternal mortality rate is uniform, but the usual practice is to base it on the number of registered births, which excludes still-births. Fallacies are thus introduced which limit the value of the figures for comparison with the rates of countries adopting live births or live and still-births, as a basis of calculation. It is considered that in future the maternal mortality rate should be calculated on live and still-births.

Probably the most accurate estimate of maternal mortality done in India hitherto is that of Dr. Mudaliar's in Madras city. He gives a rate of 16.6, but himself considers this is on the low side. As it is, this is the highest rate recorded for any large city in India.

In Table III (i) the maternal death rate in urban areas is almost everywhere shown as greater than that of rural areas. The advantage may possibly be in favour of rural India but it is certainly not so overwhelming as suggested by the figures recorded. In rural health units experience has been that the inauguration of a skilled midwifery service has rapidly effected a remarkable reduction in maternal mortality and morbidity. In certain towns, on the other hand, hospitalisation of confinements has done little to reduce maternal mortality. In Bombay, in 1931, 62.09 % of births took place in maternity homes and the maternal mortality rate is given as 7.2 per 1,000 births. In 1933 the rate was 7.5 with 70.6 % hospitalisation and in 1934 the figures were 6.9 and 68.3 per cent.

Apart from differences in health and environment more accurate classification in towns is a factor of much importance in explaining the discrepancy between rural and urban rates.

While many of the larger municipalities make arrangements to verify the cause of death by medical inquiry, the results cannot always be regarded as reliable. In rural areas it is frankly stated in the reports that verification is impossible since no agency exists capable of carrying it out.

In the circumstances only a few towns adopt the international classification of causes of maternal deaths, most are content with the broad classification, sepsis and non-sepsis.

The Public Health Commissioner is indebted to Dr. Ruth Young, M.B.E., W.M.S., for drafting the questionnaire.

The most accurate presentation of facts relating to the causes of maternal death in a general urban population is found in Dr. Mudaliar's "Report of an investigation into the causes of maternal mortality in Madras city" published in 1933. For a special population, the analysis of returns submitted by women's hospitals in India, published in the Journal of the Association of Medical Women, is worth quoting. These figures, together with figures for England and Wales taken from the Final Report of the Departmental Committee on Maternal Mortality and Morbidity published are given in Table III (ii).

TABLE III (ii).

Cause of death.	Per cent. of total.		
	England and Wales.	Madras Town- (Mudaliar 1931-32.)	Women's Hospitals, 1934.
Sepsis	29.7	29.6	22.3
Eclampsia	9.2	8.7	9.7
Operative shock	8.0	—	11.5
Ante-partum hæmorrhage	6.4	3.7	} 7.5
Post-partum hæmorrhage	5.0	9.0	
Other toxæmias	4.8	1.2	2.8
Embolism	5.4	1.8	0.9
Abortion	9.9	5.1	—
Extra uterina pregnancy	1.2	0.5	—
Associated diseases	19.8	23.4	16.3
Accidents of labour	—	5.7	9.1
Anaemia	—	11.5	19.9

Sepsis accounts for practically the same proportion of deaths in England and Wales and in India. In the non-septic causes the variation is marked. Anaemia of pregnancy, which does not appear as a cause of death in England and Wales, assumes an importance in India, second only to sepsis. The diarrhoea and dysentery group among associated diseases are of greater moment in India, and since they cause many disasters they focus attention on the need for ante-natal treatment and care.

Finance.

47. The proportion of the provincial resources allocated for maternity and child welfare varies from *nil* in Assam and Bombay to 9.3% of the public health budget in the Central Provinces. The largest sum of money allotted by a local Government is Rs. 1,20,000 in the United Provinces, while the greatest proportional allotment from a Public Health Department's budget is that of the Central Provinces.

In the Central Provinces and the United Provinces, where most is being spent, large sums from the provincial budgets are handed over to voluntary societies for expenditure. In Bihar and Orissa the situation is somewhat similar, while in Burma the Red Cross advises on the distribution of the Government grants. This policy has been of value where organisations, such as the provincial branches of the Indian Red Cross Society, are well developed and organised for maternity and child welfare work.

Official Public Health Departments are however making progress in organisation, and the time has perhaps come in some provinces for a reconsideration of the policy of reliance on voluntary associations for work which should be an integral and vital part of the public health service. A transition

period between voluntary and official control may be desirable, uniting as it does official backing and expert knowledge to the driving force of the enthusiastic voluntary worker, as in Burma and Madras which maintain cordial relationship and mutual co-operation between the Public Health Department and the Indian Red Cross Society, while retaining the ultimate control and direction in the hands of the Director of Public Health. In the Punjab and Madras a maternity and child welfare service is being organised directly under the Public Health Department, with this difference that the Punjab Government has assumed full financial responsibility for the health school, whereas in Madras the training of health visitors is still a Red Cross activity.

Madras Presidency spends the whole allotment from the public health budget at headquarters on salaries and establishment charges of personnel on the staff of the Director of Public Health, but most provinces find it desirable to make grants-in-aid of local schemes generally in the form of a contribution towards the salary of a trained worker. Even in Madras, the need for grants to centres has been felt and the Director of Public Health expresses an opinion in favour of Government financial support for local schemes.

The supply of well qualified doctors and health visitors is still limited, salaries are consequently high and beyond the resources of local bodies, and unless government grants are sanctioned the tendency is for municipalities and district boards to employ untrained and poorly educated workers who, being without vision and unable to appreciate their key position in the public health structure, wreck the best laid plan and bring welfare work into disrepute.

Burma and the Punjab not only aid in the training of health visitors for local work but also subsidise local bodies or societies employing a qualified staff, thus securing work of a high standard in aided centres.

Training and employment of Health Visitors.

48. The *health visitor* is the most important single unit in the maternity and child welfare services. On her personality, knowledge and skill the success or failure of child welfare turns and her *training* is therefore a matter of the utmost importance. In 1934 there were five health schools in India. The Punjab and Central Provinces Health Schools are wholly maintained by the provincial Governments. The schools in Delhi and Madras are financed by the Indian Red Cross Society with grants-in-aid from Government sources. The Poona Health School is sponsored by the Seva Sadan Society and receives a grant from the Maternity and Child Welfare Bureau, Indian Red Cross Society. Health schools in Bombay and Rangoon were in process of organisation during the year.

Of the major provinces, Bengal and the United Provinces have no course of training for public health nurses. The U. P. has a scheme ready to launch, but in Bengal the Red Cross Health Visitors School maintained for several years was closed in 1933 owing to lack of demand for health visitors and insufficient finance, a most unfortunate retrograde step.

The smaller provinces may desire a local health school and that is the ideal arrangement, but financial stringency may necessitate their sending stipendiary pupils to one or other of the well established health schools.

Each school admits from 8 to 12 students per year, an inadequate number in view of the need, but almost sufficient to meet the present poor demand for trained workers.

Clauses providing for regulation of the training of health visitors and for conditions of admission to the registers are incorporated in most of the recent Nurses, Midwives and Health Visitors Registration Acts, but few of the health schools have yet come under the influence of the Nursing Councils

provided in the Acts. The curriculum of training for the English course is very similar in all schools, being standardised at present mainly through the agency of the Maternity and Child Welfare Bureau of the Indian Red Cross Society. As schools become provincialised, greater individuality will tend to appear and standards may vary widely unless close co-operation is maintained between the various nursing councils responsible for inspection and recognition of the course of instruction. Reciprocal recognition of health visitors' certificates is very desirable, and just as medical education throughout India is controlled by one central medical council so also will it doubtless be found advisable to have central control in maintaining uniform and high standards of training in health schools.

The number of *welfare centres* in England and Wales in 1934 was 2,884. The number in India is 684, the number and the distribution by provinces being shown in Table B on page 318 of this report. The United Provinces heads the list with 166 centres, excluding 13 sub-centres, but many of these are in charge of poorly trained or untrained welfare workers. Educational work, which is the primary purpose of welfare centres, plays but a minor rôle in the activities of these centres and a more accurate description would be midwifery centres. In Madras and the Punjab the employment of untrained health visitors is prohibited. The establishment of 153 welfare centres therefore, all apparently engaged in preventing disease and in spreading health propaganda, is worthy of achievement. Burma, although late in the field, has made good progress and the centres, though relatively few in number, are working on sound lines.

Industrial welfare work in tea gardens, in jute mills and on railways is more extensive than is represented in the reports submitted for 1934, and comment is reserved until more accurate returns on this aspect of child welfare are available.

There is no medical woman employed by the Government of India to advise on maternity and child welfare work, while among the provinces only Madras has a medical woman assistant to the Director of Public Health.

The advantage of woman medical officers in this special branch of work is obvious and the time would appear to have arrived when the Government of India and the provinces should employ qualified women doctors to inspect and advise on maternity and child welfare work.

Training of Indian lady doctors in this special branch of preventive medicine has hitherto been a difficulty, but hope for the future lies in the establishment of a course for the Diploma in Maternity and Child Welfare (D. M. C. W.) at the All-India Institute of Hygiene and Public Health, Calcutta. The first course was completed during 1934 and two students passed out with a sound background of preventive and constructive medicine and a knowledge of administrative methods on which to superimpose experience in actual practice.

Now that facilities for training exist, it is to be hoped that employing authorities will give preference to candidates who have specialist qualifications and will also grant study leave to doctors already employed in welfare schemes.

Compared with 590 health centres, the number of health visitors employed in India is recorded as 206, only 5 of these being in Government service. A good service of qualified health visitors is a fundamental factor in all maternity and child welfare schemes, and municipalities and local bodies contemplating the establishment of infant welfare centres are well advised to defer the opening rather than to start with unqualified workers who will at worst bring the scheme into disrepute and at best model the work on curative line

The Midwifery Services.

49. Judged on a basis of one bed per 100 births and one midwife for 150 births, the provision of facilities for maternity cases in Indian provinces is undoubtedly inadequate. Accurate figures of the numbers of beds available for confinements are not available partly because so many general hospitals admit confinement cases. The total number of special beds recorded is 3,162 but this is an underestimate, some provinces having reported the numbers as "unknown".

The number of trained midwives in India, as recorded by Directors of Public Health, is shown in Table B on page 318.

Control and inspection of the work of qualified midwives varies greatly, from no inspection at all to detailed control by officers of the Medical and Public Health Departments and voluntary societies.

More important than the present position is the way in which provinces are preparing to meet the needs of the community in the future. Legislation designed to improve the standard of training, to regulate the issue of certificates, to establish and maintain registers and to supervise the practice of midwives has been passed recently in six out of eleven provinces. Unfortunately at least one provincial Government professes difficulty in meeting even the small sum required for the salary of the registrar and secretary to its nursing council.

The number of hospitals in which the standard of training is sufficiently high to warrant recognition as schools for midwives and the number of midwives qualifying yearly are insufficient. Midwifery in the scattered villages and hamlets must remain in the hands of the indigenous *dais* in the northern provinces at least, during the next two decades, and there is need in most provinces for a definite policy in regard to the training, registration and control of the *dai*. The Punjab is an outstanding exception; there the training of *dais* is being vigorously prosecuted and trained *dais* are being registered under the Punjab Nurses and Midwives Act, 1932. This Act contains clauses prohibiting untrained practice, which can be enforced by the local authority or failing it by the provincial Government, whenever the local situation warrants this step. It is not without significance that the number of *dais* attending instruction classes has increased greatly in the past few years.

One hopeful sign pointing to dissatisfaction with the existing order is that the older method of instructing of *dais* by public health officers, sub-assistant surgeons and midwives is being gradually replaced by the establishment of training schools run in conjunction with a maternity hospital or home and having an infant welfare centre attached. This system is ideal because it affords the *dai* opportunity of acquiring experience in ante-natal work and in domiciliary as well as institutional methods of midwifery. Few *dais* have the capacity of envisaging a method they have not seen, or of adapting hospital methods in the poor home. In the *dais* training school, the teacher is a health visitor or medical woman, teaching equipment is better and practical work of a higher standard.

Public examinations in midwifery are held in all provinces except Assam. In Delhi and the N.-W. F. P. the examining body is the Punjab Central Midwives Board. For the poorer and smaller provinces some such arrangement is preferable to the constitution of a separate board or council to inspect and recognise hospitals as training schools and to conduct examinations and issue certificates, since it makes for uniformity of standards and wider reciprocal recognition of certificates.

Emphasis has been laid on training of *dais* and midwives because this is the first step towards ensuring that skilled service is available for all confinements. Experience has proved the value of even a little training in cleanliness and non-interference and in ante-natal care in effecting reduction in the maternal mortality rate.

The provision of *maternity beds* for cases of complicated pregnancy and labour and for patients with unsuitable home conditions is a further step which will follow almost automatically the establishment of skilled domiciliary midwifery. The demand for maternity homes for the middle classes is very insistent, and municipalities particularly are being pressed to provide and maintain such institutions from the rates. In Bombay hospitalisation has reached the enormous proportion of over 70% of confinements. This policy is questionable. Maternity hospitals and homes are more expensive to equip, to staff and to run than an efficient domiciliary midwife service conducted from a maternity hospital or run in conjunction with a maternity and child welfare scheme, and there is no conclusive evidence that they provide for safer confinement.

The normal confinement can safely take place at home provided the surroundings are suitable, and municipalities may well pause and consider before they commit themselves to the building and staffing of expensive homes which will be used largely by a class who can afford to pay for the services of a doctor or midwife, while giving secondary place in the maternity services programme to a municipal domiciliary midwife service reaching all classes of the community.

On one point only is there unanimity in reports received. Everywhere the position with regard to midwifery is said to be improving, in some provinces progress is rapid and a definite policy is being followed, but in others improvement is slow, unco-ordinated and irregular.

In conclusion, it may be said that the outstanding need of the maternity and child welfare services in India to-day is expert medical control, developing, co-ordinating and directing all effort, voluntary and official, towards the one common goal of robust individual health and racial improvement. This need can best be met by appointing a special Assistant Director for Maternity and Child Welfare in each province and by establishing a central official controlling body to advise on and direct policy.

SECTION IV.

PUBLIC HEALTH ADMINISTRATION.

Administration.

General.

50. The total expenditure of the Central Government on public health during the year 1934-35 is included in Table IV(i).

TABLE IV(i).

	India general.	Baluchistan.	Other areas.	Total.
Total	Rs.	Rs.	Rs.	Rs.
Public health establishment	3,82,592	10,595	10,873	4,04,060
Grants for public health purposes	2,24,757	4,000	2,00,000	4,28,757
Epidemic diseases	43,784	..	2,45,787	2,89,571
Bacteriological laboratories	1,99,978	..	..	1,99,978
Pasteur institutes	1,707	..	..	1,707
Works	1,14,587	..	844	1,15,431

The figures of expenditure by the provincial Governments on these public health activities during 1934-35 are given in Table IV (ii).

TABLE IV (ii).

	Total.	Public Health establishment.	Grants for public health purposes.	Epidemic diseases.	Bacteriolo- gical laboratory.	Pasteur Institute.	Works.
Total	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
N. W. F. P.	1,31,900	75,944	39,133	15,104	..	1,719	..
Punjab	10,29,391	5,95,430	2,38,241	1,56,026	17,359	22,335	..
U. P.	20,44,069	13,69,484	4,84,686	1,30,535	..	..	59,364
B. & O.	9,96,146	4,14,820	2,16,925	1,57,547	31,115	15,371	1,60,368
Bengal	36,01,241	7,11,824	24,83,334	2,74,463	87,377	39,212	5,031
O. P.	3,51,303	85,919	44,788	2,16,734	3,862	..	..
Bombay	26,05,753	10,48,129	2,59,058	1,61,403	2,90,748	30,887	8,15,528
Madras	21,71,697	12,09,850	4,50,155	1,14,222	3,59,078	35,322	3,070
Coorg	7,224	2,504	..	4,720	..	..	..
Assam	6,68,812	1,54,422	10,743	3,48,285	12,063	1,25,943	17,356
Burma	8,79,087	3,13,185	3,18,973	1,64,047	11,038	69,906	1,938
Shan States Federation	36,899	36,818	..	81	..	..	..

North-West Frontier Province.

The I. G. C. H., is *ex-officio* D. P. H. and has two Assistant Directors, one of whom held additional charge of the provincial public health laboratory, Peshawar, while the other is employed chiefly on rural work.

Abbreviations :—

D. P. H.	Director of Public Health.
A. D. P. H.	Assistant Director of Public Health.
M. O. H.	Medical Officer of Health.
M. O. S.	Medical Officer of Schools.
I. G. C. H.	Inspector General of Civil Hospitals.
L. C. P. S.	Licentiate of the College of Physicians and Surgeons
U. P.	United Provinces of Agra and Oudh.
C. P.	Central Provinces.
B. & O.	Bihar and Orissa.

Punjab.

The D. P. H. had four Assistant Directors, one in charge of vaccination and the other three in charge of Rawalpindi, Ambala and Lahore divisions. An epidemiologist was also employed. The sanctioned strength of the provincial cadre of district M. O. Hs. remained unchanged at 28 but owing to shortage of officers the M. O. Hs. of Rawalpindi and Gurdaspur districts held additional charge during the summer as municipal M. O. Hs. of Murree and Dalhousie. The subordinate provincial staff employed under district M. O. Hs. consisted of 28 sanitary inspectors *plus* an epidemic staff of 10 sub-assistant health officers and 15 sanitary inspectors. Only 13 municipalities employed whole time M. O. Hs., whilst the dispensary medical officers, civil surgeons and private medical practitioners acted as part time M. O. Hs. in 28, 6 and 5 municipal towns, respectively, and in three others the district M. O. Hs. supervised the public health arrangements.

The work of the epidemiological bureau mainly consisted of laboratory or field work in connection with malaria surveys and forecast, spleen census, epidemic malaria, other epidemic investigations, examination of water supplies, hookworm campaign, Phalgu fair, Karnal, propaganda, educational work, etc.

Disinfectants, vaccine., etc., were kept in stock at the public health equipment depot, Jullundur.

Delhi.

The Public Health Commissioner with the Government of India is D. P. H. and has a full time A. D. P. H. who also acts as M. O. H. of New Delhi and the Notified Area, while Old Delhi has its own whole time M. O. H., employed by the Municipality. In small towns the dispensary sub-assistant surgeon acts as part time M. O. H. In rural areas, the district board advised by the A. D. P. H. is responsible for the enforcement of suitable health measures. Byelaws, applicable to rural districts were framed and issued in 1927 under the Punjab District Board's Act, 1883; these relate to the disposal of refuse; manure and night-soil; control of wells for drinking purposes; collection and steeping of hemp; excavation of pits; disposal of dead bodies and skinning and tanning processes.

United Provinces of Agra and Oudh.

The total allotment for the Public Health Department, including the Engineering Branch and the Board of Public Health, was Rs. 19,84,785 as against Rs. 19,46,392 in 1933-34. Out of this sum, the budget of the D. P. H. amounted to Rs. 14,55,059.

During the year, the U. P. Nurses, Midwives, Assistant Midwives and Health Visitors Registration Act (No. XV of 1934) was passed and amendments affecting public health were made in the following Acts:—

- (i) The U. P. Town Areas (2nd Amendment) Act (II of 1934);
- (ii) the U. P. Municipalities (2nd Amendment) Act (No. XVIII of 1934);
- (iii) and (iv) The U. P. Village Panchayat (Amendment) Acts (Nos. V and XIX of 1934).

Two Assistant Directors assisted the D. P. H. in general inspection duty each in his range; a third held charge of the hygiene publicity bureau and the school health service; while a fourth directed the malariology and epidemiology bureaux. The administration of the provincial hygiene institute remained in charge of the senior lecturer.

Out of 48 districts in the province the district health scheme was in force in 30. The number of qualified M. O. Hs. and assistant M. O. Hs. was 71

including a leave and epidemic reserve of 10. Full time urban M. O. Hs. were 33 while in 27 municipalities and 36 notified areas, the District M. O. Hs. supervised the public health arrangements.

The public health improvement scheme at work in rural areas included (a) the village aid scheme ; (b) appointment of resident public health officials for groups of villages, (c) the health unit, Partabgarh ; and (d) rural reconstruction work.

The village aid scheme consists chiefly in providing " Village aid dispensaries ", the training of " Village aiders " and in carrying out general sanitary improvements. The scheme was fully in force in 1,808 villages and partly in 5,036 ; the dispensaries numbered 3,378, these being aided by " panchayat " boards while the provincial branch of the Indian Red Cross Society provided funds for the initial equipment of many.

The scheme of appointing resident public health staff was as before in force in Gorakhpur district only, the cost being met by the district board.

The health unit, Partabgarh, was described in last year's report (pages 112-113). It was continued in co-operation with the Rockefeller Foundation and the provincial branch of the Indian Red Cross Society.

With funds provided by the Government of India and the local Government, a scheme of rural development in selected villages was formulated with a view to concentrate the efforts of the various interested Departments on improving the physical and material condition of the villagers.

The provincial hygiene institute continued its usual work. In addition to laboratory work, it manufactured 299,525 doses of cholera vaccine and provided public health training for the M. B. B. S. degree in hygiene, the L. P. H. (parts I and II) ; and for sanitary inspectors. Post-graduate courses were given to M. O. Hs. embracing malariology, hygiene publicity, maternity and child welfare, public health chemistry and bacteriology, hygiene, sanitary law, etc.

Bihar and Orissa.

The total public health allotment during 1933-34 amounted to Rs. 3,74,046 ; important items of expenditure being Rs. 44,283 for school medical examination and the teaching of hygiene in high schools ; Rs. 1,23,974 for epidemics ; Rs. 1,747 for publicity work ; Rs. 16,196 for public health laboratory and Rs. 1,84,884 for public health establishment.

Besides the D. P. H., three A. D. P. Hs. were at work, each in charge of a circle ; these investigated epidemics ; supervised prophylactic measures, *e.g.*, vaccination, cholera and plague inoculations ; inspected and reported on nuisances ; inspected district boards, municipalities, union boards, schools and fairs ; and carried out health propaganda. Their expert advice is reported to have led to sanitary improvements in many directions, notably in drainage, water supply, and disposal of refuse and excreta. In addition to a woman there are 5 M. O. Ss. of the assistant surgeon grade and 5 of the sub-assistant surgeon grade. Besides 100 vaccinators trained in disinfection work, a temporary staff of sub-assistant surgeons was maintained to assist in controlling serious epidemics in the districts.

Twelve of the 21 districts employed fully qualified M. O. Hs. with the requisite subordinate health staffs ; in some districts assistant health officers (L. M. Ps.) were also employed at subdivisional headquarters. Only two district boards met the whole cost of their M. O. Hs. ; in 6 districts, the local Government paid the entire cost, while Government contributions were given to 4 other districts. The remaining districts maintained only small health

staffs, and for epidemics, either recruited additional staff or obtained the loan of Government doctors. The expenditure on sanitation incurred by these boards amounted to Rs. 5,05,104 or about 3% of income.

Of the 58 municipalities, 8 had full time M. O. Hs. In Gaya, Patna, Puri, Ranchi and Cuttack, the M. O. Hs. were paid by Government; the remaining 3 being paid from municipal funds.

Municipal expenditure on sanitation totalled Rs. 17,21,674 or 31% of the total revenue.

The public health bureau and the laboratory continued their usual work.

Bengal.

The superior health personnel consisted of one D. P. H. and 4 A. D. P. Hs. who were in charge of the 4 circles.

A district health scheme was at work in 25 districts. All the 575 rural health circles in the districts, Darjeeling excluded, had trained sanitary inspectors, some having also assistant health officers. The expenditure on communications was Rs. 33,98,642 or 17 %, water supply Rs. 5,96,753 or 3 %, buildings Rs. 3,79,840 or 2 %, sanitation Rs. 17,50,777 or 9 %, vaccination Rs. 2,37,334 or 1 % and drainage Rs. 29,649 or 0.1 %. The administration of 4,740 union boards was carried out under the Village Self-Government Act. These bodies spent Rs. 6,24,675 or 7 % of income on roads, Rs. 5,87,857 or 7 % on water supply, Rs. 68,186 or 1 % on drainage, Rs. 67,196 or 1 % on conservancy and Rs. 1,62,139 or 2 % on dispensaries.

Excluding Calcutta, 21 M. O. Hs. and 99 sanitary inspectors were employed in municipalities. It was proposed to extend new Bengal Municipal Act (XV of 1932) to Darjeeling district. Total expenditure on sanitary works was Rs. 51,86,429 or 45 % of income.

The Bengal Public Health Laboratory and the branch laboratory at Dacca, and the Darjeeling Municipal laboratory examined samples of water, sewage effluents and foodstuffs. The Bengal excise and vaccine laboratories also carried out useful work.

Central Provinces and Berar.

The anomaly of the I. G. C. H., holding combined charge of the Medical and Public Health Departments, was rectified with the appointment in October, 1934, of a D. P. H. There is no A. D. P. H., nor are there any full time District Health Officers. In addition to the 16 civil surgeons who act as part time M. O. Hs. for the 19 districts, the rural staffs comprised two publicity officers, a leprosy specialist, 17 specially trained assistant medical officers for anti-leprosy work, 35 epidemic assistant medical officers, 232 part time dispensary assistant medical officers, 6 sub-divisional medical officers and 5 assistants to civil surgeons, who also attended to public health work. The district authorities employed 37 assistant superintendents of vaccination and 256 vaccinators.

The Village Sanitation and Public Management Act was in operation in 79 villages. Rural uplift work was continued in the districts of Saugor, Hoshangabad and Nimar.

In municipalities qualified M. O. Hs. continue to be employed in Nagpur, Jabulpore and Amraoti only; elsewhere trained sanitary inspectors were in charge of sanitation, except in the Balaghat district where no sanitary inspector was employed in any town.

The Public Health Institute, Nagpur, continued to function as the provincial bacteriological and chemical laboratory.

Bombay Presidency.

The Public Health Department cadre comprises one D. P. H., 4 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. The A. D. P. Hs., in addition to their public health duties, control vaccination work. The subordinate staff includes 31 inspectors of sanitation and 420 vaccinators.

In Bombay city there are a M. O. H. and 5 assistant M. O. Hs., 38 other health officers and 16 sanitary inspectors. In other municipalities and towns there were at work 23 M. O. Hs. and assistant M. O. Hs. and 113 sanitary inspectors and in rural districts four M. O. Hs.—one each in Belgaum, Dharwar, Satara and Larkana.

The total budget allotment under the control of the D. P. H. aggregated to Rs. 8,63,756.

Sixty-two candidates passed the sanitary inspector's examination and were awarded certificates from the Royal Sanitary Institute, London.

Madras Presidency.

The cadre of the Public Health Department consists of one D. P. H., 5 A. D. P. Hs. including one woman Assistant Director, 58 first class health officers, 51 second class health officers, 286 health inspectors, 42 Government vaccinators and 879 other vaccinators employed by local bodies, one entomological assistant and 2 compounders. Forty-five M. O. Hs. worked in districts and 53 in urban areas.

The malaria officer attended a malaria training class at Singapore under the auspices of the League of Nations; another health officer trained in malaria at Karnal. Two posts of reserve second class health officers, one temporary post of entomological assistant to the malaria officer and one temporary post of health inspector were sanctioned for *anti*-malarial work in Anantapur district. The term of the temporary staff of 6 assistant district health officers, two units for *anti*-hookworm campaign and two health inspectors for *anti*-malarial work in Vizagapatam Agency was extended for one year. The District Municipalities and the Local Boards Acts were amended to empower the local Government to provincialise local boards employees; consequently first class health officers employed by these bodies were included in the Madras public health cadre.

Assam.

The budget allotment for the year 1934-35 for Public Health amounted to Rs. 6,63,800 of which Rs. 5,67,624 was controlled by the D. P. H.

In addition to the D. P. H. and 2 A. D. P. Hs. there were employed 9 urban health officers, 7 assistant surgeons, 104 sub-assistant surgeons, 39 vaccination inspectors, one bio-chemist, 5 compounders, 30 disinfectant carriers, 15 laboratory assistants and media makers, 37 Government vaccinators in hill districts, 360 vaccinators employed by local bodies, 25 by municipalities and one by the development board. Only in Shillong was a fully qualified health officer employed and his pay was partially met by the local Government.

The 19 local boards spent a total of Rs. 1,41,278 on public health. Their chief public health activities were concerned with *anti*-cholera inoculation; vaccination; treatment of kala-azar, yaws, leprosy, malaria and minor eye complaints, quinine and cinchona distribution, etc.

Burma.

The headquarters staff consisted of one D. P. H. and two A. D. P. Hs. District M. O. Hs. were employed in Akyab, Myaungmya and Pyapon and four assistant district health officers were employed in the districts of Prome, Bassein, Magwe and Mandalay; in the remaining districts the civil surgeons were *ex-officio* district health officers. Centrally controlled but employed in the districts and in special appointments there was a cadre of 18 epidemic sub-assistant surgeons and 4 assistant district health officers.

Other rural health personnel consisted of 57 public health and 29 vaccination inspectors, 300 vaccinators, one leprosy officer and one assistant leprosy officer. Seven districts had no public health inspector and in most districts the number employed varied from 1 to 3.

At the end of 1934, 1st class whole time M. O. Hs. were employed in eight out of 9 municipalities having a population of over 25,000 and 2nd class in 6 out of 18 municipalities with a population above 10,000 and in two towns with populations below 10,000.

Urban areas employed 123 public health inspectors and 96 vaccinators. Although under section 43 of the Burma Municipal Act, every town is required to employ at least one public health inspector, the three towns of Minbya, Myitnge and Myinmu were still without them.

The Hlegu Health Unit.—The D. P. H. summarises the progress made since its inception in 1930 in the following words:—

“The Health Unit, Hlegu, in its fifth year of existence, had a very satisfactory record of work. Each year since the unit was started in 1930 has witnessed the introduction of some additional type of activity and improvement and the standard of public health administration which has now been reached in the Hlegu township is a satisfactory one. The early period of scepticism and doubt on the part of the inhabitants has been left behind, and the unit is now firmly established, conferring real benefit on the people whom it serves and standing for the rest of the province as an example of progressive rural health work carried out on sound lines.”

The Harcourt Butler Institute of Public Health.—Four private practitioners were trained for the License in Hygiene. The Public Health Inspectors' class was suspended as a measure of economy. The chemical and bacteriological sections functioned as usual. The plague section, in addition to the rats examination for plague infection, studied the Liverpool Danysz and Rattin viruses obtained from the Lister Institute. These were not as successful as claimed. The malaria bureau continued its investigation of malaria incidence in selected areas in the districts of Shwebo, Hanthawaddy and Insein.

In Appendix IV on pages 220-21 will be found details of health staffs employed in different provinces.

Medical Inspection of Schools and Colleges.

51. Arrangements for the medical inspection of school children are being developed in some provinces notably the Punjab, Delhi, U. P., B. and O. and Bengal; but in too many cases these are confined to inspection and diagnosis and are not followed up by effective measures for treatment. These activities are controlled by the provincial Education, Medical and Public Health Departments. Although there is apparently no lack of coordination, the absence of uniformity in the particulars supplied is conspicuous.

N.-W. F. P.

An additional A. D. P. H. was in charge of school medical inspection, which was continued in the municipalities of Peshawar, Bannu, D. I. Khan, Kohat and Abbotabad. Children numbering 42,794 were examined between July 1933 and June 1934. Out of 17,238 found with defects, 82 % were treated and 4,625 surgical operations were performed. Over 14 % were found unclean; 15 % had dental disease; 10 % diseases of external eye; 6 % enlarged tonsils; 5 % enlarged spleen; 4 % defective vision; 3 % ear, nose or throat troubles, whilst 8 in every 1,000 children had skin disease.

Extractions of carious teeth were done in hospitals and filling and scaling by private practitioners. External eye diseases amounted to 10 % of the total in Peshawar, 11 % in Bannu, 13 % in D. I. Khan, 4 % in Abbotabad and 2 % in Kohat. The chief causes of defective vision were errors of refraction and trachoma.

Other defects included malaria, 715 cases or 2 %; anæmia 792 or 2 %, tuberculosis of lungs 12 and other tubercular disease 70. Three unprotected children were vaccinated and 622 others were revaccinated in Bannu.

School dispensaries have not been provided but a few simple medicines for minor ailments are kept in some schools. Mid-day meals were issued to three schools in Peshawar and Bannu. Lectures were given to students on first-aid, personal hygiene, prevention of diseases, formation of regular habits, etc.

Punjab.

The activities of the Public Health Department were confined to inspection of sanitation and environment of schools, while the medical inspection of school children was, as before, controlled by the Medical Department. The scheme described in this Report for 1933 continued to work but an extended scheme of school medical relief, including girls schools, was under consideration.

Delhi.

Medical inspection staff comprised one assistant surgeon supervisor, who also acted as a part time supervisor for rural areas, and one male and 2 female sub-assistant surgeons, one of the latter being part time. For rural areas the arrangements were as described in the Report for 1932. Bad location of institutions and over-crowding in urban schools particularly in Delhi city as also the common drinking glass or cup, and lavatory (flush type) arrangements were features, requiring early attention.

In the province as a whole, of the boys examined 24 % were found suffering from trachoma; 21 % from enlarged tonsils; 15 % from defective vision; 10 % from gland diseases and 8 % each from malaria and diseases of teeth whilst 11 % were found unclean. Of the urban boys 27 % were trachoma infected; 23 % had enlarged tonsils; 16 % defective vision; and 12 % diseases of glands. The rural girls suffered chiefly from enlarged tonsils, 12 %. Trachoma is not so serious a problem in rural areas where only 4 % of the girls and 6 % of boys examined were found infected.

Of 14,952 boys and 1,757 girls recommended for treatment in urban areas, and 1,892 boys in rural areas, only 946, 462 and 971 respectively were treated.

Of 182 girls found unprotected in urban areas only 35 were vaccinated or revaccinated. First-aid boxes were maintained in 8 district board middle schools.

United Provinces of Agra and Oudh.

The "central school dispensary" scheme, drawn up by the Hygiene Publicity Bureau in 1933, was started this year in the towns of Benares, Agra, Lucknow, Cawnpore and Allahabad. Owing to its success it is proposed to extend it to 8 other towns. A total of 6,886 children attended these dispensaries and, as indicated by treatment cards, 54 % of cases turned up for treatment in Lucknow, 95 % in Agra and 57 % in Benares. In all clinics, due attention was paid to the correction of defects of vision and teeth and on an average 200 retinoscopies were done by M. O. Ss. and 100 cases attended by honorary dentists in each centre. Laboratory examinations showed that 13 % of children in Queen's College, Benares, harboured microfilaria.

About 700 scholars were fed on milk and the use of sprouting gram was continued.

In other areas, the school boys medical association provided treatment by opening dispensaries in 7 schools in Gorakhpur. In Fyzabad, first-aid dispensaries were provided in 13 municipal schools, whilst no less than 4,000 such dispensaries were at work in the province.

Anti-meningococcal prophylactic inoculations were given to 3,721 children in Agra city where 21 cases of the fever occurred; Anti-plague inoculations were given in Saharanpur, Cawnpore, Agra, Bareilly and Gorakhpur and anti-cholera inoculations in Lucknow, Agra, Allahabad, Benares, Bareilly and Gorakhpur.

In Benares, scholars have been classified into ages according to physical development and graduated exercises have been prescribed for the various physical age-groups.

Village school teachers from Lucknow, Moradabad and Gorakhpur were trained in rural reconstruction work at Partabgarh, Gorakhpur and Bulandshahr.

In 252 out of 464 schools 14 % of the children examined were found to have dental defects, 4 % pyorrhœa, 15 % tonsillar defects, 9 % eye diseases, 17 % defects of vision, 2 % lung diseases, 1 % enlarged spleen and 4 % skin diseases, whilst 3 % had acquired deformities and 3 % were mouth breathers. The school health officers in 14 municipalities detected defective teeth in 15 % of children, pyorrhœa in 4 %, tonsillar enlargement in 5 %, mouth breathing in 3 %, eyelid diseases in 12 %, defective vision in 7 %, enlarged spleen in 2 % and skin disease in 4 %. Thirty-eight goitre cases were found in the town of Pilibhit, 149 in Bahraich, 5 in the district of Ballia, 8 in Garhwal and 82 in Gorakhpur.

Bihar and Orissa.

The school health staff remained the same as in 1933, but, owing to the earthquake, much progress in school medical inspection was not recorded. Of 2,287 boys examined 42 % had defects; the corresponding figures for girls being 78 % out of 485 examined. The majority of these, as usual, had skin troubles, enlarged glands and carious teeth: 2.5 % of

boys suffered from common eye diseases, *e.g.*, trachoma, conjunctivitis, blepharitis and corneal opacity, 7 % had visual defects due to errors of refraction; and 3 % had heart disease. Re-examinations showed improvement in 367 boys and 94 girls.

Lantern lectures on hygiene, sanitation and common epidemic diseases were delivered to students of the Xth and XIth classes of the high English schools, attendance being compulsory.

M. O. S.'s inspected school and hostel buildings and these inspections are said to have led to improvements in sanitation, urinal and latrine arrangements and water supplies. They also inspected conditions of physical training.

The scheme for providing a mid-day meal at Re. 0-6-0 per student per month was introduced in Purulia.

Bengal.

The 41 medical officers examined a total of 17,602 children in 161 schools. Three full-time school medical officers examined 5,160 scholars in 30 institutions in Calcutta, whilst other medical officers examined less than 1,000 children each. Out of 17,602 scholars examined, 19 % were ill-nourished; 13 % were badly clothed; 31 % were bare footed; 6 % had skin diseases; 12 % defective teeth; 3 % nasal disease; 11 % enlarged tonsils; 2 % adenoids; 4 % enlarged lymphatic glands; 2 % lung disease; 16 % eye disease; 2 % infectious disease; while 1 % were dumb.

In height and weight the pupils compared unfavourably with recognised anthropometric standards.

Of 161 schools examined, 18 were found to have insufficient floor space, 9 insufficient lighting, 7 had neither privies nor urinals and 7 were without a playground.

In 4,865 schools in 25 districts 147,599 pupils were examined by rural sanitary inspectors. Of these 14,133 were unvaccinated and 41,776 had enlarged spleens.

Central Provinces and Berar.

School medical inspection was carried out by the urban dispensary medical officers who inspected on an average 82,847 boys and 16,096 girls each month. Of these 0·3 % children were found unvaccinated, 1 % with enlarged spleen and 2·3 % suffered from contagious or other diseases. The epidemic dispensary staff inspected on an average 103,831 students per month.

Bombay Presidency.

The Presidency is still without a scheme for the medical inspection of school children, but 131 schools were visited in Sind by the inspectors of sanitation and vaccination to ascertain the vaccinal condition of school children. Sanitation, ventilation and water supply also received attention during these inspections. Of 3,806 children examined, 27% were found with enlarged spleen.

Madras Presidency.

It was decided to credit to Government the fees received by officers of the Public Health Department for issue of sanitary certificates to schools. In

view of the elaborate public health staff in districts, there is a proposal to discontinue the practice of empowering medical officers to grant these sanitary certificates. In this connection the amendment of the relative sections of the Madras educational rules and the code of regulations for European Schools was under consideration of the local Government.

Assam.

Periodical medical examinations of pupils of selected institutions were carried out by medical officers and remedial measures were suggested and lectures on general hygiene and sanitation were delivered.

Burma.

Medical inspection of scholars was, as in 1933, limited to those English and anglo-vernacular schools which can either provide the cost or can arrange for its being done without remuneration. Health reports were available for 27 schools and of 6,979 pupils on their rolls, 98·5 % were examined. Of these 70 % were reported to be vaccinated ; 27 % revaccinated ; 2 % had had smallpox ; and 1 % were unprotected. Common disabilities were defective teeth 19 %, enlarged tonsils 14 %, defective vision 6 %, trachoma 4 %, skin diseases 4 %, anæmia 4 %, defective throat 2 % and enlarged spleen 1 %.

Prompt measures were taken, when necessary, to check the spread of contagious disease. General sanitary conditions of school buildings, including arrangements for water supply and conservancy, were reported as satisfactory.

Health Education.

52. As far back as February 1913 the Government of India in their resolution on Indian educational policy dealt at length with the need for instruction in hygiene in schools and for medical inspection of pupils and schools premises, and an Imperial grant of 25 lakhs was made in this connection. Since that date practically all provinces have been teaching hygiene in the primary, middle and high school classes, though the extent to which the subject finds a place in school curricula and the actual classes in which it is taught vary somewhat from province to province. Most provinces have had special text books prepared, for the different grades of schools ; text books which include lessons on hygiene, public health, elementary biology, the dangers of alcohol, personal cleanliness, first-aid etc., etc.

In Madras such text books are available in English, Malayalam, Tamil, Telugu and Kanarese. Similarly in Bombay, as long ago as 1917, special text books were compiled. In Bombay hygiene is a compulsory subject in all primary schools and in all girls' schools in Sind, and physiology and hygiene are in the groups prescribed for the Matriculation course. In Bengal hygiene is a compulsory subject in all primary schools and is also included in the high school syllabus. In the U. P. hygiene is included in the syllabus for primary schools and for the middle sections of all vernacular schools and is an optional subject in the Intermediate examination. In the Punjab, physiology and hygiene are included in the school courses and also in the Matriculation course. In Burma hygiene is a compulsory subject in classes II to VII of vernacular schools and in the primary and middle sections of secondary schools.

It can also be stated that in schools in which no direct compulsory provision of a separate course in hygiene is made, lessons in hygiene, elementary biology and kindred subjects are almost universally included in the ordinary class text books in English or the vernacular and form a subject of study in the language classes.

Social and moral hygiene and sex instructions have also been adopted in the schools in India to a limited extent. Since the visit of the British Social Hygiene Council's delegation to India, some years ago, the question of this instruction has been considered in all provinces. Most provinces have gone rather cautiously in this matter. Recently enquiries have been made by the Government of India from provincial Governments regarding the extent and nature of the instruction given and the necessity for an extension of such instruction is to be discussed at the first meeting of the Central Advisory Board of Education.

Fairs and Festivals.

N.-W. F. P.

53. No untoward outbreak of epidemic diseases occurred at any of the fairs.

Punjab.

The most notable event was the Phalgu fair held in Karnal district from 24th September to 8th October, which was attended by 1½ to 2 lakhs of pilgrims. The main activities of the Public Health Department included the cleaning up of the Pharal village nearby and of the fair area, the provision of a camp bacteriological laboratory under an Assistant Epidemiologist, chemical examinations of milk, *ghee* and other food stuffs, chlorination of the sacred tank and well waters, provision of an infectious diseases hospital and of bore-hole latrines. This and other fairs passed off without a case of cholera or other epidemic disease.

Sanitary arrangements at all important religious and cattle fairs were as usual supervised by the district M. O. Hs. and the A. D. P. Hs.

Delhi.

No infectious disease broke out at any of the fairs.

United Provinces of Agra and Oudh.

The sanitary and medical arrangements of all important fairs and religious gatherings were, as usual, supervised by A. D. P. Hs., those of smaller ones by district health staffs. Additional staff from the cadre of reserve M. O. Hs. or medical officers in charge of travelling dispensaries were detailed for anti-epidemic and sanitary measures, and infectious disease hospitals were set up. Temporary regulations under the Epidemic Diseases Act were enforced as necessity arose. As usual, incoming and outgoing pilgrims to the *Magh mela*, Allahabad, and to others were inspected medically.

All fairs passed off without an outbreak of epidemic disease.

Bihar and Orissa.

In addition to the sacred towns of Puri, Gaya and Deoghar which attract large numbers of pilgrims every year from all over India, many *melas* of purely

local interest are held in different parts of the province. The *Pitripaksh mela* usually held at Gaya in September attracts the largest number of pilgrims in South Bihar while the *Harihar Chatra*, held at Sonapur (Saran district) in November with an attendance of about three lakhs was the biggest cattle fair.

The Snan and Rath-jatra festivals were held at Puri on the 27th June and 13th July. About 75,000 pilgrims visited Puri during the Car festival. The epidemic staff comprised 5 sub-assistant surgeons deputed by the provincial Public Health Department and one temporary medical officer appointed by the Puri Municipality. Routine preventive measures included the chlorination and treatment with cholera-phage of all sources of water supply, treatment of all cholera contacts with cholera-phage, arrangements for prompt reporting of cases of infectious diseases, ambulance carts for removal of cholera cases, anti-cholera inoculations among the local population before the *mela*, etc. It is gratifying to record that, although cholera cases were occurring at the time in Puri district and in other parts of India, the incidence of this disease in the *mela* area was not high and only 95 cases with 14 deaths were reported.

At the Sonapur fair, only one case of cholera was reported. Three M. O. Hs. were detailed by the provincial Public Health Department to supervise sanitary operations.

Sixteen attacks and 5 deaths from cholera were reported during the *Pitripaksh mela* at Gaya; but the disease did not assume epidemic proportions although the attendance was nearly 60,000.

Bengal Presidency.

Except for 4 cases of cholera reported at the Ganga Sagar *mela* in the Presidency division and four at fairs in the Dacca division, this province again presented a clean bill of health.

Central Provinces and Berar.

Except for one case of cholera at the Sheorinarain fair in Bilaspur district, no epidemic disease was reported at any of the 86 fairs. Special arrangements were made for the disinfection of water supplies, conservancy and isolation and treatment of infectious cases. Eighty-two fairs were supervised by the epidemic and dispensary staffs, 2 by the health publicity officer and two by other medical officers.

Bombay Presidency.

At Pandharpur 9 cases of cholera, 2 cases of plague and 1 of smallpox were recorded during the Ashadi fair in July, which was attended by about 162,768 pilgrims. These cases were detected either before or soon after their entry into the fair area. The usual preventive measures were taken.

Except for one imported suspected case of cholera, the Kartiki festival at Alandi also passed off smoothly. There were 5 deaths from cholera during the Nivritti fair at Trimbak. Other fairs passed off uneventfully.

Madras Presidency.

There were 570 fairs and festivals of which 450 were celebrated during the first half of the year. All these passed off without an outbreak of cholera; except that a few imported cases occurred during five important festivals in the 2nd half of the year. Most of the important festivals in rural and urban

areas were as usual supervised by district health staffs, those in municipalities by M. O. Hs. where employed and the less important ones by health inspectors.

The district boards of Chittoor, East Godavari, Coimbatore, Tanjore, Madura, Anantapur, North Arcot, and Nellore carried out some permanent improvements in the pilgrim centres within their areas.

Assam.

All fairs passed off without an untoward event.

Health Propaganda.

Punjab.

54. No whole time publicity officer was employed but the provincial Public Health Department maintained an educational bureau which prepared propaganda material. The district M. O. Hs. delivered 20,009 lectures to school children and to audiences at fairs and on other similar occasions. Much valuable work was also done among women by the Inspectress of health centres. The most notable feature of the year was again the success of the public health section of the all-India exhibition held at Lahore, which was attended by several lakhs of persons. The health section, extending over 20 stalls, demonstrated the activities of the Public Health Department in the field of preventive medicine.

United Provinces of Agra and Oudh.

The Hygiene Publicity Bureau under the direction of an A. D. P. H., in addition to routine health propaganda supervised the health unit at Partabgarh, the composting work at Shahjahanpur, the village aid scheme and the medical inspection of schools. The publicity van of the provincial branch of the Indian Red Cross Society, equipped with models, films, posters and with a wireless set, travelled nearly 6,000 miles and gave 153 cinema shows to audiences numbering 132,000 persons. Cinema shows were also arranged on several occasions for ladies in Lucknow and during the local baby week, also during the Magh *mela*, Allahabad, and the Garhmuktesar fair. The touring motor dispensary maintained by the Lady Kinnaird hospital, distributed 2 lakhs of leaflets, 2,500 sets of posters and 5,000 other booklets at fairs and on other occasions in Lucknow district. Rural publicity work received attention in the districts of Partabgarh and Sultanpur. The Board of Public Health gave its usual grant-in-aid of Rs. 12,000 for the maintenance of the cinema section of this Bureau while local bodies contributed to the extent of Rs. 4,400. With a special grant of Rs. 5,580 from the local Government, a film on temperance was produced. Other new films produced included one on the activities of the Health Unit, Partabgarh.

Junior Red Cross groups, totalling 3,708 with a membership of 94,000, were at work in 2,886 schools, 91 per cent. being in rural areas. Their routine activities included health dramas, talks, songs, the preparation of health models, cleaning the school premises, etc., These groups are reported to have collected funds for making soak pits and improving wells; they persuaded people to be inoculated and did considerable anti-malarial and anti-rat propaganda.

A syllabus was prepared for the public health training of village guides for purposes of rural uplift.

Bihar and Orissa.

The Public Health Bureau continued its usual propaganda work by means of distribution of literature, public health exhibitions at fairs and *melas*, lectures, demonstrations, etc. The A. D. P. Hs. carried lanterns and sets of slides for exhibition while on tour in rural areas. The Red Cross health museum was maintained.

Bengal Presidency.

Twelve cinema parties worked in the Presidency under the supervision of the district M. O. Hs.; they gave 1,444 cinema shows and lectures to audiences totalling over 18 lakhs of persons and attended about 20 health exhibitions. One party was attached to the Government touring exhibition which travelled over 4 districts in Burdwan division and held 59 exhibitions. Radio, as a means of propaganda, was tried with success, 50,000 leaflets and 15,000 posters were distributed and four new films on malaria, tuberculosis, Calcutta health exhibition and the medical college centenary celebration were prepared.

Central Provinces and Berar.

The two health publicity officers visited 112 centres and delivered lectures. The epidemic assistant medical officers carried out similar work in rural areas.

Bombay Presidency.

Usual health propaganda connected chiefly with maternity and child welfare was continued by the 17 sanitary associations in existence. The Karachi sanitary association organised health talks to 24,548 women. The Broach association, in addition to the distribution of health literature, gave 48 magic lantern lectures on public health subjects and arranged health exhibitions in many places. The Ahmedabad Association arranged an exhibition at the South Daskroi taluka village uplift conference and exhibited models and charts on Red Cross Day. Under the auspices of the Bombay Association, hygiene lectures were delivered to the working classes. Other associations also worked according to local requirements. Sanitary and vaccination inspectors delivered lectures during tours on general sanitation, personal hygiene, etc.

Madras Presidency.

Several portable cinema sets and suitable films are now available for propaganda work in the districts. Pamphlets, leaflets, posters, slides, magic lanterns and films are stocked in the propaganda section in the D. P. H's. office and are supplied on demand to local bodies, health staffs and others. The district boards of Nellore, Cuddapah, Coimbatore and Chittoor maintained motor vans equipped with cinema machines, magic lanterns, health exhibits, etc., which toured into remote villages for the purpose of health propaganda. The health week was celebrated throughout the Presidency.

Altogether 139,186 lectures and short talks, 18,852 magic lantern demonstrations and 621 cinema shows were given to audiences totalling 78 lakhs. In addition, 1,461 health exhibitions and 813 health dramas were produced.

Four and 15 new leaflets on leprosy and tuberculosis, respectively, and a new set of coloured slides on plague were issued; gramophone music was

utilized for the first time for health education and 4 popular songs on flies, consumption, ante-natal care and care of the child were issued as gramophone records. Special grants-in-aid were given for temperance propaganda.

Assam.

Health propaganda, restricted in 1933 owing to financial stringency, was revived this year especially in regard to tuberculosis, the expenditure being met partly by the local Government and partly by the King George's Thanksgiving (Anti-Tuberculosis) Fund. Six sets of tuberculosis slides were purchased and 12 picture posters on tuberculosis were produced and distributed.

Burma.

The hygiene publicity bureau remained in charge of a specially selected Burman sub-assistant surgeon. During 1934, 132 lectures and 124 cinema demonstrations were given to audiences estimated at 90,000 in 21 towns and 38 villages. The Burma branch of the Indian Red Cross Society sanctioned a sum of Rs. 800 for the purchase of an additional copy of the Rockefeller Foundation film on malaria and for the local production of a Burmese film on child welfare. A total of 411,257 leaflets, cards, specimen lectures, handbills and posters was issued to the public; an English pamphlet entitled "The need for child welfare work in Burma" and three Burmese posters were added to the Bureau's stock.

The health staffs delivered 6,586 health talks or lectures, gave 213 magic lantern and 9 cinema demonstrations to audiences totalling 421,511 in rural and urban areas, and distributed 198,212 copies of health pamphlets, posters, etc.

Rangoon health week exhibition was again arranged in sections, each dealing with a specific phase of public health and this annual exhibition has proved most valuable as an educative measure and is exceedingly popular.

Industrial Hygiene and Mines.

55. The daily average number of persons who worked in and about mines regulated by the Indian Mines Act, 1923, was 192,210 men and 37,171 women. Underground labour totalled 109,023 men and 11,193 women. Of the women, 6,305 were employed underground in the coal mines in Bihar and Orissa, 3,914 in Bengal, 839 in C. P. and 135 in the salt mines in the Punjab. Deaths totalled 209 of which 157 occurred in coal mines alone; 73 persons lost their lives by falls of roofs, 60 by falls of sides, 4 in shafts, 16 by explosives, 20 by haulage, 15 by other accidents underground and 21 on the surface.

With a view to minimise accidents and to prevent the occurrence of miners nystagmus, the attention of owners, agents and managers of mines was drawn, this year to the British Coal Mines General Regulations (Lighting), 1934, which provide for improvement of lighting conditions below ground.

In Bengal and B. and O., although the prevalence of cholera increased this year, the general health of workers in the Jharia and Ranigunj Mining Settlement was on the whole satisfactory. The estimated population of the Jharia Mining Settlement was 530,022 and the death rate was 18 p. m. Cholera was the cause of 916 cases with 413 deaths. There were 959 cases with 71 deaths from smallpox.

The Board's maternity and child welfare scheme was further extended. Jharia, the largest town of the coalfield, has now 3 maternity and child welfare

centres, the staff consisting of two health visitors and 5 midwives who trained 41 indigenous *dais*, while a nurse for child welfare work was also engaged by the Dhanbad municipal board. Three outdoor leprosy clinics at Jharia, Katras and Dhanbad continued work ; 402 new patients attended and 17,088 treatments were given.

In the Asansol Mining Settlement, the birth rate was 29 p.m. and the death rate 22.3 p.m. The health of the colliery population, *i.e.*, the miners and their families, remained good. Mortality from fevers and respiratory diseases was high owing to the greater prevalence of malaria and pneumonia. There were 355 attacks and 151 deaths from cholera, anti-cholera inoculations numbering 73,819. Attacks and deaths from smallpox numbered 130 and 23, respectively and 13,840 primary and 36,523 revaccinations were performed.

The maternity and infant welfare scheme has three centres, each under a health visitor, with a lady Superintendent in charge. A health and baby week was organised in 8 areas under the joint auspices of the Board of Health and the local Health and Baby Welfare Society. There were 8 leprosy clinics, 4 maintained by the Board of Health and 4 by the Asansol Leprosy Relief Association.

Classes in first-aid were, as usual, held at 20 centres in the Jharia Coal-field, in the Mining areas of Singhbhum and Hazaribagh and in the Raniganj coalfields, 210 persons being awarded certificates.

Little progress is reported to have been made in housing and sanitation.

In Assam, Madras, Punjab, Burma no outbreaks of epidemic disease were recorded.

In the C. P. cholera was prevalent in a mild form at Balaghat causing 12 cases and 3 deaths, and at Tirody mine involving 156 cases and 33 deaths. Preventive measures included 3,069 anti-cholera inoculations. Malaria was unusually severe. Smallpox caused 130 attacks with 37 deaths during an epidemic at Tirody and 3,000 persons were vaccinated. The dispensaries maintained by the Manganese Ore Co., Ltd., continued to work usefully.

In Burma anti-malarial measures at Namtu and Bawdwin were continued while Tavoy and Mergui districts were free from serious epidemics.

The Factories Act, 1934, repealed the Act of 1911 and subsequent amending Acts. The total number of factories at work was 8,658 of which 4,023 were perennial and 4,635 seasonal. Nearly 70 % of the perennial factories were in the presidencies :—Bengal (1,139), Bombay (871) and Madras (720). In the C. P., Assam and Burma, factories were principally seasonal. District and municipal Health Officers continued to act as *ex-officio* additional inspectors of factories.

The average daily number of persons employed increased from 1,405,402 to 1,487,231. Women workers numbered 220,860 and children 18,362, these representing 15 % and 1 % of the total factory population.

Recorded accidents included 233 fatal, 1,440 serious and 16,114 minor. More extensive use of machinery was partly responsible for a higher number of accidents ; as also the development of new industries involving risks either unknown or insufficiently appreciated, increased pressure of work and increased unemployment, etc. Safety committees continued their useful work in some factories. The general health of factory employees was reported to be normal and no dislocation of industry occurred from epidemic disease.

Considerable progress was recorded with housing schemes in the U. P., Bombay, Punjab and Bengal. In Bengal the Bhatpara

water-borne sewage scheme was nearly completed, but in the C. P., water scarcity continued to hamper progress in this direction. The disposal of trade waste from the Ahmedabad mills in the Bombay Presidency and of effluent from sugar factories in the U. P. continued to present difficulties.

In the latter province crude waste water including filter press washings and molasses used to be discharged into rivers and onto lands adjoining them with considerable nuisance. For the disposal of sludge from the filter presses, the Public Health Department recommended mixing with earth, drying on platforms and subsequent use as manure. Analyses of factory effluents were made at the provincial Hygiene Institute indicating the necessity for treatment before discharge into watercourses or onto land. Standards of purity have now been laid down with a view to regulate such discharges, and byelaws have been amended to place the responsibility for the treatment and disposal of effluents in a sanitary manner on to the factory owners.

Improvements in ventilation were carried out in several factories in the Bombay Presidency and the question of better methods of dust removal in metal polishing factories also received attention. In Bengal, although lighting and ventilation were improved somewhat, many buildings in which small factories are housed still provide the chief obstacle to progress. In B. and O. in some factories in which mechanical removal of dust was not feasible, isolation of the dusty processes was effected.

Progress in welfare work included the provision of a crèche and the supply of milk and barley to children in one factory at Calicut and weekly free distribution of rice to children in a tea estate in Madras Presidency. In the Bombay Presidency the provision of crèches, the passing of a Maternity Benefit Act and the development of maternity homes in recent years are all steps in the right direction. In Bengal welfare activities included improvement of houses, bathing and drinking water facilities, appointment of medical or welfare staffs, recreation facilities for children, etc. In other provinces also welfare work received attention.

Accidents totalled 20,787 of which 95 % were recorded in perennial factories. Nearly 50 % of all accidents occurred in the Bombay and Bengal Presidencies.

Adulteration of Food.

N.-W. F. P.

56. The Punjab Pure Food Act, 1929 and the N.-W. F. P. pure food rules, 1931, were in force except in the notified area of Nowshehra Kalan. Of 104 samples of *ghee* and 23 samples of milk examined in the provincial laboratory, 44 (42 %) and 10 (43 %) were found adulterated.

Punjab.

A total of 1,021 samples, including 739 of milk, 60 of *ghee*, and 162 of water, were examined at the public health chemical laboratory. Milk samples included 681 examined at Phalgu during the fair held there (referred to in paragraph 53 on page 131) while 58 were received from local bodies, 56 % of the former and 42 % of the latter proving adulteration. *Ghee* samples included 32 submitted by local bodies, of which 70 % were adulterated, while 48 % of water samples were found unfit for domestic use. A standard of purity for malt vinegar was worked out.

During 1934, the Public Health Department chemist acted as Public analyst for 17 municipalities.

A six months course of training for public analysts was provided in the laboratory for three persons.

United Provinces of Agra and Oudh.

By the end of 1934, the U. P. Prevention of Adulteration Act was in force in 85 municipalities, 5 districts and 30 notified areas, also in several rural tracts and town areas. Altogether 6,448 samples were analysed by the Government Public Analyst; these included *ghee* 3,778, milk 1,675, edible oils 728, flour 72, butter 52, vegetable products 26 and others 117; of these samples 24 % were found adulterated.

Bihar and Orissa.

Over 700 food samples were examined in the Public Health Laboratory including 368 of *ghee*, 248 of mustard oil, 20 of sweets, 24 of milk and 32 of *atta*. Adulteration was found in 62 % of *ghee* samples, 38 % of mustard oil, 75 % of sweets, and 99 % of milk.

Bengal Presidency.

Of 5,707 samples of foodstuffs analysed at the Bengal Public Health Laboratory, 3,403 were received from districts and 1,496 from municipal boards. The percentage of adulteration is shown in Table IV (iii).

TABLE IV (iii).

Percentage of adulteration.

	District Boards.			Municipalities.		
	1932.	1933.	1934.	1932.	1933.	1934.
Mustard oil	53	33	18	42	28	19
Ghee	38	23	48	27	28	35
Milk	70	77	68	60	72	80
Butter	75	..	50	67	83	42
Dahi	57	86	100	63	78	80
Chhana	62	16	14	..	..	33
Atta and wheat flour	2	..	2	2	2	..
Tea . . . . .	..	..	7	..	..	6

The liter value of 29 samples of mustard oils of three species was found to range from 16 to 21, the average being 18, while the acetyl value of 14 samples varied from 20 to 88. The specific gravity of the same 14 samples at 15.5°C. taken by a Pyknometer ranged from 0.9128 to 0.9175.

Examinations of food samples made in the Dacca Public Health Laboratory showed adulteration as follows:—

	District Boards.		Municipalities.	
	Total examined.	Per cent. adulterated.	Total examined.	Per cent. adulterated.
Ghee	26	57	109	44
Mustard oil	1,112	48	78	16
Milk	354	76	343	44
Butter . . . . .	..	..	11	100
Dahi	66	87	8	50

Central Provinces and Berar.

The Public Health Institute carried out the analysis of 5 samples of butter and 8 of *ghee*, and reported adulteration in 4 and 6 respectively.

Bombay Presidency.

The Bombay Prevention of Adulteration Act of 1925 was in force in Karachi, Ahmedabad, Surat, Shikarpur and Broach. The chemical assistant in the Karachi laboratory, who is public analyst for Karachi, examined 1,211 samples of food-stuffs in addition to 207 samples of *ghee* for the use of Asiatic crews.

Madras Presidency.

The Madras Prevention of Food Adulteration Act was in force in all municipalities, employing M. O. Hs., in 6 other municipal towns and in one *Panchayat*. Of 6,200 food samples examined, 44 % were found to be adulterated. Under Madras Government No. 2479, Public Health, dated the 25th October 1934, the adulteration of gingelly oil was prohibited.

Assam.

Table IV (*iv*) gives the principal examinations of food samples and their results.

TABLE IV (*iv*).

	No. examined.	No. adulterated.	
		No.	Per cent. of total.
Milk	369	175	48
Ghee	92	55	61
Mustard Oil	99	38	40
Cocoanut Oil	5	4	80
Tea	10	3	30

Burma.

Food samples examined at the Harcourt Institute of Public Health, Rangoon, included *ghee* 108 with 25 showing adulteration ; rice 33 and 19 ; mustard oil 32 and 16 ; milk 32 and *nil* ; rice bran 28 and *nil* ; *dhal* 7 and 1.

Of 76 samples of *ghee* from Rangoon analysed under the Burma *Ghee* Adulteration Act, 10 proved adulterated.

Railways.

(a) Bombay, Baroda and Central India Railway. -

57. Under a chief medical officer, this railway employed 7 district medical officers, 71 assistant and sub-assistant medical officers, 59 dispensers, 2 matrons, 5 nursing sisters, 5 nurses, 1 drug inspector and 1 anti-malaria inspector. In addition, a number of civil surgeons and other medical officers were subsidised for services to the railway staff. Out of 359,388 new cases treated at railway hospitals and dispensaries during 1934-35, causes of sickness were classified in respect of 351,572 cases as follows ; air-borne cases 52,624, food and water-borne 39,778, insect-borne 66,497, infectious diseases 977, pyrexia

of uncertain origin 14,003, diseases of direct contagion 861, food deficiency 906, injuries 26,454 and other causes 150,367.

Cholera and plague were responsible for one case each, and of 266 cases of smallpox, 180 occurred among the unvaccinated. There were 5 cases of c. s. fever of which 4 proved fatal.

The anti-rat campaign and the usual anti-malarial measures were continued. A total of 8,900 vaccinations against smallpox, 105 inoculations against typhoid, 195 against plague and 2,476 against cholera were performed, and 214 persons were given anti-rabic treatment at the Ajmer Railway Hospital and 61 at other non-railway centres. Forty first-aid training classes were held and 370 out of 617 candidates obtained certificates; 17 were trained in home nursing.

(b) Madras and Southern Mahratta Railway.

This railway has 4 headquarters hospitals, 40 dispensaries and 3 first-aid posts. The headquarters hospitals are adequately equipped and facilities exist for major operative surgery in 3 of them. Over 3,400 inpatients were treated at these hospitals.

Of a total of 327,547 cases treated during 1934-35, malaria accounted for 5,834, dysentery 5,233, diarrhoea 3,654, smallpox 162, typhoid fever 130, measles 62, cholera 20 and plague 7 cases; while accidents were responsible for 28,920 and other causes 283,525 cases. Anti-cholera and anti-plague inoculations numbered 4,776 and 2,211, respectively and, although vaccination is not compulsory, 9,328 primary and re-vaccinations were performed and were largely responsible for the low railway incidence of smallpox in an epidemic period. The health department has taken notice of the high incidence of dysentery and typhoid, and preventive measures, especially improvement of water supplies, were being carried out.

A nursing service has been provided and midwives have been posted to various stations; there is a health visitor and a welfare centre at Perambur and baby weeks are held annually at Guntakal and Bezwada. The midwives in Perambur conducted 127 confinements in the families of the railway employees and 55 other cases. Of 1,210 employees examined in ambulance work, 746 passed the test.

During the meeting of the medical section of the Indian Railway Conference held at Bangalore in July, 1934, experiments were carried out in the use of hydrocyanic acid powders (calcid and zyklon B) for the disinfection of coaching stock. The results were not favourable.

(c) South Indian Railway.

There is one chief medical officer, and four district medical officers on this railway.

A total of 34,749 cases were treated including 11,930 due to infectious diseases. The total loss on account of sickness was 223,494 days or an average of 6.4 days per head. The death rate amongst employees was 3.9 *per mille*. Plague was absent; influenza was responsible for 3,673 cases and the number of days lost through this cause was 20,287. Cases of dengue numbered 247, cholera 48 with 20 deaths, and smallpox 124 with 12 deaths.

Malaria is not a serious problem; 107 indoor cases were treated with atabrin and plasmoquin with satisfactory results. Outdoor cases numbered

only 1,362 and these were treated with cinchona febrifuge, quinine, etc. The occurrence of sprue, diarrhoea, chronic dysentery and many chronic ailments, e.g. anæmia, rheumatism, etc. both with and without a history of dysentery was studied.

Sanitary and conservancy arrangements were on the whole satisfactory. The ambulance course was improved; 147 employees completed the full course of lectures in first-aid and 86, including 2 officers, passed. Medical examination of school children was continued.

(d) Great Indian Peninsula Railway.

To meet the medical and sanitary needs of a staff of 80,261 as well as their dependents, spread over 3,627 miles of railway line, this railway maintained in addition to the Principal Medical and Health Officer, 11 district medical officers, 2 assistant medical officers, 21 assistant surgeons, 38 sub-assistant surgeons, 1 matron, 25 nursing sisters, 5 nurses, 3 health assistants, 24 sanitary inspectors, 1 malaria overseer and 49 dispensers. The cost of medical services aggregated to Rs. 5,86,303 and that of health services Rs. 4,11,473.

Altogether at the different railway medical institutions 183,275 cases were treated. The daily average attendance of employees at hospitals and dispensaries was 1,324. The number of days lost from sickness was 658,035 or more than 8 days per employee, the resultant financial loss amounting to Rs. 10,77,916. The most important causes of sickness were malaria and "other fevers", nearly 8 % of the total strength suffering from malaria and 18 % from other fevers.

The incidence of malaria was as usual highest in October and lowest in May. Routine anti-malarial measures were carried out. Influenza prevailed throughout the year, and was responsible for 7,002 cases with 2 deaths. Tuberculosis of the lungs was responsible for 190 cases with 7 deaths. Five non-fatal cases of plague, 67 cases of cholera with 17 deaths and 727 cases of smallpox with 26 deaths were recorded. There were 684 inoculations against plague, 20,856 against cholera and 14,807 vaccinations.

The birth rate was 11 p.m. and the death rate 6 p.m. The infantile mortality rate within railway premises rose to 247 per 1,000 births, Bombay District again giving the highest rate (344) and Bhusaval district the lowest (76).

At the anti-rabic treatment centres at Byculla, Bhusaval and Jhansi, 204, 43 and 96 cases respectively were treated.

Accident relief medical equipment was maintained at 36 railway stations and 483 first-aid boxes were supplied to the transportation department. Forty-four classes in first-aid were held, and of the 365 candidates, 273 obtained certificates, 10 vouchers, 4 medallions and 2 labels.

The Bhusaval infant welfare and maternity centre continued its useful work.

SECTION V.

MEDICAL INTELLIGENCE AND INTERNATIONAL HEALTH
INCLUDING PORTS.

Epidemiological Intelligence.

58. The office of the Public Health Commissioner continued to act as the epidemiological bureau of the Government of India. Issues of epidemiological returns included :—

(1) Weekly statistics of reported attacks and deaths from the major epidemic diseases in British India and Indian States ;

(2) A weekly epidemic diseases bulletin containing a summary of epidemiological information concerning both India and foreign countries and other items of special interest to health officers. Part I is concerned with India alone and has a wide distribution ; Part II, which for the most part includes information from outside India, is distributed in India only and consists of 6 sections dealing with vital statistics, quarantinable diseases and other health matters under the following categories :—

(a) The latest weekly wireless statement of the League of Nations, Health Organisation, Eastern Bureau, Singapore, as broadcast from Saigon and Malabar (Java).

(b) Epidemic disease incidence of foreign countries and ports, excluding Great Britain and the United States of America ;

(c) The latest weekly information from Washington of deaths from all causes in certain large cities of the United States of America ;

(d) Extracts from the weekly statement on England and Wales issued by the British Ministry of Health.

(e) A list of foreign countries and ports in which known or suspected cases or deaths from cholera, smallpox, plague, typhus and yellow fever occurred during the 12 weeks ending the period to which the weekly summary relates, and

(f) Notes on public health matters ; communication from the " Office International " ; proceedings of the Quarantine Commission of the " Office International " ; articles on port health, etc. ;

(3) Weekly mortality figures of certain diseases including " conventional " diseases in the chief sea-port towns ;

(4) Weekly recorded vital statistics in respect of towns in British India having a population of 30,000 and over ;

(5) Weekly cables to the British Ministry of Health and the Eastern Bureau of the League at Singapore, giving a review of the epidemiological conditions in ports as well as inland. Additional information is sent to the Eastern Bureau by post in regard to (i) infected ships arriving at Indian ports, (ii) ports in India declared infected and (iii) infected rats. The Ministry of Health includes this information in its weekly record of infectious diseases of ports ; the Eastern Bureau incorporates the information in its weekly broadcasts issued from Saigon and Malabar ;

(6) In accordance with the requirements of the International Sanitary Convention, 1926, periodical reports to the Eastern Bureau of the League

in regard to conventional diseases under articles 1, 2, 4, 6, 9, 12, 14, 16, 28, 50 and 57 of the Convention ;

(7) Quarterly Abstract of Vital Statistics in British India and Indian States ;

(8) On request from the Health Section of the League at Geneva statistical data in regard to notifiable diseases ; and quarterly review of the incidence of certain diseases in British India to the International Statistical Institute, the Hague.

Of these Nos. 1, 4 and 7 are published in the Gazette of India.

General.

59. The activities of the Office International d'Hygiene Publique and the Health Section of the League of Nations are as usual described in some detail in so far as they concern the bi-annual meetings of the former in Paris on the one hand and the Singapore Bureau, the Health Committee of the League of Nations and its various commissions on the other.

Office International d'Hygiene Publique, Paris.

60. (A) Lt.-Col. J. Taylor, D.S.O., I.M.S., as delegate for India, attended the spring meeting held at Paris from the 30th April to 9th May, 1934.

In the plenary session opened on 28th April under the presidency of Sir George Buchanan, reference was made to the recent deaths of Drs. Calmette and Cantacuzene, who had been associated with the work of the " Office ". The various sectional " Commissions " were constituted and the greater part of business was as usual transacted through them. Col. Taylor was appointed a member of the following five commissions :—Quarantine, Aerial Navigation, Yellow Fever, Cholera and Opium.

(a) The important problems dealt with by the Cholera Commission were :—

(i) *The efficacy of anti-cholera inoculation with a single dose.*—The Commission recommended that, while inoculation by means of a single dose was of definite value as in the Dutch East Indies, British India, Iraq and Indo-China, and could be employed under circumstances where it was the only practicable method, inoculation by two injections should remain the method of choice. This recommendation is in accordance with the views held in India.

(ii) *The preparation of a standard agglutinating serum for cholera vibrios.*—The report of the Cholera Commission sums up the results of the studies which have been made on the serum and on the antigens used in their preparation. It has been shown that the sera prepared by Drs. Madsen and Cantacuzene are the same qualitatively and similar to those used in many laboratories.

" Office ".—Office International d'Hygiene Publique, 195, Boulevard Saint Germain, Paris.

" I. S. C."—International Sanitary Convention.

The comments and the decision of the Commission are contained in the following extract from their report to the plenary session :—

“ To sum up, the greatest uncertainty still prevails regarding the significance of these non-agglutinable vibrios isolated from clinical cases of cholera. Are they merely variants of the principal agglutinable type, possibly in some cases the result of a modification which has taken place immediately after isolation, or are they fixed races? Can they, in either case, and especially in the first, be grouped into serological types—If such types exist, is the disease caused by them identical with true cholera? What is their importance from the epidemiological point of view?

“ Prolonged and careful investigation will be necessary to elucidate these problems and it forms part of the programme of study to be carried out in British India.

