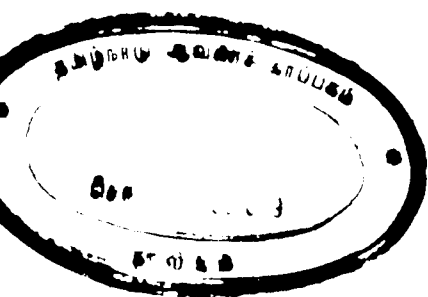


ANNUAL REPORT
OF THE
PUBLIC HEALTH COMMISSIONER
WITH THE GOVERNMENT OF INDIA
FOR 1946



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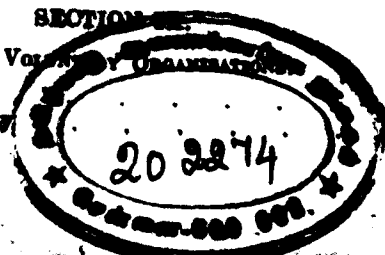
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**ANNUAL REPORT OF THE PUBLIC HEALTH COMMISSIONER
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SECTION I.

INTRODUCTION.

1. The constitutional changes that were heralded in on the 15th August 1947, have also effected the abolition of the post of the Public Health Commissioner with the Government of India. The functions of the Director General, Indian Medical Service on the curative side of medicine with those of the Public Health Commissioner on the preventive aspect have been combined and placed under the Director General of Health Services. This integrates the whole field of medical and public health work into one organisation. Such an organisation was proposed by the Bhore Committee Scheme reviewed in the last year's report.

This annual report of the Public Health Commissioner with the Government of India in its present form will therefore be the last of the series. The first of these reports appeared in 1864 as the annual report of the Sanitary Commissioner with the Government of India. The report then dealt with the health of Indian and British troops, jails and general public. With the change in the designation of the Sanitary Commissioner the report in 1920 was issued as the annual report of the Public Health Commissioner with the Government of India, and has been issued as such ever since. In 1922, the statistics of sickness and mortality among European and Indian troops and jail population were issued in a separate volume II of the report. In 1925, the report relating to the army was separated entirely from that relating to civil population by also including the narrative portion on the subject in volume II. In 1938, the volume II portion of the report was taken over by the Director of Medical Services who issued the first annual report on the health of the army in India for that year separately.

The Annual Report of the Public Health Commissioner with the Government of India is naturally based on similar reports of Provincial Directors of Public Health and of Railway and Jail Administrations. These reports which deal with health administration in their respective spheres and also give detailed statistics could not be made available to the Public Health Commissioner before the lapse of twelve months or even more after the year to which the report related. Consequently the issue of the Annual Report of the Public Health Commissioner entailed a further delay of about a year and a half. This considerably reduced the value of the report as a presentation of recent health events in the country, and therefore in order to expedite the publication of the report it was decided to issue a preliminary report based on advance notes from Provincial Directors of Public Health, and at a later date, a final report containing the usual statistical appendices.

As this preliminary report for 1939 was considered to be sufficiently informative the corresponding report for 1940 was not designated as the preliminary report but as the regular report for that year, it being mentioned that a supplementary volume of statistical data would be published subsequently. With the outbreak of war with Japan and the swift events which followed, the Government of India decided to suspend the publication of annual reports and directed that departments should concentrate on work essential for the war effort. In consequence the publication of the supplementary volume for 1940 was postponed. The preparation of annual reports was again taken up only in 1945 and combined reports for each group of two years 1941-42 and for 1943-44 were published later. Statistical tables for the period 1940-44 were issued in one volume early in 1947. For the year 1945, a preliminary note on the health conditions in British India was issued early and later a narrative portion of the main report was published without the statistical appendices which are shortly appearing in a separate volume. This arrangement (without the preliminary note) is proposed to be followed in respect of the present report. The statistical portion is under preparation and will be published as a separate volume in the near future.

The statistics of births, deaths and infant deaths in India during 1946 are given at pages 4 and 5; comparative figures for 1945, 1941-45 average and 1937-41 average are also given.

An examination of the birth, death and infantile mortality rates given in the table suggests that the following conclusions may be drawn:—

Birth rates.—The four yearly averages for the pre-war period and the war years show that a noticeable fall in the birth rate took place in the country as a whole and in individual provinces. The birth rates for 1946 as compared with the previous year suggest an improvement in the situation in British India, increases in the rate of an order of 2 per mille or more having been recorded in Ajmer-Merwara, Madras, Sind and Bengal.

Death rates.—Disparity in the death rates between the two four-year periods is not, it will be seen, so great as in the case of the birth rates, the only instance of an increase of over 2.0 per mille being Bengal and Orissa which went through the great famine of 1943. It seems therefore reasonable to hold that, in spite of the stress and strain which war conditions brought to bear on community life, the rise in mortality over the country as a whole was not appreciable. Although the high cost of living and difficulties in respect of food continued in 1946, it is gratifying to note that the recorded death rates show an appreciable fall in every province in comparison with the four-year period, the decrease being 4.1 per mille in British India as a whole and over 5 per mille in the provinces of Bengal, Delhi, Central Provinces, Coorg and Ajmer-Merwara.

Infantile mortality rates.—Here again the war years did not produce a rise in the country as a whole while individual provinces recorded varying reductions in the infantile mortality rate in comparison with the four-year period before the war. The year 1946 has shown a further

decrease in almost all the provinces and, in some cases, the fall has been appreciable.

During the year under review the incidence of epidemic diseases was mild throughout the country. There were epidemic outbreaks in Bombay, Madras, the United Provinces, and Bihar and to a minor extent in the Central Provinces, but they did not take on the explosive and extensive nature of the previous two years. Perhaps the prophylactic inoculation and vaccination campaigns introduced in anticipation of the seasonal rises of these diseases by the various provinces after their experience of the last two years may account for keeping the epidemic under check through the building up of an immune population.

Fairs and festivals in India have frequently been associated with outbreaks of cholera in the country. The provincial governments alive to the danger carry out elaborate sanitary control measures and have succeeded in a large measure in checking outbreak of the disease in or after these fairs. However, this year an unexpected fair at Samaria Ghat in Bihar caused an extensive epidemic of cholera. Due to its erratic time of occurrence, it was not anticipated and adequate sanitary arrangements were not made in time. Such incidents are vivid reminders for the establishment of legislative control by the Governments concerned so that sanction of the Government is sought before such gatherings are allowed. Compulsory anti-cholera inoculation is being increasingly enforced by the provinces for such gatherings, a measure which has proved highly successful in eliminating the spread of cholera during the movement of pilgrims.

In the sphere of health activities of the Central Government the calling of the Provincial Health Ministers Conference presided over by the Health Minister of the Central Government during the year is an event of note. This Conference considered recommendations of the Health Survey and Development Committee and agreed generally to the basic principles of the Bhore Committee's report. For the first time prominence has been given to the formulation of a policy of remedial and preventive health measures in the country. The conference dealt with only certain proposals put forward by the Bhore Committee. It is to be hoped that similar conference will be convened from time to time to discuss other proposals and to promote co-operation between the centre and the provinces in the advancement of the health of the country.

During recent years India has gradually drifted into a position of food scarcity. The pressure of the increased population on the land is only one of the factors creating such a situation. The primitive agricultural methods of generations still continue with poor per acre yield when compared to countries that have adopted mechanised methods of agriculture like the United States of America and the U.S.S.R. Modernisation of agricultural methods are urgently needed if our country's food production is to be increased substantially. In addition the enemy occupation of the rice-producing areas of Burma and the Far East during the war years cut completely the large rice supplies to India that used to come in the pre-war years. These supplies have not yet become available to any large extent, since the war has left devastated areas and disrupted communications all round. Imports of foodgrains from other surplus countries of the world have to a certain extent filled up the deficiency.

infant mortality in India in 1946.

Statement showing births, deaths and

Province.	Population (midyear estimate in thousands).	Births 1946.	Birth rate per mille.			
			1946.	1945.	1942-45 average.	1938-41 average.
N.-W. F. P.	3,314	60,144	18.2	16.7	17.1	22.8
Punjab	30,953	1,166,287	37.7	36.2	35.6	40.7
Delhi	1,068	39,760	37.2	39.4	37.1	38.7
U.P.	58,547	1,459,738	24.9	27.8	26.4	32.2
Bihar	38,061	868,344	22.6	23.5	22.2	29.2
Orissa	7,696	216,391	28.1	27.9	29.1	32.7
Bengal†	63,445	1,178,857	23.3	20.8	18.9	27.2
Assam	10,063	185,961	18.5	17.0	19.1	26.4
C. P.	17,609	647,934	36.8	39.2	38.3	39.7
Bombay	22,335	744,818	33.3	33.8	33.8	37.3
Sind	4,859	87,498	18.0	13.6	14.9	17.7
Madras	51,880	1,639,674	31.7	29.4	30.9	35.1
Coorg	169	3,320	18.9	18.4	18.8	22.6
Ajmer-Merwara	625	20,452	32.7	29.3	29.2	32.8
British India	247,179*	7,130,221*	28.9*	27.3	27.0	32.5

*Excluding Bengal.

Deaths 1946.	Death rate per mille.				Infantile deaths 1946.	Infantile mortality rate per 1,000 live births.			
	1946.	1945.	1942-45 average.	1938-41 average.		1946.	1945.	1942-45 average.	1938-41 average.
37,038	11.2	11.1	14.1	18.1	7,096	117.9	116.9	130.8	148.2
558,009	18.0	19.5	22.8	23.3	155,931	133.6	145.1	179.8	174.4
16,710	15.6	17.8	21.5	20.0	5,086	127.9	138.8	162.7	159.9
918,834	15.7	19.0	18.9	20.7	161,358	110.5	123.2	131.4	138.7
679,900	17.9	21.2	18.8	20.5	77,280	90.0	100.1	104.1	115.0
187,348	24.3	28.4	28.9	26.7	37,049	171.2	178.1	194.7	206.4
1,068,996	16.8	19.8	23.7	20.0	†	†	143.2	171.6	161.3
116,081	11.5	13.6	16.0	17.6	21,033	113.1	130.5	139.5	147.8
474,077	26.9	39.1	32.5	32.9	131,359	202.7	256.6	229.6	224.4
516,897	23.1	26.5	25.0	25.4	121,245	162.8	161.2	161.3	163.8
42,182	8.7	9.7	11.0	11.6	6,852	78.3	103.9	120.4	114.3
979,042	18.9	22.2	23.8	22.6	240,876	146.9	169.4	173.0	170.3
2,646	15.1	18.6	20.6	22.4	372	115.5	130.9	132.6	150.1
12,689	20.3	24.2	25.9	29.4	3,040	148.6	173.4	200.4	218.4
4,541,453*	18.4*	21.5	22.5	22.0	968,577*	135.8*	150.9	161.7	160.1

† Figures for 1946 are provisional.

† Not available.

Grave concern was felt over the food scarcity conditions which prevailed in certain areas in the provinces of Madras and Bombay and some of the Southern Indian States. Fortunately the measures taken both by the Central and Provincial Governments kept the worst fears of famine from materialising and by the end of the year conditions had improved sufficiently to show that the crisis had passed.

India played a very active part in the progress towards the establishment of the World Health Organisation a specialised agency of the United Nations, and in the work of its Interim Commission. The Indian member has been elected the chairman of its committee on the location of the headquarters and a vice-chairman of the committee of Epidemiology and Quarantine, as well as a member of certain other committees dealing with international health matters. A brief review of the formation of the World Health Organisation will be found in the chapter dealing with international health and quarantine.

SECTION II.

HISTORY OF CHIEF DISEASES.

Cholera.

2. It is gratifying to record that the incidence of the disease was mild throughout British India. Only in the United Provinces and Bihar there were epidemic outbreaks in the second quarter of the year but even these were not as serious as they had been during the previous two years. There was minor epidemic in the Central Provinces. Barring these exceptions, the incidence in all the provinces was within normal level and frequently was much below this level. In 1945 there were severe epidemic outbreaks in the United Provinces, Bihar, Bombay and the Central Provinces. It appears that the last two provinces after their experience in 1945 started large scale anti-cholera operations in advance of the actual outbreak of the disease. The results have been very satisfactory and may perhaps be taken to illustrate the usefulness of timely anticipatory anti-cholera measures to prevent the huge avoidable loss of human life. In some provinces compulsory inoculation was enforced in gatherings in connection with fairs and festivals and thus the usual outbreak of the disease was avoided. However, some provinces still report outbreak of the disease following in the wake of fairs and festivals. The practicability and advisability of enforcing compulsory inoculation in such gatherings in India has now been firmly established and it would appear that compulsory inoculation in big gatherings which are known to cause epidemics should be the rule rather than the exception. The increasing use of jeeps and trucks for transport purposes for anti-epidemic activities is a new feature introduced since the last war. The idea of Mobile Hygiene Units has much to commend itself in this country of vast rural distances.

A brief account of the cholera situation in the various provinces in 1946 and the important control measures adopted is given below:—

North-West Frontier Province.—The incidence of the disease was mild. Only 46 deaths were recorded during the year as against 22 in 1945.

There was a shortlived mild infection in Bannu town and surrounding villages. The infection made its appearance about the last week of May and cleared quickly by the end of June 1946. Early in November cholera broke out among Ghilzis in Afghanistan. Prompt precautionary measures were taken to check its spread in North-West Frontier Province. Detention and inspection posts were opened at Thall, Ranga and Kohat. The provincial Epidemic Travelling Dispensary 'B' was posted at Thall to combat the disease. Extensive inoculations against cholera were carried out. As a result of these precautions, Kohat and Bannu experienced only a mild incidence and both these districts were declared free from cholera by the first week of December 1946.

Punjab.—The incidence of the disease was mild when compared to that during the previous three years. Only 769 deaths were recorded during the year as against 1,285 in the previous year. The infection first appeared in April, 1946, reached its peak incidence in August and disappeared by the close of October. Later on, in the middle of November a shortlived outbreak appeared in Rawalpindi district which

was apparently due to infected food and water. No district ab heavy infection. The largest number of deaths was reported Kangra district, where the drinking water supply which is mainly hill streams became infected. An additional staff consisting of extra District Medical Officer of Health, four Sub-Assistant Health Officers, two Sanitary Inspectors and two units of Public Health were detailed to Kullu Sub-division. Epidemic Diseases Act, 1897 enforced in all the districts. Anti-cholera inoculations given number 381,132.

Delhi.—The incidence of the disease was particularly mild this year. Anti-cholera inoculations given totalled 29,011.

United Provinces.—There was an epidemic outbreak of the disease in the second quarter of the year, but the incidence of the disease was not as severe as it was last year. The total number of deaths from cholera was 50,650 as against 77,345 in 1945. The incidence started rising above the normal from the beginning of February, 1946. About the middle of March there was a steep rise indicating an epidemic during this part of the year for the second year in succession. The peak of the incidence was reached early in May, after which a rapid decline started. By the close of June the incidence had come down to the normal level. There was minor seasonal rise about August. The sharp epidemic outbreak that was experienced at this time of year for the past two years did not occur this year.

The districts worst affected during the epidemic outbreak in the second quarter of the year were Azamgarh, Balraich, Basti, Gorakhpur, Gonda, Fyzabad, Jaunpur, Kheri and Sultanpur. Of these Gorakhpur showed particularly heavy incidence. In Gorakhpur the incidence continued to be heavy during most part of the year. In the second minor rise in August Kheri, Pilibhit and Shahjahanpur experienced fairly heavy incidence.

A large scale drive against the epidemic was taken in hand. Standard regulations under the Epidemic Diseases Act were drawn up which enable District Magistrates to call up male medical practitioners up to the age of 40, as needed, to work on anti-epidemic duties on a provisional scale of remuneration. The Government authorised the employment of additional staff to the extent of 100 Medical Officers and 100 nursing orderlies and made financial provision for 26 ambulance vans for transport of cases. Pending their procurement, the Government sanctioned 20 vans from the Field Publicity Organisation. They also sanctioned jeep cars with trailer in 30 districts for speedy movement of personnel and supplies.

Restrictions on the sale of food, ice, ice-cream and sharbats in municipalities and notified areas were imposed for a period of six months under the Epidemic Diseases Act. Over 2,275,300 anti-cholera inoculations were performed which compare very favourably with the record figure of 3,373,600 in 1945 when it is considered that the latter figure includes extra inoculations given in connection with the Am Kumbh Mela. Simplification in the system of epidemic intelligence service was introduced and provision was made for the payment of annas four to the village chaukidar for the submission of timely reports.

Bihar.—An epidemic outbreak of cholera in the province did not occur this year, but, considered on the whole, it was not as severe

this time as it was in 1945. There was an early rise in the incidence of the disease in March. The disease followed a course very much similar to that in 1945 except that the curve of incidence appeared as if shifted by a month to the left. The incidence continued to rise sharply and reached the peak about the middle of May, after which it started declining and by the end of June it had come down to within normal limits. There was a minor rise in incidence again in October due to increased infection in certain districts but the outbreak was shortlived.

The districts affected on an epidemic level were Champaran, Muzaffarpur, Darbhanga and Purnea. The epidemic in the first three districts is believed to have originated from the bathing fair at Samaria Ghat in Monghyr where the gathering was unexpectedly large and the arrangements for sanitation and anti-cholera precautions were inadequate. Other districts showing considerable infection were Patna, Shahabad, Bhagalpur, Santhal Parganas and Hazaribagh. In the second minor rise in October the districts mainly affected were Patna, Champaran, Darbhanga, Bhagalpur and Purnea. Adequate arrangements for disinfecting water supplies in the affected areas were made. Disinfection of 524,581 wells was carried out. Anti-cholera inoculations numbered 5,651,893.

Orissa.—The incidence of the disease was milder this year. Deaths from cholera were 7,209 during the year as against 10,585 in 1945. During the month of February there was an unusually heavy incidence for this time of the year. The coastal districts of Cuttack, Puri and Balasore were affected on an epidemic level. Ganjam also was heavily affected. The mortality from cholera in March was the heaviest recorded in the month since 1937. There was a sharp decline in incidence in April and by the end of May the disease had come down to within normal limits. In the month of May there was a shortlived epidemic outbreak in the district of Sambalpur. The disease continued much below normal incidence from June onward. The usual seasonal rise during the second half of the year was not much in evidence. During epidemics all available public health and medical staff was deputed to help the staff of the local bodies in the affected areas as and when required. Steps were taken to keep a stock of 100,000 c.c. of cholera vaccine in Provincial Reserve at the Cuttack General Hospital in order to be able to supply the vaccine promptly when demanded. Mass anti-cholera inoculations were carried out in selected epidemic areas where the disease broke out after the car festival. Sulphaguanidine was supplied free by the Public Health Department to the local bodies and some hospitals and dispensaries.

Bengal.—The incidence of the disease was even milder this year. It is estimated that there were 27,710 deaths from cholera as against 32,537 last year. The incidence was well within normal limits throughout the year except for slightly abnormal incidence in April. This abnormal incidence was due to epidemic incidence in Howrah, 24 Parganas, Jessore, Khulna, Rajshahi, Dinajpur, Dacca, Mymensingh, Faridpur and Tippera. Otherwise, the incidence of the disease followed the usual course. In December Nadia, Murshidabad, Khulna and Bakarganj experienced epidemic conditions.

About 212 Sanitary Units, 735 Health Assistants, and 13 Sanitary Inspectors were deputed to the various local bodies to assist them in carrying out anti-cholera measures. Mobile Medical Units were carried on curative and preventive medical work throughout the province, numbered 305. Nearly 8 million anti-cholera inoculations were given during the year.

Assam.—The incidence of the disease was the lowest since 1937. 1,097 deaths were recorded as against 3,030 in the preceding year. There was a mild outbreak of the disease in Goalpara, the infection being more active in the month of May. There was considerable incidence in Sylhet during the first half of the year. The highest number of deaths (580) was reported from Sylhet district. The incidence in the latter half of the year was particularly low. Anti-cholera inoculations totalled 393,072.

Central Provinces.—1946 was a year of exceptionally low incidence of the disease in the province but for an abnormal epidemic outbreak in the month of March, which however, proved to be only of a short duration. In the later part of February a severe epidemic broke out in Raipur but towards the end of March the infection subsided. It is believed that this infection was imported from Jagannath Puri festival. There was an indigenous outbreak on an epidemic level in Drug. Here the abnormal incidence persisted till the close of April. These abnormal events were mainly responsible for making the mortality from cholera in the month of March the highest recorded in the month since 1937. After this month the incidence of the disease started declining and in the fourth quarter of the year it was very low. The usual seasonal rise during the third quarter of the year did not occur. A total of 2,943 deaths were recorded during the year as against 53,377 deaths in 1945, when there was a widespread epidemic of great severity in the province.

The course of the disease was controlled mainly through the launching of an effective anti-cholera campaign in anticipation. Wholesale inoculations were given in advance in road side and riparian village and in other villages with a bad history of cholera. Intensive control measures at the big fairs like those at Puri and Pandharpur averted the danger of importing infection. Anti-cholera inoculations performed during the year amounted to 1,693,400.

Bombay.—The incidence of cholera in the province was the lowest since 1926. Only 229 deaths were recorded during the year as against 24,691 deaths in 1945, when there was a severe epidemic in the province. The low incidence is all the more remarkable in view of the fact that food scarcity prevailed in seven districts. It is believed that cholera epidemic was successfully kept out largely because of the timely and intensive preventive measures, which included mass protection by inoculation and systematic and continuous disinfection of water supplies. The Government sanctioned the appointment of up to 20 inoculators in each of the 7 scarcity districts along with 4 Health Assistants and 4 squads. Though this staff was sanctioned for scarcity districts it was primarily for anti-epidemic work throughout the province. The Government also placed at the disposal of Public Health Department 6 trucks and 10 jeeps for use of Mobile Hygiene Units for work in the scarcity districts.

The figure of 1,387,608 anti-cholera inoculations performed during the year is a record for the province.

Sind.—The incidence of the disease was very light. 34 deaths were recorded as against 167 in 1945. The disease prevailed in two districts only. Special temporary regulations to control the disease were prescribed. Compulsory anti-cholera inoculation was successfully enforced in the Lal Shabaz fair. There was no outbreak of the disease during or after the fair. Cholera controlling officers were appointed and Inspectors of Sanitation and Vaccination were deputed for disinfection purposes. The Motor Travelling Dispensary of Sukkur was fully utilized to combat the disease. Press notes to educate public opinion on meeting the menace were issued. Local bodies were advised to pay special attention to conservancy arrangements and the sterilisation of water supplies. During the year 76,000 anti-cholera inoculations were undertaken.

Madras.—The incidence of the disease during the year was the lowest on record during the past 65 years, the reported deaths from cholera being 753 in 1946. None of the districts was heavily infected. The disease was comparatively more active in the districts of Vizagapatam, Kistna, Nellore, Guntur and Trichinopoly, where there was a mild incidence in the first quarter of the year. The infection in Guntur subsided in the second quarter and in Kistna and Nellore in the third quarter. Only sporadic cases were reported in the fourth quarter.

Coorg, Ajmer-Merwara and Baluchistan.—These provinces remained free from cholera during the year. Anti-cholera inoculations numbered 45,780 and 8,399 in Ajmer-Merwara and Baluchistan respectively.

Plague.

3. Severe epidemics of plague occurred in the United Provinces and Bihar. The incidence in Bombay and Madras also was quite heavy. Anti-plague activities were carried out on orthodox lines. The possibilities of D.D.T. as an effective pulicide have yet to become popular. With the stock of D.D.T. becoming more easily available its use should soon grow. It appears that unlike cholera the disease was more active in the districts affected with food scarcity conditions in Bombay and Madras. An account of the incidence of plague in the provinces where the disease appeared together with the preventive measures adopted is given below.

Punjab.—Plague was confined to Ambala district where 244 deaths were recorded in the year. These occurred in 49 different localities mainly adjoining the United Provinces. It is believed that the epidemic in Ambala is an extension of the epidemic in the United Provinces. The Epidemic Diseases Act and the provisions of section 144 of Criminal Procedure Code were enforced in the affected area. Villagers in infected areas were persuaded to vacate their houses, improvised huts and tents in the fields having been provided for them. It is believed that this measure was helpful in checking the spread of the disease. A temporary isolation hospital was established at Jagadhari. The new sulphonamide drugs were used in the treatment of cases. A grant of Rs. 82,568 for anti-plague measures was made this year as against Rs. 72,628 in 1945. Additional staff was obtained from other areas not

affected with plague. In 1946 two Medical Officers, 6 Sub-Assistant Health Officers, 12 Sanitary Inspectors, 27 Sanitary Supervisors, 134 Sanitary Patrols (trained coolies) were employed in the plague affected areas. The Assistant Director of Public Health, Eastern Provinces at Ambala supervised anti-plague measures. Cyanogas and D.D.T. were intensively used. Anti-plague inoculations totalled 78,749 as against 45,821 in 1945.

United Provinces.—A severe epidemic of plague was recorded. Deaths totalled 18,199 during the year as against 14,024 in 1945. Mortality in 1946 was the highest since 1940. The disease followed seasonal fluctuations. The incidence started rising in December and continued rising till the peak was reached in the months of March and April. A rapid decline started from the month of May and after June the disease prevailed at lower levels although the incidence was well above the normal limits for this part of the year. Another rise started in November and in the month of December heavy plague mortality was recorded. The mortality in each of the months June to December was the highest on record since 1937. In the first wave epidemic conditions prevailed in Cawnpore, Fyzabad, Gorakhpur, Basti, and Jaunpur. Considerable infection prevailed in Benares, Bijnor, Hamirpur, Unao, Meerut, Muzaffarnagar, and Saharanpur. In the second wave Banda, Basti, Benares, Gorakhpur, and Jaunpur were very heavily infected. In Bundelkhand the disease broke out after many years' absence, starting in Banda town in August and spread to the adjoining districts.