“ On the other hand, the recent work of Dr. Bruce White has led him to suggest that an important advance might be made by using, in the preparation of an agglutinating serum, only the O antigen of the cholera vibrio, i.e., a heated antigen. On this experiments will be carried out simultaneously in India and in the National Institute for Medical Research, London.

“ In conclusion, the Cholera Commission does not think that the preparation of a standard serum can be contemplated for the time being. Extensive and difficult preliminary investigations are necessary and the Commission considers that these investigations should preferably be made in countries in which epidemics of cholera and choleraic diseases occur. The investigations will have to clear up among others, the following points :—

- “ (a) What would be the practical advantage in diagnosis of the use of serum prepared with the O antigen of the cholera vibrio?
- (b) Do different serological types occur in true cholera and how can they be distinguished one from another?
- (c) If such types can be distinguished, what are, in each case, the characteristics of the corresponding clinical form and its rôle epidemiologically?

The Commission emphasises the importance of submitting all the strains of vibrio to careful study from the point of view of fermentation, in addition to their other characteristic properties.”

(iii) *The use of bili-vaccine as a method of cholera prophylaxis in the case of pilgrims proceeding on the Haj.*—At the request of the Public Health Commissioner with the Government of India, the suitability of this method of prophylaxis was discussed with a view to ascertain whether the method was likely to be acceptable in place of the present procedure of subcutaneous inoculation. The consensus of opinion in the plenary session was that the oral method of immunisation was less effective and that it was not considered acceptable as a method for application during the pilgrimage to Mecca.

(b) The Quarantine Commission, among other subjects dealt with :—

- (i) The optimum conditions which might be recommended for fumigation by the various processes employing sulphur;
- (ii) The application of Article 28 of the I. S. C. to loaded ships;
- (iii) The transport of sacks and jute cloth;
- (iv) Withdrawal of deratisation certificates;
- (v) Ports declared infected;
- (vi) Removal of Karachi from the list of ports qualified to give deratisation certificates.

Dr. Stock of the Ministry of Health who had been asked at the session of October, 1933, to submit to the “ Office ” provisional suggestions as to suitable standards for fumigation with S. O₂ submitted a valuable report which related chiefly to the combustion of sulphur in open containers, use of Salforkose

(combustion of carbon bisulphide), Clayton gas, by vaporisation of liquid SO_2 .

The Commission in accepting most of Dr. Stock's conclusions insisted that the question at issue was not that of laying down compulsory standards, nor even of rigorously fixing, particularly in respect of the conditions which would permit the acceptance or otherwise of certificates of deratisation of ships, either the quantities to be used or the effective time of contact required for a satisfactory fumigation. These can in fact vary according to local circumstances of climate (temperature and humidity), equipment of the port and otherwise. But it was none the less useful to indicate the limits within which a fumigation by sulphur would appear *a priori* to be satisfactory. The Commission also pointed out that in dealing especially with fumigations by sulphur (for the reason that such fumigations are still practised in a considerable number of countries), it is in no way its intention to advocate the use of any one particular process of fumigation.

In the opinion of the Commission, in general, whatever the process employed, it is necessary to require that the vessel should have been suitably prepared for the fumigation; rat harbourages should as far as possible have been opened up, bilges have been pumped out, and compartments have been carefully closed during the period of exposure.

(ii) *Periodical deratisation with loaded holds.*—The Commission noted that Article 28 of the Convention does not insist on deratisation being carried out with empty holds and there are many ships which are practically never empty, but it was considered that under certain circumstances it would appear to be advisable to defer deratisation until a ship could be fully unloaded before deratisation under the Convention and issuing a certificate.

(iii) *Alleged importation of plague to Peruvian ports by the Agency of fleas present in jute cargo from Calcutta.*—The Peruvian Government, suspecting that the S. S. "Solafric", which carried a cargo of jute from Calcutta to Peru, had introduced plague into Peruvian ports, imposed certain special restrictions on jute cargoes from Calcutta. These included the storage of jute bales for a period of 60 days and fumigation at the port of loading. The allegation of the Peruvian Government was that fleas present in the bales loaded at Calcutta were found alive and were infective when the ship arrived at Peru and that this was the factor responsible for the dissemination of infection. The matter was discussed, both in the plenary session and also by the Quarantine Commission in its two aspects, *viz.*:—(1) the general question of the risks which might exist of transmission in the manner suggested; to be taken in the Plenary Session; (2) the specific case of infected fleas in jute cargoes from Calcutta with the necessity of placing restrictions on such cargoes; to be dealt with by the Quarantine Commission in the first instance. The case of the Government of India for the removal of these restrictions was presented by the delegate for India in a comprehensive note dealing with the origin of the cargo of the "Solafric" and the circumstances of her voyage to Peru.

The Commission recommended that the terms of the I. S. C., 1926, would appear to provide adequate means for protection against the importation of plague and that exceptional measures were unnecessary. The matter was discussed in full session and the consensus of opinion was opposed to the Peruvian restrictions which have since been withdrawn.

(iv) The subject of the removal of Karachi from the list of ports qualified to give deratisation certificates was mentioned both in the Plenary Session and at the meeting of the Commission ; it was considered advisable that when a port was taken off the list of those qualified to give deratisation or exemption certificates, the detailed reasons for such action should be communicated to the "Office".

(c) Discussions in the Yellow Fever and Aerial Navigation Commissions related chiefly to the action to be taken with reference to Article 38 in the light of new observations on yellow fever, which have been made since the text of the Convention was drafted, and to the interpretation of the provisions of Articles 36 and 38 of the I. S. C. for Aerial Navigation, in relation to the special circumstances in the areas where positive mouse protection tests had been demonstrated without the occurrence of cases clinically recognisable. The reliability and significance of the mouse protection test was considered. As a result of tests with sera from known yellow fever areas in Africa and South America, from areas in South America where localised outbreaks have occurred at known date and from areas in these countries where yellow fever has not occurred, it has been concluded that the error of the test is less than 1 per cent. and that the positive results in areas definitely free from infection are probably due to experimental variations. The fact that in Brazil, amongst a population of 800 in which 19 cases had occurred, 60 per cent. were found to be immune suggested that an immunising infection may occur without the production of clinical symptoms of yellow fever. After considerable discussion a carefully drafted report was submitted, in which the opinion was expressed—that the provision of anti-amaryl aerodromes and the application of the other obligations of section II of the Convention should not be insisted on in the so-called "silent" areas where positive mouse protection tests formed the only evidence of yellow fever. This decision does not meet India's position and the reservations which the Government of India have already made when signifying their intention to adhere to the Convention would appear to provide a basis for action which may be considered necessary in regard to aeroplanes coming from such areas.

The results of the investigations into the presence of immune bodies against yellow fever in the blood of persons who have recovered from dengue on the whole tend to indicate that no effective immunity is produced ; in fact one series of investigations carried out by Sawyers' technique gave entire negative results.

The delegate for India informed the Aerial Navigation Commission that the Government of India had under consideration the question of the equipment of aerodromes necessary to enable them to ratify the Aerial Convention in due course. The Convention, which has been signed by 23 countries by April, 1934, still required 10 more countries to sign it before it could come into operation.

(d) The Smallpox Commission mainly dealt with the study of the best method of vaccination against smallpox. It was decided to publish their report on the subject, which has important chapters on the influence of the length and number of incisions, distribution and persistence of the virus in the body, criteria of successful vaccination, methods for determining immunity, duration of immunity, and standards of virulence of lymph.

(e) The Commission dealing with the international arrangements for the treatment of venereal diseases under the Brussell's Agreement of 1924

considered the revision of the "personal card", and the standard courses of treatment.

(B) At the October meeting of the "Office" India was again represented by Lt.-Col. Taylor. The Quarantine Commission considered various problems arising out of the administration of quarantine regulations and the conventions and agreements relative to quarantine work. Regarding the double fumigation of ships, it was considered desirable to obtain the views of signatory countries before deciding whether an addition to the Convention requiring a second fumigation would be likely to be accepted. In discussing the abolition of bills of health and consular visas thereon, a point arose as to bills of health in the Panama Canal. At present no such documents are necessary in this zone in the case of ships not subsequently touching at an American Port. The question of unifying the regulations for the Panama Canal zone with those of the United States was under consideration. This would result in Bills of Health being required—a move in the opposite direction from the purpose of these International Agreements. The subject of quarantine message by wireless was discussed both in full session and by the Quarantine Commission, which recommended their adoption for all ports of each country.

The Government of India statement of the reasons leading to the removal of Karachi from the list of ports qualified to give deratisation certificates was noted. Other matters discussed included construction of rat proof ships, high sanitary dues exacted from shipping companies in certain countries, infractions of quarantine regulations, and the appointment of an "Office" delegate to the Pan-American Sanitary Conference at Buenos Aires. Some of these subjects were earmarked for further discussion at the next meeting. The several communications presented to the Commission included one on fumigation by sulphur dioxide from India.

The Yellow Fever Commission discussed five notes containing fresh information on the recent epidemiology of yellow fever, on the results of further mouse protection test surveys and on inoculation.

These show that investigations carried out in Africa are rapidly throwing light on the distribution of the disease. At Wau in the Bahr-el-Ghazal, hitherto treated as a "silent" area, a case diagnosed as yellow fever on the basis of clinical symptoms and histological examination of liver sections has been recorded.

Col. S. P. James presented a report summarising the areas where the tests have proved positive without the recognition of clinical cases. The necessity for continuing investigations into the specificity of the test was emphasized. Laigret's new method of immunization in French West Africa, differing from those previously employed in that immune serum is not used along with the virus, was discussed, and the Commission expressed the opinion that the use of a living vaccine without immune serum may entail some risk. As regards the relative values of different methods of protective inoculation, comparative tests in yellow fever areas were recommended.

The subjects dealt with by the Aerial Navigation Commission included reports of the ratification of the International Sanitary Convention, the different regulations for anti-cholera inoculation and vaccination against smallpox in countries through which aircraft pass from India, the eradication of mosquitoes from aeroplanes, sanitary taxes on aeroplanes and passengers, and the Yellow Fever Commission report in relation to the I. S. C. for Aerial Navigation. Ten ratifications were still required to bring the Convention into force. The delegate for India explained the position in regard to India,

i.e., the proposed action taken to equip Karachi as a "sanitary aerodrome" under the Convention, as a step towards ratification.

The delegate for India presented Health Bulletin No. 20 prepared by Lt.-Col. Sinton, which describes the lines of investigations to be carried out in India into the eradication of mosquitoes from aeroplanes. General opinion was in favour of spraying with mineral oils to which pyrethrum preparations had been added.

The trend of discussion on the present high sanitary taxes imposed on aeroplanes was in favour of restriction of taxes to the amount required to cover the costs of special measures taken.

The most important topics discussed in the Cholera Commission included (i) the preparation of standard "O" antigen in a dried form for the purpose of raising high titre serum; (ii) the study of the El Tor vibrios, with a note by Dr. Doorenbos on the subject. The Cholera Commission took note of a communication by the delegate of Great Britain dealing with work undertaken in England in association with workers in India, on the preparation of a standard "O" antigen for the preparation of high titre diagnostic sera. The use of such an antigen would make it possible for workers in any part of the world to obtain comparable serological results and so obviate the difficulties which may occur from the use of vibrio strains liable to variation.

Dr. Doorenbos's note summarised the position as follows:—

"The presence of vibrio carriers among pilgrims returning from the Hedjaz has been revealed for five consecutive years at the Tor Lazaret, and in 1934, the number of such carriers was relatively high compared with the four preceding years. In spite of the fact that it has been possible clearly to differentiate the vibrios isolated from these carriers from the epidemic cholera vibrio, we are of opinion that they represent the true cholera vibrio in a "disequibrated" and attenuated form."

"If a large number of carriers of cholera vibrios, of whatever type, were found among pilgrims returning from Mecca, we should suspect the existence of a source of specific contamination in the Hedjaz."

The Commission expressed the view that in order to ascertain the presence of carriers among the pilgrims, investigations could usefully be carried out at ports of departure in the Dutch East Indies and in British India.

The delegate for India informed the Cholera Commission that the programme of research envisaged at the last session was in active progress in India.

The Smallpox and Vaccination Commission noted the progress in connection with research work on the cultivation of vaccine lymph of chick membrane. The attention of administrative medical officers was directed to the possibilities which this vaccine offers. Papers communicated included one on "Culture of Vaccinal Virus in Chick Membrane" by Drs. Pandit and Rao.

A note by Col. L. W. Harrison on proposals for standard courses of treatment of venereal diseases in merchant seamen was discussed and the Commission, while accepting the general principle of standard courses, considered that these may be regarded only as a guide to treatment to be modified according to circumstances. The delegate for India informed the Commission of the "Office" that the Government of India were studying the proposals and would submit their remarks later; he also stated that his Government were enquiring into the progress made at their various ports for the provision of facilities for treatment in accordance with the requirements of the Brussels Agreement, this information being necessary before ratification would be possible.

The Disinfection Commission considered reports on terminal disinfection as practised in different countries. Opinions on the value of the procedure varied from an expression of complete doubt as to its usefulness to acceptance of its value in certain diseases. It was generally accepted that disinfection during the progress of a case was of distinct value and was in some diseases, *e.g.*, typhoid fever, definitely indicated.

The delegate for India presented a paper on plague investigation in the Cumbum Valley by Dr. George and Major Webster, and a note on *c. s. fever* in India by Lt.-Col. Russell.

Singapore Bureau, League of Nations.

61. The Bureau was directed by Dr. C. L. Park except for 4 months when Dr. M. Ciuca, Secretary of the Malaria Commission of the League of Nations, officiated.

The Health Committee of the League of Nations, Geneva, at its meeting in May, 1934, emphasised the importance of the work included in the study of rural hygiene and the campaign against social diseases, and requested the Medical Director to give such effect as might be possible to the resolutions adopted by the Advisory Council on these questions.

It also invited the Eastern Bureau to undertake a study of the serum treatment of cerebro-spinal meningitis.

In September, 1934, the delegates for France and India to the 15th Assembly of the League at Geneva also made notable references to the value of the work of the Bureau, especially in regard to the first international course in malariology and the proposed conference on rural hygiene.

During 1934 no full meeting of the Council was held. The 8th Session of the Council held at Singapore on the 8th and 9th February, 1934, was attended by representatives from the Straits Settlements, China, French Indo-China and Japan. The Council passed the following resolutions amongst others :

“ The Advisory Council expresses its profound regret that, owing to his retirement from the office of Public Health Commissioner with the Government of India, it will not have the benefit of Major-General Graham's assistance at future meetings. It wishes to place on record its high appreciation of the valuable services which Major-General Graham has rendered to the Council, of which he was the first Chairman, and over whose meetings he presided so ably during the first four years of its existence.”

“ The Advisory Council having noted with satisfaction that the Government of the Straits Settlements is collaborating fully in the arrangements for the first international malaria course at Singapore, expresses its appreciation of the efforts made by the Principal of the Medical College in arranging the theoretical and laboratory courses of study, and wishes to thank the Director of Public Health Services, Dutch East Indies, the Director of Medical and Health Services, Straits Settlements and the Inspector-General of Medical and Health Services, French Indo-China, for providing facilities for the holding of field courses in their respective countries.”

“ The Advisory Council, having noted that information has been received from many countries regarding the existing arrangements for protecting the health of the inhabitants of rural areas, considers :—

(a) that preliminary informal discussions on this subject should take place during the meeting of the Far Eastern Association of Tropical Medicine at Nanking in October, 1934 ;

(b) that the year 1935 would be an appropriate one to arrange for a larger meeting of the Advisory Council, as envisaged by the resolution of the Health Committee in February 1927, and recommends that Rural Hygiene in the Far East should be one of the main subjects for discussion at this meeting.”

“ The Advisory Council recommends that the Eastern Bureau should undertake a study of the methods which are being applied in various countries of the Far East against social diseases, including in that term tuberculosis and venereal diseases.”

"The Advisory Council, having noted the relationship that exists between climatic conditions and the incidence of certain diseases, recommends the Bureau, when preparing charts showing the course of epidemics, to include all available meteorological information."

"The Advisory Council, having noted the valuable information and experience acquired by medical officers of eastern countries who have carried out individual study tours, recommends that this system should be extended as far as financial considerations permit."

"The Advisory Council, being informed that the regulations of certain countries prescribe that all passengers travelling by air must be—

- (a) vaccinated against smallpox,
- (b) inoculated twice against cholera, and
- (c) inoculated against plague—

even if coming from countries where these diseases do not exist, suggests that this question should receive consideration by the appropriate authority with a view to uniformity of practice being obtained."

This year advantage was taken of the presence of several members of the Advisory Council at the Nanking meeting of the F. E. A. T. M. in October, 1934, to discuss the activities of the Bureau since the previous meeting, in particular; the report of the first international course in malariology and the arrangements for the 2nd course; the data on rural hygiene supplied by eastern countries and the arrangements for an eastern rural hygiene conference; the budget proposals for 1936; and the date of the next meeting.

The collection and distribution of *epidemiological intelligence* continued to be the chief function of the Bureau and the weekly fasciculus prepared from reports of 35 countries was issued as usual. The short wave transmission of the wireless message from Saigon worked successfully and is now received in all eastern countries except South Africa and countries along the East African coast, which receive the long wave transmission from Tananarive. The broadcast of the weekly message in clear from Malabar was continued, as also weekly cables to Vladivostok, Canton, Bushire, Basrah, Aden and Victoria (Seychelles).

Infected ships.—The new procedure of notifying infected ships touching Indian ports, as agreed to by the P. H. C. with the Government of India, is that the Bureau will be notified of all such ships, but the responsibility for informing the next or subsequent ports of call will rest with the Bureau where the next port is more than five days' sailing distance from the port of departure. Where the sailing time is less, notification to the next port will be the responsibility of the port health officer of the port of departure.

Only 2 ships were infected with plague; in one case the infection was traced to Colombo and in the other case to Moulmein. Ships infected with cholera numbered 8; although the source of infection was uncertain in most cases, the origin was believed to be in ports in British India. Smallpox was responsible for 37 cases, in 15 of which the infection was traced to Indian ports. Chickenpox was reported on 51 vessels, cerebro-spinal meningitis on 3, measles on 22, scarlet fever on 5, mumps on 2 and leprosy on 1 vessel.

Pilgrim traffic.—The pilgrimage was declared clean by the Sanitary, Maritime and Quarantine Board of Egypt. It was reported however that the number of vibrio carriers among the pilgrims was higher this year than during the last 4 years. Nine agglutinating vibrios and 88 non-agglutinating vibrios were obtained from 5,027 specimens examined at El Tor. All the agglutinating vibrios were classified "Vibrio El Tor."

All pilgrims embarking from ports of British India were medically examined before departure, vaccinated against smallpox and inoculated against

cholera; those from the Straits Settlements underwent a similar procedure and those from the Netherlands East Indies were, in addition, inoculated against typhoid and dysentery. Dysentery was reported on 6, pneumonia on 7 and chickenpox on 6 vessels on their return voyage.

Disease incidence in ports.—Of the 10 plague infected ports 4 were in British India and included Bassein 50 cases, Bombay 37, Rangoon 27 and Moulmein 1. The ports on the east coast of India again reported the heaviest cholera infection, particularly Calcutta with 3,269 cases, other ports in India and elsewhere recording only sporadic cases.

Although the incidence of smallpox was lower than in 1933, the recorded figures in Calcutta, Madras and Bombay were nevertheless disquieting. Maps Nos. 2, 3 and 4 give the incidence of the major epidemic diseases in Indian ports.

Research programme.—The Director of the Bureau has again summarised some important researches carried out in eastern countries. He mentions the investigations into plague recrudescence and transmission in the Cumbum Valley of Madras Presidency, by George and Webster, which have suggested that rat-fleas remaining in burrows uninhabited by rats might be the off-season reservoir. Girard and Estrade have found in Antananarivo *X cheopis* among the debris from the milling of rice, thus showing the way in which human infection occurred, which had been in doubt owing to the freedom of houses from this species of flea. Hart and Pelikan (U. S. A.) who tried to discover the duration of life of fleas on rat-free ships, have concluded that under the climatic conditions likely to exist on vessels trading between India and Manila and Japan and Manila, life would not exceed five days, but with high humidity it might extend to 12 days. Cholera researches include the statistical carrier, clinical and other enquiries in Calcutta and the bacteriophage work in Madras, Assam and Calcutta (India); and the study of the vibrios of waters in Shanghai (China).

In regard to yellow fever the Director says:—

“The results of the more recent yellow fever protection test surveys carried out in Africa indicate that in the interior of French Equatorial Africa extensive epidemics of the disease have been present within recent years and that there is apparently no barrier against the extension of the disease towards the east.”

“A great increase in the percentage of children with positive sera was found in many towns along the main highway towards the east, the maximum being reached at Zemio near the Anglo-Egyptian Soudan. In the latter region positive sera have since been found among adults in several provinces, but among young children only in the Wau District of the province of Bahr-El-Ghazal.”

“Positive results with the sera of children under twelve were also obtained at Rumbek (one positive) and Juba (three positives). The results obtained correspond closely with the distribution of the disease that might be expected if the infection spread from the west.”

“Confirmation of the results of the biological tests, the specificity of which has in some quarters been questioned, was soon obtained by the occurrence at Wau in June of a case diagnosed as yellow fever, on the basis of clinical symptoms and histological examination of liver sections.”

“In Brazil a system of routine post-mortem removal of liver tissue and its microscopical examination is used to supply information concerning typical cases of yellow fever in so-called “silent” endemic foci.”

Liaison work.—This was continued by the distribution of documents and by personal contact.

Malaria course.—The first course was held in May and June, 1934, and was attended by 27 doctors from Australia, China, Formosa, India,

Indo-China, Japan, Malaya, New Guinea and Siam. The details of this course were given on page 151 of the Report for 1933.

Study tours.—The Health Section offered fellowships to Prof. Gater, Professor of Biology, Singapore; Dr. Soesilo, Medical Laboratory, Batavia-centrum; and Dr. Robin, Malaria Officer-in-Charge, Pasteur Institute, Saigon, to enable them to carry out a short period of study of anti-malaria control.

Rural Hygiene.—Preliminary discussions were held during the Nanking Conference of the F. E. A. T. M. in regard to the organisation of the proposed conference on this subject in the East. Provisional agenda were drawn up and it was decided to leave the preparatory work for the conference in the hands of the Eastern Bureau, but the Bureau of the Health Committee which met in November 1934 decided that such preparatory work could best be carried out by sending to eastern countries a group of rapporteurs comprising men of international standing in public health who should, if possible, have had experience of rural hygiene in eastern and other countries. It was also decided not to hold this conference before the later months of 1936.

Health Section of the League, Geneva.

62. The new Health Committee, appointed by the League Council on 17th January, 1934, met from May 11th to 16th. Lt.-Col. A. J. H. Russell, I.M.S., was unable to attend.

Dr. Madsen was re-elected President.

In view of the additional responsibility falling on the *per interim* advisory bureau by the fact that the Committee now holds only one session a year, it was decided to increase the number of elected vice-presidents from 3 to 4 and, excluding Sir George Buchanan, Vice-President, *ex-officio*, Surgeon General Cumming, Prof. Husamettin Bey and Drs. Jitta and Lutrario were appointed. The Darling Foundation Prize was awarded to Col. S. P. James of the British Ministry of Health. The Committee expressed its gratitude for the continued financial aid from the Rockefeller Foundation (100,000 dollars), also for the grant of £5,000 by the Millbank Memorial Fund for the work of the Health Organisation on nutrition and biological standardisation.

The quarterly, instead of bi-monthly publication of the Epidemiological Report, has necessitated the amplification of the "Weekly Record" which is now the principal channel for the rapid transmission of intelligence on the movement and prevalence of disease. The Committee decided to concentrate on the nomenclature of causes of death in view of the next decennial revision of the International list of causes of death which is not altogether suited to the requirements of tropical countries and which only a few countries have adopted. The preparation of an international list of causes of sickness was also contemplated.

Owing to the present economic depression, the Committee felt compelled to reduce the scope of liaison with health administrations but with greater concentration and more specialisation. The scope of the "reporting committees" was extended to include studies of the epidemiology of tuberculosis, of malnutrition as a factor in tuberculosis mortality, of the age at which tuberculosis is contracted in different communities, of the relation between the general and tuberculosis mortality and nutrition, housing, etc., and of methods for calculating infant and child mortality according to age-groups to establish reliable statistics among children vaccinated with B. C. G.

Discussions on the necessity of an enquiry into the epidemiology of syphilis led to the decision that Dr. Madsen should prepare a note on the experience of the Scandinavian countries and communicate it to his Spanish, United Kingdom and Netherlands colleagues.

The resolution adopted by the Committee on medical education and the training of medical assistants was as follows:—

“The Health Committee considers that the Health Section should include in its programme the collection of information on this subject, utilising the Singapore Bureau in the case of Eastern countries.

“The object is to obtain and present information as regards the arrangements made in particular countries which may be of service to the administrations of other countries with similar problems. The Health Section after obtaining such information may consider it desirable to present any resumes or observations which it considers useful for the purpose in view.

“This enquiry could, without difficulty, be made parallel to and be co-ordinated with similar enquiries carried out independently. For example, the enquiry should wherever possible, take into account similar studies which have been made by individual colonies themselves or by the country on which those colonies depend and also any relevant communications made to the “Office” International d’Hygiene Publique.”

The permanent activities of the League arise very largely out of conventional obligations and the undertaking of certain essential tasks, such as that of epidemiological service and the technical commissions. The temporary activities, owing to economic depression, continued to be restricted to matters of “widespread interest and urgent need.”

The proposal to enlarge the Commission on Biological Standardisation was approved. As regards the activities of the Malaria Commission, the Committee adopted the following 4 resolutions.

(1) “The Health Committee,

“In view of the success of the International Malaria Course held in the Far East in 1934;

“Decides that the time has come to consider the advisability of organising a similar course for certain Latin-American countries, taking into account the work accomplished by American malariologists and the need of collaboration with existing institutes:

“Entrusts the study of this question to the Health Section and, if the Section finds that the matter is urgent, invites the Bureau, in agreement with the Chairman of the Commission, to take all measures necessary for the organisation of this course.”

“The Health Committee,

(2) “Having noted the therapeutic experiments carried out with totaquina, and having studied Dr. William Fletcher’s reports thereon;

“Considers that totaquina seems able to fulfil the purpose for which it was intended, since, having regard to its efficacy—equal to or only slightly less than that of quinine—facility of preparation and cost price, its use would enable malaria treatment to be extended over a wider field;

“Recommends that the report, together with an introductory note, be distributed to Health administrations in malarial countries, and

“Requests the Health Section to assist health administrations who wish to employ this remedy in the treatment of malaria and to hold itself at the disposal of any institute which may desire to continue this research work.”

(3) “The Health Committee,

“Noting that the Study Committee as set up in 1930 contained too many members to be able to meet often;

“Decides not to renew this Committee

“It approved the list of members of the Malaria Commission submitted by its President.”

(4) "The Health Committee,

"Hope that, as the majority of the members will be in Madrid when the next Congress on Malariology is held, it will be possible to take the opportunity of holding a meeting of the Malaria Commission :

"Recommends that the Chairman of the Commission shall be its official representative at this Congress."

The Committee decided to recommend that the collaboration of the Health Organisation with the Government of China should be continued along present lines ; also to continue the investigations regarding comparative tests, in certain selected institutes, with anti-rabic vaccines killed by carbolic acid and ether, and regarding the plurality of strains of street and fixed virus and the rabicidal action of the serum of man and animals during and after immunisation. It was also decided to ask the Advisory Council of the Eastern Bureau to collect information regarding the efficacy of anti-meningitis serum in the Far East. The Committee further approved of the question of prevention of trachoma being included in the agenda of an early session.

League health commissions were at work on biological standardisation, malaria, opium, tuberculosis syphilis and cancer. The Commission on Biological Standardisation which was established in 1921 continued to collaborate with the laboratories of various countries and has adopted international standards and units for a series of therapeutic sera. In accordance with the recommendation of the first International Conference for the Standardisation of the vitamins held in London in June, 1931, a further conference was held in London in June 1934 to review progress and to reconsider standards provisionally adopted in the light of the experience gained. The Commission met under the Chairmanship of Dr. Madsen at Copenhagen in September 1934 and adopted standard preparations and international units for the following new sera, *viz.*, gas-gangrene anti-toxins (vibrion septique and oedematiens), anti-pneumococcus sera of types I and II and staphylococcus anti-toxin. The Bureau's report of November 27th 1934, contained the following paragraph :—

"While the 24 standard preparations and international units so far established by the Commission have been adopted in a large number of countries, their use is still far from general. The Bureau accordingly considers that the time has come to convene, for the end of 1935, an inter-governmental conference at which countries will be represented by the Directors of their official biological control institutes. The Conference will be called upon to confirm the results of the Commissions work during the last 12 years."

The activities of the Malaria Commission which was set up in 1924 are based on a programme of work adopted in November 1933, which included :— Investigations into biological properties of different strains of parasites : efficacy of treatment by synthetic remedies : and the possible relation between the geographical distribution of sub-species of *A. maculipennis* and malaria. The Commission continued to investigate the therapeutic value of totaquina and of recently developed synthetic drugs, such as plasmoquine and atebrin. In October 1934, the President of the Health Committee and the Chairman of the Malaria Commission met the experts in charge of experimental work for appraising the efficacy of the new synthetic drugs as compared with quinine in the treatment and prevention of malaria. A common programme was established for the prosecution of this work. In order to place at the disposal of doctors in the far east the advantage of specialised training, an international course in malariology was organised at Singapore with field work in the Netherlands Indies and Malay States. Another very valuable course for European malariologists was held under the auspices of the Commission at the Institute of Malariology at Rome.

To study the relation between the geographical distribution of *A. maculipennis* and malaria a committee of seven, including Sir Rickard Christophers and Col. James, was convened in Rome in August 1934, and the outcome of their discussion was a brief guide to the varieties of *A. maculipennis* which also gives an "identification key" showing the different characters of 5 varieties of *maculipennis* and of one closely allied species.

The opium commission has not only carried out all the work entrusted to it by international conventions but has also established a standard method of determining the morphine content of raw opium.

The enquiry into the treatment of syphilis involving a survey of 25,000 cases in selected clinics in 5 countries has been completed and has led to the establishment of certain principles which should govern the treatment of this disease, while two plans of treatment have been formulated which should give satisfactory results in ordinary cases of early syphilis.

Technical co-operation with various health administrations for specific health purposes was continued as follows:—

(a) With the National Chinese Government at Nanking on health administration. The technical agent appointed by the League submitted his first general report in May, 1934.

(b) With the Hellenic Government in the reorganisation of its public health service. The plan provided for the organisation of a permanent health service whose work would extend progressively in the period of 1931-35 to all the prefectures of Greece, and which would work under the technical direction of a health centre at Athens.

(c) With the Roumanian Government in a study of pellagra as an index of malnutrition in certain groups of the population. Recent researches have shown that there is every prospect of preventing pellagra among a population fed on maize, provided a portion of the maize is replaced by whole wheat.

(d) With the Czechoslovakian Government in respect of (i) continuation courses for health officers, courses in hygiene for medical practitioners and propaganda to instruct the population in the rudiments of hygiene; (ii) local sanitation; and (iii) co-ordination of the health work of public and private institutions.

In accordance with a recommendation adopted by the 1931 European Conference on Rural Hygiene a series of studies has been continued by institutes and schools of hygiene in various countries on the following subjects:

(i) Cost and efficiency of various types of rural health services (Spain, Hungary and Czechoslovakia);

(ii) epidemiology of typhoid fever in rural districts (Spain, France, Hungary, Poland, Czechoslovakia and Yugoslavia);

(iii) improvement in methods of storing manure and in particular, methods of protection against flies (Denmark, Spain, France, Poland);

(iv) milk supply (Spain, France, Poland, Czechoslovakia, Yugoslavia); and

(v) methods of analysing water and sewage (Poland).

The International centre for the study of leprosy was officially inaugurated in April, 1934, at Oswaldo Cruz Institute, Brazil.

The Indian Delegation to the 15th (Ordinary) Session of the Assembly of League of Nations.

63. The Delegation consisted of (1) His Highness the Right Honourable the Agha Khan, G.C.S.I., G.C.I.E., G.C.V.O., leader of the Delegation, (2) Sir Denys Bray, K.C.S.I., K.C.I.E., C.B.E. (Member of the Council of India) and (3) Sir V. T. Krishnama Chari, C.I.E., (Diwan of Baroda). Sir Homi Mehta, a member of the Council of State acted as substitute delegate.

In regard to the work of the Health Organisation of the League the Delegation reported as follows :—

“ A larger number of delegates took part in the discussion in the Second Committee, including the representatives of all the countries with which the Health Organisation is directly collaborating. These, while giving the Committee detailed and first hand information, were unanimous in expressing their appreciation of the great service which the Health Organisation was rendering to their countries.

“ The delegates of France and Poland emphasised the close relationship between health and public economy. The representative of Italy and Mexico urged the importance of large scale public works to combat unemployment, insisting that public works in the field of hygiene should be given priority. The delegate of Mexico recalled the resolutions already adopted by international bodies, as well as the work undertaken by several Governments, and suggested that the League of Nations and International Labour Office should study all measures taken to protect public health by a policy of public works ”.

“The delegates of Denmark, France, Hungary and Venezuela emphasised the valuable work which the Health Organisation is carrying on in the field of nutrition, the delegate of Venezuela pointing out, in this connection, the desirability of enquiring into the effects of manufactured food products on health, while the delegates of France and Hungary considered that enquiries should be made into the possibilities of extending the consumption of wheat to under-nourished populations. Many of these delegates referred to the value of the enquiry into the possible effects of the economic depression on public health, and stressed the importance of housing in this connection. It was considered that the Health Organisation must continue to deal with this question even after the gravity of the present economic depression has diminished”.

“ The delegate of India recalled the proposal made by his Government in 1932 to organise a rural hygiene conference for Far-Eastern countries and expressed the hope that the conference would be convened at a not-too distant date.”

“ A number of delegates, including those of the United Kingdom, Denmark, the Irish Free State and Poland, expressed their appreciation of the collective and individual study-tours, organised under the auspices of the Health Organisation.”

“ The representative of the Union of South Africa referred to the first Health Conference held in Capetown in December, 1932, and proposed that a Pan-African health conference should be held in Capetown in the autumn of 1935. He pointed out that the Union of South Africa attached great importance to this Conference and would accordingly be glad to afford it every material facility in its power. He thought it would be desirable for the Conference to have the advantage of the co-operation of the Office Internationale d'Hygiene Publique and asked that steps be taken to that effect.”

“ The delegate of the Irish Free State spoke of the efforts of his Government to reorganise hospital services in the Irish Free State, and expressed the hope that the forthcoming tour arranged by the Health Organisation to study the problem of rural hospitalisation in his country would be of value to all countries faced with similar problems.”

The Ninth Congress of the Far Eastern Association of Tropical Medicine (F. E. A. T. M.) held at Nanking, China, from 3rd—8th October, 1934.

64. Lt.-Col. A. J. H. Russell, C.B.E., I. M. S., attended as official delegate of the Government of India. Other Indian delegates were Dr. L. E. Napier from the Calcutta School of Tropical Medicine (Bengal), Lt.-Col. R. E. Wright, I.M.S. (Madras), Dr. C. G. Pandit (Madras), and Dr. (Miss) Alice M. Pannell, Dufferin's Fund. Delegates totalled 81 from India, Hongkong, China, Indo-China, Japan, Formosa, Korea, Kwantung, Macao, Siam, Netherlands Indies, Federated Malay States, Straits Settlements, London (Royal Society of Tropical Medicine), League of Nations, U. S. A. and Philippine Islands.

In the plague section Col. Russell read a paper on "Plague in India". Other interesting papers were by Dr. Wu Lien Teh on plague in China and by Dr. C. Y. Wu on his rat flea survey of Chinese ports.

Much interest was displayed in the subject of cholera, the discussion being opened by the delegate from India who described the work in this country. Dr. J. W. H. Chun dealt with cholera in the Yangtse Valley and Dr. Pollitzer spoke on the cholera vibrio and its variants.

A number of interesting papers were also read at the malaria and kala-azar sections.

Col. Russell spoke by invitation on "Medical Research in India and its practical application" at the International Rotary Club lunch giving a brief outline of the origin of the Indian Research Fund Association, its finance and control, and the results achieved.

During the Congress, India and its delegates had more than generous notice and treatment and there was expressed a continuous desire to learn what is being done in India in regard to medical and public health matters.

The resolutions of the Congress are given below:—

Plague.

"I. Whereas at the Eighth Congress held in Bangkok 1930 a resolution was passed strongly recommending rat-proofing of vessels as a practical means for preventing the spread of bubonic plague, and

"Whereas the value of this method has been amply demonstrated as a means of reducing and keeping rat-population of vessels to a minimum.

"Now therefore be it resolved:—

(a) To bring to the attention of all the constituent Governments the urgent advisability of adopting practical measures for the rat-proofing of vessels; and

(b) That serious attention be given to the question of how far similar methods could be employed to keep railway systems free from rat infestation.

"II. Be it resolved that in addition to rats and their fleas due attention be paid to other rodents and fleas, particularly *pulex irritans* capable of spreading infection".

Cholera.

"I. This Congress, having discussed the question of "carriers" of cholera, is of opinion that further investigation is desirable and recommends that such investigation be carried out in the countries of the Far East as and when opportunities arise.

"II. This Congress, having discussed the question of the protection conferred by the anti-cholera vaccine, is of the opinion that further statistically controlled field tests be carried out especially in those countries where such controlled tests have not yet been done.

"III. This Congress, having discussed the question of the relationship between the cholera vibrio and allied vibrios and their variants, is of the opinion that further study of this problem is desirable and that as far as possible the workers on this subject in different countries should exchange available information in order to correlate the results obtainable by the different methods employed.

"IV. This Congress proposes that further field and statistical work be carried out in order to obtain more exact information than at present available regarding the epidemic and endemic areas for cholera in the Far East."

Malaria.

"A resolution urging the need for co-operative international investigations of the bio-chemical changes occurring in the breeding places of anopheline mosquitoes, with a view to studying the effect of such changes in limiting the transmission of malaria."

"The Ninth Congress of the Far Eastern Association of Tropical Medicine recognizing the pressing need for co-operative investigations in the problems of malaria control wishes, in particular to emphasize and direct attention to the fundamental importance in malarial epidemiology of studying bio-chemical changes occurring in the breeding places of anopheline mosquitoes.

"This Congress considers that advances of practical utility in the control of malaria might be made if the data obtained by workers in the countries of the Far East were made comparable.

"It is resolved, therefore, "that, with the consent of the Governments concerned such investigations, conducted in various countries, be co-ordinated through the appointment of a joint committee of chemists and malariologists resident in these countries."

"It is recommended that this Committee should be invited to formulate the general lines upon which bio-chemical investigations shall proceed, and that they should be asked to report to the Director of the League of Nations Far Eastern Bureau concerning the principles and methods of study which are likely to be most profitable and from time to time concerning the results achieved from this application.

"The following experts shall be requested to serve as honorary members of this Committee.

"(1) Dr. R. Soesilo, Chief of Malaria Survey of Netherlands Indies and (Miss) Dr. C. Hyman representing the Netherlands East Indies.

"(2) Dr. H. G. Morin, Director, du Service du Paludisme en Indochine, Institute Pasteur de Saigon and Dr. Bader, Chemist of Malaria Service representing French Indo-China.

"(3) Dr. A. Neave Kingsbury, Director, Institute for Medical Research, Kuala Lumpur and Dr. J. L. Rosedale, Professor of Bio-chemistry, College of Medicine, Singapore representing British Malaya.

"Furthermore, this Committee shall be empowered to co-opt other workers experienced in this field of study so as to extend this investigation throughout the countries of the Far East."

Nutrition.

"That in view of the importance of the food-factor in disease, a section on Food Problems be added to the programme of the next Congress."

Sanitary Measures.

"That a section on sanitary measures with reference to water supplies and sewage and garbage disposal be added to the programme of the next Congress."

Port Quarantine.

65. When the revised International Sanitary Convention was signed in Paris on the 21st June, 1926, the Government of India was one of the high contracting parties. Unfortunately Government have not yet seen their way to ratify this Convention. This means that India is not bound by the international obligations imposed under this convention nor are other countries so bound in regard to India. One of the obstacles to ratification has been the archaic set of port health rules in operation in this country. The Government of India decided this year to revise these rules which are framed under Section 6(1)(p) of the Indian Ports Act, 1908, and Lt.-Col. G. G. Jolly, C.I.E., I.M.S., has since been placed on special duty for the purpose and has completed a revision to bring these rules into line with the Convention and with the present day needs of India. The revised rules have been circulated to local Governments and their adoption should render easy the ratification of the Convention.

Under the Devolution rules of 1920 port quarantine and marine hospitals form a central subject, but the maritime local Governments have been acting as agents of the Government of India and Port Health Officers work under their control. This position is not satisfactory. The ultimate responsibility rests with the Government of India, but the interests of the central and local Governments in matters of port health work are not necessarily always identical. It is also desirable that Port Health Officers should be in close and direct touch with the Public Health Commissioner and under his technical advice.

The imminent change in the constitution of India would appear to be a suitable occasion to transfer the entire control of port quarantine and hospitals connected therewith to the Government of India.

It would also be a suitable opportunity to introduce the system of Port Sanitary Authorities, a detailed scheme for which was drawn up by Mr. Clayton, I.C.S. in 1930. His scheme, as approved by the Government of India, has been circulated to local Governments. It envisages Port Sanitary Authorities composed of representatives of the Government of India, the local Government, Port Trust, and Municipal and other interests, the total not exceeding 10 or 12 at most. The field of activity of these Authorities would include the sanitation of the port area—an important part of which would be mosquito control and anti-rat measures—the provision of a safe water supply for ships, and measures for the prevention of the spread of communicable diseases through the port. The Port Health Officer would be the executive officer of the Port Sanitary Authority, but would remain in close touch with the Public Health Commissioner with the Government of India.

There is at present no uniformity in procedure in the various maritime provinces regarding the declaration of ports as infected with or free from epidemic diseases. While the Government of India have appreciated the desirability of laying down a uniform procedure for the guidance of maritime local Governments, they have been faced with difficulties in determining the conditions in respect of each disease which should lead to the declaration of a port as “infected” or “free”.

Article 10 of the I. S. C., 1926, implies that a port should be declared as infected on the occurrence of the first non-imported case of plague or yellow fever; so far as cholera is concerned, the implication is that a port should be regarded as infected only when the case of cholera forms a “foyer”, *i.e.*, when the occurrence of new cases outside the immediate surroundings of the first case prove that the spread of the disease had not been limited to the place where it began. In regard to typhus and smallpox the Article in question implies that a port should be declared as infected when the disease appears in an epidemic form.

The Public Health Commissioner with the Government of India recommended that in the case of plague, cholera, yellow fever, smallpox and typhus, a port may be deemed free from infection if no case has occurred within the previous four weeks, but the “Office International” at Paris was not in favour of a declaration regarding freedom from infection being founded solely on the fact that a certain period of time has elapsed since the last case of illness.

The Bombay Health Board declares Bombay as epidemically infected with smallpox when 52 cases with 30 deaths have been reported in any one week; when the numbers fall lower than these it is declared free. The similar provision regarding plague is that when human cases and deaths from this disease reach 34 and 30, respectively, in any one week, the port is declared infected. In this connection it should be remembered that human plague as a source of infection is of little or no importance except as an indication of the existence of a rat epizootic. Similar standards have been adopted at other ports. Further a cholera “foyer” cannot justifiably be associated with the term “epidemic”, for it implies the possibility rather than the fact of an epidemic, *i.e.*, the pre-epidemic or potential epidemic state or the proof that “the spread of the disease has not been limited to the place where it began”. This important question of introducing uniformity in these standards is at present being further examined in consultation with the Office International at Paris.

Although the International Sanitary Convention, 1926, has not so far been ratified, the Government of India agreed, as long ago as June, 1927, that they would transmit, through the Singapore Bureau of the League of Nations, the epidemiological and other communications provided for in Articles 1, 2, 3, 4, 6, 12 and 16 of the Convention. They also agreed to send direct to the Office International the information required under Articles 9, 14, 28, 50 and 57 as well as that relating to special agreements mentioned in Article 21. Action on these lines is being continued.

The Ports of Bombay, Calcutta and Rangoon are at present the only ports authorised to issue the deratisation and deratisation exemption certificates referred to in Article 28 of the I. S. C. of 1926. The Port of Karachi, formerly included, was excluded this year. The question of its restoration to the list has been raised but has not been decided yet.

As from 1st January, 1934, the system of sending wireless quarantine messages from ships, prior to their arrival, and according to the International Code, was introduced.

66. Table V (i) below gives the mortality statistics of the major ports according to the principal diseases :

TABLE V (i).

	Bombay.		Calcutta.		Madras.		Rangoon.		Karachi.	
	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.	Deaths.	Rate p.m.
Total	27,370	23·6	34,356	28·7	23,659	34·2	9,475	23·7	5,376	21·7
Smallpox	152	0·1	1,074	0·9	131	0·2	75	0·2	48	0·2
Cholera	13	...	1,360	1·1	166	0·3	4	...	...	...
Plague	31	...	...	...	...	...	27	0·1	...	...
Enteric fever	240	0·2	963	0·8	145	0·2	46	0·1	29	0·1
Malaria	101	0·1	714	0·6	193	0·3	99	0·3	36	0·1
Kala-azar	...	...	210	0·2	16	...	7	...	...	...
C. S. fever	...	...	...	...	1	...	4	...	...	...
Influenza	98	0·1	597	0·5	10	...	9	...	1	...
Measles	161	0·1	145	0·1	7	...	1	...	11	...
Dysentery	321	0·3	1,672	1·4	1,210	1·8	205	0·5	77	0·3
Tuberculosis	1,856	1·6	2,757	2·3	1,122	1·7	831	2·1	490	2·0
Other causes	24,377	21·1	24,864	20·8	20,658	29·7	8,167	20·4	4,684	19·0

Table V(ii) gives particulars of anti-rat operations within the port areas excluding operations on ships.

TABLE V (ii).

	Destroyed.	Examined.	Found infected with plague.
Calcutta	5,818	613	Nil
Chittagong	Nil	162	Nil
Karachi	2,514	395	Nil
Madras	Nil	Nil	Nil
Bombay	734,361	263,653	34
Rangoon	6,645	2,683	Nil
Cochin	16,292	327	159
Bassein	4,000	1,627	16
Moulmein	6,163	622	Nil

Fumigation of ships.—Sulphur dioxide fumigation by means of the Clayton apparatus remains the method in operation in Bombay, Calcutta and Rangoon ports. The question of the introduction of cyanide fumigation in Bombay Port has been under examination, but no decision has yet been taken. The method is obviously a dangerous one for adoption in Indian ports and would require very careful supervision.

Table V (iii) gives the number of deratisation certificates and deratisation exemption certificates issued at the three ports—Bombay, Calcutta and Rangoon—authorised for the purpose.

TABLE V (iii).

	Deratisation certificates.	Deratisation exemption certificates.
Bombay	57	16
Calcutta	41	20
Rangoon	44	15

Port of Bombay.

67. Lt.-Col. C. L. Bilderbeck, I.M.S., was in charge of the Port Health Department.

Incoming vessels.—Inspections were made of 116 vessels carrying 12,448 members of crews and 23,852 passengers and pilgrims. The following cases of communicable diseases were dealt with on arrival of vessels: measles 28, chickenpox 16, pneumonia and chigger 4 each and one case each of plague, smallpox, influenza, scarlet fever and typhus fever.

Outgoing vessels.—Altogether 701 vessels carrying 51,101 members of crews and 46,420 passengers were inspected. These figures are exclusive of troops who were examined by the military embarkation staff. In accordance with Government Notification, General Department, No. 1713, dated the 15th March, 1917, medical examination and disinfection of clothing and bedding were carried out on (a) 25,537 Asiatic and African members of crews, (b) 11,299 deck passengers (not provided with cabin accommodation) and (c) 4,169 pilgrims.

During the year 50 per cent. of the total British and foreign crews were found to be either unvaccinated or insufficiently protected against smallpox.

Among the passengers and crews of outgoing vessels, 10 cases of infectious disease were detected and these together with 15 contacts were prohibited from embarking.

Red Sea pilgrim traffic—outward.—All pilgrims were medically inspected, vaccinated against smallpox and inoculated against cholera before embarking. Their clothing and bedding in cases where there might have been exposure to infection were disinfected. Altogether 4,169 pilgrims in 8 vessels sailed for Jeddah between the 23rd November, 1933, and 7th March, 1934.

Inward.—Ten vessels, carrying 4,250 pilgrims from Jeddah, were inspected. Eighteen deaths occurred during the voyage and 6 cases of infectious disease were found on board 3 vessels on arrival.

General—disinfection.—Four vessels which became infected while lying in the harbour were disinfected. Under Article 28 of the I. S. C., 57 ships were

deratised by sulphur fumigation and issued with deratisation certificates while 16 were granted deratisation exemption certificates. In addition, 8 pilgrim ships were fumigated. The disinfection station dealt with 3,076 bundles of clothing and bedding received from different hospitals. Eight deaths from accidents occurred on board the vessels in the harbour or docks.

Rats and fleas.—Tables V (iv) and (v) summarise the anti-rat operations carried out in the port area on board ships and in the city of Bombay.

TABLE V (iv).

	Rats.				Ships deratised by				
	Killed.		Examined.		Plague infected.		Fumi- gation.	Fumiga- tion and trapping.	
	Town.	Docks.	Town.	Docks.	Town.	Docks.			
Total	727,815	6,546	257,107	6,546	34	...	...		57
January	70,727	480	26,963	480	...	...	...		4
February	61,807	333	23,211	333	11	...	...		6
March	60,035	487	18,039	487	16	...	...		1
April	53,413	583	13,551	583	1	...	...		1
May	58,038	542	21,532	542	3	...	...		2
June	52,706	528	17,126	528	2	...	...		1
July	49,144	581	16,492	581	...	...	...		1
August	53,735	568	19,564	568	...	...	...		4
September	57,427	530	19,190	530	...	...	...		9
October	72,928	742	28,622	742	1	...	...		13
November	68,155	548	25,996	548	...	...	...		7
December	69,700	624	26,821	624	...	...	...		8

TABLE V (v)

	Rats on boardships.					Certificates issued.				
	No. of ships.	Killed by trapping.	Killed by fumi- gation.	Examined.	Found infected.	Deratisation.		Exemption.		
						Loaded.	Un- loaded.	Loaded.	Un- loaded.	
Total	60	65	1,937	1,128	...	...	57	3	13
January	3	6	54	29	...	...	4	1*	...
February	6	7	37	29	...	...	6	1R	3
March	1	1	1	...	...	...	1	...	...
April	1	...	1	...	...	...	1	1S	1
May	3	12	65	76	...	...	2	...	1
June	4	6	232	18	...	...	1	...	4
July	1	1	16	17	...	...	1	...	...
August	4	5	105	67	...	...	4	...	...
September	9	2	550	317	...	...	9	...	...
October	14	9	445	295	...	...	13	...	2@
November	6	2	242	159	...	...	7	...	...
December	8	14	189	121	...	...	8	...	2

* 8,050 tons of oil.

S 6,845 tons of Deisal oil.

R 8,256 tons of fuel oil.

@ Partly loaded with oil.

Port sanitation.—The sanitary state of the harbour and of the *bunders* and docks generally was reported as good by the Port Health Officer.

Other matters.—Under Government of India orders, 413 inspections of the food supplies for lascar crews were made, the principal defects found being in *ghee*, 34 samples of which, out of 116, were condemned.

Port of Karachi.

68. *Staff and administration.*—Dr. B. F. Khambata, D.P.H., was Port Health Officer.

Incoming vessels.—During the year, 53 vessels including 7 pilgrim ships entered the port under the “Quarantine” flag. Necessary measures were carried out in respect of each. Of these vessels 48 arrived from the Red Sea and European and South African ports, one from the Persian Gulf ports and 4 from various Indian ports. No cases of plague, cholera, mumps, beri-beri, scarlet fever, yellow fever, jigger and sleeping sickness were recorded. Two cases of smallpox were detected, one among deck passengers on the S. S. “Varsova” and the other, a case of modified smallpox, on the pilgrim ship “Jehangir”. Other diseases included 6 cases of chickenpox, 6 of measles and 1 of cerebrospinal fever.

Outgoing vessels.—These numbered 721 with 64,707 persons on board. Of these vessels 409 were country boats carrying 5,048 persons.

Pilgrim traffic.—(a) *Outgoing vessels.*—Only one ship the S. S. “Rahmani” carrying 1,671 pilgrims sailed direct from Karachi, but 7 others which arrived from Bombay embarked 3,812 pilgrims at this port.

(b) *Incoming vessels.*—In all 7 ships arrived with 8,990 pilgrims, of whom 6,402 disembarked at this port, the others continuing their voyage to Bombay. During the voyage 29 deaths occurred from non-communicable diseases.

General—Rats and fleas.—Altogether 2,514 rats were destroyed. Among 395 examined in the Government Chemico-Bacteriological Laboratory, no plague infection was found.

Port sanitation.—The sanitary condition of the harbour was satisfactory.

Other matters.—Provisions and stores for the use of the Asiatic crews of 39 vessels were inspected as required under Section 91 of the Indian Merchant Shipping Act, 1923. Of 197 samples of *ghee* analysed, 69 were condemned.

Air traffic.—The Port Health Officer held collateral charge of Karachi aircraft during the year. In all 183 Bills of Health were granted to aircraft and 1,271 persons including passengers and crews leaving the port were medically inspected.

The companies operating planes from and to Karachi were (i) the Imperial Airways, Ltd., (ii) the Campagnie Air Orient Company (Fr.) and (iii) the Royal Dutch Air Mail Company. In addition, 13 British and 6 other private planes used the airport.

Port of Calcutta.

69. *Staff and administration.*—Military Assistant Surgeon Lt. Campbell, I.M.D., continued to hold temporary charge of this port. The other port health staff included three Assistant Port Health Officers, one medical inspectress, one sanitary inspector and one fumigation inspector.

Incoming vessels.—Since the discontinuance of routine inspection of all incoming ships from October, 1931, only those reported to be infected or “suspected” have been inspected by the Port Health Department. Therefore, of the 1,212 vessels entering this port during 1934 only 13 having 748 crews (95 European and 653 Asiatic) and 922 passengers on board underwent inspection. Six vessels having infectious diseases on board were disinfected. Admissions to and deaths in hospitals among European seamen were 430 and 8, respectively; the admissions included dysentery 31, influenza 20, diarrhœa 9, malaria 7, enteric fever 5, sunstroke 3, scurvy 1, and other causes 354 among whom all the 8 deaths occurred. Among Asiatic seamen there were 101 admissions and 7 deaths as follows:—Cholera 18 admissions with 3 deaths, enteric fever 2 fatal cases, malaria 3 non-fatal cases, influenza 2, diarrhœa and dysentery 1 each and other causes 74 with 2 deaths. Admissions for venereal diseases among European seamen numbered 20.

Outgoing vessels.—Of 1,210 vessels which left this port, only 874 with 66,908 members of crews and 2,405 passengers proceeding to ports beyond British India were inspected for the purpose of granting Bills of Health. As the town and port were free from plague, routine disinfection of clothing and bedding of Asiatic and African members of crews and of third class deck passengers was not enforced.

At the request of the shipping agents, 644 deck passengers on 40 ships proceeding to the Straits were vaccinated by the Port Health Department.

Pilgrim traffic.—Only one ship the S. S. “Alavi” with 286 pilgrims on board left for the Hedjaz. Before embarkation, all pilgrims were vaccinated against smallpox and inoculated against cholera.

General—Disinfection and fumigation.—The effects of crews and deck passengers continued to be disinfected at the four disinfecting sheds of the Port Health Department. Seventeen seagoing vessels, and 40 other craft were disinfected and 41 seagoing vessels were fumigated with the Clayton apparatus.

Rats and fleas.—Forty one deratisation certificates and 20 exemption certificates were issued.

Of 753 rats caught in the port and examined at the Bengal Public Health Laboratory, none were found to be plague infected.

Port sanitation.—The sanitation of the Kidderpore docks was as usual looked after by the Port Commissioners. The port sanitary inspector supervised the cleanliness of cargo boats plying in the river, also conservancy arrangements in the bathing and burning *ghats* within the limits of the port.

Other matters.—The municipal filtered water supplied to the shipping was satisfactory both in quantity and quality.

Port of Madras.

70. *Staff and administration.*—Madras is only a port of call, except for vessels going to Rangoon, Singapore, etc. An A. D. P. H. acts as part time Port Health Officer. The other staff comprised a nurse for the examination of female passengers and a sub-assistant surgeon.

Incoming vessels.—These numbered 739 and carried on board 65,490 crew and 55,077 passengers. One case each of measles, chickenpox and mumps were landed and sent to the Corporation infectious diseases hospitals.

Outgoing vessels.—Altogether 707 such vessels carrying 60,571 crew and 76,164 passengers were inspected and granted Bills of Health. Rules for

the prevention of the spread of smallpox from ports in the Madras Presidency to foreign countries were issued.

Disinfection of bedding and clothing of deck passengers and crew was carried out at the discretion of the Port Health Officer.

Rats and fleas.—No deaths among rats were found on any vessels that entered the harbour.

Port of Rangoon.

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

Incoming vessels.—A total of 875 vessels from Indian and 376 from foreign ports, carrying 117,896 members of crew and 241,204 passengers were inspected. Thirty cases of infectious disease were reported on 15 vessels—chickenpox 23, measles 3, cholera and smallpox 2 each. Except for one case of cholera landed at a previous port of call and one of measles removed by the military authorities, all were segregated and treated in the contagious diseases hospital, Rangoon. Further 15 unreported cases of chickenpox, 6 of measles and 2 of smallpox were detected on 18 vessels during inspection and removed to the contagious diseases hospital. Nineteen lepers were also discovered on vessels and except for one who was on his way to an asylum, all were allowed to proceed to their homes. A sharp outbreak of beri-beri was reported among the Asiatic crew of a vessel in December, 1934. Sixteen cases showing acute symptoms were removed to hospital; 2 died. Necessary measures for the prevention of further cases were taken. Twelve deaths from non-infectious diseases were also reported on 12 vessels.

Of a total of 246,593 passengers examined under the Burma Vaccination Act, 97,319 were found protected and 149,274 were vaccinated. The effects of 734 members of crew, 1,424 passengers, and 112 baggage coolies were disinfected.

Outgoing vessels.—These numbered 517. The effect of 35,394 members of Asiatic and African crews and 15,687 deck passengers were disinfected and 10,057 European members of crew and 4,071 saloon passengers were inspected. Vaccinations totalled 117 of members of crew and 291 of passengers. Baggage coolies numbering 3,690 were inspected and their clothes and uniforms disinfected prior to handling passengers' baggage.

Of 3,048 new members of crew inspected prior to signing ships articles, 3,008 were passed fit.

Five deaths from non-infectious diseases, one case of cholera, 3 of chickenpox, one of mumps and dysentery each were reported on vessels in the harbour.

General—Disinfection and fumigation.—Forty four vessels were fumigated by the Clayton machine and deratisation exemption certificates were issued to 15 vessels.

Rats and fleas.—The total number of rats killed was 6,645 and of 2,683 examined none were found infected. Both rat and human plague was absent in the port area in which 752 burrows were fumigated with cyanogas and 10,685 connecting burrows were blocked.

Port sanitation.—The sanitation of the Port Commissioners' area was maintained at a high standard.

Other matters.—Vaccinations performed amongst the employees of Port Commissioners numbered 2,544. Anti-cholera inoculations of members of crew

numbered 140. The provisions for the Asiatic lascar crews on 241 ships were inspected and of 147 samples examined, 28 of *ghee*, 13 of mustard oil, 5 of rice and one of *dal* were found bad or adulterated.

Port of Aden.

72. *Staff.*—Lt.-Col. E. S. Phipson, I.M.S. continued to act as Port Health Officer.

Incoming and outgoing traffic.—Bills of Health were granted to 1,709 vessels including 1,174 sailing under the British and 535 under foreign flags. Of the total 23 vessels arrived with 28 cases of infectious disease on board of which 16 were chickenpox, 11 measles, and one pneumonia.

Pilgrim traffic.—Only two deaths were reported among the 2,597 passengers on 9 pilgrim ships (British) which called at this port. All were medically examined but were not granted pratique.

Disinfection.—The disinfection stove on Flint Island quarantine station was maintained.

General.—The Port Health Officer continued to act as the inspecting officer of the port under Section 91 of the Indian Merchant Shipping Act, 1923, *vide* Government of India Notification No. 5 M II(4)/33, dated the 26th September, 1931. Medicine chests on one vessel and provisions on 3 were found in an unsatisfactory condition and remedied.

Kamran Quarantine Station, Red Sea.

73. The civil and general administration of the island is under the Government of India, but the medical administration of the Quarantine Station is under joint Anglo-Dutch control. The pilgrimage of 1933-34 which lasted for 4 months, opened with the arrival of M. S. "Peisandar" from the Dutch East Indies on the 14th November, 1933, and closed with the departure of the S.S. "Rizwani" from India on the 17th March, 1934. Twenty-two vessels of which 19 were British and 3 Dutch, carrying 13,519 pilgrims, passed through Kamran 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 9,937 were from British India, 2,465 from the Dutch East Indies, 835 from the Straits Settlements and 282 from the Arabian Coast. No "suspected" or "infected" vessels were reported, but 282 pilgrims were landed for disinfection, etc. No cases of infectious diseases occurred. Cases of ordinary illness were few. There were 6 deaths and 4 births aboard vessels during the whole season.

SECTION VI.
VACCINATION AGAINST SMALLPOX.

A. — British India.

General.

74. In spite of a decrease this year in the number of deaths from smallpox in British India to about four-fifths of the figure for 1933, the number of vaccinations performed has increased by 1,125,859 to a total of 23,269,224. This increase is spread over both primary vaccinations and revaccinations, the number of operations having increased by 209,061 and 916,793, respectively. Increases in the number of operations performed were recorded in most of the provinces, particularly in Madras and Bombay Presidencies. The increase in the former presidency was due to the prevalence of smallpox in epidemic form and the consequent demand for protection and in the latter to a vigorous campaign of mass vaccination.

Out of 9,238,897 registered infants, only 44 % were successfully protected. Until this exceedingly low percentage is at least doubled there can be little hope of preventing epidemic smallpox in the country. Nearly 96 % of the primary and 46 % of the revaccinations were recorded as successes. Details for each province are given in Table VI(i).

TABLE VI (i).

		Vaccinations.		Per cent. success.		Cost per successful case.		
		P.	R.	P.	R.	Rs.	A.	P.
British India . . .	{ 1934-35	10,128,115	13,141,109	96	46	0	3	11
	{ 1933-34	9,919,054	12,224,316	97	51	0	4	0
N.-W. F. P. . . .	{ 1934-35	142,543	114,192	98	84	0	1	11
	{ 1933-34	206,382	141,242	98	84	0	1	6
Punjab	{ 1934-35	917,582	2,195,905	99	65	0	3	0
	{ 1933-34	950,385	2,255,971	98	69	0	2	10
Delhi	{ 1934-35	18,547	15,338	97	63	0	4	10
	{ 1933-34	16,979	18,958	96	72	0	5	1
U. P.	{ 1934-35	1,575,704	282,025	95	40	0	3	11
	{ 1933-34	1,522,517	241,726	96	40	0	4	0
B. & O.	{ 1934-35	1,089,829	777,381	99	63	0	0	11
	{ 1933-34	1,065,592	851,134	99	64	0	1	8
Bengal	{ 1934-35	2,635,546	4,260,825	86	40	0	1	9
	{ 1933-34	2,532,230	4,107,104	89	43	0	1	9
C. P.	{ 1934-35	567,399	158,289	97	52	0	5	3
	{ 1933-34	570,833	117,798	97	53	0	5	7
Bombay	{ 1934-35	733,844	482,991	100	46	0	11	2
	{ 1933-34	688,659	301,371	100	53	0	12	9
Madras	{ 1934-35	1,381,176	3,842,744	96	27	0	5	9
	{ 1933-34	1,297,829	3,254,926	97	34	0	5	8
Coorg	{ 1934-35	8,112	17,101	95	64	0	5	3
	{ 1933-34	7,524	8,053	94	60	0	8	5
Assam	{ 1934-35	411,785	293,151	91	64	0	3	9
	{ 1933-34	402,375	304,085	92	61	0	3	9
Burma	{ 1934-35	621,449	697,519	96	32	0	9	7
	{ 1933-34	634,233	619,673	97	31	0	10	3
Ajmer-Merwara . . .	{ 1934-35	24,599	3,648	96	94	0	4	9
	{ 1933-34	23,516	2,295	95	97	0	5	6

P. — Primary.

R. — Revaccinations.

Success rates for the different provinces are given in the graph facing this page.

No cases of post-vaccinal encephalitis were recorded.

Vaccine Institutes and Supply of Vaccine.

75. Glycerinated lymph, manufactured at provincial vaccine institutes continued to be used throughout British India.

Manufacture and despatch.—Supplies of glycerinated chloroform lymph for the N.-W. F. P. were obtained as usual from the Punjab Vaccine Institute and gave good results. In the Punjab, vaccine lymph was prepared, propagated and despatched as in the previous years and the potency of the lymph was, as usual, extremely satisfactory. In other provinces glycerinated lymph prepared at the provincial vaccine institutes was used throughout the provinces and the supply and quality of the lymph were reported to be good.

Yield.—The yields of lymph obtained at the various vaccine depots are shown in the table below in grammes :

	Buffalo calf.	Ox calf.
Punjab	129·4	31·2
U. P.	55·6	23·0
B. & O.	57·2†	36·2
Bengal	†	25·9
C. P.	62·3	39·8
Bombay	*	32·8
Madras	18·8†	26·1
Assam	†	22·6
Burma	447·5	108·1

* No calves were used for vaccine preparation.

† Requisite amount of pulp is collected for seed purposes.

‡ Only a few calves are vaccinated for the regeneration of seed lymph.

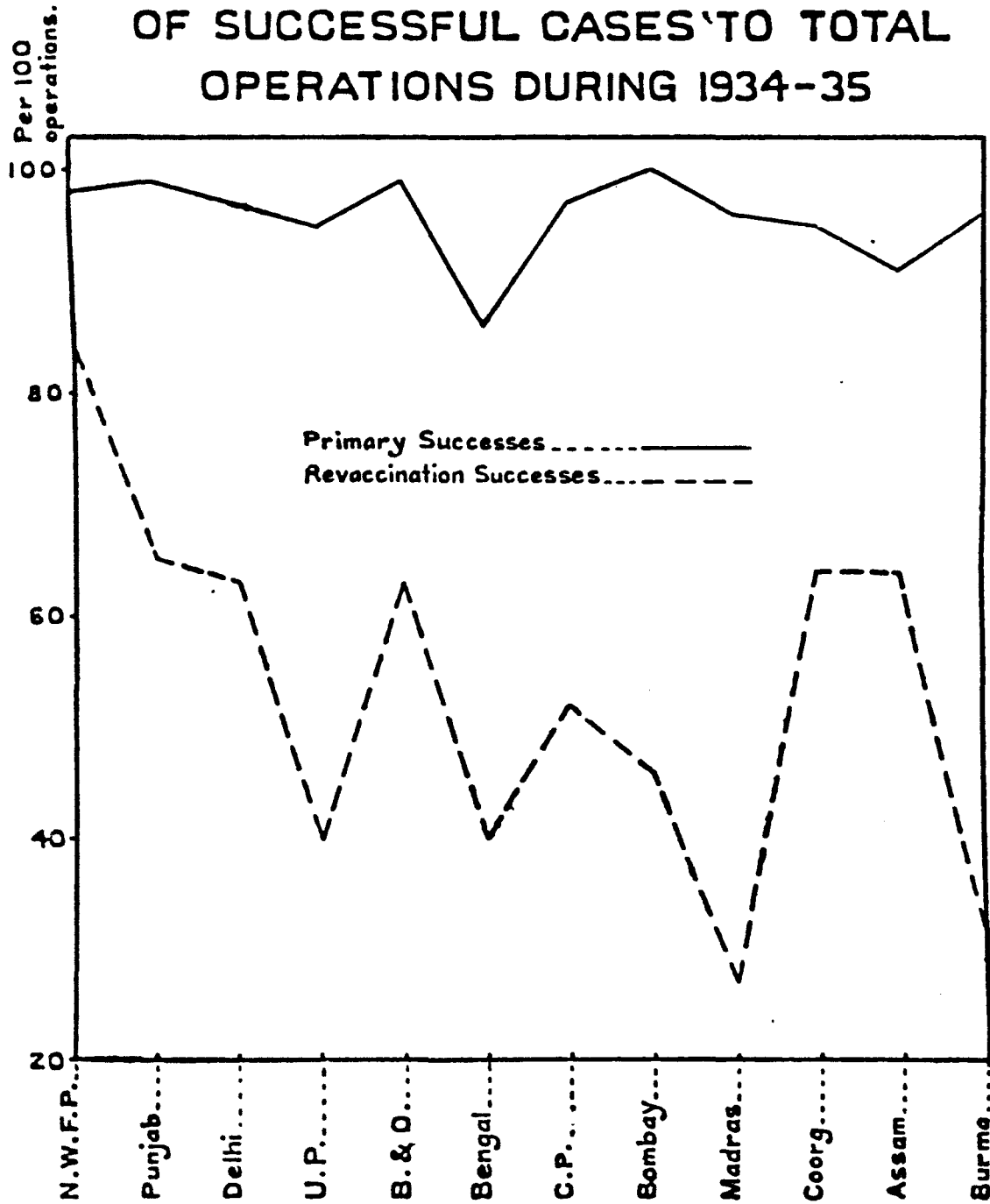
Tests.—In the Punjab, the detection of the presence of chloroform which used to be done by smell was replaced by a more accurate chemical test the details of which have been published. Experimental supply of vaccine lymph in collapsible metal tubes in place of glass tubes was discontinued as it was found that this resulted in considerable wastage of the lymph and consequently higher cost per vaccination. Each brew of vaccine lymph was tested for the presence of pathogenic organisms—both aerobic and anaerobic and its potency was then tested on at least 3 children by primary vaccination. No brew was issued from the institute which did not give a cent per cent. case and insertion success.

In the *U. P.* bacteriological tests were carried out on every sample of vaccine before issue and results obtained showed complete absence of streptococci and gas-producing anaerobes in all samples tested. The number of viable organisms per c.c. of vaccine lymph was less than the prescribed standard of 5,000 in all samples issued. Samples which showed more than 5,000 organisms per c.c. were chloroformed and issued only when subsequent tests showed adequate reduction of organisms. The potency test on rabbits was performed with every batch. Contents from several samples were pooled and then tested on rabbits in various dilutions ranging from 1 in 500 to 1 in 3,000 and the tests indicated that the vaccine was of uniformly good quality. The potency of vaccine was so high that it was possible to dilute it to the strength of 1 in 6 instead of 1 in 5 and such diluted vaccine was used during the cooler months with success. As the depot laboratory is not as yet adequately equipped and the staff provided is also meagre it was not possible to test individual samples separately.

In *Bombay Presidency* the purity and potency of all lymphs were tested as usual.

No 7

VACCINATION GRAPH SHOWING PERCENTAGES OF SUCCESSFUL CASES TO TOTAL OPERATIONS DURING 1934-35



At the *King Institute, Guindy, Madras*, the practice of mixing several cups and issuing from the mixture to secure uniformity in supply, having been found satisfactory, was continued. As previously, the lymph was subjected to a detailed bacteriological examination both at the time of manufacture and of issue to ensure freedom from pathogenic aerobic and anaerobic bacteria. An additional test for the presence or absence of *B. Pyocyaneus* was introduced.

In *Burma*, the lymph, before issue, is subjected to animal tests for bacteria and to the Calmette-Guerin potency tests on rabbits. Tests on at least three children are done, and the lymph is required to give 100 per cent. success without undue inflammation before issue.

Table VI (ii) gives details of the lymph produced and issued from the various provincial vaccine institutes.

TABLE VI (ii).

Vaccine Institutes.	Number of doses.	
	Output.	Issues.
N.-W. F. P. } Punjab		
U. P., Patwa Dangar	6,422,195	6,690,385
B. & O., Namkum (Ranchi)	3,130,625	3,480,987
	3,748,705	3,459,912
Bengal, Calcutta	6,355,576	7,174,792
C. P., Nagpur	917,220	772,565
Bombay, Belgaum	1,851,175	1,713,630
Madras, Guindy *	7,196,200	4,714,830
Assam, Shillong	863,842	863,842
Burma, Meiktila	2,230,446	1,849,380

* For the period 1st October, 1934, to 30th September, 1935. The figures refer to 2 insertions per case.

Investigations.—Investigations regarding (1) cultivation of vaccinia virus on the chorio-allantoic membrane of chick embryo and (2) the duration of degree of immunity against smallpox by infant vaccination and its relation to the size and number of insertions were carried out at the Punjab Vaccine Institute. In the U. P. the best pH value for the glycerine solution was worked out and Sobernheims test for potency was introduced as a routine measure. At the Vaccine Depot, Namkum, in B. & O., the regeneration of seed vaccine by passage through guinea-pigs was tried but proved unsatisfactory. Regeneration was also tried by passage through rabbits alone with better results. At the Vaccine Institute, Belgaum, investigations into the degree and duration of immunity against smallpox conferred by infant vaccination were carried out. The investigation covered observations on 1,012 cases of infant vaccinations and their revaccinations at varying periods. It was shown that the degree and duration of immunity conferred by infantile vaccination is certainly much shorter than is generally believed. Further experiments were made on the use of Tincture Benzoin Co. as an application after vaccination and its application two or three minutes after the operation is now adopted as a routine in all cases vaccinated in the institute. At the King Institute, Guindy, the following research work with regard to vaccines was done:—

- (i) *Cultivation of Vaccinia Virus on Chorio-allantoic Membrane of Developing Chick Embryo.*—Experiments initiated at the Institute in 1933 to see if vaccinia virus, which can now be cultivated

in the laboratory either on minced chick-embryo tissue suspended in Tyrode solution, or on the chorio-allantoic membranes of developing chick embryos to avoid entirely the presence of contaminating bacteria, could be manufactured on a large scale and also to ascertain that on such cultivation the characters of the virus had not altered in any way and that in its immunising properties it was at least equal to the calf-vaccine virus now in general use, were continued.

- (ii) Further investigations were carried out with regard to the effect of clove oil on the virus content of the lymph as issued for use in the field.
- (iii) Experiments to obtain potent dried lymph were continued and the method described by Dr. Otten of the Government Lymph Establishment, Java, was further investigated.
- (iv) Attempts were made to modify the Nijland's seed cycle by introducing human passage lymph instead of the rabbit to vaccinate buffalo-calves and experimentally this lymph gave as good a lymph as is obtainable with the routine cycle. The lymph was issued for field use and the results are awaited.

Training.—At the Punjab Vaccine Institute, 6 vaccinators, 115 private individuals and 38 students of the Ayurvedic and Unani Tibbia Colleges, Lahore, were trained in the technique of vaccination, principles of elementary hygiene and the methods of preparation of vaccine lymph. In addition one sanitary inspector, 41 students of the sanitary inspector's class, 10 lady health visitors and 72 students of the King Edward Medical College, Lahore, were given a course of lectures in vaccination. In the C. P., the usual course of training for vaccinators, lasting seven weeks was given to 75 new vaccinators, while four persons were trained as assistant superintendents of vaccination, including 2 sanitary inspectors. At the Vaccine Institute, Belgaum, a training class for vaccinators was held at which 27 candidates, who appeared for the final examination, passed. In addition, 3 Medical Officers of Health, 2 Medical Officers, 2 inspectors of sanitation and vaccination and one chief sanitary inspector were given special training in the preparation and preservation of lymph and in the theory and practice of vaccination. No vaccination training classes were held in Burma this year.

Vaccination in Provinces.

76. *N.-W. F. P.*—The staff consisted of 6 superintendents of vaccination and 48 vaccinators (including 4 temporary vaccinators).

Owing to low prevalence of smallpox during the year, there was a decrease in the number of vaccinations performed. Successful primary vaccinations numbered 135,641, including 74,861 on infants under 1 year of age and 48,778 on children over one year and under 6 years. Successful revaccinations totalled 114,192, the rate being 59 per 1,000 of the population. The attitude of people towards vaccination was favourable except in the districts of Bannu and Dera Ismail Khan. Of the total vaccinations performed 36,113 were done in Political Agencies, and 6,830 (1,804 primary and 5,026 revaccinations) in cantonments. The average number of vaccinations performed by each vaccinator was 5,349.

77. *Punjab.*—No important change took place in the administrative and other arrangements for vaccination. The number of vaccinators employed

by local bodies increased by 5 to 538 while provincial vaccinators remained unchanged.

A further decrease in the total number of vaccinations performed, compared with previous years, was due to the great fall in the prevalence of smallpox in the province and the smaller number of births recorded during the period under review. The figures given below are of interest :—

Year.	Number of deaths from smallpox.	Number of total vaccinations performed.	No. of vaccinations per one death from smallpox.
1932-33	9,726	3,607,285	371
1933-34	6,990	3,206,356	459
1934-35	1,495	3,113,487	2,083

Of the total operations performed those done by the district board and municipal vaccination staffs numbered 3,037,254—893,650 primary and 2,143,604 revaccinations.

Municipal vaccinators did 304,276 vaccinations (97,926 primary and 206,350 revaccinations); special provincial staff 52,154 (17,081 primary and 35,073 revaccinations); dispensary staff 3,816 (638 primary and 3,180 revaccinations); cantonment staff 18,935 (5,673 primary and 13,262 revaccinations) and the railway staff 1,328 (542 primary and 786 revaccinations).

Women vaccinators were employed by seven municipalities. Lady health visitors who are trained in the technique of vaccination also performed vaccination operations during the course of their routine duties in 7 districts. The employment of a female agency for purposes of vaccinating *purdah* women is still reported to be in an experimental stage. The D. P. H. in this connection remarks :—

“The amount of work done during the year under report was not commensurate with the number of vaccinators employed and the amount of expenditure incurred. However promising the prospects of the employment of women vaccinators may look, the results so far obtained are rather disappointing. The women vaccinator has still got to prove her utility in the province. Should greater stress be laid on the employment of such vaccinators, there is the danger of a demand to employ women vaccinators only for women irrespective of local requirements in this connection. Enquiries so far made are far from convincing and the need of a woman vaccinator does not seem to be very pressing.”

The average number of vaccinations performed by each vaccinator was 5,609.

78. *Delhi Province*.—The four municipalities employed 8 whole-time vaccinators; in rural areas there were three.

In spite of the fact that only 22 deaths were recorded as due to smallpox during 1934 as against 948 in 1933, the number of vaccinations showed only a slight decrease from 35,937 in 1933-34 to 33,935 during 1934-35. The average number of vaccinations performed by each vaccinator was 2,018 in urban and 3,348 in rural areas.

Revaccination amongst women who observe strict *purdah* has been a difficult problem as there are no recognised female vaccinators as yet, but with the increase of women doctors and health visitors this difficulty is slowly being overcome.

School medical inspection again brought to notice large numbers of unvaccinated young children and there is a pressing need for making vaccination and revaccination a condition precedent to the admission of children to the primary schools.

79. *United Provinces*.—The staff comprised 49 assistant superintendents of vaccination and 947 vaccinators.

The total number of operations increased by 93,486 over the figure for the previous year. The percentage of successful operations to total births was only 51 % among children under 1 year of age.

Out of 1,857,729 vaccinations, 1,424,065 primary and 197,770 revaccinations were performed in rural areas; 150,542 primary and 82,002 revaccinations in urban areas; 29 primary and 258 revaccinations in dispensaries; 123 primary and 224 revaccinations by private medical practitioners; and 945 primary and 1,771 revaccinations at railway dispensaries.

Each vaccinator vaccinated on an average 1,935 persons.

The public health staff inspected 4,046 schools for vaccination purposes and 56,352 scholars were vaccinated in their presence.

Although there was an increase in the total expenditure on vaccination, the average cost of each successful case fell slightly.

80. *Bihar and Orissa*.—The provincial staff consisted of 11 district inspectors, 36 sub-inspectors of vaccination and 1,365 vaccinators. In municipal areas, vaccinations were performed by paid vaccinators, but licensed vaccinators were generally employed in rural areas. Additional paid vaccinators were employed by local bodies and civil surgeons for short periods to deal with outbreaks of smallpox.

Vaccination has not yet become popular in the province. During the year under report, in which there was relatively little smallpox, the number of vaccination operations fell by 49,516, the decrease being in revaccinations while primary vaccinations showed a slight increase over the figures for the previous year.

Of the total operations only 72% were successful; a slight decrease from the rate for the previous year.

In municipal areas, 118,888 operations were performed, showing a decrease of 8,816 as compared with last year; of these 60,706 were successful. The success rates were 98 % in case of primary cases and 50 % for revaccinations.

Vaccination operations performed in rural areas numbered 1,719,205 and the ratios of success were 99 % for primary and 61 % for revaccinations.

The average number of vaccinations performed by each vaccinator was 1,346.

Unprotected children under 1 year numbered 1,077,354. Of these only 276 p.m. were successfully vaccinated and even in municipal areas only 447 p.m. of the surviving unprotected infant population were successfully vaccinated. These figures are unsatisfactory, showing as they do, that nearly three quarters of the total infant population remained unprotected.

81. *Bengal Presidency*.—The strength of inspecting staff remained unchanged, whilst the number of vaccinators decreased from 1,803 to 1,738 in rural areas and from 175 to 163 in municipalities. With the general amalgamation of vaccination with public health work and the provision of general health staffs, both in rural and urban areas, the above figures cannot be regarded as a correct record of the numbers of vaccinators in Bengal.

An increase of 257,037 vaccinations was recorded compared with the previous year, primary cases contributing 103,316 and revaccinations 153,721.

A slight fall occurred in the number of children under 1 year successfully vaccinated, whilst there was an increase in the number of children successfully vaccinated between the ages of 1 to 6 years, the actual numbers being 289,696 and 1,510,464, respectively.

In rural areas 6,144,000 vaccinations (2,509,470 primary and 3,634,530 revaccinations) were performed, both groups showing an increase over 1933. In municipal areas the total number was 589,707 against 588,175 in the previous year. In tea gardens 15,492 vaccinations were performed, in factories 55,377, in railways 27,600, on steamers 985 and in jails 63,210.

Of the available infant population, 237 p.m. were successfully vaccinated, the rates being 218 p.m. in rural areas and 600 p.m. in municipalities. Infant vaccination results in the districts of Faridpur, Rangpur and Mymensingh were not encouraging, and indeed the percentage throughout the rural areas is dangerously low.

The average number of vaccinations performed by each vaccinator was 3,352.

Rotatory lancets are now supplied to all municipalities and districts by the Bengal Public Health Department. It has been unanimously reported that vaccination with this lancet is much superior to the scarification and linear incision methods.

82. *Central Provinces*.—The vaccination staff comprised 37 assistant superintendents of vaccination and 324 vaccinators.

Of the total number of vaccinations performed which showed an increase of 37,057 operations over the figure for the previous year, 563,641 primary and 148,999 revaccinations—were done by district vaccinators, 2,677 by dispensary staff and 11,381 by other agencies, *i.e.*, railways, mines, tea gardens etc.

The average number of vaccinations performed by each vaccinator was 2,193.

In municipalities out of 50,840 infants requiring vaccination, 43,910 or 86 % were vaccinated.

83. *Bombay Presidency*.—Of the total primary vaccinations which showed an increase of 45,185 over the figures for the previous year, 93 % were successful and 0·14 % unsuccessful. The percentage of success was 99·85%. Sixty-nine per cent. of primary vaccinations were performed on infants under 1 year of age and 27 % on children between 1 and 6 years. Of the revaccinations in which the results were known 46 % were reported as successes.

The average number of vaccinations performed by each vaccinator was 2,803.

Vaccination in police lines and outposts was regularly carried out, and at important fair centres similar work was done well in advance of the fairs.

At Karachi, 5,509 pilgrims including 4,211 males and 1,298 females, were revaccinated by a temporary staff during the months of November, 1934, to February, 1935.

84. *Madras Presidency*.—The number of vaccinators was increased from 862 to 879. In addition, 278 health inspectors were employed on vaccination work.

Operations rose from 4,552,755 in 1933-34 to 5,223,920, increases being recorded under primary, secondary and revaccinations. The marked increase in revaccination figures was largely due to the enforcement of compulsory

revaccination throughout the Presidency. Of the total operations, 46% were successful as against 53% in 1933-34.

Each vaccinator performed 5,908 vaccinations on an average.

The number of vaccination operations performed in rural areas was 4,444,061 (1,273,562 primary and 3,210,499 revaccinations) showing an increase of 599,077 over that of the previous year. Successful vaccinations among children under 1 year of age numbered 543,947, the proportion of vaccinations to registered births varying from 19 % to 64 % in districts. The year witnessed one of the most important changes in local Government administration, namely, the abolition of taluk boards. The advantages of the transfer of vaccination to district boards are manifold. This transfer has brought about centralised control and uniformity of procedure, prompt action now being taken in many districts to supply equipment, to sanction prosecutions and to act quickly in epidemics. It has also enabled District Health Officers to concentrate staff in infected localities. Several district boards have delegated their powers of prosecution of vaccination offenders to the District Health Officers.

In municipalities 139,099 primary and 574,624 revaccination operations were performed, showing a slight decrease in primary cases and a great increase in revaccinations. The proportion of vaccinations to registered births varied according to districts from 25 % to 99 %.

The appointment of women vaccinators to facilitate vaccination among the Goshia communities was recommended to local bodies by Government and some appointments have been made.

85. *Coorg*.—Out of 25,113 persons vaccinated 16,299 were males and 8,814 females. Operations totalled 22,400 in rural areas, 2,642 in urban areas and 71 in dispensaries. In the two towns in Coorg, where the Vaccination Act is in force, 279 infants were vaccinated. Each vaccinator performed, on an average, 2,504 operations.

86. *Assam*.—Vaccination among the general population was performed by 444 departmental vaccinators. The subordinate inspecting staff of 9 inspectors, 20 sub-inspectors and 10 temporary sub-inspectors remained unchanged.

Vaccination operations showed a slight decrease of 1,524 over the previous year, the total number performed being 706,460. Of the total vaccinations performed, 656,712 were done by departmental vaccinators, 7,263 by dispensary staff, 36,426 in tea-gardens, 3,900 in jails, police hospitals, etc., and 635 by railway staff.

Each vaccinator performed on an average 1,588 vaccinations.

Of a total of 6,032 unprotected infants registered in towns, where vaccination is compulsory, 50 % were successfully vaccinated, the success rate varying between 4 % and 75 %.

Vaccination in rural areas is not compulsory, but every encouragement is given to the people to become vaccinated. Amongst certain castes there is marked opposition to vaccination. To overcome this hostility, resort has been made to regulations framed under the Epidemic Diseases Act, 1897 (Act III of 1897), but the better plan would be to extend compulsory vaccination to the districts.

87. *Burma*.—The staff comprised 38 district superintendents, 98 part-time supervising officers, 26 inspectors of vaccination and 349 vaccinators. Temporary staff was, as usual, employed to deal with epidemics.

The total number of vaccinations performed during the year exceeded last year's record. There was a considerable increase in revaccinations, while a slight fall occurred in the number of primary vaccinations.

The average number of vaccinations performed by each vaccinator was 3,735.

Of the total of 992,748 operations performed in rural areas, 561,773 were primary and 430,975 revaccinations. Approximately 89 % of primary vaccinations and 26 % of revaccinations were successful.

In urban areas, excluding cantonments, 313,203 operations (56,221 primary and 256,982 revaccinations) were performed. Of primary operations about 97 % of the verified cases were successful. Of the revaccinations, 30 % of the verified cases were successful.

Other vaccinations done were 2,908 in cantonments, 1,632 by railway dispensary staff, 1,699 by Government dispensary staff, 6,778 by private practitioners, 39,965 in jails and 170,688 at the ports of Rangoon and Akyab on immigrants.

88. *Andamans*.—Vaccinations numbered 1,639 (395 primary, 228 secondary and 1,016 revaccinations) out of which 209 were successful. Of these 1,562 cases were done with Java dried lymph and 77 with glycerinated lymph.

Vaccination amongst troops.

89. Particulars of vaccination in the army will be found in Table B of the appendix to this section (pages 325-26).

Compulsory Vaccination.

90. Table VI (iii) gives the number of towns in which compulsory vaccination is in force.

TABLE VI (iii).

	Municipal towns and Notified areas.	Vaccination Act in force in		Municipal towns and Notified areas.	Vaccination Act in force in
British India . . .	947	797	C. P. . . .	118	84
N.-W. F. P. . . .	13	10	Bombay . . .	114	38
Punjab	249	216	Madras . . .	82	82
Delhi	3	2	Coorg	2	2
U. P.	85	85	Assam	25	23
B. & O.	59	59	Burma	74	74
Bengal	118	118	Ajmer-Merwara	5	4

In comparatively few parts of India compulsory vaccination is in force in rural districts. In view of the high endemicity of smallpox in India and the periodical devastating epidemics which occur, it is deplorable that compulsory vaccination should not have been extended long ago to all settled districts. Smallpox is one of the most easily preventible diseases, and there is no reason beyond inertia and lack of administrative vigour why it should not be prevented.

In Madras Presidency vaccination is compulsory except in a few areas. The same can be said of Burma where, but for a few backward tracts, vaccination is compulsory. In the Punjab, out of 29 districts the Vaccination Amendment Act of 1929 is in force in 18 districts completely and in 8 partially. Otherwise so far as records go, vaccination remains optional among the rural population.

B.—Indian States.

91. *Punjab States*.—Statistics of those Indian States which maintain their own establishments are given in Table VI (*iv*).

TABLE VI (*iv*).

	Vaccinations.		Success-rate.	
	P.	R.	P.	R.
Patiala	59,692	53,657	98.0	60.9
Bahawalpur	22,337	610	99.7	75.7
Nabha	10,811	1,859	92.7	60.3
Jind	9,765	1,638	99.1	30.2
Kapurthala	8,615	4,887	96.5	43.6
Faridkot	5,457	5,694	98.6	46.2

Gujerat States Agency.—Altogether 32,190 primary and 2,919 revaccinations were performed. The success rate was 94% for primary cases and 47% for revaccinations. The results of 6% of primary and 23% of revaccinations could not be ascertained.

Shan States (Burma).—The staff comprised 2 district superintendents of vaccination, 2 part-time supervising officers and 46 vaccinators. Vaccinations performed in these states numbered 77,157 (56,976 primary and 20,181 revaccinations). Of the verified primary cases and revaccinations 98 % and 55 % respectively were successful. The average cost per successful case was Re. 0-9-8.

Mysore State.—Vaccination operations numbered 317,073. Of these 308,256 (191,567 primary and 116,689 revaccinations) were done by district board and municipal vaccinators and 8,817 (5,429 primary and 3,388 revaccinations) by medical subordinates. Of the vaccinations performed by medical subordinates the success rates were 87 % in the case of primary cases and 57 % in those of revaccinations; amongst those performed by district board and municipal vaccinators, the success rates were 94 % and 38% in primary and revaccination cases respectively.

The cost per successful case was Re. 0-5-5.

The potency of the lymph produced in Mysore continued to be good. Exceptionally in this State, lanoline and glycerine lymphs were prepared and the quantities produced were 2,313 and 1,450 grammes respectively. Lanoline lymph sufficient for 339,104 cases and glycerine lymph -for 50,315 cases were issued.

SECTION VII.

PUBLIC HEALTH WORKS.

A.—British India.

General.

92. A perusal of the sections of the various provincial public health reports dealing with civil works brings home the reluctance of local authorities to spend money on sanitary works. The contrast between Great Britain and India in this respect is very marked. In the former country the importance of sound environmental hygiene was early recognised and the public health movement was therefore based on a sound foundation. In India the importance of environmental hygiene has not yet been fully recognised and there is still considerable opposition towards the introduction of sanitary works which mean the expenditure of money and therefore an increase in taxation. The contrast is due mainly to the existence of a public opinion favourable to health improvement in Great Britain and to the lack of such opinion in India. In the absence of a favourable public opinion it is admittedly not easy for a local Government or a local authority to force expenditure on sanitary works, however desirable, but the need for such expenditure is pressing and without it substantial improvement of health conditions cannot be obtained. The main requirement here, as in most fields of public health is education, to impress upon Municipal and District Committees and the people in general the fact that good health cannot be maintained without a healthy environment. Further, there is no short cut to environmental hygiene which can obviate the expenditure of large sums of money. The provision of good water supplies, good drainage, the water carriage system of disposal of excreta, satisfactory removal and disposal of refuse, town planning and good housing are all costly measures, but they are fundamental to health and have got to be faced if progress is to be made. Good environmental hygiene has been a feature of most great civilisations since the world began.

One or two features brought out by the provincial reports require special mention. Whereas a good water supply, sufficient in quantity and wholesome in quality, is the first essential, it is noted that not infrequently in towns funds are spent upon less important measures before a good water supply has been introduced. Again it is not infrequent to find that large sums are spent on roads or on hospitals or even on lighting before a safe water supply has been provided. Further, there are not a few Municipal Committees who hand over important executive functions, such as conservancy and rubbish disposal to private contractors whose main object is to make profit and it is rare to find satisfactory disposal of waste products carried out under such a contract system. Another feature constantly met with is the tendency to carry out town cleansing by night instead of by day. Such a system is not likely to be successful except in a modern town unusually well lit by electricity. Almost without exception, when conservancy is done in the dark, it is badly done and there is a great need in many towns for a switch over to daylight conservancy and town cleansing.

Taking the provision of protected water supplies as an index of the development of sanitary works, it is interesting to note that in Madras Presidency, out of 82 municipalities, only 41 have protected water supplies; in the U. P. only six of the eight first class municipalities having a population over one lakh, six out of ten II class municipalities having a population between 50,000

and 100,000 and three of the 28 of the III class with populations between 20,000 and 50,000 have piped water supplies. Thus in these three categories, 30 of the 46 principal towns lack the most essential amenity. The position in other Provinces is very similar.

The sanitary disposal and agricultural utilisation of habitation wastes.—Many systems have been tried for the sanitary disposal of refuse and human waste by manual methods but there is one system recently developed for composting agricultural and human wastes which deserves special mention. The detailed technique of the process, as used in Indore, is described in the Appendix to Bulletin No. 1, 1934, of the Institute of Plant Industry, Indore, Central India, and is reproduced in full below:—

“Installation.—The essential part is the charging trench, which should be fifteen feet wide, and two feet deep. The floor must slope gently along its length to prevent water-logging, and must discharge into a natural drainage channel. It must be served by a road to be used as a charging platform running alongside. This road may lie between two trenches, serving each, and usually the most economical construction is to dig the trenches, one foot deep and pile enough of the excavated earth to make the road foundation. The road should be at least fifteen feet wide (preferably twenty feet) and suitably metalled to stand carting in wet weather. The side of the trench against the road must be vertical and should be reveted with timber or a wall of stone or brick, the top of which should carry a sill of suitable material (*e.g.*, old steel rails, girders, or heavy logs) against which carts can back. Without this sill a log must be put in position at each tipping. The other side of the trench is to be bounded, preferably by a partition, the top half of which is removable—old sleepers, boards, logs, or thick corrugated iron sheet between upright posts—or by an earth, stone or brick wall, rising two feet above the trench floor. Beyond this partition about twenty feet space must be left for storage; in practice extensive sales of compost are usually confined to two or three periods of the year. This storage ground may be excavated level with the bottom of the trench if desired. Unless dug on solid stony ground the trench must always be floored with road metal or at least well-rammed brick-bats and rubble; the storage ground is also better so treated. It is wise to build an earth bank with a drain on those sides of the whole installation from which the flow of surface water is to be feared.”

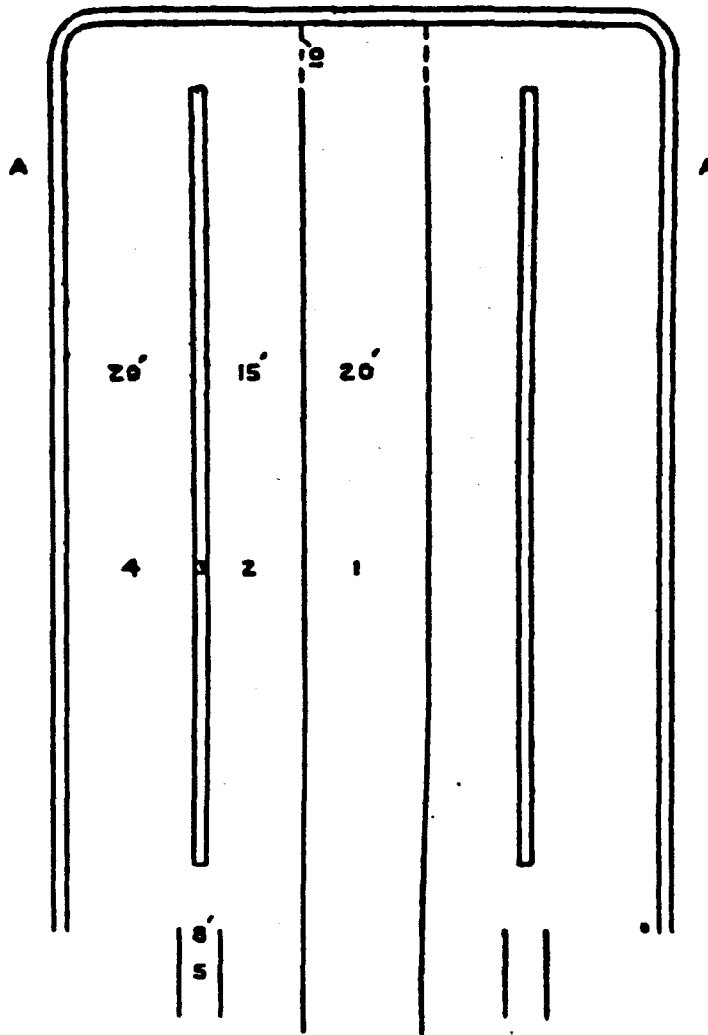
“The total length of charging trench required is determined by the average daily quantity of refuse received. Experience has shown that for each cart-load* of refuse received daily, 1 foot 4 inches length of trench is necessary. The volume of night-soil received has no influence on this figure as it is taken up in the interspaces.”

“Charging the trench.—The first charge should be made so as to leave a vacant space of four feet at one end of the trench. To start with, cart-loads of refuse, without sorting, are tipped in from the charging platform and spread by drag rakes to make a layer three or four inches thick. About a dozen forkfuls of inoculum from a charge at least two weeks old is then scattered (this of course is not necessary for the first charges of a new installation) and the cartful of night-soil tipped on top, followed immediately by more refuse, tipped over the night-soil. Then the refuse, together with the night-soil below is drawn by drag rakes in small lots until the breadth of the trench opposite is covered. About four layers per day should be made thus until the whole depth is charged in two days. The top layer for the day and at the end of the charge should be refuse only, without being mixed with the night-soil layers beneath. This top layer should not be more than 1 inch to 2 inches thick, being intended as a coating to preserve uniform moisture and heat in the whole mass of the mixture, and to prevent the breeding of fly larvæ on top. The next charge should be given to the adjacent portion of the trench without any interspace and so on continuously.”

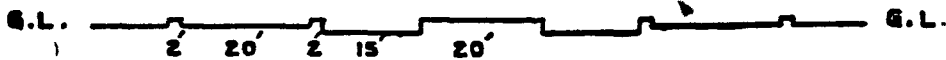
“Proportion of night-soil to refuse.—No proportioning is necessary; whatever quantities of refuse or night-soil arrive must be treated at once, no excess of either being left over. If the proportion of night-soil is high or of a very liquid nature, the refuse layer should be spread with a surrounding raised margin until the mixing is complete. After the charge or the later turns the heaps must have flat tops and vertical sides, otherwise difficulty will arise in preventing water-logging in a wet season and in keeping uniform moisture during dry weather.”

* A cart-load of refuse is here taken as 35 cubic feet and a cart-load of night-soil as 60 gallons.

Nº 8
PLAN OF MODEL INSTALLATION
 Scale 1"=20'



SECTION ON A.A.



1. Road. 2. Charging trench. 3. Partition.
 4. Storage space. 5. Drain.

"First turn.—Two days after charging is finished the first turn is given—i.e., four days from the start. Half the charge is forked* back to a position occupying the four feet vacant space left. Then the remainder of the charge is forked on top of this already turned mass."

"While this is being done water should be distributed if necessary from a hose or by hand upon the turned material so as to soak it without permitting seepage or local water-logging. Sullage water may well be applied to the lower layers at this stage but on no account to the surface."

"The few fly larvæ that may be found on the cool sides of the charge are turned into the heap and destroyed by the high temperature therein. If the first turn is delayed beyond four days there will be a greater development of maggots and more chance of their escaping to pupate in crevices in the walls or floor of the trench, especially in wet weather. Such pupation is usually slight and if desired can easily be checked by disinfectants."

"Second turn.—The second turn is given eight days later by forking the charge over to the opposite side of the trench, adding water if necessary."

"Third turn.—This should be given from eight to fifteen days after the second turn according to the stage of decomposition—when the material has crumbled to a fairly advanced degree. The mass is forked out of the trench (with watering as necessary) on to the adjacent storage ground where it may be heaped up to four feet in height."

"Watering between turns.—During very hot or windy weather the upper layers may become too dry; a well-distributed surface watering should then be given."

"Duration of the process.—The manure will be ready for use in from three to eight weeks after charging, the period depending on the proportion of night-soil to refuse, the correct control of moisture and air throughout and the season."

"Precautions during monsoon rains.—The initial charge should not occupy the full width of the trench; a two-foot space should be left next to the partition to allow storm-water to flow. If there is a risk of water flowing into the trenches from the road the charge should be built up a foot higher, above road level. In a trench of considerable length there may be a danger of exposed corners of the heap being washed away by drainage water on the trench floor. This can be prevented by protecting such surfaces with strips of sheet iron about three feet long and suitable height. During prolonged rains it is advisable to give the third turn earlier, to prevent water-logging and slowing down decomposition."

"Implements necessary.—One drag rake with four seven-inch blunt steel tines and a long handle, and one fork will be needed to deal with a daily intake of five cart-loads of refuse.† English shovels are useful for handling the finer material."

"The sprinkling of water to ensure good distribution may be done, on a small scale by throwing it with a suitable vessel such as *tagari*. For larger installations a hand pump with a hose and sprayer or even a permanent supply of piped water would be more efficient."

On account of the many possibilities both from the public health point of view and that of the agricultural needs of India the method has been brought to the notice of all local Governments and constituent States of the Imperial Council of Agricultural Research. From the information available it appears that only a few provinces and states have so far tried the process experimentally and unless this is done extensively in all the provinces and the results analysed it will be idle to emphasise its general adaptation. Considering the very small expenditure involved in the process it is hoped that the provincial authorities will give the matter the encouragement it deserves.

The Indore process, or a modification of it suited to village conditions, has been for some time past in the fore-front of agricultural propaganda in the United Provinces. There, every Government farm adopts this process of making compost and the method is said to have been taken up by a number of bigger farmers and to be in operation at several village centres and in Shahjahanpur Municipality. An investigation based on the Indore process is

* A four-pronged garden digging fork has been found very suitable.

† These implements can be supplied by the Trading Section of the Institute.

in progress at the Research Farm at Cawnpore and such modifications as may either speed up the process or render it more easily applicable are being examined.

The method has been successfully tried in several places in the Madras Presidency and also in Hyderabad-Deccan. An experiment is being carried out by the Public Health and Agricultural Officers in Mandalay (Burma) on similar lines.

In Travancore, Bhopal and in Bangalore similar "compost" methods are in use with various modifications which in the last mentioned place are reported to have accelerated the process and made it more suitable for town wastes.

During 1933-34, the municipalities in British India, out of a total income of about 18 crores of rupees, devoted approximately 3.87 crores or 22 % towards public health. In spite of the fact that there was a slight increase in the income of municipalities, the expenditure on public health showed a decrease.

Municipal water supplies cost Rs. 1,12,47,015, conservancy Rs. 1,44,10,044 and drainage Rs. 35,78,866, these totals being considerably less than those for the previous two years. Percentage expenditure on public health varied from a high level of 45 % in Bengal Presidency down to 10 % in Delhi.

Table VII (i) gives for each province the total figures for income and expenditure on public health in municipalities during the year 1933-34. It also gives the amounts devoted to conservancy, water supplies and drainage in each province during that year.

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	17,75,48,573	3,86,97,745	22	1,44,10,044	1,12,47,015	35,78,866
N.-W. F. P.*	22,69,437	3,69,651	16	2,23,152	43,217	25,419
Punjab .	1,71,98,436	42,44,639	25	9,41,766	12,94,431	8,07,386
Delhi* .	83,24,814	8,67,608	10	2,99,416	3,61,131	64,682
U. P. .	2,05,54,850	57,21,667	28	25,29,216	19,21,831	6,54,073
B. & O. .	54,84,254	17,21,674	31	10,68,090	3,43,818	1,84,145
Bengal .	1,14,93,316	51,86,429	45	28,98,965	10,90,601	3,50,788
C. P. .	84,33,463	21,51,597	26	11,34,487	5,53,352	2,46,067
Bombay† .	4,56,77,107	65,34,360	14	24,42,940	22,29,916	8,52,624
Madras .	2,38,80,463	54,10,507	23	†	19,26,779§	..
Assam† .	13,93,078	5,18,600	37	2,84,510	1,60,397	22,553
Burma .	3,28,39,355	59,71,013	18	25,87,502	13,21,542	3,71,129

* Figures for the year 1934.

† Figures for the year 1934-35.

‡ Not available.

§ Includes expenditure on drainage.

North-West Frontier Province.

93. The total expenditure on public health measures in municipal towns and notified areas decreased by about one-fourth as compared with the previous year.

District boards with an income of Rs. 21,07,664, including opening balances, devoted only Rs. 93,330 to public health. Of this Rs. 22,886 was spent on water supply, Rs. 4,292 on conservancy establishment and Rs. 1,975 on drainage and sewage.

Government grants-in-aid to municipalities and notified area committees for public health purposes amounted to Rs. 10,206, including Rs. 6,739 for sanitary purposes in Peshawar, Rs. 1,600 for sanitary improvements in Tank notified area and Rs. 1,000 for *anti*-malarial measures in civil areas of Peshawar Cantonment. Similar grants to district boards for water supplies and other public health purposes amounted to Rs. 28,927 including Rs. 12,402 for a water supply scheme for certain villages in Kohat district, Rs. 10,904 for water supply purposes in certain villages in Dera Ismail Khan district and Rs. 1,694 for water supply scheme of certain villages in Hazara district.

Sanitary inspections of towns were made as usual by the Director and Additional Assistant Director of Public Health, and defects relating to drainage and conservancy systems were brought to the notice of local bodies and practical suggestions made for their removal.

Punjab.

94. With an increase in the total income of municipalities, there was also an increase in the total expenditure for public health measures in such areas. In 114 small towns on the other hand total expenditure on public health measures showed a drop.

The sanitary engineering department had under construction 10 public health projects on behalf of Government and 14 for local bodies. Four preliminary and 20 detailed projects, estimated to cost Rs. 1,82,681 and Rs. 23,30,329, respectively, were either prepared or revised by the engineers of the department. The most important of these were Okara water supply scheme (Rs. 1,47,120); Okara drainage scheme (Rs. 2,54,167); Khanewal water supply and drainage skeleton scheme (Rs. 62,997), Multan Cantonment drainage (Rs. 1,40,024), Khanewal drainage (Rs. 1,49,662) and Burewala drainage schemes Nos. I and II (Rs. 66,633 and Rs. 94,639, respectively). Seven projects prepared by local bodies estimated to cost Rs. 2,91,240 were examined for technical sanction by the Public Health Circle, Punjab. These included Lyallpur waterworks extensions (Rs. 85,368) and Saadi Park drainage, Lahore (Rs. 76,062).

Piped water supplies are now in use in 43 towns. Arrangements for the collection, removal and disposal of excreta and street sweepings are still defective in many towns, although a little improvement has been made in a few, where modern sanitary methods are being introduced gradually.

Rural sanitation:—Work accomplished is summarised below:—

(i) 171,794 rubbish heaps were removed outside the village, (ii) 98,975 manure pits were dug, (iii) 161,012 feet of *pucca* drains were constructed; (iv) 325,229 house ventilators were constructed, (v) 769 bore-hole latrines were made and (vi) 534 sanitary sub-committees were formed.

To improve village water supplies, 1,619 parapet walls were constructed, 13,237 wells were cleansed and 2,059 hand pumps were installed.

Sanitary Board (April 1934 to March 1935).—The Board held three meetings during the year, but owing to financial stringency its activities were handicapped. A sum of Rs. 2,12,000 was placed at its disposal for grants-in-aid to local bodies (Rs. 1,37,000 for urban sanitary works and Rs. 75,000 for rural water supply). The amount for urban sanitary works was fully spent, whilst of the grant for rural water supply only Rs. 40,063 were spent, the remaining sum lapsing in the absence of completed schemes. Grants given included Rs. 1,25,000 for Bhiwani drainage scheme, Rs. 12,000 for Montgomery drainage scheme, Rs. 8,642 for Thal *ilaqa* water supply extension and Rs. 15,264 for Fort Munro water supply. The board continued to advise on public health policy and gave administrative approval to schemes placed before it.

Delhi Province.

95. Total municipal expenditure on public health showed an increase over the figure for the previous year. Sums devoted to conservancy and water supply showed an increase, but expenditure in connection with drainage decreased. District public health expenditure was only Rs. 12,634 or 4·25 per cent. of the total income.

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. Shahdara has its own water supply from deep tube wells. No municipal supply exists in other areas and water has to be drawn from shallow wells.

The sewage farm at Kilokri dealt with sewage from New Delhi, Delhi City, Notified Area Civil Lines and Fort. The conditions in the sewage farm being thoroughly unsatisfactory, a proposal to remove it from its present site is under consideration.

In the rural areas water supply is either from shallow wells or taken from rivers and canals.

United Provinces.

96. With an increase in the total income of municipalities expenditure on public health showed a slight increase over the figures for the previous year. The expenditure on conservancy, water supply and drainage increased proportionately.

Expenditure on health works executed under the Superintending Engineer, Public Health Department, amounted to Rs. 28,98,633, showing an increase of 3·88 lakhs. Of this total Rs. 4,38,010 were spent on original water works and special repairs, Rs. 18,02,840 on water works maintenance, Rs. 3,53,813 on drainage works and Rs. 3,03,970 on other works. A sum of Rs. 2,50,302 was spent on constructional works. Projects to the value of Rs. 15,70,144 were finally sanctioned; others involving an expenditure of Rs. 25,67,489 were submitted but not sanctioned. Projects estimated to cost Rs. 14,88,125 were under preparation.

Water supplies.—Inspections of water supplies carried out by the Mechanical Engineer confirmed the fact put forward in previous reports that plants at present in use are inadequate to cope with the enormous wastage which is almost universal.

Board of Public Health.—Of a total of Rs. 1,81,681, at their disposal the Board spent Rs. 27,846 on special assistance to pilgrim centres, Rs. 72,625 on urban sanitation, Rs. 66,724 on rural and minor sanitary works and Rs. 14,486 on other works. The grant for pilgrim centres included Rs. 6,141 for the construction of four infiltration wells in connection with the Brindaban water supply; Rs. 8,687 for the provision of a chlorinating plant in connection with Hardwar water supply and Rs. 2,777 for sanitary arrangements at *Piran Kaliar* fair. Improvements in urban sanitation included Gorakhpur municipal drainage (Rs. 33,732) and Jhansi Municipality drainage survey (Rs. 5,000). Out of the grant under Works, Rs. 10,700 were spent on Dewas fair water supply scheme.

The total income of district boards was Rs. 1,95,50,043 and expenditure on public health measures Rs. 5,48,206, a ludicrously inadequate proportion.

Bihar and Orissa.

97. Total expenditure on public health in the 58 municipalities amounted to Rs. 17,21,674 showing another decrease of Rs. 0·37 lakhs down to 31·4 %. Expenditure on markets and fairs absorbed Rs. 29,347.

District board spent Rs. 5,05,104 on public health measures or only about 3 % of their total income. Expenditure on conservancy totalled Rs. 2,84,618; on water supplies Rs. 1,21,469 and on drainage Rs. 8,578, while Rs. 19,108 were spent on markets and fairs. The Engineering Department prepared a preliminary water supply scheme for Chapra, estimated to cost Rs. 3,03,364. Other important projects prepared by this Department for local authorities were Monghyr water works improvement scheme (Rs. 82,029) and Daltonganj water works supplementary scheme (Rs. 32,855).

Bengal Presidency.

98. In spite of an increase in the total income of municipalities, the expenditure on public health measures (including expenditure on water supply and drainage) showed a decrease of about Rs. 52,000 compared with 1932-33. Expenditure on markets and slaughter houses amounted to Rs. 52,879. The main sanitary schemes of municipalities were Asansol water supply (Rs. 68,356), Champdani water supply (Rs. 9,341), Howrah drainage improvement (Rs. 8,223), South Suburban water supply (Rs. 9,850), Baranagar surface drainage (Rs. 5,113), Naihati drainage construction (Rs. 6,076), Nabadwip water works (Rs. 5,947), Darjeeling water supply (Rs. 9,100), Dacca water works improvement (Rs. 13,683) and Dacca drainage construction (Rs. 8,616).

Out of a total income of Rs. 1,99,38,670, Rs. 26,14,513 were spent on public health, including Rs. 5,96,753 on water supplies and Rs. 29,649 on drainage.

Union boards numbering 4,740 and having a total income of Rs. 90,12,874 spent Rs. 5,87,857 on water supplies, Rs. 68,186 on drainage and Rs. 67,196 on conservancy.

Sanitary Board, Bengal.—The total capital expenditure on water works was Rs. 2,72,893 and Rs. 2,26,339 on sewerage works. Sketch projects for schemes estimated to cost Rs. 36,50,720 were prepared, detailed projects for Rs. 4,00,400 and detailed estimates and plans for miscellaneous works amounting to Rs. 1,95,625.

The inability of Government to make any grants towards the capital cost of water works and drainage schemes again had its effect upon the number

of such schemes undertaken during the year, but the recognition of the importance of well planned water supply and drainage schemes in relation to the health of towns is indicated by the number and extent of the schemes which the department was asked to draw up during the year.

Central Provinces.

99. Municipal expenditure on public health decreased from Rs. 24,48,913 in 1932-33 to Rs. 21,51,597 in 1933-34, these sums forming 29 % and 26 % respectively of the total municipal revenues for the two years. Markets and slaughter houses absorbed Rs. 1,22,076. The Director of Public Health of the province reports that the general situation with regard to water supply in the province is unsatisfactory and gives rise to great anxiety during epidemics of cholera as the purification arrangements are incomplete and inefficient.

During 1934-35, government sanitary grants to municipalities and other local bodies amounted to Rs. 49,064. This sum included Rs. 32,500 for infant welfare work, Rs. 14,106 to cover half the cost of expenditure incurred towards the pay of sanitary inspectors, Rs. 1,527 to cover the half of the pay of midwives and Rs. 931 for *anti-malaria* measures. Grants aggregating Rs. 21,930 were paid to certain municipalities to meet 50 % of the cost of the campaign against rats.

Rural sanitation.—The water supply in rural areas is usually from wells but there are many villages where there are either no wells or the well water is brackish and the villagers use tank or river water. Improvement and protection of water supplies in rural areas is the most important sanitary work that needs to be done. No grants for the improvement of water supplies in rural areas were made during the year.

The aggregate income of the 79 villages under the Village Sanitation and Public Management Act amounted to Rs. 2,08,953, whilst total expenditure to Rs. 2,08,673, including Rs. 4,372 for water supply, Rs. 37,379 for cleaning of village sites and Rs. 3,909 for drainage. Total receipts of town fund and other villages under the *Mukaddam* rules aggregated Rs. 22,366 and the expenditure of Rs. 21,287 on public health included Rs. 292 for water supply, Rs. 12,711 for cleaning village sites and Rs. 157 on drainage. In the *ryotwari* villages of 9 districts, Rs. 4,651 were spent on the improvement of water supplies.

Bombay Presidency.

100. In Karachi city expenditure on public health measures per head of population was about Rs. 3-0-7, the average figure in other municipalities being Rs. 2-5-4. Complete sanitary surveys of 18 towns were made and 31 towns were visited for special inspections or reports.

The municipal water supplies of 8 larger towns were regularly sterilised and maintained their standard of purity. Improvements to drainage works were carried out in 8 towns during the year.

Out of a total population of 3,124,069 in municipalities and notified areas, a population of 2,053,611 or nearly 63 % were provided with water supply and a population of 809,746 only or 26 % of total had the benefit of under-ground drainage.

Government distributed grants amounting to Rs. 1 lakh for the improvement of village water supplies. These grants, supplemented by allotments

from local funds and private contributions, were expended on constructing wells, tanks, troughs and cisterns, in repairing old wells and in boring operations. Altogether 491 new draw-wells were constructed and 134 step-wells were converted into draw-wells.

The aggregate income of the 28 district local boards and 219 *taluka* local boards totalled Rs. 1,88,34,962 and expenditure on public health works Rs. 8,12,619 or a little more than 4 %.

Board of Public Health Works.—The Board accorded approval to the preparation of the following projects:—(1) Disposal of mill effluent at Broach; (2) Byadji water supply; (3) Amalner water supply and (4) Nipani water supply.

Madras Presidency.

101. *Water supplies.*—Two new water supply installations were completed during the year at Tiruvannamalai and Rajahmundry thereby increasing the number of municipalities with protected water supply systems from 39 to 41. Water supply works were in progress in 3 municipalities and improvements to existing water supplies were on hand in 11 municipalities. Two new schemes at Peddapuram and Hindupur were ordered to be executed.

No new rural schemes came into operation, but for one town a scheme was in progress and for another it was approved for execution. Plans and estimates were under preparation or investigation for 6 further centres.

Drainage.—No new drainage scheme came into operation and only 3 towns possess a modern system of drainage. Drainage works were in progress in 3 towns; plans and estimates were under preparation for 4 towns whilst investigations of schemes for 4 towns were completed.

Assam.

102. The total expenditure on public health increased from Rs. 5,00,902 in 1933-34 to Rs. 5,18,600. Expenditure on markets and slaughter houses amounted to Rs. 15,626.

The 19 local boards in the province spent Rs. 1,41,278 on public health as against Rs. 1,74,557 in the preceding year.

Burma.

103. Of the total municipal income, over 18 % was spent on public health purposes, the largest expenditure being Rs. 35,72,143 or nearly 61 % of the total in Pegu division. Rs. 8.66 lakhs were devoted to markets and slaughter houses whilst Rs. 26,371 were spent on epidemic charges.

Water supplies.—Amongst urban areas the water works scheme at Akyab was completed and as a result thereof those parts of the town, which in previous years suffered from an acute shortage of water now receive an adequate supply. In Magwe a piped supply was made available for the first time. In Moulmein, where 5 tube wells were sunk in 1933, yield tests were continued during the year. The installation of 19 additional pumps in Pyapon was completed whilst in Mandalay, a scheme for consolidating the existing arrangements in connection with the supply of tube well water was under consideration. In rural areas no advance worth recording was made in any district towards improving the very unsatisfactory standard of water supply.

Conservancy and drainage.—A further advance was made towards abolishing the unsatisfactory contract system of conservancy in towns. The Syriam drainage system was continued, new drains being constructed at a cost of Rs. 13,000, whilst Mandalay had under consideration the raising of a loan for improving drainage. In rural areas the campaign to introduce bored-hole latrines progressed particularly in the districts of Akyab, Henzada, Myaungmya and Pyapon.

Rural sanitary works.—In rural areas out of an aggregate income of Rs. 1,08,82,410, a sum of Rs. 8,01,912 only was expended for public health purposes. This total included Rs. 26,362 on water supply, Rs. 762 on drainage, Rs. 2,03,896 on conservancy and Rs. 1,49,949 on markets and slaughter houses.

Public Health Board.—No new sanitary engineering works were financed. Nyaunglebin and Pyapon water supplies were completed at a cost of Rs. 1,93,212 and Rs. 87,870 respectively. Paungde water supply scheme was postponed *sine die* for want of funds.

B.—Indian States.

104. *Federated Shan States, Burma.*—The total income, including opening balances, was Rs. 43,41,540—Rs. 2,45,102 in towns and Rs. 40,96,438 in rural areas. A total of Rs. 1,32,061 was spent on public health measures—Rs. 68,372 in urban and Rs. 63,689 in rural areas. Expenditure on water supplies amounted to Rs. 8,507 for urban and Rs. 3,211 for rural; that on conservancy to Rs. 35,800 and Rs. 20,007 respectively and on drainage to Rs. 5,763 in towns only. A sum of Rs. 12,842 was spent on markets and slaughter houses in urban areas.

Mysore State.—The Sanitary Engineering Department maintained 11 old water works, completed 13 new ones, and carried out improvements in 8, while 6 were reported as under construction.

Four drainage works were completed and three were under execution. Two drainage works estimates were sanctioned whilst in the case of 5 the estimates were pending sanction.

Sixty bored-hole latrines were constructed during the year.

SECTION VIII.

LABORATORIES AND MEDICAL RESEARCH.

Central Research Institute, Kasauli.*

105. In the absence on leave from 22nd March to 14th November, 1935, of the permanent Director, Lt.-Col. J. Taylor, I.M.S., Lt.-Col. H.E. Shortt, I.M.S., officiated. Other I. M. S. officers of the Medical Research Department who served on the staff were Majors Craighead, Webster and Greval and Captains Ahuja and Mallick.

While on leave, Lt.-Col. Taylor attended the Spring and Autumn Sessions of the Office International d'Hygiene Publique, Paris, as the delegate of the Government of India. He was also deputed to study methods of testing the toxicity of plasmoguin at the laboratories of the I. G. Farbenindustrie, Elberfeld, Germany, and later submitted a note on the position with regard to toxicity testing of plasmoguin preparations in collaboration with Director, Malaria Survey of India. He continued to act as Editor of the I. J. M. R. and Indian Medical Research Memoirs.

Seven medical officers and laboratory assistants were given practical instructions in bacteriological technique in the Institute.

The main products manufactured were anti-cholera and anti-typhoid vaccines.

Anti-cholera vaccine was issued to the Punjab, Bombay Presidency and Burma and to the Army; T. A. B. vaccine was as usual supplied mainly for army purposes; influenza and mixed catarrhal vaccines were manufactured as required, and the institute continued to meet all requirements in India for anti-venine. Other biological products such as high titre diagnostic sera, haemolytic serum, etc., were also prepared and issued.

Table VIII (i) gives the quantities in c. cs. of vaccines and sera issued in 1933 and 1934.

TABLE VIII (i).

	1934.	1933.
<i>Vaccines.</i>		
Prophylactic cholera . . .	601,590	462,002
Prophylactic T. A. B. . . .	349,454	350,920
Prophylactic influenza . . .	19,790	20,072
Curative (various)	9,118 doses.	8,731 doses.
Autogenous	517 doses.	800 doses.
<i>Manufactured sera.</i>		
Anti-venine	5,973 tubes.	173,680
Normal horse	13,820	14,300
High titre (diagnostic) . . .	1,080	718

* Annual Report of the Central Research Institute, Kasauli, including the Annual Report of the Malaria Survey of India for 1934. Manager of Publications, Delhi, Price Rs. 3-4-0 or 5s. 6d.

Abbreviations—

I. R. F. A.	Indian Research Fund Association.
S. A. B.	Scientific Advisory Board of the Indian Research Fund Association.
G. B.	Governing Body of the Indian Research Fund Association.
I. J. M. R.	Indian Journal of Medical Research.
I. M. G.	Indian Medical Gazette.
D. T. M.	Diploma of Tropical Medicine.

The study of the serological reactions of cholera vibrios in relation to their chemical structure and the results of prophylactic experiments in animals have shown certain points of interest which may be of value in selecting strains for vaccine but the exact interpretation of the findings is not yet clear. Previous findings regarding the keeping properties of cholera vaccine up to six months after manufacture were confirmed and further trials were in hand to examine the possibility of fixing a longer expiry period.

Following experimental work, a method of concentrating anti-venomous serum by ammonium sulphate precipitation was adopted for routine use and from April, 1934, only the concentration product was issued. The concentrated serum has been found to retain its full potency for at least one year.

Table VIII (ii) shows the results in a series of cases treated in recent years in which definite identification of the snake as a cobra or Russell's viper was made or there was a fair probability of the snake being one or other of these species.

TABLE VIII (ii).

	Cases.	Recovered.	Per cent. of total.
(1) Cobra identified	29	25	86
(2) Probably cobra	37	29	78
(3) Russell's Viper	13	12	92
(4) Probably Russell's Viper . .	26	24	92

Anti-meningococcus vaccine was also prepared from local strains of meningococci types I and III isolated from cases of c. s. fever at Delhi. Of this 32,853 c. cs. were issued free for experimental purposes. From the reports received, its prophylactic value is doubtful.

The institute also continued to store and issue imported curative and prophylactic sera for the army in India.

A type collection of micro-organisms was maintained from which strains were issued for study, teaching purposes, vaccine manufacture, etc. Media stains and other requirements for bacteriological work were also prepared and issued. The institute library was used by numerous workers, both civil and military.

Research Work.—The succeeding sub-paragraphs give a brief resumé of the more important problems dealt with during the year but for further information the Director's report should be consulted. Nine papers by the Institute staff were published during the year.

(A) *Studies on vibrios.*—Serological relationship and antigenic structure of vibrios isolated from different sources were studied.

(i) *Agglutinable carrier vibrios.*—Five strains isolated from healthy persons in Diamond Harbour, an endemic area, appeared on examination to be of the same serological nature and gave the typical biological reactions, including agglutination, shown by a characteristic vibrio isolated from a fatal case of cholera.

(ii) *Inagglutinable carrier vibrios.*—A group of five vibrios selected from the same source was studied; these were not found to fall into any definite serological group and a comparison of them with a series of cholera variants did not show any relationship to the strains with which they were compared.

(iii) *Serological relationships of vibrios isolated from water in a non-endemic area.*—One strain isolated from a stream liable to pollution, was supplied by military authorities from Kohat, where no case of cholera had occurred for many years. On arrival, it was found inagglutinable and showed certain other differences from *V. cholerae*. After a period of 6 months subculture, it developed the full serological reactions of *V. cholerae* in regard to both its "H" and "O" fractions.

(iv) *Comparative value of vaccines made from different vibrio strains.*—Judging from a series of protection (animal) experiments with vaccines prepared from typical cholera strains and agglutinable and inagglutinable vibrios isolated from carriers, the highest degree of protection would appear to be obtained when strains of chemical structure, similar to the typical cholera vibrio used for infection, are used for vaccine.

(v) *Cholera diagnostic sera.*—Comparative trials were made of the value of high titre sera for agglutination tests prepared by injection of (a) living cultures, (b) formalinised cultures, (c) cultures killed at 55°C. for half an hour and (d) by injection of a dried antigen prepared by boiling suspensions in alcohol for one hour. Sera of these different types were found to be of value for special types of antigenic analysis. The sera raised against the living cultures were found to have a wide range of action while those raised against the boiled antigen were capable of more detailed differentiation of strains.

(vi) *Differentiation of chemical fractions of Vibrio by anaphylactic methods.*—Protein and carbohydrate substances obtained from Dr. Linton were tried unsuccessfully for sensitisation of young guineapigs, subsequent tests for the development of anaphylactic shock being made.

(B) *Indian strains of meningococcus and preparation of anti-meningococcus vaccine.*—A series of cultures of meningococci was obtained from the cerebro-spinal fluid of cases in Delhi and a type serum was prepared. As a result of the examinations made the meningococci during the epidemic period were found to belong to type I and type III (group I) as has been the experience in Europe and elsewhere. Strains obtained from Ahmedabad were also found to belong to these types.

A vaccine of these locally isolated strains was prepared and issued for experimental use but sufficient figures are not yet available to prove or disprove its value. Its further manufacture has since been abandoned.

(C) *Anti-venine:*—(i) *Comparison of properties of the Kasauli anti-venine and that prepared by the South African Institute of Medical Research.*—It was found that the former could neutralise the South African cobra venom but its effect on puff-adder venom which was not available could not be tested; the latter production neutralised the Indian cobra venom but not that of Russell's viper.

(ii) *Studies on the haemorrhagin of snake venoms.*—The titre of neutralisation of the haemorrhagin of daboia venom determined by the intradermal test was found closely parallel in daboia anti-venom sera with the titre for neutralisation of its lethal effect in pigeons. The anti-daboia serum and a serum prepared against *Bitis arietans*, which were tested, were found to neutralise effectively the haemorrhagins of heterologous viper venoms. The neutralisation of the haemorrhagin of the viper venoms tested by heterologous anti-venine did not effect their immediate lethal action by intravenous injection in pigeons and did not affect the lethal dose.

(iii) *Detoxication of snake venom by the photodynamic action of methylene blue.*—Daboia venom was completely detoxicated, the rapidity of action varying according to exposure to light, the amount of daboia venom present in mixture and the concentration of methylene blue in the solutions used.

(iv) *Standardisation of Kasauli anti-venine by the Ramon flocculation method.*—Preliminary experiments carried out have shown that (1) all sera will not flocculate with the range of mixtures of serum and venom employed, although some do so with consistency; (2) flocculation occurs at the same level with the serum of an individual horse at times when its titre is widely prevalent; (3) the irregularity of the results obtained and absence of exact relationship to titre as determined by neutralisation tests make the flocculation method unsuitable for practical standardisation.

In addition the above researches, an investigation into the bionomics of phlebotomus was carried out by Drs. I. M. Puri and D. R. Mehta under the Indian Research Fund Association, while an enquiry on helminths by Dr. V. T. Korke and a protozoological survey by Dr. J. C. Ray under the same auspices were completed in March 1934.

All-India Institute of Hygiene and Public Health, Calcutta.*

106. Lt.-Col. A. D. Stewart, I.M.S., was Director and Lt.-Col. A. A. Baptist, I.M.D. (ret'd.), Assistant Director throughout the year.

The Government of India continued to provide funds to the extent of rupees two lakhs for four of the six sections originally contemplated. The sections opened were: (i) Public Health Administration under Lt.-Col. Stewart; (ii) Malariology and Rural Hygiene under Dr. K. V. Krishnan; (iii) Epidemiology and Vital Statistics under Dr. R. B. Lal; and (iv) Nutrition and Biochemistry under Dr. H. Ellis Wilson. Each Department has been provided with an Assistant Professor. Realising the prime necessity for immediate provision of post-graduate instruction in this branch of public health work, the Countess of Dufferin Fund (W. M. S.) and the Indian Red Cross Society have been providing funds since May, 1933, for the maintenance of a nucleus-section for Maternity and Child Welfare, in charge of a member of the Women's Medical Service, Dr. Jean M. Orkney, D.P.H., W.M.S. During 1934, the resources of the section were materially improved by grants from the Calcutta Health Week Committee, the Indian Football Association, the Calcutta Corporation, and by donations from Mr. B. N. Birla and Mr. Khaitan, etc. It is hoped the Government of India will soon be able to shoulder the financial responsibilities in respect of this section and open the remaining section of Sanitary Engineering.

The first course for the Diploma in Public Health was held at the Institute in 1932-33, when out of 24 candidates on the rolls 23 appeared and passed Part I and 20 Part II. During the session of 1933-34, courses were opened for the Diploma in Public Health of the Faculty of Tropical Medicine and Hygiene of Bengal and for a Diploma in Maternity and Child Welfare.

The Government of Bengal have sanctioned the affiliation with effect from the session of 1935-36 of this Institute to the University of Calcutta for the purposes of the Diploma in Public Health. The Calcutta University has

* Annual Report of the All-India Institute of Hygiene and Public Health, Calcutta 1934. Government of India Press, Calcutta.

instituted a Doctorate of Science (Public Health) which is a higher degree open to those holding a D. P. H. and will be obtainable after a year's study and research in some special public health subject. The Institute has been recognised for the purposes of this Degree.

Accommodation being available, five important enquiries have also been based temporarily at the institute including (a) leprosy research under Dr. E. Muir, (b) tuberculosis enquiry under Dr. Ukil; (c) cholera enquiry under Dr. Linton; and (d) *Anopheles ludlowi* enquiry under the Bengal Public Health Department.

Department of Vital Statistics and Epidemiology.—In addition to teaching, this department was associated with the cholera carrier enquiry under the I. R. F. A. and controlled the field section and the statistical enquiry which aimed at a study of the factors concerned in the endemicity of cholera. An attempt was made by the calculation of intercensal populations in 11 districts, according to Dr. R. A. Fisher's method of analysis to classify cholera mortality by *thanas*. These studies, it is hoped, will reveal some of the mysteries in connection with the endemicity of cholera and provide a sound basis for forecasting epidemics.

The field section was organised with three objects—(i) to make a detailed study of the actual happenings which determine the origin, progress and termination of cholera outbreaks in an endemic area, with special reference to the part played by cholera carriers; (ii) to make a bacteriological study of vibrios, isolated from cases contacts and healthy persons living under natural village conditions; and (iii) to determine the personal and environmental conditions conducive to the carrier state. A detailed epidemiological survey of a group of 16 villages in the Diamond Harbour *thana* was completed. The basic study of the data, recorded and analysed systematically, will, it is hoped, lead to a better understanding of the mechanism of the incidence of cholera in endemic areas and of the rôle played by the vibrio carriers in this connection.

Department of Malariology and Rural Hygiene.—This Department studied the rôle of the reticulo-endothelial system in the aetiology and prevention of blackwater fever. Other lines of work were (i) the factors responsible for the proliferation, mobilisation and functional activation of the cells of the reticulo-endothelial system on which immunity to malaria is believed to depend; (ii) the rôle of cholesterol and other lipoids in malarial immunity, electric charges of normal red cells, red cells infected with malarial parasites and reticulocytes. The Department also carried out minor anopheline surveys in parts of Calcutta.

Department of Biochemistry and Nutrition.—Work concentrated on as complete an analysis of Indian food stuffs as was possible with the methods available. A technique was elaborated for estimating hexuronic acid by titration with the reduction indicator 2·6 dichlorophenolindophenol. By this method the vitamin C content of some 60 food stuffs including fruits, vegetables, cereals, pulses, etc., was ascertained and certain fruits of the citrus variety, e.g., Indian orange and lime were found to be not so poor as was previously believed. The excretion of vitamin C and reducing substances in the urine under different conditions were also investigated; imported halibut liver oils were studied—while an investigation was made into the metabolism of carotene which indicate that the cells of the reticulo-endothelial system are probably concerned in the transformation of carotene to vitamin A.

This Department also tested the value of a special diet, elaborated by the Bombay Health Week authorities, while voluntary workers studied the analysis of food stuffs; radio-active water and vitamin deficiency; *atta* and rice diets;

factors favouring calculus formation ; and the preparation of vitamin B concentrates. A survey in a number of families and two orphanages, one Hindu and one Muslim, showed that the diets are low in protein, fat, especially animal fat, and calcium.

Investigations were also made into the albumin and globulin content of the blood in the different types of leprosy and on mineral metabolism in experimental scurvy.

Maternity and Child Welfare Department.—In addition to theoretical instruction, this section provided practical experience in maternity and child welfare and school medical work for students studying for the Diploma in Maternity and Child Welfare. For this purpose a demonstration unit aiming at continuity in care of the individual from conception to school leaving age has been organised in Calcutta.

School of Tropical Medicine, Calcutta.*

107. Lt.-Col. R. Knowles acted as Director throughout the year, Lt.-Col. Acton, the permanent Director, being on leave preparatory to retirement. Dr. R. T. M. Hayter continued as Assistant Director.

During the year, two members of the staff, Dr. D. N. Roy, Assistant Professor of Entomology and Dr. B. M. Dass Gupta, Assistant Professor of Protozoology, were awarded Rockefeller Foundation Fellowships. The Minto medal was awarded to Lt.-Col. S. S. Sokhey, I.M.S., an officer of the Medical Research Department and the Chuni Lal Bose medal to Dr. Y. Y. Ying.

The School continued to function as a centre for post-graduate teaching and medical research. Of the 36 students who appeared for the D. T. M. examination in April, 32 passed. Thirty students attended the D. P. H. course ; 28 appeared and 24 passed Part I in May ; 4 appeared in Part I and 23 in Part II in September and 3 and 16, respectively, were successful.

Investigations in progress during the year included hookworm under Dr. Maplestone, respiratory diseases under Dr. Napier, leprosy under Dr. Muir, bowel diseases under Dr. De Monte, diabetes under Dr. J. P. Bose and filariasis under Dr. Sundar Rao. The "I. R. F. A." continued to provide funds for two professors of Pathology and Protozoology and to subsidise no less than 11 enquiries on kala-azar, indigenous drugs, drug addiction, dermatology, malaria, helminthology, cholera, leprosy and blood changes in certain tropical diseases.

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.—This concentrated chiefly on teaching for the L. T. M. and D. T. M. courses, and a careful study of hospital cases. Special features were the treatment of *B. coli* infection of the urinary tract with ketogenic diet, of splenomegaly with intramuscular injections of turpentine, and a study of epidemic dropsy in the Manbhūm district of Bihar.

* Annual Report of the Calcutta School of Tropical Medicine and the Carmichael Hospital for Tropical Diseases, 1934, Bengal Government Press, Alipore, Bengal, 1935 (Gratis).

(b) *Department of Bacteriology, Pathology and Helminthology.*—This Department played an important part in the cholera enquiry financed by the I. R. F. A. and carried out investigations into the clinical, carrier and toxin aspects of cholera as well as basic research on the cholera vibrio and bacteriophage, in which 12 types of cholera phage and 15 of vibriophage were isolated. Evidence obtained did not substantiate D'Herelle's claim that under 'phage action strains of the cholera vibrio always lose their virulence; on the other hand in some instances the virulence was found to increase.

In regard to the antigenic structure of vibrios, it was found that the serological test, which has so long been held as the one test essential in the diagnosis of the cholera vibrio, is not absolute.

The carrier enquiry worked for about six months of the year; true cholera vibrios being isolated from 62 % of clinical cases and 0·8 % of contacts, and healthy persons.

In the toxin enquiry Hahn and Hirsch's experiments were repeated under strictly controlled pH conditions. Fifty recently isolated strains of agglutinating and non-agglutinating vibrios from fatal cases of cholera and four El Tor strains from the National Collection of type cultures were used. Intraperitoneal injections of the filtrates in large doses (2·5 c.c.m.) failed to produce death or any marked effect on guinea-pigs. Other problems investigated included the amine theory of cholera; minimal lethal dose; skin reactions; toxic effects of bacteriophage; variations in the virulence of organisms after bacteriophage action; susceptibility of animals to cholera; and metabolic activities of cholera vibrio.

The clinical 'phage enquiry worked for 6 months but the evidence obtained did not support the value of 'phage in the treatment of cholera. Work was also carried out to determine (i) at what stage in the disease 'phage appears in the stool and the correlation of the presence of 'phage and the condition of the patient; and (ii) at what period in the disease agglutinating vibrios are replaced by non-agglutinating vibrios.

(c) *Protozoology Department.*—In addition to routine examinations, this department studied the problems of malaria and filariasis transmission; treatment of amoebiasis; experimental transmission of *Entamoeba histolytica* of macaques to man; experimental treatment of balantidiosis; the coccidia of Indian cats; and latent malaria in monkeys.

In the malaria transmission enquiry the air conditioning cabinet which has been described in previous reports continued to work satisfactorily and transmission experiments were carried out on the three species of parasite using *A. stephensi*. Detailed results of the experiments are given in the annual report of the School, but generally speaking it may be said that the temperatures and humidities, at which transmission can occur, have been ascertained.

(d) *Entomological Department.*—The Calcutta anopheline survey was continued during the year and the infectivity of *A. stephensi* artificially infected in the laboratory was studied under unfavourable conditions when it was found that the mosquitoes retained salivary infection. Observations on the natural infection of *A. ludlowi* were carried out and experimental infection of *A. rossi* was also studied.

(e) *Pharmacological Department.*—Snake venoms continued to be studied. Daboia (Russell's viper) venom was found to possess a marked tendency to produce thrombosis and gangrene at the site of the bite. The systemic blood

vessels, especially peripheral, are found contracted while those of the splanchnic area are widely dilated as in histamine shock and similarly death is due to secondary shock. The pharmacological action of *Echis carinata* continued to be worked out and biochemical studies regarding the enzymes occurring in different venoms were in progress.

Chemotherapeutic studies included anti-malaria and anti-dysenteric remedies. Investigations in connection with the action of quinine in monkeys infected with *plasmodium knowlesi* showed that this drug acted slower than atebtrin. The destructive action of atebtrin on this plasmodium was found to be exceptionally powerful. The effectiveness of some new anti-malaria drugs was tested on Indian strains of malaria in a series of patients. "*Malarcan*" probably a derivative of quinine or quinidine has been found to show fluorescence under ultra-violet light in high dilutions.

Work on indigenous drugs related chiefly to the chemical analysis of the root and bark of *Alangium lamarckii* used in indigenous medicine as an emetic diaphoretic and antipyretic, and the experimental use of dried juice obtained from the leaves and bark of *Antiaris toxicaria* common in the Deccan Peninsula and the *ghats* from Konkan downwards which is known as the source of a deadly poison. The chemical analysis of the former drug showed the presence of an alkaloid which produces a slow and maintained fall of blood pressure and has a selective action on the para-sympathetic mechanism, being most marked on the gastro-intestinal tract. The dried juice from the latter was found to have a slight stimulant action on the heart and circulation, but in larger doses to act as a strong cardiac poison.

Vernonia anthelmintica the seeds of which are used in the treatment of leucoderma and psoriasis and are considered to have powerful anthelmintic properties was also studied. Its seeds were found to contain 18 % of a fixed oil, about 0.02 % of an essential oil, a bitter principle and resin, tannins, phlobaphenes, etc. This drug however has no action whatever against hookworm and tapeworms; its anthelmintic properties against ascaris and even against oxyuris are weak and in no way comparable to other compounds now in the British Pharmacopoeia.

In the drug addiction enquiry work was in progress on (i) habitual administration of opium in India and (ii) changes in the physical and chemical properties of blood sera of opium addicts. In regard to the first, an analytical study of infant cases was made and various factors, *e.g.*, age of commencement, duration of administration of the drug, causes leading to the custom, dosage given, methods of administration and symptoms and effects produced connected with the custom have been discussed. Blood serum changes were studied in 25 cases and the pH in all cases was found to be near the lower limit of normal Indian subjects, whilst the buffer action appeared to be considerably lower.

(f) *Department of Chemistry and Physics*.—Ten drugs were under chemical investigation whilst a paper was published dealing with eight others. From *Moringa pterygosperma* a base was extracted which has a strong pharmacological action resembling that of adrenalin. *Ptylophora asthmatica*, a reputed remedy for asthma, yielded 0.44 % of alkaloids, none having emetic properties. A glucoside with an action resembling that of pilocarpin was isolated from *Periploca aphylla*. A paper was published on *Abhra bhasma*, an ayurvedic medicine used as a tonic, which was found to have mineral constituents. The glucosides of *Digitalis lanata* were isolated and purified for

clinical trial. Other work of importance included an investigation into the cause of discolouration of old quinine tablets in government factories and studies on the reduction of nitrates by fungi and on the enzymes of the cholera vibrio.

(g) *Serological and Immunological Department*.—In addition to medico-legal and routine serological work, an enquiry into the nature of the blood meal of the anopheline mosquito was concluded and enquiries to determine the blood grouping of different castes in the Indian Army were commenced. A further study was made of the different antigens used in the Wassermann reaction.

(h) *Department of Public Health Laboratory Practice*.—An investigation on the constants of the oils made from the three mustard seeds, *sarisha*, *swet sarisha* and *rai* was concluded and constants for each laid down. Standards have also been given for cow and buffalo *ghee*.

The activities of the special research departments financed by the Endowment Fund mentioned earlier in this paragraph have been summarised below :—

Hookworm.—Experiments have shown that the combination of tetrachlorethylene with chenopodium oils is the best treatment for this infection. Treatment without proper measures for the disposal of excreta was found of little avail in reducing ascaris infection in communities living under insanitary conditions. The relationship of hookworm infection to anaemia in tea garden coolies in Assam was studied and an improved technique for the cultivation of hookworm larvae was elaborated.

Anaemias and respiratory diseases.—It was found that *achlorhydria* was not characteristic of Indians. Most of the anaemic tea garden coolies examined were cases of microcytic hypochromic anaemia and hyperchromic anaemia, which is very frequently diagnosed, was found to be rare.

Work on respiratory diseases included the typing of pneumococci. It was found that the pneumococcal types I and II, so commonly encountered in England, were comparatively rare, less than 12 % of the strains isolated falling into these two types. Much work was done on the manufacture of high titre sera against the types of pneumococci prevalent in Assam, and it was found that 22 undiagnosed strains were agglutinated by one or other of two sera that were prepared.

Leprosy.—The leprolin test has been found to be strongly positive in neural cases and negative, or only very weakly positive, in the cutaneous type of the disease. The test has shown that children are highly susceptible to infection and adults much more resistant. In resistant types of leprosy lesions and in neural leprosy, bacilli have been demonstrated in small numbers in 70 % of 73 cases.

All attempts to cultivate the leprosy bacillus on artificial media having so far failed, tissue-plasma media have been tried.

Bowel diseases.—Cholera, dysentery and typhoid phages were prepared, but their value has not yet been proved. Up to 1933 cholera phage, type A, lysed the vast majority of some thousands of smooth agglutinating vibrio strains isolated; in 1934 the condition was completely reversed and the majority of strains isolated were not lysed. Other activities included an investigation of an outbreak of epidemic dropsy in Bengal and Behar and the prevalence of hill diarrhoea and dysentery in Darjeeling.

The action of cholera phage on the nitrate-reducing reaction of the cholera vibrio was studied and it was found that the phage inhibits this action.

Diabetes.—An important finding was that of the value of the arterio-venous sugar difference as a criterion for measuring the severity of the disease in the individual. Studies of the basal metabolic rate of Indians in health and disease were completed and an important study made of blood cholesterol in diabetes. In connection with the belief that diabetic mortality is increasing in the civilised world, reliable statistics of comparative death rates from diabetes in different Indian races have been collected.

Filariasis.—An apparently new species of microfilaria recorded previously from Patnagarh (B. and O.) has now been identified as *Microfilaria malayi* Brug. The development of the larvae in *Culex* mosquitoes at different atmospheric temperatures and humidities was studied.

The work of the Pasteur Institute has been dealt with on page 203.

For further details of the activities of this institution, the Director's report should be consulted. Sixty-nine scientific papers were published by the School staff and workers, *vide* list on pages 328—40.

Haffkine Institute, Bombay.

108. Lt.-Col. S. S. Sokhey, I.M.S., acted as Director. Dr. K. S. Mhaskar, Dr. M. B. Somparkar and Dr. P. M. Wagle were Assistant Directors. Dr. B. P. B. Naidu worked as special research worker.