Intensive campaign of cyanogassing, inoculation and spraying with D.D.T. was carried out in the affected areas. Evacuation of affected areas also was resorted to. Improvised hospitals were put up in the affected towns and some of the larger village centres. Medical Officers administered treatment using sulphur drugs. Over 1,237,700 anti-plague inoculations were performed as against 535,500 in the previous year.

Bihar.—A very severe epidemic of plague raged in the district of Saran. The district of Monghyr also was considerably affected. Mild incidence was reported from Champaran and Darbhanga. North Bhagalpur and Jamalpur town. Saran accounted for a very high proportion of plague mortality in the province. The abnormal infection which started in the month of November 1945 continued to rise till it reached the peak towards the close of March 1946. Thereafter a seasonal decline occurred but the incidence continued to be abnormal for this time of the year. The infection flared up again to a heavy epidemic level in Saran during December. Anti-plague measures like inoculation, evacuation of infected houses, cyanogassing of rat holes, use of Barium Carbonate Baits, application of Kerosene oil emulsion were carried out. Patients were treated with thiazamide. 1,004,181 anti-plague inoculations were given. 68,494 houses were disinfected and 91,500 houses were cyanogassed.

Central Provinces.—The disease prevailed in a mild form. 137 deaths were recorded during the year as against 575 in 1945. Jubbulpur showed heavy infection.

Bombay.—The incidence of the disease was slightly above normal. During the year 3,405 deaths were recorded as against 11,779 in 1945. which was a year of heavy epidemic conditions for the province. 44

seems that the epidemic of 1945 was carried forward to the month of January, 1946, the recorded mortality for this month was the highest in that month since 1937. The heavy epidemic conditions declined in the subsequent months but the incidence continued to be slightly above the normal experience throughout the year. The districts worst affected were Satara with 918 deaths, Belgaum 528 deaths, Poona 439 deaths, Sholapur 403 deaths, Ahmednagar 297 deaths, and Kolaba 204 deaths.

All the districts, affected with food scarcity except Dharwar, were heavily infected with plague. The anti-epidemic staff of 20 inoculators, 4 Health Assistants, and 4 Squads was engaged on anti-plague measures in districts affected with food scarcity. Jeeps supplied as transport for food scarcity areas were utilised for the rapid conveyance of staff and material from village to village. This mobility enabled a recorded number totalling 1,095,539 anti-plague inoculations to be given. Mobile Units were formed in the food scarcity areas and were utilised mainly for anti-plague work in the rural areas. In Poona and Belgaum districts two ambulances were made available for the removal of patients to the Infectious Diseases Hospitals opened by local bodies. Temporary Isolation Hospitals were opened in heavily affected areas.

Madras.—The incidence this year was above the normal experience and was slightly heavier than what it was in 1945. The disease followed the usual seasonal variations. The fairly widespread infection in Coimbatore district of the previous year was carried forward to 1946. There was considerable infection in Anantapur and Salem districts. Other districts affected were Chittoor, Bellary, Suth Arcot, Madras and Malabar. The infection in the plains subsided as usual during the hot weather months. With the onset of monsoon the disease flared up again in Coimbatore district, where the incidence was particularly heavy in November and December. Bellary, Chittoor, Malabar, Salem and Nilgiris districts also were affected.

Among the anti-plague measures adopted were prophylactic inoculations, cyanogas fumigation of infected houses, rat burrows, rat harbourages and of out-going commodities from infected localities and evacuation of infected localities. Anti-plague inoculations totalled 778,262.

Coorg.—The disease prevailed in certain parts. Plague was imported into Coorg during January to April from Mysore through traffic transporting paddy and other grains and commodities. Fumigation with cyanogas was carried out. Anti-plague inoculations numbered 8,370.

Smallpox.

4. The disease prevailed in an epidemic form in Bombay and the Central Provinces. The incidence in Orissa, Punjab, Madras, Sind and North-West Frontier Province was a little above the normal level. In the remaining provinces the incidence was within the normal experience. It will be recalled that the Central Provinces, Orissa and Madras experienced severe epidemic condition in 1945, but the incidence of the disease in these provinces in 1946 was comparatively much milder. Only Bombay which had mild incidence in 1945 experienced heavy infection this year. In British India on the whole the disease prevailed in a milder form when compared to the last year.

North-West Frontier Province.—The total mortality from smallpox was the highest this year since 1937. 1,276 deaths were recorded in 1946 as against 326 in the previous year. The incidence was mainly high from the month of May to the end of the year, but it did not assume a severe epidemic form anywhere. Peshawar and Hazara remained infected throughout the year. There was a mild incidence in Balochistan and some cases were recorded in Kohat.

Punjab.—The incidence of the disease was well above the normal level, was the highest since 1941. 3,046 deaths were recorded during the year as against 1,927 in the previous year. The disease followed the usual course of higher incidence in the first half of the year, declining in the subsequent months and rising sharply in December. The infection was widespread throughout the province but it was heavy in the districts of Multan, Gujranwala, Lahore, Hissar and Amritsar. 28 per cent. of the total smallpox deaths were from amongst infants and 45 per cent. of the total smallpox deaths were from amongst children between 1 to 10 years.

During the year 1,092,905 primary vaccinations and 3,846,890 revaccinations were performed.

United Provinces.—The incidence of the disease was mild. Deaths reported were 5,598 as against 22,128 in 1945, which was a year of very severe epidemic for the province.

Bihar.—The disease followed the usual course during the year. The epidemic started in November, 1945 and reached its peak in April, and by August had subsided. All the districts were infected. Purnea and Manbhum were affected at an epidemic level, Monghyr, Santhal Parganas and Ranchi also were heavily affected. In the rest of the districts the infection was mild. A large number of paid vaccinators were deputed by the Government to help the local bodies. The Health Officers were also the Superintendents of Vaccination in all the districts except in Palamau where the Civil Surgeon continued to be the Superintendent of Vaccination. Licensed vaccinators continued to be employed as vaccinators in rural areas. During the year 842,550 primary vaccinations and 1,586,830 revaccinations were performed.

Orissa.—There were 6,055 deaths from smallpox during the year as against 12,018 deaths in 1945 which was a year of heavy epidemic for the province. As is usual the incidence was severe during the first half of the year and it gradually declined with the onset of the monsoon. There was a severe epidemic in the district of Cuttack. Puri and Sambalpur also experienced epidemic incidence. In Ganjam heavy infection continued from the previous year. Balasore had considerable infection. All these districts continued to remain infected throughout the year. There was no case of smallpox in Berhampur Municipality which is considered to be the direct result of anti-smallpox drive there started in the later part of 1945 and continued to the end of February 1946.

Mass vaccinations were carried out in the badly affected rural areas of Cuttack, Puri, and Balasore. Paid vaccinators were appointed by the Government and were deputed to work under the local bodies in the affected areas. A special Health Inspector was deputed to supervise the vaccination work. Primary vaccination is compulsory in all the Municipalities of North Orissa and in the districts of Cuttack, Puri,

Balasore, and Ganjam Plains including the Municipality and the Union Board areas of Koraput. In the latter two areas revaccination also is compulsory.

Bengal.—The disease incidence did not take a severe form this year, and remained within the normal experience and followed the normal course. The number of deaths from smallpox in 1946 is estimated to be 6,628 as against 36,823 in 1945, which was a year of highly intense epidemic for the province. The incidence of the disease was at epidemic level in Burdwan and Murshidabad. Birbhum, Bankura, Howrah, 24-Parganas, Nadia, Jessore, Khulna, Rajshahi, Dinajpur, and Malda showed considerable infection. In the remaining districts the incidence was very mild. Nearly 14 million vaccinations were performed. The Sanitary Units Health Assistants and Sanitary Inspectors assisted in carrying out anti-smallpox measures. The Public Health Directorate supplied all the vaccine lymph and lancets required.

Assam.—The incidence of the disease was fairly low. 825 deaths were recorded during the year as against 3,838 in 1945, a year of heavy incidence. The disease followed the normal seasonal course. Sibsagar and Lakhimpur recorded a higher incidence during the first half of the year. Mass vaccination was vigorously carried out both in urban and rural areas.

Central Provinces.—The province again had a bad year in so far as smallpox incidence is concerned, although 1946 was not as bad as the previous year. 4,565 deaths were recorded during the year as against 8,841 in the previous year. It appears that the epidemic of 1945 was carried over to 1946. The disease followed the seasonal fluctuations but the incidence was high throughout the year. Almost all the districts were affected but the incidence was particularly heavy in Chanda, Hoshangabad, Raipur, Bilaspur, and Yeotmal. In these districts the infection was indigenous and the disease prevailed throughout the year.

A vigorous vaccination and revaccination campaign was launched in the rural areas. The Civil Surgeons were asked to train people in vaccination work. Assistant Health Officers also assisted in carrying out vaccination. Temporary smallpox regulations were applied to the heavily infected districts.

Bombay.—The disease prevailed in severe form. 8,421 deaths were recorded during the year as against 4,699 in the previous year. This mortality figure was exceeded only in the years 1935 and 1940 since 1931. The abnormal incidence shown in December, 1945 was carried forward to 1946 and heavy infection prevailed during the first half of the year. There was a rapid seasonal decline in the latter half of the year and mortality from smallpox during the period was only slightly above normal. Epidemic conditions prevailed in Poona which recorded 1,176 deaths during the year, in Ahmednagar with 1,128 deaths, West Khandesh with 831 deaths, Bombay city with 858 deaths and Surat with 761 deaths. High incidence was shown by Ratnagiri, Nasik, Thana and Satara. Of the seven districts afflicted with scarcity conditions only Poona and Ahmednagar were severely affected.

Vaccination work was intensified in all the affected and threatened areas. In this connection propaganda with magic lantern lectures, posters, etc., was carried out. 17 extra vaccinators were appointed. All the lymph required was supplied by the Vaccine Institute, Belgaum.

Sind.—The incidence of the disease was fairly high for the province. 676 deaths were recorded during the year as against 121 in 1945. The incidence was above the normal from the month of April onward. The disease prevailed in all the districts almost throughout the year. Sukkur, Hyderabad and Larkana were affected comparatively more heavily. Vaccination work was continued vigorously. Posts of lady vaccinators were created in the municipal towns of Sukkur, Larkana, Shikarpur and Mirpur Khas. Candidates to fill up posts in the last two municipalities could not be got. Vaccination and revaccination is already compulsory in the Municipal towns and efforts are being made to introduce compulsory vaccination in rural circles. The number of rural vaccination circles is growing steadily.

Madras.—The incidence of the disease was fairly heavy although it was much milder compared to that in 1945, when there was a severe epidemic in the province. The abnormal infection of 1945 was carried forward in 1946 and the incidence was much above the normal level during the first half of the year. In the latter half the incidence came down to the normal level. The disease was prevalent in all the districts. In the districts of Guntur, Malabar, Chittoor, West Godavari, Nellore and Coimbatore the disease prevailed in an epidemic form. Of these only Malabar and Coimbatore were the districts affected by food scarcity conditions. Vaccination and revaccination were carried on vigorously and there was no regular vaccination off season during the summer months.

Coorg.—The disease prevailed in many parts of the province throughout the year. 90 deaths were recorded during the year as against 159 in 1945. It is considered that the intensity of infection could be very much reduced if timely reports about the outbreak of the disease were to reach public health staff and if the prejudices of the people against vaccination could be overcome. The infection is usually imported into the province from the villages in Mysore State adjacent to Coorg and through labour coming from South Kanara. A bill to make vaccination compulsory in the rural areas was referred to the Select Committee of the Local Legislative Council. During the year 26,576 vaccinations of which 7,351 were primary vaccinations were performed as against 16,286 during 1945.

Ajmer-Merwara.—The incidence of the disease was a little above the normal level. 321 deaths were recorded during the year as against 230 in the previous year. The incidence in Ajmer Municipal area was fairly heavy and 56 deaths were reported during the year. Mass vaccination and revaccination was carried out. Special staff was deputed for this work. Primary vaccinations and revaccinations performed in Ajmer town during the year numbered 15,778. As revaccination is not compulsory people had to be persuaded to take it.

Baluchistan.—Sporadic cases were reported from various places. Mass vaccinations were carried out to check the spread of the infection.

Malaria.

5. The problem of malaria in India is of such colossal magnitude that isolated measures can have little permanent value. Large scale operations for a planned control over a number of years are necessary to achieve results. Apart from the untouched problem of malaria under

rural conditions, the large scale development of irrigation schemes and the building of dams for the supply of hydro-electric power must be carefully studied with a view to control their malaria producing potentialities and steps taken beforehand to safeguard against the rise of malaria incidence. The post-war planning of the Central and Provincial Governments has many such schemes of development. It was with this realisation, that the Government of India deputed their malaria experts Major-General Sir Gordon Covell and Lt.-Colonel Afridi to the United States to study the methods of malaria control in operation in the area administered by the Tennessee Valley Authority. The following information is taken from the report of their visit to the United States of America from 14th May to 17th July 1946.

“By the standard of many other regions, notably India and Eastern countries generally, the incidence of malaria in the Tennessee Valley before the Tennessee Valley Authority commenced its activities, was never very great, but the nature of these activities was such that malaria epidemic of a most serious nature might well have resulted had not the preventive measures been taken as complete as they have been. For instance, in the case of the Santee Cooper Reservoir in South Carolina which was impounded some four years ago with only partial clearance of the bed and margins, resulted in a serious epidemic of malaria, whereas when impounding work was in progress in the Tennessee Valley there was no such increase in the incidence of the disease. The expenditure incurred on anti-malaria measures by the Tennessee Valley Authority may justly be classed as a wise measure of health insurance which has already yielded handsome dividends by the prevention of disease”.

Briefly the Tennessee Valley malaria control scheme may be described as follows. Along the main course of the Tennessee river, over a stretch of 600 miles, nine huge dams have been constructed, each measuring from approximately $\frac{1}{2}$ to $1\frac{1}{2}$ miles in length and from 72 to 160 ft. in height which have converted this section of the river into a series of large lakes. On the tributaries of the river are a further eleven dams ranging up to 300 ft. in height. The total area of the lakes and reservoirs is about 1,100 sq. miles and the reservoirs have a total shore line of more than 2,300 miles of which 1,600 miles are in areas where malaria is endemic. The primary aims of the Tennessee Valley Authority are navigation, flood control and power production, but its activities also include in addition to malaria control, forestry, chemical engineering, anti-erosion measures, improving agriculture, pure and applied research, recreation, fisheries, town planning, publicity, constructional work of all kinds, wild life conservation, housing, survey, encouragement of co-operative and rural industries, building of roads, running of fleet of boats, planes and trucks of hospitals, of police and fire departments, electricity distribution, etc.

The guiding principle of malaria control programme has been to prevent malaria, if possible, by permanent measures, such as dyking de-watering, cut and fill, shore line topography alteration and land use restriction rather than by repetitive measures. Great stress has also been laid on the proper treatment of the bed of reservoirs before impoundage and on the correct timing of the impoundage which should invariably be carried out during the winter months and not during the

mosquito breeding season. These permanent measures were employed to the full for the first time in the construction of the Kentucky reservoir recently completed. Other methods are fluctuation of the water level, mosquito-proofing of dwellings, application of larvicides and, recently, the spray-killing of adult mosquitoes. The malaria control measure which is most closely associated with the development of the Tennessee Valley hydro-electric scheme in the minds of malarialogists the world over is the seasonal and periodic fluctuation in water level, although this method of controlling mosquito breeding had been practiced many years before the creation of the Tennessee Valley Authority. The main point of interest is that, for the first time in history, a study has been made of the operation of a series of hydro-electric plants for the benefit of malaria control before their actual construction. It was found that the pool elevation in the Wheeler reservoir could be increased by one foot, so as to render possible a seasonal fluctuation by making the gates one foot higher without affecting the design of the main structure. Following this precedent a so-called malaria surcharge of one foot has been provided on all succeeding main river projects. The water is kept at a maximum level during winter and spring and is lowered to normal level at the commencement of the mosquito breeding season, so that floatage will be stranded and the shore-line freed from vegetation (seasonal fluctuation). During the mosquito breeding season the water level is lowered every 7 to 10 days (periodic fluctuation) so that larvae are stranded and die or are carried to open water where they are more exposed to natural enemies. Shore-line improvement has shown that if a cut and fill operation with a grade of 8 in 1 is achieved it is stable and needs no maintenance. In dyking and de-watering the natural high bank is reinforced, the residual water being pumped out during summer. Sluice gates are provided so that water may be run off when required but these are usually not automatic and resort is almost invariably had to pumping.

A Sanitary Engineer of the Health and Safety Department is detailed to each reservoir to work closely with the reservoir clearance division in the pre-impoundage preparations. The maps and surveys division co-operates with the Health Department, particularly in regard to the drainage of marginal depressions. A close working agreement exists between the Health Department and the Reservoir Property Management Department which is responsible for the application of the plans promulgated by the Health Department. The fluctuation of water level programme is submitted to the Water Planning Department prior to the mosquito season. The Water Planning Department adjusts the proposed schedules to the needs of other activities like navigation, flood control, power production, etc. In the early stages of the development of the Tennessee Valley there were a number of instances where the impounding of water was followed by serious outbreaks of malaria. An intensive study of local conditions has enabled the Tennessee Valley Authority to profit by the experience of these early years and prevented the occurrence of such epidemics. More care is now taken regarding the clearance of the bed and marginal conditioning of the reservoir before the commencement of impoundage and the danger of impounding during the mosquito breeding season is fully recognised. An intensive malaria survey is

carried out before any project is undertaken. Examination of children is carried out by house-to-house visits instead of by school surveys formerly relied on. Larvicides, notably the application of D.D.T. as a fine mist from the exhaust pipe of an aircraft, are used in special cases where adequate control cannot be secured by other means. The importance of malaria control as a factor in the economic and social life of the valley is fully realised and no project is now undertaken without taking into consideration the advice of the anti-malaria staff.

Spraying of D.D.T. from the exhaust of an aircraft has been worked out; an apparatus has been developed by which the liquid can be broken up to any particle size desired. Smokes (consisting of particles of one micron diameter or less) have been found ineffective and the aim is to produce a particle size of 40 to 50 microns which is dispersed as a fine mist, sometimes inaccurately termed as 'Aerosol'. D.D.T. is applied at the rate of 1/10 lb. per acre but only a small proportion of this is recovered from the water, the remainder falling on vegetation or being blown away altogether. The object is to destroy larvae but adults may also be killed by increasing the dosage to 1 lb. per acre. The standard solution employed consists of D.D.T. 20 per cent. and Velsicol (poly-methylated naphthalene) 80 per cent. A swathe of 100 ft. is used and 21 acres of country can be treated per minute. The same apparatus with certain modifications can be operated by a truck or a jeep.

During General Covell's visit to the United States, advantage was taken to study in those countries the latest developments in anti-malaria drugs and insecticides, their supply position particularly as the Army in India was at that time considering the question of switch over from mepacrine to paludrine for the treatment and prophylaxis of malaria. General Covell had discussions with Sir Edward Mellanby, Brigadier Fairley, Dr. Hawking, Professor Maegraith, Prof. Macdonald, and Drs. Davey and Scott of the Imperial Chemical Industries and many others. These discussions included an account by Brigadier Fairley on his work on paludrine and other synthetic anti-malaria drugs at Cairns, Australia. They all agreed that the proposal to switch over by the military and civil authorities in India, from mepacrine to paludrine for the prophylaxis and treatment of malaria should be approved. The Imperial Chemical Industries gave him to understand that their aim was to produce 60 tons of paludrine in 1947 which is approximately equivalent to the total pre-war production of quinine, one ton of paludrine being equivalent to 10 tons of quinine.

With regard to the supply position of D.D.T., its manufacture in the United Kingdom is undertaken by Geigy of Manchester, the Imperial Chemical Industry at Manchester, Bush of Hackney and Middleton of Midlands.

During the year field trials with paludrine were undertaken in the United Provinces, Madras and Quetta. Details of these will be found in another section. Trials were also undertaken in most provinces in D.D.T. spraying operations. Such operations have not yet acquired the importance and the position in anti-malaria activities which their efficacy would seem to merit.

Bihar was the only province where there was a serious outbreak of the disease in an epidemic form. In most provinces the incidence

of the disease was reported to be mild. An account of the anti-malaria activities in the provinces is given below.

North-West Frontier Province.—The incidence of the disease was mild. It is believed that it was largely due to the vigorous anti-malaria measures carried out in collaboration with the military authorities in all the municipalities and cantonment areas. The Kohat municipality contributed Rs. 1,000 to the Military Anti-malaria Authorities for spraying with D.D.T. quarters in the city. One special compounder for anti-malaria work was posted in Hangu village and another was posted in the Frontier Constabulary and Police Lines. Besides this one compounder with 10 coolies worked throughout the malaria season around Peshawar city walls. For this work the Peshawar Municipality contributed Rs. 500.

Punjab.—Compared to the previous years the incidence was mild. The last large epidemic occurred in 1942; the total recorded deaths from malaria in 1946 were 4,382, as against 5,640 in 1945, but the figures are considered to be serious under-estimates. A good proportion of deaths recorded under other fever (which were 388,575 in 1946) was actually deaths from malaria. The districts subject to flooding such as Jullundur, Ludhiana, Gurdaspur, Sialkot and Sheikhpura and the highly waterlogged districts of Gurgaon and Gujranwala were more heavily affected.

Anti-malaria operations are now undertaken by specially recruited anti-malaria staff organised in 7 units, each having a Sub-Assistant Health Officer, an Entomological Assistant, 5 Sanitary Supervisors and 22 Sanitary Patrols. These units carry out anti-larval and anti-mosquito operations as well as look after the treatment of malaria patients. Another 7 units are proposed to be formed. The directional staff at the headquarters consisting of an Assistant Director of Public Health, Malariology, an Anti-malaria Officer, an Anti-malaria Assistant and a Sanitary Engineer was sanctioned and is expected to be recruited soon. An Entomologist on the staff of Epidemiological Bureau would be in charge of all entomological work. 28 anti-epidemic squads having a strength of 56 sanitary supervisors and 336 sanitary patrols also assisted in anti-malaria work. Large quantities of mepacrine and quinine were distributed free in addition to those offered for sale.

The statistical enquiry into the methods of forecasting epidemic malaria started by the I.R.F.A. in July, 1944, was taken over in April, 1946, by the Punjab Government. Preliminary work to test Col. Gill's theory of extra-territorial phenomena, specially the variation of sun spots, affecting the incidence of malaria has not been able to establish any statistical significance. It is stated that a highly significant association was found between the spleen rate of school children in November and the year's annual epidemic figure of malaria. This association could not be established when June spleen rate, instead of November rate, was taken. This association, if confirmed, will have an important bearing on the present method of forecasting epidemics.

United Provinces.—The disease was prevalent more or less to the same moderate extent as in 1945. Twelve districts including those which were visited by floods were mainly affected.

A scheme of treatment with quinacrine hydrochloride was started in hyper-endemic areas of 21 districts. Over 60 thousands tablets were

issued. Field trials with Paludrine for the treatment of malaria were carried out in two selected hyper-endemic areas of Naini Tal Tarai. The results show that this drug controls the disease quicker than does mepacrine and that there were no toxic effects. The Malaria Branch set up an organisation to protect the workers on a large construction work of a hydroelectric scheme in the Tarai. D.D.T. was used for anti-mosquito purposes primarily in labour camps attached to canal construction and in the police lines. Out of 2,528 blood films examined only 17 per cent. were found to be positive which result agrees with the finding in the previous year. It indicates that all illness accompanied by fever is labelled malaria.

Bihar.—Malaria was reported from all the districts but in Muzaffarpur, Darbhanga, Purnea and Champaran the disease prevailed in an epidemic form. The districts of Shahabad, Saran, Bhagalpur, Ranchi, and Singhbhum were heavily affected. The remaining districts were mildly affected.

Malaria cases were treated in dispensaries maintained by the Government and the local bodies and in special malaria centres which functioned in all the districts except Gaya, Shahabad and Saran. Adequate supplies of anti-malarial drugs were distributed free through unofficial agencies also. Mainly due to the wide scale distribution of quinine and its substitutes the disease was brought under control in most of the affected areas. An anti-malaria scheme has been submitted to the Government for their consideration and approval. The scheme provides for anti-malarial headquarter's unit and malaria control units in the first two years to be gradually increased to 40 within five years. There is another scheme for the clearance of choked river canals of North Bihar in areas of high malaria endemicity.

Orissa.—No epidemics of malaria occurred anywhere except in a few isolated places like Indupur in Cuttack district and Satyabadi Baliana in Puri district. Distribution of quinine and its substitutes and operations for clearance of weeds enabled the epidemic to be brought under control.

During the year 830 lbs. of quinine, 338 lbs. of cinchona febrifuge, 2,692,405 tablets of quinine substitutes, 34,600 five-grain tablets and 1,300 four-grain tablets of quinine sulphate, 4,573 boxes of quinine injections and 15,650 tablets of pamaquin were issued to hospitals, dispensaries, local bodies, chemists and private practitioners, etc., besides the quantity issued to Health Officers and Civil Surgeons. The Government secured $\frac{1}{2}$ a ton of D.D.T. and supplied it to the various local bodies. The Government also sanctioned Rs. 45,500 to various local bodies for anti-malaria measures. Anti-malaria operations were carried out in 6 centres of Koraput district. The Government also aided anti-mosquito schemes in seven municipalities.