The Institute continued to function as (a) the centre for the manufacture of plague vaccine for the whole of India, (b) the centre for the manufacture of anti-rabic vaccine for Bombay Presidency and treatment centre for Bombay city, (c) the provincial diagnostic laboratory for Bombay Presidency, (d) the centre for collection of snake venoms and (e) a centre of medical research.

The routine preparation of various prophylactic vaccines and diagnostic work for local hospitals staff restricted the undertaking of research work.

Plague Vaccine.—A total of 1,794,132 doses were issued compared with 1,582,182 in 1933. The largest monthly issue, 273,792 doses, was made in January and the lowest 3,404 in June. British India took 1,203,954 and the Indian States 588,682 doses; Bombay Presidency alone was supplied with 299,208 doses.

Examination of rats.—727,815 rats from Bombay city were examined; of these 34 were found to be plague-infected, 29 being identified as *Rattus norvegicus* and 5 as *Rattus rattus*. The peak of infection was reached in February and March and the minimum incidence from August to December.

Anti-rabic Section.—The work of this section has been dealt with on page 203.

Diagnostic Section.—Bacteriological, serological, pathological and biochemical work was done for various hospitals in the Presidency, 5,800 specimens being examined of which 3,100 were Wassermann tests.

Research Work:—(a) *Plague Vaccine.*—Last year's researches were continued and important observations made. The effect of cold storage at 5°C to 8°C on the virulence of *B. pestis* was determined. The measurement of virulence was carried out by determining the minimum number of organisms required to constitute a lethal dose for a mouse, which was found to vary from 3 to 10 organisms. Further improvement was effected in the biological method of standardising plague vaccine. This has made it possible to maintain

the test dose of plague vaccine absolutely constant. Another important change has been introduced in the preparation of the vaccine. Virulent cultures made from blood obtained from human cases and stored at 5° to 8° now play an important part in the preparation of plague vaccine, replacing the former method of passage through Madras non-immune house-rats. This change has increased the potency of the vaccine, the protective mouse dose now being 0.0017 c.c. as against 0.002 c.c. in the previous year. The protective value of the antiplague vaccines of the different continents was tried and it has been possible to establish beyond doubt that the Haffkine vaccine is the most potent. Efforts were made to reduce the toxicity of this vaccine without impairing its protective power, and from experiments done this year the observation has been made that vaccines incubated at 37°C are only half as toxic as those grown at 27°C.

(b) *Plague phage*.—A phage supplied by Dr. D'Herelle was tried on animals; in vitro it proved to be a very potent strain, lysing in 1 in 50 million dilution the plague strain used in our experiments.

(c) *Anti-plague serum*.—Encouraged by the favourable results obtained by treatment of human cases with buffalo immune serum, 15 more buffaloes were immunised to obtain a larger quantity of serum for more extensive field test. Every immunised animal was bled at regular intervals after a given number of injections and the potency of the serum tested. The optimal number of injections to give the highest potency to sera was found to be from 30 to 35. Alongside these, complement fixation tests which did not compare favourably with the animal tests were also tried. A suitable opportunity did not occur to test the serum under hospital conditions.

Epidemiology of plague.—Measurement of immunity to plague of rats from different areas in which the disease had occurred in epidemic form was continued by Dr. Chitre during the year. An accurately measured test dose of *B. pestis* was employed for this purpose and rats from any given area were always tested along with a batch of rats from Madras (highly susceptible to plague) and a batch from Bombay (resistant to plague). Rats from towns and cities situated in the Madras Presidency were examined this year. This investigation has so far shown that the percentages of deaths from plague in the inoculated rats have a general correspondence to the aggregate incidence of plague in the area from which the rats are obtained.

Experiments in the use of proprietary calcium cyanide preparation for destruction of the animal vectors of plague has been continued. A comparative study of the various preparations on the market has been made and a valuable technique for prophylaxis evolved.

Snake venom.—Snake venom was collected during the year for despatch to the Central Research Institute, Kasauli, where the anti-venine serum is manufactured, as well as to various scientific workers in Europe and America for experimental purpose.

Bio-chemical Unit.—This Unit, in addition to examinations for clinical diagnosis, has done valuable work for concentration of anti-plague serum, testing of proprietary calcium cyanide preparations, and manufacture of anti-cyanide treatments.

King Institute of Preventive Medicine, Madras.*

109. Lt.-Col. H. H. King, I.M.S., Director of the Institute, proceeded on leave preparatory to retirement on the 12th April, 1934, Dr. C. G. Pandit acting for the rest of the year.

*Report of the King Institute of Preventive Medicine, Guindy, for the year ending 30th September, 1934, Superintendent, Government Press, Madras, Price annas 8.

Vaccine lymph.—Only glycerinated lymph was issued as before ; details of its manufacture will be found in Section VI of this report.

Bacterial vaccines.—Issues included 1,318,011 stock doses of cholera, 35,450 doses of T. A. B. and 285 of influenza vaccines. Other vaccines issued were staphylococcus pyogenes ; streptococcus pyogenes ; mixed staphylococcus and streptococcus (mixed) ; B. typhosus (curative) ; pneumococcus ; B. influenza (curative) and compound catarrhal vaccines. The total issue of cholera bacteriophage was 228,760 c.cs. and of dysentery phage 5,949 c.cs., while 27,703 doses of anti-tetanic and 22,982 of other sera were also issued.

Bacteriological, serological and chemical examinations.—Altogether 55,507 examinations were carried out. Of the bacteriological examinations 1,677 specimens were examined for cholera and 602 proved positive. The isolation of *B. typhosus* on 11 occasions from the stools of 35 convalescent patients is of epidemiological interest.

Research work.—Some of this work is summarised below but for details the original report of the Director and the papers published in the Indian Journal of Medical Research should be consulted.

(a) *Vaccine lymph.*—In order to eliminate the bacterial content without reducing its potency the possibility of manufacturing vaccinia virus on a large scale was investigated. Cultures were initiated with the routine glycerinated calf lymph virus (dermal strain). This strain has had 30 serial passages on allantoic membranes of developing chick embryos. It has been found that this method is not unsuitable for large scale production, if arrangements could be made to ensure a regular and sufficient supply of fertile eggs and if the cultivated virus were found suitable for use in all respects. No material difference was noted in the course of reaction in animals after vaccination with cultured virus and with routine calf lymph. In their immunising power and in cross immunity experiments the cultured virus and routine calf lymph behaved alike. Further work is being continued on the correlation between the extent of lesions on membranes and their potency.

The effect of clove oil on the virus content of vaccine lymph was further investigated. Experiments to obtain potent dried lymph by Otten's method were continued. The previous finding that buffalo-calf lymph withstood drying much better than cow-calf lymph was not confirmed and a considerable fall in potency was noted when dried lymph was tested after two months storage at room temperatures.

Nijland's seed cycle was modified by substituting human passage lymph instead of the rabbit lymph to vaccinate buffalo-calves. Experimentally the lymph produced by this method was as good as that obtained by the routine cycle.

Other studies included (i) the cause of trachoma ; (ii) the serological classification of streptococci and staphylococci ; (iii) Eijkman's and William's tests ; (iv) faecal streptococci in Madras waters and longevity of faecal organism in stored water.

Pasteur Institute of India, Kasauli.

110. Major G. C. Maitra, I.M.S., Lt.-Col. G. Covell, I.M.S., Dr. J. P. McGuire, I.M.D. and Lt.-Col. H. E. Shortt, I.M.S., acted as Directors in succession.

A total of 21,241 patients sought treatment at Kasauli and 122 at ancillary centres. Of these 16,851 underwent the complete course of treatment. A total of 2,567 persons, presumably at risk, were incompletely treated while 1,734 were advised.

Of 1,714 cases treated at Kasauli the biting animal was proved to be rabid in 108 cases ; was certified to be rabid in 14 and was probably rabid in 1,400 (14 deaths). The history of the animal was unknown in 169 cases (1 death) and the animal was probably not rabid in 23 cases. The figures for the centres under these categories were : proved rabid, 856 cases (1 death) ; certified rabid, 892 cases ; animal probably rabid, 10,531 cases (60 deaths) ; history of animal unknown, 2,745 cases (6 deaths) ; animal probably not rabid, 113 cases.

Table VIII (iii) gives the death rates amongst Asiatics treated at Kasauli and its centres according to position of wounds.

TABLE VIII (iii).

Position of wounds.	Kasauli.			Centres.		
	Treated.	Deaths.	Rate %	Treated.	Deaths.	Rate %
Leg	806	3	0·4	7,883	29	0·4
Trunk	53	..	..	409	1	0·2
Arm	370	4	1·1	3,781	12	0·3
Multiple	155	1	0·6	915	5	0·5
Face	160	5	3·1	497	14	2·8
Multiple face	101	2	2·0	250	5	2·0

Table VIII (iv) gives figures arranged according to lateness of arrival expressed in days for Asiatics treated at the institute and its centres :—

TABLE VIII (iv).

	Kasauli.			Centres.		
	Treated.	Deaths.	Rate %	Treated.	Deaths.	Rate %
1—7 days	1,362	10	0·70	11,141	44	0·4
8—14 days	186	2	1·07	1,523	8	0·5
15—21 days	37	3	8·11	461	5	1·1
22—28 days	15	..	..	135	2	1·5
Over 28 days	45	..	..	475	7	1·5

The total included 1,416 cases with 11 deaths at the Institute and 12,565 cases with 40 deaths at the centres in which the biting animal was a dog ; a jackal in 180 cases with 4 deaths and 1,733 cases with 23 deaths, respectively ; a wolf in 20 cases with 3 deaths at the centres and in the case of 6 cases with 1 death the biting animal was unknown. Other bites were non-fatal. The interval between the bite and death varied between 3 days and 290 days whilst symptoms of hydrophobia appeared from 2 days to 271 days after the commencement of the treatment.

Details of the work of the various Pasteur Institutes mentioned will be found in the following publications :—

- (1) Pasteur Institute of India, Kasauli—34th Annual Report of the Central Committee of the Association and the Report of the Director of the Institute for 1934.
- (2) Pasteur Institute of Southern India, Coonoor—The Annual Report of the Director for 1934 together with the 28th Annual Report of the Central Committee of the Association for 1934-35. Methodist Publishing House, Madras.
- (3) King Edward VII Memorial Pasteur Institute and Medical Research Institute, Shillong—The 18th Annual Report for 1934. Assam Government Press, Shillong (Rs. 1-4-0 per copy).
- (4) Report on the working of the Burma Pasteur Institute and Bacteriological Laboratory for 1934 and for 1934-35 respectively—Superintendent Government Printing and Stationery, Burma.
- (5) Pasteur Institute, Calcutta—11th Annual Report of the Pasteur Institute, Calcutta, for 1934. Bengal Secretariat Book Depot, Calcutta.

Carbolised 5% Paris sheep vaccine was used both at the institute and at centres. The brain of a sheep which is completely paralysed as the result of infection with Paris fixed virus is made into an 8% emulsion with a 1% carbolic acid in normal saline. This is incubated for 24 hours at 37°C and then diluted with normal saline to make a 5% emulsion. The vaccine is kept at room temperature for at least 30 days before use.

A number of severe (class IV) cases at Kasauli and at the Lahore centre were given anti-rabic serum in addition to the ordinary course of vaccine treatment.

Complaints attributed to treatment were received from 200 patients, but as usual, most of these bore no causal relationship to the treatment. Two doubtful and one definite case of paralysis were recorded.

Courses of vaccine were issued for 671 animals; each course consisting of 7 daily injections of a 6% carbolised Paris sheep vaccine, the dosage being graded according to the size of the animal.

The brains of 196 animals were examined and 120 were found positive.

Research Work.—This included experiments on (i) the use of live fixed virus in conjunction with anti-rabic serum as adjuncts to dead vaccine treatment; (ii) the antigenic properties of carbolised 5% vaccine; (iii) a rabies virus fixed in the dog for the treatment of animals; (iv) the viricidal properties of phenol; and (v) human experiments to test the value of immune serum in conjunction with the routine vaccine treatment.

Pasteur Institute of Southern India, Coonoor.

111. Major K. R. K. Iyengar, I.M.S., was Director throughout the year. At the Institute 414 patients underwent complete treatment; 41 were incompletely treated; 36 were given advice; and 41 absconded during treatment. For the second year in succession, no deaths were reported among treated cases. In 33 cases the biting animal was proved to be rabid; in 2 it was certified so; in 188 it was probably rabid according to history; in 188 the history of the animal was unknown; and in 3 the animal was probably not rabid.

Semple's carbolised 5% sheep vaccine was used throughout without any post-treatment complications. The dosage and duration of treatment remained unchanged (*c.f.* this report for 1933, page 204). A total of 993,267 c.cs. of anti-rabic vaccine was manufactured.

Issues to veterinary surgeons totalled 20,300 c.cs., although only 259 animals including 216 dogs were treated.

Of 372 specimens examined, 255 proved positive.

Outcentres.—Treatment was the same as at the Institute. Altogether 10,634 patients (Europeans 293 and Asiatics 10,341) received the complete course and among these 13 deaths occurred, all Asiatics. Those incompletely treated numbered 2,343 (Europeans 26 and Asiatics 2,317) and included 1,899 who were presumed to be at risk; among these cases also deaths from hydrophobia numbered 13, all Asiatics. Three deaths occurred in cases of jackal bites, one was a fox-bite and 22 were cases of dog-bite. The total death rate was 0.24% the lowest on record; that among the completely treated 0.12% and that among the incompletely treated 0.68%. The fatal cases in the latter group included 10 who developed hydrophobia

during treatment and 3 amongst those who absconded during treatment. The low mortality during the present and the preceding two years corresponds with the exclusive use of Paris fixed virus and a higher strength and dosage of vaccine. The shortest incubation period was 14 days in a case of dog-bite and the longest, 397 days in a fox-bite patient.

Of the total fatal cases, 13 sought treatment 1—7 days after the bite ; 2 after 8—14 days ; 3 after 15—21 days ; 6 after 22—35 days ; 1 case after 43—49 days ; and 1 case over 50 days.

Research Work.—Eleven scientific papers embodying the results of investigations carried out at the Institute were published in the "I. J. M. R." and "Current Science". A list is given in the Appendix to this section (page 328).

King Edward VII Memorial Pasteur Institute, Shillong.

112. Lt.-Col. J. Morison, I.M.S., who proceeded on leave preparatory to retirement, was succeeded as Director by Lt.-Col. L. A. P. Anderson, I.M.S., from the 20th July, 1934.

Anti-rabic treatment.—Since the adoption of a 5% emulsion of carbolised killed sheep fixed virus, the fall in deaths and case mortality has been significant. The classification of the cases and the dosage remained unchanged, viz., class I cases, 2 c.c. daily for 14 days ; classes II and III, 4 c.c. daily for 14 days ; class IV, 6 c.c. daily for 14 days. No post-treatment accidents were reported. A total of 1,751 patients (Europeans 105 and Asiatics 1,646) underwent the complete course : 259 were treated at the institute and 1,492 at the 57 outcentres. Deaths numbered 7, all amongst Indians ; 4 among dog-bite and 3 among jackal-bite cases. The death rate, 0.4%, was the lowest on record and the failure rate on five deaths occurring within 15 days after the completion of treatment was 0.3 %. Most of the European patients were, as usual, "lick" cases. In the case of 66 Indian patients the biting animal was proved rabid and only 2 deaths occurred in this group ; in 91 cases, including one fatal, it was certified rabid ; in 1,190 cases of which 3 died it was probably rabid according to history ; in 128 cases the history of the animal was unknown and no patient died ; and in 17 cases the animal was not rabid according to the particulars supplied and no mortality was reported.

Vaccines.—There were issued 171,117 doses of anti-cholera, 5,838 c.cs. of T. A. B. and 16,040 c.cs. of influenza vaccines and 871,316 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) isolation of new types of cholera bacteriophage, (ii) variation in the rate of multiplication in different types of cholera phage ; (iii) causes of the absence of certain types of bacteriophage from the brews of cholera dysentery phage prepared for therapeutic use.

For details of results, the report of the Institute should be consulted.

The Assam Medical Research Society continued to be financed jointly by the Assam Government, the I. R. F. A., the Indian Tea Association, the Assam Bengal Railway, the Assam Oil Company and miscellaneous contributions. The main activity of this Society was the study of malaria under Dr. Milford Rice, its research officer. The malaria section was reorganised to

ensure better co-ordination of surveys, routine examinations of specimens, etc. No training class was held this year. A study of malaria factors in Assam showed *A. minimus* to be the significant factor in the Brahmaputra Valley. Areas of non-endemicity and of varying degrees of endemicity were determined and in the latter areas the differences in water conditions were found to determine varying intensity.

Burma Pasteur Institute and Bacteriological Laboratory.

113. Lt.-Col. L. A. P. Anderson, I.M.S., and Major G. C. Maitra, I.M.S., acted as Directors in succession.

Anti-rabic treatment.—A total of 2,074 persons received the full course of treatment, 1,701 at the Institute and 373 at outcentres and hospitals. Advice cases numbered 883 at the Institute and 18 at centres, etc.

Total deaths were 12, all amongst Asiatics; 8 among the completely treated cases of severe bite (6 at the Institute and 2 at district hospitals), 4 among those who developed hydrophobia and died during treatment at the Institute. Of the fatal cases at the Institute 6 had come for treatment 0-7 days after the bite and 4 after 22-45 days; 6 had had doses of 7 c.c. each for 14 days; 1 of 10 c.c. for 7 days; 1 of 7 c.c. for 6 days; 1 of 7 c.c. for 4 days and 1 of 7 c.c. for 3 days. The death rate was 0·35% at the Institute and 0·6% at out-hospitals; no death occurred among the cases treated at outcentres. In the ten fatal cases at the Institute, males 8 and females 2, the biting animal was a dog.

In the case of 347 cases treated at the Institute the biting animal was proved rabid; in 49 cases with 2 deaths it was certified so; and in 1,305 cases with 4 deaths it was probably rabid. This year the Paris fixed virus was substituted for the Kasauli virus which had been in use since the opening of the Institute. In the case of classes I and II cases, the strength of the vaccine was raised from a 1% to a 5% suspension of brain substance for all treatments given at the Institute, its 3 centres and district hospitals. Class I cases were given 2 c.c. daily for 7 days; class II cases 2 c.c. daily for 14 days; class III cases 5 c.c. daily for 14 days; and class IV cases with injuries on extremities and trunk 7 c.c. daily and those with injuries on head 10 c.c. daily for 14 days. Altogether 207,150 c.c.s. of the vaccine were manufactured and included 455 courses supplied to district medical officers.

Seventy-nine courses of vaccine were issued for animals including a cat and a horse and two deaths only among dogs were reported among the inoculated.

Bacteriological Section.—A total of 21,297 examinations were carried out. These included 16,920 serological, 2,934 microscopical, 710 cultural, 493 chemical and biochemical, 159 histological and 81 miscellaneous examinations. The use of Dreyer's method of Widal test was continued and every serum tested against five different emulsions. The demand for prophylactic T. A. B. vaccine was lower this year being 22,852 c.c.s.; that for curative sera, especially anti-tetanic serum was higher, the issues being antidysenteric serum 625,000 units, diphtheria antitoxin 600,000 units, tetanus antitoxin 7,008,000 units, anti-streptococcic serum 3,414 c.c.s., antidysenteric serum 270 c.c.s., anti-venene concentrated 1,630 c.c.s. and anti-leptospira serum 2,500 c.c.s.

Hydnocarpus oil, pure 230 lbs. with creosote 131,489 c.c.s., and alepot solution 26,950 c.c.s. were also issued for the treatment of leprosy.

Research work.—Work carried out or in operation included (i) the examination of samples of sera against different antigens of *B. proteus* X 19 ; and (ii) a systematic examination of wild rats for leptospiral infestation.

Pasteur Institute, Calcutta.

114. This Institute is a part of the School of Tropical Medicine, Calcutta. A total of 1,134 patients, nearly all from Bengal, had the full course of treatment while 343 were advised to attend other centres to complete the treatment. In addition, 857 were given advice, 3 not at risk discontinued treatment and 170 discontinued the treatment voluntarily. Excluding 3 cases which arrived at the Institute with symptoms, deaths from hydrophobia numbered 3 of which two occurring after 15 days of the completion of treatment were classed as "failures". The 3rd case developed hydrophobia during treatment. The death rate was 0·26% and the failure rate 0·18%. No deaths were reported among Europeans.

Of the total, 147 were lick cases only, 304 cases had superficial bites, 517 had deep bites on the trunk and extremities, and 166 had extensive deep bites on face and head. All three deaths were among cases who arrived at the institute for treatment 4, 5 and 10 days late. The interval between the bites and death varied between 18 and 61 days and the duration of illness from 24 to 84 hours. Patients numbering 4,808 attended the other 135 sub-centres in the Presidency.

Semple's carbolised 1% vaccine made from sheep's brain with the Paris strain of fixed virus continued to be used. The treatment was 5 c.c. daily for 7 days for licks (class I) and for 14 days for bites (classes II—IV). No case of post-treatment paralysis was reported.

Of the 41 specimens, dogs 39 and jackal two, 22 were positive.

Pasteur Institute, Bombay.

115. At the Institute which is incorporated with the Haffkine Institute, Bombay, 2,581 patients applied for treatment. Of these 1,830 cases received the complete treatment, 37 discontinued treatment before completion and 714 were advice cases only.

Health returns from 98·2% of the cases treated were received, one death from hydrophobia occurred within, and 3 deaths more than 15 days after completion of treatment, giving a total mortality of 0·21%.

In the case of 34 patients the biting animal was proved to be rabid ; in 45 it was certified to be rabid ; in 812 it was probably so according to history and in 939 the history was unknown.

The biting animal was a dog in 1,765 cases (4 deaths) ; jackal in 21 ; cat in 25 ; monkey in 15 ; fox in 3 ; human being in 5 ; donkey in 2 ; horse in 2 ; and calf in one.

Of the 181 animal brains examined 136 were found positive.

Out-centres.—At 58 out-centres 5,806 persons received a full course of treatment and 45 were advice cases. Three patients died of hydrophobia during treatment, eight within 15 days and fifteen over 15 days after completion of treatment, giving a mortality rate of 0·39%. Health returns of only 76·3% of cases treated were received. The centres are being urged to get more complete health returns.

Ten deaths occurred amongst those bitten on the face and 13 deaths among those with bites on the trunk and extremities. In 160 cases the biting animal was proved rabid; in 343 it was certified so; in 3,493 cases it was probably so according to history and in 180 the history of the animal was unknown.

No patient developed paralysis after treatment either at the Institute or at the centre. Anti-rabic treatments issued to veterinary surgeons for the treatment of dogs and other animals numbered 287.

Pasteur Institute, Patna.

116. Cases totalling 4,132 received the full course of treatment, 947 presumably at risk absconded before completing treatment, 418 were advised while 11 cases arrived with symptoms of hydrophobia; 4 developed hydrophobia during treatment and 7 others died of other causes during treatment.

All the 16 deaths from hydrophobia giving a rate of 0·4% occurred among Indians; 2 fatal cases were of class II, 8 of class III and 6 of class IV. In 19 cases the animal was proved rabid, in 10 it was certified so, in 2,325 it was probably rabid, in 1,661 cases the history of the animal was unknown and in 96 cases the animal probably was not rabid. Five deaths were recorded among patients with bites on the face including 2 multiple bites and 11 among those bitten on the extremities. In the case of 14 deaths the patients had sought treatment 0-7 days after the bite; and in the case of 2 deaths, 8-14 days after the bite.

The number of days from the commencement of treatment to the onset of symptoms of hydrophobia was 217 days in one fatal case, varied from 13-31 days in 11 fatal cases, from 33-51 days in 3 cases, and in one case the period was not ascertained.

The interval between the bite and death in these 16 cases varied between 20 and 226 days. Verified jackal bites were fatal in 11 cases (69%) and dog bites in 5 cases (31%).

At the Cuttack centre to which 26,000 c.cs. of anti-rabic vaccine were issued, 337 patients, mostly of classes II and IV were completely treated. In 307 cases the biting animal was probably rabid, 50 left off treatment before completion, 3 were advised only and one case who arrived with symptoms of hydrophobia was not treated.

Of the treated cases, a dog was the biting animal in 156 cases, a jackal in 160 cases, and other animals in 21 cases.

Reports were received from 77% of Asiatic cases treated at the Institute and from 49% of those at Cuttack. Reports received from European cases were 81% at the Institute and 50% at the centre.

All cases at the Institute and centre were treated with 2% carbolic vaccine, except 195 cases who were given 5% carbolic vaccine. Treatment lasted for 14 days except in 5 cases who were given 21 days' treatment.

In addition, 15 cases were treated by civil surgeons while vaccine sufficient to inoculate 19 domestic animals was issued on payment.

Medico-Legal Work.

117. Table VIII (vi) summarises the medico-legal work done in provinces employing a chemical examiner.

TABLE VIII (vi).

	Cases investigated.	Cases detected.	Samples examined.
British India	11,268	7,192	35,671
N. W. F. P.	426	338	1,323
Punjab	2,340	1,851	8,489
U. P. and C. P.	1,586	1,070	4,150
Bengal	2,363	1,301	5,467
Bombay	1,172	767	5,164
Madras	1,382	1,037	7,437
Burma	1,999	828	3,641

N.-W. F. P.—Cases, totalling 440 comprising 1,375 exhibits, were investigated, the increase being chiefly in poisoning cases. Stain specimens numbered 279. Positive detection was made in 65% of human poisoning cases, and 50% of cattle poisoning, in 86% of murders, etc., and 90% of sexual crimes. Of 52 articles analysed for government departments 36 were cocaine and its adulterants, 2 opium and 2 *lahan*.

Punjab.—A total of 3,614 cases comprising 11,098 articles were examined. Out of 979 human and 62 animal poisoning cases investigated, 582 and 32 respectively were fatal. The percentage of detection under the different heads was 73% in human poisoning cases, 32% in cattle poisoning cases, 89% in blood cases (murder or hurt by violence) and 82% in sexual offences. As usual the poisons most commonly used in human poisoning cases were opium (48%), arsenic (21%), *dhatūra* (9%), alcohol (6%) and mercury and its compounds (3%). Arsenic was also found in all the fatal cattle poisoning cases. Miscellaneous examinations included 34 samples of water, 6 of *ghee*, 24 of quinine and 134 of spirituous preparations including chloroform.

U. P. and C. P.—Cases of human poisoning investigated were 371, the total number of medico-legal cases received being 1,586 involving 4,150 examinations. Analyses were 1,870 and stain cases 1,159. Arsenic, opium and *dhatūra* were the commonest poisons.

Bengal.—Of the 2,363 medico-legal cases investigated, positive results were obtained in 1,301 or 55%. Medico-legal articles examined numbered 6,169, including 702 samples of preservatives. Poison was detected in 241 cases, opium being detected in 176 articles. Arsenic, alcohol, aconite, oleander, hydrocyanic acid compounds and atropine cases occurred in this order of frequency forming 11, 11, 9, 7, 4 and 3% respectively of the total detected poisons.

Bombay.—In all 5,164 medico-legal examinations were carried out and 1,172 cases investigated, including 628 of suspected human poisoning, 449 stain cases, 45 suspected animal poisoning and 50 miscellaneous. Other examinations included 2,926 samples from the excise department, 284 for government stores and 361 miscellaneous. Among the 628 human poisoning cases, poison was detected in 274, with 105 deaths, opium being present in 142, *dhatūra* in 36, arsenic in 18 and other poisons in 78. In animal cases, poison was detected in 22, yellow oleander (*Cerbera Thevetia*) in 16 and arsenic in 6. Reports were made on 205 samples of *ghee*, milk, flour, sugar and lime juice, 26 medicines and chemicals and 2 others.

Madras.—Cases totalling 1,553 comprising 7,608 articles were received for analysis, including 327 for human poisoning, 20 for animal poisoning, 928 for stains and 107 miscellaneous. Poison was detected in 174 human poisoning

cases or 53% of the total. Oleander, opium or its alkaloids and *dhatūra* were the commonest poisons detected. Of the animal poisoning cases, 9 or 45% were positive, the common animal poisons being oleander (5 cases) and arsenic (3 cases).

Burma.—In the laboratory 9,079 examinations were made and the number of medico-legal cases was 1,999. Of the 511 cases of suspected human poisons investigated, poison was detected in 213, the most common poisons being arsenic, opium, *dhatūra* and oxalic acid.

THE INDIAN RESEARCH FUND ASSOCIATION*.

General.

118. The following is a brief summary of the investigations undertaken by workers of the Association during the financial year, 1934-35. For details, reference should be made to the reports published in the Indian Journal of Medical Research, in its Memoirs and in the Records of the Malaria Survey of India, in the Indian Medical Gazette and other papers. A detailed list of publications is given in Appendix to this section (pages 328-40). A short resumé of the various investigations will also be found in the published report of the Scientific Advisory Board of the Association.

Malaria.

119. *A. Malaria Survey of India.*—(a) *General.*—Lt.-Col. J. A. Sinton, V.C., I.M.S., was Director throughout the year. Lt.-Col. G. Covell, I.M.S., Major R. C. Wats, I.M.S., and Capt. H. W. Mulligan, I.M.S., acted as Assistant Directors in succession. Other officers included Dr. I. M. Puri, Entomologist, *vice* Mr. P. J. Barraud who retired in May, 1934, Mr. Raja Ram, Malaria Engineer and Mr. Kehar, Chemist.

(b) *Classes and instructional work.*—The annual malaria class held at Karnal from 18th March to 21st April was attended by 19 students of whom 12 qualified. Other workers provided with facilities for study at Kasauli and Karnal included 5 from India, 2 from China and one each from Siam, U. S. A., England and Tanganyika territory.

The Director continued to edit the Records of the Malaria Survey of India. Much of his time was also occupied with the compilation of new health bulletins dealing with malaria and mosquitoes and the revision of the older ones. Volume V of the Fauna of British India series—Diptera, Family culicines, was published and 19 papers by members of staff were published in various journals.

(c) *Routine entomological work.*—This included identification of 245 collections of insects mainly mosquitoes and sandflies comprising 6,358 specimens, the collection and preparation of anophelines for class work, and the exchange and augmentation of existing collections.

(d) *Surveys.*—Monthly surveys of the seasonal and annual variations in the factors influencing malarial incidence in the Karnal district, a study of mosquito incidence in New Delhi and a mosquito survey of Karachi aerodrome were carried out.

* Report of the S. A. B. of the I. R. F. A. for the year 1934-35. Price Re. 1, obtainable from the Secretary, I. R. F. A., New Delhi/Simla.

(e) *Sind Malaria Enquiry*.—In addition to malarial surveys and routine mosquito collections in the water logged area of Khairpur State, a large amount of material was collected for the study of post-epidemic conditions, endemic conditions and the effects of the Sukkur Barrage on the incidence of malaria. A review of spleen and parasite findings with special reference to spring and autumnal malaria incidence in a rice tract in Larkana district was prepared.

(f) *Anti-malarial measures*.—These included experimental work on Paris green dusting in villages in Sind and Karnal; use of larvicidal fish; destruction of larvae in streams and irrigation channels and relative values of spraying mixtures for killing adult mosquitoes.

(g) *Entomological studies*.—These comprised the chemical composition of the water of anopheline breeding places; seasonal prevalence of different species of anophelines (larvae and adults) at Karnal; investigation of the geographical distribution of different species of Indian anophelines; carriage of anopheline larvae in the current of streams and irrigation channels; breeding of *Aedes Aegypti*; and study of new species of *phlebotomus*.

(h) *Malaria parasites*.—Isolation from *S. irus* of two strains of a parasite having a quartan periodicity; study and description of morphology, schizogonic cycle, pathogenicity and diagnostic characters of this parasite; identification of this quartan parasite with *P. inui*, and proof of specific identity of *P. cynomolgi*; unsuccessful attempts to infect other laboratory animals with the simian parasites, *P. knowlesi*, *P. cynomolgi* and *P. inui*; maintenance in monkeys of pure infections of these three parasites; duration of infectivity of malarial parasites in drawn blood; and study of monkey malaria parasites from other countries.

(i) *Insect of transmission*.—Infection of culicine mosquitoes with *Proteosoma*; infection of anopheline mosquitoes with *P. cynomolgi*; another successful transmission of *P. cynomolgi* by bites of *A. annularis*; unsuccessful attempts to transmit *P. knowlesi* and *P. inui* by mosquito bites; preparation of serial sections of infected mosquitoes; and determination of the seasonal infectivity rate of *A. culicifacies* in Karnal district in nature.

(j) *Malarial immunity*.—Continued experiments on the effects of super-infections with homologous and heterologous strains of *P. knowlesi*; the duration of acquired immunity after cure; the occurrence and degree of natural tolerance in monkeys; and experiments on cross immunity between different species of *Plasmodium*.

(k) *Therapeutics*.—The relative clinical efficacy of totaquina as compared with quinine; new qualitative and quantitative tests for atebrin; investigations into effects of various climatic conditions upon the toxicity of plasmoguin; the rate and duration of the excretion of atebrin in the urine; and attempts to prevent the haemoglobinuria which sometimes occurs when *S. rhesus* is infected with *P. knowlesi*.

(l) *Bio-chemical*.—The chemical nature of malarial pigment; cholesterol and phosphorus metabolism in malaria; and changes in the equilibrium of the serum proteins of the blood at different stages of malarial infection.

(m) *Engineering*.—Study of water-logging and drainage problems in relation to malaria in Sind and the Punjab; study of obstruction of drainage caused by roads; preparations of plans for a mosquito-proof house; and study of engineering in relation to various aspects of the incidence and prevention of malaria.

(n) *Miscellaneous*.—Detection of a third case of natural canine leishmaniasis in India; successful cultivation of *Leishmania* from the lesions; unsuccessful attempts to transmit the disease to man and monkeys; no apparent beneficial result in canine leishmaniasis obtained by use of *Leishmania* vaccine prepared from *L. tropica* and experiments upon the transmission of *L. tropica* by *P. Sergenti* in India.

B. *Totaquina Enquiry* by Dr. E. P. Hicks.—Experimental work carried out in the Borstal Institution and the central jail, Lahore, to determine the comparative values of totaquina, types I and II, and quinine sulphate showed no decided difference in efficacy among the three drugs.

C. *Malaria Transmission Enquiry*.—This enquiry was carried out by Lt.-Col. Knowles, I.M.S., at the Calcutta School of Tropical Medicine. The effect of 11 different combinations of temperature and humidity on female laboratory bred *A. stephensi* fed on gametocyte carriers was examined. A paper dealing with mosquito density and mosquito borne diseases in Calcutta was published. A paper dealing with the nuclear division of malarial sporozoites was published.

D. *Malaria Section of the Assam Medical Research Society*.—Data collected during surveys between August, 1932 and July, 1934, has suggested that *A. minimus* is the principal vector of malaria in Assam. The larvicidal action of rice bran used alone and as a diluent for different strengths of Paris green was further investigated. Mass treatment of children with an increased dosage of plasmoquin 1/6 grain with cinchona febrifuge in the reduction of malaria was continued. Other work included a study of the efficacy of 4 grain tablets of cinchona febrifuge, slow intravenous quinine treatment and certain breeding experiments.

Plague.

120. A. *Plague researches at the Haffkine Institute*. (i) *Plague Vaccine*.—Experimental work has been carried out for the last five years on methods of testing the virulence of plague cultures and a standard test has now been devised.

Further experiments on the storage of *B. pestis* cultures at 4°C. to 8°C. showed that virulence remained undiminished for long periods. The optimum temperature for the growth of plague bacillus was found to be 25°C.

A study of the relative protective value of different plague vaccines was also made.

Plague phage.—D'Herelle's phage was found to have no action on bacteria in the body, although in *vitro* it proved very potent.

Anti-plague serum.—No opportunity has yet occurred to carry out a comprehensive field test of the serum prepared at the Haffkine Institute.

Epidemiology of plague.—This work included investigations into the comparative immunity of rat populations in the towns and cities in the Madras Presidency.

B. *Plague Recrudescence Enquiry in the Cumbum Valley*.—The work included (a) plague recrudescence problems with reference to rats and their fleas as off-season reservoirs; (b) rat flea surveys; (c) factors relating to the spread of plague by continuity or metastasis; (d) climate of rat burrows; (e) cyanogas fumigation of rat burrows; (f) an efficient method of disinfestation of grain consignments in bulk under field conditions.

Cholera and bacteriophage.

121. (a) *Cholera Enquiry (Dr. Linton)*.—Dr. Linton has classified vibrios into six groups, according to their chemical structure and has shown that the vibrios of cholera, those of water, the El Tor and the Japanese strains and the dissociants form a single interlocking group. Other work included a study of the chemical changes which accompany dissociation; the chemical structure of vibrios in relation to their sources and characteristics; and vibrio metabolism.

(b) *Cholera Toxin Enquiry (Capt. Pasricha)*.—Hahn and Hirsch's experiments on cholera toxin were repeated under controlled pH concentration of the medium. Acton and Chopra's experiments on the Amine theory of cholera toxin were repeated with freshly isolated strains of cholera vibrios. Other work comprised studies of isolation of amines by Koessler and Hanke's method; minimal lethal dose; skin reactions; toxic effects of bacteriophage; haemolytic property of vibrios; variations in the virulence of organisms after bacteriophage action; susceptibility of animals to cholera; variations in agglutination; the antigenic structure of vibrios and metabolic activity of the cholera vibrio.

Cholera Carrier Enquiry (Capt. Pasricha).—The main lines of work were the preparation of media and the bacteriological and bacteriophagic examinations of stools collected by the field section of this enquiry.

Cholera Carrier Enquiry—field section (Dr. R. B. Lal).—An attempt was made to study in detail the actual happenings which determine the origin, progress and termination of cholera outbreaks in an endemic area with special reference to the part played by cholera carriers. Material was provided for a detailed bacteriological study of vibrios isolated from cases, contacts and healthy persons living in natural village conditions; and the personal and environmental conditions conducive to the carrier state were examined.

Cholera Statistical Enquiry (Dr. R. B. Lal).—The epidemiology of cholera in Bengal was studied, the province being divided into five rough groups having special epidemiological features.

Cholera Clinical Enquiry (Capt. Pasricha).—The work carried out confirmed the previous finding that during the inter-endemic period non-agglutinating vibrios are found in the majority of cases. Morphology and smoothness or roughness of strains isolated from vibrios, their agglutinability and lysability by cholera-phage were worked out and the relationship of the strains and the phages present in the stools to the different stages of the disease and the epidemic was being studied.

The value of cholera-phage prepared from freshly isolated phages grown on freshly isolated vibrios was studied.

Studies on Cholera Vibrios and Related Vibrios (The Director, Central Research Institute, Kasauli).—(1) Detailed qualitative and quantitative serological examination of a group of agglutinable vibrios isolated from healthy persons in the Diamond Harbour area have failed to show any difference between these vibrios and a typical vibrio isolated from a cholera case and maintained in subculture.

(2) Inagglutinable vibrios obtained from the same source are not agglutinable by cholera serum or by the sera of other vibrios employed for their examination.

(3) Animal protection experiments carried out with vaccines prepared from (a) typical strains from cholera cases, (b) agglutinating carrier strains,

(c) inagglutinating carrier strains showed the protection given by vaccines of these strains to be respectively 94%, 72% and 20%.

(4) A water vibrio from Kohat originally inagglutinable was studied for a prolonged period and found to have eventually become agglutinable showing both H and O fractions of *V. cholerae*.

(5) Studies have been made on dissociation forms of a cholera vibrio and variants have been found showing no serological relationship to the original form or to a series of other cholera variants.

(6) The comparative value of high titre sera prepared in different ways including the use of a dried "O" antigen has been studied and the sera of different types have been found to be of special value for antigenic analysis.

(7) The production of cholera in experimental animals has been investigated with negative results.

Bacteriophage in cholera (The Director, Pasteur and Medical Research Institute, Shillong).—The epidemiological experience in 1934 cannot be said to lead to any definite conclusions either for or against the value of bacteriophage when used alone on a large scale as a preventive of cholera and the whole question must still be regarded as not proven. The work of the enquiry this year consisted largely of basic research and the problems studied included (i) isolation of new cholera phage types; (ii) variations in the rate of multiplication in different types of cholera phage; (iii) causes for the absence of certain types of cholera phage from the brews of cholera-dysentery phage prepared for therapeutic use; (iv) preparation of a medium based on papain-mutton broth to ascertain the optimum growth both of vibrios and of bacteriophage; (v) growth characteristics of different types of bacteriophage using pure-line cultures; and (vi) changes produced in a typical cholera vibrio strain by bacteriophage action.

The use of cholera bacteriophage in South Arcot District (The D. P. H., Madras).—The bacteriophage used was a mixture of cholera phage, types A, B, C, D and E, manufactured at the Guindy Institute from a passaged seed.

Although the conclusions are provisional, the prophylactic administration of phage was reported to be effective in reducing the rate of attacks from cholera, whilst the difference between bacteriophage and pro-diarrhoea mixture as curative agents against cholera was not significant.

Kala-azar.

122. (A) *Kala-azar Enquiry (Calcutta Tropical School).*—The two main lines of work were:—(a) The study of the bionomics of *Phlebotomus argentipes* with reference to their breeding habits, their range of flight, duration of life in nature and the collection and dissection of flies for an estimate of the infection rate in nature and (b) The obtaining of further evidence of the transmission of *Leishmania donovani* by the sandfly *P. argentipes*.

Some work was also done on the mechanism of infections in kala-azar and the study of dermal leishmaniasis.

(B) *Leishmania Vaccine Enquiry at the C. R. I., Kasauli.*—Studies of the vaccine treatment of leishmania were continued.

Leprosy.

123. *Leprosy Enquiry (Drs. E. Muir and J. Lowe).*—The "Leproline" test was employed in the study of various aspects of leprosy. Pathological studies biopsy material were carried out in connection with clinical studies using

the leprolin test and it was found possible to correlate the clinical, pathological and bacteriological findings with the results of the leprolin test. A study of the pathology of rat leprosy was completed. Bacteriological work included attempts to culture the leprosy organisms by the methods of Soule and McKinley and of McKinley and Verder.

Leprolin was tried in the treatment of leprosy and in resistant cases with limited lesions it gave excellent results. Aniline dyes were also tried but results were not encouraging.

Nutrition.

124. *Nutritional Research at Coonoor.*—Major General Sir Robert McCarrison continued to direct this research. A brief summary of the main problems dealt with is given below.

Ulceration of the stomach and duodenum was studied in animals fed on diets deficient in vitamins A, B and C.

Experiments for the production of uric acid calculi in rats gave negative results. Metabolic studies were made to ascertain the extent to which cereal grains in common use in India favour or disfavour the retention of calcium, magnesium and phosphorus. Bio-physical studies of vitamin B showed that the solubility of this vitamin was influenced by pH.; a method of obtaining standard solutions of vitamin B, from the International Standard Preparation, was evolved; also a method of iodine-estimation in food stuffs which has enabled the determination of the iodine content of certain national diets of India. The chemical composition of the commoner foodstuffs of India was ascertained; the vitamin C content of over 100 common Indian food stuffs was determined by chemical means; and spectro-photometric studies made of the vitamin A content of fats and oils of Indian origin.

Other studies included the emission and absorption spectra of human, cow's, goat's and buffalo's milk; tissue culture experiments; bio-physical studies of the virus of rabies; effect of avitaminosis on the pH of organs and tissues of the body; effects of avitaminosis on the heart and a study of lathyrism.

Tuberculosis.

125. (A) *Tuberculosis Enquiry (Dr. Ukil).*—The problems studied were (i) tuberculosis in infancy and childhood, (ii) histopathology of lung tuberculosis; (iii) types of tubercle bacilli found in pulmonary and extra-pulmonary lesions; (iv) portals of entry of the tubercle bacillus; (v) a sensitive culture medium for tubercle bacilli; and sunlight experiments.

(B) *Tuberculosis Enquiry (Dr. Soparkar).*—The filterable phase of the tubercle bacillus was studied. The enquiry was closed in May.

Vaccines.

126. *Anti-rabic Vaccine Enquiry at the Pasteur Institute of India, Kasauli.*—Experiments were continued on human beings to test the value of anti-rabic serum as an adjunct to vaccine treatment. Animal experiments were conducted; (i) to determine the effect of storage in the antigenic value of carbolised 5% Paris sheep vaccine; (ii) to ascertain the immunity conferred on rabbits surviving after subdural infection with rabies fixed virus, which had been acted upon by anti-rabic serum at 37°C. for varying periods from 1 to 8

hours in the incubator ; (iii) to compare the relative pre-infectious immunising value in monkeys of carbolised 5% Paris sheep vaccine administered alone and when supplemented by fresh live fixed virus ; (iv) to ascertain the immunising value of rabies fixed virus inactivated by the combined action of methylene blue and sunlight ; (v) to determine the neutralising action of anti-rabic serum on rabies street virus when the two are brought in contact in the form of an emulsion ; (vi) to test the neutralising action of buffalo anti-rabic serum when placed in contact with fresh fixed virus ; (vii) to ascertain if an immunity in keeping with that produced against yellow fever can be conferred on monkeys against rabies with one immunising dose of anti-rabic serum *plus* live fixed virus, (viii) to test the immunising action of unconcentrated anti-rabic serum when infiltrated into the tissues surrounding the site of infection ; (ix) to compare the relative immunising values of carbolised 5% Paris fixed virus vaccine used singly or supplemented by fresh live virus ; and of fixed virus inactivated by methylene blue and sunlight ; (x) to compare the immunising values of vaccine prepared from brains of sheep with those prepared from spinal cords.

Helminthology.

127. (A). *Helminthological Enquiry* (Dr. Maplestone).—Work on *Gnathostoma spinigerum* and its effect on cats was continued. Other investigations were begun on the epidemiology of ascaris infection and on skin reactions to ascaris extracts.

(B). *Dracontiasis and Filariasis Enquiry* (Dr. Sundar Rao). *Guinea Worm*.—Surveys of a few endemic areas in the Bombay Presidency and in Vizianagram State were continued. Experiments *in vitro* to observe the effects on guinea worm embryos were carried out with neostibosan, fouadin, soamin, berberine sulph., acriflavine and watery extract of bamboo shoots.

Filariasis.—Work on the estimation of protein fractions in blood sera in cases of filarial infection was completed. Feeding experiments of mosquitoes under controlled conditions of temperature and humidity were continued. Berberine acid sulphate, caesalpina bonducella, oleum chenopodium carbarsone and aolan were tested for their efficacy in combating filarial infection.

Miscellaneous.

128. *Maternal Mortality and Morbidity in Child-birth* (Dr. Mudaliar).—A systematic investigation into the bacteriology of puerperal sepsis was begun in Madras, with a view to establish, if possible, some correlation between the bacteriological findings and the different therapeutic methods adopted.

129. *Enquiry on the Bionomics and Early Stages of Phlebotomus* at the C. R. I., Kasauli, and at Karnal :—Further studies were made of the stage or stages in which phlebotomus over-winters ; the longevity of fed and unfed sandflies (*P. papatasi*) under different humidity conditions ; trial of certain insecticides against sandfly larvae breeding in crevices and under heaps of stones.

130. *Protozoal Parasites Enquiry* (Lt.-Col. H. E. Shortt, I.M.S.).—The life cycle of *Babesia canis*, except the earliest stages, was worked out in detail, as it occurs in the dog tick *Rhipcephalus sanguineus*. Preliminary experiments on the transmission of oriental sore offered strong presumptive evidence that *P. sergenti* is the vector in the Punjab. For the first time in India *L. tropica* was successfully cultured from the dog ; a paper on this case was published in the I. J. M. R. (Vol. XXII, No. 2).

Further experiments were made with *Triatoma rubrofasciata* and *Trypanosoma ruzi*. Other work included trials with the oriental sore vaccine prepared by Dr. Ray.

131. *Cancer in India* (Dr. Vishwanath).—Statistics of indoor departments of hospitals and pathological laboratories in medical schools and colleges were studied in the U. P., Punjab, Delhi and B. and O.

132. *Skin Diseases Enquiry* (under the Director, School of Tropical Medicine, Calcutta).—Further studies were made of actinomycosis, tinea imbricata, favus, ringworm, psoriasis, molluscum contagiosum and pityriasis rubra.

133. *Indigenous Drugs Enquiry* (Lt.-Col. Chopra, I.M.S.). The effectiveness of emetine, carbarsone and gavano, as remedies of intestinal amoebiasis was tested. Research was continued in connection with quinine, atebrin and malarcan, on both monkey and human malaria.

Other work was (i) in connection with snake venom, *Indian daboia* with a view to find an effective treatment; (ii) on the changes in the physical properties of the blood sera in health and disease; (iii) an electrocardiograph study of the effects of various drugs on the heart; (iv) the effectiveness of the following indigenous drugs; *Alangium lamarkii*, *Antiaris toxicaria*, *Veronia anthelmintica*, *Picrorhiza Kurroo*, Benth, *Erythrina indica*, *Hygrophilla spinosa*, *Sansivieria zeylanica*, *Pongamia glabra*, *Bryophyllum calycinum*, *Salis*, *Solanum indicum* and *Rheum emodi*.

134. *Drug Addiction Enquiry* (Lt.-Col. Chopra, I.M.S.).—The main aspects of this research were the study of (i) the habitual administration of opium to infants; (ii) the physical and mental effects of the opium habits, (iii) blood changes in opium addicts; (iv) determination of the incidence of hemp drugs addiction; (v) habituation to new drugs, e.g. barbitol and allied drugs.

135. *Statistical Enquiry*.—This enquiry under the Public Health Commissioner with the Government of India continued to prepare photographic copies of charts showing weekly deaths from cholera, smallpox and plague for the period, 1920-32, in all the major provinces.

SECTION IX.

MEDICAL INSTITUTIONS.

I.—Hospitals and Dispensaries.

A.—British India.

General and Statistical.

136. At the end of 1934 there were 6,597 hospitals and dispensaries in British India following the modern system of treatment—an increase of 49 over 1933. On the average 41,800 persons were served by each such institution; the averages for rural and urban institutions being 58,459 and 11,914 persons respectively. Of these institutions, 5,202 or 79% were maintained either by Government, local authorities or both and only a small number, *i.e.*, 545 or 8% were financed, managed and controlled by private organisations. In rural areas facilities for medical relief remain very inadequate, the small province of Coorg standing out as the area in which rural medical relief is most developed.

Table IX (i) gives institutions for medical relief by areas and population for 1933 and 1934.

The meaning of the various classes of institutions for medical relief is given in the footnote*.

TABLE IX (i).
Hospitals and dispensaries.

	Classes I, III and IV.		Classes II and VI.		Class V		Total.		Average population served per institution, 1934.
	1933.	1934.	1933.	1934.	1933.	1934.	1933.	1934.	
British India	5,154	5,202	861	850	533	545	6,548	6,597	41,800
N.-W. F. P.	67	70	35	35	7	10	109	115	21,157
Punjab	778	780	187	181	8	8	973	969	25,473
Delhi	25	25	2	2	...	...	27	27	24,747
U. P.	481	493	103	110	77	83	661	686	73,702
B. & O.	536	540	84	84	66	66	686	690	56,594
Bengal	974	1,012	119	119	175	179	1,268	1,310	38,807
C. P.	229	230	50	53	50	53	329	336	48,327
Bombay	414	414	80	79	40	40	534	533	42,533
Madras	1,165	1,186	77	76	94	94	1,336	1,356	34,773
Coorg	11	11	...	...	3	3	14	14	11,728
Assam	208	210	43	43	7	7	258	260	31,529
Burma	231	231	71	68	2	2	304	301	41,613
Baluchistan	35	...	10	...	4	...	49	...	...

Table IX (ii) gives the distribution of these institutions in rural and urban areas in the different provinces (excluding Delhi Province), and the populations served by them.

In these institutions the indoor accommodation for males is nearly double that for females and children. Institutions of Classes II, V and VI and subsidised dispensaries generally provide outdoor treatment only and totalled

abbreviations :—

M.	Male.
F.	Female.
R.	Rural.
U.	Urban.
p.m.	per mille.
C. P.	Central Provinces and Berar.
U. P.	United Provinces of Agra and Oudh.
B. & O.	Bihar and Orissa.
I. G. C. H.	Inspector-General, Civil Hospitals.
P. U. O.	Pyrexia of uncertain origin.

*	Class I.—State-public.
	Class II.—State-special.
	Class III.—Local, municipal fund and subsidised dispensaries.
	Class IV.—Private-aided.
	Class V.—Private non-aided.
	Class VI.—Railways.

TABLE IX (ii).
Hospitals and dispensaries.

	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	3,553	1,609	347	485	351	193	4,251	2,287	6,538	58,459	11,914
N.-W. P.	34	21	6	13	3	6	43	40	88	49,011*	8,138*
Punjab	592	188	98	83	4	4	604	275	909	30,852	11,900
U. P.	286	207	19	91	62	21	367	319	686	127,107	12,261
B. & O.	467	73	43	41	54	12	564	126	690	66,679	11,453
Bengal	595	417	26	93	105	74	726	584	1,310	65,171	6,032
C. P.	112	118	12	41	87	16	161	175	336	90,012	9,976
Bombay	157	257	27	52	17	23	201	332	533	91,372	12,065
Madras	994	192	52	24	61	33	1,107	249	1,356	36,772	25,885
Coorg	9	2	...	...	3	...	12	2	14	12,883	4,705
Assam	171	39	21	22	5	2	197	63	260	40,586	3,209
Burma	136	95	43	25	...	2	179	122	301	62,032	11,655

* Excluding 32 dispensaries in the Agencies.

14,283 or 20% while 57,701 beds or 80% of the total were in institutions of classes I, III and IV providing indoor and outdoor accommodation. Table IX (iii) shows the numbers of beds available in the different provinces by sexes, children being included with females.

TABLE IX (iii).
Numbers of beds.

	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 . . .	46,034	25,950	71,984	35,673	22,028	57,701
N.-W. F. P. . . .	1,652	499	2,151	822	397	1,219
Punjab	6,304	4,094	10,398	5,415	3,971	9,386
Delhi	330	506	836	272	506	778
U. P.	6,310	2,951	9,261	4,295	2,677	6,972
B. & O.	3,898	1,939	5,837	2,706	1,499	4,205
Bengal	6,729	2,872	9,601	4,271	2,371	6,642
C. P.	1,811	1,132	2,943	1,334	854	2,188
Bombay	5,062	3,522	8,584	4,238	2,972	7,210
Madras	6,452	5,935	12,387	6,150	4,508	10,658
Coorg	88	66	154	88	66	154
Assam	1,260	386	1,646	780	313	1,093
Burma	6,138	2,048	8,186*	5,302	1,894	7,196

* Excluding 38 beds for children and 8 special beds.

Table IX (iv) shows the numbers of patients treated during 1934 in various classes of institutions :—in classes I, III and IV as indoor and outdoor patients and for all classes according to sex, children being again included with females. The low figures of females treated by no means connote relative healthiness of the female population but is ascribable partly to the prevailing *purdah* system and partly to the inadequacy of indoor accommodation for females.

TABLE IX (iv).
Patients treated.

	Classes I, III and IV.			All Classes.		
	Indoor.	Outdoor.	Total.	M.	F.	Total.
British India . . .	1,098,144	64,384,559	65,482,703	48,337,195	26,547,567	75,543,813
N.-W. F. P. . . .	29,432	1,894,520	1,923,952	1,580,252	599,028	2,179,280
Punjab	206,810	13,817,689	14,024,499	9,485,273	5,907,232	15,392,505
Delhi	17,178	874,525	891,703	592,146	335,975	928,121
U. P.	123,194	7,459,585	7,582,779	6,164,470	2,929,259	9,093,729
B. & O.	75,511	5,553,960	5,629,471	4,987,301	2,042,393	7,029,694
Bengal	118,751	7,511,409	7,630,160	7,045,595	2,929,776	9,975,371
C. P.	36,031	2,902,277	2,938,308	2,364,775	1,068,503	3,433,278
Bombay	115,775	2,982,840	3,098,615	1,977,327	1,121,288	3,847,926
Madras	231,623	16,006,374	16,237,997	10,246,260	8,152,565	18,398,825
Coorg	4,996	295,719	300,715	210,662	98,864	309,526
Assam	16,848	2,108,125	2,124,973	1,716,761	624,283	2,341,044
Burma	121,995	2,977,536	3,099,531	1,966,373	738,401	3,363,825*

* Including 659,051 children, details according to sex not being available.

Facilities for the treatment of women exist in all classes of institutions but the numbers of hospitals and dispensaries, exclusively for women, are not very many; those maintained or aided by Government or by local funds numbered 78 in the U. P., 41 in Madras Presidency including 4 in Madras city, 40 in the Punjab, 14 in Bengal including 6 in Calcutta, 11 in the C. P., 8 in Bombay Presidency including 8 in Bombay city, 5 each in B. & O. (Patna 2) and Burma including 3 in Rangoon and 4 in N.-W. F. P. Of these 206 institutions, 30 were state-public, 99 local and municipal fund, 74 private-aided and 3 others. These hospitals and dispensaries are to be found chiefly in headquarter or other urban centres and some provide only outdoor treatment.

The numbers of beds for females in general and women's hospitals and dispensaries of classes I, III and IV in ten provinces are given in Table IX (v).

TABLE IX (v).

	General hospitals.	Women's hospitals.	Total.	Women's hospitals.	
				Total indoor patients treated.	Indoor daily average.
Total	15,873	5,583	21,456	134,813	4,438
N.-W. F. P.	283	114	397	2,903	79
Punjab	2,676	1,295	3,971	24,729	991
U. P.	1,293	1,384	2,677	23,219	870
B. & O.	1,284	215	1,499	3,429	158
Bengal	1,969	402	2,371	10,551	230
C. P.	552	302	854	8,057	291
Bombay	2,205	767	2,972	24,765	649
Madras	3,536	972	4,508	33,422	1,066
Assam	313	..	313	..	..
Burma	1,762	132	1,894	3,738	104

Surgical Operations.—Nearly 90% of the total surgical operations were performed in state-public, local fund and private-aided institutions. Table IX (vi) shows the numbers of operations by provinces.

TABLE IX (vi).

	Classes I, III and IV.	All Classes.
	1934.	1934.
British India	2,475,214	2,751,968
N.-W. F. P.	103,481	123,288
Punjab	569,671	661,951
Delhi	30,776	31,340
U. P.	321,216	361,039
B. & O.	273,689	334,868
Bengal	195,342	208,094
C. P.	103,200	113,543
Bombay	154,018	168,048
Madras	571,988	583,521
Coorg	4,499	4,522
Assam	21,929	23,708
Burma	125,405	138,046

Tables IX (vii) and IX (viii) give figures of income and expenditure for 1934.

TABLE IX (vii).

	Total income Classes I, III and IV. Rs.	Contributions by—	
		Government.	Municipal and local funds.
		Rs.	Rs.
British India	4,30,07,724	1,78,51,651	1,33,62,288
N.-W. F. P.	6,64,890	3,60,607	249,917
Punjab	42,97,025	17,77,669	20,49,761
Delhi	7,79,907	3,06,443	2,32,250
U. P.	35,44,940	8,68,298	18,48,992
B. & O.	32,91,196	9,41,717	14,66,845
Bengal.	68,63,269	20,14,463	24,24,022
C. P.	25,79,304	6,99,898	2,49,395
Bombay	60,29,726	25,41,457	19,28,186
Madras	80,22,534	52,50,247	18,50,095
Coorg	1,03,798	48,022	48,612
Assam	9,48,077	7,19,885	45,470
Burma.	58,83,058	23,22,945	14,68,743

TABLE IX (viii).

	Total expendi- ture. Rs.	Expenditure on—			
		Medical officers.	Nurses.	Diet.	Medicines.
		Rs.	Rs.	Rs.	Rs.
British India	3,71,94,518	95,73,887	36,52,649	30,34,690	49,25,825
N.-W. F. P.	6,54,211	1,85,595	32,452	30,059	1,07,623
Punjab	40,50,289	13,03,548	1,96,604	1,17,825	5,45,141
Delhi	7,83,873	1,16,230	1,48,139	43,887	1,19,582
U. P.	30,34,401	8,51,703	2,13,862	1,48,687	4,51,257
B. & O.	27,04,328	7,36,777	1,27,491	1,44,451	4,70,009
Bengal	58,62,407	11,43,939	6,28,359	5,51,224	7,66,849
C. P.	12,40,779	4,23,938	94,198	17,172	1,58,562
Bombay	55,80,410	12,98,473	6,29,311	4,41,212	6,25,626
Madras	80,86,217	19,76,572	9,30,410	10,45,615	11,58,989
Coorg	1,03,798	36,448	8,211	9,317	19,651
Assam	8,02,673	3,26,858	1,05,030	44,837	1,26,034
Burma	42,91,132	11,73,806	5,38,582	4,40,404	3,76,502

During 1934, medical personnel in the different provinces comprised Indian Medical Service Officers 179, Indian Medical Department Officers 90, Women's Medical Service Officers 32, salaried medical graduates 1,750 and licentiates 6,437. The provincial distribution is given in Table IX (ix).

TABLE IX (ix).

	I. M. S.	W. M. S.	I. M. D.	Salaried graduates.	Licentiates.
Total	179	32	90	1,750	6,437
N.-W. F. P.	9	2	14	22	81
Punjab	24	..	18	182	938
Delhi	2	12	3	19	27
U. P.	16	8	8	220	564
B. & O.	12	2	6	181	727
Bengal	23	..	13	390	1,310
C. P.	8	6	4	83	329
Bombay	16	..	13	220	518
Madras	31*	2	..	309	1,303
Coorg . . . . .	..	..	..	1	17
Assam	12	..	4	43	283
Burma	26	..	7	80	340

* Including I. M. D. Officers.

Honorary Medical Staff.—The practice of associating selected private medical practitioners with the staffs of Government hospitals in an honorary capacity is gaining in popularity throughout the provinces. Such practitioners are appointed either as honorary physicians or surgeons or assistant physicians or surgeons or are employed in other specialist posts, clinical or educational. In addition to this, newly qualified medical graduates and licentiates are being employed in increasing numbers as honorary house surgeons and assistant house surgeons in headquarters hospitals. There were during 1934 661 medical graduates and 256 medical licentiates rendering honorary services in the various provinces mainly in provincial and district headquarter hospitals. Table IX (x) gives distribution of these doctors by provinces.

TABLE IX (x).

Honorary Medical Staff.

	Graduates.	Licentiates.
Total	661	256
N.-W. F. P.	6	4
Punjab	16	3
Delhi	..	..
U. P.	40	24
B. & O.	14	6
Bengal.	240	89
C. P.	20	3
Bombay	155	10
Madras	148	99
Coorg	..	5
Assam	4	3
Burma	18	10

Nursing Services.—Table IX (xi) shows the numbers of nurses employed in hospitals in rural and urban areas. The slow growth of nursing services in rural areas is very noticeable.

TABLE IX (xi).

	Rural.	Urban.	Total.
Total	211	3,486	3,697
N.-W. F. P.	10	85	95
Punjab	5	275	280
Delhi	..	123	123
U. P.	8	307	315
B. & O.	15	194	209
Bengal	17	788	805
C. P.	22	113	135
Bombay	22	624	646
Madras	53	530	583
Coorg	3	4	7
Assam	14	10	24
Burma	42	433	475

Progress in the development of nursing service is slow largely on account of the lack of suitable candidates and the relatively low esteem in which the profession of nursing is held among middle class Indians. Owing to this shortage of trained nurses, salaries are relatively high.

Table IX (xii) gives the numbers of in-patients together with the cost of nursing them.

TABLE IX (xii).

	Indoor patients in classes I, III and IV.	Expenditure on nursing.	
		Total.	Per case treated.
		Rs.	Rs. A. P.
Total	1,094,406	35,54,726	3 4 6
N.-W. F. P.	29,432	32,432	1 1 8
Punjab	206,810	1,96,604	0 15 9
Delhi	17,178	1,48,139	8 10 3
U. P.	123,194	2,13,862	1 12 0
B. & O.	75,511	1,27,491	1 11 0
Bengal	118,751	6,28,359	5 4 8
C. P.	36,031	94,198	2 9 9
Bombay	715,775	6,29,311	5 7 0
Madras	231,623	9,30,410	4 0 3
Coorg	4,996	8,211	1 10 3
Assam	16,848	1,05,030	6 4 0
Burma	118,257	4,40,679	3 12 0

In *Bengal Presidency* the Nurses Registration Act, 1934, was passed during the year but was not enforced. In the Calcutta hospitals existing arrangements for nursing fall far short of the actual requirements and the local Government has been considering a proposal for the training and employment of more nurses. Table IX (xiii) shows the numbers employed in Calcutta during 1934.

TABLE IX (xiii).

	No. of Nurses.			Average number of beds per nurse.		
	1932.	1933.	1934.	1932.	1933.	1934.
	Presidency General Hospital	83	99	100	2	2	2
Lady Dufferin Victoria Hospital	50	40	42	3	3	3
Medical College Hospitals	168	179	174	4	4	4
Carmichael Hospital for Tropical Diseases	20	20	20	4	4	4
Calcutta Medical School Hospital	51	58	61	5	5	5
Howrah General Hospital	21	21	21	6	6	7
Mayo Hospital	8	8	8	11	11	11
Chittaranjan Hospital	25	26	37	13	12	13
Sambhunath Pandit Hospital	25	25	25	16	13	11
Campbell Hospital	52	52	52	26	30	36
Sree Visudhanand Saraswati Marwari Hospital	25	25	25	9	9	9
Carmichael Medical College Hospitals, Belgachia	51	58	61	5	5	5

Outside Calcutta, nursing arrangements were reported as highly unsatisfactory on account of shortage of funds and lack of trained nurses; in only 14 hospitals were qualified nurses employed at all; in other institutions untrained female attendants, *dais*, ward servants, compounders, friends or relatives

attended patients. Approved training centres for junior nurses existed at 8 hospitals in the *muffassal*.

In *Bihar and Orissa* qualified nurses are employed in only a few district headquarters' hospitals notably those at Cuttack, Patna, Ranchi and Darbhanga; elsewhere attendance on the sick is generally entrusted to ward attendants. Examinations for the Diploma in Nursing are held bi-annually by the provincial examination board and during the three years 1932-34, 16 Anglo-Indian and 12 Indian candidates were successful. The Nurses Registration Act was passed in 1935, *i.e.* after the close of the year under review.

In *Bombay Presidency* a number of nursing associations affiliated to the Bombay Presidency Nursing Association were at work. The Central Association prescribes the curriculum, conducts examinations, awards diplomas and maintains a register of all qualified nurses. A Bill for the registration of nurses, midwives, etc., was under consideration.

In the *United Provinces* the Nurses Registration Act has been enforced but rules thereunder have not yet been framed. Women's hospitals employ a considerable number of staff nurses and also utilise female compounders who have had an elementary training in midwifery and nursing. In district hospitals, the employment of male nurses has been popular. The I. G. C. H. considers that there is need for better nursing facilities, particularly in the *sadr* hospitals and women's hospitals.

Of the 280 European, Anglo-Indian and Indian nurses in the *Punjab* only five were employed in rural areas. During the year 50 women obtained the Diploma in Midwifery and 43 nurses and 290 indigenous *dais* were awarded certificates of the Punjab Central Midwives Board.

In the *Central Provinces* only the main hospitals of Wardha and Akola employed staff nurses but the numbers were inadequate. Training classes for probationer nurses were however held at the Irwin Hospital, Amraoti, the main hospital, Raipur, Mayo Hospital, Nagpur and the Victoria Hospital, Jubbulpore.

In *Madras Presidency* the nursing service is more popular and many suitable candidates are said to be seeking training, each training centre having a waiting list.

In *Assam* the nucleus of a nursing service has existed since 1931 and trained staffs are now available at Gauhati, Dibrugarh, Nowgong and Silchar. A comprehensive scheme of nursing has been worked out for the new hospital for women and children, Shillong, and it was proposed to appoint nursing sisters for the hospitals at Sylhet and Jorhat.

Burma takes a high position amongst the provinces of India in respect of the numbers and quality of its nurses and midwives. About 96 probationers are constantly under training in the Rangoon General Hospital, whilst 42 nurses and 68 midwives obtained certificates of the Burma Midwives and Nurses Council during 1934, and those employed in hospitals totalled 369.

Subsidised Practitioners.—During the last decade considerable progress has been made in extending medical relief to remote rural tracts, notably in the Punjab and Madras Presidency by means of subsidies to private practitioners. The Punjab scheme is outlined in the following extract from the I. G. C. H.'s report :

“ A private practitioner is placed in charge of a dispensary and is given Rs. 25 per mensem by way of a subsidy. The practitioner thus placed in charge of the dispensary

is not liable to be transferred to another dispensary without his consent but in other respects is subject to the same conditions of service as the whole time medical officers in charge of rural dispensaries. A whole time dispenser who is an employee of the District Board is appointed to the dispensary on a salary of Rs. 25 per mensem and a grant of Rs. 500 per annum is given for drugs and instruments. The total cost of such a dispensary is thus Rs. 1,100 against Rs. 2,500 that of a rural dispensary under the existing scheme. The practitioner has to make his own arrangements for menial servants and for any miscellaneous expenditure connected with the dispensary. He is also entitled to charge for medicines supplied to patients except to the very poor in accordance with a scale which lays down the maximum chargeable in this manner."

In some other provinces also schemes of medical relief on similar lines have been introduced to suit local conditions and requirements.

North-West Frontier Province.

137. During 1934 six new dispensaries were opened—3 in rural, 2 in urban areas and one in the agencies. The local Government in their resolution on the working of hospitals and dispensaries in this province says :

"Although Government has been unable through lack of funds to allot all the money it would like for expansion in the Medical Department, the small but steady increase in the number of dispensaries has been maintained."

Of the 29,432 indoor patients treated in classes I, III and IV institutions 878 died, giving a death rate of 3%. The four female hospitals at Peshawar, Dera Ismail Khan, Bannu and Kohat were maintained from local or municipal funds, and dealt with 2,903 in door and 968,496 out door cases. Eight subsidised outdoor dispensaries treated 58,597 patients. Visits by medical officers in charge of local dispensaries to adjoining villages continues to gain in popularity.

Diseases treated included malaria 544,696 cases, eye affections 219,275, ulcerative inflammation 213,156, respiratory diseases 169,951, skin diseases 119,771, diseases of ear 91,583, intestinal disease 80,008, diseases of the stomach 78,816, anaemia 26,063, dysentery 26,045, pyrexia of uncertain origin 18,830, pneumonia 9,082, rheumatic fever 7,840, syphilis 7,571, tubercle of lungs 6,429 with 74 deaths, other tubercular disease 4,974 with 56 deaths, roundworms 4,083, influenza 2,221, gonococcal infection 2,078, enteric fever 1,845, ankylostomiasis 947, diabetes 626, scurvy 302, mental disease 275, leprosy 90 and relapsing fever 41.

Punjab.

138. Nine dispensaries were opened, 7 in rural and 2 in urban areas, and 9 including 8 rural and 1 urban, were closed. Of 375 dispensaries scheduled to be opened for rural inhabitants, only 15 now remain to be set up. As in 1933, the number of subsidised dispensaries was 10. The number of class III institutions (local and municipal fund), 699, was the largest on record, except in 1931. With the "Provincialisation" of the civil hospital, Rohtak, during 1934, the number of such provincialised headquarters institutions totalled 47, and the local Government proposes to provincialise 66 more district and *tehsil* headquarters hospitals and dispensaries.

In almost all general hospitals, separate indoor accommodation exists for the treatment of women.

In addition to 42 women's hospitals there were 43 special wards under lady doctors, exclusively for women.

Considerable overcrowding was reported in classes I, III and IV institutions which are well known surgical centres throughout the cataract season. The 360 rural dispensaries treated 4,807,540 patients.

Diseases of the eye continue to head the list with 3,173,995 cases, followed by malaria 2,174,764; diseases of digestive system 1,109,827, ulcerative inflammation 1,089,189, skin diseases 1,073,787, diseases of stomach 588,516, intestines 409,055, dysentery 207,523—amoebic 102,839 and bacillary 104,684, diseases of nose 168,277, diarrhoea 154,197, rheumatic fever 55,085, enteric fever 22,841, tubercle of lungs 16,622, other tubercular diseases 15,455, syphilis 17,703, gonococcal infection 13,602, other "V. D." 2,892. Influenza was the cause of 37,388 cases, kala-azar 38, leprosy 519, meningococcal infection 731, pneumonia 54,840, typhus 283, louse borne 1, the remaining 283 being unknown vector, pyrexia of uncertain origin 106,130, guineaworm disease 2,518 and filariasis 793. Opium poisoning was treated in 344 cases and other poisons in 3,468. Labour cases totalled 12,116.

The selected operations numbering 71,739, included 28,411 for removal of cataract on 23,724 patients of whom 96·9% obtained good vision; amputations 1,200; litholapaxy 1,143; obstetric 2,696; lithotomy 914; hernia 756; abdominal sections 222; cystotomy 160, liver abscess 128; and appendicitis 217.

The Punjab dental hospital, Lahore, provided treatment for 23,704 cases, including 14,942 old cases. In association with this hospital, the deMontmorency College of dentistry was opened, and 12 medical graduates and 6 licentiates were given post-graduate training.

The chief sources for the supply of qualified women doctors are the Lady Hardinge Medical College, Delhi, for which the Punjab Government nominate 7 students, and the Punjab Medical School for women, Ludhiana, whilst a system of coeducation is in force in the King Edward Medical College, Lahore, and the Medical School, Amritsar, 10 seats in the former and 15 in the latter institution being reserved for female students.

Delhi.

139. Delhi Municipal Committee maintains civil (Dufferin) hospital and 8 branch dispensaries: New Delhi Municipality meets the cost of the Willingdon Hospital, the Willingdon Nursing Home and 2 other branch dispensaries; while 5 dispensaries are financed by the district board. A venereal diseases hospital was opened in Delhi city, and an isolation hospital at Kingsway. The projected new Irwin Hospital, on which work has begun, will have 303 beds.