A malaria unit to investigate into the malaria incidence at Bhubaneswar where it is proposed to establish the capital of the province, was sanctioned. Two malaria control units one at Cuttack and the other at Koraput were also sanctioned. The malaria unit at the headquarters carried out surveys in heavily affected localities. 1,534 children were examined in 23 villages. Of 11,725 mosquitoes specimen 6,373 were dissected. A *annularis* was found to predominate.

Bengal.—The number of deaths from malaria is estimated at 329,523 as against 516,099 in 1945 and the average of 388,538 in the quinquennium 1938-42. The incidence of the disease in 1946, therefore approximated to the normal experience.

The Government sanctioned 20 lakhs of rupees to meet the cost of free distribution of anti-malaria drugs. A scheme for mass distribution of anti-malaria drugs to poor patients by house-to-house visits was undertaken and a large quantity of mepacrine tablets was distributed through the Government rural health staff. The quinine distribution scheme was continued. The quinine Ordinance Order promulgated in 1944 was in force up to 30th September, 1946. The registered medical practitioners and non-registered medical practitioners approved by the Civil Surgeons were allowed a monthly maximum of $\frac{1}{2}$ lb. of quinine from September onward. Sale and free distribution amounted to 43,750 lbs. of quinine, 18,420 lbs. of cinchona febrifuge, and 144,600,000 tablets of mepacrine.

Grants were made to all municipalities for carrying out anti-malaria operations. Besides the existing anti-malaria schemes at Burdwan, Singur and the Ludlowii control measure at Budge Budge and the Salt Lake areas, a new scheme was started at the Khulna Civil Supplies Depot. The malaria control operations undertaken by the Government within the area of Calcutta Corporation were closed, as it was considered that the emergency under which these operations were started no longer existed since the incidence of malaria had been greatly reduced. It was however suggested that the Calcutta Corporation should continue these measures as a safeguard in the future. Malaria survey of Damodar Hooghly Valley which was started in 1945 was completed during the year.

Assam.—The incidence is not considered to have been heavy. The district of Sibsagar had a comparatively heavier incidence. There was no epidemic incidence of the disease in Sylhet.

The malaria section started in 1945 was further strengthened by more staff and equipment under the Post-war Development Scheme during the last quarter of the year. Anti-malaria measures were extended to more areas and the use of D.D.T. was introduced for the first time. Quinine was distributed through the Public Health Department. Packets of mepacrine tablets with instructions for use were supplied to postal and other agents for sale in rural areas and were becoming increasingly popular.

Central Provinces.—The incidence of the disease maintained the usual level. This year 247,008 deaths were recorded as against 309,425 in 1945, a year in which the incidence of malaria was heavy. The districts particularly heavily affected in 1946 were Bilaspur, Raipur and Saugor.

Anti-malaria drugs distributed amounted to 2,579 lbs. of quinine sulphate, 1,807 lbs. of cinchona, 3,583 boxes of quinine ampoules, 403,758 quinaquine tablets and 1,474,571 mepacrine tablets.

Bombay.—The incidence of malaria showed a decline. 32,559 deaths were recorded during the year as against 41,631 in 1945. The districts more heavily affected were Nasik, Poona, Thana, Belgaum, Dharwar, and Ahmednagar.

The districts of Brouch, Kaira, Panch Mahals and Bombay Saburban had the lowest incidence. Compared to other months the incidence was

higher in January, October, November and December. A special Medical Officer on malaria duty was appointed. The touring staff of Public Health Department connected with epidemics, vaccination and sanitation also assisted in distributing quinine to malaria patients.

Sind.—The incidence was about normal. 2,137 deaths from malaria were recorded during the year as against 2,004 in 1945. The figures are considered to be serious under-estimates.

Quinine and its substitutes continued to be distributed by the Public Health Department. The usual sum of Rs. 2,000 was sanctioned by the Government for anti-mosquito operations in Larkana town. Employment of five additional Motor Travelling Dispensaries was sanctioned by the Government bringing the total to 8, one for each district. The dearth of qualified medical men, coupled with lack of inducement due to inadequate emoluments offered to medical men made it impossible to make any progress. A scheme aiming at eradicating the disease from important municipal towns is under the consideration of the Government. To begin with additional staff consisting of 1 medical graduate, 1 medical licentiate, 1 microbiologist, 1 compounder, 4 insect collectors, and 9 other members for office work was sanctioned to strengthen the anti-malaria organisation. A proposal for the setting up a Regional Organisation has been submitted to the Government. In spite of the raising of the post of Entomologist to that of Gazetted Officer it remained vacant throughout the year for lack of suitable candidate.

Madras.—Schemes for the investigation and control of malaria for the new projects of Rampadsagar Irrigation and Machkund Hydrcelectric Scheme were sanctioned during the year. Anti-malaria schemes for 5 additional districts were also sanctioned. In November, 1943, malaria had broken out in a violent form in Cuddapah and continued to be a menace since. Its source was traced to Bugga Vanka, which does not flow fast enough and collects in pools offering a fertile breeding ground for mosquitoes. Vanka was canalised and the experiment appears to have been successful in weeding out malaria. In 1944 before canalisation 41,740 cases with 188 deaths from malaria were reported but in 1946 there were only 7,489 cases with 10 deaths. The splenic index in the wards on the banks of Bugga Vanka was 60 per cent. in 1944 while it was only 12 per cent. in 1946.

Some experiments conducted by the Regional Malariologist show that a monthly spray with D.D.T. specially when preceded by two bi-weekly sprays of Pyrethrum is most effective in controlling epidemic malaria. The use of M.K.E. as a solvent for D.D.T. will make the spraying economical. For this purpose 50,000 gallons of M.K.E. are being obtained for distribution to anti-malarial units. 20 tons of D.D.T. were received from the Government of India and were distributed. Field experiments on the curative and preventive effects of Paludrine were conducted and the results are being studied. Five training classes in Malariology were conducted and 63 persons were trained. A short two-day course in the use of D.D.T. was given for the benefit of the District Health Officer. Chapter IX of the Madras Public Health Act, 1939 relating to malaria control was extended to 4 more municipalities, 2 Panchayats and Sriharikota Island.

Coorg.—The incidence of malaria remained normal. Anti-larval spraying was carried out more effectively because supplies of Malariol

improved. Spraying of dwelling houses with pyrocidine was carried on. Large scale D.D.T. spraying could not be carried out because of the limited supply of kerosene oil available. A malaria control unit under the control of the Central Government was established in December. Free distribution amounting to 438 lbs. of quinine, 183 lbs. of cinchona febrifuge and 103,240 tablets of mepacrine and quinacrine was carried out.

Ajmer-Merwara.—There was no abnormal incidence in the province considered as a whole, but some localised epidemics occurred in rural area.

Quinine and mepacrine tablets were freely distributed. In Ajmer town anti-larval measures were carried out throughout the year. Additional staff was employed to check breeding of mosquitoes during the rainy season.

Baluchistan.—Malaria was prevalent during July to October. The incidence was appreciably less than that in the previous year. Quinine and its substitutes were liberally distributed through hospitals, dispensaries and post offices. A malaria control scheme under the charge of a malariologist was started. The control party carried out systematic spraying with D.D.T. of public and private buildings in rural and urban areas.

Enteric fever.

6. The provincial reports of the Directors of Public Health do not show that there was any epidemic of enteric fever during the year. The remarks made in last year's report on the recorded figures relating to the morbidity and mortality from this disease being markedly small when compared with the widespread nature of the disease due to the lack of reporting agency and diagnosing facilities must be borne in mind when considering the following remarks on the prevalence of the disease in the provinces from which relevant information has been received.

North-West Frontier Province.—Dera Ismail Khan continues to be endemically affected. A few sporadic cases were also reported from Mardan and Peshawar districts. Inoculations with T.A.B. Vaccine were carried out in schools, police and Frontier Constabulary forces with good results.

Bihar.—A large number of cases of enteric fever were reported from the districts of Patna, Gaya, Shahabad, Saran, Monghyr, Bhagalpur and Hazaribagh. The incidence was the highest in Patna district. Hospitals and dispensaries recorded 16,471 outdoor cases and 2,173 indoor patients treated. The incidence was the highest during summer months.

Bengal.—Sporadic cases were reported from different localities but there was no epidemic anywhere in the province.

Bombay. During the year 5,237 deaths from enteric fever were recorded as against 6,443 in 1945. In Bombay city there were 513 deaths from the disease as against 616 in the preceding year. The districts from where a comparatively large number of deaths were reported were Dharwar, Poona, Kolaba, Thana, Ratnagiri, West Khandesh, Surat, Ahmednagar, Belgaum, Kanara and Bijapur. The incidence was distributed throughout the year. The highest number of deaths was in December and the lowest in April. The Haffkine Institute,

Bombay, continued to extend the facility of free diagnostic aid by examining the clinical material sent by private medical practitioners.

Coorg.—As in previous years only sporadic cases were reported from rural and urban areas. The contacts were protected and the area water supply was chlorinated. Steps were taken to protect the Government servants against this disease.

Ajmer-Merwara.—At present the disease is endemic in Ajmer with a tendency for it to develop into small epidemics during the summer months of April to June. It is expected that with the introduction of a protected water supply scheme and a drainage system to replace the present soakage pits the incidence of the disease in Ajmer city will be much reduced.

Tuberculosis.

7. The Central Government took the preliminary steps in implementing the recommendations of Health Survey and Development Committee in regard to anti-tuberculosis activities by appointing an Officer on Special Duty for the purpose of offering technical advice to Central, Provincial and State Health authorities on tuberculosis control measures. The Officer took over his duties about the middle of the year and made a study of the existing control measures in several Provinces and States. He prepared a provincial Anti-tuberculosis Scheme giving in broad outlines the points which should be considered in formulating provincial schemes, as it was felt that the schemes submitted by the various provinces to the Central Government did not deal adequately with the preventive aspect of the problem. He also outlined certain general considerations for an Anti-tuberculosis Scheme for India. He prepared a comprehensive Anti-tuberculosis Scheme for Delhi Province. He drafted the regulations, syllabus and financial implications for instituting a diploma course in tuberculosis diseases in the Delhi University. His proposals after consideration by a Committee appointed by the Vice-Chancellor of the University were submitted to the Government, which accepted the scheme and sanctioned the necessary funds. The first course of T. D. D. is expected to commence from 1st March, 1947. The proposals for establishing in Delhi a Tuberculosis Institute for training and research on the lines of the Malaria Institute for India were drafted and are under consideration. The Officer during his tours gave lectures on tuberculosis problems in general, and dealt in particular with popular misconceptions about the disease.

The Fourth Tuberculosis Workers' Conference was held in November, where important papers were read and discussed. In one paper propaganda methods adopted in the western countries were described and it was emphasised that they should be adopted in India. It was considered that propaganda should mainly be the function of voluntary associations; the State giving all possible help. In another paper on campaign against tuberculosis stress was laid on well run clinics, establishment of tuberculosis hospitals in urban areas and the appointment of provincial Tuberculosis Officer in each Province. Considerable interest in another paper on B.C.G. vaccination was shown. The subject received special attention in view of the decision of Ministry of Health in United Kingdom to give this vaccination a trial. It was

pointed out that methods of prevention like isolation and improving living conditions being difficult of immediate realisation, this vaccination may be of some use in preventing the spread of the disease. It was explained that the vaccine was innocuous and that it did produce a certain amount of immunity but it was neither lasting nor absolute. Since it should be used within a few days of its preparation, its manufacture in India should be arranged in a separate laboratory with an expert and experience staff. It was felt that one great difficulty in popularising its use was due to the absence of organised Anti-tuberculosis centres and clinics.

In the United Kingdom and the United States of America an almost revolutionary technique in the detection of early cases has been developed in the form of Mass Miniature Radiography. In the United States of America in one year of operation nearly a million people were surveyed by means of miniature chest films. This radiography enables the detection of the disease in its earliest ambulatory non-infective stages, so that the patients can be treated and cured before they reach the stage when they constitute a social menace and a public health problem. One difficulty in using this powerful weapon in anti-tuberculosis campaign in India is presented by the lack of facilities for treating all the tubercular cases which may be detected by mass radiography. Most of the cases among the apparently normal members of the population will fall in the pre-pythisical and ambulatory stage. Such cases do not require hospitalisation or active treatment and would get all right by simple precautions like rest, reduction in hours of work, improved nutrition, regulation of life, etc. Such cases need be kept under periodic observation to see if they pass on to the infective stage when isolation and active treatment becomes necessary. For this large 'observation group' clinics with some technical staff would be necessary. Thus, with a Mass Radiography and Clinic Scheme a very high proportion estimated at 80 per cent. of the newly detected cases can be effectively disposed of. In this way it should be possible to bring the disease effectively under control, as advanced cases, if not tackled by expanded medical facilities would pass out in course of time by natural processes. In fact it is by adopting this method that many of the western countries hope to eradicate tuberculosis in a couple of decades. Of course, this does not mean that efforts to provide medical facilities to the existing infective cases can be slackened.

During the year a tuberculosis clinic was started in Rampur State and a hospital with 200 beds in Bengal. The existing facilities for the treatment of tuberculosis patients in India are 125 clinics, 73 tuberculosis sanatoria and hospitals with 4,600 beds, 2,050 beds reserved in the wards of the various general hospitals, 744 beds in jail hospitals and 1,200 beds for soldiers maintained by the military authorities.

From the accounts received from the provinces, it does not appear that any special measures were adopted during this year for the control, prevention and cure of this important disease. Below is given a brief account of the anti-tuberculosis activities in the provinces that have commented upon the subject in their health notes.

North-West Frontier Province.—All the nine clinics in the province continued to function throughout the year. Useful work was done at the Tuberculosis Sanatorium at Dadar. Besides the Provincial Tuberculosis Association, the District Associations continued to work throughout the

year. The Association received a special grant of Rs. 27,000 from the Provincial Red Cross Society out of His Excellency the Governor's Red Cross Appeal Fund, 1945. Grant of Rs. 2,000 was made to the tuberculosis clinic at Dera Ismail Khan and of Rs. 1,000 to the Afghan Mission Hospital, Peshawar.

Punjab.—The number of recorded deaths from pulmonary tuberculosis was 8,263 as against 9,211 in 1945 and an average of 9,735 for the period 1941-45. The province does not have any special tuberculosis service for the control and the prevention of the disease.

United Provinces.—Tuberculosis clinics functioned at nine places and advised nearly four thousand persons.

Bihar.—Tuberculosis clinics functioned at each district headquarter. At these clinics local doctors trained in tuberculosis work were engaged and worked under the supervision of Civil Surgeons. Outdoor and indoor tuberculosis cases treated in the different clinics, dispensaries and hospitals numbered 17,879 and 1,276 respectively.

Orissa.—In the only clinic at Cuttack situated in the General Hospital, 623 patients including 69 carried over from the previous year were attended to. Screening of 492 patients were carried out and 40 X-ray photos were taken at the expense of the Provincial Tuberculosis Association. Observation wards of the clinic admitted 19 patients and six were sent to the different sanatoria in India. Poor and needy patients received 20 maunds of milk and 50 lbs. of cod liver oil. The three Health Visitors attached to the clinic visited 1,006 houses and delivered 236 health talks in the Cuttack Municipal Area. Pamphlets and leaflets also were distributed.

Bengal.—During the year new clinics were established at Burdwan and Rajshahi and foundation of a clinic at Midnapore was laid. Tuberculosis Associations to control tuberculosis work in their areas were formed at Midnapore, Burdwan, Pabna, Faridpur, Tippera, and Rajshahi. In addition to the usual grant of Rs. 10,000 to Bengal Tuberculosis Association the Government sanctioned Rs. 3,000 for publicity, Rs. 770 for purchase of equipment and Rs. 5,952 towards pay and allowances of 8 additional tuberculosis home visitors. Renewals of grants of chest clinics were sanctioned. The two special tuberculosis officers continued to advise on the establishment of chest clinics.

Central Provinces.—The four tuberculosis clinics at Nagpur, Jabulpore, Amraoti and Raipur continued to work satisfactorily. Deaths from the disease reported were 5,862 as against 7,428 deaths in the preceding year.

Coorg.—The disease is prevalent on a fairly large scale in the rural area. A sanatorium at Mercara is proposed to be built during 1947-48.

Ajmer-Merwara.—The anti-Tuberculosis Clinic in the Victoria Hospital, Ajmer and the Madar Tuberculosis Sanatorium continued to do useful work. There is a proposal in the Post-war Scheme to establish a Tuberculosis Clinic with a ward of 50 beds.

Leprosy.

8 Leprosy in India is mainly a rural problem, although the growth of towns and cities with their industrialisation and the social institution

of giving alms to lepers has in recent years tended to produce a steady flow of lepers into urban areas. These factors assist in the dissemination of the disease. The existing Lepers Act empowers removal of indigent lepers to institutions and prevention of lepers from following certain occupations but for various reasons the provisions of the Act have been found difficult to apply.

As was remarked in last years' report the provincial Governments are assuming an increasing responsibility for anti-leprosy work. It has to be accepted that it is an impracticable task to isolate the large number of lepers that exist in India. Hence, quite naturally the expansion in the activities of the provincial Governments is mainly in the direction of establishing self-contained and self-supporting leper colonies and providing cheap leper clinics. However, it has to be remembered that the real thing is to lay stress on general health propaganda directed towards the removal of factors such as bad environmental sanitation, overcrowding and malnutrition. This should supplement the activities of special services in anti-leprosy campaign. Below is given an account of the anti-leprosy activities of the provincial Governments, who have supplied the necessary information in their health notes. The two principal voluntary organisations the British Empire Leprosy Relief Association and the Mission to Lepers still figure prominently in anti-leprosy activities in the country and their activities are given elsewhere in Section IX on Voluntary Organisations.

Punjab.—Anti-leprosy work was carried out by the Public Health Staff in collaboration with the British Empire Leprosy Relief Association and the Mission to Lepers. A grant of Rs. 1,04,271 was given by the Punjab Government for the maintenance and treatment of patients in the five Leper Homes at Rawalpindi, Tarn Taran, Ambala, Sabathu and Palampur. These Homes had 823 patients on their registers and of these 727 received treatment. An additional grant of Rs. 13,442 was made by the Government to the Leper Home, Tarn Taran, for maintenance and treatment of infectious cases from Lahore segregated under the Lepers Act. Three new clinics were opened, one in Gurdaspur and two in Kangra district, bringing the total number of such clinics in the Punjab to 199. These clinics had 1,179 cases on their registers but only 346 cases attended for treatment. Leprosy surveys were carried out in 3 villages in Palampur and 292 villages in Kangra. 99 new cases of leprosy were detected during surveys or from attendances at the clinics.

A training course was arranged for the doctors of Ambala Division. Ten doctors attended. The provincial Government took over the responsibility of meeting the expenses in connection with the Officers and establishment of Provincial Leprosy Officer, District Leprosy Officer, Kangra and Assistant Leprosy Officer, Kulu. The Lepers Act remained in force in the districts of Kangra, Hoshiarpur, and the city of Lahore. In Kangra district the Act was applied in 8 instances. During 1944-46, 1,000 leprosy cases were segregated from Lahore Corporation Area. Of these 150 infectious cases were transferred to the Leper Home, Tarn Taran for treatment. Propaganda work was carried on and booklets and pamphlets on leprosy in Urdu, Hindi and Gurmukhi were freely distributed.

United Provinces.—Last year the Government had under its consideration a scheme for carrying out leprosy surveys and propaganda throughout the province. This scheme has been replaced by a fresh one which provides for leprosy work only in selected areas in the province and includes constructive work along with the surveys. The creation of a number of leprosy units with a Provincial Leprosy Officer to supervise and co-ordinate work in the province has been recommended. The units will carry on work on survey, propaganda, treatment and isolation of cases. In the first instance, six such units are proposed to be started at places where facilities for isolation already exist.

Bihar.—The disease was confined mainly to the districts of Manbhum and Ranchi. A number of leprosy asylums and special clinics functioned in several districts. The clinics were under the charge of specially trained medical officers and had the necessary facilities for diagnosis and treatment. Indoor and outdoor patients treated in different hospitals and dispensaries numbered 7,682 and 787 respectively. Attempts were being made to start a leper asylum at Chapra. Arrangements are also being made to convert the Zaman Clinic at Monghyr to a leper asylum.

Orissa.—Anti-leprosy work in the province is undertaken separately by the Provincial Government, the local bodies, the Mission to Lepers and private organisations. The provincial branch of the British Empire Leprosy Relief Association co-ordinates their activities. Of 189 leper clinics, 40 were managed by the provincial branch, 4 by District Leprosy Councils, 128 were attached to hospitals and dispensaries and the rest were managed by private agencies. Besides the Cuttack Leper Asylum and the Puri Leper Colony, 8 smaller colonies were maintained with grants from the Provincial Association. There were 570 infective lepers isolated in these institutions. The Government has a scheme of establishing a leprosy colony at Janla. A suitable site has been selected and the plan of buildings, etc., has been prepared and approved. Survey of 145 villages with a population of 39,703 was carried out and 206 cases were detected and persuaded to attend clinics for treatment. Some infective cases belonging to the middle class volunteered for isolation and the Provincial Association sanctioned funds for erecting small isolation sheds for their accommodation. Propaganda work was carried out by the district leprosy staff as well as by the regular health staff. 500 lectures with and without magic lanterns were delivered. Films also were shown and small exhibitions were held at Fairs and Cattle Shows. Pamphlets and leaflets in Oriya were distributed.

Bengal.—A Special Committee was appointed by Government to plan a comprehensive anti-leprosy scheme. The Committee recommended:—(i) the Government should accept the principle that the control of leprosy in the Province is its direct responsibility;

(ii) A Senior Officer of the status of Assistant Director of Public Health be deputed to the Directorate of Public Health for directing, supervising and co-ordinating the whole leprosy work in the province;

(iii) The province should be divided into 12 units for anti-leprosy work, each unit to consist of one or more districts according to the extent of the leprosy problem; the activities of the units should be to organise village isolation centres, leprosy clinics and asylums and conduct surveys;

(iv) Each unit should have at least one leprosy institution for infectious cases. The Government has accepted the report and a special Assistant Director of Public Health was appointed temporarily for organising leprosy work. Leprosy clinics established by local bodies were subsidised by the Government. There are 69 such clinics run by the local bodies. The Post-war Development Scheme provides for the establishment of 3 leper colonies for the isolation of infective cases. Progress in this direction is being made in the way of acquisition of land, preparation of estimates of buildings, etc. The Government makes a grant-in-aid of Rs. 10,000 to the Bengal Branch of the British Empire Leprosy Relief Association.

Assam.—Four new Leprosy Clinics were opened during the year on the recommendation of the Leprosy Officer based on the surveys carried out. Public Health dispensaries treated 856 cases of leprosy. The special Leprosy Officer also supervised the work of treatment centres and gave advice to leper institutions.

Central Provinces.—The anti-leprosy campaign was undertaken on the usual lines. The Assistant Health Officers on leprosy duty, carried out treatment, propaganda and survey work. Leprosy cases treated at the various Government centres totalled 5,442. Voluntary organisations including the Mission to Lepers and Maharogi Seva Mandal continued their anti-leprosy work.

Madras.—The Government appointed an *ad hoc* committee to consider the present position of leprosy work in the province and to frame proposals for further preventive and curative work with reference to the post-war plans and Bhole Committee's recommendations.

Coorg.—No case of leprosy was reported from the province.

Kala-Azar.

9. The disease was not prevalent in a severe form in any of the provinces. Brief notes on the incidence of the disease in the provinces where the disease is more commonly prevalent are given below.

United Provinces.—The disease prevailed in the eastern districts. The Government sanctioned the formation of 26 travelling medical units for survey and treatment work in the districts of Gorakhpur, Deoria, Basti, Benares and Azamgarh and these are likely to start functioning from about the 1st of May, 1947. Medicine for the treatment of the more serious cases has been provided at district hospitals and branch dispensaries.

Bihar.—The disease is endemic mainly in North Bihar. Its incidence is high in the districts of Darbhanga and Purnea but not so high in North Bhagalpur. In other districts only sporadic cases occur. An interesting feature is that the hyperendemic areas for malaria and Kala-azar are identical.

Bengal.—A slight increase in the incidence of the disease was noticed in some parts of the province but there was no epidemic of Kala-azar anywhere. Out of Rs. 1,20,000 sanctioned by the Government for anti-Kala-azar work, Rs. 80,000 were allotted to District Boards and the Central Co-operative Anti-malaria Society for running Kala-azar treatment centres. Rs. 11,500 were sanctioned to the District Board of

Darjeeling for the continuance of a special anti-Kala-azar scheme. The balance of Rs. 28,500 was utilised for the purchase and distribution of Kala-azar specifics to district boards.

Assam.—An intensive survey of the affected areas was possible this year, as more doctors were becoming available for the work. A large number of new cases were brought under treatment. Nowgong was found to be the worst affected district. Approximately 23,000 cases were treated as against 19,256 during the previous year. All districts except that of Lakhimpur recorded a higher number of patients this year.

Central Provinces.—Sporadic cases were reported from the districts of Nagpur, Wardha, Chhindwara, Jubbulpore, Mandla, Raipur, Bilaspur and Drug. These cases were not verified.