The principal diseases in order of frequency were:—Malaria 129,063 cases, influenza 97,371, diseases of the eye 84,679, digestive system 68,098, ulcerative inflammation 62,759, skin 59,104, ear 43,215, areolar tissue 39,578, intestines 32,224, stomach 20,107, anaemia 13,069, dysentery 11,762 and "V. D." 9,444 including gonorrhoea 4,902 and syphilis 4,542. Cases of opium poisoning numbered 36 and of other poisoning 566, of these 5 each proving fatal. Of 1,054 cases of normal and 538 of abnormal labour, 10 and 25, respectively were fatal.

United Provinces of Agra and Oudh.

140. Thirty-three rural and 12 urban institutions were opened; 3 and 10, respectively, were closed; and 5 and 2 were transferred to other departments or classes. The cadre of the provincial medical service totalled 97. The scheme

for post-graduate studies for provincial subordinate medical service officers sanctioned by Government and for an advanced course of studies at the Agra Medical School had to be postponed owing to financial stringency. The subsidies were continued to local boards for 24 qualified medical practitioners settled in rural areas, while subsidised dispensaries in hill tracts numbered 48. The Colvin and Manohar Das eye hospitals at Allahabad were provincialised.

The appointment of honorary physicians and surgeons at headquarters and *muffassal* hospitals was encouraged. Six dental clinics were at work under honorary dentists at district headquarters hospitals at Benares, Jhansi, Dehra Dun, Meerut, Bareilly and Lucknow. The scheme for the extension of medical relief to women by women doctors in small towns and rural areas continued to work satisfactorily.

The treatment of venereal diseases was carried out in hospitals and dispensaries on improved modern lines. The skin dispensaries treating leprosy at Cawnpore, Benares and Lucknow continued to do useful work under the auspices of the B. E. L. R. A. (Indian Council).

Malaria was, as usual, the chief cause of sickness, 1,091,195 cases being treated. Next in order of frequency were skin diseases 970,679 cases; diseases of the eye 746,635; ear 735,854; respiratory system 688,289; digestive system 595,237; ulcerative inflammation 555,395; scabies 330,809; diseases of areolar tissue 283,940; trachoma 257,949; diseases of stomach 254,243; pyrexia of uncertain origin 220,629; rheumatic fever 197,385; diseases of teeth and gums 193,389; generative system 182,162; nervous system 152,313; intestines 123,318; bones and joints 119,499; goitre 106,891; influenza 105,892; pneumonia 27,509; tuberculosis of lungs 22,205; other tubercular diseases 17,082; leprosy 8,533; relapsing fever 2,280; kala-azar 921 and c. s. fever 786. Of 1,111 cases of typhus fever 117 were tick borne, 16 louse borne, and 978 undetermined.

Bihar and Orissa.

141. Of the 6 new dispensaries opened in rural areas 2 were "subsidised", 2 maintained by local and municipal funds, one a private institution and one a railway dispensary. Medical personnel in this province comprised 24 I. M. S. officers, 3 military and 113 civil assistant surgeons and 136 civil sub-assistant surgeons.

Most hospitals have inadequate nursing arrangements. The present staff at Patna Medical College Hospital includes one matron, 20 nursing sisters and staff nurses, 26 anglo-Indian and 14 Indian probationers; at Cuttack general Hospital, one Reverend Mother, 2 nuns, 5 nursing sisters and 15 probationers; at Darbhanga medical School hospital, 5 nurses and 4 probationers; at Ranchi European Hospital, 3 nurses and at the Ranchi *Sadr* hospital 3 European and 3 Indian nurses. Examinations for the Diploma in Nursing are held twice a year by the Provincial Medical Examination Board.

Arrangements for medical aid to women are particularly inadequate in the rural areas, the chief handicap being the lack of funds. Separate hospitals for women exist at Patna, Gaya, Ranchi, Monghyr, Bettiah, Bhagalpur, Hazaribagh and Chakradharpur; special wards for women are also attached to general hospitals; in almost all *sadr* hospitals and in most sub-divisional hospitals qualified lady doctors are attached to the staffs.

Malaria was the cause of 1,016,176 cases, diseases of the skin 952,673, digestive system 617,576, ear 544,775 and eye 431,160, ulcerative inflammation 423,963, diseases of the respiratory system 376,447, intestines 196,641, stomach 170,080 and areolar tissue 164,097, dysentery 141,325, diseases of nerves, spinal cord, brain and meningitis 135,808, roundworms 116,373, rheumatic fever

105,430, influenza 102,112 and diseases of ductless or endocrine glands 100,202. Opium poisoning cases numbered 321 with 13 deaths and other poisoning cases 7,197 of which 28 were fatal. Cases of normal labour numbered 4,687 and abnormal labour, 1,931 with 37 and 207 deaths respectively. Pyrexia of uncertain origin was the cause in 76,202 cases ; kala-azar in 58,547 ; syphilis in 38,697 ; gonorrhoea in 25,895 ; tuberculosis of lungs in 18,383 with 204 deaths ; pneumonia in 12,994 ; leprosy in 8,766 : enteric fever in 8,537 with 134 deaths ; other tubercular diseases in 6,774 with 68 deaths ; relapsing fever in 1,109.

The Radium Institute, Patna, provided beds for 12 males and 6 females, in addition to a set of cabins for treatment of patients. The local Government and the provincial branch of the Indian Red Cross continued to give a special grant for the treatment of venereal diseases. The Government grant of Rs. 10,000 for kala-azar was continued.

Bengal.

142. Excluding the Surgeon General, the medical personnel included 23 I. M. S. officers, 13 I. M. D. officers, 390 civil assistant surgeons and 1,310 sub-assistant surgeons.

Calcutta.—There were 44 hospitals and dispensaries at end of the year, 38 being general and 6 exclusively for women. Only 23 institutions provided indoor accommodation comprising 3,721 beds of which 2,341 were for males and 1,380 for females. Cases treated totalled 962,953 (males 676,191 and females 286,762). The more important causes of morbidity were eye diseases 87,496 cases : malaria 63,007 ; influenza 34,646 ; pyrexia of uncertain origin 23,463 ; dysentery 17,269 ; roundworms 16,718 ; gonorrhoea 16,598 ; syphilis 15,120 ; tubercle of lungs 13,745 ; kala-azar 6,195 ; beri-beri 6,054 ; other tubercular diseases 4,707 ; pneumonia 3,559 ; enteric fever 2,593 ; ankylostomiasis 1,466 ; diabetes 1,438 ; leprosy 1,109 ; relapsing fever 186 and scurvy 79.

The Medical College group of hospitals provide a special outdoor department for tuberculosis of the lungs and treated 984 indoor cases with 111 deaths and 15,471 outdoor patients. There is an eye infirmary where 36,156 patients attended. The 3 leper hospitals at Gobra (Calcutta), Raniganj (Burdwan) and Bankura continued to function. At Gobra, there is a ward for insane lepers.

Surgical operations totalled 57,797, with 1,176 deaths.

Government spent Rs. 17,04,181 and local bodies Rs. 7,32,793 on the maintenance of medical institutions ; the expenditure on medical officers amounted to Rs. 3,99,164, on nurses Rs. 5,59,577 and on diet Rs. 3,99,364.

Honorary medical officers were reported to be doing valuable work in the state hospitals. There were altogether 46 house surgeons and physicians, 5 anaesthetists, 6 clinical tutors and numerous clinical assistants, as well as 18 medical officers in the Medical College hospitals and 12 in the Campbell hospital.

A Dental Registration Act for Calcutta was under consideration.

Muffassal.—A total of 1,266 hospitals and dispensaries functioned in the Presidency outside Calcutta and included 18 state-public, 42 state-special, 647 local fund, 68 village, 140 union board, 93 private-aided, 175 private non-aided, 73 railway and 10 subsidised institutions. Of the total 726 were in rural and 540 in urban areas. In addition, 267 dispensaries worked under the Public Health Department. Beds totalled 6,000 including 3,515 in state-public, local fund and private aided hospitals and 2,485 in state-special, railway and private non-aided institutions.

Altogether 9,012,418 patients were treated in addition to 582,508 who attended the medical centres under the Public Health Department. The most important causes of sickness were malaria, 3,035,346 cases ; skin diseases 1,068,359 ; digestive system, *viz.* stomach 239,245, intestines 218,240, and others 703,880. Other diseases treated included respiratory 513,737 excluding tuberculosis of lungs 13,916 and pneumonia 25,961 ; eyes 331,946 ; ear 306,855 ; ulcerative inflammation 295,117 ; dysentery 202,208 ; influenza 160,504 ; areolar tissue 105,694 ; pyrexia of uncertain origin 98,057 ; nerves, spinal cord, brain and meningitis 88,407 ; kala-azar 73,891 ; gonorrhoea 33,065 ; syphilis 21,456 ; enteric fever 11,102 ; beri-beri 7,182 ; leprosy 5,015 ; and relapsing fever 1,930. Opium poisoning cases numbered 111 of which 14 were fatal and other poisoning cases 2,346. Of 3,461 cases of normal labour 26 died and of 1,216 abnormal cases 98 died. The tuberculosis hospital at Jadabpur under the auspices of the Calcutta Medical Aid and Research Society was maintained partly by public donations and partly by the Calcutta Corporation and the local Government.

Surgical cases numbered 150,297 with 416 deaths. In state-public, local fund and private aided institutions 117,589 operations were performed.

The major portion of the expenditure on the upkeep and maintenance of medical institutions came from local bodies, *i.e.*, Rs. 16,91,129, whilst Government provided Rs. 3,10,282. Of a total expenditure of Rs. 25,75,946, salaries of medical officers consumed Rs. 7,44,775, nursing Rs. 68,782 and diet Rs. 1,51,860.

Central Provinces and Berar.

143. The number of hospitals and dispensaries increased by 7 (6 in rural areas and one in urban). Of the 161 rural dispensaries only 2 were wholly and 7 partly maintained by Government, 103 by local bodies, 37 by private agencies and 12 by other bodies. The scheme of subsidising medical practitioners to settle in villages, not having proved successful, was abandoned.

Medical personnel consisted of eight I. M. S. officers and 1,081 other officers, the distribution being 1 and 117 respectively in provincial headquarter institutions, 6 and 642 respectively in district headquarters and other urban hospitals and dispensaries and 1 and 322 respectively in rural areas.

The C. P. Medical Registration Act, 1916, has not yet been enforced owing to financial stringency. Twenty-eight women qualified as midwives by passing the prescribed test of the C. P. Medical Examination Board. The principal diseases were :—digestive system 501,677 cases ; malaria 390,042, ulcerative inflammation 280,949, other skin diseases 259,495, eye diseases 245,348 including trachoma 28,081, cataract 2,358, glaucoma 811 and others 214,098, ear disease 206,092, scabies 183,335, pyrexia of uncertain origin 134,388, diseases of nervous system 103,751, influenza 80,670, diarrhoea 76,366, dysentery 61,242 (amoebic 36,311 and bacillary 24,931), syphilis 15,373, gonorrhoea 11,712, other "V. D." 3,811, tubercle of lungs 3,482, other tubercular diseases 2,472, leprosy 1,912, mental disease 1,162, stone in the bladder 360, c.s. fever 231, osteomalacia 283, goitre 108 and typhus 35 (tick 2 and unknown vector 33). Opium poisoning cases totalled 275 with 13 deaths ; other poisoning cases 10,509 with 24 deaths. Normal maternity cases numbered 4,883 of which 7 proved fatal ; abnormal cases were 1,815 with 165 deaths.

Selected operations totalled 17,934.

Antirabic treatment was provided at Nagpur, Jubbulpur, Raipur, Hoshangabad, Akola and Saugcr and 1,825 cases were treated. In accordance

with the resolution passed by the 12th Conference of Medical Research Workers held at Calcutta from 26th November to 1st December, the question of opening an anti-rabic treatment centre in each district was under consideration.

Bombay Presidency.

144. The Government hospital organisation in urban areas continued to maintain a high standard of medical treatment ; rural areas are still backward in this respect.

In addition to thirteen I. M. S. and 2 R.A.M.C. officers, a cadre of 18 provincial medical service officers (class II) and 249 subordinate medical service officers is maintained for the administration of 267 dispensaries, the district boards paying a fixed contribution of about 66% of the cost. In the case of remaining 111 dispensaries, the local bodies recruit their own staffs. In rural areas village aid posts have been set up, trained compounders, school masters or educated villagers being provided with a limited supply of drugs and dressings for simple treatment and first-aid. This system is employed in several districts but is not considered by the Surgeon General as even a reasonable substitute for a qualified medical man.

Non-official bodies, concerned chiefly with infant welfare, baby weeks, leprosy, blindness, tuberculosis, social hygiene, etc. and the Red Cross Society, are doing good work in the field of medical relief.

The principal causes of sickness were malaria, 693,587 cases ; diseases of digestive system 643,810 (stomach 117,142 and intestine 161,564) ; respiratory diseases 315,072 including tubercle of lungs 16,059 and pneumonia 22,503 ; skin diseases 244,942 ; eye diseases 242,298 ; ear 182,035 ; round worms 120,599 ; influenza 86,051 ; dysentery 60,908 ; diseases of nerves, spinal cord, brain and meninges 60,368 ; pyrexia of uncertain origin 55,136 ; syphilis 28,247 and gonorrhoea 22,157. Opium poisoning cases totalled 516 and other poisonings 8,288.

Normal maternity cases numbered 26,474 and abnormal cases 3,263 ; of these 44 and 111 respectively proved fatal.

Surgical operations included 1,548 for removal of tumours and cysts ; 771 amputations ; 9,989 on the eye including cataract 3,141 and trachoma 393 ; 1,777 on the bladder ; 1,767 on the abdominal wall and cavity ; and 2,521 obstetrical.

Anti-rabic treatment centres were at work at 13 places including the Haffkine Institute at Parel. The price per treatment was reduced from Rs. 10 to Rs. 5.

Madras Presidency.

145. Twenty-five new dispensaries were opened in rural and 2 in urban areas and 7 rural institutions were closed or transferred to other departments or classes. Since the issue in 1932 of Government orders, holding in abeyance the appointment of medical practitioners to subsidised rural dispensaries which had been sanctioned but not opened, no budget provision has been made for the payment of subsidies to new rural dispensaries. The " Visited Dispensary system " under which a dispensary medical officer or practitioner visits neighbouring villages on two specified days a week continued in operation in Anantapur, South Arcot, Guntur, Malabar, Nilgiris, Tinnevely and Vizagapatam Agency but was discontinued in places where the attendance of patients was persistently below 20.

Medical personnel comprised thirty-one I. M. S. and I. M. D. officers, 2 W. M. S., 309 salaried graduates, 1,303 licentiates, 148 honorary graduates, and 99 licentiates, 337 European and Anglo-Indian nurses, 775 midwives, 16 *dais* and 1,110 compounders.

The year 1934 was notable in the history of Indian medical education. An examination of the Royal College of Surgeons of England for the Primary Fellowship was held for the first time in India in December 1934 at Madras. Of 60 candidates appearing for the examination, 21 were successful, of whom 13 were from the Madras Presidency.

In this province financial stringency has had its adverse effects and although 119 institutions were provincialised during the three years, 1928-30, further progress in this direction has stopped.

The Surgeon General summarises some notable recent advances in the medical administration of the province in the following quotation taken from his triennial report, 1932-34.

“The proposal of the Surgeon General and the D. P. H. to constitute a Public Health Committee in place of the Board of Health for a better co-ordination of Public Health work in the Presidency has been approved by the Government. The Government have also approved the Surgeon General's proposal to hold Annual Medical Conferences in the District headquarters at the beginning of every year consisting of Presidents of District Boards, Chairmen of Municipal Councils and District Medical Officers to discuss and to solve intricate medical problems connected with the working of medical institutions under the control of local bodies. The Surgeon General's proposal to constitute a Central Research Board for the Province for the purpose of advising in the matter of research on diseases which are met with chiefly in *muffassal* practice was approved by Government.”

Diseases of skin headed the list with 2,136,907 cases followed by diseases of the eye 1,763,339, other diseases of the digestive system 1,706,317, ulcerative inflammation 1,383,732, diseases of respiratory system 1,140,759, malaria 1,094,553, diseases of ear 1,079,049, diseases of intestines 931,091, pyrexia of uncertain origin 621,839, diseases of stomach 464,437, diseases of areolar tissue 431,780, nerves, spinal cord and meningitis 351,438, rheumatic fever 331,951, diseases of organs of locomotion 322,921, dysentery 301,777, round-worms 269,849, influenza 267,140, ankylostomiasis 166,438, liver disease 142,487, gonorrhoea 112,735, syphilis 111,481, leprosy 71,184, tubercle of lungs 46,454 and beri-beri 23,091. Opium and other poisoning cases numbered 1,823 and 31,601, respectively. Among the 98,540 labour cases dealt with 758 deaths occurred.

There were 408 leprosy clinics at work in Government hospitals and dispensaries and 16 leprosy relief councils have been formed in the districts. The venereal department of the Government General Hospital, Madras, is the largest of its kind in South India, but facilities for treatment of venereal cases were provided in all hospitals' and dispensaries.

Coorg.

146. Malaria continued to be the chief cause of attendance at hospitals and dispensaries, and a total of 99,922 cases was recorded; next in order were respiratory diseases 33,077 cases, other diseases of digestive system 28,197, scabies 18,077, diseases of blood and spleen 14,756, pyrexia of uncertain origin 10,771, diseases of nervous system 8,696, skin diseases 6,726, ulcerative inflammation 6,275, dysentery 5,464 (bacillary 1,903 and amoebic 3,561), intestinal disease 4,825, stomach 3,162, diarrhoea 4,711 and rheumatic fever 4,018.

Assam.

147. I. M. S. officers numbered 12, I. M. D. 4, assistant surgeons 43, sub-assistant surgeons 283, honorary assistant surgeons 4, and sub-assistant surgeons 3, European and Anglo-Indian nurses 11 and Indian nurses 13.

The two most important projects awaiting allotment of funds were two separate hospitals for males and females in connection with the Sylhet Medical School, and a leper hospital at Jorhat, estimated to cost Rs. 4,58,374 and Rs. 1,84,394, respectively. The scheme of providing Shillong with a separate hospital for men estimated to cost Rs. 3,69,051 was still under consideration of the local Government; that for females was nearing completion. The construction of a maternity and gynaecological block at Dibrugarh at an estimated cost of Rs. 23,500 is to be commenced. Only the *sadr* hospital, Sylhet, was provincialised. The question of providing a hospital on the sanatorium principle was under consideration.

Only 2 new dispensaries, including one subsidised, were opened in rural areas, the largest number at work in any one district being 61 in Sylhet and the lowest one each in Manipur state and Balipara. Table IX (xiv) gives the number of dispensaries per 100,000 persons and per 1,000 square miles.

TABLE IX (xiv).

Name.	Per 100,000 inhabitants.	Per 1,000 square miles.
Whole province	2.3	3.2
Cachar	2.6	4.2
Sylhet	2.4	11.1
Khasi and Jaintia Hills	7.2	1.3
Naga Hills	4.4	2.5
Lushai Hills	8.8	1.6
Goalpara	2.6	5.8
Kamrup	1.8	4.6
Darrang	2.2	4.4
Nowgong	2.3	3.3
Sibsagar	1.8	3.3
Lakhimpur	1.6	2.9
Garo Hills	3.1	1.9
Manipur	0.2	0.1
Sadiya Frontier Tract	18.7	25.7
Balipara Frontier Tract	19.4	1.9

Attendances at hospitals and dispensaries totalled malaria 617,763, diseases of skin 355,047, respiratory diseases 171,697, digestive diseases 146,283 (excluding diseases of stomach 74,654 and intestinal disease 68,706), eye affections 126,348, and other diseases due to metazoan parasites 124,009. Ulcerative inflammation was the cause of 95,892 attendances, diseases of bones, joints, muscles, etc., of 82,841, ear of 53,699, pyrexia of uncertain origin 47,845, dysentery 41,660, goitre 37,605, influenza 34,760, diseases of nervous system 26,598, blood and spleen 10,692, kala-azar 5,558 and tubercle of lungs 1,573. Dysentery was very prevalent in all districts particularly in Sylhet, Goalpara, Kamrup and Nowgong and malaria in Sylhet, Goalpara, Kamrup and Nowgong. Of the 10 smallpox cases only 4 were found to be vaccinated.

Selected operations numbered 1,525 and included excision of tumours 54, excision of joints 5, operations on bone 65, amputations 27, extraction of lens 434, abdominal section 123, removal of calculi 71 and obstetric cases 133.

Burma.

148. Compared with 1933, there was a net decrease of 3 institutions due mainly to financial stringency. The I. G. C. H. remarks in this connection—

“ But if the times were unpropitious for increasing the number of medical institutions, the relatively low cost of construction, associated with trade depression, encouraged many local bodies with funds at their disposal, to seize the opportunity of rebuilding, reconditioning and extending existing hospitals.”

Funds have been provided for erecting 8 new hospitals at Yenangyaung (40 beds), Gyobingauk (14 beds), Maymyo (female ward, 12 beds), Kyaiklat (36 beds), and at 4 other places. New local fund hospitals of modern design have been built at Prome (60 beds), Taungdwingyi (28), Ye (10), Kayau (10) and Pantanaw. A new administrative and outpatient department at the general hospital, Mandalay, and at the civil hospitals at Mergui, Moulmeingyur and Pakokku have been constructed.

The sanctioned cadre of I. M. S. officers totalled 38 though only 26 were employed; I. M. D. officers numbered 11 of which 7 were employed in the Medical Department, 3 in the Public Health Department and one in the Bacteriological Department. One private medical practitioner was confirmed as a civil surgeon. Other staff were civil assistant surgeons 80, sub-assistant surgeons 340 excluding 32 in the jail department, subsidised medical practitioners 4, honorary graduates 18 and licentiates 10, lady doctors 13, nurses 369, male nurses 106, midwives 188 and compounders 307.

Of 3,363,825 patients attending hospitals and dispensaries, malaria accounted for 406,424 cases, other diseases of digestive system 350,820, skin diseases 289,954, respiratory diseases 288,496, ulcerative inflammation 239,043, diseases of intestines 225,761, roundworms 209,066, diseases of eyes 175,941, of ear 134,738, of stomach 110,463, pyrexia of uncertain origin 77,685, influenza 33,163, dysentery 30,290, syphilis 29,942, and gonorrhoea 21,741, tubercle of lungs 6,389, other tubercular disease 1,424, diabetes 884 and beriberi 1,481. Altogether 4,848 cases of leprosy attended clinics in civil hospitals in the districts of Minbu, Meiktila and Insein and 136 at the Rangoon General hospital. Prior to retrenchment the treatment of venereal disease was available at 27 hospitals with the aid of a special grant from Government but since the cessation of the grant in 1932, such treatment has been discontinued except in a few Government hospitals.

Normal labour cases numbered 11,825 with 180 deaths and abnormal 1,886 and 180, respectively. Twelve deaths occurred among 209 opium poisoning and 27 among 801 other poisoning cases.

Most of the major surgery is conducted in the Rangoon General hospital and at the civil hospitals at Mandalay, Akyab, Bassein, Toungoo, Moulmein and Maymyo, whilst the main centre for obstetric operations is the Dufferin hospital, Rangoon.

An important feature of the surgical work was the large volume of intravenous injections which are mainly carried out in connection with the treatment of syphilis and these were mainly responsible for the high figure of 37,700 under the head of “ other operations on veins ”. The number of operations on the eye and bladder was relatively small due mainly to the rarity of cataract and urinary calculus. Of a total of 115,034 persons operated on, 108,866 or 95 % were cured.

In the Pathological Department of Rangoon General Hospital, the mercuric chloride method of estimating blood urea was introduced and after a prolonged research the Ascheim Zondek test for pregnancy was replaced by the Friedmann method which in 71 consecutive cases proved its absolute reliability.

Most hospitals, even the smallest, are now equipped with a microscope and the equipment necessary for carrying out simple laboratory tests. In the larger hospitals laboratory examinations numbered 6,055 in Akyab, 9,030 in Mandalay, 3,086 in Moulmein, 20,018 in Myitkyina, 1,489 in Bassein and 1,234 in Toungoo. It has been arranged that 6 sub-assistant surgeons should be trained in laboratory methods annually for 6 months at the Rangoon Pasteur Institute with a view to holding charge of district laboratories and of venereal, leprosy and anti-rabic clinics.

B.—Indian States.

149. *Mysore State*.—The number of hospitals and dispensaries remained unchanged. Altogether 45,695 in-patients and 4,355,680 out-patients were treated; of these 43,010 and 4,104,689, respectively, attended state-public, local fund and private-aided institutions. A total of 12,808 in and 408,599 out-patients were treated in 26 institutions of classes I, III and IV reserved for women and containing 431 beds. Beds numbered 2,130 which included 1,930 (886 for males and 1,044 for females) in state-public, local fund and private-aided hospitals and dispensaries, the female institutions providing 431 beds.

The principal causes of sickness were malaria 704,405 cases, diseases of digestive system 457,475, diseases of eye 342,954, pyrexia of uncertain origin 191,045, diseases of ear 163,755, diarrhoea 101,296, dysentery 80,991, ankylostomiasis 13,944, syphilis 13,184, gonococcal infection 11,192, enteric fever 4,173, tubercle of lungs 2,815, other tubercular disease 2,653, and leprosy 301. Surgical operations totalled 100,798. The *Unani* and *Ayurvedic* dispensaries treated 1,176,919 cases.

The 282 midwives attended 22,823 maternity cases or 80 cases each, whilst the maternity hospitals at Bangalore, Mysore and Kolar Gold Fields attended 5,770 cases. Birth control clinics were continued at these institutions.

The Princess Krishnammanni Tuberculosis Sanatorium, Mysore, dealt with 337 cases; of these 223 were relieved and 37 died. The epidemic diseases hospitals at Bangalore, Kolar Gold Fields and Mysore continued to function. Patients treated in the leper asylum, Bangalore, numbered 191. Leprosy survey work was continued in 3 *taluks*.

Expenditure on the upkeep of hospitals and dispensaries of classes I, III and IV aggregated Rs. 15,09,558 and included Rs. 9,46,963 on salaries, Rs. 1,78,782 on medicines and Rs. 1,53,985 on patients' diet.

II.—Mental Hospitals.

150. According to the census of 1931, the number of insane persons in British India was 98,449 (males 60,424 and females 38,025) while less than one-seventh of this total or 13,506 such persons (males 10,449 and females 3,057) were housed in 19 mental hospitals in the provinces during 1934 having accommodation for 9,518 patients. There was therefore overcrowding to the extent of nearly 4,000 cases or 42%. Table IX (*xv*) shows that the maximum number confined in these institutions was in excess of the available

accommodation in all provinces and especially in Bombay, Madras and Burma. The apparent disparity between the incidence of insanity among males and females is stated to be attributable partly to the natural tendency to conceal female cases and partly to the fact that women, leading a more sheltered life, are less subject to anxiety and less liable than men to indulge in excesses of various kinds.

TABLE IX (xv).

	Number.	Accommodation.			Maximum confined.			Sq. ft. per head.
		M.	F.	Total.	M.	F.	Total.	
British India	19	7,261	2,257	9,518	8,380	2,508	10,888	—
Punjab	1	826	182	1,008	882	245	1,127	70
U. P.	3	1,208	406	1,614	1,292	378	1,670	50
B. & O.	2	1,120	372	1,492	1,158	352	1,510	50
C. P.	1	344	126	470	380	99	479	54
Bombay	6	1,273	628	1,901	1,528	671	2,199	50—140
Madras	3	900	254	1,154	1,349	444	1,793	50
Assam	1	566	124	690	581	123	704	50
Burma	2	1,024	165	1,189	1,210	196	1,406	36—87

In addition to the institutions in Table IX (xv) the mental observation ward, Bhowanipur (Calcutta), provides 30 beds, (6 for Europeans and 24 for Indians) and the mental ward of the Albert Victor Hospital, Gobra (Calcutta), for the treatment of leprosy has 10 beds (males 8 and females 2). So far as information is available, among Indian States mental hospitals exist in Indore, Bangalore, Baroda and Chimbhel. In the Hyderabad State an asylum for treating mental cases forms part of the central jail at Hyderabad. European patients from the U. P., B. & O., C. P., Bengal and Assam are sent to the European Mental Hospital at Ranchi and the Indian Mental Hospital there treats Indian patients from Bengal and B. & O. European cases in the Bombay Presidency are treated in a section of the Central Mental Hospital, Yeravda, which provides 222 beds—137 for males and 85 for females; those in the Madras Presidency are housed in the Madras Mental Hospital with an accommodation of 155 beds (males 85 and females 70).

151. Table IX (xvi) gives the admissions, total population, daily average strength, daily average sick, cures and deaths among mental cases.

TABLE IX (xvi).

	Admitted.	Population.			Cured.	Died.	Average Strength.	Average sick.	Criminal insanes.
		M.	F.	Total.					
British India	3,151	10,449	3,057	13,506	1,621	668	10,457	814	1,881
Punjab	391	1,161	298	1,459	128	68	1,097	79	265
U. P.	469	1,610	443	2,053	449	158	1,550	134	77
B. & O.	198	1,272	412	1,684	84	45	1,487	69	5
C. P.	95	442	118	560	53	31	469	17	141
Bombay	865	2,047	852	2,899	380	159	2,108	112	176
Madras	655	1,771	558	2,329	220	114	1,727	301	268
Assam	164	697	144	841	121	23	687	60	291
Burma	314	1,449	232	1,681	186	70	1,332	42	658

152. The principal types of insanity treated in provinces are given in Table IX (xvii) which is arranged according to the revised nomenclature.

TABLE IX (xvii).

	Punjab.	U. P.	B. & O.	C. P.	Bombay.
Total	1,459	2,053	1,684	560	2,899
Mental Deficiency	116	187	81	52	199
Manic Depressive Insanity	223	6	154	44	121
Mania	226	501	177	147	684
Melancholia	95	258	163	84	694
Schizophrenia including Dementia Praecox.	222	97	342	63	369
Secondary Dementia	220	24	134	10	175
Paranoia and Paranoid States	24	99	166	20	122
Epilepsy and Epileptic Insanity	125	134	69	41	94
Toxic Psychosis—					
(a) Acute confusional Insanity	40	169	51	16	59
(b) Alcoholic Psychosis	8	23	33	3	31
(c) Cannabis Indica Psychosis	67	318	117	5	130
(d) Of Endocrine Origin . . . . .	...	...	...	5	...
(e) In relation to child bearing	8	62	1	15	33
(f) In relation to other constitutional diseases	9	40	3	2	49
Organic Psychosis—					
(a) General . . . . .	...	2	7	...	4
(b) Cerebral Syphilis	1	71	3	2	2
(c) Arteriopathic and Senile Psychosis	24	16	17	32	26
(d) Encephalitis	7	...	1	...	...
(e) Other cerebral Lesions	4	...	4	...	20
Neurosis and Psycho-Neurosis . . . . .	...	19	31	...	2
No appreciable disease	40	...	124	18	...
Not yet diagnosed . . . . .	...	27	6	1	85
	Madras.	Assam.	Burma.	Total.	
Total	2,317	841	1,681	13,494	
Mental Deficiency	205	8	91	939	
Manic Depressive Insanity	101	113	17	779	
Mania	353	238	464	2,790	
Melancholia	113	163	297	1,867	
Schizophrenia including Dementia Praecox	677	163	302	2,235	
Secondary Dementia	140	6	58	767	
Paranoia and Paranoid States	105	15	40	591	
Epilepsy and Epileptic Insanity	132	43	38	676	
Toxic Psychosis—					
(a) Acute confusional Insanity	41	1	81	458	
(b) Alcoholic Psychosis	76	...	23	197	
(c) Cannabis Indica Psychosis	149	87	28	901	
(d) Of Endocrine Origin . . . . .	...	...	...	5	
(e) In relation to child bearing	20	1	6	146	
(f) In relation to other constitutional diseases	40	...	1	144	
Organic Psychosis--					
(a) General	22	...	131	166	
(b) Cerebral Syphilis	24	3	1	107	
(c) Arteriopathic and Senile Psychosis	64	...	37	216	
(d) Encephalitis	1	...	6	15	
(e) Other cerebral Lesions	4	...	4	36	
Neurosis and Psycho-Neurosis . . . . .	...	...	...	52	
No appreciable disease	39	...	56	277	
Not yet diagnosed	11	...	...	130	

Details of the causes of insanity are given in Table IX (xviii). In many cases the causes of insanity were more than one.

TABLE IX (xviii).

	Punjab.	U. P.	B. & O.	C. P.	Bombay.	Madras.	Assam.	Burma.	Total.
Total	424	469	343	196	966	1,292	179	334	4,203
Mental Stress—									
Moral	1	...	...	...	29	28	...	...	58
Business worry	3	21	...	39	11	60	...	36	170
Domestic worry	28	49	80	3	117	180	14	1	472
Stress of military service . . . . .	...	...	...	...	...	...	...	...	...
Toxins—									
Cannabis Indica	42	113	19	12	49	74	42	15	366
Alcohol	5	12	20	3	27	23	...	7	97
Other Toxins . . . . .	...	5	2	2	44	20	...	39	112
Physical									
Opium . . . . .	...	4	...	...	161	76	...	78	319
Bodily illness	1	1	...	...	3	5	...	...	10
	6	3	1	3	100	82	...	...	195
Pregnancy									
Child-birth . . . . .	...	...	3	...	6	...	2	...	11
Child-birth	4	3	1	11	23	25	...	...	67
Climacteric . . . . .	...	9	2	3	9	23	...	...	46
Epilepsy									
Epilepsy	27	6	8	8	28	53	14	4	148
Head injury	1	4	1	...	2	5	...	2	15
Infection—									
Encephalitis Lethargica . . . . .	...	...	...	...	...	...	...	...	...
Influenza . . . . .	...	...	...	...	...	...	...	...	...
Syphilis . . . . .	...	16	11	...	4	40	...	77	148
Other infections									
Old age	8	22	6	...	6	9	2	11	64
Hereditary predisposition . . . . .	...	9	8	5	14	19	...	...	55
	24	19	20	46	160	191	6	14	480
Previous attacks									
Previous attacks	71	24	48	25	87	105	...	32	392
Unascertained	203	149	113	36	86	274	99	18	979

153. Insanity is an affliction of the adult period and Tables IX (xix) and IX (xx) give details of the 3,118 admissions by age-groups and religions. Of the total, 74% were between 20 and 40 years of age; nearly 60% were Hindus and 21% Muhammedans. The high incidence among females in these ages was evidently due to the strain of child-bearing; that among males corresponds to the period of entry into family life and the associated cares and worries.

TABLE IX (xix).

	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 . . .	154	61	1,764	458	455	172	36	18	2,409	709
Punjab . . .	23	10	234	51	55	16	2	...	314	77
U. P. . . .	19	6	289	60	63	22	6	4	377	92
B. & O. . . .	12	9	92	47	16	18	2	2	122	76
C. P. . . .	4	2	56	14	15	4	...	...	75	20
Bombay . . .	49	17	477	131	104	62	17	8	647	218
Madras . . .	36	12	322	102	126	38	4	3	488	155
Assam . . .	3	...	93	23	16	7	1	...	113	30
Burma . . .	8	5	201	30	60	5	4	1	273	41

TABLE IX (xx).

	Hindus.		Muhammedans.		Christians and Europeans.		Others.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
British India . . .	1,475	396	555	97	165	144	214	72	2,409	709
Punjab . . .	147	43	151	26	5	4	11	4	314	77
U. P. . . .	284	63	77	12	16	16	...	1	377	92
B. & O. . . .	63	21	24	6	35*	45*	...	4	122	76
C. P. . . .	66	18	6	1	3	1	...	...	75	20
Bombay . . .	395	131	170	22	61	27	21	38	647	218
Madras . . .	365	91	88	21	32	40	3	3	488	155
Assam . . .	95	22	11	4	1	3	6	1	113	30
Burma . . .	60	7	28	5	12	8	173	21	273	41

154. In the *Bombay Presidency*, the death rate was 7.5 p. m. and the chief causes of death were dysentery 17, malaria 17, nervous diseases 13, pneumonia 9, tuberculosis 12 and diarrhoea 5. The Naupada Mental Hospital (Thana) again reported the highest death rate of 16 p. m. and the European ward of the central mental hospital the lowest rate of 1 p. m. In the *C. P.* deaths totalled 31; of these 10 occurred within one year of the patient's stay in the hospital and included 8 patients who had been received in hospital in a bad state of health and were aged 60-80 years. Colitis was the cause of 9 deaths; acute mania 3; pneumonia, influenza, epilepsy, heatstroke and syncope of 2 deaths each; and pulmonary tuberculosis, other tubercular infection, bacillary dysentery, chronic enteritis, cerebral haemorrhage, anaemia, dropsy, sarcoma and septicaemia of one death each. Nearly 10% of new admissions were found infected with hook-worm. In *Assam*, of the 191 admissions to infirmaries 34 were for malaria, 29 for dysentery, 21 for diseases of the digestive system, 12 for influenza, 6 for tuberculosis and 89 for other causes. Over 37% of inmates were admitted in good, 36% in bad and 27% in indifferent health. The chief causes of death were tuberculosis 6 and dysentery 5.

*Include 33 male and 39 female European insanes received from all provinces and treated at the European Mental Hospital at Ranchi.

In *Madras Presidency* the deaths totalled 114 and the death rate was 7 p. m. Tubercular disease was the cause of death in 37 cases, anaemia and debility in 11, syphilis in 6, urinary diseases in 4, diseases of the circulatory system in 21, dysentery in 2, diseases of the nervous and respiratory systems in 4 each and other causes 25. In the *Punjab* the death rate was the lowest on record; of the 68 deaths, 11 were due to pneumonia and tuberculosis each, 4 each to pleurisy, dysentery and debility, 3 to diarrhoea, 7 to ankylostomiasis, 1 to *status epilepticus* and 23 to other causes. In the *U. P.* deaths numbered 158, the death rate, 10·2 p. m. exceeding the rate for 1933 by 3 p. m. Agra and Bareilly mental hospitals recorded 98 and 50 deaths, respectively. In the *Ranchi Indian Mental Hospital, Kanke*, tuberculosis of lungs, ankylostomiasis, gangrene of lungs and general debility and senility were responsible for most of the deaths. No outbreak of epidemic disease was reported. Out of a total of 31 deaths 14 were of patients aged 40-60 years. In the *European Mental Hospital, Ranchi*, 14 deaths occurred. In *Burma* 68 deaths occurred at the *Tadagale Mental Hospital* and 4 at *Minbu*. Most of the deaths were due to general paralysis (30) and tuberculosis of the lungs (17).

155. The latest methods of treatment and skilled nursing are provided at the *European Mental Hospital, Ranchi*.

The *Ranchi Mental Hospital for Indians* is the first institution in India to give sulphur injections in the treatment of mental disorders since 1930. Of a total of 285 cases treated with these injections during these 5 years, 18% recovered, 42% improved and in 40% the disease remained stationery. Other methods of treatment included Rorschach test, hypo-analysis, utility of intravenous iodine injections in P. U. O.; use of raw brain in stuporous cases and physio-therapy. In other hospitals also treatment was continued on more or less similar lines.

156. Table IX (*xxi*) gives provincial expenditures on the maintenance and upkeep of mental institutions.

TABLE IX (*xxi*).

	Total.	Diet.	Bedding and clothing.	Medicines.
	Rs.	Rs.	Rs.	Rs.
British India	34,77,370	8,54,237	1,17,826	16,865
Punjab	4,37,281	91,923	22,437	1,533
U. P.	2,30,871	65,096	11,730	945
Bihar and Orissa—				
European	4,94,623	1,49,814	23,766	1,789
Indian	3,79,823	60,886	9,373	3,914
C. P.	1,05,655	32,160	5,077	47
Bombay	7,04,583	1,77,106	30,278	1,601
Madras	5,03,474	1,80,400	7,693	1,441
Assam	1,18,571	40,564	6,671	157
Burma	5,02,489	56,288	801	5,438

III.—Medical Colleges.

Punjab.

157. *King Edward Medical College, Lahore*.—The total number of students on the rolls was 487. Eleven students received scholarships from the Punjab Government, 3 from the North-West Frontier Province Government and 41 from non-Government sources.

University Examination Results.

		Appeared.	Passed.
M. B., B. S.:—			
1st	{ May, 1934	100	50
	{ October, 1934	58	32
2nd	{ May, 1934	87	53
	{ October, 1934	38	20
3rd	{ April, 1934	59	50
	{ October, 1934	15	11
Final	{ April, 1934	34	17
	{ October, 1934	93	34
Post-graduates (assistant surgeons)		7	7

Delhi.

158. *Lady Hardinge Medical College for Women, New Delhi.*—The session began with 152 resident students.

University Examination Results.

		Appeared.	Passed.
Intermediate Science		23	19
M. B., B. S.:—			
1st		29	13
2nd		20	11
3rd		16	16
Final	{ Part A.	12	10
	{ Part B.	14	11

United Provinces.

159. *King George's Medical College, Lucknow.*—268 students were on the rolls.

University Examination Results.

		Appeared.	Passed.	
M.B., B. S.:—				
1st .	{ April, 1934	46	34	
	{ October, 1934	12	8	
Final Part I	{ Group A. {	April, 1934	43	32
		October, 1934	20	18
	{ Group B. {	April, 1934	38	29
		October, 1934	17	10
Final Part II	{	April, 1934	39	22
	{	October, 1934	35	23
M. D.		April, 1934	5	4
M. S.		" "	2	2

Bihar and Orissa.

160. *Prince of Wales Medical College, Patna.*—The number of students on the rolls was 266.

University Examination Results.

		Appeared.	Passed.
M. B., B. S. :—			
2nd	{ Part I April, 1934	39	16
	{ Part II April, 1934	41	20
Final	{ Part I April, 1934	41	23
	{ Part II April, 1934	44	17
1st	. September, 1934	17	14
2nd	{ Part I September, 1934.	24	18
	{ Part II September, 1934	30	13
Final	{ Part I September, 1934.	25	14
	{ Part II September, 1934	38	12
1st	. January 1935	28	23

Bengal Presidency.

161. (a) *Medical College, Calcutta.*—A total of 771 students including 49 military and 18 female students was on the rolls.

University Examination Results.

	Appeared.			Passed.		
	M.	F.	Mily. Students.	M.	F.	Mily. Students.
M. B., B. S. :—						
Preliminary Science	110	3	3	102	2	1
1st	128	4	5	88	4	4
2nd	98	4	..	65	4	..
3rd	86	..	..	78	..	..
Final	237	3	..	93	2	..

Membership Medical Faculty :—

	Appeared.		Passed.	
	Civil.	Military.	Civil.	Military.
Preliminary Science	..	2	..	2
1st	..	3	3	1
2nd	..	7	3	..
3rd	..	1	1	..
Final (new Regulations)	..	23	7	..
Intermediate	3
Final (Part II)	10
Final (Part I)	..	2	1	6
Final (Part I and New Combined)

(b) *Carmichael Medical College, Belgachia.*—664 students were on the rolls.

University Examination Results.

	Appeared.	Passed.
M. B.:—		
Preliminary Science	141	107
1st	161	88
2nd	134	65
3rd	96	79
Final	199	62
State Medical Faculty :—		
Intermediate Membership . . . . .	..	..
Final Membership	6	3

No candidate appeared for the preliminary membership examination.

Bombay Presidency.

162. (a) *Grant Medical College, Bombay.*—The total number of regular students on the rolls at the end of the year was 690, of whom 98 were women. No military students were under training.

University Examination Results.

M. B., B. S.:—	Appeared.	Passed.		
		M.	F.	
1st Examination {	April	99	46	3
	December	179	58	9
2nd Examination {	April	79	37	9
	December	109	63	9
3rd Examination {	Group A—			
	April	94	11	..
	December	135	18	5
	Group B—			
April	94	26	2	
December	113	10	3	
M. D. (Midwifery)	5	1		
M. S.	5	1		
B. Hy. Part II	8	1		
B. Sc.	4	2		

(b) *Seth Gordhandas Sunderdas Medical College, Bombay.*—The regular students on the rolls numbered 389. This total included 28 women students and 80 new admissions.

M. B., B. S.:—	
First {	
1st year	79
2nd year	60
Second—3rd year	59
Third {	
4th year	64
5th year	126
B. Sc.	1
Total number of regular students	389
Post-graduates	10
Grand Total	399

University Examination Results.

	Appeared.		Passed.	
	April.	Dec.	April.	Dec.
M. B., B. S. :—				
1st	48	93	19	39
2nd	55	62	28	42
3rd	75	81	23	22

Five candidates appeared for the M. D. degree and 1 passed. Four appeared for the M. S. degree and 1 passed.

Madras Presidency.

163. (a) *Medical College, Madras.*—890 students were on the rolls.

	M.	F.	Total.
M. B., B. S.	599	87	686
L. M. S.	3	1	4
Military medical students	74	..	74
L. M. Ps. qualifying for M. B., B. S. degree	19	1	20
Public Health Diploma	3	..	3
Chemists and Druggists	10	..	10
Sanitary inspectors	90	..	90
Post Graduate Biochemistry	1	..	1
Post Graduate Anatomy	1	..	1
Post Graduate Pathology and Bacteriology	1	..	1
Total	801	89	890

University Examination Results.

M. B., B. S. :—	Appeared.	Passed.
1st (New Regulations Part II)	205	109
2nd Part II	147	81
Final Part II	226	87

Of the military medical students 11 were in the final year ; 2 appeared for the final M. B., B. S. examination in December, 1934, of whom one passed. Three (including 1 who failed in M. B., B. S.) appeared for the Board examination in December, 1934, and passed. One appeared for the final M. B., B. S. examination in April, 1935, but failed, while 5 appeared for the Board examination in April, 1935, and two passed. One candidate was on leave on account of illness.

(b) *Medical College, Vizagapatam.*—246 students were on the rolls at the beginning of the academical year, 50 being new admissions. This number however at the end of the year was reduced to 230, the variation being due to the results of the University examinations and to the withdrawal of passed candidates.

This college is affiliated to the Andhra University. Until December, 1933, all examinations were held conjointly with the Madras University. In March and December, 1934, all examinations except the final were held in Vizagapatam. In March, 1935, the final M. B., B. S. was held in Vizagapatam except clinical and practical midwifery and gynaecology which was held in Madras.

University Examination Results.

		Appeared.	Passed.
Pre-registration		102	43
M. B., B. S.:—			
First	{ Part I	49	43
	{ Part II	68	32
Second	{ Part I	22	19
	{ Part II	39	30
Final	{ Part I	27	26
	{ Part II	58	17

Medical Research.

164. The following brief paragraphs indicate the activities of various college departments in the field of medical research.

Medical College, Lahore.—Various investigations were carried on, such as (a) observations on avertin narcosis; (b) investigations on the value of CO_2 gas in anæsthesia, (c) treatment of oriental sore; (d) the vitamin A contents of ghee; (e) pharmaceutical action of certain derivatives of *Cotarnine*; (f) observations on the metabolism of *Carotene*; (g) observations on the treatment of tetanus; (h) carcinoma of the gall bladder; (i) observations on cirrhosis of the liver as seen in the Punjab; (j) therapeutic value of camphor as cardiac and general circulatory stimulant, biological assay of adrenaline, rôle of alcohol in modern therapeutics, use and abuse of purgatives in medical practice and incompatibilities in prescribing.

King George Medical College, Lucknow.—The Department of Anatomy published 7 papers on (1) A Breech-Fused Twin Monster; (2) Variations in the lower end of Femurs from Indians; (3) Genito—Urinary system of *Sciurus*; (4) a case of Human Ischiopagus Double Monster; (5) Arrangement of Superficial veins of Cubital Fossa in Indians; (6) Volvulus in a newborn child and (7) the course and distribution of the Anterior Ramus of a typical Thoracic nerve in man and certain other mammals. The Physiology Department published 4 papers on (1) a new physiological psychology; (2) alcohol and anaesthesia; (3) colour vision and (4) the new doctrine of rhythm. The Department of Pharmacology published a paper on the biological assay of digitalis by the frog method, describing a characteristic curve for *Rana Tigrina*. The Department of State Medicine prepared a paper on the methods of tuberculosis prevention in foreign countries, which was read at the All-India Tuberculosis Conference convened at New Delhi by the King George's Thanksgiving (Tuberculosis) Fund.

The Department of Pathology published papers on (1) further notes on the aetiology of goitre in the super-endemic areas of the Gonda and Gorakhpur districts. (2) Further clinical notes on endemic goitre, sub-thyroidism, cretinism and deaf mutism in the super-endemic areas of Gonda and Gorakhpore districts; (3) observations on the gastric form of anaemia; (4) nephritis, its classification and nature in Indians; (5) a case of dry pleurisy with extreme eosinophilia; (6) observation on blood urea, urea clearance test and urea concentration factor among Indians in health and disease; (7) modern

treatment of pneumococcal pneumonia; (8) a new conception of Bunti's disease; (9) coelic disease and its treatment; (10) anaemia in nephritis; (11) albumen reaction in the sputum of tubercular patients; (12) means to improve the common laboratory diagnosis by stool examination (incomplete) and (13) a case of complete heart block.

Prince of Wales Medical College, Patna.—The University of Patna has awarded two research scholarships one to Dr. S. S. Mahmud Shah for working under Lt.-Col. H. G. Alexander, I.M.S., the Professor of Surgery, on the surgical aspect of filariasis and the other to Dr. Barid Baran Sen for working under Dr. R. K. Pal, the Professor of Physiology, on the metabolism of sugars. The Department of Anatomy continued to record observations on anatomical anomalies and on the reconstruction of the embryos. The Department of Pathology was investigating on the nature of gastric juice in hook-worm diseases and on the possibility of a cutaneous test for the same infection. The Departments of Physiology, Pharmacology and Organic Chemistry published 13 papers.

Medical College, Calcutta.—The Department of Biology is continuing research on fish and plant morphology (classification of fruits in Bengal plants). The Anatomy Department published a paper on some variations in the musculature of the superior extremity. The Pathology Department published 12 papers entitled (1) Streptococcal Septicaemia and Filarial Orchitis; (2) Actinomycosis of the human body; (3) An interesting case of Dermal Leishmanoid; (4) Gonorrhoea, Pathology and Laboratory Diagnosis; (5) Tuberculosis, Pathology and Laboratory Diagnosis; (6) Diphtheria, Pathology and Laboratory diagnosis; (7) A study of 14 cases of Rhinosporidium infection; (8) Cutaneous manifestations of Epidemic Dropsy; (9) Bengal Spleno-megaly; (10) A case of displaced and malformed kidney; (11) Practical morbid, Histology and Bacteriology for medical students and (12) Study of Faecal Cocci. Four papers of this department are under publication, *viz.*, (1) Epidemic Dropsy with special reference to cutaneous manifestations in a boy aged 12. (2) Pathology of Epidemic Dropsy. (3) Nodular Eruptions in Epidemic Dropsy and (4) Dysenteric conditions amongst Europeans in Calcutta. The Department of Medicine also published some papers, *viz.*, (1) Treatment of typhoid in children; (2) Carcinoma of the stomach; (3) the Pathology of Rheumatic Carditis; (4) the modern Widal's Test in Enteric Fevers; (5) the Therapeutic value of an Acridine Dye (Rivanol) 3,047; (6) Cerebrospinal Meningitis; (7) Early diagnosis of Pulmonary Tuberculosis; (8) some observations on difficulties in the diagnosis of malaria; (9) a clinical study of infantilism; (10) Alonkaemic lymphadenosis; (11) Diagnosis of patent Ductus Arteriosus; (12) Congenital Dextrocardia complicated with congenital heart disease; (13) Intestinal Haemorrhage in typhoid fever of infants. Investigations are being carried on (1) the nature of change of gastric acidity on a salt-free diet and its bearing on the treatment of peptic ulcer; (2) the rôle of tuberculo-allergy in assessing the prognosis and in guiding the choice of therapy in pulmonary tuberculosis; (3) a study of the after-results of 70 cases of phrenic evulsion; (4) a study of pulmonary tuberculosis in infants and children is being carried out with the help of the health visitor of the Tuberculosis Association of Bengal; (5) bronchiectasis and (6) abscess and gangrene of the lungs. The Department of Surgery published papers on (1) treatment of compound fractures of bones of the leg by skeletal traction; (2) infective mononucleosis; (3) prevention and treatment of chronic suppurative otitis media. The Department of Ophthalmology published papers on (1) primary glaucoma, a symptom complex of epidemic dropsy; (2) development of ophthalmology

in Bengal; (3) corneal transplantation on opaque corneas; (6) detachment of retina; (7) ocular complications of diabetes; (8) further observations of ocular complications of diabetes; (9) use of diathermy in ophthalmology; (10) xerophthalmia in children and adults with special reference to Bengal; (11) rôle of anaesthesia in ophthalmology.

Seth Gordhandas Sunderdas Medical College, Bombay.—No research work was in progress during the year under report.

Grant Medical College, Bombay.—The Physiology Department carried on investigations regarding the composition of gastric secretion; electro-cardiography; blood changes in lead poisoning and effect of oral administration of insulin phosphating state. The Anatomy Department worked on the measurement of pelvis of Indians; the Pathology Department on the pathogenesis of cancer and Fontanelles in health and disease and the Ophthalmology Department on the eye disease due to improper diet, Epibulbar epithelioma of conjunctiva and treatment of external eye diseases with ultra-violet light. Researches were also carried on in certain skin diseases, *e.g.*, warts, alopecia, areata, psoriasis, ringworm, herpes zoster, impetigo contagiosa and lupus erythematosus and observations were made on tyronormin in the treatment of Grave's Disease. Investigations were also carried out on the treatment of lobar pneumonia, leucorrhœa, chronic infection of the cervix uteri, etiology of acute dysentery in hospital practice in Bombay, routine treatment of bronchial asthma, injection treatment of piles, modern treatment of carbuncles, malaria, hæmoptysis and water test for renal efficiency.

Medical College, Madras.—The Bacteriological Department in collaboration with the Superintendent of the Tuberculosis Hospital carried on investigation as to the evidence of bovine tuberculosis in man and the Biochemistry Department did some research work on kidney efficiency tests. The Dermatology Department continued their observation on anti-leprotic remedies adopting mainly protein shock therapy of a non-specific nature. The midwifery Department carried on investigations on the bacteriology of puerperal sepsis and the rôle of vitamins in the causation and cure of this condition under the auspices of the Indian Research Fund Association and a paper will be published shortly in the "Indian Journal of Medical Research". Seven papers on operative surgery were published during the year. The Ophthalmology Department carried on research on trachoma in co-operation with the King Institute of Preventive Medicine, Guindy. The work will be published shortly in papers. Nine papers of scientific importance were published by Lt.-Col. R. E. Wright, I.M.S., during 1934-35. The Pathology Department continued their work on the transmission of rhinosporidium but no successful result was obtained. The results of investigations of the diseases of the lymph nodes will shortly be published. The Physiology Department is still carrying on its experimental work with acetyl-choline.

The Research Unit published two papers (1) on the chemical examination of tylophora asthmatica and the isolation of the alkaloids, tylophorine and tylophorinine and (2) the anthelmintic constituent of calycopterus floribunda.

IV.—Medical Schools.

165. *General.*—During the current year the Director-General, Indian Medical Service, has undertaken the preparation of a "Note on the Medical Schools of India" dealing with the 28 Government and private medical schools in India and Burma

and with the hospitals attached to them so far as their suitability for medical education was concerned. The note also attempts to lay down certain standards of equipment, etc., at which the medical schools should aim. This note has since been published and the conclusion reached is that none of the medical schools have quite attained the desired standard and that several are deplorably deficient. The two principal defects in most schools are overcrowding in the number of students and deficiency of equipment. It is however hoped that the note will assist medical schools in attempting to reach a better standard more particularly by the provision of somewhat better equipment.

The 28 Medical Schools in existence are distributed as follows:—

Bengal 10 ; Madras 3 ; Bombay 5 ; U. P. 2 ; Punjab 2 ; Bihar and Orissa 2 ; Burma 1 ; C. P. 1 ; Assam 1 ; and Central India 1.

Punjab.

166. (a) *Medical School, Amritsar*.—Of the 416 students on the rolls 19 belonged to the military students class. 116 students appeared for the final L. S. M. F. and 80 passed.

(b) *Punjab Medical School for Women, Ludhiana*.—122 students were on the rolls, 85 passed the final L. S. M. F. P. examination.

United Provinces.

167. (a) *Medical School, Agra*.—Of the 288 students on the rolls 22 belonged to the military students class.

Examination Results.

	Appeared.	Passed.
Primary	43	28
Intermediate	86	42
Final.—Part I	82	54
Part II	56	38
Parts I and II	19	10

(b) *Women's Medical School, Agra*.—84 students were on the rolls.

Examination Results.

	Appeared.	Passed.
Primary	17	14
Intermediate	22	16
Final Part I	26	16
Final	20	14

Bihar and Orissa.

168. (a) *Medical School, Darbhanga*.—There were 249 students on the rolls including one female. 72 appeared for the final Board examination and 35 passed ; 74 students of the compounder class appeared for the qualifying examination and 56 passed.

(b) *Orissa Medical School, Cuttack*.—There were 201 students on the rolls including 15 females. 70 students including 3 females appeared for the final Board examination and 37 passed including 2 females. 47 candidates appeared for the compounders examination and 31 passed.

Bengal Presidency.

169. (a) The following table summarises details of the medical schools in the Presidency :—

State Medical Faculty.

	On rolls.	Primary.		Intermediate.		Final.		Compounder Examination.	
		A.	P.	A.	P.	A.	P.	A.	P.
		Campbell School, Calcutta.	578	103	76	103	51	140	78	34	32
Lytton School, Mymensingh.	235	66	35	84	23	53	24	11	8
Ronaldshay School, Burdwan	212	41	26	55	32	73	34	18	11
Ohittagong School . . .	186	54	35	54	19	37	10	...	...
Jackson School, Jalpaiguri ,	167	20	12	61	36	28	13	...	...
Bankura Sammilani School .	234	58	27	85	31	54	17	...	...
National Medical Institute, Calcutta.	410	89	56	129	58	117	46	...	...
Dacca Medical School. . .	511	114	75	151	69	117	52	36	28
Calcutta Medical School. . .	449	110	68	158	65	143	59	...	...

A. = Appeared

P. = Passed.

(b) *School of Tropical Medicine, Calcutta.*—A total of 91 students were on the rolls.

Examination Results.

	Appeared.	Passed.
D. T. M.	41	32
L. T. M.	48	35

Central Provinces.

170. *Robertson Medical School, Nagpur.*—There were 280 students on the rolls. Of the 89 students who appeared for the final Board examination 43 passed.

Central India.

171. *King Edward Medical School, Indore.*—There were 304 students on the rolls.

Examination Results.

	Appeared.	Passed.
1st L. C. P. and S. (Bombay)	1	1
2nd L. C. P. and S. (Bombay)	5	5
Final L. C. P. and S. (Bombay)	5	2
L. M. P. (Nagpur)	112	47
L. M. F. (Calcutta)	28	7
Compounders	163	122

Bombay Presidency.

172. The L. C. P. S. examination results are given below :—

	1st.		2nd.		Final.	
	A.	P.	A.	P.	A.	P.
B. J. Medical School, Poona	64	39	106	44	137	53
B. J. Medical School, Ahmedabad	72	37	78	22	76	23
Medical School, Hyderabad (Sind)	37	25	41	24	32	11
National Medical College, Bombay	79	49	88	33	104	34
Christian Medical School, Miraj . . . . .	..	..	27	7	5	..

Madras Presidency.

173. Examination results are given below :—

	On rolls.	1st year.		2nd year.		3rd year.		Final Part I.		Final Part II.	
		A.	P.	A.	P.	A.	P.	A.	P.	A.	P.
		Stanley Medical School, Madras	449	118	72	95	54	81	66	91	85	241	109
Lady Willingdon Medical School for Women, Madras	95	44	18	18	12	27	21	20	20	42	13
Missionary Medical School for Women, Vellore	92	29	12	11	8	29	23	...	...	58	32

Assam.

174. *Berry-White Medical School, Dibrugarh.*—236 students were on the rolls ; of these 51 appeared for the final examination and 24 passed. Of the 54 students, who appeared for the compounders examination, 35 passed.

Burma.

175. *Burma Government Medical School, Rangoon.*—The total number of students on the rolls was 168, these comprising 129 old students, 38 new admissions and one re-admission ; 65 students appeared for the final examination Part II and 35 passed.

The Countess of Dufferin's Fund.

176. A total of 367 women students were on the rolls in different Medical Colleges in India ; 27 scholarships were awarded, 18 at the Lady Hardinge Medical College, Delhi ; 3 at Bombay ; 3 at Madras ; and 3 at Calcutta. Of these scholarships 18 were awarded from Association funds and the remainder from trust funds administered by the Dufferin Council.

The extent of work done in Dufferin Hospitals may be estimated from the following figures :—

New in-patients	157,152
New out-patients	2,166,510
Out-patients (old and new)	6,214,693
Gynaecological cases—	
Indoor	10,812
Outdoor	82,362
Midwifery cases—	
Abortion	1,704
Normal labour	8,819
Abnormal labour	2,772
Operations—	
Abdominal	1,249
General or spinal anaesthesia	11,633

SECTION X.

HEALTH OF JAILS IN INDIA.

Population, Sickness and Mortality Rates.

177. The decline in the average daily population (excluding that of the Andamans) experienced in 1933 as a sequel to the complete collapse of the civil disobedience movement was continued. The figure for 1934 was 141,895 being 3,542 less than in the preceding year but still 478 in excess of the quinquennial mean. Compared with 1933, the largest decreases occurred in the Bombay Presidency (—1,552), B. & O. (—1,468) and U. P. (—1,421), elsewhere reductions were small, but in Bengal the population again showed an increase of 2,615.

Table X (i) gives the authorised accommodation, the daily average population and the maximum population confined on any one day in jails and sub-jails during 1933 and 1934.

TABLE X (i).

	Authorised accommodation excluding hospitals and observation cells.		Daily average population.		Maximum number confined on any one day.	
	1934.	1933.	1934.	1933.	1934.	1933.
N.-W. F. P.	5,024	5,053	6,351	6,838	7,260	7,764
Punjab	15,013	15,013	21,849	22,378	26,370	28,134
U. P.	32,053	32,081	31,925	33,346	32,650	35,321
B. & O.	13,730	13,730	12,431	13,562	18,988	20,121
Bengal	18,304	18,151	21,851	21,405	28,969	30,073
C. P.	6,518	6,518	4,793	4,901	5,924	6,311
Bombay	19,275	20,186	14,510	19,085	22,647	24,750
Madras	20,123	20,316	14,959	14,761	13,466	13,634
Assam	3,581	3,508	4,009	3,804	4,818	4,707
Burma	20,362	20,197	20,477	21,145	22,525	25,519

Abbreviations :—

N.-W. F. P.—North-West Frontier Province.

B. and O.—Bihar and Orissa.

U. P.—United Provinces of Agra and Oudh.

p.m.—*per mille*.

C. P.—Central Provinces and Berar.

I. G. of P.—Inspector General of Prisons.

C. s. fever—Cerebro-spinal fever.

P. U. O.—Pyrexia of uncertain origin.

178. On the whole, 1934 was a healthy year. The constantly sick rate, exclusive of the Andamans, fell from 22 p. m. in 1933 to 21 p. m., the quinquennial mean being 23 p. m. Excepting Bengal, C. P. and Bombay, all provinces recorded decreases. In Bengal, the high sick rate is associated with marked overcrowding; in the C. P., influenza prevailed in epidemic form in Nagpur, Chhindwara and Raipur jails; and in Bombay, where the increase was small, c. s. fever in the jails of Sind swelled the figure.

179. Excluding the Andamans, the "admission to hospital rate" dropped from 560 p. m. in 1933 to 541 p. m. and was lower than the quinquennial mean, 587 p. m. In N.-W. F. P., Punjab, U. P., B. & O., Madras, Assam and Burma the rate was below that for 1933 and the mean; in Bengal it was lower than in 1933 but was higher than the mean; in the C. P. it was in excess of the rate for 1933 and the mean. Bengal, with its overcrowded jails, again returned the highest rate, viz, 1,079 p. m.; while the lowest admission rate was reported in Burma, 179 p. m.

The Andamans recorded a rate of 567 p. m. as against 552 p. m. in 1933 and 753, the quinquennial mean.

180. There was an increase in the death rate from 11 p. m. in 1933 to 12 p. m. as against 12 p. m., the quinquennial mean. Death rates were higher than in 1933 in B. & O., C. P., N.-W. F. P., Bombay, U. P., Bengal, Punjab and Madras; lower in Assam and Burma. In B. & O. the high death rate which exceeded that for 1933 by 5 p. m. was ascribed in part to disease in the Gaya central jail resulting from the use of diseased rice; in the C. P. to the greater incidence of anæmia and debility, diarrhoea and respiratory diseases; in N.-W. F. P. to the prevalence of pneumonia; in Bombay to c. s. fever in the overcrowded central jail at Ahmedabad and in the Shikarpur special prison. The increases in other provinces were small, but further details will be found on pages 253—63.

The highest death rate, 20 p. m., was again reported in the Hills and the lowest, 8 p. m., on the Western Coast.

Causes of Sickness and Mortality.

181. The principal recorded causes of sickness, exclusive of the Andamans, are given in their order of priority in Table X (ii).

TABLE X (ii).

	1933.		1934.	
	Admissions.	Rate. p. m.	Admissions.	Rate. p. m.
Malaria	25,018	172	21,622	152
Influenza	4,536	31	5,667	40
Abscess, ulcer and boil	5,001	34	4,982	35
Dysentery	5,121	35	4,746	33
Respiratory diseases*	4,357	30	4,329	31
Diarrhoea	2,893	20	2,834	20
Pneumonia	1,504	10	1,614	11
P. U. O.	1,343	9	1,132	8
Anaemia and debility	1,179	8	1,089	8
Tubercle of the lungs	815	6	831	6
Sandfly fever	669	5	406	3
Dengue	155	1	265	2

*Excluding tubercle of the lungs and pneumonia.

TABLE X (ii)—*contd.*

	1933.		1934.	
	Admissions.	Rate p. m.	Admissions.	Rate p. m.
Enteric fever	331	2	243	2
C. s. fever	106	1	130	1
Spleen diseases	94	1	60	..
Smallpox	56	..	54	..
Phagedaena, slough and gangrene	29	..	41	..
Cholera	5	..	26	..
Hepatic abscess	13	..	25	..
Scurvy	31	..	12	..

A decrease of 20 p. m. in the admission rate from malaria, was offset by an increase of 25 % in admissions from influenza.

Pneumonia and tubercle of the lungs continue to be the chief causes of death. The increase under the latter occurred mainly in the Punjab, where 34 deaths took place among cases transferred to the new Multan central jail in a late stage of the disease.

Pneumonia increased chiefly in the N.-W. F. P. where unusually severe cold was experienced in December. Table X (iii) below gives the deaths and the rates *p. m.* during 1933 and 1934.

TABLE X (iii).

	1933.		1934.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.
Pneumonia	328	2.3	392	2.8
Tubercle of the lungs	241	1.7	308	2.2
Dysentery	111	0.8	112	0.8
Malaria	83	0.6	82	0.6
C. s. fever	54	0.4	78	0.6
Respiratory diseases	53	0.4	70	0.5
Enteric fever	38	0.3	41	0.3
Anaemia and debility	50	0.3	46	0.3
Influenza	18	0.1	26	0.2
Diarrhoea	34	0.2	25	0.2

182. *C. S. Fever.*—There were 130 cases with 78 deaths as against 106 and 54 in 1933. Of these 63 cases and 30 deaths were recorded in the Punjab jails; 32 and 26 in Bombay Presidency; 10 and 9 in B. & O.; 9 and 5 in Delhi; 9 and 4 in N.-W. F. P.; 4 and 2 in Bengal; 2 and 2 in Burma; and 1 non-fatal case in the C. P. Further details will be found in paragraphs 195—205.

183. *Influenza.*—Bengal Presidency suffered most with 2,243 admissions; next U. P. with 1,204 admissions; then Madras with 437; B. & O. 352, Burma 336, and Punjab 322. Elsewhere the incidence was low. Admission rates for the period, 1930-34, are given in Table X (iv).

TABLE X (iv).

	Admission rates per mille.				
	1930.	1931.	1932.	1933.	1934.
India	33·9	51·0	34·0	30·4	39·0
N.-W. F. P.	53	23	18	6	23
Punjab	18	47	10	3	16
U. P.	24	49	39	28	38
B. & O.	48	82	28	23	35
Bengal	73	114	106	107	116
C. P.	42	45	10	52	55
Bombay	20	10	9	3	18
Madras	33	53	56	60	37
Assam.	47	97	45	28	27
Burma	46	62	22	17	17
Andamans	3	2	3	14	18

184. *Cholera*.—The number of cases increased from 5 in 1933 to 35 and the deaths from *nil* in 1933 to 7 this year. These comprised 21 cases with 4 deaths in the U. P., 6 and 1 in B. & O., 4 and 1 in Bengal, 2 and 1 in C. P. and 2 non-fatal cases in Burma.

185. *Smallpox*.—54 admissions with 1 death were reported as against 56 and 2, respectively, in 1933. The U. P. recorded 24 cases with 1 death; and other provinces registered:—Burma 9 cases, B. & O. 7, Punjab and Bengal 5 each, C. P. 3 and Madras 1.

186. *Plague*.—Except for two fatal cases in Burma jails, this disease was absent.

187. *Enteric Fever*.—Of 243 admissions with 41 deaths, 47 and 6 occurred in the Punjab, 38 and 5 in Burma, 30 and 8 in Bengal, 30 and 4 in N.-W. F. P., 26 and 5 in B. & O., 23 and 2 in U. P., 12 and 2 in Assam, 8 and 3 in Delhi, 6 and 1 in Madras and 3 non-fatal cases in the C. P.

188. *Kala-azar* admissions numbered 280 and of these 17 were fatal—191 and 11 respectively in Bengal, 66 and 5 in B. & O., 10 and 1 in U. P., 12 non-fatal cases in Assam and 1 non-fatal case in Madras.

189. *Dysentery*.—Bengal again headed the list with 1,273 admissions and 28 deaths, followed by Punjab 633 and 12, Bombay Presidency 625 and 4, U. P. 498 and 14, B. & O. 447 and 15, Madras 422 and 15, Assam 395 and 7, N.-W. F. P., C. P. and Burma reported low incidences. In B. & O., Madras, Assam and Burma the admission rate was lower than that for 1933 and the quinquennial mean; in Bengal it was higher.

Comparing the geographical groups, the largest number of admissions was again recorded in Bengal and Orissa (1,370), followed by North-West Frontier, Indus Valley and North-West Rajputana (707), Gangetic Plain and Chota Nagpur (681), the upper Sub-Himalayan region (499), Assam (391), Southern India (293), Western Coast (192), the coast of Burma and Bay Islands (129), the interior of Burma (64) and Hills (18). The incidence *per mille* of average population is given in Table B on pages 344-45.

190. *Diarrhoea*.—Bengal leads once more with 1,211 admissions or nearly 43% of the total as against 933 or nearly 32 % of the total in 1933. The only other provinces recording a notable incidence were U. P., Bombay and Punjab with 475, 394 and 313 admissions, respectively.

Comparing geographical groups, Bengal and Orissa continued to return the highest admission rate of 62 p. m. Other areas reporting high incidence included the Deccan (27 p. m.), Western Coast (24 p. m.), Gangetic Plain and Chota Nagpur (17 p. m.) and the Upper Sub-Himalayan Region (17 p. m.). The provinces of Madras (2 p. m.) and Burma (2 p. m.) continue as usual to return the lowest rates for this condition.

Table X (v) gives combined figures for dysentery and diarrhoea.

TABLE X (v).

	Admission rate p. m.			Death rate p. m.		
	Mean 1929-33.	1933.	1934.	Mean 1929-33.	1933.	1934.
India	61	54	52	1	..	1
N.-W. F. P.	24	27	18	..	1	..
Punjab	50	58	48	1	2	1
U. P.	33	28	30	1	..	1
B. & O.	117	98	64	2	2	2
Bengal	113	121	129	2	1	2
C. P.	72	37	50	2	1	2
Bombay	85	70	83	1	..	..
Madras	48	41	33	1	2	2
Assam.	155	156	110	4	2	2
Burma	34	17	12	3	1	1
Andamans	31	31	32	5	2	1

The combined admission rate exceeded that for 1933 and the mean in Bengal and the Andamans and was lower than both in N.-W. F. P., Punjab, B. & O., Madras, Assam and Burma. In the U. P., C. P., and Bombay it was higher than in 1933 but remained well below the mean.

191. *Malaria*.—Malaria incidence was less this year than in 1933 ; compared with the quinquennial mean the admission rate for 1934 was nearly 10% less. All provinces shared in the decrease except Bombay where the incidence was 317 p. m. as against 298 p. m. in 1933 and 225, the mean. In Bengal the admission rate though considerably lower than in 1933, was still somewhat higher than the mean. The Andamans reported a rate of 260 p. m. as compared with 245 p. m. in 1933 and 396, the mean.

Burma, Madras Presidency, C. P. and B. & O. continued to record the lowest incidences.

Comparing geographical groups, Bengal and Orissa continued their lead with an admission rate of 262 p. m. Other high rates were Andamans (260 p. m.), the Upper Sub-Himalayan region (258), North-West Frontier, Indus Valley and North-Western Rajputana (246), South-Western Rajputana

Central India and Gujarat (187) and Western Coast (169). As usual, the jails in Burma and Southern India escaped lightly.

The malaria death rate was highest in the Andamans (1·7 p. m.), the Punjab (1·2) and Bengal (1·2). In other provinces the rates varied between 0·9 p. m. in N.-W. F. P. and 0·1 p. m. in the U. P.

192. *Pneumonia*.—Of the total 255 admissions and 60 deaths were registered in the Punjab, 233 and 65 in the U. P., 212 and 48 in N.-W. F. P., 203 and 42 in Bombay Presidency, 167 and 31 in Burma, 143 and 44 in B. & O., 73 and 21 in Assam, 37 and 13 in Madras and 33 and 11 in the C. P.

The N.-W. F. P. continued to show the highest admission rate (33 p. m.) and Madras the lowest (3 p. m.). Other provinces recording high incidence were Assam (18 p. m.), Bombay (17 p. m.), B. & O. (14 p. m.) and Punjab (13 p. m.).

The N.-W. F. P. headed the list of mortality rates, followed by Assam (5·2 p. m.), B. & O. (4·4 p. m.), Bombay (3·5), Punjab (3·0), C. P. (2·9), Bengal (2·6), U. P. (2·0), Burma (1·5), Madras (1·1) and Andamans (1·0).

193. *Tubercle of the lungs*.—In India proper, excluding the Andamans, the admissions 831 and deaths 308 were higher than in 1933 (815 and 241) but lower than the 5-year means of 972 and 286 respectively.

The admission rates were :—N.-W. F. P. 10 p. m., B. & O. 9 p. m., Punjab and Assam 8 p. m. each, Burma and Bengal 6 p. m. each, C. P. and Madras 5 p. m. each, U. P. and Bombay 3 p. m. each; and death rates :—Punjab 3·9 p. m., B. & O. 3·8 p. m., N.-W. F. P. 3·1 p. m., Burma 2·1 p. m., Madras 2·0 p. m., Bengal 1·9 p. m., C. P. and Assam 1·7 p. m. each, Bombay 1·3 p. m., U. P. 1·2 p. m. In the Andamans admissions 23 and deaths 12 were less than in 1933 (36 and 14 respectively).

Provision existed for the segregation and treatment of tubercular patients as follows :—

N.-W. F. P.—Abbottabad jail has a ward containing 40 beds.

Punjab.—As in previous years, prisoners suffering from tuberculosis were concentrated in the Multan new central jail (136 beds), but some cases were also treated in other institutions, *e.g.*, Multan old central (8 beds), Lahore Borstal (6 beds), Rawalpindi (8 beds), Ambala (6 beds), and Sialkot (2 beds).

U. P.—Sultanpur jail (146 beds).

B. & O.—Arrangements for housing tubercular cases exist at Bhagalpur (35 beds), Buxur (12 beds) and Gaya central (6 beds) jails. The district jails at Motihari and Purulia also provide 4 beds each.

Bengal.—Suri jail has accommodation for 34 cases.

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.—Long term prisoners, fit for transfer, are removed to the Wellesley Sanatorium jail, Bellary; arrangements also exist in other jails for advanced cases not fit to undertake a journey to Bellary.

Assam.—Sylhet jail (20 beds).

Burma.—The Myingyan jail tubercular ward with 50 beds. Accommodation is also provided at Rangoon and Insein (20 beds each), Myaungmya

(8 beds), Thavetmyo and Moulmein (5 beds each), Akyab, Tharrawaddy, Bassein and Toungoo (4 beds each), Henzada (3 beds), and Mandalay (2 beds).

Weight of Prisoners.

194. Table X (vi) 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 (vi).

Provinces.	Gained weight.	Stationary.	Lost weight.
Andamans	45	14	41
Aden	40	23	37
Bombay	51	25	24
B. & O.	52	29	19
Bengal	50	36	14
Burma	63	24	14
Assam	55	33	12
C. P.	62	26	12
U. P.	57	33	10
Punjab	45	47	8
N.-W. F. P.	60	33	7
Madras	70	23	7
Coorg	84	15	1

In the Punjab 74% of the prisoners released were reported to be in good health, 25% in indifferent and only 1% in bad health. These compare favourably with the conditions of health recorded on admission to jails, viz., 70% in good, 29% in indifferent and 1% in bad health.

In the Madras Presidency, Salem again recorded the largest percentage of those who lost weight (29%), followed by Bellary central (25%), Vizagapatam (20%), and the Presidency jail for women, Vellore (18%), whilst Berhampore district (0.12%), Trichinopoly central (0.17%), and Palamcottah Borstal (0.83%) jails recorded the lowest percentages.

Special Remarks on Provinces.

195. *N.-W. F. P.*—The numbers of jails and lock-ups remained unchanged, viz., 3 central, 3 district and 9 subjails, the former six jails providing for 4,921 male and 103 female prisoners, whilst the maximum numbers confined on any one day was 7,154 and 106, respectively.

Despite overcrowding, the general health of the inmates was exceptionally good. The daily average population of 7,270 in 1933 fell to 6,780 but this figure was still in excess of the quinquennial mean of 6,314.

On grounds of sickness 22 releases were made as against 68 in 1933. Whilst admissions of convicts to hospital diminished from 4,110 in 1933 to 2,867, deaths rose from 78 to 91 on account of higher mortality from pneumonia in December when this province experienced unusual cold. The daily average sick rate was 31 p. m., males 30 p. m.; females 67 p. m. The hospital admission

rate among females was also more than double the rate for males, *viz.*, 1,088 p. m. and 486 p. m. respectively. The death rates were males 15 p. m. and females 22 p. m.

The I. G. of P. has reported that a second suit of clothing was issued to prisoners this year and the high mortality from pneumonia in this province certainly suggests that the clothing or the bedding or both have been inadequate, particularly among women prisoners.

The major epidemic diseases were again absent.

Of the recorded deaths, 44 were due to pneumonia, 18 to pulmonary tuberculosis and haemoptysis due to tuberculosis; 6 to other respiratory diseases; 5 each to malaria and other tubercular disease; and 13 to other causes.

The continued fall in the prices of food grains has led to the dietary charges per head declining further to Rs. 29-13-9. The cost of sanitation also fell to Rs. 1-0-7, whilst comparatively more money was spent on the maintenance of hospitals, the figure being Rs. 233-13-4 per patient treated, and on clothing and bedding of prisoners (Rs. 11-5-0 per head).

196. *Punjab.*—The available jail accommodation, excluding hospital and observation cells, in 4 central, 1 Borstal, 18 district, 2 camp and 11 subjails provided for 14,367 male and 646 female prisoners. The daily average strength for all classes of prisoners was 21,849 (males 21,565 and females 284) and the maximum population confined on any one day was 26,370 (males 25,991 and females 379). The I. G. of P. has stressed the need for an additional central jail to relieve overcrowding of long-term prisoners and a special jail for tubercular cases.

The year was a fairly healthy one. Although the death rate increased slightly due to the prevalence of malaria and c. s. fever (in certain jails), the admissions to hospital, the daily average sick and the number of deaths all fell from 17,036, 510 and 314 to 16,160, 472 and 310, respectively. Jails recording high death rates included Multan new central (46 p. m.) in which tubercular patients from all over the province are concentrated, Ambala (37 p. m.), Jhang (35 p. m.), Shahpur (24 p. m.), Multan district (23 p. m.), and Rohtak (15 p. m.).

Malaria was the chief cause of sickness whilst tuberculosis and pneumonia were the most fatal diseases. Cholera, plague and relapsing fever were absent. Malaria caused 5,272 admissions and 27 deaths as against 6,349 and 16, respectively, in 1933. The decrease was ascribed to the fact that this year instead of the prophylactic use of quinine on large scale, special attention was given to measures for the destruction of mosquitoes and the prevention of breeding. In addition to the medical inspection on admission to jail, prisoners were examined for enlarged spleen once in July, August, September and October. Tuberculosis produced 197 admissions and 83 deaths, 60 deaths occurring in the special ward attached to the new central jail, Multan. Pneumonia accounted for 281 admissions and 66 deaths; its incidence and mortality have increased markedly.

C. s. fever was responsible for 61 admissions with 28 deaths principally in Lahore central and Borstal jails and in Jhang. Of 503 dysentery admissions and 11 deaths, 108 and 3 occurred in the Multan district jail alone, 80 non-fatal cases each in Lahore central and Ludhiana district jails and 20 and 3 in Ambala.

Fortyseven convicts developed insanity and were transferred to the mental hospital. Five old and 10 new lepers were treated in the special ward attached to the district jail, Mianwali.

Dietary charges dropped from Rs. 31-7-7 to Rs. 22-10-7 per head (excluding civil prisoners), clothing and bedding charges from Rs. 9-2-1 to Rs. 7-7-6 and the sanitation charges from Rs. 3-7-4 to Rs. 2-14-2, whilst the hospital charges rose from Rs. 417-10-5 to Rs. 419-14-6 per head of average number sick.

197. *U. P.*—The daily average population of the 56 jails in this province declined from 33,346 to 31,925. The total available accommodation for convicts alone was sufficient for 27,287 males and 1,326 females as compared with the average daily population of 26,682 and 350, respectively. The largest population (all classes) on any one day was 32,650 in September.

The improvement in health conditions recorded in the previous year was well maintained during 1934. Both the admissions to hospital, 14,656, with a rate of 459 p. m. and the daily average number of sick, 607 or 19 p. m., continued down.

The main causes of sickness were malaria 3,440 admissions, abscess, boil and ulcer 1,510, "Other respiratory diseases" 1,121, diarrhoea 398, dysentery 359, pneumonia 189, anaemia and debility 126, and tuberculosis 120. Pneumonia (56) and tuberculosis (42) were the cause of nearly 40% of the total deaths. Other causes included dysentery 12, "other respiratory diseases" 10, malaria and diarrhoea 4 each, abscess and cholera 3 each and debility 2. Of the 20 admissions for cholera 16 with 3 deaths were in the Naini central prison. Except for one non-fatal case in the Bareilly district jail, plague was absent.

Epidemiological investigations were carried out into the prevalence of malaria in the central and district jails, Bareilly, and into the high incidence of typhoid fever in the Gorakhpur district jail.

Leprosy cases were, as usual, concentrated in the Rae Bareilly district jail, old and new cases numbering 80 and 38, with no deaths. Except 3 burnt-out cases, all were given injections of iodised esters of hydnocarpus oil with satisfactory results.

Dietary charges fell to Rs. 27-13-1, hospital charges (per head of average number of sick) to Rs. 105-14-10, and clothing and bedding charges to Rs. 3-0-6, while the expenditure on sanitation increased from Rs. 49,468 in 1933 to Rs. 52,749, due to certain improvements of jail watersupplies.

198. *B. & O.*—The 4 central, 12 district, 1 juvenile and 50 subsidiary jails provided accommodation for 12,151 convicts, 1,461 undertrial and 118 civil prisoners. In order to relieve overcrowding, which persisted in nearly all the jails throughout the year, the sub-jails at Arrah, Chaibassa, Balasore and Daltonganj continued to be used as district jails and the sub-jail at Gularbagh which was closed in 1932 was reopened for about 5 months. The camp jail at Patna was however closed in March, 1934, and the juvenile jail at Monghyr which was damaged by the earthquake was under reconstruction.

Compared with 1933, the daily average population dropped by 8% but was still 71% above normal years (up to 1929). The convict wards were on the whole much less overcrowded this year as the average daily population

aggregated 10,204 with an accommodation for 12,151 prisoners. Admissions to hospital (5,241) and daily average number of sick (284), were considerably lower than in 1933 but the number of deaths and the death rate rose to 230 and 18 p. m., respectively, due mainly to bad health conditions in the Gaya central jail, where 58 deaths or about $\frac{1}{4}$ th of the provincial total occurred. In this central jail the high sickness and mortality was ascribed chiefly to the feeding of prisoners on diseased rice which was considered unfit for human consumption. Other jails recording high mortality were Bhagalpur central (23·5), Purnea district (57 p. m.), Sambalpur (43 p. m.), Motihari (31 p. m.), Cuttack (21 p. m.), and Monghyr (20 p. m.).

Seven sporadic cases of cholera with 2 deaths were reported and prompt measures were taken to arrest spread.

Of the 9 sporadic cases of c. s. fever with 8 deaths, 6 and 4, respectively, occurred in the Gaya central jail: 2 cases and 3 deaths at Bhagalpur central jail; and one fatal case at Bankipur. Dysentery cases numbered 593 and deaths 17. Malaria was responsible for 649 admissions and 4 deaths as against 1,041 and 6, respectively, in 1933; influenza 465 cases with 6 deaths; pneumonia 148 and 44; diarrhoea 277 cases; abscess, ulcer and boil 156; "other respiratory diseases" 276 and 6.

Ankylostomiasis accounted for 432 admissions and 28 deaths, Gaya alone recording 112 cases with 11 deaths and Bhagalpur 75 cases with 6 deaths. The examination of newly admitted prisoners for hookworm infection was continued and of 17,816 cases examined, 7,617 were found positive.

The incidence of pulmonary tuberculosis rose from 73 cases with 30 deaths in 1933 to 108 and 38, respectively.

Leprosy cases were as before segregated in the Muzaffarpur district jail. The daily average number of cases was 44.

The cost per head on diet, hospital, clothing and bedding, and sanitation, all decreased to Rs. 31-1-0, Rs. 4-7-0, Rs. 5-5-0 and Rs. 1-14-0 respectively.

199. *Bengal Presidency*.—During the year, there was general overcrowding particularly marked in the central jails. In order to afford some relief, the 3 special jails at Dum Dum and Hijli continued open and, consequent on the release or transfer of civil disobedience movement female prisoners, the Berhampore female jail was converted into a juvenile jail with additional accommodation for 215 male juvenile prisoners. Excluding hospital and observation cells, there existed accommodation for 18,304 prisoners (17,672 males and 632 females) and including the temporary accommodation it was sufficient for 20,232 prisoners. The daily average population was 21,851 (21,615 males and 236 females), the highest in the last 10 years except in 1932, whilst the maximum population confined on any one day was 28,431 males and 538 females. The daily average convict population aggregated 17,279 (male 17,095 and female 184), whilst the maximum number confined on any one day was 21,024 (20,664 males and 360 females).

As is to be expected in such circumstances, sickness and mortality curves showed an upward trend. The daily average number of sick rose from 762 (35·6 p. m.) to 789 (36·1 p. m.) and the number of deaths from 233 (11 p. m.) to 282 (13 p. m.). The death rates for individual jails varied from 44 p. m. in Jalpaiguri to 4p. m. in Berhampore.

Cholera was responsible for 4 admissions with 1 death, as against 3 non-fatal cases in 1933.

Whilst the incidence of malaria fell to 4,785 admissions and 22 deaths, that of pulmonary tuberculosis rose from 90 admissions and 26 deaths to 103 and 26. Comparative figures for other diseases are shown below :—

TABLE X (vii).

	1933.		1934.	
	Cases.	Deaths.	Cases.	Deaths.
Other tubercular disease	5	7	6	2
Anaemia and debility	356	11	354	13.
Pneumonia	176	43	196	48.
Other respiratory disease	686	2	727	13.
Diarrhoea	1,122	3	1,071	3.
Abscess, ulcer and boil	1,026	1	911	1
Other causes	8,236	63	9,202	79

High mortality from dysentery, pneumonia and other respiratory diseases was partly due to the serious overcrowding; that under pulmonary tuberculosis was probably due to the admission of cases in advanced stages of the disease when treatment is of little benefit.

The manufacturing section of the Presidency jail issued 41,976 lbs. of quinine and cinchona in addition to 87,140 boxes of quinine treatments.

The Bengal After-Care Association and its district ramifications continued their useful work.

Dietary charges per head further fell from Rs. 41 to Rs. 39-12; hospital charges from Rs. 225-12 to Rs. 200-7 (per head of average sick); and sanitation charges from Rs. 3-1 to Rs. 2-15; whilst expenditure on the clothing and bedding of prisoners remained stationary.

Expenditure on jail buildings amounted to Rs. 2,81,569, original works consuming Rs. 35,164 only.

200. *C. P. & Berar.*—Two central, 10 district and 9 subsidiary jails, excluding hospital and observation cells, continued to provide accommodation for 6,086 male and 432 female prisoners. The total average jail population further fell to 4,793 and the number of convicted persons admitted into prisons was 6,990. The number of prisoners sentenced under the Borstal Act was 83.

The year was not as healthy as 1933 owing to the prevalence of influenza in epidemic form at Nagpur, Chhindwara and Raipur jails. The admissions to hospital, 1,396 or 291 p. m., the daily average sick 53 or 11 p. m. and deaths, 70 or 15 p. m. all increased as compared with the previous year. Although cholera prevailed in several districts, only two cases, of which one was fatal, occurred in the jail population. Dysentery with 156 admissions and malaria with 171 were the chief causes of sickness; pneumonia accounted for 36 admissions, diarrhoea 75, tuberculosis of the lungs 25, and c. s. meningitis for one non-fatal case. Of the total deaths, pneumonia was the cause of 12, pulmonary tuberculosis and haemoptysis due to tuberculosis 8, dysentery and anaemia and debility combined 5 each, diarrhoea 4, malaria 1 and other causes 35.

The Nagpur central jail continued to meet the steady increase in demand for quinine and cinchona as is evident from the quantities issued during the year, *vide* statement below :—

TABLE X (viii).

	1932.	1933.	1934.
	lbs.	lbs.	lbs.
Quinine sulphate	562	641	652
Cinchona febrifuge	591	619	558
Quinine hydrochloride	24	29	25
Quinine tablets	227	346	292
Cinchona tablets	158	185	184
No. of quinine boxes	2,626	2,965	3,176

The Discharged Prisoners' Aid Societies at Nagpur and Amraoti continued to render useful service.

The dietary and hospital charges further dropped from Rs. 25-14-3 and Rs. 498-6-11 to Rs. 24-4-11 and Rs. 397-10-11, respectively; the clothing and bedding and sanitation charges rose from Rs. 6-11-11 and Rs. 2-9-8 to Rs. 7-2-11 and Rs. 3-0-7, respectively.

201. *Bombay Presidency*.—In this province, conditions have returned to normal in all prisons following complete cessation of civil disobedience and the release of practically all prisoners convicted of offences connected with it. Consequently the daily average population decreased from 16,238 to 14,510. Only 6 releases were made on medical grounds. Adolescent admissions between the ages of 16 and 21 dropped to 1,941 males and 114 females. The special juvenile section at Yeravda was developed to follow as far as possible Borstal lines.

The available accommodation provided for 19,275 prisoners (16,532 males and 2,743 females) whilst the maximum population confined on any one day was 21,741 male and 906 female prisoners, as compared with 25,506 and 1,244, respectively in 1933. As a result of a rise in the subsoil water level, the Shikarpur special prison showed signs of rapid disintegration. The scheme for the conversion of Visapur prison into a permanent prison farm was still under consideration of Government. Plans and estimates for a new sub-jail at Nawabshah were technically approved; those for the conversion of an old liquor house at Nasik into a sub-jail were under consideration. The jails where the daily average population was in excess of the available accommodation are again those in which overcrowding has been serious in previous years—a feature which merits consideration.

TABLE X (ix).

	Authorised accom- modation.	Daily average population.
H. M.'s House of Correction	244	261
Bijapur district	345	351
Ahmedabad central	1,264	1,441
Hyderabad central	1,527	1,628
Sukkur district	448	568
Shikarpur special	464	472

• Whilst the number of admissions and the average daily number of sick fell from 11,217 and 315, respectively, to 11,197 and 290, the constantly sick rate per 1,000, the total number of deaths and the death rate *p. m.* rose from 19·8, 171 and 10·8 in 1933 to 20·5, 179 and 12·6 respectively. Ahmedabad central and Visapur temporary jails were mainly responsible for the increase in mortality although the highest death rate, 49 *p. m.*, was recorded at Shikarpur special jail.

Cholera was absent. Plague was responsible for two fatal cases in the sub-jails at Satara and Tasgaon. Influenza admissions numbered 222; mumps 28; chickenpox 7; erysipelas one fatal case; typhoid 14 cases with 3 deaths; and para-typhoid 3 cases.

Eight cases of scurvy were reported from Sind jails.

Cerebro-spinal fever was again confined to the Sind jails which recorded 32 admissions with 26 deaths, as against 26 and 20 in 1933. These included Shikarpur special 16 cases with 14 deaths, Sind convict gang 9 and 7, Hyderabad central 4 and 3 and Sukkur district 3 and 2. The Inspector General of Prisons remarks :

“ This disease (c. s. fever) appears to be endemic in Sind and practically every year it makes an appearance in one or other of the jails there. Shikarpur prison appears to be particularly bad in this respect—and some of the earliest reports on this disease in India are in connection with the appearance of meningitis in Shikarpur prison (Dimmock). ”

“ Prophylactic inoculation appeared to have had very good results. ”

Dysentery and diarrhoea together were responsible for 929 admissions and 3 deaths; tuberculosis of the lungs for 45 and 18 as against 51 and 17 in 1933.

Malaria was the cause of 3,598 cases and 4 deaths, Visapur temporary prison and Yeravda central jails recording fewer cases this year. Ahmedabad and Hyderabad central prisons had increased incidences. In the former the increase was attributable directly to the late rains, whilst in the latter 33% of the prisoners were found to have enlarged spleens. Quinine tablets continued to be manufactured at the Yeravda central prison.

Pneumonia caused 189 admissions with 41 deaths.

Prisoners' Aid Societies continued to work in Bombay, Ahmedabad, Bijapur, Poona and Belgaum.

Dietary charges per head rose slightly to Rs. 36-11-8; hospital, clothing and bedding and sanitation charges fell to Rs. 2-5-3, Rs. 2-10-0 and Rs. 5-9-9, respectively.

Twelve male and 2 female prisoners were transferred to mental hospitals.

202. *Madras Presidency.*—Nine central, 3 district, 2 Borstal, 3 special and 301 sub-jails provided accommodation for 20,123 prisoners (18,352 males and 1,771 females). The daily average population of all classes of prisoners was 14,614 male and 345 female prisoners, that of convicts 11,443 and 282, respectively. Only 19 prisoners were released on medical grounds. Other releases included 4 female prisoners, who had been convicted of infanticide; these were made over to the Madras Seva Sadan and the rescue home of the Salvation Army.

Adolescents detained in the Borstal schools at Tanjore and Palamcottah numbered 989. As in previous years, ambulance and first-aid training was provided; of the 522 new admissions under training 75 obtained certificates.

The downward trend of 1933 in the number of admissions to hospital, and the daily average number of sick was maintained, the figures being 3,925 (262 p. m.) and 207 (14 p. m.) respectively. The female admission rate (310 p. m.) was in excess of the male, 261 p. m. The number of deaths further rose to 158 and the death rate to 11 p. m., due chiefly to the admission of a large number of prisoners in bad and indifferent health. Of the total deaths, 137 occurred among convicts, 18 among under-trials and 3 among civil prisoners; 28 occurred in Trichinopoly central, 20 in Vellore, 17 in Rajahmundry, 12 in Madras Penitentiary, 11 in Coimbatore, 10 in Salem, 9 in Vizagapatam, 7 in Cannanore, Berhampore 8, Presidency jail for women, Vellore 6, Madura district jail 5, Bellary and Cuddalore 4 each.

Cholera was again absent. Dysentery caused 388 admissions, of which 121 were treated in the Cannanore central jail alone. Although the origin of infection could not be traced, the disease was reported by the Inspector General to have been kept well under control by the daily administration of dysentery phage to the whole population.

The number of admissions from malaria fell to 196, and included 89 in Bellary and 40 in Trichinopoly central jails.

Tuberculosis continued widespread in all jails except at Vizagapatam and Madura and the Tanjore and Palamcottah Borstal Schools, but the recorded admissions and deaths, 57 and 22, respectively, were lower than the figures for 1933.

Of 78 admissions and 6 deaths from anaemia and debility, Trichinopoly accounted for 20 and 4, respectively.

Pneumonia provided 33 admissions with 12 deaths; diarrhoea 20 and 3; enteric fever 7 and 1; and syphilis 20 and 1.

Only 10 admissions were ascribed to ankylostomiasis and the administration of a routine anthelmintic course to all prisoners on admission, unless otherwise contra-indicated, was continued.

The mental defectives section of the Cuddalore district jail dealt with 87 prisoners; the leper annexe of the Salem central jail had 141 inmates.

Protected water supplies were available in all central and district jails and Borstal schools.

Of the 28,083 prisoners released, the Discharged Prisoners' Aid Society rendered aid to 963.

The dieting, hospital, clothing and bedding, and sanitation charges all dropped to Rs. 35-13-6, Rs. 2-14-4, Rs. 4-10-2 and Rs. 3-11-8, respectively.

203. *Assam*.—Available accommodation providing for 3,971 prisoners increased by 138 over 1933 as a result of the construction of a leper annexe in the Sylhet district jail for 35 prisoners; the conversion of a portion of the old female ward into a male barrack to provide additional accommodation for 7 prisoners in the Dhubri jail; the addition of temporary accommodation for 80 and 20 prisoners respectively at Gauhati and Habiganj; and the construction of a female annexe in the South Sylhet district jail.

The daily average population was the highest on record being 4,009 or 204 more than in 1933 and included 3,354 convicts, 651 under-trials, 4 civil prisoners.

Although additional temporary accommodation was provided in some jails, a certain amount of overcrowding was inevitable as the available accommodation was already inadequate. Thus the problem of accommodation remained acute, especially in respect of cellular accommodation; the temporary segregation of new admissions and the permanent segregation of habituals.

Admissions to hospital fell from 2,135 to 2,122; the admission rate p.m. from 561 to 98; the daily average sick from 98 to 87; the number of deaths and death rate from 62 and 20·3 p.m. to 58 and 19·6 p.m.

Of the total deaths, 54 occurred among convicts, giving a rate of 14·5 p.m. against 16·3 p.m. in 1933.

In the Assam Valley jails, 33% of the convicts were habitual drug takers and in the Surma Valley 7% as compared with 28% and 6%, respectively, in 1933.

Eight prisoners were transferred to the mental hospital.

Malaria (357 admissions) and dysentery (333) continued to be the main causes of sickness, whilst 19 deaths were ascribed to pneumonia, 7 each to pulmonary tuberculosis and dysentery, 2 to malaria and 1 to ankylostomiasis. The incidence of dysentery was again the highest in Gauhati (163 cases); that of malaria in Sylhet (75 cases).

Cases infected with hookworm were as before given suitable treatment; of 3,797 cases examined in the jails, 811 or over 21% were found infected. Admissions to hospital numbered 42.

Dietary charges per head of population rose to Rs. 33-13-1 and the cost of hospitalisation alone came to Rs. 222-5-9 per head of average number sick. The expenditure on clothing and bedding and on sanitation was lower than in 1933, being Rs. 4-12-3 and Re. 0-10-0 per head of population.

A Discharged Prisoners' Aid Society was formed at Shillong.

204. *Burma*.—Nine central, 18 district, 1 camp and 4 subsidiary jails provided accommodation for 20,593 male and 324 female prisoners or a total of 20,917. The combined Borstal and Senior Training School at Thayetmyo continued to function. The Alôn camp jail was closed and the conversion of the Reformatory school buildings at Insein into a special jail for "A" and "B" class prisoners was sanctioned.

The daily average population was 20,477 (males 20,278 and females 199). Of prisoners discharged, 32 were released on grounds of sickness and 12 were sent to mental hospitals.

The health statistics for the year showed further improvement, admissions to hospital dropping to 3,668 or 1,358 less than in 1933, the daily average sick to 204 (224 in 1933), the admission to hospital rate to 179 p.m. (238 p.m. in 1933), the daily average sick rate to 10 p.m. (11 p.m. in 1933) and the number of deaths and the death rate to 196 and 10 p.m. (227 and 11 p.m. in 1933). Of the total deaths 93% were recorded among convicts; 7% died within a week, 22% within 4 weeks of admission and 78% after more than a month's detention in jail. Three deaths occurred among prisoners who on admission were sent direct to hospital. 122 deaths occurred among prisoners aged 16-40 years, 65 among those between 40-60 years and 9 among those over 60 years of age.

Cholera was absent and only two fatal cases of plague were recorded.

Owing to more efficient chlorination of drinking water and greater attention paid to cleanliness, food, etc. the incidence of dysentery further fell to 180 admissions and 12 deaths.

Tuberculosis was responsible for 138 admissions and 49 deaths as against 98 and 54, respectively, in 1933. In the special ward at Myingyan, providing for 50 prisoners, 95 cases including 86 new admissions were treated. Of these 14 died, one within and 13 after 3 months of admission; 28 cases were discharged cured.

Anaemia and debility was the cause of 36 admissions with 3 deaths, as against 63 and 5 in 1933.

Enteric fever was reported as the cause of 38 cases of which five proved fatal, and beri-beri of 4 (12 in 1933). In the case of the latter cases, the source of infection was extraneous.

Influenza caused 336 admissions with 1 death. Malaria incidence further decreased from 388 cases and 12 deaths to 220 and 5, respectively.

Admissions from ankylostomiasis numbered 2,837 with 1 death. All new admissions were, as usual, examined for ankylostome infection.

Over 4% of the convict population were opium addicts.

First-aid classes were held in 12 jails, and 6 jailors, 15 warders and 93 prisoners passed the prescribed test.

Dietary, hospital, clothing and bedding, and sanitation charges all decreased during the year.

205. *Andamans*.—The daily average population numbered 5,679 males and 80 females, as against 6,527 and 96, respectively in 1933. The barracks and cells, allowing 50 superficial feet per prisoner, had accommodation for 4,136 (4,076 males and 60 females), whilst the maximum population confined on any one day was 6,152 (6,061 males and 91 females).

A total of 3,268 admissions to hospital was recorded corresponding to a rate *per mille* of 552 as against 3,654 and 560, respectively in 1933. The average daily number of sick was 156 (176 in 1933) and the deaths numbered 83 against 118 in 1933.

The general health of the Settlement was good and is reflected in the diminished incidence particularly of malaria, (1,497 admissions and 9 deaths) following energetic anti-malarial measures. Other diseases showing decreased incidence are given below:—

TABLE X (x).

	1933.		1934.	
	C.	D.	C.	D.
Dysentery	162	13	147	7
Colitis	118	7	72	..
Weil's disease	36	6	29	5
Pulmonary tuberculosis	36	14	23	12
Anaemia	77	16	45	9
Sprue	17	3	4	2
Diarrhoea	40	1	32	..

Cholera was again absent.

Enteric fever was responsible for increased incidence this year, *viz.* 13 cases with 2 deaths (3 non-fatal cases in 1933). Influenza caused 106 admissions (93 in 1933).

Among the respiratory group, bronchitis accounted for 114 cases, asthma 43 and pneumonia 23.

Gonorrhœa and syphilis each was the cause of 33 and 15 cases against 45 and 21 in 1933.

Smallpox cases numbered 3 among the free population, the origin of these cases was traced to infection acquired in India.

Vaccinations performed totalled 1,562, of which 341 were primary, 221 secondary and 1,000 re-vaccinations.

Ships arriving from and departing to Indian ports were inspected as a routine.

Food and water supplies were satisfactory; sanitation and conservancy arrangements were adequate.

Examination of school children was carried out half-yearly.

206. *Aden and Coorg*.—These reports again contained various items of value and interest but no detailed comment is necessary.

Conclusion.

207. Generally speaking the year was a normal one as regards the health of the jail population, the death rate being 12 *per mille* which is the average figure for the previous five years. In particular, in the Andamans, the drop in the death rate from 31, which was the mean of the previous five years, to 17 in 1933 and to 11 in the year under report is striking. The improvement in health conditions here is evidenced by a pronounced drop in admissions and deaths from such diseases as malaria, dysentery and colitis, pulmonary tuberculosis and Weil's disease. Of the provinces, Burma shows the greatest improvement in health conditions as measured by death rate, followed by Assam, while Bihar and Orissa shows the highest rise in death rate, an increase of $\frac{1}{3}$ rd over the mean. For the most part the constantly sick rate bears out the same points, though in this case Bihar and Orissa shows a lower constantly sick rate than obtained either in 1933 or in the five-year mean.

Turning to communicable diseases, it is notable that while admissions are below the figures for 1933, the combined death rate of this group is slightly higher, due in part to an excessive mortality from pneumonia during the cold weather in the N.-W. F. P. jails.

The most notable increase among communicable diseases was that in cerebro-spinal fever which occupied this year the fourth place as a cause of mortality in this group. A slight upward trend in admissions and deaths of tubercle of lungs over the previous year's figures and the five-year mean is noted and should cause concern to the jail administrations of the provinces principally contributing to the rise, namely, the Punjab, the N.-W. F. P. and Bihar and Orissa.

There is every evidence that on the whole the high standard of care and attention to the health of prisoners, which characterises the administration of Indian jails by medical officers, has been well maintained throughout the year.

Health conditions within jails compare favourably with those outside.

SECTION XI.

INDIAN VOLUNTARY HEALTH ORGANISATIONS.

The Indian Red Cross Society*.

208. During the first half of 1934 both headquarters and the branches, particularly the Bihar and Orissa branch, were occupied with relief work for the Bihar earthquake sufferers. Red Cross Societies all over the world gave generous aid to the Indian Society.

Membership.—There were altogether 23 provincial and state and nearly 200 district Red Cross Committees at work at the end of 1934. The membership was 15,912, the largest increase over the figure for 1933 occurring in the Punjab from 5,575 to 8,949, and Sind won the “Flag of Honour” for the most enrolments during Red Cross week.

Prevention of Blindness.—Considerable progress was made during the year in the scheme which this Society is carrying out in cooperation with the National Institute for the Blind, London, for the training of teachers in the prevention of eye diseases. The National Institute have given a generous grant of £570 including £450 for organising eye courses for teachers and £120 for free distribution of literature.

With regard to the organisation of courses, it was decided to limit the work to training institutions. With the help of the medical sub-committee a syllabus was drawn up, and a uniform fee of Rs. 20 per course of two lectures arranged. The courses are being organised through provincial and state Red Cross branches, and free sets of lantern slides are being provided by headquarters. At the end of 1934 only a few courses had been held as the preliminary arrangements took some time but the scheme is now in full swing, and these courses should make a valuable contribution to the campaign for the prevention of eye diseases which the Junior Red Cross is carrying on throughout India.

With the £120 it was decided to print 10,000 copies in Bengali, 5,000 in Tamil and 5,000 in Telegu of the pamphlet, “The Prevention of Blindness,” which had already appeared in English, Urdu, Hindi and Gujrati. The Tamil edition is ready and the Bengali and Telegu are in the press. All these pamphlets will be distributed free to schools in Bengal and Madras.

Maternity and Child Welfare Bureau.—Educational activities absorbed a good deal of the funds of this Bureau. In 1934 three schools for the training of health visitors were wholly or partly supported by the Bureau as well as two nursery schools. Assistance was also given to the welfare Centre which provides field work for the students taking the Diploma in Maternity and Child Welfare at the All-India Hygiene Institute at Calcutta.

In the absence of any officer doing whole time work on maternity and child welfare with the Government of India, the Bureau provides a central adviser on this subject for India, and so helps to co-ordinate the work in various provinces. The Bureau also provides literature and helps in the organisation of baby and health weeks.

The Victoria Memorial Scholarship Fund is ear-marked for the training of indigenous and other midwives. The number of trained midwives is gradually increasing, and it is hoped, that in time, this will help to reduce the enormous maternal mortality rate in India.

* Prepared from a note supplied by Miss Norah Hill, A. R. R. C., Secretary, Indian Red Cross Society.

Child welfare work in the army, though largely of the character of medical aid, is gradually assuming a more preventative outlook. The care thus given to the troops' families is greatly appreciated, and the work is warmly supported by the officers and their wives.

King George Thanksgiving (Anti-Tuberculosis) Fund.—During the year the educational and propaganda campaign against tuberculosis was carried on through 16 provincial and state anti-tuberculosis committees, Medical, Public Health and Education Departments, sanatoria, medical colleges and schools throughout India.

The outstanding event of the year was the bringing together for the first time of tuberculosis workers from all over India at the Tuberculosis Conference held in Delhi in November. Some interesting papers were read and stimulating discussions took place.

The coloured posters issued last year have proved very popular and another 5,000 copies have had to be printed. A new chart on "spitting," in black and red, has been published. Some of the Fund's posters and pamphlets have been translated into Burmese and distributed through the Public Health and Education Departments throughout Burma. Two new films one entitled "Posture" and the other "Consequences," were purchased from America. Two copies of the film "Causation and Prevention of Tuberculosis," prepared by the Fund, were sold during the year.

A propaganda cinema lorry is being fitted up at headquarters to tour the provinces with films and carry out intensive propaganda. There will be a qualified medical man in charge.

Training grants were made to several medical institutions for special courses in tuberculosis.

Junior Red Cross.—The Junior Red Cross has achieved real popularity in India. It is an encouraging fact that the movement is now gaining ground in girls' schools, particularly in the Punjab.

Inter-school correspondence is also being taken up more widely, and this year 128 albums were exchanged with foreign countries, compared with 72 last year.

During the Bihar earthquake, Junior groups all over India gave valuable assistance in collecting both money and relief material, such as blankets and clothing.

A Junior Red Cross Conference was held in Sind and a Junior Red Cross and St. John Ambulance Camp in Lahore, both of which were well attended by teachers, the former by men and the latter by women.

Among the many interesting activities reported are prevention of blindness, propaganda, anti-epidemic work, rural hygiene and social service, while all groups continued their regular programme of practising health habits.

Publicity and Health Propaganda.—A Red Cross Week was held in February, 1934. In spite of the fact that the Bihar earthquake interfered with the universal celebration of the Week, flags and posters were sold in thousands. The silk "Flag of Honour," offered by headquarters for the branch enrolling most members during the Week, was won by the Sind provincial branch, which held its "week" in September, during which it carried on excellent anti-tuberculosis propaganda. About 432 new members were enrolled and over Rs. 4,000 added to the funds. Ajmer also held a very successful week.

The first standard film produced by the Cinema section at headquarters entitled "The Prevention of Blindness" has proved a great success. Two copies, one with English, Urdu and Hindi titles and one with English only, have been made for the headquarters circulating library, and four have been sold to Punjab, Calcutta, Cochin State and Baroda State. Work is now proceeding on two films, one describing the activities of the Indian Red Cross Society, and one on "Homecraft and Mothercraft".

Altogether 160 films were sent out from the Red Cross film circulating library of which 105 were standard-size and 55 were 16 mm. During the year two new films were bought, one "Plague, the Destroyer," produced by the Hyderabad Plague Officer, and the other "The King of Flies," produced by the U. P. branch. A number of films were also added to 16 mm. library.

In August the Government of India informed the Society that it had decided to exempt educational films from customs duty.

The Red Cross journal had a fairly successful year. A coloured supplement (Red Cross week posters) was issued in January and pictorial supplements in April and July. One of the best health propaganda efforts throughout India is the "Health Welfare Week" sponsored by the Bengal Red Cross. This year, in addition to a most successful Calcutta Health Exhibition, which won the Irwin Baby Week Challenge Cup, exhibitions were held in 22 districts throughout Bengal, and it is calculated that the area covered included some 3,000 villages. The organisers report that the response from the people is most encouraging, and there is no doubt that repeated annual efforts, such as this, do much to combat the prevailing ignorance on health matters. All this work is done by volunteers, which makes it all the more remarkable and the more suitable for adoption elsewhere.

Enrolment of Registered Nurses and Voluntary Aid Detachments.—A scheme for the enrolment of registered nurses for emergency or war service to be operated by this Society in co-operation with the Trained Nurses' Association of India, was approved by the Managing Body.

The voluntary aid detachment scheme to provide volunteer nurses for military hospitals in case of war is now in operation.

Rural Welfare.—Slow but steady progress is being made with the scheme to open Red Cross sub-branches in smaller centres away from district headquarters. The Central Provinces and Berar branch towards the end of the year received Rs. 5,000 from the Government for village welfare work. Kotah State opened a number of Red Cross dispensaries in villages. Hyderabad has opened an experimental village centre for child welfare work, while the Central India branch reports that considerable propaganda work was carried out at fairs in villages.

The St. John Ambulance Association (Indian Council) and St. John Ambulance Brigade Overseas.*

209. During the year 1934 both branches of the Order, the Association with its instructional work, and the Brigade with its divisions of trained personnel, have shown progress, although financial difficulties continued to be a source of anxiety.

Altogether 27,821 persons attended 1,801 courses of instruction in first-aid, home nursing, home hygiene and sanitation, of whom 17,722 qualified

* Prepared from a note supplied by Miss Norah Hill, Secretary, Indian Red Cross Society.

for the Association's certificates, namely, 16,260 in first aid, 910 in home nursing, 450 in hygiene and 102 in sanitation. These figures show a striking increase over those for 1933, when 12,869 passed in first-aid and 584 in home nursing. This year, 420 persons obtained the voucher certificate by passing a second higher test in first-aid, while 154 qualified for the medallion by passing an examination for the third time. The new course, "Domestic Hygiene and Mothercraft," introduced in 1932, attracted 8 classes with 147 candidates of whom 114 qualified for certificates. The Mackenzie School course has continued to grow in popularity. In this course 9,596 students were instructed, of whom 6,788 were awarded certificates as compared with 6,268 in 1933.

The figures for first-aid show an increase of about 27 per cent over 1933 and those for home nursing almost a hundred per cent increase, which is a happy augury for the formation of the Nursing Division of the Brigade, and in turn for the formation of voluntary aid detachments, to which a reference is made in a subsequent paragraph. The number of first aid certificates issued is the largest ever issued in one year in India, even including the war years.

In addition to the above, 1,100 members of the criminal tribes settlements in the Punjab passed in the examination in first-aid (967) and home nursing (173), for whom certificates were not applied for as they could not afford to pay the fee.

From the St. John Ambulance Stores Depot, 20,876 text books were sold, an increase of 5,375 over the 1933 figure.

The two first-aid road stations in Calcutta continued to do useful work. In all 818 cases were dealt with of which 619 were treated on the spot and 144 were sent to hospital.

The All-India Ambulance Competitions were held in Calcutta from the 15th to 17th January, 1934, through the courtesy of the Bengal provincial centres. Eleven trophies were keenly contested by 65 teams, and 23 ladies entered for the individual competition. The largest number of teams entered for the boy scouts' trophy (13) and the trophies open to teams from Ambulance divisions of the St. John Ambulance Brigade Overseas and from educational institutions attracted 9 teams each.

St. John Ambulance Brigade Overseas (Empire of India). In the Bihar earthquake the St. John Ambulance Brigade performed admirable work in assisting the sick and the injured. In co-operation with the Bengal provincial branch of the Indian Red Cross Society, a camp hospital fully equipped with tents, doctors, nurses, medicines ambulance workers, etc., was mobilized and despatched to Monghyr, the worst affected area. This was one of the first relief units to appear upon the scene, and its work was much appreciated.

The total number of Divisions rose from 72 to 86, the new formations being 2 Nursing and 1 Cadet Nursing Divisions in No. 1 District (Lahore), 4 Ambulance Divisions in No. II District (Calcutta), 3 Ambulance Divisions at Bangalore (South India) and 4 Cadet Ambulance Divisions in the United Provinces. In addition to the four existing Districts with headquarters at Lahore, Calcutta, Bombay and Madras a new District was formed in Mysore State with headquarters at Bangalore. This is the first unit of the Brigade Overseas in an Indian State, and it is hoped that other States will follow suit. Another important event has been the resuscitation of the Brigade in Burma where activities lapsed after the Great War.

British Empire Leprosy Relief Association (Indian Council).*

210. The British Empire Leprosy Relief Association continued to carry on activities along the prescribed lines which comprised research work, propaganda and publicity and training of doctors conducted directly under the headquarters organisation, and survey and treatment of lepers conducted by the provincial branches of the Association. The work under all these heads is gradually increasing in extent and intensity, and, encouraged by the good results of modern methods of treatment, leprosy patients are seeking treatment in ever-increasing numbers. This is leading to an awakening of interest in all directions, and public bodies such as district boards and municipalities are becoming more and more alert in tackling the problem of leprosy in all its aspects. The result is that today there is available a wider data as regards the incidence and endemicity of leprosy, increased means of rendering proper treatment to the leper, an effective publicity organisation and a channel of educational propaganda to dispel ignorance about the disease and to bring the leper within the ambit of medical and public health activities of the country.

All these achievements have, however, only succeeded in bringing to notice the enormity of the leprosy problem and the complications with which it is hedged in all directions. The resources at the disposal of the British Empire Leprosy Relief Association are too meagre to enable it to attempt to do all that is desired and activities have necessarily to be confined to items of relative urgency

During the year 1934, the Endowment Fund of Rs. 22,32,760 yielded a revenue of Rs. 1,13,985 and the total expenditure amounted to Rs. 1,12,461. The details of work done were published in the Annual Report of the Association for that year, but the following expenditure incurred at headquarters on the various items of its programme gives an index to the amount of work done :—

	Rs.
Propaganda and publicity	16,174
Research	28,515
Training of doctors	2,306
Grants to provincial branches	57,450

Research work is carried on in Calcutta at the School of Tropical Medicine in co-operation with the Indian Research Fund Association, where a clinic is also maintained to provide material for research work and instruction. The work done in 1934 included pathology, bacteriology, rat leprosy and chemistry. In addition to this, field work has been undertaken over a fairly extensive area.

The 17 provincial and State branches are endeavouring to push the campaign of anti-leprosy work within their areas with greater vigour commensurate with their financial resources. Reports bear witness to the fact that the benefits are penetrating slowly and steadily through the barriers which at one time had appeared almost impregnable. The following excerpts from the Annual Report of the Association for 1934 are quoted as indicating the position reached towards the control of the disease :—

“ The report received from Bihar and Orissa shows that Government, Mission to Lepers, interested Local Bodies and the British Empire Leprosy Relief Association are all working in co-operation for the benefit of the leper. Surveys have been held, dietic experiments made and a large number of patients have been treated. Burma Branch reports

* Prepared from a note supplied by the Secretary, B. E. L. R. A. (Indian Council).

that intensive local surveys have revealed twelve times more lepers (somewhere 16 and 21 times) than in the Census of 1931. Madras is going ahead with its ever-increasing number of clinics and the formation of District Leprosy Councils. The Rural Investigation Centre at Bankura in Bengal of which detailed reference is made in the report of that Province is fully justifying its purpose. A systematic survey of 150 villages was conducted which has clarified the situation with regard to the disease in the District. Some of the results namely, that more than 78 per cent of villages are affected and one in every six families harbours leprosy cases, and that on an average two out of every five cases are infectious are remarkable. These investigations are leading more and more to the conclusion that leprosy cannot be controlled by treatment alone. Treatment is necessary, and a large proportion of cases may be expected to recover, but infectious cases during the many years that they are under treatment may continue to infect the younger generation, unless they be effectively isolated.

In the Asansol area a Central Leprosy Board was formed in 1932, and later twelve divisional branches were formed scattered over an area about 250 square miles. Attempts are being made to isolate infectious cases outside the villages, one small village segregation camp having been opened in 1932, and another in 1934. In order to help to finance the work of the Asansol Leprosy Board, a Leper Day was organised on which, chiefly by the sale of flags, a sum of over Rs. 6,000 was raised.

The above results are reassuring to the Governing Body after ten years' work but the most gratifying feature of the provincial reports is the reports of returns from hospitals and clinics about the patients treated. Such remarks as patients discharged "cured", "non-infectious", "disease arrested," "apparently cured", "decidedly improved," "complete disappearance" "symptom free" are now becoming quite common and when it is remembered that thousands of lepers are now under proper treatment and that one "cured" or "improved" case brings within the purview of the treatment centres more than a hundred lepers, the achievements of the past ten years can be better appreciated".

The Countess of Dufferin's Fund and Women's Medical Service.

211. The main source of income of this Fund is the interest on its investments which amounted to Rs. 7.18 lakhs (cost price) on the 1st January, 1934. The Government of India grant was continued at the reduced rate of Rs. 3,44,300.

As usual, grants were given to provincial Dufferin branches and to various hospitals and other institutions. Of the scholarships, 18 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 cadre of the Women's Medical Service consists of 41 officers excluding 8 temporary members and a training reserve of 11 officers.

Dr. Ruth Young remained on a study tour in China, America and Canada for six months as a guest of the Rockefeller Foundation of U. S. A., America.

Lady Minto's Indian Nursing Association.

212. The income of this Association is made up of an annual Government subsidy of Rs. 32,500, of interest on invested funds, Rs. 25,966 donations fees, subscriptions, etc. Rs. 1,47,846.

The nursing staff is composed of highly qualified European nursing sisters possessing maternity qualifications. They are recruited, under a 5 or 3 years agreement, for the most part in the United Kingdom by the selection committee of the home branch.

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 Goergina 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 2,967 cases, including 1,437 medical, 1,066 surgical, 281 infectious, 7 mental, 12 massage and 164 maternity cases.

The Bombay Presidency Baby and Health Week Association.

213. This Association with a relatively small income of Rs. 13,545, including a Government grant of Rs. 4,962, continued its health propaganda activities by issuing on loan cinema films or lantern slides, by arranging health lectures, demonstrations and exhibitions and by distributing leaflets, posters, etc.; but the most notable feature of this year's activities was the incorporation of food and vitamins section in the health and child welfare exhibitions organised by this Association. A set of 36 magic lantern slides on food and health with key lectures was prepared. An experiment to improve the diet has been carried out at Matunga, Bombay, with the object of keeping the food cost per month per person at about Rs. 4 and to introduce nutritious but cheap food, such as dried skim milk, soya beans, ricepolishings etc., for balancing the defects in the present day diet of the poor and to observe their effects on the growth and health of children. The results show that the growth rate has been stimulated by nearly 6 per cent. in the case of some children and 3 per cent. in others. A pamphlet giving a general idea of balanced diets and the modifications that might be made in them so as to suit one's purse and taste was issued. A study of the height and weight of nearly 1,000 children in primary schools in Bombay city was also made to examine the state of nutrition among them. It was found that their growth was about 22 per cent. below the Indian standard and 12 per cent. below that of the orphans in the Byramjee Jeejeebhoy home of the Society for the promotion of children in Western India.

With a special grant of Rs. 3,000 from the Government of Bombay for rural health work, the cinema unit of the Association worked mainly for village propaganda in close cooperation with rural uplift district and *taluka* committees. A set of 31 new models was prepared specially for rural uplift work and included those on infant welfare and on cholera, guineaworm, smallpox and other common diseases in rural areas.

SECTION XII.

MISCELLANEOUS.

The New Constitution.

214. In view of the approach of the New Constitution it may be useful to review the future position of the Central Government *vis-a-vis* the autonomous provincial Governments in regard to public health. The Government of India Bill, published in February 1935 and since passed into law, gives three lists of subjects for legislation: List I is a Federal Legislative List, List II a Provincial Legislative List, and List III a Concurrent Legislative List. The Federal Legislature alone has power to make laws with respect to any matters in the Federal Legislative List. These include the health of cantonments; central institutes for medical and public health research and technical training in these subjects; the census; emigration and immigration and presumably supervision over the health of emigrants and immigrants as well as the health conditions under which pilgrims proceed to places beyond India; port quarantine, seamen's and marine hospitals and hospitals connected with port quarantine; federal and minor railways in respect of the safety of passengers and the general carriage of passengers in the latter; the declaration and delimitation of major ports and the constitution and powers of Port Authorities therein; aircraft and air navigation and the regulation and organisation of air traffic and of aerodromes in regard to health and quarantine; the carriage of passengers and goods both by sea and by air; the regulation of conditions of labour and safety in mines and oil fields; and migration within India from or into a Governor's province or a Chief Commissioner's province.

The Provincial Legislative List includes health conditions in prisons and allied institutions; local government in relation to health, including sanitation, hospitalisation and registration of births and deaths; pilgrimages within India; water supplies; the control of food and drugs, subject to certain restrictions mentioned later on in regard to the latter.

The Concurrent List gives subjects in regard to which both the Federal Legislature and a Provincial Legislature have power to make laws. The list is in two parts. Part I includes the medical and health aspects of such questions as marriage; the care of infants, minors and the mentally deficient; poisons and dangerous drugs. In Part II of the list are included various important subjects from the point of view of public health, such as factories; the welfare of labour; shipping and navigation; the carriage of passengers and goods on inland waterways; and notably, the prevention of the extension from one unit to another of infectious and contagious diseases. The power of calling for statistics on any subject in this part of the list is also of importance. A clear distinction exists between Parts I and II of this list. In regard to subjects in Part I, the federal entry is in effect confined to legislation, since the executive authority lies with the provinces. Central legislation, however, on subjects in Part II may authorise the giving of directions to a province by the Central Government as to the carrying out of such legislation, and if so, the Central Executive authority will then extend to the giving of such directions to the Province.

A section of the Act which may be of importance in future years is Section 135 which permits the establishment of Inter-provincial Councils, with such duties as investigation and discussion of subjects in which some or all provinces or the federation and one or more provinces have a common interest. The order establishing such a Council may make provision for representatives of Indian States to participate in its work.

It will thus be seen that a considerable measure of control is given to the Federal Government in regard to medical and public health matters which affect the country as a whole or certain classes of the population requiring special treatment. It is desirable and indeed necessary that in a Federation the Central Government should retain a considerable measure of general control over health conditions in the component parts of its territory, while leaving local Governments free of interference in matters which they are best qualified, through local knowledge and sentiment, to develop. Only by mutual assistance and goodwill between the Federal and local Governments can the desired objective be achieved in the establishment of a national health organisation built up with the assent of the people.

Food and Drugs.

215. The adulteration of foods will be a provincial subject under the New Constitution, whereas the control of poisons and dangerous drugs, excluding opium which is federal, come under the Concurrent List, other drugs being controlled by provincial Governments. There will therefore be power vested in the Central Government to control by an all-India standard, the use and abuse of poisons and dangerous drugs, but it should be emphasised that there is great need for uniform standards for many of the food-stuffs consumed in India. Not only is it desirable from the public health point of view that the provinces should adopt uniform standards for foodstuffs, but, if standards vary as between the provinces, there must inevitably be interference with commerce and with the transport of food materials from place to place. It is to be hoped that provincial Governments will realise this and that the various parts of India will reach an agreement on common food standards for the whole of the country. For example, with a substance like *ghee*, it is very desirable that an all-India standard be prescribed so that *ghee* which is frequently transported from province to province, may not be a different substance legally in the various parts of India. The same argument applies with force to milk and other milk products. In regard to the control of food and drugs, practice varies in the different provinces. In some the Acts apply both to food and drugs, in others there is separate legislation dealing with each. Under most Acts Public Analysts have been appointed and laboratories for examination and analysis established, but up to date the control of food adulteration is highly defective in most provinces, the legislation in many places being to all intents and purposes a dead letter. It is to be hoped that, when a Central Board of Health is established, the question of the control of food and drugs throughout India will be one of the first subjects to be taken up. In regard to drugs, the report of the Drugs Enquiry Committee published in 1931 has proposed a detailed policy which, if followed out by the Central and Local Governments, should result in a satisfactory measure of control. A similar policy for foodstuffs is urgently required. In regard to certain therapeutic substances, the League of Nations Permanent Commission on Biological Standardisation has been at work and has prescribed 26 international standards for a series of products, the assay of which can only be effected by biological methods. It is desirable that the same standards be adopted in India and Government has under consideration the maintenance of these biological standards at Central laboratories for the use of manufacturing and other concerns.

Central Malaria Organization.

216. Malaria is the disease in India which causes the greatest mortality, morbidity and economic loss. The Indian Research Fund Association, an

organization financed almost entirely by the Government of India, has established the Malaria Survey of India whose functions are :—to collect information on malaria ; to advise Government on all aspects of the disease in India ; to initiate enquiries for the Central Government and to assist local Governments in carrying out investigations ; to undertake systematic research in malaria, including clinical research into treatment ; to train officers in malaria work ; to publish the results of work done and to carry out *anti-malaria* propaganda. Altogether over 15 lakhs of rupees have hitherto been spent by the I. R. F. A. on this organization. During the nine years of its life the Malaria Survey of India has carried out invaluable work in all the directions indicated above and the time has come when its re-organization on a permanent basis should be considered. Many of the provinces now have their own Malaria Bureaux, but the Government of India has none. Since the primary function of the I. R. F. A. is to carry out research work, it is desirable that those activities of the Malaria Survey, not directly connected with research, should be taken over by the Central Government as its Malaria Bureau and placed on a permanent footing. Research work would then be carried out in close association with such a permanent Bureau but continue to be financed by the I. R. F. A. The Government of India would in this way have at its disposal a valuable organization to advise on and to carry out *anti-malarial* measures in the centrally administered areas and to assist provinces, while the I. R. F. A. would be free to concentrate upon research work with the help of the staff of the Central Bureau.

Aerial Navigation and Yellow Fever.

217. For many years the threat of the introduction of yellow fever into India lay in the danger of the arrival of infected persons or mosquitoes by ships. Recently, however, as a result of the establishment of rapid aerial communication between Africa and India, the danger has become acute and the main threat to India lies now in the introduction of infection, by persons or mosquitoes, by way of air traffic. Africa, the main endemic home of yellow fever, is now only a few days distant in time from India, and an infected person embarking on a plane in Africa could arrive in India in the infective stage of the disease. When the International Aerial Navigation Convention, 1933, was drawn up, the possibilities of infection in Africa were only visualised in the endemic home of yellow fever in the western part of the tropical belt of that continent. Since then the existence of 'silent' areas has been discovered in which, by mouse protection tests, it has been demonstrated that yellow fever has existed within the life time of the present generation. The demonstration of these areas has widely extended the territory in Africa in which potential sources of infection exist and, since the International Convention does not recognise such areas as infected, inadequate precautions exist in these areas for the prevention of the spread of infection from them. At the Conference of Medical Research Workers held this year the following resolution was passed :—

“ In light of the recent developments in connection with yellow fever in Africa including the occurrence of suspected cases of the disease in areas where positive mouse-protection tests had been obtained although no clinical cases had previously been recognised, this Conference views with concern the opinion expressed by the Yellow Fever Commission of the Office International at its May 1934 session that the establishment of *anti-amaryl* aerodromes and the application of the other requirements of Section II of the Aerial Sanitary Convention are not obligatory in regions where the only information available is that of positive mouse-protection tests.

“ In the absence of exact knowledge of the epidemiological significance of the so-called “ silent areas ” and the potentialities which these areas may possess for the

dissemination of yellow fever, this Conference considers that the approval given by the Yellow Fever Commission of the Office International to the exemption of such areas from the application of the provisions of Article 38, Chapter II of the Aerial Sanitary Convention entails a weakening of the chain of preventive measures. This Conference further expresses the opinion that such areas should be considered as definite yellow fever areas for the purpose of the application of the provisions of the Convention and that the full requirements of the Aerial Sanitary Convention (Chapter II, Section II) should be made immediately applicable to them.

“This Conference is of opinion that the Government of India should take drastic precautions against air traffic coming from the “silent area” where the administrative authorities of these areas have not established *anti-amaryl aerodromes*.”

Until such time as the degree and extent of infection in such “silent areas” are ascertained and the limit of these areas demarcated, it is only prudent for India to regard them as potential sources of infection and to take steps accordingly.

Were yellow fever introduced into India, the disease would be so appalling that it might well cripple the country for a generation. All the necessary factors for the rapid spread of the disease, if the virus be introduced, are present, and it is necessary that we should realise the risk and be prepared. Precautionary measures consist in freeing our cities, and particularly our seaboard towns, of the *stegomyia* mosquito and in establishing adequate quarantine facilities for isolation of suspected cases and their contacts in mosquito-proof buildings at our airport of entry in Karachi.

Nutrition.

218. Whatever may be the solution of the population problem in India, no one will deny that our large annual increase of population requires that attention should be directed, to a greater extent than has hitherto been the case, to the important subject of nutrition. As has been mentioned in the introduction to this report, the whole question bristles with difficulties, the principal one being the lack of accurate data on food production. A great deal of research has been carried out in the Nutrition Research Laboratories of the I. R. F. A. at Coonoor and the results of this research require to be made known to the public. Over and above this there is need for an investigation into the state of nutrition and dietary habits of the people, on which our information is lamentably deficient. Only after ascertaining the facts will it be possible to draw up a sound scheme for the improvement of nutrition in the country. Such a survey cannot be carried out by the Central Government alone. It requires the active co-operation of all units, and it seems desirable that a beginning should be made by appointing, on the staff of the Directors of Public Health in each province, an officer who might be trained as a nutrition expert to carry out provincial surveys and to act as general nutrition adviser in his province.

Professor A. L. Bowley and Mr. D. H. Robertson in their report to the Government of India on “A scheme for an economic census of India with special reference to a census of production and reorganization of statistics” have recognised the inseparable connection between health and economic questions and the desirability of including information regarding health matters within the scope of the surveys they have proposed.

One of the greatest deficiencies in the diet of the peoples of India is the fat-soluble vitamin A. New cheap sources of this important vitamin are urgently needed and research on this subject should be prosecuted with vigour.

Rural Hygiene.

219. Sanitary improvements in rural areas, where the vast majority of the population of India live, is one of the outstanding needs of the country. In these areas, educationally, socially and materially backward as the people are compared with urban areas, general sanitation is still in a primitive condition. There are few protected water supplies or efficient arrangements for conservancy. There is much soil pollution, fly breeding is intense in most, malaria is rampant through great tracts, and epidemics find a favourable home and take a heavy toll of life annually. Medical relief for the most part is grossly inadequate, and maternity and child welfare works are almost completely lacking. It is perhaps natural that funds available for environmental hygiene have hitherto been spent mainly in the towns, but there is great need for improvement of sanitation in the villages and the claims of the rural dwellers should not continue to be neglected.

It is true that a beginning has been made in various areas. In Hlegu in Burma, the first rural health unit in India was established in 1929 in co-operation with the Rockefeller Foundation. Such units are of great value both as experimental stations for trying out schemes of village improvement, and as demonstration and educational centres. Every province in India should have such a station and the ideal should be to develop one in each district or division. There is a movement going on in India now for rural uplift and improvement. The establishment of rural health units should be an integral part of this movement. A good deal of preparatory work has already been done. Health instruction is being given in schools, but more is required in this direction. Educational propaganda is being fostered, but it requires to be based on a definite policy. The sections of District Board Acts dealing with health subjects are for the most part permissive and there is need for mandatory injunctions in regard to the more important subjects. Where powers are given, responsibility should also be accepted. Public health staff in rural areas is notably deficient and, in some provinces, heavily worked civil surgeons are still responsible, on paper, for the health of their districts. There are insufficient sanitary inspectors in many areas and health visitors, probably the most important unit of the lot, are almost entirely absent in rural areas.

Since the close of the year the Government of India have given grants to provinces for rural reconstruction approximating over 90 lakhs and have specified sanitary measures, such as *anti-malarial* schemes, village water supplies and village sanitation, among the principal subjects, to which the funds should be devoted. It is to be hoped that these substantial grants will accelerate the progress of rural sanitation and will assist and stimulate provinces to draw up a definite policy for effecting improvement in the health conditions of life of the Indian villager.

The Health Committee of the League of Nations have recently focussed attention on rural hygiene, and proposals have been made for holding a conference on the subject in the Far East. This should have an important effect in stimulating interest in the subject in this country, particularly if Governments sent strong delegations to attend it. The experience gained at such a conference, where the methods of rural hygiene adopted in other countries having problems similar to those of India will be discussed, should be invaluable.

Conclusion.

220. In the last two reports reference has been made to the effects of retrenchment on public health budgets throughout the country. The result

of such retrenchments, necessitated no doubt by financial stringency, on the activities of Public Health Departments has been serious. There are signs, however of financial improvement and it is to be hoped that with such improvement there will be a resumption of that development of public health activities which has been a feature since the introduction of the Reforms.

In Table XII (i) below are set out the figures of expenditure by provincial Public Health Departments for the years immediately preceding and following the financial crisis. The only province showing an increase is the N.-W. F. Province and here the circumstances are unique in that this area was formed into a Governor's province in 1932. The reductions of expenditure on public health in other provinces must have seriously curtailed the activities of the Public Health Departments.

TABLE XII (i).

	1930-31.	1932-33.	Per cent. decrease —or increase. +.
	Rs.	Rs.	
Total	1,78,07,763	1,39,40,252	—22
N.-W. F. P.	94,603	1,21,106	+28
Punjab	19,48,116	12,12,483	—38
U. P.	23,49,781	18,65,285	—20
B. & O.	11,45,527	4,53,113	—60
Bengal	37,27,339	36,84,112	—1
C. P.	5,44,000	3,57,000	—34
Bombay	26,65,838	23,82,237	—11
Madras	34,23,416	22,69,387	—34
Assam	7,61,091	6,06,719	—20
Burma	11,48,052	9,88,810	—14

Table XII (ii) below shows the number of districts in each province employing full time medical officers of health and the number without such officers.

TABLE XII (ii).

	No. of districts.	Those employing M. O. Hs.	Number without M. O. Hs.
N.-W. F. P.	5	..	5
Punjab	29	28	1
U. P.	48	30	18
B. & O.	21	12	9
Bengal	26	26	..
C. P.	19	..	19
Bombay	28	4	24
Madras	25	25	..
Coorg	1	..	1
Assam	13	..	13
Burma	33	3	30
Ajmer-Merwara	1	..	1

It is evident that the development of district health services is very backward in the Central Provinces, Bombay, the N.-W. F. Province and Burma. In the last mentioned province, however, a strong cadre of epidemic sub-assistant surgeons, normally employed in districts, makes the position less serious than it appears in the table.

Now that the Niemeyer Committee appointed by His Majesty's Government to review the budgetary positions of the Government of India and provincial Governments on the matters referred to in Sections 138 (1) and (2), 140 (2) and 142 of the Government of India Act, 1935, has made recommendations on the percentage contributions, which the Government of India under the Federal Constitution should give to enable local Governments to meet their increased responsibilities, it is hoped that the claims of the Public Health Departments for development and expansion will not be overlooked. The Committee have stated on pages 3-4 of their report :

“ Expenditure in the Provinces could obviously be increased, with advantage, on many heads. This is a question of degree and opportunity. Some expansion in fact took place even with existing provincial resources, especially in the years before the slump when many provinces were able, for instance, to increase substantially their expenditure on education, agriculture, medical and public health. And some expansion may now be anticipated from the recovery of provincial revenues, not all of which are or need be static. Nevertheless, the allocation at an early date of a share in Taxes and Income under Section 138 of the Government of India Act constitutes for many provinces the main hope for future expansion.”

There are signs on all hands that the “sanitary idea” is beginning to penetrate the mind of India. The intensive public health propoganda carried out in most provinces during the last ten or twelve years is beginning to bear fruit : interest is increasing in such matters as rural reconstruction, nutrition, child welfare and the prevention of epidemics. This is the most welcome feature in the present situation. Public health cannot proceed much in advance of education, but it must be remembered that the best form of public education is the efficient administration of the public health services. The time is ripe for a big step forward and it appears that public opinion is now ready to accept more specific and more mandatory public health legislation. In 1866 Sir John Simon, the first Chief Medical Officer of the English Local Government Board, wrote : “The grammar of sanitary legislation, with few exceptions, has not yet acquired the imperative mood.” This is the present position in India and there is little doubt but that much more of the ‘imperative’ could now be introduced into our various Public Health Acts. For example, compulsory vaccination is capable of extension to the greater part of our rural areas.

In the words of Disraeli : “Power has only one duty, to secure the social welfare of the people.”

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Offg. Public Health Commissioner with the
Government of India.

SIMLA ;
 The 10th July, 1936.

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Appendix I

relating to

Section I.

TABLE A.—MAXIMUM, MINIMUM AND MEAN TEMPERATURE AND DEPARTURE FROM THE AVERAGE OF THE MEAN TEMPERATURE AT 32 STATIONS, AND RAINFALL WITH ITS DEPARTURE AT 33 STATIONS IN INDIA DURING 1934.

Station.	January.						February.						March.					
	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.
Rangoon . . .	89·8	67·6	78·7	+1·9	...	-0·21	91·1	67·7	79·4	+0·4	1·11	+0·89	95·1	71·1	83·1	-0·5	...	-0·32
Akyab . . .	80·8	57·6	69·2	-0·9	...	-0·06	82·6	61·0	71·8	-0·9	...	-0·15	88·1	67·7	77·9	-0·6	...	-0·49
Sibsagar . . .	73·4	51·0	62·2	+2·3	1·50	+0·21	74·0	54·1	64·1	+1·1	2·76	+0·75	83·1	59·4	71·3	+2·1	0·92	-3·86
Silchar . . .	77·7	50·8	64·3	-0·9	0·19	-0·62	80·6	56·0	68·3	+0·2	4·74	+2·62	87·0	62·7	74·9	+0·3	3·57	-4·34
Chittagong . . .	80·3	53·7	67·0	+0·2	0·12	-0·16	82·3	59·2	70·7	+0·3	0·49	-0·54	88·0	67·7	77·9	+0·8	1·00	-1·56
Narayanganj . . .	78·3	55·0	66·7	+0·1	0·40	+0·10	81·8	59·3	70·5	+0·3	2·89	+1·49	93·1	68·5	80·3	+2·1	...	-2·69
Calcutta . . .	77·6	55·5	66·5	...	...	-0·34	83·1	61·6	72·3	+1·1	0·08	-1·02	94·4	70·5	82·5	+2·3	0·16	-1·28
Cuttack . . .	83·9	56·5	70·2	-1·5	...	-0·27	89·7	61·3	75·5	-1·5	0·44	-0·32	98·4	70·4	84·4	-0·1	0·06	-1·05
Hazaribagh . . .	71·6	48·2	59·9	-2·1	1·91	+1·19	77·4	52·9	65·1	-0·7	0·26	-0·87	87·2	62·2	74·7	-1·0	0·18	-0·86
Patna . . .	72·9	51·3	62·1	+0·3	1·37	+0·84	77·5	56·7	67·1	+1·3	0·09	-0·62	89·7	64·5	77·1	+0·4	0·19	-0·28
Allahabad . . .	75·8	47·8	61·8	+0·6	0·86	+0·10	82·0	53·0	67·5	+1·8	...	-0·58	90·0	62·3	76·1	-0·7	0·83	+0·52
Lucknow . . .	73·4	46·6	60·0	-0·3	1·71	+0·94	80·5	52·9	66·7	+2·0	...	-0·65	89·0	60·8	74·9	-0·5	0·24	+0·49
Jhansi . . .	75·5	47·3	61·4	-2·1	0·28	-0·31	84·5	52·7	68·6	+0·7	...	-0·45	89·2	61·6	75·4	-3·5	0·99	+0·70
Agra . . .	70·1	42·1	56·1	-2·9	0·63	+0·09	81·0	47·4	64·2	+1·5	...	-0·48	85·5	55·0	70·3	-2·7	0·83	+0·48
Meerut(*) . . .	...	...	...	...	1·23	-0·05	...	...	...	...	...	-0·88	...	...	...	...	1·69	+1·07
Delhi . . .	66·9	43·2	55·1	...	1·30	+0·26	78·1	50·7	64·4	...	...	-0·76	88·2	57·5	70·3	...	2·40	+1·88
Lahore . . .	64·4	37·5	50·9	-3·6	0·53	-0·52	77·7	48·3	63·0	+4·9	0·16	-0·78	80·4	54·5	67·5	-0·4	1·13	+0·27
Multan . . .	66·0	38·5	52·3	-4·6	0·01	-0·41	81·8	51·3	66·5	+5·6	...	-0·36	83·7	57·7	70·7	-1·3	0·43	...
Peshawar . . .	61·1	35·3	48·2	-3·9	0·30	-1·26	75·7	47·6	61·7	+6·7	0·15	-1·20	74·5	52·1	63·3	...	5·57	+3·32
Manora (Karachi)	72·0	52·2	62·1	-4·5	...	-0·52	77·0	61·6	69·3	+0·3	...	-0·39	80·9	67·8	74·3	-0·9	0·08	-0·25
Ajmer . . .	69·4	41·9	55·7	-4·0	0·17	-0·19	83·1	49·8	66·5	+2·9	...	-0·25	85·5	58·8	72·1	-2·1	0·12	-0·07
Deesa . . .	81·1	45·9	63·5	-3·9	...	-0·11	94·1	53·7	73·9	+3·5	...	-0·16	96·2	61·1	78·7	-0·8	0·16	+0·08
Indore . . .	76·7	47·0	61·9	-3·0	0·20	-0·08	86·6	52·3	69·5	+1·8	...	-0·18	90·9	59·2	75·1	-1·3	...	-0·06
Saugor . . .	74·4	50·7	62·5	-2·1	0·51	-0·03	83·8	57·3	70·5	+2·5	...	-0·44	88·8	64·2	76·5	-1·3	0·33	-0·02
Jubbulpore . . .	76·6	46·3	61·5	...	0·21	-0·59	84·6	47·6	66·1	...	...	-0·82	91·0	57·0	74·0	...	0·75	+0·18
Nagpur . . .	81·0	52·3	66·7	-2·9	0·03	-0·39	91·7	55·8	73·7	-0·3	...	-0·60	97·8	65·5	81·7	-0·7	...	-0·52
Bombay . . .	81·9	64·1	73·0	-1·8	...	-0·10	85·6	68·0	76·8	+1·7	...	-0·08	85·6	71·8	78·7	...	0·04	-0·03
Belgaum . . .	83·5	58·0	70·7	+0·1	0·13	...	89·4	59·7	74·5	+0·7	...	-0·05	93·5	61·9	77·7	-1·0	...	-0·27
Bangalore . . .	80·5	60·2	70·3	+1·2	0·29	+0·03	87·3	58·9	73·1	-0·1	...	-0·17	91·2	64·5	77·9	-0·1	0·30	-0·20
Madras . . .	82·4	70·3	76·3	+0·1	2·05	+0·66	85·2	66·5	75·9	-1·7	...	-0·32	88·5	71·5	80·0	-0·6	...	-0·19
Bellary . . .	85·7	63·8	74·7	-0·2	...	-0·11	92·1	65·0	78·5	-1·5	...	-0·16	97·3	72·3	84·8	-1·5	...	-0·20
Darjeeling . . .	45·6	33·5	39·5	-1·7	0·31	-0·24	48·9	36·9	42·9	+0·4	2·76	+1·66	56·0	43·0	49·5	+0·1	0·12	-1·72
Mussooree . . .	44·5	32·3	38·7	-4·1	2·55	...	55·7	42·7	49·2	+5·3	0·20	...	58·8	43·7	51·3	-1·6	3·38	...