Cerebrospinal fever.

10. There was no epidemic of the disease in India. The disease occurred in a sporadic form in several provinces. A brief account of the incidence of the disease in the provinces mentioning this disease in their health notes is given below.

In North-West Frontier Province only one case was reported from Peshawar and another from Bannu; otherwise the districts were free from the disease. In the Punjab 79 deaths from the disease were recorded as against 134 in 1945. Of the deaths in 1946, thirty were reported from Shahpur and 11 from Jhang. In Bihar the disease is believed to be rare. During the year only one case was reported from Motihari Jail. Some cases were reported from jails and some from villages in Koraput and Balasore in Orissa. In Bengal cases were reported from Calcutta only. In Central Provinces sporadic cases were reported from almost all the districts. In Bombay 109 deaths from the disease were reported as against 222 in 1945. Sixty deaths were reported from Bombay city and 24 deaths from Ahmedabad. Sporadic cases were reported from 9 districts. Sulpha drugs and in some cases penicillin were used in the treatment of patients. Isolation and treatment of cases in Infectious Diseases Hospitals were carried out where possible and the infected premises were disinfected. The disease prevailed in a mild form in all the districts in Sind. During the year 107 cases with 36 deaths were reported as against 214 cases with 73 deaths in 1945. Press notes describing the signs and symptoms of and the precautions against the disease were issued for the benefit of the public. In Coorg sporadic cases were reported. The cases were easily diagnosed for all cases of neck-rigidity with fever had lumbar-puncture done as a routine. 2 cases with 2 deaths were reported in Ajmer.

SECTION III.

HEALTH ACTIVITIES OF THE CENTRAL AND PROVINCIAL
PUBLIC HEALTH DEPARTMENTS.

Health activities of the Central Government.

11. A conference of Provincial Health Ministers was convened by the Government of India in October, 1946, to formulate lines of action in accordance with the recommendations made by the Health Survey and Development Committee and to implement as far as possible within existing resources the recommendations made by the Committee. The conference of Provincial Ministers agreed generally with the basic principles laid down in the report of the Bhore Committee and further proceeded to consider ways and means to implement the plan within the scope of existing resources. The conference passed the following resolutions:—

“(1) The Conference endorses the objectives proposed by the Bhore Committee as objectives to be kept in view in formulating plans for national health services.

(2) The Conference considers that the district health organisation proposed is administratively sound and acceptable in principle. The programme for the first five years is not within present financial resources but it is agreed:—

Firstly that the scheme would be implemented on as wide a scale as possible consistent with financial limitations, taking full advantage of existing institutions and staff;

Secondly that modifications in the scheme may be made where necessary to adapt to local conditions;

Thirdly that in areas where the full organisations cannot be set up immediately schemes for development should be framed with due regard to the objectives of building up a curative and preventive health services on the general lines recommended by the Bhore report.

Fourthly that each province should review the plans with these considerations in view.

(3) The Conference agrees that a review of the training facilities in the light of probable future requirements should be undertaken and that particular emphasis should be laid on the training of personnel. It also agrees that as far as possible, the larger provinces should assist those provinces which have not yet been able to provide their own training facilities, by admitting students to their training institutions.

(4) The Conference agrees that Boards of Health and Councils of Experts should be constituted at the Centre and in the Provinces. It considers that representatives of the Central Legislature should be included in the Central Board of Health, that the constitution of the Provincial Boards should be left to the discretion of the Provincial Governments and that the health experts of the Central Provincial Governments should attend the Central Board of

of Health. The Conference also considers that the functions of the Central Board and Council should be purely advisory.

(5) The Conference accepts the principle of amalgamation of medical and public health departments and considers that the amalgamation should take place when a suitable opportunity occurs. The Honourable Ministers from Madras and Bombay dissented from this view. The Honourable Minister from Madras considered that co-ordination between the two departments was preferable to amalgamation.

(6) The Conference agrees:—

(a) that an active programme for the improvement of water supply and sanitation in both urban and rural areas should be undertaken;

(b) that in respect of water supply, the objective should be to provide at least 50 per cent. of the population with a safe and abundant water supply within a period of not more than 20 years and the entire population within a period of not more than 35 years;

(c) that in urban areas the objective should be to instal adequate sewerage in all towns with a population of 50,000 or over during the first 10 years.

The Conference considers that the constitution and functions of provincial water and drainage boards should be left to the discretion of the provincial Governments.

(7) The Conference agrees:—

(a) that a vigorous drive against malaria should receive priority in development programmes;

(b) that, subject to adaptation to suit local conditions, anti-malaria organisations should follow the general framework of the organisation proposed by the Bhore Committee;

(c) that anti-malaria personnel trained in the Defence Services should be utilised to the fullest possible extent.

(8) This Conference agrees that quinine production should be continued and developed up to about 200,000 lbs. a year subject to review from time to time.”

To implement the recommendations made by the Bhore Committee regarding the improvement and extension of medical education, the Government of India selected 54 students for advanced training overseas to equip them for teaching and research posts in the various medical institutions in the country.

A committee was set up to advise the Government on the steps that should be taken to establish a high grade and up-to-date medical teaching and research institute. Grants for the establishment of medical colleges are to be given to Benares and Aligarh Universities. A temporary medical college has been opened in Calcutta to provide a post-graduate course for medical licentiates to enable them to take their degree. The college is intended to train 1,000 licentiates over a period of 5 years.

Provincial Governments have all planned for the extension of facilities for medical education with development grants made by the Central Government.

The Government of India sanctioned a sum of Rs. 16,837 to meet the cost of manufacturing Influenza Vaccine on a limited scale at the King Institute, Guindy. Proposals for continuing the work in 1947 have been made. 20,000 doses of dry vaccine (Lymph Vaccine) were obtained from Paris and trials on its efficacy under Indian conditions are being conducted at the King Institute, Guindy.

Another important development in the direction of land fertilizers was the manufacture of compost from town refuse—a matter which is of vital interest to the activities of agriculturists. The prejudice against the use of compost found in some quarters will, it is hoped, soon be overcome. In the final quarter of the year 469 municipal centres prepared about 92,400 tons of compost. In addition, under the village compost scheme 4,616 villages produced during the last quarter of 1946, about 250,000 tons of manure. This represents the first stage of exploration and a large scale trial of improved methods under local conditions existing in different Provinces and States. The stage next contemplated is one of rapid expansion to cover 5,000 towns and 650,000 villages in the country as soon as possible. Provision for this has been made in the programmes of Provinces and States from 1947-48 onwards.

The Bengal Famine drew the attention of medical men on the treatment of starvation cases. As food scarcity conditions prevailed in some parts of the country the Director, All India Institute of Hygiene and Public Health, Calcutta, was authorised to manufacture Protein Hydrolysates for the treatment of advanced cases of starvation. The Institute manufactured a total of 2,184,000 ccs. and of these 1,346,000 ccs. were supplied to the King Institute, Guindy, Madras, against the demand of Madras Government for 2 million ccs.

Two officers, one for Health Education and the other for Industrial Health were appointed. The post of a Nutrition Officer and the two posts of Maternity and Child Welfare Officers sanctioned by the Central Government last year remained vacant during the year for want of suitable candidates.

No meeting of the Central Advisory Board of Health was held in 1946. The functions of this body will be vested in the proposed Central Board of Health whose formation was agreed to by the Provincial Health Ministers at their Conference in October, 1946, as already referred to above.

Food scarcity and famine relief.

12. Throughout the year grave concern was felt over food scarcity in certain areas in the Provinces of Madras and Bombay. Towards the close of the first quarter of the year scarcity food conditions prevailed in certain areas in nine districts of Anantapur, Bellary, Kurnool, Cuddapah, Chittoor, North Arcot, Salem, Coimbatore and Malabar in Madras. From the third quarter of the year Ramnad was also added to the list. The total population of all these districts at the last census was about 20 millions. In Bombay, areas in seven districts of Poona, Satara, Sholapur, Belgaum, Dharwar, Bijapur and Ahmednagar were similarly affected. The total population of all these districts was about 8 millions.

Certain areas in Citaldrug, Tumkur and Kolar in Mysore State were also threatened with food scarcity. The mid year 1943 population of these districts was 2½ millions. The population of Kolhapur State which was affected with food scarcity was nearly a million. The scarcity conditions had eased considerably by the close of the year.

To assess the effects of food scarcity on the health of the people the local Governments concerned were requested to furnish the Central Government with weekly reports on the health conditions in the areas threatened with food scarcity with particular reference to starvation cases and deficiency diseases. In spite of severe scarcity conditions the distribution of rationed food was adequately maintained in all the areas. This is evidenced from the fact that no appreciable deterioration in the nutritional condition of the population was noted. A few deaths from starvation were however reported from Madras but they were generally from the itinerant beggar class. Among the precautionary measures the prophylactic inoculation and vaccination work was intensified. Emergency reserves of cholera and plague vaccines, vaccine lymph and a small quantity of influenza vaccine were maintained to meet any adverse developments. The production of protein hydrolysates for the treatment of inanition cases was speeded up. Adequate provision of additional medical staff and stores and hospital accommodation particularly for cases of malnutrition and inanition was made. Mobile Units for emergency work were formed.

A brief account of the relief activities organised by the provincial Governments to meet economic distress caused by floods and damage to crops during the financial year 1945-46 is given below.

North-West Frontier Province.—Remissions to the extent of nearly Rs. 76,000 in land revenue, Rs. 13,565 in irrigation dues and Rs. 24,000 in old taccavi loans were granted.

Punjab.—The crops were generally good. Heavy rains and floods caused considerable damage to crops and property in Hoshiarpur, Ludhiana, Ferozepur and Ambala districts. The Government sanctioned Rs. 4,13,000 for distribution as gratuitous relief to the sufferers. A further grant of Rs. 7,12,000 as gratuitous relief in Shahpur district was made. A sum of Rs. 2,50,000 was remitted and recovery of Rs. 1,27,000 suspended from the fixed land revenue due for the current and previous harvests. Fluctuating land revenue was remitted to the extent of Rs. 10,18,568 and remissions of abiana amounted to Rs. 19,41,817. Recovery of Rs. 8,665 was suspended and Rs. 58,667 was remitted from the old taccavi balances. Advances to the extent of Rs. 33,988 were made in connection with Grow More Food Campaign.

United Provinces.—On account of agricultural calamities during April 1945 to September 1945 irrigation dues were remitted to the extent of Rs. 1,79,719. Land revenue and old taccavi dues were remitted to the extent of Rs. 21,071 and Rs. 5,966 respectively. Gratuitous relief to the extent of Rs. 6,527 was also given.

Bihar.—The crops failed due either to floods or to insufficient rainfall in the districts of Gaya, Shahabad, Muzaffarpur, Hazaribagh and Palamau. There were outbreaks of fire in the districts of Muzaffarpur, Darbhanga, Monghyr, Bhagalpur and Santhal Parganas. Gratuitous relief to the extent of Rs. 1,80,467 was given to sufferers.

Bengal.—Agricultural distress of varying degree over wide areas was caused first by deficient rainfall and later on by floods. The *Aus* crop was nearly 75 per cent. and the *aman* crop was about 80 per cent. of the normal. Gratuitous relief amounting to Rs. 64,65,125 and other kinds of financial relief amounting to Rs. 74,89,936 were given. These relief measures included free distribution of food and cloth, free milk canteens and subsidies to voluntary organisations. Total remissions amounting to Rs. 6,04,398 and suspensions amounting to Rs. 12,55,964 in land revenue were granted.

Assam.—The agricultural situation was on the whole satisfactory. To meet local calamities land revenue was remitted to the extent of Rs. 14,063. Gratuitous relief amounting to 18,282 was given in the districts of Kamrup, Darrang, Sibsagar, Sylhet and Cachar which were visited by floods of local character.

Orissa.—The total rainfall in the province was above the normal. Heavy rainfall damaged the paddy crop as well as affected the crops of cereals and pulses just after *rabi* crops had been sown particularly in the two subdivisions of Cuttack district. The outturn of other *rabi* crops was affected for want of timely rains. Free grants amounting to Rs. 40,000 were made by the Government for the relief of the distressed.

Central Provinces.—The crops were fair and the rainfall generally timely and helpful to the agriculturist. To meet damage to crops by hail-storm and other local calamities remission of land revenue amounting to Rs. 8,780 was granted and suspensions and resuspensions amounting to Rs. 25,696 were sanctioned. Taccavi demand amounting to Rs. 43,790 was remitted.

Bombay.—The agricultural situation was on the whole fair. Heavy rains and floods caused considerable damage in Broach district, and *rabi* crops in one taluk of the Nasik district were damaged by hail. Due to the failure of the rains, scarcity conditions prevailed in parts of Ahmednagar, Poona, Satara, Sholapur, Belgaum, Bijapur and Dharwar districts. Gratuitous relief amounting to Rs. 2,23,360 and other kinds of financial relief amounting to Rs. 2,31,692 were given. Remissions amounting to Rs. 19,88,875 and suspensions to the extent of Rs. 60,16,261 in land revenue, irrigation and Tagai dues were granted.

Sind.—Agricultural conditions were fairly good. Remissions in land revenue and irrigation dues amounted to Rs. 7,01,888. Suspensions in land revenue dues were granted to the extent of Rs. 2,55,597. Other financial relief amounting to Rs. 5,53,075 was given. The relief work started in Sukkur, Larkana and Dadu in 1942 after floods was continued and a further 12 lakhs of rupees were spent on gratuitous relief.

Madras.—Standing crops were generally fair. Remissions amounting to Rs. 25,28,493 from land revenue and irrigation dues were granted. Suspensions amounting to Rs. 13,85,314 from irrigation and taccavi loans were granted. Gratuitous and other kind of relief amounting to Rs. 8,41,878 was given. In localities of fodder scarcity, depots were opened and fodder was sold at concessional rates.

Coorg.—Due to the failure of monsoon during the latter part of the year some of the high-lying lands were left fallow. The people were given subsidies by the Government for the Grow More Food Scheme, for the reclamation of waste lands and for the construction of tanks and

channels. The crop yield was below the average. Remission of assessment on account of failure of crops due to water scarcity and damage to crops by wild animals was allowed to the extent of Rs. 15,201.

Ajmer-Merwara.—The outturn of crops was, generally speaking, low. The crops in Kekri subdivision were damaged by excessive rains. Due to damage to crops by pests in Ajmer subdivision revenue was remitted to the extent of Rs. 9,917.

Baluchistan.—There was not particular agricultural distress in Baluchistan beyond normal crop failures. Remission of land revenue, irrigation and old taccavi dues amounting to Rs. 1,27,976 was granted and suspensions to the extent of Rs. 6,664 were given. Other kinds of financial relief amounted to Rs. 4,20,000.

Rural health.

13. India is primarily a land of villages and for an improvement of national health, attention must therefore be focussed on the problems of rural area. The vast rural tracts with their predominantly agricultural character where nearly 85 per cent. of India's population reside, present the health worker with problems of immense magnitude. Just as the scattered nature of the population, the lack of adequate communications and the conservative outlook of people add to the difficulties, the simple habits of the people, their fewer wants and freedom from strains and complications of urban life present some relieving features to the difficult problems that have to be tackled. To achieve improvement in public health in rural areas effort has to be on a large scale, so large that even the provision of elementary requirements of environmental hygiene such as safe water supply and proper conservancy arrangement involve a heavy expenditure. It is true to some extent that in India a disproportionately large portion of available funds has been spent on urban sanitation but this has occurred not only in India but in other countries also. The steps taken in other countries to raise public health standards have invariably been more favourable to the urban population and to industrial workers than to the agriculturist.

The sanitation in the urban areas in India is as yet far from satisfactory but rural areas must get priority for their needs if the health of the rural population is to improve. The authorities concerned have realised the urgency of the problems of rural health and are paying increasing attention to the expansion of medical relief, the provision of safe water supply and proper conservancy, and the introduction of maternity and child welfare services though the actual efforts made so far have touched only the fringe of the problem.

Experimental studies on the organisation of public health activities in the rural areas are being undertaken in some small areas through the formation of Health Units. These Units also serve as demonstration areas to show what can be achieved by a properly equipped health service. It is hoped that the experience gained there will find a wider application in the rural areas at large. A brief account of the important activities of the Health Units and of the improvement in rural water supply is given in the following paragraphs. Other developments in rural health are given in the relevant sections.

Health Units.

Delhi.—The Najafgarh Unit was established in April 1937. The Unit area remained free from cholera, small-pox and plague. Suspected cases were followed up. During the rainy season disinfection of water supply and control over foodstuffs were enforced. Disinfection of 503 wells was carried out. Anti-cholera inoculations totalled 1,023. Vaccinations and revaccinations were continued throughout the year. Vaccinations performed were 11,821. Deratting operations were carried out during the winter months. 48,432 rats were destroyed. Anti-malaria measures which included treating with larvicide or draining off water collections, filling up of swamps and building of drains were undertaken with the voluntary help of villagers. During the year only one village out of 72 showed a spleen rate of over 25 per cent. in June. This contrasts favourably with the year 1937 when the number was 39. The birth, death and infant mortality rates in the Unit area were 45.7 per mille, 17.5 per mille and 110.7 per 1,000 births as against the corresponding figures of 48.6, 24 and 151.7 in 1945. The death rate and infant mortality rate were the lowest since the inception of the Unit.

Of 788 students on school rolls, 605 were medically examined and 177 were recommended for treatment. Of the defectives 23 per cent. had eye trouble, 28 per cent. dental trouble and 8 per cent. showed personal unhygienic conditions. There is as yet no touring dentist and eye specialist to look after such cases. The students from Lady Reading Health School and Lady Irwin College received training in rural public health. Lectures in Hygiene were given to Normal School students. The sanitation of villages continued to be unsatisfactory. Suggestions for improving these conditions, which were mentioned in last year's report, were still under the consideration of the Government. Consolidation of land holdings was completed in 2 more villages this year.

The Unit staff attended to 45 per cent. of the total confinements. This year 1,792 ante-natal attendances, 2,426 infants and 3,478 toddlers were under care as against 1,970 ante-natal attendances, 2,121 infants and 3,137 toddlers in 1945. Total clinic attendances were 15,518 as against 16,676 in 1945. The mortality rate of infants and toddlers on cards was 40 and 15.5 per mille respectively. Fevers, pneumonia, and gastro-intestinal diseases were the main causes of death. The maternity and child welfare activities were greatly handicapped for want of a sufficient number of midwives and *dais*. The existing strength is considered to be adequate to look after only 34 villages out of 72 villages in the Unit. A maternity hospital in Najafgarh is badly needed.

United Provinces.—The Partabgarh Health Unit completed its 14th year of existence. The local bodies were relieved of their financial responsibilities towards this Unit, the United Provinces Government having agreed to meet all the expenses apart from the Red Cross contribution towards the activities of the Maternity and Child Welfare Section and towards the dearness allowance to staff. The Unit is divided into four circles, each under the charge of a midwife. The Medical Officer-in-Charge co-ordinates the health activities of the Unit.

Cholera broke out in February due to infection imported from *Magh Mela*. Epidemic Diseases Regulations were enforced for two months and other anti-cholera measures were taken. The Director of Public

Health, United Provinces, made a grant of Rs. 1.00 for epidemic work. Five villages were infected with plague, the neighbouring districts of Jaunpur and Sultanpur having been heavily affected. Anti-plague measures were intensively carried out in villages infected during the last season and those within a radius of 5 miles of the villages showing infection this year. There was no epidemic of small-pox. All the available children in the rural area were vaccinated. The incidence of malaria was light. Field units of Junior Red Cross groups in rural schools under the guidance of teachers went round the villages on Sundays and holidays and carried on propaganda and other activities for the prevention of malaria. The Health Unit sanitary gang also helped the villagers in filling up of excavations and draining off of small water collections. The birth rate, death rate and infant mortality rate were 29.0 per mille, 12.2 per mille and 113.2 per 1,000 live births as against 24.6, 16.6 and 113.6 respectively in 1945.

The Unit staff conducted 50 per cent. of labour cases in the Unit area. The infant mortality rate in the cases conducted by the Unit staff was 49.6 against 180.6 among cases conducted by other agencies. Maternity and Child Welfare Centres recorded attendance of 640 expectant mothers, 1,457 infants and 1,594 toddlers. Training was given to 13 *dais* under the Victoria Memorial Scholarship Fund Scheme. Lectures in aseptic midwifery were given to 20 other village *dais*. The milk feeding scheme in one of the child welfare centres was continued. Towards the close of the year the Provincial Red Cross Branch made a special grant of Rs. 1,200 for free distribution of milk, fruit juice, cod liver oil and vitamin D preparations. In addition to the ordinary parade inspection in nearly all schools, a detailed examination of 186 students in 11 schools was carried out. Students with major defects were given vouchers for treatment at the neighbouring dispensaries. Minor ailments were treated on the spot.

Intensive work on sanitary improvements such as the construction of bore-hole latrines, soakage pits, septic tank latrines, bathrooms, bathing platforms, utensil cleaning outfits, sanitary kitchens with smoke chimneys, sanitary cowsheds, etc., was effected in two villages of every circle. The village medicine chests proved very useful. 15,053 minor ailments were treated by sanitary inspectors and maternity workers. Some progress was recorded in the preparation of Village Health Gazetteer. Fifteen such gazetteers have been prepared. The Village Health Leagues functioned satisfactorily. They were useful in pushing on sanitary improvements, vaccination, preventive inoculation and correct reporting of vital events.

The bye-laws for the regulations of vendors of food articles were applied to Bela municipality and licensing rules for butter, ghee and fat were strictly enforced in the rural areas. The manufacture of compost was continued in Bela municipality and 2,800 cubic feet of manure were prepared. After an observation of the working of village Home Septic Tank latrine, a modified design to suit the rural areas of the province was devised. The new design is estimated to cost Rs. 100. The effect of the intervention of silt catcher on increasing the life of the present bore hole absorption pits was also studied. An improved design of standard cement ventilators for use in villages was made and suggested for common use. The Museum was reorganised and several new and useful models were added. The Unit continued to serve as a training ground in rural public health activities.

Bengal.—The Singur Health Centre was in its third year since its reorganisation in January 1944. The Centre includes 4 Union Boards of Serampore Sub-Division with an area of 33 square miles and a population of 63,700 distributed in 68 villages of varying size and population. The Technical Advisory Committee which is responsible for the administration of the Unit scheme has recommended the extension of the scheme to four more Union Boards. The Union Boards and Village Health Committees functioned satisfactorily. The idea of self-help in this sphere is gaining ground. A scheme designed to improve the recording of vital statistics in the Unit area was started. The central idea of the scheme is that the Sanitary Inspector who acts as the registrar, receives the information from three independent sources, viz., the chowkidar, the Village Health Committee Member, and the maternity staff. Discrepancies which are noticed are verified and the chowkidars list is accordingly corrected. The birth rate during the year was 42.5 per mille, the death rate was 16.5 per mille and infant mortality rate was 126.3 per 1,000 live births. These figures are decided improvements over those of the two previous years. The activities for immunisation against small-pox and cholera were greatly assisted by the Village Health Committee members and the school teachers. Segregation of cases of infectious diseases was emphasised by the staff of the Health Centre and seemed to have invoked response. Malaria control measures were carried out in some places by village volunteers under the technical supervision of Health Centre staff. The spleen census of villages showed that antilarval measures conducted on self-help basis produced good results.

During the year, 32 new tube wells were sunk, 11 were resunk, 3 were cleared and 612 were repaired. Nearly 90 per cent. of the tube wells in the area were maintained in good order by the maintenance gang. The villagers were induced to construct 787 bore-hole latrines under a scheme which requires 50 per cent. of the houses to construct bore-hole latrines before the Health Centre agrees to sink a new tube well in the locality. Concrete squatting plates were supplied by the centre. The use of bore-hole latrine has still to be popularised. It is estimated that on the average only 40 per cent. of latrines are regularly used. 50 per cent. are used only during night or rainy season and the remaining 10 per cent. are not used at all.

The Maternity and Child Welfare work was handicapped due to shortage of personnel. Several villages were inaccessible during the monsoon due to flooding. Cases of anaemia, pyorrhoea, angular stomatitis and symptoms of diet deficiencies amongst expectant mothers were fairly common. An enquiry into the cause of anaemia sanctioned by the I. R. F. A. could not be undertaken for want of suitable staff. It was not possible with the funds available to undertake adequate treatment of the large number of anaemia cases but a generous supply of multi-vitamin tablets from Friends Ambulance Unit helped the situation considerably. Special scabies clinics were established and 1,275 cases were treated. There was a definite improvement in home visits and clinic work. During the year 7,381 pre-natal visits, 3,950 infant visits, 714 toddler visits, 1,243 post-natal visits and 999 friendly visits bringing the total of visits to 14,287 were made. These include 4,953 first visits and 10,277 home visits. The Centre staff attended on 7 per cent. confinements as against 44 per cent. in the previous year. In the

Maternity Home 64 confinement cases were admitted together with 16 cases of anemia of pregnancy and 8 cases of other complaints. Due to lack of suitable candidates coming forward, *dai* training was suspended in February 1945. It was re-started in November 1946 with 4 trainees.