(*) Reports only rainfall.

TABLE A.—MAXIMUM, MINIMUM AND MEAN TEMPERATURE AND DEPARTURE FROM THE AVERAGE OF THE MEAN TEMPERATURE AT 32 STATIONS, AND RAINFALL WITH ITS DEPARTURE AT 33 STATIONS IN INDIA DURING 1934—*contd.*

Station.	April.						May.						June.					
	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.
Rangoon . . .	93.4	74.8	84.1	-2.9	18.97	+17.34	94.8	77.1	85.9	+1.5	4.73	-7.25	87.2	75.8	81.5	+0.1	14.68	-3.36
Akyab . . .	89.5	75.9	82.7	-0.6	0.58	-1.49	91.0	78.0	84.5	+0.4	5.83	-8.12	84.9	76.6	80.7	-1.0	33.55	-13.39
Sibsagar . . .	82.1	67.0	74.5	+1.0	15.33	+5.22	83.6	70.5	77.1	-1.4	11.57	-0.32	85.0	74.1	79.5	-2.9	21.78	+7.57
Silchar . . .	87.2	69.1	78.1	-0.1	26.73	+12.40	86.3	70.0	78.1	-2.5	29.71	+14.12	86.7	74.5	80.6	-2.1	32.77	+11.09
Chittagong . . .	88.5	74.1	81.3	+0.5	2.78	-2.69	89.2	75.3	82.3	+0.1	8.76	-0.76	86.2	76.1	81.1	-0.7	25.23	+4.49
Narayanganj . . .	93.1	74.9	84.0	+1.0	3.60	-1.88	91.3	75.1	83.2	-0.3	9.25	-0.16	89.0	77.3	83.1	-0.3	22.63	+9.68
Calcutta . . .	96.4	77.7	87.1	+1.5	1.95	+0.06	96.9	79.6	88.3	+2.1	2.55	-3.20	92.1	79.5	85.8	+0.7	7.69	-4.21
Cuttack . . .	102.7	78.7	90.7	+1.2	...	-1.15	106.4	81.3	93.9	+3.3	0.74	-3.21	94.9	79.0	86.9	-0.5	10.36	+0.28
Hazaribagh . . .	98.4	70.6	84.5	-0.5	0.23	-0.26	103.7	76.1	89.9	+2.3	0.10	-2.21	94.6	75.1	84.9	+0.3	5.51	-3.62
Patna . . .	100.9	74.4	87.7	+1.5	...	-0.30	103.5	79.5	91.5	+2.8	0.34	-1.33	96.5	79.6	88.1	+0.3	3.32	-4.80
Allahabad . . .	103.5	72.1	87.8	+0.4	...	-0.15	109.1	80.1	94.6	+1.5	...	-0.34	103.1	82.6	92.9	+0.5	3.05	-1.91
Lucknow . . .	103.2	70.8	87.0	+0.9	...	-0.26	108.2	78.6	93.4	+2.1	...	-1.01	102.0	80.7	91.3	-0.1	3.69	-0.78
Jhansi . . .	102.7	72.1	87.4	-2.1	...	-0.15	108.0	79.5	93.7	-2.2	...	-0.38	102.3	82.2	92.3	-1.9	7.48	+3.18
Agra . . .	100.8	65.6	83.2	-1.5	...	-0.24	106.1	75.9	91.0	-1.3	...	-0.47	101.7	81.1	91.4	-3.1	4.14	+1.79
Meerut(*) . . .	...	...	...	...	...	-0.43	...	...	...	...	0.06	-0.59	...	...	...	...	3.15	+0.02
Delhi . . .	97.8	67.8	82.8	...	...	-0.39	102.9	77.0	89.9	...	0.14	-0.44	100.8	81.2	91.0	...	2.51	-0.48
Lahore . . .	95.2	64.4	79.8	+0.9	0.05	-0.49	101.4	72.2	86.8	-1.1	0.10	-0.60	105.5	80.1	92.8	+0.3	1.12	-0.56
Multan . . .	99.1	69.9	84.5	+1.6	0.20	-0.07	104.6	76.1	90.3	-2.1	0.18	-0.17	109.4	84.0	96.7	+0.2	2.31	+1.69
Peshawar . . .	86.9	61.5	74.2	+1.5	1.64	-0.21	92.0	68.8	80.4	-3.1	0.81	-0.01	104.4	79.8	92.1	+1.1	0.01	-0.35
Manora (Karachi) . . .	86.8	74.9	80.9	+1.0	...	-0.17	89.1	79.6	84.3	+0.6	...	-0.07	89.9	81.4	85.7	-0.7	1.28	+0.42
Ajmer . . .	97.4	68.4	82.9	-2.0	0.19	+0.02	101.3	79.2	90.3	-1.5	0.08	-0.52	99.6	80.4	90.0	-1.1	5.18	+2.77
Deesa . . .	107.2	70.8	89.0	+1.5	...	-0.03	108.7	76.2	92.5	+0.3	...	-0.43	102.1	80.9	91.5	+0.1	5.52	+3.34
Indore . . .	100.1	69.6	84.9	...	0.01	-0.13	102.5	76.3	89.4	-0.1	...	-0.58	97.3	76.8	87.1	+1.6	10.44	+4.74
Saugor . . .	100.1	74.1	87.1	+0.4	...	-0.15	104.3	78.9	91.6	-0.3	...	-0.50	98.8	77.7	88.3	...	10.91	+4.44
Jubbulpore . . .	102.1	67.2	84.7	...	...	-0.25	106.5	74.9	90.7	...	...	-0.53	98.7	78.6	88.7	...	16.50	+9.18
Nagpur . . .	105.9	74.9	90.4	+0.1	1.23	+0.67	109.8	82.3	96.1	+0.9	...	-0.83	99.4	79.0	89.2	+0.3	7.18	-1.78
Bombay . . .	90.1	77.4	83.7	+1.7	...	-0.05	91.6	79.5	85.5	+0.5	...	-0.84	88.9	78.1	83.5	+0.1	28.45	+10.14
Belgaum . . .	95.6	67.2	81.4	-0.1	2.01	+0.41	95.8	67.8	81.8	+1.1	0.59	-1.87	82.4	68.7	75.5	+0.7	9.82	+1.68
Bangalore . . .	93.9	69.7	81.8	+0.3	3.56	+2.23	93.5	70.2	81.9	+1.4	2.53	-1.83	85.9	67.7	76.8	+0.9	3.35	+0.46
Madras . . .	92.1	77.6	84.9	+0.1	0.74	+0.21	97.8	81.7	89.7	+0.3	...	-1.07	97.4	80.3	88.9	-0.6	1.76	-0.13
Bellary . . .	101.2	77.1	89.1	-1.3	0.89	+0.13	103.2	79.4	91.3	+1.3	0.52	-1.44	93.5	76.7	85.1	-0.3	1.70	-0.17
Darjeeling . . .	63.0	50.1	56.5	+1.1	2.61	-1.24	62.0	51.8	56.9	-1.5	11.41	+2.71	64.5	55.3	59.9	-1.5	22.33	-1.88
Mussooree . . .	71.0	54.7	62.9	+0.6	0.95	...	75.8	57.0	66.4	-1.6	1.53	...	73.7	60.8	67.3	-1.9	12.49	...

(*) Reports only rainfall.

TABLE A.—MAXIMUM, MINIMUM AND MEAN TEMPERATURE AND DEPARTURE FROM THE AVERAGE OF THE MEAN TEMPERATURE AT 32 STATIONS, AND RAINFALL WITH ITS DEPARTURE AT 33 STATIONS IN INDIA DURING 1934—contd.

Station.	July.						August.						September.					
	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.
Rangoon . . .	86.5	75.4	80.9	+0.4	21.54	+0.12	85.8	74.9	80.3	-0.1	18.22	-1.65	86.6	75.7	81.1	+0.2	13.48	-1.79
Akyab . . .	83.6	76.9	80.3	-0.5	37.57	-17.23	83.8	76.7	80.3	-0.5	29.23	-15.96	84.4	77.1	80.7	-1.1	32.92	+10.35
Sibsagar . . .	89.7	77.8	83.7	+0.3	21.11	+4.10	90.5	77.6	84.1	+0.9	15.99	-0.28	89.5	76.7	83.1	+1.2	14.28	+2.58
Silchar . . .	89.9	77.1	83.5	-0.1	26.97	+7.23	91.4	76.3	83.9	+0.7	20.30	+0.55	90.9	77.1	84.0	+1.0	15.50	+1.09
Chittagong . . .	85.8	76.5	81.1	-0.1	41.81	+19.41	87.2	77.2	82.2	+1.1	16.75	-2.55	88.3	77.7	83.0	+1.4	3.33	-8.60
Narayanganj . . .	88.8	79.0	83.9	+0.3	14.39	+1.41	89.0	78.9	83.9	+0.7	10.47	-2.27	90.5	79.8	85.1	+1.6	5.40	-4.23
Calcutta . . .	90.1	79.5	84.8	+1.1	8.91	-3.60	89.0	78.7	83.9	+0.7	14.10	+1.41	89.2	79.3	84.3	+1.1	12.42	+2.55
Cuttack . . .	89.5	78.4	83.9	-0.3	10.25	-1.46	88.2	77.5	82.9	-0.9	21.13	+7.47	89.5	77.9	83.7	-0.4	12.70	+3.13
Hazaribagh . . .	85.7	74.2	79.9	+0.3	15.08	+2.64	84.6	73.6	79.1	+0.5	13.08	-0.06	85.3	73.1	79.2	+0.7	7.19	-1.99
Patna . . .	91.7	80.5	86.1	+0.9	13.34	+1.40	89.9	80.7	85.3	+1.1	5.73	-7.82	90.5	80.4	85.5	+1.3	8.11	-0.22
Allahabad . . .	92.1	79.7	85.9	-0.4	7.08	-4.63	89.8	78.9	84.3	+0.1	8.39	-3.31	90.4	78.3	84.3	+0.1	8.06	+2.39
Lucknow . . .	91.9	79.5	85.7	-0.3	12.35	+0.90	90.8	78.2	84.5	-0.1	8.81	-2.08	92.0	77.0	84.5	+0.4	13.92	+6.85
Jhansi . . .	91.2	77.6	84.4	-1.5	5.85	-5.72	88.8	76.5	82.7	-0.7	21.87	+10.62	89.5	75.8	82.7	-1.3	13.88	+7.96
Agra . . .	93.7	79.5	86.6	-1.0	3.58	-5.54	88.3	77.8	83.1	-2.3	7.34	-0.81	91.6	74.9	83.3	-1.1	2.66	-1.39
Meerut (*) . . .	...	...	...	...	7.91	-1.18	...	...	...	...	14.38	+5.69	...	...	...	...	3.33	-2.74
Delhi . . .	94.3	80.4	87.3	...	13.13	+5.60	89.7	77.3	83.5	...	10.25	+2.83	95.4	75.8	85.6	...	0.05	-4.73
Lahore . . .	99.5	81.8	90.7	+0.9	3.75	-1.73	95.3	78.8	87.1	-0.8	4.44	-0.89	100.7	75.4	88.1	+2.9	0.03	-2.33
Multan . . .	103.6	83.7	93.7	-0.7	2.94	+0.92	103.7	83.5	93.6	+1.9	0.55	-1.43	103.3	...	...	...	...	-0.41
Peshawar . . .	103.1	82.3	92.7	+1.7	0.02	-1.22	96.5	78.8	87.7	-0.7	0.16	-2.08	97.2	72.7	84.9	+1.9	0.72	-0.09
Manora (Karachi) . . .	89.0	81.7	85.3	+0.6	6.49	+3.55	87.6	80.6	84.1	+2.1	0.23	-1.44	85.9	77.8	81.9	+0.7	...	-0.42
Ajmer . . .	90.0	77.7	83.9	-1.1	4.38	-2.08	86.1	75.3	80.7	-1.3	15.49	+8.74	88.4	74.0	81.2	-1.2	2.65	-0.02
Deesa . . .	92.0	77.2	84.6	-1.0	10.95	+1.95	88.1	76.2	82.1	-0.5	16.24	+7.62	93.0	73.0	83.0	-0.7	0.93	-2.61
Indore . . .	84.3	72.5	78.4	-0.7	9.37	-0.50	81.4	71.9	76.7	-0.3	21.21	+13.20	81.8	70.2	76.0	-1.7	14.95	+8.42
Saugor . . .	84.2	73.3	78.7	-1.3	17.51	+3.57	83.5	72.7	78.1	-0.1	29.06	+15.41	82.9	71.7	77.3	-1.7	24.52	+17.58
Jubbulpore . . .	85.2	75.0	80.1	...	12.78	-4.84	85.0	74.2	79.6	...	15.20	-1.66	84.4	73.9	79.1	...	20.80	+13.13
Nagpur . . .	87.1	74.7	80.9	-0.8	8.20	-5.64	85.6	73.7	79.7	-1.1	9.26	-2.38	85.5	73.1	79.3	-2.1	10.66	+2.41
Bombay . . .	85.6	77.0	81.3	+0.3	21.37	-2.89	84.0	76.2	80.1	-0.3	14.07	+0.27	86.1	76.2	81.1	+0.7	5.88	-4.62
Belgaum . . .	76.0	67.8	71.9	+0.3	18.91	+2.76	74.9	67.5	71.2	-0.1	11.02	+1.35	78.5	65.4	71.9	-0.5	1.67	-3.21
Bangalore . . .	83.7	66.9	75.3	+1.2	1.32	-2.86	81.9	66.6	74.3	+0.3	2.65	-2.73	86.3	66.3	76.3	+2.3	0.33	-6.65
Madras . . .	95.2	78.9	87.1	+0.1	2.07	-1.87	92.8	77.6	85.2	-0.3	7.17	+2.53	93.3	78.0	85.7	+1.0	2.00	-2.99
Bellary . . .	88.9	74.4	81.7	-1.4	4.43	+2.58	87.5	74.3	80.9	-1.5	0.30	-2.02	90.4	73.6	82.0	+0.2	0.19	-4.89
Darjeeling . . .	66.4	58.5	62.5	+0.1	22.69	-9.62	66.3	58.0	62.1	+0.1	24.32	-1.80	66.7	57.5	62.1	+1.5	11.59	-6.79
Mussooree . . .	67.9	60.7	64.3	-1.7	18.04	...	67.2	59.4	63.3	-1.1	30.13	...	68.0	58.4	63.2	+0.5	8.44	...

(*) Reports only rainfall.

TABLE A.—MAXIMUM, MINIMUM AND MEAN TEMPERATURE AND DEPARTURE FROM THE AVERAGE OF THE MEAN TEMPERATURE AT 32 STATIONS, AND RAINFALL WITH ITS DEPARTURE AT 33 STATIONS IN INDIA DURING 1934—concl'd.

Station.	October.						November.						December.					
	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.	Max.	Min.	Mean temp.	Dep.	Rain.	Dep.
Rangoon . . .	89.0	75.7	82.3	+0.7	7.32	+0.41	89.5	71.4	80.5	+0.3	1.12	-1.67	86.7	62.8	74.7	-2.5	0.10	-0.27
Akyab . . .	86.7	75.8	81.3	-0.5	21.20	+10.29	82.7	66.4	74.5	-3.3	7.94	+2.46	80.0	59.7	69.9	-2.1	0.02	-0.74
Sibsagar . . .	85.0	70.1	77.5	+0.2	5.69	+0.59	77.2	61.9	69.5	+0.9	1.59	+0.49	74.5	50.0	62.3	+1.3	0.04	-0.48
Silchar . . .	88.5	71.6	80.1	-0.4	6.36	-0.19	80.0	61.4	70.7	-3.5	7.11	+5.71	78.9	52.5	65.7	-1.5	0.13	-0.21
Chittagong . . .	88.3	73.2	80.7	+0.7	11.79	+4.91	82.0	63.3	72.7	-1.7	4.55	+2.68	79.9	56.3	68.1	+0.3	0.33	-0.37
Narayanganj . . .	89.3	75.3	82.3	+0.7	9.22	+4.15	82.7	65.8	74.3	-0.5	1.60	+0.62	79.7	58.4	69.1	+1.5	0.55	+0.36
Calcutta . . .	88.0	75.4	81.7	-0.7	5.36	+1.17	82.0	64.3	73.1	-0.3	0.86	+0.20	77.9	58.8	68.3	+1.9	0.31	+0.11
Cuttack . . .	89.7	73.4	81.5	-0.7	5.43	+0.23	85.4	62.9	74.1	-1.5	0.12	-1.41	83.3	59.3	71.3	+1.5	...	-0.28
Hazaribagh . . .	82.5	63.6	73.1	-2.2	1.88	-1.29	77.2	54.7	65.9	-1.8	0.17	-0.20	73.1	49.4	61.3	-0.1	...	-0.21
Patna . . .	88.4	72.3	80.3	-0.3	3.17	+0.63	81.2	60.1	70.7	-0.7	0.35	+0.07	76.4	55.1	65.7	+2.8	...	-0.09
Allahabad . . .	91.5	65.6	78.5	-0.7	0.09	-2.23	83.4	56.9	70.1	+0.8	0.20	-0.13	76.7	51.5	64.1	+2.4	0.10	-0.13
Lucknow . . .	93.4	63.9	78.7	-0.1	0.39	-0.79	85.1	54.5	69.8	+1.2	...	-0.19	77.5	50.5	64.0	+2.9	0.50	+0.22
Jhansi . . .	91.9	62.8	77.3	-3.9	...	-0.87	84.7	54.9	69.8	-2.2	...	-0.17	76.9	50.6	63.7	-1.0	0.60	+0.37
Agra . . .	91.3	56.0	73.7	-4.1	...	-0.76	82.1	48.6	65.3	-2.2	...	-0.12	75.5	47.7	61.6	+0.9	0.94	+0.67
Meerut (*) . . .	...	...	...	...	...	-0.56	...	...	...	...	-0.15	...	...	...	...	...	0.38	-0.03
Delhi . . .	93.0	62.3	77.7	...	...	-0.32	82.9	53.0	67.9	...	...	-0.11	73.5	48.3	60.9	...	0.41	+0.01
Lahore . . .	94.0	57.5	75.7	-1.1	...	-0.25	82.3	46.9	64.6	-0.5	...	-0.07	70.8	44.3	57.5	+1.2	0.26	-0.10
Multan . . .	98.0	63.9	80.9	+0.2	...	-0.05	86.1	53.6	69.9	+0.7	...	-0.07	74.1	49.7	61.9	+2.7	0.04	-0.18
Peshawar . . .	89.1	58.5	73.8	-0.3	...	-0.16	78.7	47.8	63.3	+0.5	0.05	-0.23	67.4	44.5	55.9	+2.4	0.39	-0.20
Manora (Karachi) . . .	86.5	72.5	79.5	-0.9	...	-0.01	84.9	68.8	76.9	+1.1	...	-0.04	79.8	63.0	71.4	+2.5	0.36	+0.22
Ajmer . . .	90.4	58.5	74.5	-3.8	...	-0.33	83.4	49.0	66.2	-2.1	...	-0.18	75.5	47.8	61.7	+0.6	0.51	+0.23
Deesa . . .	100.0	61.4	80.7	-1.5	...	-0.41	94.2	55.8	75.0	-0.1	...	-0.10	88.3	52.9	70.6	+1.5	...	-0.04
Indore . . .	87.7	60.3	74.0	-2.2	...	-1.15	81.6	53.9	67.7	-1.7	1.46	+1.05	79.4	51.2	65.3	+0.5	0.02	-0.19
Saugor . . .	86.2	64.6	75.4	-1.9	0.15	-0.87	79.9	58.8	69.3	-0.9	1.86	+1.40	75.8	54.5	65.1	+0.3	1.44	+1.00
Jubbulpore . . .	86.6	60.7	73.7	...	0.71	-1.10	81.4	52.8	67.1	...	0.63	+0.06	78.2	48.9	63.5	...	0.39	+0.10
Nagpur . . .	89.2	65.2	77.2	-2.3	0.59	-1.51	83.7	57.1	70.4	-2.4	1.31	+0.60	82.1	54.1	68.1	+0.1	...	-0.54
Bombay . . .	91.3	76.5	83.9	+1.9	0.21	-1.95	87.2	71.4	79.3	-1.5	3.23	+2.82	87.7	70.1	78.9	+1.5	...	-0.05
Belgaum . . .	85.7	66.5	76.1	+1.8	3.76	-0.91	81.5	58.6	70.1	-1.9	2.24	+0.50	81.4	57.2	69.3	-0.8	...	-0.37
Bangalore . . .	83.4	67.1	75.3	+1.6	9.15	+3.25	79.2	61.3	70.3	-0.7	1.06	-1.88	78.2	58.6	68.4	-0.3	0.20	-0.28
Madras . . .	88.3	75.4	81.9	-0.3	16.82	+5.10	84.8	71.0	77.9	-0.9	1.86	-12.39	82.4	68.3	75.3	-1.3	2.19	-3.62
Bellary . . .	91.9	72.7	82.3	+1.5	5.37	+1.47	85.6	64.5	75.1	-1.8	0.99	-1.20	83.8	61.2	72.5	-1.3	...	-0.11
Darjeeling . . .	61.3	51.0	56.1	+0.3	12.14	+7.60	51.8	42.2	47.0	-2.2	0.86	+0.08	48.5	37.5	43.0	-0.1	0.72	+0.48
Mussooree . . .	66.0	51.5	58.7	+0.6	...	...	...	46.0	...	...	...	...	52.1	37.8	44.9	-0.8	4.05	...

(*) Reports only rainfall.

TABLE B.—POPULATIONS (UNDER REGISTRATION) ACCORDING TO 1931 CENSUS COMPARED WITH ESTIMATED POPULATIONS ON 30TH JUNE, 1934.

	Rural.		Urban.		Total.		Male.		Female.	
	Census.	Estimated.	Census.	Estimated.	Census.	Estimated.	Census.	Estimated.	Census.	Estimated.
BRITISH INDIA	239,216,274	248,507,310	26,472,590	27,246,260	265,688,864	275,753,570	136,882,928	142,076,785	128,805,936	133,676,785
N.-W. F. P.	2,043,537	2,107,474	315,174	325,537	2,358,711	2,433,011	1,268,513	1,313,322	1,090,198	1,119,689
Punjab	20,337,938	21,410,961	3,122,329	3,272,447	23,460,267	24,683,408	12,798,121	13,443,644	10,662,146	11,239,764
Delhi	197,066	206,486	439,180	461,674	636,246	668,160	369,497	386,527	266,749	281,633
U. P.	44,665,155	46,648,250	3,743,608	3,911,147	48,408,763	50,559,397	25,445,006	26,566,487	22,963,757	23,992,910
B. & O.	36,265,937	37,606,976	1,411,639	1,443,053	37,677,576	39,050,029	18,794,138	19,473,035	18,883,438	19,576,994
Bengal	46,889,495	47,314,260	3,511,585	3,522,918	49,901,080	50,837,178	25,927,428	26,423,268	23,973,652	24,413,910
C. P.	13,844,061	14,491,967	1,663,662	1,745,740	15,507,723	16,237,707	7,761,818	8,114,787	7,745,905	8,122,920
Bombay	17,605,704	18,365,806	4,203,052	4,304,477	21,808,756	22,670,283	11,458,782	11,911,499	10,349,974	10,758,784
Madras	38,907,511	40,706,761	6,268,369	6,445,375	45,175,880	47,152,136	22,303,255	23,338,240	22,872,625	23,813,896
Coorg	153,500	154,598	9,827	9,589	163,327	164,187	90,575	90,924	72,752	73,263
Assam	7,733,479	7,995,445	194,474	202,160	7,927,953	8,197,605	4,187,085	4,321,158	3,740,868	3,876,447
Burma	10,692,798	11,103,725	1,409,492	1,421,931	12,102,290	12,525,656	6,182,629	6,389,721	5,919,661	6,135,935
Ajmer-Merwara	380,093	394,601	180,199	180,212	560,292	574,813	296,081	304,173	264,211	270,640

TABLE C.—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 .	38,931	37,009	463,040	455,751	10,608	10,498	780,689	783,032	476,157	485,182	842,448	845,330	280,880	287,263
1—5 years .	160,261	156,306	1,529,607	1,467,943	35,920	35,142	3,033,867	3,061,205	2,356,297	2,489,088	3,059,440	3,146,415	961,313	1,008,891
5—10 years .	186,739	152,180	1,765,273	1,525,727	41,180	34,908	3,389,346	2,923,983	2,738,391	2,519,539	3,614,833	3,206,893	1,043,510	1,007,612
10—15 years .	166,680	125,890	1,640,258	1,344,048	41,512	33,125	3,141,060	2,562,817	2,385,517	2,118,989	3,162,775	2,824,566	944,331	893,458
15—20 years .	115,625	99,184	1,256,046	1,036,572	41,537	30,583	2,405,063	2,104,721	1,620,465	1,680,462	2,315,167	2,579,833	714,735	750,183
20—30 years .	226,156	213,905	2,330,975	1,955,004	85,316	57,385	4,744,943	4,378,765	3,334,464	3,548,015	4,840,002	4,823,418	1,439,024	1,467,535
30—40 years .	180,595	152,291	1,750,790	1,370,321	62,885	37,073	3,845,516	3,433,712	2,812,098	2,837,962	3,913,554	3,132,721	1,129,573	1,103,643
40—50 years .	114,377	92,163	1,207,340	954,367	36,858	21,919	2,682,756	2,328,532	1,932,414	1,878,122	2,473,753	1,921,507	809,392	758,413
50—60 years .	68,759	52,908	794,488	604,846	18,601	12,375	1,543,227	1,403,464	1,108,394	1,140,296	1,320,292	1,127,418	468,726	464,600
60 years and over	55,198	37,853	705,828	525,185	12,111	8,624	1,000,020	1,012,648	708,838	879,339	881,004	805,805	323,303	381,323

	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 .	335,837	337,704	650,844	669,708	2,135	2,201	142,714	109,173	161,359	171,173	9,527	9,612	4,195,746	4,203,379
1—5 years .	1,343,246	1,361,251	2,711,646	2,786,916	7,570	7,722	222,941	163,410	677,201	705,115	33,904	34,208	16,131,965	16,424,403
5—10 years .	1,543,611	1,388,236	3,059,845	2,994,378	9,564	9,153	409,372	288,445	779,772	769,624	37,403	32,947	18,621,490	16,855,897
10—15 years .	1,382,086	1,192,506	2,814,043	2,667,770	10,032	9,024	645,768	488,953	728,664	704,331	35,344	29,863	17,098,806	14,997,130
15—20 years .	1,040,516	988,694	2,040,362	2,183,830	9,164	7,563	767,466	746,131	593,637	615,085	30,373	26,775	12,951,089	12,856,930
20—30 years .	2,189,776	2,033,487	3,915,736	4,499,543	19,695	15,346	356,497	394,787	1,176,636	1,129,143	56,777	49,140	24,718,550	24,572,717
30—40 years .	1,849,784	1,496,103	3,322,308	3,297,458	16,402	10,384	496,830	442,825	934,528	788,430	41,005	35,762	20,358,747	18,135,648
40—50 years .	1,165,317	969,983	2,328,922	2,194,150	9,414	5,966	584,362	528,918	613,749	548,101	32,442	26,662	13,989,575	12,222,993
50—60 years .	644,093	578,287	1,411,970	1,396,842	4,435	3,470	558,931	576,402	400,103	385,758	18,159	15,349	8,357,520	7,757,665
60 years and over	417,232	412,533	1,082,564	1,123,301	2,514	2,434	136,276	137,403	324,072	319,174	9,238	10,322	5,653,298	5,650,523

TABLE D.—BIRTHS.

	Births.			Birth rate p. m.			Males born to every 100 females.	Excess of birth rate over death rate.
	M.	F.	Total.	M.	F.	Total.		
BRITISH INDIA	4,827,379	4,461,518	9,288,897	17·5	16·2	33·7	108	8·8
N.-W. F. P.	41,004	31,713	72,717	17	13	30	129	9
Punjab	495,767	442,863	938,630	20	18	38	112	12
Delhi	12,750	11,885	24,635	19	18	37	107	8
U. P.	941,838	836,954	1,778,792	19	17	35	113	10
B. & O.	652,829	615,501	1,268,330	17	16	32	106	7
Bengal	759,722	704,798	1,464,520	15	14	29	108	6
C. P.	357,503	337,216	694,719	22	21	43	106	7
Bombay	404,571	375,950	780,521	18	17	34	108	10
Madras	836,444	797,552	1,633,996	18	17	35	105	11
Coorg.	2,184	1,984	4,118	13	12	25	108	2
Assam	125,740	117,016	242,756	15	14	30	107	11
Burma	186,503	179,225	365,728	15	14	29	104	9
Ajmer-Merwara	10,574	8,861	19,435	18	15	34	119	

TABLE E.—TOTAL BIRTHS BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p. m.	
														1934.	1933.
BRITISH INDIA	810,504	750,160	794,143	752,165	699,951	648,449	713,144	768,909	790,491	857,106	850,926	852,949	9,288,897	33·7	35·5
N. W. F. P.	6,688	6,425	7,324	5,827	6,058	4,976	4,798	5,965	5,804	5,888	6,231	6,783	72,717	30	29
Punjab	90,394	80,711	79,319	66,615	65,070	56,963	59,082	70,641	81,390	91,630	96,165	100,650	938,630	38	43
Delhi	2,368	1,910	1,915	1,662	1,533	1,388	1,492	1,957	2,330	2,776	2,731	2,573	24,635	37	44
U. P.	161,563	147,535	148,397	147,837	128,278	121,419	144,203	160,206	161,837	164,898	144,264	148,355	1,778,792	35	38
B. & O.	102,472	102,585	103,691	112,125	104,482	88,364	93,735	104,859	111,495	116,452	110,241	112,829	1,268,330	32	35
Bengal	141,392	140,595	148,663	124,806	100,264	82,917	80,532	82,869	97,122	134,578	165,638	165,134	1,464,520	29	29
C. P.	57,119	51,172	56,118	55,404	53,237	51,458	58,226	67,805	65,712	65,255	59,325	53,888	694,719	43	43
Bombay	65,666	58,753	64,820	60,723	61,177	53,798	65,806	71,153	68,581	71,427	68,202	65,410	780,521	34	35
Madras	123,763	108,863	128,466	127,536	133,156	135,491	151,111	154,224	147,793	146,078	139,931	137,584	1,633,996	35	37
Coorg	281	348	391	343	360	395	373	375	372	308	276	296	4,118	25	25
Assam	26,027	23,030	21,265	18,008	14,652	14,245	15,795	16,374	18,699	23,160	25,539	25,962	242,756	30	30
Burma	31,074	26,819	27,276	29,852	30,237	30,688	36,645	30,716	27,626	32,668	30,611	31,466	365,728	29	29
Ajmer-Merwara	1,747	1,414	1,508	1,422	1,397	1,347	1,346	1,745	1,730	1,988	1,772	2,019	19,435	34	38

TABLE F.—DEATHS.

	Estimated population.	Area in sq. miles.	Density per sq. mile.	Deaths.			Death rate p.m.		
				M.	F.	Total.	M.	F.	Total.
BRITISH INDIA .	275,753,570	890,116	310	3,570,543	3,285,701	6,856,244	25·1	24·6	24·9
N.-W. F. P.	2,433,011	13,308	183	27,389	22,276	49,665	21	20	20
Punjab	24,683,408	96,614	255	346,156	303,619	649,775	26	27	26
Delhi	668,160	578	1,156	10,039	9,020	19,059	26	32	29
U. P.	50,559,397	106,248	476	684,543	610,551	1,295,094	26	25	26
B. & O.	39,050,029	83,054	470	509,759	471,840	981,599	26	24	25
Bengal	50,837,178	72,514	701	610,731	566,156	1,176,887	23	23	23
C. P.	16,237,707	99,920	163	302,031	275,104	577,135	37	34	36
Bombay	22,670,283	123,069	184	285,713	268,598	554,311	24	25	24
Madras	47,152,136	142,277	331	570,915	556,254	1,127,169	24	23	24
Coorg	164,187	1,593	103	1,906	1,890	3,796	21	26	23
Assam	8,197,605	31,382	261	81,947	73,754	155,701	19	19	19
Burma	12,525,656	116,848	107	130,725	118,822	249,547	20	19	20
Ajmer-Merwara.	574,813	2,711	212	8,689	7,817	16,506	29	29	29

TABLE G.—DEATHS BY MONTHS.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.	Rate p. m.	
														1934.	1933.
BRITISH INDIA .	559,254	493,629	538,326	575,943	565,300	519,892	550,906	615,763	605,392	604,069	601,380	626,390	6,856,244	24·9	22·4
N.-W. F. P.	5,587	5,164	4,766	4,025	3,892	3,730	3,222	3,366	3,623	3,310	4,093	4,887	49,665	20	21
Punjab	59,321	52,708	53,038	52,021	58,290	51,871	44,068	45,714	50,804	55,335	58,097	68,508	649,775	26	27
Delhi	1,476	1,226	1,373	1,503	1,701	1,620	1,452	1,609	1,762	1,760	1,716	1,861	19,059	29	32
U. P.	78,932	80,899	98,832	120,909	119,280	117,528	111,349	117,770	115,509	120,665	106,884	106,537	1,295,094	26	18
B. & O.	73,499	63,136	66,676	83,241	84,730	76,525	89,233	103,106	98,945	88,647	78,087	75,774	981,599	25	22
Bengal	119,630	95,899	97,975	104,540	89,586	72,564	78,945	85,069	85,472	97,699	120,748	128,760	1,176,887	23	24
C. P.	35,402	33,790	41,469	47,584	46,886	46,731	46,027	62,103	68,150	60,505	47,946	40,542	577,135	36	26
Bombay	50,204	43,840	50,215	44,530	39,522	33,490	42,630	55,510	51,323	49,708	47,743	45,596	554,311	24	24
Madras	99,067	87,128	93,460	85,592	89,295	83,370	94,974	103,376	93,693	87,644	97,214	112,356	1,127,169	24	23
Coorg	225	267	344	363	341	392	409	365	314	271	267	238	3,796	23	24
Assam	14,525	11,902	11,148	12,026	13,521	14,013	13,904	11,975	12,407	12,584	13,185	14,511	155,701	19	20
Burma	20,152	16,419	17,463	18,043	16,982	17,002	23,728	24,384	22,041	24,397	23,958	24,978	249,547	20	18
Ajmer-Merwara.	1,234	1,251	1,567	1,566	1,274	1,056	965	1,416	1,349	1,544	1,442	1,842	16,506	29	28

TABLE H.—DEATH RATES PER MILLE BY MONTHS.

	Jan.	Feb.	March.	April.	May.	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
BRITISH INDIA	24	21	23	25	25	23	24	27	26	26	26	27	24·9
N.-W. F. P.	28	25	24	20	19	18	16	17	18	16	20	24	20
Punjab	29	26	26	25	28	25	21	22	25	27	28	33	26
Delhi	27	22	25	27	31	29	26	29	32	32	31	33	29
U. P.	19	19	23	29	28	28	26	28	27	29	25	25	26
B. & O.	23	19	20	26	26	24	27	32	30	27	24	23	25
Bengal	28	23	23	25	21	17	19	20	20	23	29	30	23
C. P.	26	25	31	35	35	35	34	46	50	45	35	30	36
Bombay	27	23	27	24	21	18	23	29	27	26	25	24	24
Madras	25	22	24	22	23	21	24	26	24	22	25	29	24
Coorg	16	20	25	27	25	29	30	27	23	20	20	17	23
Assam	21	17	16	18	20	21	20	18	18	18	19	21	19
Burma	19	16	17	17	16	16	23	23	21	23	23	24	20
Ajmer-Merwara	26	26	33	33	27	22	20	30	28	32	30	38	29

TABLE I.—DEATHS BY MONTHS IN RURAL AREAS.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.	Rate p. m.	
														1934.	1933.
BRITISH INDIA	506,358	444,669	482,679	519,381	508,089	469,547	496,833	550,465	546,630	549,269	547,700	570,856	6,192,476	24·9	22·4
N.-W. F. P.	4,871	4,666	4,141	3,585	3,397	3,248	2,802	2,922	3,227	2,908	3,633	4,358	43,758	21	21
Punjab	54,027	47,754	47,829	46,956	52,524	45,910	39,159	40,163	44,244	49,830	52,474	61,951	582,821	27	28
Delhi	576	468	459	602	638	666	534	463	595	692	754	788	7,235	35	41
U. P.	70,072	71,915	86,743	106,288	104,196	104,607	98,698	102,067	101,750	108,338	96,210	96,369	1,147,253	25	17
B. & O.	70,910	61,402	64,877	81,180	82,598	74,780	86,787	100,141	96,603	86,743	76,236	74,194	956,451	25	22
Bengal	112,582	90,014	91,592	98,183	83,781	67,950	73,515	78,890	79,639	91,885	114,134	121,922	1,104,087	23	24
C. P.	31,672	30,185	36,615	42,593	41,558	42,258	41,010	54,516	61,575	54,944	43,454	36,235	516,615	36	26
Bombay	40,796	34,734	40,451	35,068	31,013	26,248	33,628	44,347	41,669	40,197	38,717	36,180	443,048	24	24
Madras*	89,151	77,850	83,961	78,989	80,447	75,337	86,053	93,418	85,392	79,330	87,854	102,184	1,017,966	25	24
Coorg	203	234	307	314	317	352	374	327	274	236	234	213	3,385	22	23
Assam	14,176	11,692	10,930	11,801	13,225	13,728	13,606	11,624	12,065	12,278	12,851	14,250	152,246	19	20
Burma	16,547	12,914	13,678	14,819	13,625	13,811	20,132	20,712	18,627	20,866	20,328	21,066	207,125	19	17
Ajmer-Merwara	775	841	1,096	1,003	770	652	535	875	950	1,022	821	1,146	10,486	27	24

* Inclusive of figures of towns other than municipalities.

TABLE J.—DEATHS BY MONTHS IN URBAN AREAS.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Total.	Rate p. m.	
														1934.	1933.
BRITISH INDIA	52,896	48,960	55,647	56,562	57,211	50,345	54,073	65,298	58,762	54,800	53,680	55,534	663,768	24·4	22·2
N.-W. F. P.	716	493	625	440	495	482	420	444	396	402	460	529	5,907	18	19
Punjab	5,294	4,954	5,209	5,065	5,766	5,961	4,909	5,551	6,560	5,505	5,623	6,557	66,954	20	21
Delhi	900	753	914	901	1,063	954	918	1,146	1,167	1,068	962	1,073	11,824	26	23
U. P.	8,860	8,984	12,089	14,621	15,084	12,921	12,651	15,703	13,759	12,327	10,674	10,168	147,841	38	29
B. & O.	2,589	1,734	1,799	2,061	2,132	1,745	2,446	2,965	2,342	1,904	1,851	1,580	25,148	17	15
Bengal	7,048	5,885	6,383	6,357	5,805	4,614	5,430	6,179	5,833	5,814	6,614	6,838	72,800	21	21
C. P.	3,730	3,605	4,854	4,991	5,328	4,473	5,017	7,587	6,575	5,561	4,492	4,307	60,520	35	26
Bombay	9,408	9,106	9,764	9,462	8,509	7,242	9,002	11,163	9,654	9,511	9,026	9,416	111,263	26	15
Madras*	9,916	9,278	9,499	8,603	8,848	8,033	8,921	9,958	8,301	8,314	9,360	10,172	109,203	17	17
Coorg	22	33	37	49	24	40	35	38	40	35	33	25	411	43	47
Assam	319	210	218	225	296	285	298	351	322	306	334	261	3,455	17	17
Butma	3,605	3,505	3,785	3,224	3,357	3,191	3,596	3,672	3,414	3,531	3,630	3,912	42,422	30	27
Ajmer-Merwara	459	410	471	563	504	404	430	541	399	522	621	696	6,020	23	37

* For municipalities only.

TABLE K.—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* . . .	846,302	712,124	593,223	562,432	184,965	168,799	103,301	91,825	109,483	129,164
N.-W. F. P.	5,621	4,144	4,654	4,018	1,588	1,449	920	815	901	832
Punjab	95,359	80,536	57,359	51,800	21,501	19,060	15,644	14,404	15,317	14,213
Delhi	2,799	2,434	1,651	1,622	467	383	346	357	382	407
U. P.	180,777	147,656	159,169	141,699	32,050	28,649	19,443	17,991	18,005	19,528
B. & O.	104,083	86,109	112,097	106,157	33,335	28,223	17,651	13,732	16,941	17,016
Bengal	143,592	123,602	86,294	85,388	45,502	41,307	25,562	21,547	25,067	34,397
C. P.					Not available.					
Bombay	70,727	59,908	55,141	55,763	13,173	13,616	7,382	7,525	6,878	8,855
Madras*†	170,448	144,908	88,200	87,933	26,157	25,555	9,704	9,533	18,376	24,851
Coorg	405	375	233	228	92	106	72	69	110	115
Assam	21,893	18,250	11,909	11,342	5,561	4,884	2,896	2,442	2,781	4,366
Burma	43,223	37,015	14,469	14,679	5,190	5,298	3,479	3,170	4,542	4,322
Ajmer-Merwara	2,875	2,187	2,047	1,803	349	269	202	190	183	262
	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	232,278	288,455	245,978	230,987	243,169	188,592	243,040	202,783	456,939	435,590
N.-W. F. P.	2,282	2,262	2,520	2,440	2,490	1,997	2,613	1,858	3,800	2,461
Punjab	21,470	21,545	21,763	20,644	23,504	19,827	25,198	20,939	49,041	40,651
Delhi	772	892	700	695	739	510	729	483	1,454	1,237
U. P.	42,420	51,675	43,440	43,650	47,094	36,361	50,420	39,727	91,725	83,615
B. & O.	42,095	46,472	43,278	39,449	40,537	31,624	40,537	37,990	59,205	65,018
Bengal	53,691	70,038	55,373	47,868	52,355	37,660	47,409	37,444	70,886	61,905
C. P.					Not available.					
Bombay	18,214	24,068	21,033	19,779	22,856	15,841	22,432	16,047	47,877	47,196
Madras†	34,567	50,323	38,419	38,823	40,719	31,925	42,097	35,799	102,394	106,758
Coorg	235	320	265	263	206	126	159	127	129	161
Assam	6,033	9,744	7,570	6,549	7,048	4,713	6,695	4,558	9,561	6,906
Burma	10,000	10,482	11,130	10,312	9,977	7,589	8,968	7,306	19,747	18,649
Ajmer-Merwara	499	634	487	515	644	419	783	505	1,120	1,033

* Excluding C. P., figures for which are not available.
 † Including Europeans and Anglo-Indians.

TABLE L.—DEATH RATES PER MILLE 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† . . .	202	169	37	34	10	10	6	6	8	10
N.-W. F. P.	144	112	29	26	9	10	6	6	8	8
Punjab	206	177	37	35	12	12	10	11	12	14
Delhi	263	232	46	46	11	11	8	11	9	13
U. P.	232	189	52	46	10	10	6	7	7	9
B. & O.	219	177	43	43	12	11	7	7	10	10
Bengal	176	152	28	27	13	13	8	8	11	13
Bombay	210	177	41	41	9	10	5	6	7	9
Madras	262	216	33	32	9	9	4	4	9	11
Coorg	190	170	31	30	10	12	7	8	12	15
Assam	153	167	53	69	14	17	4	5	4	6
Burma	268	216	21	21	7	7	5	5	8	7
Ajmer-Merwara . . .	249	228	60	53	9	8	6	6	6	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† . . .	9	12	12	13	18	15	30	26	81	77
N.-W. F. P.	10	11	14	16	22	22	38	35	69	65
Punjab	9	11	12	15	19	21	32	35	69	77
Delhi	9	16	11	19	20	23	39	39	120	143
U. P.	9	12	11	13	18	17	33	28	92	82
B. & O.	13	13	15	14	21	17	37	33	83	74
Bengal	11	15	14	15	21	20	36	33	80	77
Bombay	8	12	11	13	20	16	35	28	11	11
Madras	9	11	12	12	18	14	30	26	95	95
Coorg	12	21	16	25	22	21	36	36	51	66
Assam	17	24	15	15	12	9	12	8	70	50
Burma	8	9	12	13	16	14	22	19	61	58
Ajmer-Merwara . . .	9	13	12	14	20	16	43	33	121	100

* Worked on live-births.

† Excluding C. P., figures for which are not available.

TABLE M.—DEATHS ACCORDING TO AGE IN RURAL AREAS.

	Under one year.		1—5 year		5—10 years.		10—15 years.		15—20 years.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
BRITISH INDIA*	745,773	627,275	538,770	508,318	171,579	155,528	94,853	82,028	99,020	114,259
N.-W. F. P.	4,828	3,551	4,099	3,587	1,463	1,325	849	692	802	696
Punjab	84,494	71,156	51,335	46,032	19,842	17,401	14,329	12,977	13,908	12,573
Delhi	920	773	695	644	229	160	156	140	153	120
U. P.	154,964	125,758	143,801	125,954	29,303	25,845	17,722	15,478	16,224	15,926
B. & O.	101,224	83,868	109,782	104,150	32,563	27,476	17,188	13,285	16,400	16,366
Bengal	140,796	122,008	82,549	81,979	43,665	39,723	24,246	20,359	23,500	32,793
C. P. † . . . . .	...	...	...	...	...	...	...	...	...	...
Bombay	53,736	45,389	45,087	45,575	11,380	11,681	6,299	6,263	5,389	6,741
Madras	145,314	124,134	75,433	75,046	22,766	22,205	8,067	7,658	15,937	20,943
Coorg	396	370	224	211	86	99	64	62	99	103
Assam	21,475	17,887	11,704	11,138	5,484	4,819	2,836	2,392	2,718	4,262
Burma	36,372	31,239	12,649	12,799	4,527	4,581	2,954	2,609	3,767	3,593
Ajmer-Merwara	1,254	1,142	1,412	1,203	271	213	143	113	123	143

	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*	203,332	253,748	219,109	207,512	221,647	170,949	222,766	185,438	405,234	386,744
N.-W. F. P.	1,995	1,978	2,258	2,219	2,206	1,819	2,352	1,703	3,255	2,081
Punjab	19,136	18,951	19,740	18,599	21,302	18,162	22,960	19,233	44,090	36,601
Delhi	269	279	279	252	294	234	314	233	605	486
U. P.	38,424	44,046	39,868	39,275	43,406	33,408	46,456	36,891	81,099	73,405
B. & O.	40,839	45,077	42,034	38,449	39,376	30,889	39,515	37,266	57,431	63,273
Bengal	46,990	64,445	50,758	44,716	48,300	34,944	43,898	34,995	65,760	57,663
C. P. † . . . . .	...	...	...	...	...	...	...	...	...	...
Bombay	13,692	18,235	16,203	15,971	18,150	13,136	17,828	13,407	39,583	39,253
Madras	28,269	41,853	31,874	32,453	33,774	27,035	35,191	30,637	86,724	90,724
Coorg	179	271	195	226	163	110	143	118	113	148
Assam	5,800	9,542	7,300	6,414	6,815	4,614	6,520	4,480	9,314	6,732
Burma	7,398	8,656	8,282	8,579	7,387	6,304	7,027	6,154	16,514	15,734
Ajmer-Merwara	341	365	318	359	469	294	562	371	746	644

* Excluding C. P., figures for which are not available.
 † Figures not available.

	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* . . .	100,529	84,849	54,453	54,114	13,386	13,271	8,448	9,797	10,463	14,905
N.-W. F. P.	793	593	555	431	125	124	71	123	99	136
Punjab	10,865	9,380	6,024	5,768	1,659	1,659	1,315	1,427	1,409	1,640
Delhi	1,879	1,661	956	978	238	223	190	217	229	287
U. P.	25,813	21,898	15,368	15,745	2,747	2,804	1,721	2,513	1,781	3,602
B. & O.	2,859	2,241	2,315	2,007	772	747	463	497	541	650
Bengal	7,796	6,594	3,745	3,409	1,837	1,584	1,316	1,188	1,567	1,604
C. P. † . . . . .	...	...	...	...	...	...	...	...	...	...
Bombay	16,991	14,519	10,054	10,188	1,793	1,935	1,083	1,262	1,489	2,114
Madras	25,134	20,774	12,767	12,887	3,391	3,350	1,637	1,875	2,439	3,908
Coorg	9	5	9	17	6	7	8	7	11	12
Assam	418	363	205	204	77	65	60	50	63	104
Burma	6,851	5,776	1,820	1,880	663	717	525	561	775	729
Ajmer-Merwara . . .	1,121	1,045	635	600	78	56	59	77	60	119

	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* . . .	28,946	34,707	26,869	23,475	26,522	17,643	25,274	17,295	51,705	48,846
N.-W. F. P.	287	284	262	221	284	178	261	155	545	380
Punjab	2,334	2,594	2,023	2,045	2,202	1,665	2,238	1,706	4,951	4,050
Delhi	503	613	421	443	445	276	415	250	849	751
U. P.	3,996	7,629	3,572	4,375	3,688	2,953	3,964	2,836	10,626	10,210
B. & O.	1,256	1,395	1,244	1,000	1,161	735	1,022	724	1,774	1,745
Bengal	6,701	5,593	4,615	3,152	4,055	2,716	3,511	2,449	5,126	4,242
C. P. † . . . . .	...	...	...	...	...	...	...	...	...	...
Bombay	4,522	5,783	4,830	3,808	4,706	2,705	4,604	2,640	8,294	7,943
Madras	6,298	8,470	6,545	6,370	6,945	4,890	6,906	5,162	15,670	16,034
Coorg	56	49	70	37	38	16	16	9	16	13
Assam	233	202	270	135	233	99	175	78	247	174
Burma	2,602	1,826	2,848	1,733	2,590	1,285	1,941	1,152	3,233	2,915
Ajmer-Merwara . . .	158	269	169	156	175	125	221	134	374	389

* Excluding C. P., figures for which are not available.

† Figures not available.

TABLE O.—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	150	Howrah	280
Dera Ismail Khan]	155	Bally	82
		South Suburban	200
<i>Delhi.</i>		Baranagar	199
Delhi city	219	Kamarhati	117
New Delhi	95	Titagarh	197
<i>United Provinces.</i>		Naihati	117
Dehra	303	Bhatpara	127
Saharanpur	379	Calcutta	259
Hardwar Union	341	Serajganj	120
Muzaffarnagar	223	Dacca	192
Meerut	165	Narayanganj	219
Khurja	329	Mymensingh	213
Aligarh	201	Barisal	210
Hathras	291	Chittagong	178
Muttra	268	Comilla	116
Agra	230	<i>Central Provinces.</i>	
Bareilly	195	Nagpur	296
Budaun	294	Jubbulpore	295
Moradabad	258	Saugor	315
Amroha	238	Khandwa	276
Sambhal	297	Burhanpur	247
Shahjahanpur	158	Raipur	326
Pilibhit	280	Bilaspur	260
Farrukhabad-cum-Fatehgarh	325	Amraoti	198
Etawah	420	Akola	248
Cawnpore	294	<i>Bombay.</i>	
Allahabad	252	City of Bombay	246
Jhansi	327	Jalgaon	209
Benares	329	Dhulia	183
Mirzapur-Bindhachal	252	Surat	291
Jaunpur	223	Broach	144
Gorakhpur	249	Nadiad	353
Lucknow	275	Godhra	219
Fyzabad-Ajodhya	205	Ahmedabad	316
Bahraich	214	Ahmednagar	180
<i>Bengal.</i>		Poona city	334
Burdwan	79	Nasik	377
Asansol	176	Malegaon	255
Bankura	144	Bandra	164
Midnapur	62	Kurla	192
Hooghly-Chinsura	141	Belgaum	161
Serampur	114	Dharwar	106
		Hubli	80
		Gadag-Bettigeri	197

TABLE O.—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>Bombay—contd.</i>		<i>Madras—contd.</i>	
Bijapur	120	Calicut	106
Sholapur	240	Palghat	176
Karachi	142	Cannanore	143
Hyderabad	182	Tellicherry	114
Sukkur	126	Nellore	227
Shikarpur	175	Vellore	183
<i>Madras.</i>		Virudhunagar	209
Bellary	311	Srivilliputtur	174
Adoni	121	Salem	174
Conjeeveram	180	Cuddalore	195
Saidapet	202	Mangalore	106
Coimbatore	236	Tanjore	215
Erode	129	Kumbakonam	159
Berhampur	134	Negapatam	208
Cocanada	253	Mayavaram	176
Rajahmundry	297	Tuticorin	214
Ellore	89	Tinnevelly	262
Guntur	177	Palamcottah	215
Tenali	170	Trichinopoly	187
Bezwada	282	Vizagapatam	287
Masulipatam	234	Vizianagram	221
Kurnool	127	<i>Burma.</i>	
Madras	232	Akyab	272
Madura	269	Rangoon	271
Dindigul	74	Bassien	308
		Moulmein	199
		Mandalay	257

Appendix II

relating to

Section II.

TABLE A.—DEATHS FROM CHOLERA FROM 1905 TO 1934.

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.	Hydera-bad.	Mysore.
1905	441,786	300	2,197	...	121,790	93,590	172,178	1,217	5,396	16,888	...	22,883	2,347	...	8	27	64	628
1906	690,521	...	4,107	127	149,549	131,571	135,621	38,768	46,119	142,811	10	33,682	7,872	234	4,714	10,147	1,061	7,222
1907	408,102	266	429	8	22,438	115,801	158,190	4,291	7,656	81,565	187	8,892	7,678	1	64	41	1	4,972
1908	591,725	2,845	12,120	177	83,544	182,377	123,471	9,048	1,759	141,970	114	22,389	11,911	...	787	1,730	937	2,149
1909	239,231	134	1,501	12	21,823	32,011	88,356	7,687	28,714	39,424	99	8,081	11,389	...	403	1,421	164	1,629
1910	430,451	1,605	2,130	1	102,402	126,382	119,686	5,316	3,694	32,594	56	34,512	2,011	2	8	2,864	2	1,812
1911	354,005	12	1,213	47	117,689	88,583	67,750	2,998	5,817	58,174	6	7,475	4,191	50	85	1,054	803	210
1912	407,769	1,329	1,833	406	18,894	77,023	95,467	34,313	64,505	92,497	...	14,303	7,186	13	414	9,080	1,190	6,748
1913	294,815	175	5,811	37	60,427	70,379	78,898	15,286	5,194	37,730	92	16,407	4,339	...	4,085	2,823	1,322	8,062
1914	280,730	2,300	6,656	12	32,498	32,115	89,224	20,345	17,779	68,449	...	9,270	2,073	9	1,627	10,075	5,893	840
1915	404,472	932	13,196	92	90,508	88,349	180,679	5,662	377	30,093	...	26,979	17,687	3	1,981	795	2,072	178
1916	288,047	194	1,651	69	33,300	90,582	70,836	39,205	19,841	16,735	1	13,099	1,773	861	5,075	5,474	1,475	137
1917	267,002	...	1,365	12	21,440	109,620	45,021	691	17,003	58,939	32	10,953	1,914	12	69	589	2,579	7,288
1918	560,802	31	257	3	119,746	205,584	82,379	3,351	8,834	122,263	1	14,077	4,269	7	3	485	7,200	3,153
1919	578,426	4,400	8,561	66	81,365	104,727	124,949	62,089	51,551	98,262	157	33,080	13,260	59	842	8,309	13,321	2,306
1920	130,140	2	138	7	6,952	26,341	54,199	3,491	2,047	31,139	6	2,421	3,396	1	508	278	57	220
1921	450,608	4,285	19,215	635	149,667	90,688	89,547	58,331	3,521	27,064	...	12,829	3,791	35	2,750	5,079	1,381	25
1922	121,679	92	128	6	2,330	26,805	51,712	64	2,768	16,502	4	16,219	5,047	2	...	...	3,288	...
1923	73,002	2	11	12	2,591	8,198	41,483	1,090	9,221	5,169	...	3,728	1,488	9	9	62	1,174	79
1924	293,707	9	3,351	121	67,000	77,480	48,514	9,704	8,236	61,971	24	19,182	8,083	32	644	1,407	3,354	7,699
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	135,151	...	87	18	6,166	27,268	59,106	4,565	78	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	35,384	...	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	837,322	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	67,291	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	...	5,503	179	...	35	642	4,838	91
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

TABLE B.—DEATHS FROM CHOLERA IN RURAL AND URBAN AREAS.

	Deaths.			Rate p.m.			Mean 1929-33.	Total Villages.	Number Infected.
	R.	U.	Total.	R.	U.	Total.			
BRITISH INDIA	187,502	12,206	199,708	0·8	0·4	0·7	0·5	464,296	36,003
N.-W. F. P. . . . .	...	...	...	...	...	...	0·1	2,802	...
Punjab	140	38	178	...	...	...	...	34,520	78
Delhi . . . . .	...	19	19	...	...	...	0·1	304	...
U. P.	30,251	1,652	31,903	0·6	0·4	0·6	0·7	105,640	4,436
B. & O.	55,883	1,406	57,289	1·5	1·0	1·5	1·7	83,402	12,200
Bengal	47,546	3,196	50,742	1·0	0·9	1·0	1·1	86,360	10,436
C. P.	24,559	2,770	27,329	1·7	1·6	1·7	0·1	39,874	3,106
Bombay	10,399	963	11,362	0·6	0·2	0·5	0·5	30,550	1,756
Madras	16,133	2,025	18,158	0·4	0·3	0·4	0·4	39,887	2,998
Coorg	1	...	1	...	...	...	0·1	298	1
Assam	1,884	20	1,904	0·2	0·1	0·2	0·8	28,333	725
Burma	706	116	822	0·1	0·1	0·1	0·2	11,587	266
Ajmer-Merwara . . . . .	...	1	1	...	...	...	...	739	1

TABLE C.—DEATHS FROM CHOLERA BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.		Rate p.m.		Quin- quennial mean.
													1934.	1933.	1934.	1933.	
BRITISH INDIA	4,896	3,369	6,647	8,893	10,000	16,072	31,899	37,655	25,685	16,795	16,664	20,833	199,708	68,318	0·7	0·3	0·5
N.-W. F. P. . . . .	...	...	1	5	12	30	43	47	36	4	...	...	178	160	...	...	0·1
Punjab . . . . .	...	...	...	1	1	1	1	7	8	...	...	...	19	...	...	...	...
Delhi . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
U. P.	2	5	31	89	1,041	4,093	6,564	6,979	5,134	5,402	1,671	892	31,903	1,915	0·6	...	0·7
B. & O.	1,672	622	944	1,134	2,110	5,134	12,434	13,845	9,853	4,788	3,500	1,253	57,289	17,514	1·5	0·5	1·7
Bengal	1,912	2,047	5,260	6,473	5,018	2,547	2,353	1,675	919	2,267	8,569	11,702	50,742	29,242	1·0	0·6	1·1
C. P. . . . .	...	3	37	308	847	2,982	6,495	7,311	6,346	2,603	353	44	27,329	2,152	1·7	0·1	0·1
Bombay	202	106	78	470	546	406	2,285	4,152	1,696	910	377	134	11,362	7,797	0·5	0·4	0·5
Madras	601	413	457	312	314	729	1,656	3,586	1,645	722	1,859	5,864	18,158	3,851	0·4	0·1	0·4
Coorg . . . . .	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	0·1
Assam	506	173	137	75	66	56	45	39	44	33	134	596	1,904	5,508	0·2	0·7	0·8
Burma	1	...	2	25	44	94	23	14	4	66	201	348	822	179	0·1	...	0·2
Ajmer-Merwara . . . . .	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...

TABLE D.—DEATHS FROM PLAGUE BY MONTHS.

(i) British Provinces.

		Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.		Rate p.m.	
														1934.	1933.	1934.	1933.
GRAND TOTAL	1933	6,491	5,836	5,741	3,608	2,777	1,682	3,642	6,712	7,717	8,343	7,752	9,891	...	70,192	...	...
	1934	15,923	18,497	22,451	17,642	7,538	1,702	1,045	3,268	4,367	3,761	3,118	3,987	103,299	...	...	...
BRITISH INDIA	1933	3,644	3,455	3,993	2,800	2,276	845	1,649	3,513	4,351	4,841	4,845	6,419	...	42,631	...	0·2
	1934	11,627	14,494	19,165	15,793	6,808	1,354	624	1,718	2,019	1,996	1,842	2,691	80,131	...	0·3	...
N.-W. F. P.		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Punjab		557	630	1,180	1,957	2,788	714	34	109	2	10	48	40	8,069	1,789	0·3	0·1
Delhi		...	...	2	...	...	...	...	...	...	...	...	...	2	...	...	...
U. P.		6,269	9,061	14,087	11,942	3,454	493	61	156	133	202	456	1,374	47,688	9,835	0·9	0·2
B. & O.		608	1,084	1,587	1,380	362	38	18	33	19	7	71	204	5,411	1,635	0·1	...
Bengal		...	...	...	1	...	...	...	...	...	...	...	...	1	1	...	...
C. P.		283	184	130	9	...	...	...	51	109	121	39	41	967	1,200	0·1	0·1
Bombay		2,992	2,551	1,316	377	162	81	356	1,011	1,428	1,364	994	675	13,307	24,560	0·6	1·1
Madras		488	346	243	29	14	12	91	260	271	235	156	213	2,358	2,591	0·1	0·1
Coorg		1	1	...	2	...	...	1	...	1	2	...	2	10	48	0·1	0·3
Assam		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Burma		429	637	620	96	28	16	63	98	56	55	78	142	2,318	972	0·2	0·1
Ajmer-Merwara		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

(ii) Indian States and Agencies.

TOTAL	1933	2,847	2,381	1,748	808	501	837	1,993	3,199	3,366	3,502	2,907	3,472	...	27,561	...	...
	1934	4,296	4,003	3,286	1,849	730	348	421	1,550	2,348	1,765	1,276	1,296	23,168	...	...	...
Punjab		20	15	43	51	42	...	...	...	...	...	...	...	171	15	...	...
U. P.		...	1	23	51	6	...	...	...	...	...	...	...	81	72	...	...
B. & O.		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bengal		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
C. P.		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bombay		793	727	431	206	214	71	174	500	525	497	272	137	4,547	7,012	...	...
Madras		...	...	...	...	...	...	...	...	...	...	...	...	7	...	...	...
Mysore		1,012	798	405	196	139	192	219	336	578	584	412	425	5,296	5,855	...	...
Bangalore C. & M. Station		4	6	5	...	...	...	...	1	7	8	5	1	37	123	...	...
Hyderabad		2,323	2,228	2,015	984	146	54	15	686	1,182	636	543	653	11,465	13,487	...	...
C. I. Agency		25	24	25	13	...	...	...	...	1	3	3	8	97	50	...	...
Baroda		8	58	42	15	...	1	...	...	14	24	24	26	212	360	...	...
Rajputana		...	23	8	7	2	...	...	...	24	4	...	12	80	...	...	...
Assam		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Burma		8	...	...	3	1	9	13	27	17	9	12	33	132	62	...	...
Jammu & Kashmir		103	123	289	823	180	21	...	...	...	...	1	3	1,043	525	...	...
Baluchistan		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE E.—DEATHS FROM SMALLPOX IN RURAL AND URBAN AREAS.

	Deaths.			Death rate p. m.			Mean. 1929-33.	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	71,415	12,513	83,928	0·3	0·5	0·3	0·3	16,033	22,280	38,313	19	27	46
N.-W. F. P.	574	41	615	0·3	0·1	0·3	0·2	162	324	486	26	53	79
Punjab	1,501	191	1,692	0·1	0·1	0·1	0·3	514	740	1,254	30	44	74
Delhi	1	21	22	...	...	...	0·5	3	13	16	14	59	73
U. P.	12,792	2,025	14,817	0·3	0·5	0·3	0·2	4,316	5,587	9,903	29	38	67
B. & O.	29,434	876	30,310	0·8	0·6	0·8	0·4	2,455	5,138	7,593	8	17	25
Bengal	6,798	1,498	8,296	0·1	0·4	0·2	0·3	377	966	1,343	12	4	16
C. P.	1,171	1,111	2,282	0·1	0·6	0·1	0·2	822	1,011	1,833	36	44	80
Bombay	3,651	1,865	5,516	0·2	0·4	0·2	0·5	1,604	2,594	4,198	29	47	76
Madras	14,251	3,837	18,088	0·4	0·6	0·4	0·2	5,593	5,516	11,109	31	30	61
Coorg	41	4	45	0·3	0·4	0·3	0·1	17	5	22	38	11	49
Assam	200	6	206	...	...	...	0·1	15	14	29	7	7	14
Burma	664	937	1,601	0·1	0·7	0·1	0·1	155	372	527	10	23	33
Ajmer-Merwara	337	101	438	0·9	0·6	0·8	0·1		Not available.		...	...	...

TABLE F.—DEATHS FROM SMALLPOX BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p. m.	
														1934.	1933.
BRITISH INDIA	6,480	8,110	10,958	13,099	12,937	9,508	6,636	3,875	2,280	1,940	2,719	5,386	83,928	0·3	0·4
N.-W. F. P.	86	100	88	51	47	85	62	13	13	19	24	27	615	0·3	0·7
Punjab	183	188	179	198	236	191	180	76	42	22	67	130	1,692	0·1	0·5
Delhi . . . . .	...	...	...	1	4	5	3	3	1	1	1	3	22	...	1·4
U. P.	783	969	1,555	1,978	2,562	2,362	1,427	716	266	191	580	1,428	14,817	0·3	0·2
B. & O.	2,866	3,416	3,896	5,153	4,374	3,314	2,232	1,211	832	539	605	1,372	30,310	0·8	1·1
Bengal	806	1,049	1,229	1,597	1,380	837	494	317	117	112	112	246	8,296	0·2	0·3
C. P.	87	147	407	427	494	312	211	80	29	10	37	41	2,282	0·1	...
Bombay	374	545	680	771	636	509	353	277	149	157	328	737	5,516	0·2	0·4
Madras	1,196	1,556	2,641	2,359	2,211	1,620	1,550	1,103	800	865	922	1,265	18,088	0·4	0·2
Coorg . . . . .	...	2	...	4	7	3	6	...	1	6	6	10	45	0·3	0·1
Assam	13	14	19	30	14	21	22	22	9	4	8	30	206	...	...
Burma	75	113	227	455	370	183	64	39	19	11	22	23	1,601	0·1	0·1
Ajmer-Merwara	11	11	37	75	102	66	32	18	2	3	7	74	438	0·8	1·4

TABLE G.—DEATHS FROM FEVERS AND MALARIA IN RURAL AND URBAN AREAS.

	Fever deaths.			Death rate p. m.			Mean 1929-33.	Reported malaria deaths.			Death rate p. m.		
	R.	U.	Total.	R.	U.	Total.		R.	U.	Total.	R.	U.	Total.
British India	3,761,695	195,382	3,957,077	15	7	14	15	1,532,336	46,256	1,578,592	...	...	...
N.-W. F. P.	37,879	2,994	40,873	18	9	17	7	...	74*	74	...	...	...
Punjab	430,045	31,272	461,317	20	10	19	18	...	411†	411	0·1	0·1	0·1
Delhi	5,368	5,089	10,457	26	11	16	15	28	47	75	...	...	...
U. P.	916,560	53,729	970,289	20	14	19	18	853,477	19,579	873,056	18·3	5·0	17·3
B. & O.	659,459	10,930	670,389	18	8	17	17	...	...	...	...	...	...
Bengal	749,877	14,615	764,492	16	4	15	15	384,376	2,815	387,191	8·1	0·8	7·6
C. P.	281,381	20,738	302,119	19	12	19	18	266,455	18,562	285,017	18·4	10·6	17·6
Bombay	179,397	22,008	201,405	10	5	9	10	28,000	2,893	30,893	1·5	0·7	1·4
Madras	298,790	26,260	325,050	7	4	7	7	...	...	...	...	...	...
Coorg	2,738	63	2,801	18	7	17	19	...	...	...	...	...	...
Assam	100,736	1,043	101,779	13	5	12	12	...	271†	271	...	...	...
Burma	89,556	4,611	94,167	8	3	8	7	...	1,604	1,604	...	...	...
Ajmer-Merwara	9,909	2,030	11,939	25	11	21	18	...	...	...	...	...	...

*Municipal towns only. †For 13 municipal towns in charge of whole-time health officers. ‡ In municipalities and small towns in which registration is compulsory.

TABLE H.—DEATHS FROM FEVERS BY MONTHS.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p. m.	
														1934.	1933.
British India	314,337	274,774	302,459	343,517	344,534	314,572	304,875	334,321	344,175	359,941	356,604	362,968	3,957,077	14	13
N.-W. F. P.	4,674	4,305	3,851	3,348	3,204	3,034	2,593	2,715	3,036	2,659	3,421	4,033	40,873	17	17
Punjab	42,681	36,403	36,540	36,675	41,303	38,318	31,707	31,634	35,740	40,522	41,541	48,163	461,317	19	19
Delhi	712	569	657	794	988	1,018	807	793	1,055	1,106	990	968	10,457	16	17
U. P.	56,273	56,005	66,270	87,574	93,482	92,465	82,690	84,167	85,467	93,447	85,879	86,570	970,289	19	14
B. & O.	46,496	41,984	45,629	57,990	60,751	53,261	54,351	64,776	65,975	63,705	58,579	56,892	670,389	17	15
Bengal	81,105	63,029	61,611	66,963	57,825	47,607	51,766	56,978	57,027	65,294	76,703	78,584	764,492	15	10
C. P.	18,736	17,813	23,541	28,216	27,327	25,769	20,676	27,647	32,776	31,727	26,201	21,690	302,119	19	15
Bombay	18,432	15,675	19,799	18,085	15,401	11,907	13,634	17,413	17,263	18,381	18,527	16,888	201,405	9	9
Madras	27,208	24,117	29,208	27,094	26,703	23,757	26,830	30,014	28,636	25,438	26,660	29,385	325,050	7	6
Coorg	166	173	233	268	262	287	321	290	223	200	186	187	2,801	17	19
Assam	8,823	7,280	6,956	8,013	9,963	10,127	9,976	8,026	8,247	7,878	7,820	8,670	101,779	12	13
Burma	8,123	6,372	6,970	7,407	6,520	6,313	8,900	8,863	7,691	8,446	9,038	9,524	94,167	8	7
Ajmer-Merwara	908	954	1,194	1,090	805	709	624	1,005	1,039	1,138	1,059	1,414	11,939	21	20

TABLE I.—DEATHS FROM DYSENTERY AND DIARRHŒA IN RURAL AND URBAN AREAS.

	Deaths.			Death rate p. m.			Mean 1929-33.	Deaths from dysentery.			Death rate p. m.		
	R.	U.	Total.	R.	U.	Total.		R.	U.	Total.	R.	U.	Total.
British India	228,867	56,243	285,110	0·9	2·1	1·0	0·9	...	...	...	...	...	...
N.-W. F. P.	94	191	285	...	0·6	0·1	0·1	...	12†	...	...	...	...
Punjab	8,939	3,472	12,411	0·4	1·1	0·5	0·6	...	712*	...	...	...	...
Delhi	111	689	800	0·5	1·5	1·2	0·8	54	205	259	0·3	0·4	0·4
U. P.	6,421	11,719	18,140	0·1	3·0	0·4	0·3	4,151	3,588	7,739	0·1	0·9	0·2
B. & O.	22,030	1,451	23,481	0·6	1·0	0·6	0·5	...	...	...	...	...	...
Bengal	46,150	7,797	53,947	1·0	2·2	1·1	0·8	25,323	4,351	29,674	0·5	1·2	0·6
C. P.	33,339	4,736	38,075	2·3	2·7	2·3	2·1	6,041	672	6,713	0·4	0·4	0·4
Bombay	20,303	5,998	26,301	1·1	1·4	1·2	1·2	2,577	1,344	3,921	0·1	0·3	0·2
Madras	80,187	17,657	97,844	2·0	2·7	2·1	1·9	...	...	...	...	...	...
Coorg	141	36	177	0·9	3·8	1·1	0·8	86	25	111	0·6	2·6	0·7
Assam	7,892	303	8,195	1·0	1·5	1·0	1·1	...	184	...	...	...	...
Burma	3,258	1,773	5,031	0·3	1·2	0·4	0·5	...	807	...	...	...	...
Ajmer-Merwara	2	421	423	...	2·3	0·8	0·4	...	...	...	...	...	...

* For 13 municipal towns in charge of whole-time health officers.

† Municipal towns only.

TABLE J.—DEATHS FROM DYSENTERY AND DIARRHŒA BY MONTHS.

	Jan.	Feb.	Mar.	Apl.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total. ■	Rate p. m.	
														1934.	1933.
British India	21,538	17,308	18,821	21,567	21,907	19,931	25,536	33,916	30,901	25,289	23,506	24,890	285,110	1·0	0·9
N.-W. F. P.	21	16	19	18	35	21	21	20	22	25	31	36	285	0·1	0·1
Punjab	1,010	679	855	933	1,091	919	869	1,154	1,412	1,218	1,204	1,067	12,411	0·5	0·5
Delhi	45	25	42	56	57	64	77	131	128	81	44	50	800	1·2	0·9
U. P.	625	571	875	1,568	1,987	1,770	1,940	2,687	2,063	1,603	1,344	1,107	18,140	0·4	0·2
B. & O.	1,958	1,532	1,515	1,989	1,732	1,401	2,429	3,086	2,635	2,306	1,420	1,478	23,481	0·6	·4
Bengal	5,111	3,771	4,443	5,260	4,800	3,772	4,107	4,300	4,187	4,176	4,811	5,209	53,947	1·1	0·9
C. P.	1,583	1,373	1,786	2,491	2,204	1,964	3,136	6,435	6,689	4,850	3,134	2,430	38,075	2·3	1·4
Bombay	1,536	1,168	1,353	1,541	1,519	1,608	2,840	4,665	3,828	2,683	1,944	1,616	26,301	1·2	1·0
Madras	8,712	7,341	7,091	6,649	7,373	7,117	8,517	9,923	8,699	7,163	8,394	10,865	97,844	2·1	2·1
Coorg	10	7	24	11	19	24	21	13	20	15	11	2	177	1·1	0·7
Assam	623	571	534	682	660	750	754	731	668	720	815	687	8,195	1·0	1·1
Burma	284	240	250	312	388	491	790	709	502	409	327	329	5,031	0·4	0·4
Ajmer-Merwara	20	14	34	57	42	30	35	62	48	40	27	14	423	0·8	0·7

TABLE K.—DEATHS FROM RESPIRATORY DISEASES IN RURAL AND URBAN AREAS.

	Deaths.			Death rate p.m.			Mean 1929-33.	Deaths from pulmonary tuberculosis.			Death rate p.m.		
	R.	U.	Total.	R.	U.	Total.		R.	U.	Total.	R.	U.	Total.
British India	332,581	150,437	483,018	1·3	5·5	1·8	1·6	...	...	...	...	...	...
N.-W. F. P.	1,732	1,419	3,151	0·8	4·4	1·3	1·0	...	70*	...	...	...	...
Punjab	41,808	13,762	55,570	2·0	4·2	2·3	2·3	...	1,547†	...	...	0·4	0·9
Delhi	1,406	3,074	4,480	6·8	6·7	6·7	7·2	73	403	476	...	...	0·7
U. P.	12,367	34,200	46,567	0·3	8·7	0·9	0·7	569	5,402	5,971	...	1·4	0·1
B. & O.	6,404	944	7,348	0·2	0·6	0·2	0·2	...	...	...	...	...	...
Bengal	67,143	17,970	85,113	1·4	5·1	1·7	1·3	10,928	3,917	14,845	0·2	1·1	0·3
C. P.	38,559	6,622	45,181	2·7	3·8	2·8	2·5	3,205	905	4,110	0·2	0·5	0·3
Bombay	71,230	35,338	106,568	3·9	8·2	4·7	4·8	15,843	7,406	23,249	0·9	1·7	1·0
Madras	81,537	26,205	107,742	2·0	4·1	2·3	2·2	...	...	...	...	0·1	...
Coorg	88	64	152	0·6	6·7	0·9	1·5	2	1	3	...	...	...
Assam	5,950	490	6,440	0·7	2·4	0·8	0·7	...	125	...	...	...	...
Burma	4,352	8,639	12,991	0·4	6·1	1·0	1·0	...	2,221	...	...	...	...
Ajmer-Merwara	5	1,710	1,715	...	9·6	3·0	1·3	...	...	...	...	...	...

TABLE L.—DEATHS FROM RESPIRATORY DISEASES BY MONTHS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	Rate p.m.	
														1934.	1933.
British India	45,304	43,536	46,722	41,798	36,846	32,488	34,136	38,011	37,445	38,065	41,022	47,645	483,018	1·8	1·6
N.-W. F. P.	426	412	368	252	258	193	137	157	184	209	237	318	3,151	1·3	1·1
Punjab	5,731	6,244	5,491	4,193	3,667	3,365	3,057	3,167	3,469	3,689	5,067	8,430	55,570	2·3	2·3
Delhi	449	399	408	418	343	280	294	357	255	269	412	596	4,480	6·7	6·8
U. P.	3,770	3,890	4,554	4,484	4,245	3,560	3,342	3,971	3,724	3,516	3,809	3,902	46,567	0·9	0·7
B. & O.	668	640	563	758	543	470	671	705	614	592	517	607	7,348	0·2	0·2
Bengal	8,634	8,023	8,552	8,471	6,535	5,142	5,741	5,815	5,683	6,218	7,625	8,674	85,113	1·7	1·6
C. P.	3,582	3,841	4,732	4,320	3,698	3,290	3,049	3,882	3,848	4,119	3,470	3,350	45,181	2·8	2·0
Bombay	10,047	9,695	11,142	8,836	7,388	6,176	7,240	8,874	9,111	9,102	9,098	9,859	106,568	4·7	4·5
Madras	10,178	8,606	9,034	8,281	8,593	8,441	8,849	9,183	8,734	8,576	9,235	10,032	107,742	2·3	2·3
Coorg	10	15	13	18	1	16	12	14	19	12	9	13	152	0·9	1·1
Assam	532	555	658	625	462	486	497	551	553	498	528	495	6,440	0·8	0·6
Burma	1,097	1,051	1,042	959	959	977	1,126	1,219	1,149	1,135	1,069	1,208	12,991	1·0	1·0
Ajmer-Merwara	180	165	165	183	154	92	121	116	102	130	146	161	1,715	3·0	2·7

*Municipal towns only.

†For 13 municipal towns in charge of whole-time health officers.

TABLE M.—QUININE AND CINCHONA FEBRIFUGE ISSUED BY THE PUBLIC HEALTH, MEDICAL, AND OTHER DEPARTMENTS IN THE VARIOUS PROVINCES DURING 1934.

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
N.-W. F. P. (SETTLED DISTTS. ONLY).				
Peshawar	427	3	461	4
Hazara	60	1	98	1
D. I. Khan	124	3	113	3
Kohat	120	4	73	2
Bannu	159	5	40	1
Total	890	3	785	3
PUNJAB.				
Hissar	8	..	21	..
Rohtak	52	..	..	..
Gurgaon	9	..	15	..
Karnal	76	1	..	..
Ambala	29	..	66	1
Simla . . . . .	..	..	..	..
Kangra	77	1	..	..
Hoshiarpur	100	1	..	..
Jullundur	42	..	..	..
Ludhiana	53	1	..	..
Ferozepore	15	..	..	..
Lahore	58	..	..	..
Amritsar	42	..	2	..
Gurdaspur	85	1	38	..
Sialkot	13	..	..	..
Gujranwala	54	1	..	..
Sheikhupura	30	..	14	..
Gujrat	44	..	..	..
Shahpur	9	..	..	..
Jhelum	18	..	..	..
Rawalpindi	47	1	..	..
Attock	32	..	1	..
Mianwali	23	..	..	..
Montgomery	93	1	..	..
Lyalpur	8	..	53	..
Jhang	22	..	..	..
Multan	20	..	..	..
Muzaffargarh	20	..	..	..
Dera Ghazi Khan	12	..	..	..
Total	*3,497	1	210	..
DELHI PROVINCE.				
Delhi	307	3	238	3

*Including 2,406 lbs. issued by the Medical Department of which details are not available.

TABLE M. — QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.—*contd.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
UNITED PROVINCES. *				
Dehra Dun	20	1	9	..
Saharanpur	128	1	123	1
Muzaffarnagar	85	1	25	..
Meerut	58	..	80	..
Bulandshahr	53	..	95	1
Aligarh	87	1	77	..
Muttra	56	1	128	1
Agra	99	1	115	1
Mainpuri	32	..	22	..
Etah	48	..	63	1
Bareilly	141	1	131	1
Bijnor	33	..	75	1
Budaun	34	..	37	..
Moradabad	64	..	129	1
Shahjahanpur	38	..	109	1
Pilibhit	52	1	90	1
Farrukhabad	56	..	67	1
Etawah	24	..	28	..
Cawnpore	50	..	42	..
Fatehpur	16	..	49	..
Allahabad	222	1	260	1
Banda	33	..	4	..
Hamirpur	28	..	37	1
Jhansi	107	1	112	1
Jalaun	27	..	24	..
Benares	45	..	98	1
Mirzapur	14	..	43	..
Jaunpur	25	..	32	..
Ghazipur	12	..	17	..
Ballia	12	..	15	..
Gorakhpur	171	..	324	1
Basti	35	..	161	1
Azamgarh	16	..	27	..
Naini Tal	222	6	494	12
Almora	16	..	12	..
Garhwal	30	..	35	..
Lucknow	132	1	155	1
Unao	28	..	88	1
Rae Bareli	30	..	94	1

*Quantities issued by the Public Health, Medical, Jail and other Departments.

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.—*contd.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
UNITED PROVINCES— <i>contd.</i>				
Sitapur	50	..	75	..
Hardoi	51	..	71	..
Kheri	76	1	131	1
Fyzabad	54	..	60	..
Gonda	122	1	129	1
-ahraich	61	..	94	1
Sultanpur	14	..	16	..
Partabgarh	25	..	40	..
Bara Banki	27	..	36	..
Total	2,859	..	4,178	1

BIHAR AND ORISSA.

Patna	11	..	NOTE.—Quinine or Cinchona febrifuge was not distributed free.
Gaya	1	..	
Shahabad	22	..	
Saran	15	..	
Champaran	13	..	
Muzaffarpur	14	..	
Darbhanga	9	..	
Monghyr	8	..	
Bhagalpur	15	..	
Purnea	51	..	
Santal Parganas	25	..	
Cuttack	25	..	
Balasore	17	..	
Angul	6	..	
Puri	13	..	
Sambalpur	14	..	
Hazaribagh	14	..	
Ranchi	17	..	
Palamau	3	..	
Manbhum	17	..	
Singhbhum	17	..	
Total	340	..	

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.—*contd.*

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
BENGAL PRESIDENCY (<i>Quantities issued by the Public Health Department only</i>).				
Mymensingh	1,201	2	..	..
Dacca	1,019	2	..	..
Tippera	893	2	..	..
Chittagong	775	3	..	..
Faridpur	730	2	..	..
Noakhali	501	2	..	..
Pabna	382	2	..	..
Jessore	317	1	..	..
Bakarganj	298	1	..	..
Rangpur	289	1	..	..
Khulna	286	1	..	..
Bogra	217	1	..	..
Nadia	213	1	..	..
Burdwan	212	1	..	..
Murshidabad	170	1	..	..
Midnapur	140	..	..	..
24-Parganas	137	..	..	..
Birbhum	130	1	..	..
Rajshahi	126	1	..	..
Bankura	117	1	..	..
Dinajpur	95	..	..	..
Hooghly	94	1	..	..
Calcutta	79	1	..	..
Malda	73	1	..	..
Jalpaiguri	60	..	..	..
Howrah	27	..	..	..
Darjeeling	11	..	..	..
Total	8,589	1	..	..

C. P. & BERAR.

Nagpur	252	2	42	..
Wardha	33	..	24	..
Chanda	29	..	28	..
Chhindwara	81	1	41	..
Betul	92	?	23	..
Jubbulpore	66	1	50	..
Saugor	98	1	30	..
Mandla	59	1	23	..
Hoshangabad	111	1	52	..

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.
—contd.

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
C. P. & BERAR—contd.				
Nimar	45	1	48	1
Raipur	156	1	43	..
Bilaspur	65	..	32	..
Drug	39	..	5	..
Ehandara	36	..	35	..
Balaghat	41	1	29	..
Amraoti	243	2	62	..
Yeotmal	81	1	27	..
Akola	174	1	36	..
Buldana	244	2	71	1
Total	1,945	1	706	..
BOMBAY PRESIDENCY.				
East Khandesh	42	..	..	..
West Khandesh	31	..	..	..
Surat	97	1	..	..
Broach	33	1	..	..
Kaira	92	1	..	..
Panch Mahals	28	..	..	..
Ahmedabad	281	2	..	..
Ahmednagar	19	..	..	..
Poona	250	2	..	..
Nasik	18	..	..	..
Thana	17	..	..	..
Bombay Suburban	7	..	..	..
Bombay City	5*	..	..	..
Kolaba	7	..	..	..
Ratnagiri	2	..	..	..
Belgaum	470	3	..	..
Dharwar	107	1	..	..
Bijapur	17	..	..	..
Kanara	55	1	..	..
Sholapur	26	..	..	..
Satara	148	1	..	..
Karachi	203	2	..	..
Dadu	61	1	..	..
Hyderabad	218	2	..	..
Nawabshah	117	2	..	..
Thar and Parkar	80	1	..	..
Larkana	214	3	..	..
Sukkur	307	3	..	..
Upper Sind Frontier	47	1	..	..
Total	2,999†	1	..	..

* The figs. relate to two jails.

† These represent free issues and exclude 7½ lbs. issued free on railways. In addition, quinine hydrochloride treatments worth Rs. 7,805 was sold by the Public Health Department and quinine worth Rs. 30,892 was sold through Post Offices.

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.
—contd.

Districts.	Quinine.		Cinchona febrifuge.	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
MADRAS PRESIDENCY.*				
Anantapur	421	3	65	..
Bellary	379	4	112	1
Chingleput	41	..	..	..
Chittoor	72	..	..	..
Coimbatore	104	..	1	..
Cuddapah	120	1	23	..
Ganjam	112	..	..	..
Godavari	113	..	..	..
Guntur	75	..	..	..
Kistna	70	..	..	..
Kurnool	188	1	..	..
Madura	242	1	97	..
Madras	169	3	102	1
Malabar	161	1	108	..
Nellore	130	1	..	..
The Nilgiris	56	3	4	..
North Arcot	31	..	..	..
Ramnad	130	1	1	..
Salem	81	..	..	..
South Arcot	31	..	..	..
South Kanara	619	3	45	..
Tanjore	265	1	15	..
Tinnevelly	60	..	..	..
Trichinopoly	72	..	..	..
Vizagapatam	163	1	29	..
Total	3,905	1	602	..
COORG.				
Coorg	83	..	40	..
ASSAM.				
Cachar	74	1	143	2
Sylhet	216	1	270	1
Goalpara	66	1	16	..
Kamrup	223	2	158	1
Darrang	119	1	174	2
Nowgong	83	1	275	3
Sibsagar	7	..	25	..
Lakhimpur	92	1	58	1
K. & J. Hills	108	3	63	2
Garo Hills	56	2	19	1
Sadiya Frontier Tract	74	10	25	3
Naga Hills	63	2	69	3
Lushai Hills	49	3	83	5
Total	1,230	1	1,378	1

* The given figures show actual consumption.

TABLE M.—QUININE ISSUED BY PUBLIC HEALTH DEPARTMENTS, ETC.
—concl'd.

Districts.	Quinine.		Cinchona febrifuge	
	Total issues in lbs.	Grains per head of population.	Total issues in lbs.	Grains per head of population.
BURMA.				
Akyab	3	..	98	1
Kyaukpyu	3	..	11	..
Sandoway . . . . .	..	..	2	..
Rangoon	5	..	..	..
Pegu . . . . .	..	..	134	2
Tharrawaddy	4	..	37	1
Hanthawaddy . . . . .	..	..	67	1
Insein	9	..	43	1
Prome	4	..	31	1
Bassein	9	..	68	1
Henzada	2	..	54	1
Myaungmya	5	..	38	..
Maubin	1	..	1	..
Pyapon . . . . .	..	..	61	1
Thaton	19	..	31	..
Amherst	15	..	41	1
Tavoy	2	..	60	2
Mergui . . . . .	..	..	92	4
Toungoo	7	..	119	2
Thayetmyo	5	..	13	..
Minbu . . . . .	..	..	73	2
Magwe	2	..	5	..
Pakokku . . . . .	..	..	16	..
Chin Hills . . . . .	..	..	31	1
Mandalay	5	..	40	1
Kyaukse . . . . .	..	..	18	1
Meiktila . . . . .	..	..	5	..
Myingyan	2	..	..	..
Yamethin	1	..	16	..
Bhamo	1	..	232	13
Myitkyina. . . . .	..	..	74	3
Shwebo	1	..	37	1
Sagaing . . . . .	..	..	1	..
Katha	4	..	21	1
Upper Chindwin . . . . .	..	..	12	..
Lower Chindwin	2	..	10	..
Northern Shan States. . . . .	..	..	245	3
Southern Shan States . . . . .	..	..	232	2
Total	111	1	2,069	1
Total including issues from the Medical Store Depôt	2,624	1	2,257	1
AJMER-MERWARA.				
Ajmer-Merwara	332	14	215	9

Appendix III

relating to

Section III.

TABLE A.—MATERNAL DEATH RATES PER 1,000 BIRTHS IN CERTAIN TOWNS.

	1934.		1933.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.
<i>Delhi.</i>				
Delhi City	87	6	104	7
Delhi Ntd. Area	27	34	27	31
<i>United Provinces.</i>				
Lucknow	177	14	119	10
Agra	71	6	68	5
Cawnpore	119	9	74	6
Allahabad	110	13	73	9
Benares	171	15	111	9
Moradabad	84	15	48	8
Aligarh	20	6	22	7
Bareilly	38	6	28	4
Saharanpur	61	15	30	8
Hathras	41	18	19	8
Muttra	29	10	32	10
Muzaffarnagar	8	6	12	7
Meerut	30	10	13	5
Jhansi	13	4	6	2
<i>Central Provinces.</i>				
Nagpur	111	11	80	8
Amraoti	64	27	48	20
Raipur	26	14	16	9
Burhanpur	32	14	33	16
Akola	64	33	40	21
Jubbulpore	44	8	27	8
Khamgaon	5	5	6	6
<i>Bombay Presidency.</i>				
Bombay City	249	7	233	8
Ahmedabad	188	12	204	12
Karachi	110	9	108	9
Surat	41	7	56	10
Sukkur	37	16	43	18
Shikarpur	38	17	67	29
Hyderabad	27	8	37	11
Poona	1,031	184	49	10
Larkana	21	25	18	24
Nasik	26	25	26	25
Sholapur	31	5	57	8
Satara	6	13	2	4
Ahmednagar	27	13	15	7

TABLE A.—MATERNAL DEATH RATES PER 1,000 BIRTHS IN CERTAIN TOWNS—*contd.*

	1934.		1933.	
	Deaths.	Rate p. m.	Deaths.	Rate p. m.
<i>Madras Presidency.</i>				
Chingleput	16	22	17	22
Tanjore	55	20	62	23
Guntur	86	32	73	28
Nellore	45	22	66	32
Negapatam	29	18	29	19
Nandyal	13	14	9	11
Anantapur	8	15	8	14
Mayavaram	16	18	3	3
Kurnool	15	9	32	20
Cuddapah	28	30	18	22
Kumbakonam	38	16	52	24
Tinnevelly	52	25	33	16
Cuddalore	31	15	42	20
Trichinopoly	68	15	63	13
Conjeeveram	34	13	35	13
Calicut	58	14	65	23
Rajahmundry	40	16	28	12
Palamcottah	38	19	27	13
Madura	117	18	107	16
Vellore	59	19	36	12
Cocanada	24	12	37	17
Tuticorin	37	15	22	9
Bezwada	50	18	33	12
Ellore	20	10	26	13
Madras	313	11	331	12
<i>Burma.</i>				
Mandalay	64	8	50	7
Moulmein	32	17	23	13
Rangoon Town	66	7	54	6
Myingyan	24	24	17	16
Akyab	13	18	9	12
Prome	13	12	14	12
Pegu	12	15	12	14
<i>Coorg.</i>				
Mercara	9	50	2	12

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						
Total	13	7	233	193	91	147	337	347	31	205	1,058	1,129	2,245	1,683
N.-W. F. P.	..	..	..	1	..	1	..	2	..	1	..	3	10	16
Punjab.	..	..	22*	21*	18*	35*	40	56	15	48	1	14	155	558
Delhi	..	..	7	15	1	3	8	18	1	13	7	5	1	17
U. P.	..	..	109†	60	7	3	116	63	..	15	106	120	44	189
B. & O.	..	6	..	5	4	8	4	19	..	7	4	19	..	7
Bengal†	11	1	7	12	2	8	20	21	2	9	16	66	1,706	504
C. P.	..	..	..	7	11	39	11	46	6	42	6	2	19	194
Bombay	..	..	25	22	34	..	59	22	..	20	30	130	300	178
Madras.	..	..	63	46	14	30	77	76	7	38	769	633	6	15
Coorg	..	..	..	..	..	1	..	1	..	..	..	..	3	..
Assam	..	..	..	..	..	3	..	3	..	2	3	9	1	5
Burma	2	..	..	4	..	16	2	20	..	10	116	128	..	..
Ajmer-Merwara	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Not available.

*Columns 3—6 include 32 sub-centres (branches of the main centres) in addition to 64 centres.

†Includes 13 sub-centres.

R = Rural.
U = Urban.

‡Urban figures exclude two towns.

Appendix IV

relating to

Section IV.

TABLE SHOWING THE DISTRIBUTION OF

	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. H. S.)				M.	F.		
	Whole time.	Part time.	Whole time.	Part time.						
Total	146	1	70	...	651	1,244	6,319	86	17	797
N.-W. F. P.	...	...	...	...	2*	...	24	...	...	2
Punjab	28	...	...	...	60	48	483	...	...	14
Delhi	1	1	...	...	...	2	3	...	5	10
	(I. M. S. A. D. P. H.)							(S. A. S. (Sanitary Part Assistants). time).		
U. P.	41	...	30	...	43	131	821	...	...	...
B. & O.	13	...	15	...	162	76	1,178	1	10	132
Bengal†	23	...	8	...	199	574	1,813	32	...	540
C. P.	...	...	...	...	33	...	256	...	...	37
Bombay	2	...	2	...	97	5	877	...	1	48
Madras	30	...	15	...	18	322	653	3	1	12
Assam	...	...	...	...	15	...	411	...	...	...
Burma	8	...	...	...	22	86	300	...	...	2

† Urban figures exclude two towns.

*Appointments sanctioned for rural as well as

HEALTH STAFFS IN RURAL AND URBAN AREAS.

Urban Areas.									
Medical Officers of Health.				Sanitary and Health Inspec- tors	Vaccinators.		Inspec- tors of Vaccin- ation.	School Medical Officers.	Other Health Staffs.
Holding D. P. H.		Licentiate (L. P. H. S.)			M.	F.			
Whole time.	Part time.	Whole time.	Part time.						
124	8	98	19	9 ⁰	927	27	97	59	667
1	...	...	...	8	8	1	*6	5	...
12	...	...	17	129	88	10	5	8	68
1	3	...	...	12	8	...	...	3	8
	(Includes one I. M. S.)							(2 S. A. S. whole-time and 1 A. S. A. S. (Part- time)).	
20	...	13	...	165	185	...	...	13	...
9	3	...	...	65	72	1	20	...	53
19	...	5	2	103	134	5	4	4	75
2	...	1	...	61	68	...	...	...	5
20	...	47	...	129	61	2	2	10	237
25	...	28	...	181	178	8	19	13	88
1	...	...	...	14	29	...	41	...	97
14	2	4	...	123	96	...	...	3	36

urban areas of the province.

Appendix V

relating to

Section VI.

TABLE A.—VACCINATION STATISTICS FOR 1934-35.

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 successfully vaccinated.
		P	R	Total.	P.	R.	Under 1 year.	1 to 6 years.				
British India	269,694,709	10,128,115	13,141,109	23,269,224	96	46	4,084,309	4,128,994	33,46,172	Rs. 0 3 11	51	44
N.-W. F. P.	3,762,678	142,543	114,192	256,735	98	84	74,861	48,778	26,919	0 1 11	59	103
Punjab	23,454,352	917,582	2,195,905	3,113,487	99	65	690,263	133,611	3,78,597	0 3 0	85	74
Delhi	636,246	18,547	15,338	33,885	97	63	13,500	2,749	7,438	0 4 10	38	55
U. P.	48,408,763	1,575,704	282,025	1,857,729	95	40	912,799	460,224	3,83,598	0 3 11	33	51
B. & O.	37,677,576	1,089,829	777,381	1,867,210	99	63	297,810	719,149	76,694	0 0 11	35	23
Bengal	50,114,002	2,635,546	4,260,825	6,896,371	86	40	289,696	1,510,464	4,49,249	0 1 9	80	20
C. P.	15,507,723	567,399	158,289	725,688	97	52	418,478	108,856	1,91,645	0 5 3	38	60
Bombay	21,855,300	733,844	482,991	1,216,835	100	46	481,052	189,753	5,42,265	0 11 2	35	62
Madras	45,204,545	1,331,176	3,842,744	5,223,920	96	27	642,825	498,161	7,26,400	0 5 9	44	39
Coorg	163,327	8,112	17,101	25,213	95	64	1,379	4,391	5,846	0 5 3	109	33
Assam	9,247,857	411,785	293,151	704,936	91	64	71,459	254,692	1,15,759	0 3 9	56	29
Burma	13,102,048	621,449	697,519	1,318,968	96	32	171,949	294,591	4,33,634	0 9 7	56	47
Ajmer-Merwara	560,292	24,599	3,648	28,247	96	94	18,238	3,575	3,128	0 4 9	48	94

P = Primary.
R = Revaccinations.

TABLE B.—VACCINATIONS PERFORMED IN THE BRITISH AND INDIAN ARMIES DURING 1934—OFFICERS AND OTHER RANKS.

Commands.	British Troops.									
	Officers.					Warrant, 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	1	81	100	95	2	3,079	50	86		
Western	...	34	...	100	3	750	100	77		
Eastern	4	95	75	83	23	3,267	74	55		
Southern	...	119	...	64	6	4,102	83	61		
Burma District	...	18	...	78	...	403	...	84		
Total	5	347	80	81	34	11,601	76	68		

Commands.	Indian Troops.											
	European officers.				Indian commissioned, non-commissioned officers and men.				Followers.			
	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	...	127	...	94	235	14,746	88	88	50	3,691	100	94
Western	1	33	...	91	...	2,987	...	96	...	772	...	92
Eastern	...	53	...	72	548	10,038	84	79	9	1,684	78	68
Southern	4	86	100	66	72	7,866	97	66	23	2,731	100	58
Burma District	...	7	...	100	...	718	...	90	...	73	...	78
Total	5	306	80	82	855	36,355	86	81	82	8,951	98	73

P.—Primary. R.—Revaccinations.

TABLE B.—VACCINATIONS PERFORMED IN THE FAMILIES—BRITISH ARMY
DURING 1934—*concl.*

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 . . .	...	239	...	95	207	302	88	92
Western . . .	...	51	...	78	52	56	100	80
Eastern . . .	7	253	71	68	137	354	80	69
Southern . . .	4	326	100	67	214	322	71	82
Burma District . . .	...	38	...	86	33	27	76	81
Total . . .	11	905	82	76	643	1,061	81	81

TABLE B.—VACCINATIONS PERFORMED IN THE FAMILIES—INDIAN ARMY
DURING 1934—*concl.*

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 . . .	...	68	...	96	7	26	100	92
Western . . .	...	10	...	80	4	6	100	100
Eastern . . .	23	61	52	97	49	71	82	96
Southern . . .	...	28	...	64	6	22	100	86
Burma District . . .	...	3	...	100	...	4	...	100
Total . . .	23	170	52	90	66	129	86	94

Appendix VI

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 1934.

A.—(i) PAPERS PUBLISHED IN THE INDIAN JOURNAL OF MEDICAL RESEARCH (I. J. M. R.) AND ITS MEMOIRS.

Basir, M.A., and Reddy, D.V.S.

Structure and Significance of the Hypophysio-portal System. (Volume XXII, No. 1).

Basu, K. P., and Chakravarty, S.C.

Action of *B. coli* on conjugated Bile Acids. (Volume XXI, No. 4).

Basu, N. K.

Foundation of a Biochemical Method of Standardizing Vitamin D or Irradiated Ergosterol. (Volume XXII, No. 2).

Bhatia, B. B., and Lal, S.

The Pharmacological Action of Thevetoxin: A Second Glucoside from *Thevetia nerifolia*. (Volume XXI, No. 3).

On the Biological Assay of Digitalis by the Frog Method: describing a Characteristic Curve for *Rana tigrina*. (Volume XXII, No. 1).

Chopra, R. N., Chaudhury, S. G., and Gupta, J. C.

On Electrocardiograms. Part I. Blood-pressure and Electrocardiographic Changes with Muscle Extract. (Volume XXI, No. 3).

Chopra, R. N., and Chowhan, J. S.

Action of the Indian Daboia (*Vipera russellii*) Venom on the Circulatory System. (Volume XXI, No. 3).

Alangium lamarkii.—Its Chemistry and Pharmacological Action. (Volume XXI, No. 3).

Chopra, R. N., and De, Premankur.

A Preliminary Note on the Pharmacological Action of *Antiaris toxicaria*. (Volume XXI, No. 3).

Chopra, R. N., Mukherjee, S. N., and Sundar Rao, S.

Studies on the Protein Fractions of Blood Sera. Part I. Normal and Filarial Blood Sera. (Volume XXII, No. 1).

Chopra, R. N., Ghosh, N. N., and Mukerji, A. K.

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Appendix VII

relating to

Section X (Prisoners).

TABLE A.—SICKNESS

Statistics by

Administrations.*	Average strength.	Constantly sick.	Cholera.		Small-pox.		Malaria.	
			A.	D.	A.	D.	A.	D.
India (excluding Andamans)	141,895	21	0·2	...	0·4	...	152	0·6
	145,437	22	...	...	0·4	...	172	0·6
	141,417	23	0·1	...	0·4	...	169	0·5
Andamans	5,759	27	...	...	...	...	260	1·7
	6,623	27	...	...	0·3	...	245	2·7
	7,363	38	...	...	0·1	...	396	7·4
India (Including Andamans)	147,654	22	0·2	...	0·4	...	157	0·6
	152,060	22	...	...	0·4	...	175	0·7
	148,780	24	0·1	...	0·3	...	180	0·9
N.-W. F. P.	6,447	30	...	...	...	...	157	0·9
	6,927	35	...	...	0·7	...	258	0·4
	5,944	31	...	...	0·2	...	227	0·6
Punjab	19,957	22	...	...	0·3	...	274	1·4
	20,428	23	...	...	0·2	...	315	0·8
	19,317	28	0·1	...	0·2	...	355	0·9
U. P.	31,925	19	0·7	0·1	0·8	...	127	0·1
	33,346	20	...	...	0·6	...	128	0·3
	33,646	20	0·2	0·1	0·6	...	144	0·4
B. & O.	10,001	24	0·6	0·1	0·7	...	50	0·6
	11,469	25	...	...	0·4	0·1	68	0·5
	10,251	27	0·2	0·1	0·6	0·1	104	0·3
Bengal	19,271	38	0·2	0·1	0·3	...	269	1·2
	16,656	37	0·1	...	0·4	...	334	1·2
	15,316	35	0·2	...	0·4	0·1	264	1·1
C. P.	4,201	11	0·5	0·2	0·7	...	35	0·2
	4,308	10	...	...	0·2	...	43	0·5
	4,459	12	0·2	0·1	0·2	...	49	0·7
Bombay	12,143	22	...	...	...	...	317	0·3
	13,695	22	...	...	0·4	...	298	0·5
	13,559	20	0·1	...	0·3	...	225	0·3
Madras	11,640	15	...	...	0·1	...	18	0·2
	11,758	17	...	...	0·1	...	22	0·2
	13,008	18	...	...	0·2	...	27	0·2
Assam	4,007	22	...	...	...	...	111	0·7
	3,805	26	...	...	...	...	131	0·8
	3,102	30	...	...	0·1	...	114	0·5
Burma	20,239	10	0·1	...	0·4	...	12	0·2
	20,895	11	...	...	0·3	...	19	0·6
	20,257	15	...	...	0·3	...	41	0·5

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.		Diarrhoea.		Anæmia and debility.		All causes.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
5	2.2	11	2.8	31	0.5	33	0.8	20	0.2	8	0.3	541	12
6	1.7	10	2.3	30	0.4	35	0.8	20	0.2	8	0.3	560	11
7	2.0	12	2.5	29	0.4	40	1.1	21	0.3	9	0.4	587	12
4	2.1	4	1.0	28	0.2	26	1.2	6	...	8	1.7	567	11
5	2.1	6	1.2	23	0.6	25	2.0	6	0.2	12	2.4	552	17
3	2.0	6	2.4	21	0.4	20	5.0	11	0.3	10	3.2	753	31
6	2.2	11	2.7	30	0.5	33	0.8	19	0.2	8	0.4	552	12
6	1.7	10	2.2	30	0.4	35	0.8	19	0.2	8	0.4	560	12
7	2.0	11	2.5	29	0.4	39	1.2	20	0.3	9	0.5	595	13
10	3.1	33	7.4	59	0.9	13	...	5	...	19	...	496	15
8	2.2	21	3.3	66	0.4	17	0.6	10	0.3	11	...	642	12
10	2.6	28	4.5	59	0.4	13	0.2	11	0.1	7	...	600	13
8	3.9	13	3.0	50	0.4	32	0.6	16	0.4	6	0.2	745	15
10	1.1	10	2.7	40	0.4	40	1.0	18	0.6	8	0.3	746	15
7	2.5	13	3.6	47	0.5	29	0.4	21	0.6	15	0.2	859	14
3	1.2	7	2.0	25	0.2	15	6.4	15	0.2	6	0.1	459	8
4	1.3	9	1.6	26	0.4	15	0.1	13	0.2	6	0.2	474	7
7	1.2	12	2.4	23	0.4	21	0.4	12	0.2	6	0.2	480	9
9	3.8	14	4.4	29	0.7	45	1.5	19	...	3	1.1	363	20
6	2.6	17	3.4	44	0.6	53	1.8	45	0.1	3	0.2	462	15
6	2.8	14	2.6	37	0.5	71	1.7	46	0.3	1	0.1	516	15
6	1.9	11	2.6	41	0.8	66	1.5	63	0.1	30	0.7	1,079	13
5	1.4	12	3.0	39	0.1	65	1.1	56	0.2	20	0.7	1,094	12
5	1.6	12	2.3	34	0.4	58	1.4	55	0.2	18	0.5	993	12
5	1.7	8	2.9	14	1.4	31	0.7	19	1.0	5	1.4	289	15
8	2.1	8	2.8	14	0.7	24	0.7	13	0.5	5	0.5	277	10
8	1.7	8	1.9	14	0.9	58	1.4	14	0.4	3	0.4	320	12
3	1.3	17	3.5	40	0.5	51	0.3	32	0.1	7	0.6	737	13
3	1.2	13	2.7	32	0.3	43	0.1	26	0.2	10	0.3	666	11
3	1.1	16	3.0	33	0.3	54	0.4	31	0.2	8	0.3	623	10
5	2.0	3	1.1	7	0.8	36	1.3	2	0.3	7	0.6	210	12
5	2.0	4	0.4	11	0.4	39	1.3	2	0.2	9	0.3	290	11
11	2.0	5	1.1	14	0.4	47	0.8	1	0.1	8	0.3	321	10
8	1.7	18	5.2	66	0.7	99	1.7	11	...	19	0.5	530	14
11	2.6	15	3.2	53	0.5	134	1.6	22	...	14	1.6	561	16
12	3.8	12	3.1	52	0.6	128	3.4	27	0.2	12	1.2	597	18
6	2.1	8	1.5	6	0.1	10	0.7	2	0.1	2	0.1	179	10
4	2.2	6	1.7	7	0.2	15	0.8	2	...	3	0.2	239	11
7	3.2	6	1.7	10	0.3	29	2.7	5	0.2	8	0.8	399	16

are those for (1) 1934, (2) 1933 and (3) 1929—33.
of average population.

TABLE B.—SICKNESS

Statistics by

Groups.*	Average strength.	Constantly sick.	Influenza.		Cholera.		Smallpox.	
			A.	D.	A.	D.	A.	D.
India (excluding Andamans)	141,895	21	40	0.2	0.2	...	0.4	...
	145,437	22	31	0.1	...	...	0.4	...
	141,417	23	37	0.2	0.1	...	0.4	...
Andamans	5,759	27	18	...	...	...	0.3	...
	6,623	27	14	...	...	...	0.1	...
	7,363	33	4	0.1	...	...	0.1	...
India (including Andamans)	147,654	22	39	0.2	0.2	...	0.4	...
	152,060	22	30	0.1	...	...	0.4	...
	148,780	24	35	0.2	0.1	...	0.3	...
Group I.—Burma Coast and Bay Islands	14,539	10	22	0.1	0.1	...	0.1	...
	14,700	10	19	...	...	...	0.3	...
	13,903	16	43	...	...	...	0.2	...
Group II.—Burma Inland	5,700	9	3	...	0.2	...	1.2	...
	6,195	13	11	...	...	...	0.3	0.2
	6,355	13	13	0.1	...	...	0.4	...
Group III.—Assam	3,896	22	25	0.3	...	...	...	...
	3,678	26	24	1.1	...	...	...	...
	2,996	30	45	0.3	...	...	0.1	...
Group IV.—Bengal & Orissa	20,358	39	114	0.3	0.2	...	0.4	...
	17,559	37	101	0.3	0.1	...	0.3	...
	16,137	35	86	0.3	0.2	...	0.4	0.1
Group V.—Gangetic Plain and Chota-Nagpur.	29,719	21	39	0.3	0.8	0.1	0.9	...
	32,423	23	31	0.2	...	...	0.7	...
	31,339	24	36	0.3	0.1	0.1	0.7	...
Group VI.—Upper Sub-Himalaya	18,290	22	26	0.1	0.2	0.1	0.1	0.1
	19,405	19	7	...	...	...	0.1	...
	19,734	21	18	0.2	0.2	0.1	0.3	...
Group VII.—North-West Frontier, Indus Valley and North-Western Rajputana.	19,962	22	13	...	...	...	0.3	...
	20,106	29	3	...	...	...	0.5	...
	18,423	30	21	0.2	0.1	...	0.2	...
Group VIII.—South Western Rajputana, Central India & Gujarat.	5,332	14	20	...	0.5	...	...	...
	5,584	12	24	...	0.3	...	0.3	...
	5,578	12	37	...	...	...	...	...
Group IX.—Deccan	9,860	18	39	0.4	0.2	0.1	0.3	...
	11,139	17	24	...	...	...	0.1	...
	11,114	17	21	0.1	0.2	0.1	0.2	...
Group X.—Western Coast	2,112	23	48	...	...	...	1.2	...
	2,553	18	20	...	...	...	0.4	...
	2,570	17	21	0.1	...	...	...	...
Group XI.—Southern India	10,899	14	39	0.2	...	...	0.1	...
	10,863	17	61	0.1	...	...	...	...
	12,159	19	48	0.2	...	...	0.2	...
Group XII.—Hills	1,174	48	25	...	...	...	...	...
	1,171	49	28	0.9	...	...	...	...
	1,037	38	52	0.8	...	...	0.2	...

A = Admissions.

D = Deaths.

NOTE.—The three figures opposite each administrative group. The rates have been calculated *per mille*.

* Excluding subsidiary falls.

AND MORTALITY.

Geographical Groups.

Enteric fever.		Malaria.		Pyrexia of uncertain origin.		Pneumonia.		Dysentery.		Diarrhoea.		All causes.	
A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
2	0.3	152	0.6	8	...	11	2.8	33	0.8	20	0.2	541	12
2	0.3	172	0.6	9	...	10	2.3	35	0.8	20	0.2	560	11
2	0.3	169	0.5	12	...	12	2.5	40	1.1	21	0.3	587	12
2	0.4	260	1.7	...	...	4	1.0	26	1.2	6	...	567	11
1	...	245	2.7	...	...	6	1.2	25	2.0	6	0.2	552	18
1	0.1	396	7.4	...	...	6	2.4	20	5.0	11	0.3	753	31
2	0.3	157	0.6	8	...	11	2.7	33	0.8	19	0.2	552	12
2	0.2	175	0.7	9	...	10	2.2	35	0.8	19	0.2	560	12
2	0.3	180	0.9	14	...	11	2.5	39	1.2	20	0.3	595	13
2	0.1	9	0.1	7	...	7	0.1	9	0.4	3	0.1	176	9
1	0.2	14	0.3	9	0.1	5	1.2	14	0.9	2	0.1	222	10
4	0.4	37	0.3	14	...	5	1.6	30	2.5	5	0.2	421	15
2	0.5	20	0.7	11	...	12	2.3	11	1.4	1	0.2	186	12
2	0.3	29	1.3	5	...	10	2.9	16	0.5	1	...	282	13
3	0.5	41	0.9	10	...	8	2.0	29	3.1	5	0.2	350	18
3	0.5	110	0.8	2	...	18	5.4	100	1.8	11	...	530	15
1	...	130	0.8	1	...	15	3.3	134	1.4	18	...	542	16
1	0.1	112	0.5	8	0.1	12	3.2	130	3.4	25	0.2	587	18
1	0.4	262	1.2	25	...	12	3.0	67	1.7	62	0.1	1,061	14
1	0.5	328	1.1	18	...	13	3.2	64	1.2	54	0.2	1,072	13
2	0.3	266	1.1	38	...	12	2.4	58	1.5	54	0.2	981	17
1	0.2	97	0.2	6	...	9	2.5	23	0.6	17	0.1	413	11
3	0.2	92	0.4	10	...	10	2.2	27	0.6	24	0.2	468	9
2	0.3	124	0.4	7	...	12	2.4	36	0.7	22	0.2	485	11
2	0.2	258	0.8	11	...	10	2.5	27	0.5	17	0.1	717	10
2	0.2	287	0.6	8	0.1	11	2.4	32	0.9	18	0.5	695	12
2	0.2	317	0.7	13	0.1	14	3.6	29	0.4	18	0.5	780	10
3	0.5	246	1.2	3	...	25	5.6	35	0.5	15	0.3	651	17
6	0.6	304	0.8	16	...	18	3.7	34	0.5	15	0.4	710	15
4	0.4	278	0.7	6	...	23	4.5	28	0.4	17	0.4	711	15
1	0.6	187	0.4	2	...	13	2.3	29	0.6	9	0.4	432	9
3	0.2	132	0.2	2	0.2	12	1.6	13	0.2	7	...	331	6
2	0.1	137	0.4	1	...	12	2.4	20	0.5	18	0.3	418	8
1	0.1	141	0.2	5	0.1	6	1.8	25	0.3	27	0.5	487	11
1	...	198	0.3	6	...	6	1.4	29	0.4	25	0.2	516	8
2	0.1	134	0.4	10	...	6	1.1	58	0.8	27	0.2	478	8
3	0.5	169	0.5	...	...	2	...	91	1.9	24	...	617	8
3	...	106	...	2	...	2	...	86	1.2	24	...	537	7
4	0.2	136	0.2	1	...	4	1.1	83	1.1	28	0.1	521	8
...	...	19	0.2	1	...	3	1.2	27	1.0	2	0.3	200	12
2	...	23	0.2	1	...	4	0.5	33	1.2	2	0.2	282	11
3	0.3	29	0.2	3	...	5	1.1	46	0.8	1	0.1	328	10
3	1.7	121	...	2	...	12	3.4	15	...	8	...	422	20
...	...	227	0.9	3	...	10	1.7	24	0.9	23	0.9	565	18
1	0.4	183	0.2	14	...	20	2.1	36	0.2	18	0.6	610	20

are those for (1) 1934, (2) 1933 and (3) 1929—33.
of average population.

TABLE C.—CAUSES OF ADMISSION.*

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Cholera	{ 1	{ 2	{ 2	{ 2	{ 1	{ 2	{ 20	{ 4	{ 1	{ 2	{ 1	{ 1	{ 35
Smallpox	{ 7 4	{ 6 5	{ 9 8	{ 9 6	{ 7 11	{ 5 12	{ 2 2	{ 2 2	{ 1 ...	{	{ 4 2	{ 2 2	{ 54 54 51
Dysentery	{ 306 277 327	{ 262 282 169	{ 328 362 330	{ 387 322 355	{ 412 377 335	{ 418 405 362	{ 640 501 736	{ 795 550 625	{ 695 535 442	{ 584 567 383	{ 491 521 382	{ 406 422 300	{ 5,724 5,121 4,746
Diarrhoea	{ 165 160 134	{ 162 186 147	{ 264 291 279	{ 241 214 234	{ 229 253 267	{ 258 262 255	{ 343 303 452	{ 374 320 343	{ 266 233 228	{ 229 255 174	{ 211 248 165	{ 180 173 156	{ 2,912 2,898 2,834
Enteric fever	{ 13 19 10	{ 16 18 17	{ 25 25 18	{ 31 42 30	{ 34 37 20	{ 28 37 18	{ 34 28 29	{ 41 35 37	{ 44 37 21	{ 34 26 18	{ 26 20 12	{ 12 7 13	{ 338 331 243
Malaria	{ 1,259 1,223 1,452	{ 973 920 1,133	{ 1,143 1,303 1,405	{ 1,267 1,350 1,387	{ 1,353 1,419 1,437	{ 1,378 1,466 1,409	{ 1,842 1,937 1,929	{ 2,420 2,313 2,085	{ 3,002 2,861 2,562	{ 3,879 4,349 2,979	{ 3,256 3,578 2,367	{ 2,063 2,299 1,477	{ 23,840 25,018 21,622
Pyrexia of uncertain origin	{ 96 88 61	{ 75 90 51	{ 117 104 78	{ 121 146 140	{ 134 120 126	{ 165 86 117	{ 197 115 106	{ 133 120 106	{ 170 170 69	{ 164 128 76	{ 132 99 108	{ 93 77 94	{ 1,647 1,348 1,132
Pneumonia	{ 205 201	{ 119 195	{ 126 173	{ 113 131	{ 100 114	{ 78 100	{ 101 84	{ 88 94	{ 87 81	{ 122 110	{ 173 137	{ 192 194	{ 1,504 1,614
Tubercle of the lungs	{ 70 64	{ 78 63	{ 57 52	{ 66 68	{ 76 88	{ 64 65	{ 67 84	{ 130 75	{ 69 85	{ 50 76	{ 46 64	{ 47 47	{ 815 831 972

Not available.

Not available.

Not available.

NOTE.—The three figures shown against each disease are those for (1) 1934, (2) 1933 and (3) mean of 1929—33,

* Excluding Andamans.

TABLE D.—*SICKNESS AND MORTALITY FROM PRINCIPAL DISEASES.

Year.	Average annual strength.	Influenza.				Cholera.				Smallpox.				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.
1934	141,895	5,667	26	40	0·2	35	7	0·2	...	54	1	0·4	...	243	41	2	0·3
1933	145,437	4,536	18	31	0·1	5	...	0·1	...	54	2	0·4	...	331	38	2	0·3
Mean 1929—33	141,417	5,217	28	37	0·2	15	5	0·1	...	51	3	0·4	...	338	42	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.
1934	141,895	21,622	82	152	0·6	1,132	2	8	...	831	308	6	2·2	1,614	392	11	2·8
1933	145,437	25,018	83	172	0·6	1,343	4	9	...	815	241	6	1·7	1,504	328	10	2·3
Mean 1929—33	141,417	23,840	77	169	0·5	1,647	5	12	...	972	286	7	2·0	1,634	357	12	2·5

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.
1934	141,895	4,329	70	31	0·5	4,746	112	33	0·8	2,834	25	20	0·2	1,089	46	8	0·3
1933	145,437	4,357	53	30	0·4	5,121	111	35	0·8	2,898	34	20	0·2	1,179	50	8	0·3
Mean 1929—33	141,417	4,113	60	29	0·4	5,724	150	40	1·1	2,912	37	21	0·3	1,299	50	9	0·4

NOTE.—Rates have been calculated *per mille* of average population.

* Excluding Andamans.

A = Admissions.

D = Deaths.

TABLE E.—SICKNESS STATISTICS OF CONVICTS ONLY.

		1930			1931			1932			1933			1934		
		Average population.	Rate per 1,000.		Average population.	Rate per 1,000.		Average population.	Rate per 1,000.		Average population.	Rate per 1,000.		Average population.	Rate per 1,000.	
			A.	D.		A.	D.		A.	D.		A.	D.		A.	D.
Total	{ C.	64,554	576	13	66,066	506	12	76,799	482	10	71,222	434	11	70,108	411	12
	{ D.	63,097	667	12	40,199	680	14	58,752	737	12	53,671	801	12	52,462	721	13
N.-W. F. P.	{ C.	3,764	605	18	3,959	439	8	6,359	734	11	5,538	687	11	5,100	512	14
	{ D.	572	902	21	637	730	41	630	797	18	670	457	22	671	383	27
Punjab	{ C.	8,359	975	13	9,051	823	15	9,558	722	17	8,943	679	17	8,938	626	16
	{ D.	8,635	1,032	16	7,865	1,143	13	8,519	962	10	8,614	934	16	8,566	950	15
U. P.	{ C.	11,789	241	4	12,189	360	8	13,115	356	8	12,477	318	5	12,056	300	7
	{ D.	16,417	562	8	14,246	675	13	17,939	675	10	16,042	577	7	14,976	561	9
B. & O.	{ C.	4,784	246	20	4,876	337	24	5,230	257	12	5,866	211	15	5,799	241	22
	{ D.	6,222	667	8	3,952	818	16	5,753	1,098	14	4,739	771	17	3,300	539	19
Bengal	{ C.	7,111	900	9	6,891	872	11	7,399	1,017	12	7,551	909	12	8,281	907	13
	{ D.	9,051	958	11	5,449	1,089	15	5,968	1,222	14	6,295	1,286	14	8,377	1,249	15
C. P.	{ C.	2,111	421	9	2,058	180	12	2,214	265	6	1,830	104	6	1,830	135	9
	{ D.	2,295	418	9	1,682	599	23	2,289	426	8	1,992	437	16	2,294	435	17
Bombay	{ C.	7,776	724	9	6,546	590	8	8,755	519	6	7,001	511	11	6,670	603	12
	{ D.	6,686	604	10	5,143	560	16	6,725	585	9	5,827	887	12	4,654	958	15
Madras	{ C.	10,427	605	18	9,372	373	10	10,018	273	8	8,849	271	12	8,726	184	13
	{ D.	3,343	902	21	11,669	396	10	2,306	447	11	2,045	367	7	2,045	304	11
Assam	{ C.	2,370	536	16	2,606	630	22	3,140	596	21	3,143	551	18	3,354	531	16
Burma	{ C.	10,433	555	21	11,124	397	13	14,151	364	11	13,167	214	12	12,728	174	10
	{ D.	7,506	375	16	5,875	243	12	5,483	262	15	4,304	273	12	4,225	180	12

C = Central Jails.
D = District Jails.

A = Admission Rates.
D = Death Rates.

TABLE F.—SICKNESS STATISTICS OF CONVICTS ONLY ARRANGED ACCORDING TO DURATION OF CONFINEMENT.

			Not exceeding six months.	Above six months and not exceed- ing one year.	Above one year and not exceed- ing two years.	Above two years and not exceed- ing three years.	Above three years and not exceed- ing seven years.	Above seven years.	Total.
1930	District Jails . . .	Average Popn. . .	30,071	12,642	9,224	5,353	3,430	1,227	61,947
		Deaths . . .	308	127	128	60	68	36	727
		Rate per 1,000 . . .	10	10	14	11	20	29	12
	Central Jails . . .	Average Popn. . .	17,179	12,116	11,403	8,911	8,815	9,085	67,509
		Deaths . . .	224	114	154	106	170	100	868
		Rate per 1,000 . . .	13	9	14	12	19	11	13
1931	District Jails . . .	Average Popn. . .	21,990	11,453	8,166	5,174	2,837	1,106	50,726
		Deaths . . .	338	147	124	44	57	21	731
		Rate per 1,000 . . .	15	13	15	9	20	18	14
	Central Jails . . .	Average Popn. . .	15,092	11,604	10,587	8,834	8,917	8,762	63,796
		Deaths . . .	229	106	132	80	142	83	772
		Rate per 1,000 . . .	15	9	13	9	16	10	12
1932	District Jails . . .	Average Popn. . .	26,794	13,931	8,277	4,822	2,774	1,093	57,691
		Deaths . . .	335	136	91	44	48	25	679
		Rate per 1,000 . . .	13	10	11	9	17	23	12
	Central Jails . . .	Average Popn. . .	19,316	13,891	11,898	10,503	9,900	9,381	74,889
		Deaths . . .	234	138	133	76	111	74	766
		Rate per 1,000 . . .	12	10	11	7	11	8	10
1933	District Jails . . .	Average Popn. . .	21,188	13,762	8,601	5,164	2,984	1,007	52,706
		Deaths . . .	295	153	104	50	42	16	660
		Rate per 1,000 . . .	14	11	12	10	14	16	13
	Central Jails . . .	Average Popn. . .	14,424	11,394	12,278	10,067	9,444	9,343	66,950
		Deaths . . .	222	128	158	72	143	75	798
		Rate per 1,000 . . .	13	11	13	7	15	8	11
1934	District Jails . . .	Average Popn. . .	19,804	11,874	8,870	5,500	3,220	809	50,077
		Deaths . . .	340	140	97	63	48	14	702
		Rate per 1,000 . . .	17	12	11	11	15	17	14
	Central Jails . . .	Average Popn. . .	12,811	11,278	11,516	10,495	10,418	9,805	66,323
		Deaths . . .	240	115	186	113	136	78	873
		Rate per 1,000 . . .	19	10	16	11	13	8	13

TABLE G.—ADMISSION AND DEATH RATES PER MILLE OF AVERAGE STRENGTH.

	N.-W. F. P.	Punjab.	U. P.	B. & O.	Bengal.	C. P.	Bombay.	Madras.	Assam.	Burma.	India.*	Andamans.	India.†
I.—Average Annual Strength.	6,447	19,957	31,925	10,001	19,271	4,201	12,143	11,640	4,007	20,239	141,895	5,759	147,654
II.—Constantly Sick Rate—													
(a) Excluding subsidiary jails and lock-ups.	30	22	19	24	38	11	22	15	22	10	21	27	22
(b) Including subsidiary jails and lock-ups.	30	21	19	23	36	11	20	14	22	10	21	27	21
III.—Admission Rate—													
All causes—													
(a) Excluding subsidiary jails and lock-ups.	496	745	459	363	1,079	289	737	210	530	179	541	567	552
(b) Including subsidiary jails and lock-ups.	497	736	459	422	1,062	291	784	262	530	179	555	567	555
Influenza	23	16	38	85	116	57	18	38	27	17	40	18	39
Cholera . . . . .	...	...	1	1	...	1	...	...	...	...	...	...	...
Smallpox . . . . .	...	...	1	1	...	1	...	...	...	...	...	...	...
Enteric fever	5	2	1	3	2	1	1	1	3	2	2	2	2
Malaria	157	274	127	50	269	35	317	18	111	12	152	280	157
Sandfly fever . . . . .	...	11	5	...	...	...	...	...	...	...	3	...	8
Pyrexia of uncertain origin.	3	7	9	1	22	12	...	1	1	8	8	...	8
Tubercle of the lungs	10	8	3	9	6	5	3	5	8	6	6	4	6
Pneumonia	33	18	7	14	11	8	17	3	18	8	11	4	11
Respiratory diseases	59	50	25	29	41	14	40	7	66	6	31	23	30
Dysentery	13	32	15	45	66	31	51	36	99	10	33	26	33
Diarrhœa	5	16	15	19	63	19	32	2	11	2	20	6	19
Spleen diseases . . . . .	...	1	1	...	...	...	1	...	...	...	...	...	...
Scurvy . . . . .	...	...	...	...	...	...	1	...	...	...	...	...	...
Anæmia and debility	19	6	6	3	30	5	7	7	19	2	8	8	8
Abscess, ulcer and boil	31	56	50	14	53	9	37	6	18	9	35	23	35
IV.—Death Rate—													
All causes—													
(a) Excluding subsidiary jails and lock-ups.	15	15	8	20	13	15	13	12	14	10	12	11	12
(b) Including subsidiary jails and lock-ups.	15	14	8	18	13	15	12	11	14	10	12	11	12
Cholera . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
Smallpox . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
Enteric fever	1	...	...	...	...	...	...	...	...	...	...	...	...
Malaria	1	1	...	1	1	...	...	...	1	...	1	2	1
Sandfly fever . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
Pyrexia of uncertain origin.	...	...	...	...	...	...	...	...	...	...	...	...	...
Tubercle of the lungs	3	4	1	4	2	2	1	2	2	2	2	2	2
Pneumonia	7	3	2	4	3	3	4	1	5	2	3	1	3
Respiratory diseases	1	...	...	1	1	1	1	1	1	...	1	...	1
Dysentery . . . . .	...	1	...	2	2	1	...	1	2	1	1	1	1
Diarrhœa . . . . .	...	...	...	...	...	1	...	...	...	...	...	...	...
Hepatic abscess . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
Anæmia and debility . . . . .	...	...	...	...	1	1	1	1	1	...	...	2	...
Phagadœna, slough and gangrene.	...	...	...	...	...	...	...	...	...	...	...	...	...

*Excluding Andamans.

†Including Andamans.

TABLE H.—ADMISSIONS BY MONTHS FROM CHOLERA, SMALLPOX, ENTERIC FEVER, MALARIA, PYREXIA OF UNCERTAIN ORIGIN, TUBERCULOSIS OF THE LUNGS, PNEUMONIA, DYSENTERY AND DIARRHŒA.

	CHOLERA.												Total.
	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
India . . . . .	...	...	2	2	1	2	20	4	...	2	1	1	35
N.-W. F. P. . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
Punjab . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
U. P. . . . .	...	...	1	...	...	...	18	2	...	...	...	...	21
B. & O. . . . .	...	...	...	1	1	2	1	1	...	...	...	...	6
Bengal . . . . .	...	...	1	...	...	...	...	...	...	2	1	...	4
C. P. . . . .	...	...	...	...	...	...	1	1	...	...	...	...	2
Bombay . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
Madras . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
Assam . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
Burma . . . . .	...	...	...	1	...	...	...	...	...	...	...	1	2
Andamans . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
	SMALLPOX.												
India	4	5	8	6	11	12	2	2	...	...	2	2	54
N.-W. F. P. . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
Punjab	1	2	...	...	...	...	...	...	...	...	...	2	5
U. P.	1	1	2	3	4	11	1	...	...	...	1	...	24
B. & O.	1	2	2	...	2	...	...	...	...	...	...	...	7
Bengal . . . . .	...	...	...	...	2	...	1	2	...	...	...	...	5
C. P.	1	...	...	2	...	...	...	...	...	...	...	...	8
Bombay . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
Madras . . . . .	...	...	1	...	...	...	...	...	...	...	...	...	1
Assam . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
Burma . . . . .	...	...	3	1	3	1	...	...	...	...	1	...	9
Andamans . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
	ENTERIC FEVER.												
India	10	17	19	31	20	18	29	40	22	22	15	13	256
N.-W. F. P.	1	2	...	3	6	3	7	6	2	...	...	...	30
Punjab . . . . .	...	1	2	8	6	6	4	9	4	3	1	3	47
U. P.	1	1	3	6	2	1	2	2	...	3	...	2	23
B. & O. . . . .	...	2	...	4	2	2	4	5	1	3	1	...	26
Bengal	2	...	2	4	1	2	6	4	4	2	1	2	30
C. P. . . . .	...	...	...	...	...	...	1	1	1	...	...	...	8
Bombay . . . . .	...	1	...	...	2	...	1	3	3	1	4	1	16
Madras . . . . .	...	...	1	...	...	...	...	1	1	2	1	...	6
Assam	1	2	4	...	...	...	2	...	...	...	1	2	12
Burma	5	6	3	3	1	3	2	5	2	2	3	3	38
Andamans . . . . .	...	...	1	1	...	...	...	3	1	4	3	...	13

TABLE H.—ADMISSIONS BY MONTHS FROM CHOLERA, SMALLPOX, ENTERIC FEVER, MALARIA, PYREXIA OF UNCERTAIN ORIGIN, TUBERCULOSIS OF THE LUNGS, PNEUMONIA, DYSENTERY AND DIARRHŒA—*contd.*

	MALARIA.													Total.
	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.		
India	1,522	1,185	1,503	1,536	1,589	1,597	2,152	2,237	2,667	3,099	2,476	1,556	23,119	
N.-W. F. P.	66	53	74	87	73	104	140	90	100	95	71	59	1,012	
Punjab	320	247	229	276	451	364	523	548	910	721	545	332	5,466	
U. P.	183	118	209	219	205	195	319	491	609	852	426	230	4,056	
B. & O.	41	27	48	57	55	42	45	54	33	38	41	19	500	
Bengal	376	298	425	399	376	361	472	451	382	630	584	421	5,175	
C. P.	11	16	5	10	2	2	15	11	15	22	28	10	147	
Bombay	367	297	331	262	145	212	264	321	337	430	552	326	3,844	
Madras	22	25	20	14	9	10	23	12	28	22	9	15	209	
Assam	19	19	19	29	57	73	61	36	33	32	36	32	446	
Burma	15	10	14	15	23	24	25	25	19	24	35	15	244	
Andamans	70	52	98	149	152	188	223	152	105	120	109	79	1,497	
	PYREXIA OF UNCERTAIN ORIGIN.													
India	61	51	78	140	126	117	106	106	69	76	108	94	1,132	
N.-W. F. P.	2	2	...	1	1	3	1	5	1	1	1	1	19	
Punjab	4	12	2	5	24	24	15	14	3	4	26	10	143	
U. P.	8	14	28	37	30	32	47	38	29	15	5	14	297	
B. & O. . . . .	...	1	1	...	1	...	...	1	2	1	...	...	7
Bengal	28	15	28	68	40	39	23	29	24	43	43	32	417	
C. P.	8	2	0	6	3	2	8	8	3	2	2	...	50	
Bombay . . . . .	...	...	2	...	1	...	1	1	...	...	...	...	5
Madras . . . . .	...	1	...	2	1	2	...	...	1	...	1	1	9
Assam . . . . .	...	...	1	...	4	1	...	...	...	...	...	...	6
Burma	11	4	9	21	21	13	8	10	6	10	23	30	172	
Andamans . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...
	TUBERCULOSIS OF THE LUNGS.													
India	65	63	54	69	89	65	86	79	88	80	68	48	854	
N.-W. F. P.	8	6	2	8	8	4	11	3	4	8	1	2	65	
Punjab	8	5	6	16	11	9	15	23	20	24	13	15	165	
U. P.	9	11	9	6	9	10	14	6	10	5	6	3	98	
B. & O.	5	5	5	6	9	14	8	7	9	5	12	6	91	
Bengal	14	7	9	9	13	9	7	9	14	8	10	5	114	
C. P.	4	4	4	...	2	...	3	...	3	...	2	1	23	
Bombay	2	1	2	5	3	2	4	4	3	4	5	3	38	
Madras	4	4	4	3	4	5	7	6	5	5	4	8	59	
Assam	3	4	3	1	5	3	1	4	3	3	3	...	33	
Burma	6	15	7	12	22	8	13	13	13	14	6	2	131	
Andamans	1	...	2	1	1	...	2	4	3	4	4	1	23	

TABLE H.—ADMISSIONS BY MONTHS FROM CHOLERA, SMALLPOX, ENTERIC FEVER, MALARIA, PYREXIA OF UNCERTAIN ORIGIN, TUBERCULOSIS OF THE LUNGS, PNEUMONIA, DYSENTERY AND DIARRHOEA—*concl'd.*

		PNEUMONIA.												
		Jan.	Feb.	Mar.	Aprl.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
India	. . .	203	198	174	195	115	102	85	95	81	115	139	195	1,637
N.-W. F. P.	. . .	21	36	29	14	13	4	6	10	1	10	19	49	212
Punjab	. . .	51	32	25	19	13	6	8	9	12	11	19	50	255
U. P.	. . .	22	10	21	19	22	22	17	13	19	20	28	20	233
B. & O.	. . .	14	17	10	8	13	5	6	16	10	16	15	13	143
Bengal	. . .	25	24	18	29	19	17	13	12	10	14	21	19	221
C. P.	. . .	5	4	2	1	4	...	5	5	1	1	2	3	33
Bombay	. . .	27	38	25	19	8	15	10	6	8	10	16	21	203
Madras	. . .	5	3	5	3	3	1	2	2	4	5	2	2	37
Assam	. . .	1	8	7	8	3	10	4	6	7	10	4	5	73
Burma	. . .	23	19	25	11	14	17	11	14	7	10	9	7	167
Andamans	. . .	2	3	1	4	1	2	1	1	...	5	2	1	23
		DYSENTERY.												
India	. . .	345	180	338	363	344	379	749	648	460	389	389	311	4,895
N.-W. F. P.	. . .	8	2	4	9	10	9	6	3	12	10	9	4	86
Punjab	. . .	43	12	46	68	50	45	46	80	98	79	49	17	633
U. P.	. . .	31	20	26	46	44	47	67	75	54	36	32	20	493
B. & O.	. . .	31	20	40	35	23	26	151	48	19	19	22	13	447
Bengal	. . .	91	51	103	89	93	97	180	152	87	81	123	126	1,273
C. P.	. . .	2	3	5	2	2	5	44	35	13	11	5	5	132
Bombay	. . .	60	19	34	39	22	32	120	120	55	39	40	45	625
Madras	. . .	30	21	23	26	39	26	57	39	29	38	60	34	422
Assam	. . .	16	16	47	32	39	45	30	44	43	45	24	14	395
Burma	. . .	14	3	1	9	12	28	29	24	20	20	14	19	193
Andamans	. . .	18	11	8	8	9	17	13	23	18	6	7	11	149
		DIARRHOEA.												
India	. . .	141	148	282	237	269	260	456	344	230	175	166	158	2,866
N.-W. F. P.	. . .	3	1	6	2	1	3	...	3	6	2	5	3	35
Punjab	. . .	20	18	46	23	31	16	28	30	34	18	23	26	313
U. P.	. . .	17	39	63	41	46	32	96	44	26	33	20	18	475
B. & O.	. . .	5	8	16	12	15	12	44	36	13	10	7	9	187
Bengal	. . .	54	44	123	127	133	140	178	133	95	55	68	56	1,211
C. P.	. . .	1	1	7	4	5	6	33	10	6	4	1	1	7
Bombay	. . .	25	25	10	21	18	31	59	77	35	42	23	28	394
Madras	. . .	5	3	...	...	...	2	12	4	2	...	3	3	24
Assam	. . .	...	4	5	2	6	4	4	1	6	5	3	6	46
Burma	. . .	3	2	2	2	7	8	3	1	3	3	8	2	44
Andamans	. . .	7	1	3	3	2	5	4	1	2	1	1	2	32

TABLE I.—DETAILS OF DISEASES.

Jail population of India		147,654
	Admissions.	Deaths.
<i>Diseases caused by Infection or infestation.</i>		
Blackwater fever	1	1
Chicken-pox	908	..
Cholera	35	7
Dengue	265	..
Dysentery	4,895	119
Enteric fevers	256	43
Enteritis infective (including food poisoning)	2	..
Erysipelas	60	6
Gangrene, acute infective	13	2
Hydrophobia (rabies)	1	1
Influenza	5,773	26
Jaundice spirochætal	29†	5†
Kala-azar	280	17
Leprosy	150	9
Malaria	23,119	91
Measles	74	..
Meningococcal infection (cerebro-spinal fever)	130	78
Mumps	1,751	1
Plague	2	2
Pyæmia	3	2
Pyrexia of uncertain origin	1,132	2
Rheumatic fever	464	3
Sandfly fever	406	1
Septicæmia	7	2
Smallpox	54	1
Tetanus	4	2
Tuberculosis pulmonary	854	320
Tuberculosis other cases	151	48
Venereal diseases—		
(a) Gonorrhœa	480	..
(b) Soft chancre	98	..
(c) Syphilis	701	7
(d) Other cases	1	..
Other diseases caused by infection	110	6
<i>Diseases due to infestation by Metazoan Parasites.</i>		
Ankylostomiasis	1,279	37
Ascariasis	41	..
Bilharziasis	5	..
Dracontiasis (Guinea-worm)	245	..
Intestinal tæniasis—		
(a) Tænia Solium	4	..
Other intestinal parasites	6	..
Scabies	697	..
Other diseases due to infestation	97	2

† Weil's disease.

TABLE I.—DETAILS OF DISEASES—*contd.*

	Admissions.	Deaths.
<i>Diseases of the Nervous System.</i>		
Cerebral hæmorrhage	1	1
Epilepsy	127	9
Meningitis	1	1
Neuralgia	172	1
Neuritis	58	1
Paralysis	30	1
Sciatica	39	..
Other diseases of the nervous system.	176	17
<i>Mental Diseases.</i>		
Hysteria	1	..
Involution (Melancholia).	15	1
Mania	27	..
Neurasthenia	1	..
Schizophrenia (Dementia præcox)	13	..
Other mental diseases	17	2
<i>Diseases of the Eye.</i>		
Blepharitis	4	..
Conjunctivitis	745	..
" granular (Trachoma)	46	..
Cataract	6	..
Glaucoma	11	..
Iritis	20	..
Keratitis	178	..
Other diseases of the eye	243	..
<i>Diseases of the Ear.</i>		
Inflammation of the external ear	89	1
Diseases of the middle ear	117	2
Diseases of the mastoid process	13	1
Other diseases of the ear	33	..
<i>Diseases of the Nose.</i>		
Diseases of the mucuous membrane	679	2
Other diseases of the nose	11	..
<i>Diseases of the Circulatory System.</i>		
Diseases of the valves	100	30
Disordered action of the heart	4	1
Diseases of blood vessels	4	2
Endocarditis	6	2
Myocarditis	45	13
Pericarditis	4	..
Other diseases of the circulatory system	71	32
<i>Diseases of the Blood and blood forming organs.</i>		
Anæmia primary	} 500	43
Anæmia pernicious		
Anæmia secondary		
Diseases of the spleen	61	1
Lymphadenitis	229	1
Lymphangitis	55	..
Other blood diseases	694	12

TABLE I.—DETAILS OF DISEASES—*contd.*

	Admissions.	Deaths.
<i>Diseases of Glands of Internal Secretion.</i>		
Goitre	1	..
<i>Diseases of the Breast.</i>		
Mastitis	4	..
Other diseases	1	..
<i>Diseases of the Respiratory System.</i>		
Asthma	786	30
Bronchitis	3,347	18
Empyema	5	4
Laryngitis	12	1
Pleurisy	197	8
Pneumonia :—		
(a) Lobar	1,637	398
(b) Lobular (broncho-pneumonia)		
Other diseases	143	10
<i>Diseases of the Teeth and Gums.</i>		
Caries of the enamel, dentine and cementum	39	..
Gingivitis	65	..
Pyorrhœa alveolaris	52	1
Other diseases	306	2
<i>Diseases of the Digestive System.</i>		
Appendicitis	77	4
Cholecystitis and cholangitis	14	1
Colic	571	..
Colitis	3,817	19
Constipation	277	..
Diarrhœa	2,866	25
Enteritis :	172	21
Fistula in ano	26	..
Gastritis	95	2
Glossitis	2	..
Hæmorrhoids (piles)	597	3
Hepatitis acute	97	4
Hepatic abscess (tropical abscess)	25	2
Hepatitis chronic (cirrhosis)	55	5
Hernia	67	..
Indigestion	630	1
Intestinal obstruction	17	7
Jaundice	235	4
Pharyngitis	87	1
Peritonitis	18	9
Sprue	16	3
Stomatitis	140	..
Tonsillitis	119	..
Other diseases	651	31
<i>Diseases due to Disorders of Nutrition or of Metabolism</i>		
Beri-beri	31	1
Diabetes mellitus	26	3
Gout	11	..
Inanition	8	1
Scurvy	13	..
Other diseases	20	..

TABLE I.—DETAILS OF DISEASES—*contd.*

	Admissions.	Deaths.
<i>Diseases of the Male Organs of Generation.</i>		
Balanitis	3	..
Epididymitis	3	..
Hydrocele of tunica vaginalis	110	..
Orchitis	246	1
Paraphimosis	8	..
Phimosis	35	..
Stricture of the urethra	13	..
Urethral fistula	7	1
Urethritis	23	..
Other diseases	188	4
<i>Diseases of the Female Organs of Generation.</i>		
Abortion	4	..
Affection connected with pregnancy and Parturition and consequent on parturition.	3	..
Displacements and distortions of the uterus	3	..
Dysmenorrhœa	1	..
Endometritis	1	..
Menorrhægia	2	..
Other diseases peculiar to women	56	2
<i>Diseases of Bones, Joints, Muscles, Fasciæ and Bursæ.</i>		
Arthritis	56	..
Diseases of the spine	8	..
Myalgia	295	..
Osteo-myelitis	9	..
Periostitis	22	..
Synovitis	210	..
Other diseases	238	1
<i>Diseases of the Areolar Tissue.</i>		
Boil	898	..
Carbuncle	41	1
Cellulitis	904	9
Cellulitis suppurative (abscess)	2,755	1
Other diseases	70	1
<i>Diseases of the Skin.</i>		
Dermatitis	25	..
Eczema	416	..
Herpes zoster	23	..
Impetigo	9	..
Onychia	1	..
Prickly heat	5	..
Psoriasis	7	..
Urticaria	27	..
Whitlow	211	..
Other diseases	1,792	4

TABLE I.—DETAILS OF DISEASES—concl'd.

	Admissions.	Deaths.
<i>Diseases of the Urinary organs.</i>		
Calculus, kidney	6	1
Cystitis	35	3
Hæmaturia	9	..
Nephritis acute	106	22
" chronic	99	23
Other diseases	170	11
<i>General Injuries.</i>		
Burns and scalds	93	3
Heat exhaustion	6	..
Heat stroke	204	14
Sun stroke	57	7
Other injuries	105	9
<i>Local Injuries.</i>		
Abrasions	165	..
Burns and scalds	134	1
Concussions	3	1
Contusions	418	2
Dislocations and displacements	36	..
Fractures	254	8
Sprains and strains	150	..
Wounds, gun-shot	25	1
,, others	1,764	4
Injuries self-inflicted	1	1
Other injuries	432	12
<i>Tumours and Cysts.</i>		
Carcinoma	20	8
Cysts	65	2
Sarcoma	13	2
New growths, malignant (other cases)	18	4
" " non-malignant.	6	1
Malformations	5	..
<i>Poisons.</i>		
Opium	2	1
Venom of insecta	2	..
,, Ophidia (snake bite)	11	..
Other poisons	14	1
No appreciable diseases	21	..
All other causes	294	4
Total	80,075	1,808