Out of 2,904 school children only 36 per cent. were medically examined. In 1945 this figure was 60 per cent. Of the children examined 73 per cent. were found to be defective with 1,604 total defects. The chief defects were malnutrition 26 per cent., carious teeth 32 per cent., glandular enlargements 19 per cent. and chronic tonsillitis 32 per cent. Each school has been provided with a medical first aid box. Arrangements were also made for treatment of defectives at school clinics and Calcutta Hospitals. School children were inspected for personal cleanliness and were provided with health habit booklets to record remarks on personal health matters. Special dramas and poems for recitation on the spread and control of communicable diseases were arranged. Teachers took the students to local markets, fly and mosquito-breeding places and explained to them the risks of taking exposed food and methods of fly and mosquito control. Health propaganda among the general population was carried on through group talks, magic lantern shows and distribution of leaflets.

Bombay.—The Sirur Health Unit completed its seventh year of work. The health staff consisted of an Assistant Medical Officer, 4 Sanitary Inspectors, 1 Health Visitor, 7 Midwives and 1 trained *dai*. The incidence of small-pox in the Unit was rather severe. During the year 11 wells were improved, 1 step well was closed, 15 deep pit latrines and 44 soakage pits were constructed. The number of home visits increased to 38,501 as against 14,401 in 1945. The post-natal, ante-natal and infant visits amounted to 37,430 as against 16,831 in 1945. The Unit continued to serve as a training centre in Public Health. Three batches of military officers and a batch of Sanitary Inspectors' Class visited the Unit for receiving training in rural sanitation.

Madras.—The area of Poonamallee Health Unit was extended so as to include 10 more villages with an area of 10 square miles and a population of 10,000. This extension makes it possible to have a population of 15,000 in each of the four primary centres at Poonamallee, Tirumushi, Mangadu and Kunnathur. The Group Health Centre was located at Poonamallee. The activities of the Unit were handicapped due to shortage of staff and material; particular difficulty was experienced in maintaining the full strength of woman medical officer, health visitors and midwives.

The Unit will start a training centre in Public Health as soon as the Assistant Professor of Hygiene is appointed and the demonstration ground and the lecture hall are ready. The Government have agreed to the provincialisation of the District Board dispensaries at Poonamallee; it will thus be possible to include them in the post-war experimental activities of the health unit. The birth rate in the area increased from 22.7 per mille in 1945 to 36.3 in 1946 while the death rate decreased from 25.5 per mille in 1945 to 21.9 in 1946. The infant mortality rate in 1946 was 166.2 per 1,000 live births as against 240.6 in 1945. Smallpox prevailed in an epidemic form at Poonamallee during

the first quarter of the year. Intensive vaccinations and revaccinations were carried out.

Qualified midwives conducted 68 per cent. of labour cases in the Unit area. To stimulate interest in health work local committees have been formed in villages and joint committees in groups of villages in panchayat areas. The Government made a provision of Rs. 15,000 per year for such work. From this grant four wells at a cost of Rs. 3,600 and five public septic tank latrines at a cost of Rs. 6,200 were sanctioned. 200 water seal squatting slabs for distribution at one-third the cost were under preparation. Four new wells were constructed. Eleven public wells were improved by covering the well and providing a pump and lead off drain. Five septic tank public latrines were constructed. Three tube wells and one pump were sunk. Drains extending to 1,700 ft. in length were under construction and 700 ft. of drains were repaired and reconstructed. The provisions of the Madras Food Adulteration Act were extended to Poonamallee and Mangadu Panchayats. The provisions of the Public Health Act are being gradually enforced. Health propaganda was conducted on the usual lines. The cinema outfit was repaired. The motor van which was received primarily for ambulance work will serve for transporting the cinema equipment as well.

RURAL WATER SUPPLIES AND CONSERVANCY.

A summary of the activities of the provinces in this direction is given below.

Punjab.—A Sanitary Board consisting of 10 officials and 7 non-official members advises the Government on the distribution of grants-in-aid to local bodies for financing water supply and drainage schemes for urban and rural areas. It sanctioned a grant of Rs. 3,02,155 towards rural sanitary works in the province. The chief schemes included in the grant were Bit Haqa Water Supply Scheme estimated to cost Rs. 2,41,188 and the provision of a second oil engine tube well at Musa Khen Water Works, in Mianwali, estimated to cost Rs. 38,457.

Construction of 71 new wells was completed and 42 hand-pumps were installed. Repairs to 1,842 wells were effected and 2,327 village ponds were improved. Some improvements were effected in 720 wells in the province. The medical officers in charge of rural dispensaries under the control of Public Health Department besides attending to patients undertook activities to improve the sanitation of the villages. General environmental hygiene is claimed to have improved in the areas concerned as a result of these efforts.

Bihar.—It is proposed to construct septic tank latrines in areas where the grid system is ultimately to be extended. In other areas bore-hole latrines are suggested.

Orissa.—The Government attached great importance to the improvement of rural water supply and sanctioned sufficient funds to local bodies for constructing tube wells and deep masonry wells. In coastal areas where good drinking water could not be obtained by such wells, construction of shallow tanks were sanctioned. At present rivers, canals, tank, shallow earthen, ring wells continue to be the chief sources of water supply in the rural areas with the result that cholera and other

water-borne diseases usually break out. There was no improvement in the conservancy arrangements in the rural areas.

Assam.—There was no appreciable improvement in the rural water supplies and conservancy arrangements.

Central Provinces.—No new schemes were sanctioned during the year. The Public Health Engineer has a detailed five-year programme of improving rural water supply. The Assistant Medical Officers advocated the construction of trench latrines and bore-hole latrines in the rural areas and there seems to be a slow appreciation of this improvement among the people.

Bombay.—A grant of Rs. 5,00,000 was made to the Commissioners and of Rs. 4,76,300 to the Public Works Department for village water supply.

Ajmer-Merwara.—Sanitary conditions in rural areas continued to be bad. The Government of India have been approached to sanction health staff for improving sanitary conditions.

Nutrition.

14. The modern knowledge of nutrition is based on a few simple facts. The human body is sustained by the food it gets; if the food is inadequate the health of the body is impaired. People who are ill-nourished lack the energy, the ability and even the will to better their lot. Millions in India are chronically under-nourished and in consequence lack vitality and suffer from langour. Disease finds them an easy victim as their resisting power due to under-nourishment is reduced. More and better food is all they need to revive their health and strength but this is not easy to achieve. In India during recent years demand has outstripped by a wide margin the available supply of food commodities. Production of cereals, the staple food in the country, is estimated to be about 4 million tons a year whereas the consumption at the barest minimum level approximates 8 million tons annually. Imports from surplus countries of the world have steadily grown and reached about 2 million tons last year and this was all that was available. There was thus a serious shortage of 2 million tons required for India's immediate requirements. Scarcity conditions prevailed over the country and starvation faced certain areas. Food rationing was widely extended and covered over 130 million people. The daily calorie value of the rationed foodstuffs amounts to barely 1,200 for an adult. This is possibly the lowest calorie intake of rationed foods in the world.

To utilise the available supplies to the best advantage, knowledge of nutrition must be widely broadcast. Nutrition policy should be guided at the Centre and in the Provinces by expert advisers. The nutrition Advisory Committee of the I. R. F. A. has been in existence for a number of years. It discusses the nutrition problems of the country and directs laboratory research and field work in nutrition. Some of the provinces have nutrition committees to advise their Governments on nutrition matters but the evolving of nutrition plans and their execution are yet in their infancy.

The problems of food production, their procurement storage and distribution are factors intimately connected with the nutritional status of the people. The Departments of Health, Agriculture and Food

must all plan together and work towards a common policy. Planned programmes of work with set targets are bound to produce results towards improving the health of the people.

Without trained nutrition workers development of nutrition work is bound to be slow. It is, however, gratifying to record some progress in this direction. Dr. Sankaran, Professor of Biochemistry and Nutrition at the All-India Institute of Hygiene and Public Health, Calcutta, was deputed early in March 1946, by the Government of India to work on the staff of the Bureau of Human and Animal Nutrition in the United Kingdom, for a year to establish liaison with English workers as well as to acquire first-hand knowledge of nutrition trends in that country. He has also been studying vitamin manufacture in the United Kingdom. Dr. Mitra, Deputy Director of Rationing, Department of Food, was to accompany Dr. Sankaran but the prevalent famine conditions in the country delayed his departure to the end of the year when food scarcity conditions in the country had eased. He is studying nutrition policy and the machinery for its execution in the United Kingdom. He is also participating in a survey of nutrition conditions as a result of the war in Germany. Such experience should prove very useful for surveying and planning nutrition work in this country. The Central Government has also in hand selection of nutrition officers from the Central areas and provinces to be granted scholarships for studying nutrition abroad, in the United Kingdom and United States of America.

The training of nutrition workers in India has been organised at the Nutrition Research Laboratories, Coonoor, and the All-India Institute of Hygiene and Public Health, Calcutta, and nutrition courses are held at these Institutes annually.

In the international field the creation of the United Nations Food and Agriculture Organisation has an important bearing on the Food and Nutrition policies of the nations of the world. Born at Quebec in October 1945 from idea "freedom from want", the first session of the Food and Agriculture Organisation took place at Copenhagen, Denmark, in September 1946. India was represented at this conference. The conference laid down lines of general policy for the organisation's programme during the year to come. Its long- and short-term food policy is of special interest. Sir John Boyd Orr, Director General of Food and Agriculture Organisation laid before it a proposal for a World Food Board. The major objectives proposed are providing diets on health standard for the peoples of all countries and stabilising agricultural prices at levels fair to producers and consumers alike. The Nutrition Committee of the Food and Agriculture Organisation discussed the report of the Standing Advisory Committee on Nutrition. The recommendations of this Committee included:—

1. The standardization of food composition tables.
2. Diet surveys in relation to family income and expenditure;
3. The utilisation of cereals and other sources of plant and animal food;
4. Food technology; and
5. The formation of national nutrition organisations.

Two meetings of the Nutrition Advisory Committee of I. R. F. A. were held during the year and their proceedings in detail may be seen

in the Report of the Scientific Advisory Board for 1946. The Committee approved and adopted important notes on the subject of "Food Fortification" and the Nutritive value of Vanaspati or Hydrogenated Oil. Extracts from the latter note are reproduced below on account of its importance:

"During the last quarter of a century, Vanaspati as an edible fat rapidly gained greater and greater popularity in this country and its nutritive value has been the subject of considerable comment and discussion. It has been lately the subject of discussion by Committees of the Imperial Council of Agricultural Research, and the Hydrogenated Oils Committee of the Technical Panel of the Food Department. A symposium was also held on this subject at the last session of the Indian Science Congress at Bangalore."

The comments and recommendations of the various bodies mentioned above, who have discussed this problem are briefly summarised below:—

"1. Vanaspati is more or less devoid of Vitamins A and D. In spite of this as a fat it has good nutritional value, but it cannot be considered as a substitute for ghee.

"2. Suggestions have been made that the consumption of Vanaspati is injurious to health causing particularly irritation to the throat and respiratory passages. Even medical opinion has sometimes seemed to countenance such reports but there is so far no unequivocal scientific evidence that Vanaspati is unwholesome.

"3. Such experimental investigations as have been undertaken, show that its digestibility and absorption are not very much inferior to vegetable oils, particularly when its melting point is not very much higher than the body temperature. There is some scientific evidence to show that when colonies of rats are fed on hydrogenated fats for a number of generations, they have somewhat poor rates of growth in 2nd and 3rd generation, poor reproductive ability, and sometimes loss of fur. Other experiments have indicated that its consumption affects somewhat adversely the utilisation of other nutritional factors such as vitamins and minerals. It is generally agreed, however, that such scientific evidence will have to be based on very much more extended experiments before it can be accepted that Vanaspati really has a deleterious effect upon health after long periods of consumption.

"4. The relative nutritive value of deodorized refined vegetable oils appears to be slightly better than that of the hydrogenated product. The hydrogenated product sometimes has high melting points, particularly when the product is manufactured in summer, and the digestibility and absorption of such high melting products is poorer.

"5. The Hydrogenated Oil Committee of the Technical Panel of the Food Department recommended the melting point of the Vanaspati produced in the country should not exceed 38° C. since as the melting point increases the digestibility and absorption decrease."

The Committee also considered the question of food yeast and concluded that brewery yeast after processing is suitable for medicinal purposes. They considered that distillery yeast could not be purified

on account of the presence of a large number of impurities. On the suitability of groundnut cake flour as human food the Committee expressed the opinion that the fullest possible use of groundnut cake flour should be made provided it is prepared under controlled conditions and every care is taken to prevent rancidity.

The Committee considered interesting notes on vegetable milks and the report published by Chick and Slack on the nutritive value of Maltavena. They recommended an investigation into the suitability of Maltavena in India.

The subject of Nutrition has invoked much widespread interest not only among medical workers but also among the general public. In a country like India whose main health problems are closely linked up with the malnutrition and undernutrition of her people, no effort towards raising the nutritional standard can be too much. The signs are that the Provincial Governments have awakened to their responsibility in this direction, but the efforts so far made by some of them seem to be half-hearted and halting. It has to be admitted that this year energies of the Provincial Governments were directed mainly towards meeting the precarious situation caused by the threatened food shortage. Efforts have been made, wherever possible, towards educating the public in the essentials of nutrition. Suggestions have also been given regarding the use of alternative foods. The Government of India in the Food Department started a bulletin "Nutrition" to educate the people in problems of nutrition. Most of the provinces recorded little progress under "Nutrition" but the problem is receiving attention and it is hoped that the coming year will see more progress in this field. An account of the nutrition activities in the provinces is given below:—

Punjab.—The data collected in the Nutrition and Diet Survey in 1945 in four areas in Ambala district were analysed statistically and the results are being published. Plans for the establishment of a Nutrition Laboratory in accordance with the recommendations of the Bhore Committee have been submitted to the Government. The Nutrition Officer was on study leave for nine months in 1946 and hence no special investigations were undertaken. From the quarterly reports of the District and Municipal Health Officers on the general state of nutrition it appears that there was no deterioration in the nutritional state of the people. Rationing of wheat and sugar was extended in urban areas bringing the total of towns under rationing to twenty-four.

United Provinces.—A Nutrition Committee to advise the Government in connection with their rationing scheme was appointed. The Director of Public Health was a member of this Committee. A booklet on balanced diet was prepared and issued to Medical Officers of Health and Maternity and Child Welfare Centres. Some schemes of mid-day meals for school children were run this year. Two milk feeding schemes subsidised by the Government and another sponsored privately were started in the towns of Lucknow and Cawnpore. In the scheme at Lucknow 8 ounces of pasteurised milk were supplied on alternate days to each student in primary schools. The milk was supplied at cost price by a co-operative milk union. Each student was required to pay six paise for each day's supply but in the case of indigent students this contribution was paid by the Municipal Board. The balance of the cost of the scheme was met by the Provincial Government. This cost is

estimated to be Rs. 86,700 annually on the basis of 10,000 students participating in the scheme. The privately sponsored scheme was started in a girls' school, Lucknow, where every student was supplied 8 ounces of skimmed milk with toffee and fruits on a monthly charge of Rs. 2-8. The scheme was self-supporting. In Cawnpore there was a similar scheme which jointly worked for the primary schools and maternity and labour welfare centres. To these latter units Animal Husbandry Department gave assistance by supplying milk at cost price. Multivitamin tablets were supplied to maternity and child welfare centres and to School Health Officers for issue to expectant and nursing mothers and to the needy school children.

Bihar.—High prices of foodstuffs were responsible for food scarcity. The chief defects in diets were due to shortage of animal protein and vitamin B complex. Milk was distributed free on a small scale among infants attending maternity and child welfare centres and among patients convalescing from malaria, kala-azar, etc. A dietary survey of food intake of certain sections of populations in the districts of Saran and Patna was undertaken. An experiment on feeding of food yeast to children was in progress. Education and publicity work was continued. Lectures on food and nutrition were given to candidates undergoing Sanitary Inspector's training.

Orissa.—Propaganda material like leaflets, booklets, pamphlets, charts and models to educate the people on the value of different foodstuffs, preparation of balanced diet and avoiding of food wastage was prepared. 500 lbs. of dry milk received as a gift from the Indian Red Cross Society were distributed to hospitals, dispensaries, jails and maternity centres. The American Friends Service Committee made a free gift of multivitamin tablets. These were distributed to the various health and educational institutions for use in cases of nutritional and deficiency diseases. 500,000 tablets were also purchased at a cost of Rs. 10,500.

Bengal.—No progress could be recorded as the posts of the Nutrition Officer and the Lady Doctor were vacant throughout the year.

Assam.—No nutrition or dietary surveys were carried out during the year. A small private scheme to provide milk to younger school children was started.

Central Provinces.—The two Nutrition Officers of the province carried out diet surveys, studied the incidence of lathyrism, supervised industrial canteens and school feeding schemes. Arrangements were made for starting school meals in some of the primary schools in Nagpur. Industrial organisations were encouraged to start canteens for their workers and routine work on publicity and propaganda was carried out. Free distribution of seeds was started among the aborigines with the object of supplementing their produce and thus making up the deficiencies in their ill-balanced diets.

A reference to the problem of lathyrism in the province was made in last year's report. During the year a watch was kept on fresh cases of lathyrism. Civil Surgeons were requested to submit monthly reports regarding the number of fresh cases. Measures taken to prevent the spread of the disease included (i) making broken rice available in the affected villages at a cheap rate, (ii) the enforcement of the "Teora Control Order of 1946" which lays down that Teora will not be sold or

otherwise disposed of in any form, except in the form of a mixture with other specified grains, *viz.*, wheat, gram, jvar, rice, etc., in a proportion of not more than one-third of the total quantity of foodgrains, and (iii) Government propaganda to restrict the cultivation of Teora and to grow other *rabi* crops in its place.

Bombay.—The Government of Bombay continued its work on the problem of providing better nutrition for its population. The following activities may be mentioned. Groundnut cake atta was supplied at the rate of 1 anna per lb. which could be mixed with ordinary wheat atta to the extent of 15 to 20 per cent. for making chapattis. This product is becoming increasingly popular with the educated section of the public.

Schemes for the improvement of the supply of milk in some of the towns were undertaken. The supply of cheap subsidised milk for vulnerable groups was in progress in the city of Bombay and was extended to some of the city suburbs. Nearly 2,550 maunds of milk were being distributed through 525 distributing centres in the city and 146 in the suburbs. In the city 304,000 people as well as 42,000 in the suburbs took advantage of this scheme. The Government are also considering opening of shops for supply of toned milk to public at cheap rates. The milk is prepared by adding to fresh buffalo milk approximately 50 per cent. of reconstituted milk from separated milk powder and the mixture is then pasteurised. It is sold as a substitute for cow's milk containing 4 per cent. of fats and 9 per cent. solids not fat. This milk is sold at a cheaper rate than the prevalent prices. A subsidised milk distribution scheme was introduced at Poona during the year. Over 12,000 persons received this milk from 96 centres.

A scheme for catching deep water sharks by power-propelled vessels was sanctioned. During the year 4,000 gallons of shark liver oil with high vitamin A content was produced. The collection of this oil is the result of training local fishermen in its production with the intention of developing it as a cottage industry along the coastline. Government vegetable shops were maintained in 12 big municipal markets of the city and the Government thus kept an indirect control on the price of vegetables. A potato scheme was put into operation by which potatoes were sold to the public through 245 Government grainshops at rates varying from 2 to 4 annas per lb. Further extensions of community feeding and canteens in industry were made. The industrial canteens now number 304. Work on school feeding and institutional feeding carried on last year was continued.

Madras.—The Government sanctioned the establishment of a Bureau of Nutrition under an Assistant Director of Public Health with two Regional Units, each with a staff of one first class Health Officer with three Health Inspectors. The Regional Units have been formed at Anantapur and Trichinopoly. The Central Organisation continued to function under the Nutrition Officer as the post of Assistant Director of Public Health could not be filled.

Special relief measures included the supply of free mid-day meals to school children. This is linked up with the scheme of compulsory primary education in the province. The scheme is administered jointly by the Department of Education and the local authorities. During the year about 7,500 school children were supplied with free mid-day meals in the city of Madras under the auspices of the Corporation. School

children in all labour schools under the Government were provided with free mid-day meals. Milk was distributed free to infants, toddlers, expectant and nursing mothers. In the city of Madras about 2,000 measures of milk were supplied each day by Government. The free supply of milk was restricted to families whose income was below Rs. 50 per month. Government also sanctioned a scheme of free distribution of milk reconstituted from imported milk powder to all school children attending standards I to V.

There were 227 canteens attached to industrial establishments in the province.

Detailed diet surveys were undertaken in 6 districts. During these surveys children were examined to detect food deficiency conditions. The survey disclosed a general deficiency in the intake of Vitamins A and B₂ and protective food. The calorie value of the diets varied from 1,819 in an orphanage to 2,826 with an average value of 2,290 per consumption unit. Three nutrition exhibitions were organised. A pamphlet on "simple food recipes" with unaccustomed foodstuffs was issued in English, Tamil and Telegu. The pamphlet on weaning and feeding of children from six months to six years published by I.R.F.A. was issued in an abridged form in these languages. 175 broadcast talks chiefly on "Protective Foods", "Alternate Foods", "Useful Recipes" and "Grow More Food" were arranged by the All-India Radio. Popular lectures and talks were also given by the health staff in most districts. The Nutrition Laboratory carried on studies mainly in scientific cooking and formulation of simple and palatable recipes with alternative foodstuffs. Training of 24 food propagandists deputed by the Food Department was carried out.

Ajmer-Merwara.—A diet survey of Ajmer city and a few selected villages was carried by Dr. K. L. Shourie, a research worker of the I.R.F.A. The recommendations made for improving conditions as a result of the survey are under the consideration of local authorities.

Adulteration of Food.

15. Legislation to control food adulteration has been slow in developing. In the early days certain sections of the Indian Penal Code and some Municipal Acts made provision for dealing with this problem. The Bombay Government were the first to introduce the Prevention of Adulteration Act in 1899. A more comprehensive Bill was passed in 1925. The United Provinces introduced a Prevention of Adulteration Act in 1912 and enforced it in 1914. In Madras, though the Act was passed in 1918 it was not until 1929 that it was enforced. The Punjab Adulteration of Food Act was first introduced in 1919. It was replaced by the Punjab Pure Food Act in 1929. The Central Provinces and Bihar also introduced similar Acts in 1919. In 1920 the Food Adulteration Act was first applied in Bengal. It took seven years to enforce it in the whole of Bengal. In 1930 the Punjab Pure Food Act was applied to the North-West Frontier Province. Sind introduced the Bombay Act of 1925 for certain areas in 1930 and has since extended it to the whole province. Assam and Delhi introduced Acts in 1932.

Among the States, Mysore was the first to take action by passing an Act in 1921. Baroda introduced a Food Act in 1934 and Jodhpur enacted a Pure Food Act in 1946.

The Public Analysts' reports from the various provinces show that the percentage of samples showing adulteration ranges from 35 to 50 per cent. There are certain obvious reasons for this state of affairs. The administration of the Food Adulteration Act is in the hands of the Local Bodies which, for several reasons, are reluctant to prosecute offenders. The public opinion is not sufficiently organised to force their hands in the matter. In the small number of cases that lead to successful prosecution, the fines imposed are usually so light that they fail to act as a deterrent.

As the control of Food Adulteration grew, the need for approved and uniform standards of food was increasingly felt. Definitions and standards of purity which could be used to compare samples of suspected articles were necessary. If comparable results were to be obtained the public analysts need to use similar techniques for chemical analysis of samples tested by them. To meet this need the Central Advisory Board of Health appointed an *ad hoc* Committee in 1937 to investigate the whole question of food adulteration with particular reference to legislation in force in different provinces and to varying standards which were in force. Owing to certain difficulties the Committee could not set to work till 1939. In that year it submitted Part I of its report which was followed in 1943 by their final report. These reports have been published by the Government of India; they deal exhaustively with the subject of food adulteration and make specific recommendations for dealing with the problem. One of its recommendations emphasised the setting up of a Central Committee for Food Standards as a Standing Committee to lay down food standards and unify techniques of chemical examination. Such a Committee has been constituted by the Government of India. It meets once or twice a year as necessary. Its first meeting was held in January 1944 and the second meeting took place in November of the same year. The third meeting was not held till March this year. The minutes of the meetings are also published for general information and circulated to various Governments for necessary action.

A summary of the working of the Food Adulteration Acts in the provinces which have mentioned the subjects in their health notes is given in the succeeding paragraphs.

Punjab.—The Pure Food Act is enforced in 211 municipalities and districts. 7,614 samples of food were examined of which 47 per cent. were found to be adulterated. 3,569 prosecutions were launched. It is considered that the penalties imposed on defaulters are lenient and unless these are enhanced it is unlikely that the sentences will serve as a deterrent. The Government sanctioned posts of 40 Food Inspectors for taking samples and enforcing the provisions of Pure Food Act. Till last year the samples were taken by Medical Officers of Health, Secretaries and Executive Officers of local bodies and Sanitary Inspectors. Laboratory facilities for the examination of samples were extended. A Provincial Public Analyst was appointed to control work in the four new Divisional Laboratories each under the charge of a Deputy Public Analyst.

United Provinces.—Over thirteen thousand samples were submitted to the Public Analyst. 34 per cent. were found adulterated. The percentage was higher than those in the last two years, the percentages being 25.6 per cent. in 1944 and 28.3 per cent. in 1945. Milk samples tested were found to be 45.7 per cent. adulterated.

Bihar.—Food Adulteration Act was in force in 200 places including municipalities, thanas and railway colonies. Food samples analysed in the Public Health Laboratory numbered 1,955. Adulteration of common articles of diet was high, for instance, 60 per cent. of ghee and milk samples, 66 per cent. of mustard oil, 43 per cent. of flour and 51 per cent. of sweetmeat samples were found to be adulterated.

Assam.—A revised Bill to replace the existing Pure Food Act was submitted to the Government. Due to the short supplies of essential commodities, action against food adulteration seemed to result in complete disappearance of commodities from the open market. This was particularly true of mustard oil. Hence, local bodies were generally reluctant to take legal action under the Pure Food Act.

Central Provinces.—The enforcement of Food Adulteration Act is very loose but efforts are being made to tighten up its operation. The local bodies who are responsible for the enforcement of the Act grudge the costs involved in prosecution. The sentences awarded in proved cases are much too lenient to serve as a deterrent while the acute scarcity of commodities and rising prices are incentives for adulteration.

Sind.—The revised Food Adulteration Bill was again referred to a Select Committee. The action taken by local bodies in general to enforce the Food Adulteration Act was far from satisfactory. Karachi Municipal Corporation, however, continued its activities in this direction throughout the year.

Madras.—The Madras Prevention and Adulteration Act was extended to 13 Panchayat Boards bringing the total of local areas where the Act was in force to 236. Nearly 18,000 food samples were analysed, of which 46 per cent. were found to be adulterated. In 1945, 47 per cent. of the samples examined were found to be adulterated.

Coorg.—Food Adulteration Act was in force in 2 Municipalities, 3 Notified Areas and 4 Panchayat Boards.

Ajmer-Merwara.—In Ajmer city the Punjab Pure Food Act was in force. The provisions of the act were extended to Beawar and Kekri Municipal areas also. Milk, ghee and other foodstuffs were regularly inspected by trained Sanitary Inspectors.

Baluchistan.—There is no Food Adulteration Act applicable to the area.

Medical Inspection of Schools.

16. A well organised school health service is recognised to be an integral part of the public health administration of the community at large. It is a sound investment for the betterment of national health. "Medical Science has proved with unmistakable clearness that disease and incapacity in adolescence and adult life find their source, all too often, in the seed-time of childhood. It cannot be doubted that much of the excess of sickness and mortality under forty years of age must be attributed to this origin." In England school medical inspection was started in 1908 and provision was required to be made for—

"(1) Medical inspection of all children, on a schedule prescribed by the Board immediately before or at the time of their admission to school, before they left school, and at an intermediate period, i.e., three times during their school life; (2) a system of 'following-up'

the child after inspection; (3) medical treatment to be made available, 'arrangements for attending to the health' for those found to be in need of it; (4) appropriate supervision as regards cleanliness; (5) the supervision of the special schools for blind and deaf and for defective and epileptic children; (6) the teaching of hygiene in the schools; (7) the teaching of physical training in the schools; and (8) the supervision of the administration of school meals." On this foundation a considerable superstructure has since been built up.

Unfortunately, in India school medical service is as yet one of the least developed branch of the public health services. Arrangements for the medical inspection of school children in India are very inadequate, and only in rare instances is there any provision for 'follow-up' treatment. This makes mere inspection infructuous. Only a few of the provinces have furnished information on the subject of medical inspection of schools in their health notes. The summary manner in which the topic has been dealt with by others who have furnished the information indicates to some extent the indifference with which the problem of medical inspection of school children is treated. The school health work carried on in the provinces is summarised in the following paragraphs:—

North-West Frontier Province.—The medical inspection of schools in Peshawar, Mardan, Bannu and Dera Ismail Khan, was restarted from August, 1946. These inspections had remained suspended since March, 1941, due to withdrawal of many medical officers on war service. Provision for introducing similar inspection in the remaining districts has been made in the post-war development scheme.

United Provinces.—The work was continued on the usual lines.

Bihar.—Four school medical officers and a lady school medical officer were engaged in inspecting children in high and middle schools. On admission all school children were examined and suitable treatment was advised in cases found with defects. Lectures and magic lantern slides demonstrations were given on hygiene, prevention of diseases and on general sanitation. During the year 273 schools were visited by these medical officers and 11,505 children were examined of which 42 per cent. were found to be defective. The chief defects noticed were malnutrition, errors of refraction and enlarged tonsils. During these visits 1,619 lectures on hygiene were delivered.

Central Provinces.—The Assistant Medical Officers in-charge of the dispensaries also undertook medical inspection of schools and colleges.

Coorg.—In towns where there is a hospital or a dispensary, medical examination of school children and the 'follow-up' treatment scheme continued to function satisfactorily but where schools were far away from the hospital or dispensary the work was unsatisfactory. One dispensary was without a Medical Officer throughout the year and others for some months. This resulted in the medical inspection of schools not being systematic or universal. Two part-time medical officers were appointed to inspect school children at the High Schools in Mercara and Virajpet. The results of examination were entered on printed charts maintained for permanent record.

Aimor-Morwara.—Almost all Anglo-Vernacular High Schools as well as some middle schools have arrangements for medical examination of students. The parents seem to be interested and to be carrying out

the suggestions made by the medical officer. Hygiene is taught as a regular subject in all Anglo-Vernacular Schools by part-time Medical Officers. Domestic Science and home nursing is taught in girls' schools.

Baluchistan.—The Medical Officers in-charge of hospitals or dispensaries carried out regular inspection of schools in their areas. Necessary advice in cases requiring attention was given.

Industrial Hygiene and Mines.

17. During the year the Government of India took a definite step forward to survey and to organise Industrial Health activities in India. Dr. T. Bedford of the Industrial Research Board, Medical Research Council in the United Kingdom was invited by the Government of India. He along with the newly appointed Industrial Health Officer toured all the important industrial centres during the period of his stay in India from February to May and submitted a report since published by the Government of India. In his report Dr. T. Bedford has given his impressions on industrial health in India. These are summarised below:—

The manual worker is handicapped by climatic conditions, for high environmental temperatures reduce capacity for work. The construction of factory buildings was unsuitable for a tropical climate, in fact for any climate. Most of the factories have corrugated iron roof which absorb heat and re-radiate it into the factory. No serious attention is paid to factory lighting. There is a callous disregard among employers in general for industrial health hazard. In practically no industry dust is controlled; even acid burns and chrome ulcers are considered commonplace. The welfare activities in a good number of factories are either primitive or absent. Chilled water is not provided to thirsty workers. Washing and sanitary arrangements are inadequate. Where there are canteens, the cooking and serving arrangements were dirty and diet ill-balanced. While many of the larger industrial concerns have established workers' colonies, where dwellings are a distinct advance on the accommodation otherwise available, most of the workers have to live where they can. The lack of a safe water supply seriously influences the health of workers and constitutes an important public health problem. Malnutrition must be reducing seriously the working capacity of the industrial population.

On factory inspection Dr. Bedford says, "There can be no doubt that the Factories Act needs to be strengthened but if the existing rules were consistently enforced there would be a great improvement in factory hygiene. He considers the number of factory inspectors to be hopelessly inadequate so also the training of the existing inspectors. Among the recommendations made by Dr. Bedford are improvements of the factory working environment, welfare provisions, industrial efficacy and methods of work and collection of accident and sickness statistics. He has laid stress on extra-factory requirements in the direction of better nutrition, improved housing, better sanitation and an ample supply of pure water. He has pointed out some of the most urgent problems of industrial health research in India. He has agreed with the view of the Royal Commission on Labour in India that industrial health research should be entrusted to the I.R.F.A. under a Director of Industrial Health Research. In conclusion he has said, "The problems which confront India in the sphere of industrial health are great and their solution will call for much

skill, courage, devotion and resolution. On the research side, work has to be started from scratch, and many difficulties are bound to arise, but those concerned can surely count on the full co-operation of their colleagues in Great Britain."

The Industrial Health Advisory Committee of the I.R.F.A. considered recommendations of Dr. Bedford with a view to formulate plans for action. It was considered that the formation of a Sub-Committee consisting of medical men and engineers to make concrete recommendations on construction of factories was premature until standards for ventilation, light and other environmental factors are determined, for which purpose fact-finding surveys and investigations are necessary.

The Committee recommended that an industrial health research unit consisting of a physiologist, psychologist, chemist, medical officer and an engineer be set at the All-India Institute of Hygiene and Public Health, Calcutta, to make a start with research into the various urgent problems. It was explained that steps are being taken to tighten up factory inspection and that arrangements were being made for training of factory inspectors. It was stressed that in the training of inspectors more importance should be given to the practical aspects of industrial health and medicine.

The present position in regard to medical inspection of factories is that in most provinces, officers of the public health departments are appointed as additional inspectors of factories. Their inspections are mainly directed towards examining provisions for lighting and ventilation, water supply and sanitation. For the sake of uniformity of administrative action, the health officer's recommendations are communicated to the circle factory inspectors or the Chief Inspector of Factories who take appropriate action for rectifying defects indicated in the reports. Dr. Bedford in his report has questioned whether the medical inspection of the factories should be left in the hands of public health officers or whether it should be done by medical men serving under the Chief Inspector of Factories as in Great Britain. The Committee adopted a note on the desirability of instituting a Medical Inspectorate of Mines and Factories in India.

The Sub-committee appointed to examine the position regarding maintenance of sickness absenteeism records in Indian industries submitted its report which was adopted with minor amendments.

Only a few of the provinces have referred to the subject of industrial hygiene in their health notes. A summary of the reports received is given below:—

Punjab.—The Director and Assistant Directors of Public Health and the District and Municipal Officers of Health acted as Additional Inspectors of Factories for sections of Punjab Factories Act dealing with health matters. These officers were also *ex-officio* Inspectors of Mines. The Medical Officer of Health (Factories) attached to the Public Health Department was on study leave. During the year 262 factories and 44 mines were examined. The inspection reports of factories were forwarded to the Chief Inspector of Factories who issued notices to factory owners drawing attention to the defects noticed. The conditions of work, housing and other factors influencing the health of the workers were still satisfactory. Some improvement in the sanitary arrangements in

mines has resulted from the increasing attention paid by the inspecting staff.

Bihar.—In North Bihar, South Bihar and Chota Nagpur Circles the Assistant Directors of Public Health acted as *ex-officio* Inspectors of Factories. The general condition of factory workers was satisfactory but housing, water supply and conservancy arrangements in all but a few big areas were poor. A Lady Inspector of Factories visited 21 factories employing women and children.

The Hazaribagh Mines Board and the Jharia Mines Board maintain their own Public Health Organisation under the control of the Provincial Public Health Department. The health in the colliery areas was satisfactory. An anti-malaria scheme under the Central Coal Mines Welfare Fund was in operation in Jharia and has already succeeded in reducing malaria. Water supply was satisfactory but the general sanitation and housing arrangements require improvement.

Central Provinces.—The general health of the workers has been satisfactory. In spinning and weaving mills the workers are provided free medical treatment by the employer. In smaller concerns Government dispensaries, wherever provided, serve the medical needs of the workers. One officer was deputed to Calcutta for a special training in Industrial Hygiene.

Health Propaganda.

18. Health education of the people has been recognised by the public health workers as an essential weapon in their armoury. The health services and medical institutions that the State may provide will produce far better results if active co-operation of the public through a proper understanding of their health requirements is also forthcoming. It is therefore essential to overcome the appalling ignorance of the population through a properly planned campaign of health education. The serious epidemics which annually visit the different parts of the country would be a thing of the past, only if the people were to grasp and observe a few simple facts about their mode of spread.

Health propaganda has to be developed into a highly specialised art and it must make use of all the methods which may catch the imagination of the people, *i.e.*, posters, leaflets, health exhibitions, music, dramas, films and radio talks. Urban and rural health staff should give regular health talks with or without the help of magic lanterns during their tours. In some provinces demonstration vans and motor lorries fitted with posters, lanterns, screens and projectors have enlarged the scope of these activities. All these efforts are in the right direction and yet there seems to be the need for something more dynamic to rouse the people to a realisation of their responsibilities. Practical demonstrations to show how people can plan a healthier way of life by the organisation of special health weeks in towns and villages periodically and at all fairs and festivals may foster in the people a sense of their own responsibility in matters pertaining to health.

The Central Government has appointed a special officer for organising health education. Through this Central organisation it is hoped to co-ordinate the activities of the provinces concerning health propaganda.

North-West Frontier Province.—Health propaganda work was part of the duties of the two Provincial Epidemic Travelling Dispensaries, which besides their main work of rendering medical and surgical aid

gave lectures with magic lanterns and distributed posters among the public and school children in the rural areas of Peshawar, Mardan and Hazara districts. Models and posters were also exhibited in public fairs.

United Provinces.—In the health education programme special stress was laid on food and tuberculosis. Films on tuberculosis were shown in public cinema houses and were supplied to Junior Red Cross groups. 130 first-aid outfits were supplied to Junior Red Cross groups for training purposes. Medical Officers of Health assisted the Red Cross and the St. John Ambulance Association and the Rural Development Department in their health programme.

Bihar.—The Public Health Bureau under the charge of the Personal Assistant to the Director of Public Health carried on health propaganda for educating the public in elementary rules of hygiene and sanitation and simple methods of prevention of epidemic diseases. Publicity Department of the Government also carried on health propaganda in the province. The public was kept informed of the activities of the department and the health conditions in the province by means of *communiqués* issued to the press by the Department. The Nutrition Department organised nutrition stalls at important exhibitions and fairs.

Orissa.—Besides propaganda on usual lines, films on health subjects borrowed from the Red Cross Circulating Library were exhibited in cinema halls in various towns. Public health propaganda stalls were organised at Agricultural and Industrial Exhibitions. Leaflets on communicable diseases were printed and supplied to the health staff in local boards for distribution to the public. They were also distributed at exhibitions, fairs and festivals. The Publicity Department also carried on health propaganda through their mobile units touring all districts, particularly at fairs and in epidemic affected areas.

Bengal.—Posters and pamphlets on public health subjects were supplied on requisition.

Assam.—The propaganda work was carried on in rural areas with the aid of posters, leaflets, and magic lantern demonstrations and by putting up health stalls and exhibits in fairs and exhibitions. The useful work done by the Publicity and Rural Development Department however had to be curtailed due to lack of funds.

Central Provinces.—Health propaganda work was carried out by the Red Cross branches in the districts. The Red Cross propagandist assisted in organising Baby Shows at several places.

Bombay.—Magic lantern slides on 18 different health subjects have been prepared. These were exhibited by Public Health Officers, Education Officers, Assistant Rural Development Inspectors, propaganda vans, etc., during their tours. Films on different health subjects under local surroundings and with local costumes have been screened with the aid of projectors fitted to mobile vans, rural uplift vans and the propaganda van of the Bombay Mofussil Maternity Child Welfare and Health Council. Gramophone records in Marathi on diseases like Small-pox, Cholera, Plague and Malaria also were supplied for propaganda work. These were also included in village broadcasts.

The Government made the usual annual grant of Rs. 5,000 to the Bombay Mofussil Maternity Child Welfare and Health Council for health propaganda. A projector with talkie equipment has been supplied to the

Council. The Council besides carrying on propaganda on the usual lines also arranged radio programmes. Health propaganda was also carried on by Sanitary Associations of Broach, Bombay and Ahmedabad and Arogya Mandal, Poona.

Madras.—The work was carried on the usual lines. Four new films on health matters were purchased now bringing the total of such films to 50. Some new pamphlets and coloured posters were issued during the year. Approximately 300 cinema shows, 10,000 magic lantern lectures, 300 health exhibitions, 150 health dramas and 30,000 health talks were given by the health staff at the various centres.

Coorg.—The health propaganda activities were carried on as usual. The importance of growing and using leafy vegetables and fruits in diet was emphasised in health lectures. Health lectures were included in a ten days refresher course for selected teachers. A weekly class in hygiene was held for the benefit of pupil teachers undergoing training in Mercara.

Baluchistan.—Health propaganda was carried out by arranging lectures and issuing posters and other health literature.

Fairs and Festivals.

19. In India fairs and festivals need special attention because they are frequently associated with the outbreak of cholera epidemics. Pilgrims come from far and wide and on return act as carriers of infection to distant places all over the country. Control measures are difficult to enforce as these fairs usually carry a religious sanctity. In recent years sanitary control measures like the supply of safe water, provision of drainage, quick disposal of night soil and refuse and the vigilant watch of health authorities have reduced to a large extent the danger of outbreaks of epidemics. The extensive epidemic which inadequate sanitary arrangements can cause is illustrated this year by the outbreak of cholera in Bihar following the fair at Samari Ghat. It is stated that the timing of the fair is erratic and the public health department was not aware of its exact time of occurrence and therefore could not introduce sanitary control in time. As has already been remarked under the section on cholera, compulsory anti-cholera inoculation should become a normal feature in the sanitary control of fairs. It is satisfactory to note that Central Provinces Government is already contemplating action on this line. A brief account of the sanitary activities in fairs and festivals undertaken by the provinces is given below:—

Bihar.—Ten important fairs were held during the year. All these were well attended, except the Kartik Purnima Melas, which were banned on account of communal tension. Adequate arrangements, for sanitation, water supply and anti-cholera inoculations were made in all the melas and the adjoining areas with the exception of the Chait Barni Mela at Samaria Ghat. The Public Health Department was unaware of the coming of this bathing fair as it occurs erratically after 12 to 14 years. The sanitary arrangements that were made proved inadequate, the gathering being unusually large this time. Cholera broke out in an epidemic form and spread to the adjoining districts. Cholera patients were treated in special hospitals. Apart from the Chait Barni Mela, cholera cases were few and the sanitary arrangements proved satisfactory.

Orissa.—Special sanitary arrangements were made at the Puri Rathjatra festival. The Government made a special grant of Rs. 10,000 to the District Board and Rs. 19,000 to the Municipal Board for undertaking these sanitary measures. Eight Sub-Assistant Surgeons, three District Leprosy and Epidemic Officers and three Health Inspectors were deputed for special duty. Voluntary organisations rendered excellent service. Special mention need to be made of the unique service rendered by Acharya Hari Har Das and his band of workers who organised sweeping of the streets and removal of rubbish and filth at a time when there was a dearth of sweepers. As a result of these special efforts the festival passed off without any serious outbreak of epidemic. Adequate sanitary arrangements were also made at several other festivals with full success. The outbreak of cholera following Chandrabhag Mela held in Puri in February raised apprehensions that a similar thing may happen at Baruni Mela. The District Boards of Balasore and Cuttack and the Jaipur municipality interested in the Mela arrangements undertook the necessary sanitary arrangements for the water supply, conservancy, lighting and preventive inoculation. The residents of the town were inoculated before the Mela started; while during the mela 24,000 people were inoculated. No case of cholera was reported during or after the Mela.

Bengal.—Three important fairs, Allowakhwa, Langalband, and Sitakund Sivaratri were held. Necessary medical and sanitary arrangements were made. There was no serious outbreak of any epidemic diseases.

Assam.—Necessary sanitary measures were adopted at all important fairs and festivals. There was no outbreak of epidemic diseases.

Central Provinces.—No epidemic of any kind was reported from any of the fairs except on one instance at Rajim Fair where cholera broke out. Special efforts were made for conservancy arrangements, disinfection of water supply, isolation and treatment of infectious cases. Trench latrines were constructed. Ghara Sheds supplying chlorinated water proved increasingly popular. Plans for the improvement of water supply at the fairs and introduction of compulsory anti-cholera inoculation of pilgrims were under consideration of the Government.

Bombay.—Necessary sanitary arrangements were made at all the fairs. In certain fairs special precautions against plague infection were taken. Inoculation of the pilgrims and fumigation of their bedding with cyanogas were enforced. Certain fairs in Satara, Sholapur, Bijapur and Belgaum districts and all the fairs in Dharwar district where plague was prevalent were banned to safeguard against the risk of spread of plague infection.

Madras.—Adequate sanitary arrangements were made at all important fairs and festivals which passed off without any epidemic outbreak.

Coorg.—At the two important festivals and at a cattle fair adequate sanitary arrangements were made. The drinking water supply was chlorinated. There was no outbreak of epidemic during or after the fairs.

Ajmer-Merwara.—The two big fairs, Pushkar and Ura, which were largely attended remained free of any epidemic outbreak.

Public health administration and other health activities in provinces.

20. North-West Frontier Province.—A District Medical Officer of Health for Mardan-cum-Peshawar with the necessary clerical staff was sanctioned as an experimental measure for five years. It is proposed to build up similar organisations in other districts if the experiment succeeds. Against a total provision for 10 only four candidates were found suitable for selection for training as Sanitary Inspectors.

Punjab.—The Government published for the guidance of local bodies model bye-laws to regulate the construction of buildings under section 189 of the Punjab Municipal Act. Only six of the towns, which employ whole-time Medical Officers of Health, have Building Inspectors and Overseers. In a number of urban areas there are no such bye-laws, and in cases where there are, they need to be revised. Under section 116 of the Punjab Municipal Act, 478 notices prohibiting use of houses considered unfit for human habitation were served during the year. Those who complied with the requirement of the notice numbered 148 while 117 were prosecuted for non-compliance. Due to the difficulty in procuring building material, removal of the defects found could not be insisted upon.

The Epidemiological Bureau, besides carrying on its main function of examining pathological material, undertook investigation on the insecticidal properties of Ak. Neem leaves, D.D.T. emulsions and insecticide. The Punjab Vaccine Institute continued to cater for the needs of Punjab, the North-West Frontier Province, Baluchistan, the army in Northern India, Railways and Indian States, and issued 174,074 grammes of vaccine lymph, which is the largest amount issued so far in any year. The Officer-in-charge of the Institute was given the status of Assistant Director of Public Health. A study of the vital statistical data covering the last eight decades was started in September 1945. An interesting observation is that the urban mortality rate showed a more rapid decrease than the rural rate.

United Provinces.—Compost making was being undertaken in 67 towns and 3,859,000 tons of compost manure were prepared in the year ending 31st July 1946. There is little prejudice against its use in the western parts of the province, but in the eastern parts, it requires to be popularised among cultivators. Small subsidies including provision for transport were given. The Government appointed a Sewage Utilization Committee with the Director of Public Health as Chairman to advise on the utilisation of town sewage for agriculture. The committee's recommendations were submitted to Government.

A training class for sanitary inspectors and a number of classes for epidemic assistants were held at the Provincial Hygiene Institute. Control tests of the water supplied by water works for drinking purposes were carried out regularly. The Institute manufactured over 1,635,000 doses of cholera vaccine.

Bihar.—During the year 80 epidemic doctors, 400 non-medical inoculators and 200 vaccinators were engaged to assist the local bodies. Ten reserve health units each consisting of one doctor, two assistant sanitary inspectors, 10 disinfectors and some sweepers were established for improving the village sanitation, and to assist public health work in connection with fairs and epidemics. Special development and reconstruction schemes to improve health and general conditions in urban

and rural areas have been submitted to the Government of which the following may be mentioned. There is a scheme to provide rural and urban health organisations with permanent arrangements for anti-cholera measures and vaccination work in place of the existing licence system. It is intended to appoint a Medical Officer of Health for each district and for each municipality having a population of 30,000 and over and an Assistant Health Officer in each sub-division. Construction of 10 primary health centres and two 30-bedded hospitals is contemplated to provide curative and preventive facilities for the rural areas. The development and expansion of Patna and other large towns on well planned lines is sought to be regulated through formation of town improvement trusts. Reorganisation and improvement of the existing water supplies, drainage and sewerage and introduction of these services in other towns is planned. Improvement of rural water supply is suggested through sinking of new wells covered and fitted with pumps and of tube wells. A Public Health Bill on the lines of Madras Health Act is under consideration of the Government.

Under another scheme a routine examination and research laboratory for public health and malaria work and arrangements for the manufacture of cholera and anti-rabic vaccines at the Patna Laboratories are suggested. It is proposed to send 5 D.P.H. and 10 D.P.H. & Hy. stipendiary students for training to the All-India Institute of Hygiene, Calcutta. A scheme to train non-medical persons as Health Assistants for epidemic work in rural areas is envisaged whereby in 2 years 180 ex-servicemen are proposed to be trained as Health Inspectors and another 60 as Sanitary Inspectors at the Sanitary School at Gulzarbagh.

Orissa.—The Government sanctioned a grant of Rs. 31,000 for sinking 5 tube wells in Cuttack town. It also made a grant of Rs. 1,71,000 for purchasing 19 motor trucks for distribution to local bodies for conservancy work. A scheme of underground drainage is proposed under the post-war plans and it is hoped that this would greatly reduce the incidence of filariasis which is very prevalent in the coastal districts. The Government sanctioned a grant of Rs. 4,000 for the treatment of yaws prevalent in certain parts of Koraput and Ganjam Agency. The two Mission Hospitals received annual grants of Rs. 1,500 each. Besides the Mobile Dispensary in the Malkanagiri Taluk, Koraput district, establishment of another similar dispensary was sanctioned by the Government at Motu. Sulphaguanidine and M. & B. 693 were obtained and distributed to Civil Surgeons and Health Officers for the treatment of dysentery, cholera, influenza cases, free of charge. At the Health Inspector Training School 30 candidates qualified at the examination. There were 30 Divisions of St. John Ambulance Brigade. During the year 483 persons were trained in First-Aid bringing the total of trained persons to 3,124.

Bengal.—34 Sub-Divisional Health Officers were appointed during the year. The rural public health scheme for the districts of Darjeeling and Chittagong Hill Tracts worked satisfactorily. The disastrous communal riots in Calcutta, Noakhali and Tippera and the influx of refugees from Bihar raised serious apprehensions of outbreaks of epidemics but preventive measures taken in time on a large scale averted the danger. There was an immediate breakdown of conservancy services in the Calcutta riots. The unfiltered water supply broke down and as a

result latrines and sanitary fittings could not be flushed. Corpses, garbage and rubbish lay scattered all over the city and its suburbs. Suitable arrangements for restoring the sanitation of the city were quickly organised. Bleaching powder was freely distributed for disinfection work. A high concentration of free chlorine was maintained in the filtered water supply to ward against water-borne epidemics. A large number of doctors, sanitary inspectors and assistants and mobile medical units were mobilised and posted in the different congested localities for looking after water supply and sanitary arrangements, and preventive inoculation and vaccination. The refugee centres in Calcutta and Howrah were similarly looked after.

Assam.—Six posts of urban Health Officers for municipalities with a population of over 5,000 were sanctioned by the Government but could not be filled for lack of suitable doctors. Thirty temporary posts of licentiate doctors were sanctioned by Government in connection with Kala-azar survey and treatment. Two licentiates were deputed to Calcutta for D.P.H. & Hy. course. One Assistant Director of Public Health was sent to the United Kingdom for higher training but other officers selected for training abroad could not be placed. The anti-malaria organisation was placed under the charge of Assistant Director of Public Health (malaria) and preliminary arrangements were made to locate four anti-malaria units, two in each valley. The Government sanctioned the posts of a Public Health Engineer and a Provincial Nutrition Officer, but suitable candidates to fill these posts were not available. Schemes for the provincialisation of vaccinators and improvements in the collection of vital statistics and the formation of a Provincial Anti-leprosy Organisation have been accepted by the Provincial Government and are awaiting the approval of the Government of India. A Maternity and Child Welfare scheme is awaiting sanction of the Provincial Government.

Central Provinces.—A mechanised travelling dispensary under an Assistant Health Officer worked in Mandla district. This officer treated patients for minor ailments and performed minor operations, disinfected wells and performed inoculations in the wayside villages. A Health Unit to accord with the primary unit recommended by the Bhole Committee was sanctioned by the Government but no progress could be made for want of suitable personnel. Village panchayats did some useful work in the direction of distributing medicines, taking anti-epidemic measures, improving village sanitation and water supply and construction and repairs of roads and drains. Village Uplift Boards continued to function in all the districts.

Bombay.—In addition to the Director of Public Health and six Assistant Directors of Public Health, there were two temporary Assistant Directors of Public Health, one of these being for epidemic work. The health staff in the province consisted of 13 District Health Officers, 2 Civil Surgeons working as *ex-officio* District Health Officers, 1 Entomologist, 10 Malaria Medical Officers, 2 Officers-in-Charge of Health Units, 1 temporary Medical Officer-in-charge of Paludrine Experiments, 42 Epidemic Medical Officers including 20 for Shock Squad Scheme, 16 subordinate medical service and Assistant Medical Officers in Malaria, 20 Chief Sanitary Inspectors, 39 Sanitary Inspectors and 391 vaccinators.

Sind.—The Government approved the recommendations of the General Policy Committee of the Board of Public Health Works for the preparation, execution and financing of water supply and drainage schemes in the municipal areas. Drainage schemes for Shahdapur and Mirpurkhas were prepared and forwarded to these municipalities for arranging for the necessary funds. The work of improving drainage in Larkana and Dadu was in progress and is expected to be completed by 1947. A drainage scheme for Nawabshah was in hand. The Government approved the proposal that lay-out plans for the zoning of industrial areas in towns may be taken up.

The work of supplementing water supply and of improving the drainage in Karachi was more or less completed. Water supply in Sukkur has been improved but the drainage system continues to be defective. Steps to supplement water supply in Jacobabad by sinking bores, which have been found to give satisfactory results, were being taken. Works on the improvement of the drainage system in Larkana and Dadu was in progress and is expected to be completed by 1947. The Board of Public Health Works has recommended the creation of a new Public Health Division with two sub-divisions.

A new scheme for the improvement of system of birth and death registration and reporting of epidemic diseases was submitted to the Government.

Facilities for the examination of Shark Liver Oil manufactured locally at the Chemico-Bacteriological Laboratory at Karachi were extended to encourage the industry. The Government sanctioned the post of a Sanitary Inspector at the Dokri Agricultural Farm for carrying out anti-malaria and other sanitary measures. The Drugs Act and Rules are expected to be enforced from 1st April, 1947. Sanitary Boards have been formed at district headquarter towns to enlist the co-operation of local authorities.

Madras.—The food scarcity conditions prevailing called for great vigilance on the part of the health authorities. A reserve staff and stocks of drugs, disinfectants and appliances were kept ready to meet any serious deterioration in the health of the people.

Biological control measures against the guinea worm menace were in progress in 5 districts. This consisted of the introduction of cyclopoecidal fish in drinking water sources. In one district application of fresh lime to infected water source was also tried to determine the relative efficiency of the two methods. It has been observed in laboratory experiments that while less than a drachm of fresh lime per gallon had little effect on cyclops, one drachm per gallon killed cyclops in tap water in 1 hour and two drachms per gallon took only 20 minutes.

About 40 municipal towns and 30 panchavats were included in the scheme of compost manufacture. About 4 million cubic feet of compost was manufactured, of which nearly 3 million cubic feet was sold to the ryot through local co-operative societies.

Coorg.—It is hoped that there will be a District Public Health Laboratory in Mercara in 1947. An ex-Army Medical Officer was deputed to the All-India Institute of Hygiene and Public Health, Calcutta, for training in laboratory technique. Soya bean seedlings were supplied free last year and the crop was grown on a small scale. Soya bean milk was

used to supplement cow's milk in the headquarter hospital. The health of the people appears to have improved. Distribution of quinine and quinine substitutes was made on a liberal scale.

Ajmer-Merwara.—Except for some rudimentary sanitary services in the municipal towns there is practically no public health organisation in the province. A proposal to establish some health organisation for towns and rural areas under an Assistant Director of Public Health has been submitted to the Government of India. Establishment of some primary health centres in the rural areas and building of improved drinking wells in selected villages have also been proposed.

Baluchistan.—There is generally no regular health service but in Quetta and some other military stations there are satisfactory conservancy arrangements and water is chlorinated before use. Source of water supply in rural area is from springs. The population is mostly nomadic.

SECTION IV.

MATERNITY AND CHILD WELFARE.

Introduction.

21. The account given of the Maternity and Child Welfare Service in the last year's report remains substantially unchanged. The voluntary effort under the direction of the Maternity and Child Welfare Bureau of the Indian Red Cross Society is still very largely responsible for the organization and running of the majority of centres in the Country. In spite of the Society's limited resources and funds, it has striven to maintain and even expand these activities. Useful as these efforts have been, they have only touched a fringe of the problem in the Country. It is now time that the Government, both at the Centre and in the provinces, took over the responsibility of planning, administering and expanding these services on a country-wide basis.

The Health Survey and Development Committee has stressed the urgent need for providing adequate measures for the protection of the health of women and children and has included in its long and short-term programmes development of health services for women and children. These services include domiciliary and institutional services and hospitalisation of cases requiring institutional treatment, health supervision of mothers and children and health education for mother and families. The provinces have been advised by the Government of India to implement the recommendations of this Committee. It is gratifying to record that provinces have drawn up schemes on maternity and child welfare which are expected to materialise in the near future.

Provincial Governments are much alive to the needs of developing maternity and child welfare services in their provinces and some of the provinces have already appointed qualified women doctors as technical advisers and organisers. The lack of trained staff, without which such centres cannot function efficiently, continues to hamper their progress. Efforts to remedy this shortcoming of lack of trained personnel have been initiated both by the Centre and by the provinces by expanding training facilities, encouraging candidates by offering them stipends and scholarships and deputing suitable women candidates overseas for training, but the pace of progress remains slow. Not only the trained personnel are few in number but the present scales of remuneration offered to workers in such vital fields of health are relatively poor and need considerable improvement if they are to attract women doctors and health workers.

The Government of India have initiated a scheme for the training of public health nurses for the implementation of which they have established a College of Nursing in New Delhi. The course of training at this College is a comprehensive one extending over a period of four years. The College opened in July 1946 and 13 candidates have joined for training in public health nursing. The managing body of the Indian Red Cross Society gave six scholarships, each of Rs. 15 per month, to students who joined training during 1946.

Remarks on individual provinces.

22. *North-West Frontier Province.*—A large provincial Red Cross Welfare Centre specially designed for the training of health visitors was

built at Peshawar during the year at a cost of about Rs. 1,00,000. In addition 7 Maternity and Child Welfare Centres under qualified health visitors and 4 sub-centres under *dais* in rural areas functioned during the year. These centres are maintained by the Provincial Red Cross Society. A lady Assistant Director of Public Health inspects the centres from time to time. Nine pupil *dais* were trained at these centres and obtained District Dais Certificate. The Government Midwives Training Centre at Peshawar gave training to 8 pupil midwives, all of whom received Diplomas in Midwifery.

Punjab.—There was an increase of 6 centres in the province during the year making a total of 130 in all. Of these 55 centres functioned for combined rural and urban areas, 48 centres for urban areas and 27 centres for rural areas.

The Indian Red Cross Society runs 41 centres. The Government, Municipal Committees and District Boards, between them, control 79 centres and the remaining 10 centres are managed by other private organisations. Government gave financial assistance to 47 centres. The services of the trained health visitors have been provincialised and Government meets the salaries of 57 health visitors.

The Director of Public Health is assisted in his duties by an inspectorate staff consisting of an Inspectress of Health Centres who is a woman doctor and 2 Assistant Inspectresses, who are qualified lady health visitors.

The Punjab Central Midwives Board examined 417 *dais*; of these 319 (117 urban and 142 rural) were successful and granted certificates. Certified *dais* in the province now number 5,871 (3,059 urban and 2,812 rural).

United Provinces.—There was some improvement in the number of candidates coming forward for health visitors' training but none for assistant midwives. The Government made an increased grant of Rs. 1,24,000 for maternity and child welfare work and for extra staff and equipment.

Bihar.—Maternity and child welfare work in the province is in the hands of a society established in 1928. This society runs 12 centres all in urban areas. There is no centre located in any rural area.

Training of *dais* is undertaken at these centres. A proposal for the opening of additional 55 maternity and child welfare centres has been submitted to the provincial Government for sanction.

Orissa.—Under the management of the local maternity and child welfare committees eight maternity and child welfare centres continued to function during the year. In addition seven centres carried on their activities under the supervision of local medical officers.

Trained *dais* were appointed at Chandwar, Ballikuda and Binjharpur in Cuttack district and at Satyabadi in Puri district; they conducted the domiciliary service in addition to attending to confinements. The Government sanctioned a sum of Rs. 2,240 and Rs. 1,500 for the upkeep of the centres at Cuttack and Balasore respectively. The Cuttack centre also received a non-recurring grant of Rs. 1,000 for raising the compound wall.

Children and expectant and nursing mothers received multi-vitamin tablets and milk free at all the centres. All the urban centres and hospitals where lady doctors are posted held ante and post-natal clinics. The work of *dais* was supervised by the lady doctors visiting expectant mothers in their homes on certain specific days in a week.

The Government deputed three female candidates to undergo senior midwifery training in the United Provinces.

Under the Orissa branch of the Victoria Memorial Scholarship Fund 22 *dais* received training and 5 *dais* attended refresher course.

The midwifery school at Berhampur admitted four candidates and two nurses. All the ten candidates taking final midwifery examination passed.

Bengal.—The dearth of trained health visitors prevented satisfactory expansion of the maternity and child welfare activities of the province. For the running of 33 centres in the province the Government gave an annual grant of Rs. 50,000. Sanction for the establishment of four new centres was given during the year. The post-war development plan makes a provision of Rs. 1,50,000 towards improvement of the existing centres.

Assam.—The work of the maternity and child welfare centres is mainly carried out by the provincial Red Cross Society. A qualified lady doctor was appointed by the Society on the recommendation of the Director of Public Health to organise and supervise this work in the province. A midwifery training centre was started at the Ganesh Das Hospital, Shillong, and at Sylhet.

Central Provinces.—An Assistant Director of Public Health to organise and supervise maternity and child welfare work was recruited during the year but the incumbent resigned the post after six months. Due to lack of trained workers no new activities could be developed.

The Health School held its usual session from July to March. Out of 16 candidates only 10 were selected. Of these 10, only 8 joined the school. At the final examination only 6 candidates passed and received certificates. The number of health visitors passed out from the school is now 163 (141 stipend holder and 22 private).

An additional post of Assistant Superintendent (Tutor) was sanctioned but remained vacant due to lack of a suitable candidate.

Bombay.—Non-availability of staff has not allowed any progress being made in the development of maternity and child welfare scheme. The Government sanctioned a scheme for combined medical and public health units in 26 talukas of the province which will include maternity wards staffed with midwives, health visitors and *dais*, but these posts remain vacant for lack of trained staff.

Some voluntary societies and institutions in the northern registration districts maintain maternity and child welfare centres and employ trained midwives and nurses for work in rural and urban areas. Two of these are run in Broach city and one in Ahmedabad city. Besides these there are child welfare centres at Surat, Aukleshwar, Anand, Mehmabad, Nadiad, Prantij and Nandurbar towns.

The Government gives a grant-in-aid of Rs. 39,600 to the Bombay Mofussil Maternity Child Welfare and Health Council for work in

connection with maternity and child welfare in rural areas. The Council also runs a Health School at Poona for training health visitors. Health visitors are also trained at the Health Visitors' Institute, Bombay, maintained by the Bombay Presidency Infant Welfare Society which receives a grant-in-aid from the Government of Rs. 5,500.

The maternity and child welfare work at the Sirur Health Unit is under the charge of a medical officer of health. He has a trained staff of one lady doctor, one public health nurse, one health visitor, 8 midwives and one trained *dai*. Clinics held and home visits paid numbered 51 and 38,501 respectively. The pre-natal, post-natal and infant visits amounted to 37,430.

Sind.—To increase the number of trained personnel for maternity work in the province scholarships granted were four for lady health visitors, five for midwives and 15 for assistant midwives. Another five scholarships are proposed for Assistant Midwives receiving training at the Janbai Maternity Home recently established as a training centre in Karachi.

Madras.—It is satisfactory to record that the local bodies have continued to show keenness in extending maternity and child welfare work in their areas. During the year 23 new child welfare centres were opened bringing the total in the province to 290. The Government gave a grant for the building of 4 centres.

Additional posts of 3 women medical officers (maternity and child welfare), 11 health visitors, 35 midwives and 35 *ayahs* were sanctioned by the local bodies. The lack of qualified staff was responsible for 21 posts of women medical officers (maternity and child welfare) and 4 posts of health visitors remaining unfilled.

Maternity and child welfare expenditure of district boards and municipalities amounted to Rs. 5,91,436.

Coorg.—The scheme of training of rural midwives and their return to villages after training did not prove a success and had to be discontinued as the women considered their work in villages not remunerative enough. Out of 32 women so trained only 4 midwives could be persuaded with the aid of a small stipend to practice in selected localities. They conducted 101 deliveries in the rural areas. Deliveries conducted by the staff hospitals and dispensaries, numbered 1,089. The municipal, Red Cross and the rural midwives were responsible for conducting another 334 deliveries.

Ajmer-Merwara.—Maternity and child welfare activities are undertaken at the King George V Memorial Maternity Home at Ajmer.

Baluchistan.—Maternity and child welfare activities were continued at the Archar Welfare Centre, Indian Military Families Hospital, Railway Hospital and Church Mission Hospital centres.

SECTION V.

INTERNATIONAL HEALTH, QUARANTINE AND PORT HEALTH ADMINISTRATION.

International Health Conference and World Health Organisation.

23. This Section has been enlarged to include international health activities. During the year under review, international co-operation in public health was resumed after six years of war devastation with its problems of displaced peoples and under-nourished populations. A new realisation had dawned amongst the nations of the world that not until the people of all nations enjoy good health, in the broadest sense of the word, can the peace of the world be ensured. The following steps were accordingly taken by the United Nations towards the formation of a World Health Organization during 1946, and India took an active part in this work.

International Health Agreements and Conventions have been in force for many years and before the World War II two governmental international health organizations were in existence: (i) the Office Internationale d'Hygiene Publique established under the Rome Agreement of 1907 with its headquarters at Paris, and (ii) the League of Nations Health Section established after the World War I with its headquarters at Geneva. During this war both these organizations had their activities markedly curtailed. In 1943, the United Nations Relief and Rehabilitation Organization took up international health duties in respect of war devastated countries and also the administration of the International Sanitary Conventions which was normally the duty of the Paris Office. This however was a temporary arrangement and was to be terminated after the war.

In April 1945 when the nations of the world met at San Francisco to found the United Nations Organization, delegates of Brazil and China urged the formation of a single international health organization. By a Resolution dated 15th February 1946 the United Nations, through its Economic and Social Council, decided to call an international health conference to consider the scope and the appropriate machinery for international action in the field of health through the establishment of a single unified international health organization.

Accordingly on the 18th March 1946, a Technical Preparatory Committee consisting of health experts from 16 countries including India met in Paris to draw up the principle governing such an organization for submission to the International Health Conference. This Committee prepared a draft constitution for a new organization to be called the "World Health Organization".

The International Health Conference met in New York from 19th June to 22nd July 1946 to consider the recommendations of the Technical Preparatory Committee. Voting delegates from 51 nations, observers from 30 non-member nations, representatives of Allied Control authorities in Germany, Japan and Korea attended. Representatives of the following International Organizations who have an interest in health matters were also present:—

- (1) The Food and Agriculture Organization of the United Nations.
- (2) The International Labour Organization.

- (3) The League of Red Cross Societies.
- (4) Office Internationale d'Hygiene Publique, Paris.
- (5) The Pan American Sanitary Bureau.
- (6) Provisional International Civil Aviation Organization.
- (7) The Rockefeller Foundation.
- (8) United Nations' Educational, Scientific and Agriculture Organization.
- (9) The United Nations Relief and Rehabilitation Administration.
- (10) The World Federation of Trade Unions.

The most important achievements of this Conference were, the signing of a Charter of a World Health Organization, the setting up of an Interim Commission and the signing of a Protocol to transfer to the World Health Organisation, the duties of the Office Internationale d'Hygiene Publique, Paris. The constitution of the World Health Organization makes it the directing and co-ordinating authority in all international health work. The broad principles on which this organization is based, are as follows:—

"Health is a state of complete physical, mental and social well being and not merely absence of disease or infirmity.

"The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.

"The health of all peoples is fundamental to the attainment of peace and security and is dependent upon the fullest co-operation of individuals and States.

"The achievement of any state in the promotion and protection of health is of value to all.

"Unequal development in different countries in the promotion of health and control of disease, especially communicable disease, is a common danger.

"Healthy development of a child is of basic importance. The ability to live harmoniously in a changing environment is essential to such development.

"The extension to all peoples of the benefits of medical, psychological and related knowledge is essential to the fullest attainment of health.

"Informed opinion and active co-operation on the part of the public are of the utmost importance in the improvement of the health of the people.

"Governments have a responsibility for the health of their peoples which can be fulfilled only by the provision of adequate health and social measures."

The functions of the World Health Organization as set forth in its constitution are, to give technical assistance to Governments in strengthening health services and in emergencies; to promote research

in the field of health; to promote with other agencies the eradication of epidemic, endemic and other diseases; prevention of accidents; the improvement of medical education, of maternity and child welfare, of nutrition, housing, sanitation, recreation facilities, of economic conditions and of mental hygiene, etc. The Organization will consist of a World Health Assembly, an Executive Board and a Secretariat with technical and other staff.

The first World Health Assembly will be convened within six months after 26 members of the United Nations Organization have ratified the World Health Organization constitution (probably February 1948). The Indian delegation signed this constitution subject to ratification by the Indian Legislature. It is hoped that the Government of India will obtain the necessary ratification at an early date so that India can join the first World Health Assembly and secure a seat on the Executive Board. Meanwhile the International Health Conference has established a provisional body called the Interim Commission to carry on the activities of the organization until the entry into force of its constitution. This Interim Commission is composed of representatives from the following 18 States:—

Australia	Norway
Brazil	Peru
Canada	Ukrainian Socialist Republic
China	Union of Soviet Socialist Republic
Egypt	United Kingdom
France	United States of America
India	Venezuela
Liberia	Yugoslavia
Mexico	
Netherlands	

Meetings of this Commission are held every four months. By the end of the year under review it has held two sessions, the first between 19th and 23rd July 1946 at New York and the second from 4th to 13th November 1946 at Geneva. The Interim Commission elected Dr. Andrija Stampar of Yugoslavia as Chairman and Dr. Brock Chisholm of Canada as Executive Secretary.

On 16th October 1946 this Interim Commission took over the functions of the health section of the League of Nations, *viz.*, the maintenance of the central office of the service of epidemiological intelligence and public health statistics, the publication of the *Weekly Epidemiological Record* and the administration of biological standardisation work, etc.

The duties and functions of U.N.R.R.A. were transferred to the Interim Commission on 1st December 1946, *viz.*, the administration of the International Sanitary Conventions as well as the U.N.R.R.A. health programmes in war-devastated countries.

The protocol concerning the Office International de Paris which was signed at the International Health Conference, New York, in July 1946, authorised the transfer of the work of the "Office" to the World Health Organization. This protocol becomes effective when 20 States,

parties to the Rome Agreement of 1907, have ratified. Meanwhile the duties of the Paris Office also go over to the Interim Commission.

The work of the World Health Organization Interim Commission is largely carried out in committees. Internal Committees are formed of members from within the Interim Commission. Four such committees have been formed:

- (i) Epidemiological and Quarantine Committee of which the Indian member is the Vice-chairman;
- (ii) Administration and Finance Committee;
- (iii) Relations Committee; and
- (iv) Location of Headquarters Committee of which the Indian member is Chairman.

Six Expert Committees have also been planned as follows:—

- (1) Expert Committee on Revision of International lists of causes of death and on the establishment of international lists of causes for morbidity.
- (2) Expert Committee on Biological Standardization.
- (3) Expert Committee on Quarantine.
- (4) Expert Committee on Narcotic Drugs.
- (5) Expert Committee on Malaria.
- (6) Expert Committee on revision of the Pilgrimage clauses of the International Sanitary Convention.

The Interim Commission will hand over its work to the World Health Organization as soon as the latter comes into existence, on the ratification of its constitution by at least 26 countries, members of the United Nations Organization—probably about February 1948.

Port Health Administration.

24. The health administration of both sea and airports is reviewed in this Section. The seaports are administered under the existing Indian Port Health Rules 1938 but the question of revising these rules is under active consideration.

During the year 1946, the Indian Aircraft (Public Health) Rules 1946 superseded the Indian Aircraft (Public Health) Rules 1940, thus bringing them into close conformity with the International Sanitary Convention for Aerial Navigation 1933 as amended in 1944. Under the revised rules, all aircraft coming to India from the west are regarded as suspected of yellow fever infection and are accordingly required to land at a designated airport. The revised rules also provide for the recognition, subject to the approval of the Government of India, of certificates of disinsectisation issued by other Governments in accordance with the procedure laid down in these rules. The Government of India have so far approved the disinsectisation arrangements of the Governments of Egypt, Sudan, United Kingdom, United States of America and the Netherlands. The health documents prescribed in the International Sanitary Convention for Aerial Navigation have been adopted as the standard forms for purposes of these rules. For delineating yellow fever infected areas, geographical limits defined by

U.N.R.R.A. have been followed with a very few exceptions. The minimum period of validity for yellow fever inoculation is laid down at ten days for persons who have been inoculated in a non-endemic area and who have not entered an endemic area within the first ten days after inoculation, and as 15 days in all other cases.

To cope with the increasing demands made by the growth of international air traffic, steps were initiated during 1946 to provide Santa Cruz Airport at Bombay with some health staff and sanitary equipment to enable this airport to function as the last port of departure for international air traffic leaving for the west. It is proposed to expand the health organisation of this air port as rapidly as possible, in order to deal with all incoming and outgoing international traffic.

A meeting of the Yellow Fever Committee was held in July, 1946 which among other things recommended that :—

(a)

- (i) certificates of disinsectisation of aircraft granted by the Egyptian Quarantine Administration or by the Director of Medical Service of Anglo-Egyptian Sudan should be accepted.
- (ii) no procedure for disinsectisation of aircraft can be regarded as adequate for quarantine purposes which is entrusted to the crew of an aircraft or to any personnel other than the staff of a health organisation whose sole duty is the protection of a population from the introduction of disease. Service planes from yellow fever endemic areas must, therefore, obtain disinsectisation certificates from the civilian quarantine authorities recognised for this purpose.
- (iii) the most suitable time for the spraying of aircraft is immediately after landing, the passengers having been first allowed to disembark through a barrage of spray put up at the exit door, and
- (iv) that the procedure for the disinsectisation of aircraft should form a part of the Indian Aircraft (Public Health) Rules 1946 and that the standard laid down therein must be complied with before recognition is given to any certificate issued by a quarantine authority.

- (b) It was also decided at the same meeting that each province in India should maintain a list of personnel to undertake ward and nursing duties in the event of a case of yellow fever occurring in that area and that such a unit should include a suitable number of medical officers, nurses and other staff, previously protected against yellow fever by inoculation.

Considerable progress was also made during the year towards implementing the recommendation made by the Yellow Fever Committee in 1941 regarding the manufacture of yellow fever vaccine in India. A laboratory called the "Virus Laboratories, Guindy" has been especially built and equipped for the purpose, and the Director, King Institute, Guindy will be its *ex-officio* Director. The manufacture of vaccine is expected to begin some time in 1947-48.

PROVISION OF MEDICAL FACILITIES FOR SEAMEN.

The question of the provision of adequate medical facilities both indoor and outdoor, for seamen at various Indian Ports and arrangements for their medical examination, before recruitment, by independent medical officers, unconnected with Shipping Companies, had been under consideration of the Government of India for some time past. Towards the end of December 1945 at a meeting which was held between the representatives of the various Departments of the Government of India it was decided to set up a small committee at each major port drawn from among the representatives of the Provincial Governments, Port Trust, Port Health Department, Principal Officer, Mercantile Marine Department and the Seamen's Welfare Officer.

The functions of these committees were to be :—

- (i) Consideration of all questions relating to the provision of health services including facilities for hospital and dispensary treatment for all seamen on 'articles' as well as seamen not on 'articles'; and
- (ii) Consideration of such matters as may be referred to them by the Central Government and also to make recommendations to the Central Government on their own initiative.

It was also decided to have a central committee consisting of representatives from the Departments concerned at the centre which would meet about once a quarter to review progress and discuss pending questions.

The first meeting of the Central Committee was held in July 1946 and it was tentatively decided that

- (a) "The standard of treatment of seamen both on 'articles' and 'off articles' in ports should be the same. The treatment provided should be free of charge to the men. The funds for this liability should be obtained from the ship-owners or shipping companies' Agents by contributions towards meeting treatment charges for men 'on articles' and the balance should be contributed by Government of India for treatment of men 'off articles'."

- (b) The share of ship-owner or agents contribution should be based on the average of the volume of each company's shipping in that port."

It was also decided that the management of seamen's clinic at Thana Street, Bombay, which had been constructed by the Seamen's Welfare Directorate should be taken over by the Health Department of the Government of India, and that 50 beds should be reserved for indoor treatment of seamen at the Lake Medical College (the American Army Hospital) in Calcutta. The question of laying down minimum standards of physical fitness for seamen is now under the consideration of Government.

The reorganisation of the Port Health Departments at the various seaports and airports in India which could not be taken up during the war was completed early in 1946. The Department as now constituted, consists of 29 gazetted posts in the permanent cadre in addition to a large number of non-gazetted posts, both technical and non-technical.

The prevalence of Infectious Diseases in the Ports.

25. The incidence of the epidemic diseases during the year is given below:—

Seaports.	Cholera.		Small-pox.		Plague.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Calcutta	1,792	685	190	124	..	..
Bombay	2	..	2443	744	11	1
Madras	3	3	881	167	..	..
Karachi	..	..	85	28	..	..
Chittagong . . .	9	5	34	5	..	..
Cochin	2	..	53	7	32	6
Vizagapatam . .	..	..	14	3	..	..
Cuddalore . . .	..	..	1	..	..	..
Mangalore . . .	..	..	20	2	8	6
Cannanore . . .	..	..	..	..	..	6
Tuticorin . . .	..	..	..	..	..	..
Calicut	..	..	57	11	..	..
Masulipatam . .	..	..	20	2	..	..
Tellicherry . . .	..	..	19	..	..	..
Negapatam . . .	..	..	2	..	..	..
Air Ports.						
Cawnpore	194	65	46	9	1,027	380
Delhi	84	2	400	305	..	..
Jodhpur	..	..	2	75	..	..
Allahabad . . .	91	57	163	22	2	1
Seaports (States).						
Alleppey	..	..	216	150	5	5
Mahuva	..	..	4	2	..	..
Veraval	..	..	223	143	..	..
Mandvi	..	..	10	15	..	..

It will be seen that there were fairly severe epidemics of small-pox in Bombay and plague in Cawnpore. Both the places were affected mainly in the early half of the year. There was a heavy incidence of

smallpox in Madras though this year it was not quite as severe as it was last year, when 1,053 cases with 175 deaths were recorded. Compared to last year's record of 122 cases with 65 deaths from smallpox, the incidence of the disease in Delhi this year was heavier. Allahabad, Alleppey and Veraval usually experienced a mild incidence of smallpox but the incidence of the disease this year was fairly heavy. Cholera was not particularly heavy in any of the ports excepting Calcutta. Delhi and Allahabad where usually the disease appears in a sporadic form experienced a mild attack of cholera. There was some plague in Cochin. The incidence of cholera and smallpox in Calcutta was well within the normal experience.

Port of Bombay.

26. During the year under the report out of 2,309 vessels which came from foreign ports, 12 passenger vessels arrived with 13 cases of chickenpox, 1 case of diphtheria, two cases of influenzal pneumonia and one case of measles. The cases which occurred on hired transports were dealt with by the Embarkation Medical Officer; in other cases, all necessary precautions were taken by the Port Health Department. The infected parts of the vessels from foreign ports which came in quarantine on account of infectious diseases were disinfected on arrival. Personal baggages and kit, etc., of 72 members of crew who were contacts were disinfected. Three cargo vessels, on their way to Bombay, landed respectively, a case of smallpox at Cochin, one case of smallpox at Bedi Bunder and a case of chickenpox at Karachi. All these vessels were boarded on arrival at this port but no further cases were reported. No coastal steamers arrived in quarantine during the year under review. No measures enforcing isolation, observation and surveillance were imposed by the Port Health Department. Cases of infectious diseases were sent to the Infectious Diseases Hospital, Bombay, for disposal.

29 passenger vessels and 4 cargo vessels arrived in Bombay from East African ports *via* Mombassa during the year. The total number of crew on board was 6,830 and all with the exception of 2 were protected against Yellow Fever. In addition one country craft arrived from East Africa *via* Mombassa with 13 crew but no passengers. Out of the 13 members of the crew 6 were not protected against Yellow Fever.

Outgoing vessels numbered 775 and country crafts 154. The numbers of passengers and crew inspected were 55,038 and 94,925 respectively. Of this number, 342 crew and 5 passengers were not fully protected against smallpox by recent vaccination at the time of their departure from this port, and an endorsement to that effect was made on each Bill of Health. Two members of crew and 10 passengers with 28 contacts were prevented from sailing as they were found to be suffering from infectious disease at the time of medical inspection. Clothing, bedding and other personal effects of 5,780 newly joining crew were disinfected prior to their departure from this port. In addition to the above, 5,130 baggage coolies were also inspected and their clothing disinfected. Four cases of smallpox, 1 case of chickenpox and 1 case of diphtheria occurred on three cargo vessels and on three country crafts lying in the harbour. All necessary precautions were taken by the Port Health Department. The Embarkation Medical Officer, Bombay, dealt with a few cases of chickenpox and one case of smallpox on board Hired Transports.

Under instructions from the Port Health Department, measures to prevent ingress of rats were taken by the Bombay Port Trust and a certificate was furnished to this Department. In addition to the above measures rat-catching operations by means of setting of traps and treating of burrows on shore by Cyanogas were also undertaken daily by the Bombay Port Trust in the dock area. The total number of vessels fumigated was 42, but Deratisation Certificates were issued only to 34 as the rest, though fumigated, did not require certificates. These ships were fumigated by sulphur. 74 more vessels on inspection were found to have rat indications necessitating fumigation which could not, however, be carried out, as the vessels were either partly loaded with same bottom cargo or were required to sail urgently. In addition to the above vessels, 96 more vessels were exempted from fumigation after inspection and were issued Deratisation Exemption Certificates. Out of 3,559 country crafts which were inspected, 1 was fumigated and the rest, viz., 3,558 were exempted. The total number of rats and mice caught and destroyed on ocean-going vessels as well as on country and harbour craft was 1,561. Out of these, 239 rats were examined at the Haffkine Institute, but none was found to be plague infected.

One hundred inspections of crews' provisions on board the ships were carried out. A number of complaints were received from the members of the crew of vessels regarding supply of unsatisfactory foodstuff; provisions complained of were inspected and appropriate recommendations made to the agents of the vessels.

The pilgrim traffic at this port is seasonal and does not conform to the calendar year. Pilgrims continued to leave from about the middle of July to about the middle of October 1946. The total number of pilgrims who left this port during the Haj season, by seven pilgrim ships, was 6,678. Before embarkation all the pilgrims were vaccinated against smallpox and inoculated against cholera. The total number of pilgrims who returned to Bombay by the beginning of March 1947 by 13 vessels was 5,469.

During this year twelve ships on the high seas asked for medical advice by radio messages, and return messages were sent prescribing suitable treatment.

Port of Karachi.

27. During the year 1946, 330 passenger vessels and 1,991 country craft arrived from foreign ports and of these, 25 vessels with 17,576 passengers and 2,634 crew were examined. Only two in-coming vessels reported two cases of chickenpox amongst the deck passengers. These two cases were sent to the Municipal Epidemic Diseases Hospital, Karachi and necessary sanitary measures were taken by the Port Health Department. There were 58 deaths from non-infectious diseases on in-coming vessels (pilgrim ships).

554 vessels sailing for ports beyond India were granted Bills of Health after proper medical inspection. Of these, 32 were passenger vessels, 225 cargo vessels and 297 country craft. The total number of passengers inspected (inclusive of pilgrims) was 26,807 and crew 21,906. During the course of medical inspection of the above, three cases of chickenpox were detected amongst deck passengers of a passenger vessel and were sent to the Municipal Epidemic Diseases Hospital.

8 ships were granted Deratisation Certificates under rule 63 of the Indian Port Health Rules, 1938. Of these, 7 ships were deratised by fumigation by burning sulphur in pots and pans and the remaining one ship was deratised by "Trapping". 20 ships were granted Deratisation Exemption Certificates after ascertaining the degree of rat infestation by inspection, trapping and baiting, etc., including 2 troop ships.

Anti-rat campaign was carried out throughout the year under the supervision of the Port Health Officer, on behalf of Karachi Port Trust, on the wharfs and jetties. The average number of rats trapped per day per 250 traps was 14 and average number of rats killed by poison baits was 1.2 per day per average 600 baits. The total number of rats trapped during the year was 5,129, of these 77 rats were trapped on board the ships; 348 rats were killed by poison baits in the wharf area, while the total number of rats killed by fumigation (by burning sulphur) was 519. The grand total of rats destroyed on ships and on the wharf area was 5,596. Throughout the year, rats were sent to the Sind Government Chemico-Bacteriological Laboratory, Karachi, twice a month for bacteriological examination. No rats were reported as infected with plague.

Provisions and stores for the use of the crew of 55 ships were inspected; 78 samples of ghee were sent to the Chemical Examiner, Customs House, Karachi, out of which only two samples were reported to be impure.

The outward Haj pilgrim traffic began on the 18th July 1946 with the sailing of the pilgrim ship "Khosrou" and ended on the 19th October 1946 with the departure of the pilgrim ship "Englestan". Altogether 11 pilgrim ships sailed from Karachi. The total number of pilgrims embarked was 13,272. In all fourteen pilgrim ships arrived from Jeddah at Karachi with 16,806 returning pilgrims on board. Of these, 14,883 pilgrims disembarked at Karachi and the remaining pilgrims proceeded to Bombay. The total number of deaths during the voyage on these in-coming ships was 58, all from non-infectious diseases, thus giving death rate of 0.33 per cent. Thanks to the strict enforcement of immunisation against cholera and vaccination against smallpox of out-going pilgrims, no cases of cholera and smallpox occurred amongst the returning pilgrims.

Anti-stegomyia operations in the harbour area and the adjoining Port Trust Estates comprising East Wharf, West Wharf, Marine Air Port, Mansfield Import Yard and Thole Produce Yard Area were carried out during the year. All newly arrived country craft numbering 5,911 were boarded and inspected for mosquito breeding and out of these 352 were found breeding stegomyia. None of the craft inspected afloat were found to breed stegomyia.

Karachi Marine Airport.

28. All the flying boats arriving from the West landed at the Marine Airport, West Wharf (Karachi Harbour) from 1st January to 13th April 1946. The Marine Airport was transferred from West Wharf (Karachi Harbour) to Korangi Creek, from the 14th April 1946 and all flying boats arriving from the West landed there from that date. In the Administrative building at the Marine Airport, a temporary mosquito-proof Isolation Room has been reserved for effective isolation of yellow

fever cases or suspects, pending their removal to the Yellow Fever Isolation Hospital at Drigh Road. There is also in the Administrative Building, a room for medical inspection of passengers and crew of out-going and in-coming flying boats.

During the year 511 flying boats with a total of 10,264 crew and passengers arrived at Karachi. Of these, 122 flying boats came from or after having passed through yellow fever areas; all these 122 flying boats were disinfected on arrival. Of the total number of 7,040 passengers arriving at the Marine Airport, 2,505 passengers were not in possession of certificates of inoculation against yellow fever. No action was taken in respect of these passengers, as they did not come from or pass through any yellow fever area, nor had they boarded flying boats coming from yellow fever areas. As regards the crew of these in-coming flying boats, 583 out of a total of 3,224 had come from yellow fever areas within nine days and all had valid yellow fever inoculation certificates.

During the year, no military flying boat arrived at the Marine Airport.

A total of 11,076 crew and passengers in the 512 flying boats leaving Karachi was medically inspected and Bills of Health were granted.

Karachi Airport.

29. During the year 1946 the number of eastbound aircraft inspected at Karachi Airport, Mauripur Airfield and Drigh Road R.A.F. Airfield was 583, 2,879 and 84 respectively and the number of west or outward bound aircraft inspected was 366, 275 and *nil* respectively. The number of eastbound crew and passengers inspected was 10,001, 41,207 and 593 respectively and the number of west or outward bound crew and passengers was 5,994, 3,384 and *nil* respectively. No case of infectious disease was detected. The number of eastbound aircraft disinfected was 554, 2,878 and 84 respectively.

In the beginning of the year there were three airfields where eastbound traffic landed, viz. (1) Karachi Airport, which was the U.S.A. Air Force base till June 1946, (2) Mauripur Airfield where the Civil and Royal Air Force aircraft landed till June 1946 when the Civil Airlines were transferred to Karachi Airport and (3) Drigh Road Royal Air Force Airfield, which closed down in March 1946.

There were three instances of eastbound Royal Air Force aircraft overflying Karachi, one due to bad weather, which returned to Karachi on improvement of weather and the other two due to failure of Mauripur Airfield Traffic Control to prevent them from overflying to Delhi. Appropriate action was taken in each case.

All troop movements by "trooping aircraft" at Mauripur Airfield were discontinued from August 1946.

For the first time a few pilgrims for Jeddah left Karachi by air in three chartered planes.

A few cases of "false" yellow fever inoculation certificates were reported to the Public Health Commissioner for necessary action.

Some cases of irregularities were brought to the notice of the operating Air Lines and the Officer Commanding, Royal Air Force Mauripur Airfield and in all cases the instructions of the Airport Health Officer were complied with.

The number of persons detained in the Isolation Hospital for observation was 163, a majority of whom arrived in infected aircraft either without any yellow fever certificates or with invalid certificates.

Sanitation at Karachi Airport was constantly supervised by the Airport Health Officer. At Mauripur Airfield, which was controlled by the Royal Air Force, the sanitation of the civil domestic area and villages around the airport was also supervised by the Airport Health Officer. General sanitation at both Karachi Airport and Mauripur Airfield was satisfactory.

D. D. T. mixture 5 per cent. was introduced this year as a measure against adult mosquitoes with very good results; all residential and non-residential buildings, huts, tents, etc., were sprayed both at Karachi Airport and at Mauripur Airfield once in six weeks except in the case of the "Terminal buildings" and their surroundings and the Isolation Hospital where spraying was done every three weeks.

All aircraft arriving from the west were subjected to disinfection on arrival at Karachi with a mixture of pyrethrum in kerosene oil, using petrol-driven sprayers.

Malaria B. was used against mosquito larvæ in swamps, nullahs and pools. All springs, wells, seepage water and other water collections were attended to. A number of unauthorised huts constructed in the vicinity of the airport were removed with the cooperation of the Executive Officer, Drigh Road Cantonment and the Collector of Karachi.

The average number of houses and breeding foci searched for adult mosquitoes and larvæ during each month was 1,497 and 1,461 respectively at Karachi Airport and its neighbouring villages and 166 and 5,213 respectively at Mauripur airfield and surrounding villages.

The Department adapted itself well to the new situation created by the end of the war and with the increasing international civil traffic.

Port of Calcutta.

30. During the year 1946, 1,254 vessels entered the Port of Calcutta as against 1,974 in the previous year. Of these four were infected, three having cases of chickenpox (1 each) and one a case of smallpox amongst military passengers. Necessary precautionary measures were taken in respect of these vessels.

The affected parts of all infected vessels were disinfected by the Port Health Department. The effects of the contacts were also disinfected.

30 deaths from non-infectious diseases, were reported to have occurred on vessels which arrived at this port during the year 1946.

1,288 vessels left the Port of Calcutta during the year against 1,938 in the previous year. 921 outward bound vessels with 52,405 passengers and 64,229 crew were inspected. None of these was prevented from sailing on account of infectious diseases. The numbers of cargo and passenger vessels were respectively 718 and 203.

The personal effects of new members of crew joining ships in this port were disinfected as and when necessary.

Amongst the vessels in harbour two cases of chickenpox occurred. All necessary precautionary measures were taken.

During the year 1946 a daily dock patrol was carried out by the Assistant Port Health Officers and the Fumigation Inspector to ensure that the measures in force in this port for the prevention of ingress of rats into ships, were actually being carried out. During the year, 319 vessels were checked on this account. In 27 vessels, new rat-guards were procured locally on the advice of the departmental officers concerned and in 292 vessels, improperly fixed and defective guards were corrected. Anti-rat measures on shore were carried out by the Calcutta Port Commissioners. The total number of rats caught during the year was 5,109, of which 2,052 were examined. No rat plague was found.

In accordance with Rule 61 of the Indian Port Health Rules, 1938, 54 Deratisation Certificates and 215 Deratisation Exemption Certificates were issued in this port during the year as compared with 49 Deratisation Certificates and 173 Deratisation Exemption Certificates in 1945. In all cases vessels were deratised by sulphur fumigation. Due to emergent circumstances necessitating an early departure of vessels concerned, permits to leave the port without a valid certificate were granted to 53 vessels which could not be granted Deratisation Certificates or Deratisation Exemption Certificates. They were permitted to sail on the condition that the certificates would be renewed at the earliest opportunity. Ships were fumigated by the Port Health Department.

Provisions of 513 ships were inspected by this department during the year 1946. Two samples of ghee, 2 samples of butter, 1 sample of mustard oil and four samples of condensed milk were collected by this department and analysed by the Chemical Examiner, Calcutta Customs House. All those samples were reported to be fit for human consumption and up to the standard approved by Government.

The s/s "Khosrou" sailed from this port on 14th September 1946 with 1,363 Haj pilgrims on board. The pilgrims were vaccinated against smallpox and inoculated against cholera. They were medically examined before embarkation.

Anti-mosquito measures on shore were carried out by the staff of the Garden Reach Anti-malaria Association. Mosquito Survey was also carried out on vessels and out of 10,087 vessels inspected during the year, breeding was detected on 439 vessels.

Apart from the routine inspection of lascar provisions, fourteen bags of rice, 400 bags of flour, 382 bags of wheat, 3 chests of tea, 164 lbs. of dal, 285 lbs. of split pea, 136 bags of barley, 800 lbs. of beef, 105 bags of maize and 2,148 lbs. of oatmeal which were inspected by this department at the request of the shipping companies were condemned as unfit for human consumption.

Samples of water were collected at regular intervals and analysed by the Chief Analyst, Calcutta Corporation. In cases adversely reported on by him, the source of supply was stopped till measures to improve the water supply had been taken. In the case of water boats and water barges, the chlorination of tanks was carried out under the personal supervision of an Assistant Port Health Officer, Calcutta. Water is being supplied to vessels only from water boats.

Medical advice by wireless was given to six ships during the year under review.

Marine Airport at Bally.

31. The Marine Airport is located at Bally within the limits of the Port of Calcutta. Inspection of seaplanes was carried out by the Port Health Officer, Calcutta. The medical inspection of crews and passengers of flying boats was done, as usual, in a cabin provided on the House Boat "Sonamukhi". First-aid equipment was maintained to meet emergencies arising out of accidents, etc. The number of seaplanes, crew and passengers inspected during the year is furnished below:—

	Flying boat.	Crew.	Passengers.
In-coming	232	1,659	4,152
Out-going	240	1,732	3,882

No case of infectious disease occurred either among the crews or passengers of the seaplanes inspected during the year.

Dum Dum Aerodrome.

32. A total of 624 airplanes was inspected, with 9,297 passengers and 2,790 crew.

The health of the in-coming and out-going passengers and crew remained satisfactory and there was no occasion to detain any passenger.

The general health and sanitation of the personnel of the aerodrome remained satisfactory during the year. Not a single case of infectious disease occurred in the airport. As a protective measure, 414 persons were vaccinated against smallpox, 130 were given anti-cholera inoculation and 17 T. A. B. vaccine.

The airport was supplied with sufficient water by means of 5 tube wells with overhead tanks. Samples of water were periodically analysed and any defects rectified as soon as possible.

Anti-mosquito measures were carried out throughout the year and breeding places of Aedes were looked for with special care. Altogether 13 catching stations were mapped out—each station being visited twice a week. Out of 1,290 mosquitoes caught, only 8 were varuna and 5 philippinesis, the chief carrier species in this locality. All the buildings were sprayed twice a week with a pyrethrum-kerosene mixture. Tanks and other collections of water were first cleaned of vegetation and then sprayed with Malariol "B".

Port of Madras.

33. During the year, 692 vessels arrived in Madras port. Of these only one ship arrived infected with chickenpox when all necessary precautionary measures were taken. The total number of crew and passengers inspected was 61,874 and 133,038 respectively.

Altogether 723 vessels departed during the year, of which 278 vessels leaving for foreign ports were inspected before departure. Two deck passengers and one crew were rejected for chickenpox at the time of medical inspection and were sent to Infectious Diseases Hospital. A case of Bilateral Mumps and a case of high fever were also rejected by the ships' surgeons. The total number of crew and passengers inspected was 24,378 and 21,627 respectively. Among 4 vessels lying in the harbour there were nine cases of chickenpox. Necessary precautionary measures including the steam disinfection of crew kits and disinfection of vessels were taken.

Lascar provisions of five ships were examined. Two samples of rice, one sample of ghee and one sample of flour were sent to Chemical Examiner for analysis. Of these, the sample of ghee and the sample of flour were reported to be unfit for human consumption. The masters of the vessels replaced the unwholesome articles.

European crew provisions were also examined on two vessels due to complaints received from the masters of ships. One consignment of meat in one ship and a consignment of coffee and potatoes in another, were condemned and destroyed due to adverse reports received from the Chemical Examiner.

The sanitation of the Port area is looked after by the Madras Port Trust and is maintained satisfactorily. Anti-mosquito measures were undertaken by the Port Trust. The Aedes index was shown to vary between .3 and .1 during the year.

Altogether 65 consignments of foodstuff were examined by the Port Health Officer, of which 16 consignments were good and the rest were damaged and ordered to be destroyed.

The Port area as well as ships were supplied with drinking water from the Corporation main through Port Trust reservoir tanks, which were periodically cleaned. No complaints were received from the masters or crew of vessels regarding quality of water. Water barges were kept in suitable sanitary condition and were cleaned periodically.

Port of Vizagapatam.

34. During the year 10 passenger vessels and 99 cargo vessels arrived in the port, with a total of 11,737 passengers and 7,640 crew. All the vessels were inspected; one vessel was found infected with a case of chickenpox. Necessary measures were taken to isolate the patient and to carry out disinfection, etc. Fifteen members of the crew were revaccinated. Seven passenger and 99 cargo vessels left the port, with 8,710 passengers and 7,675 crew. All vessels were inspected and no case of infectious disease occurred on these or on the vessels in the harbour.

Provisions and drugs were examined in two cargo vessels and two passenger vessels. In all cases they were found to be satisfactory.

Anti-rat measures in the Port were carried out by trapping and poisoning. 153 rats were examined and destroyed.

Anti-mosquito measures were conducted in an area of about 2,350 acres, including an area of about 1,600 acres which was under tidal influence.

All drinking water was chlorinated and regular bacteriological tests were undertaken.

Port of Cochin.

35. During 1946, 171 vessels arrived at Cochin from foreign ports, of which 106 with 1,844 passengers and 6,809 crew were inspected. In-coming vessels from coastal ports numbered 331 and country craft 656. Of these 118 vessels and 257 country craft were inspected carrying 2,535 passengers and 10,591 crew. No case of infectious disease occurred on these vessels. One fatal case of smallpox occurred on board a Hired Transport. Adequate disinfection, etc., was carried out. One case of smallpox occurred on a coastal vessel lying in the harbour. The patient was removed to the Isolation Hospital and the ship was placed under

quarantine. The room occupied by the patient, his bedding and personal belongings were disinfected and all the crew vaccinated against smallpox.

The vaccination state of 17,408 crew and 4,928 passengers in 234 out-going vessels was inspected and only 242 persons out of these were unvaccinated. There were no cases of infectious diseases in any of the out-going vessels. 1,425 newly embarking crew and 144 newly embarking passengers joining the above out-going vessels were examined and found to be free from infectious disease. The provision stores including the cold store where meat and other perishable articles are kept, were inspected in 138 out-going vessels and they were found to be kept in clean and sanitary condition and the condition of provisions was found to be satisfactory. Nine of the out-going vessels had doctors on board and the Port Health Officer inspected the Ships' Dispensaries and Hospitals and their condition was fairly satisfactory. 413½ tins of ghee intended to be supplied to the ships for the use of Indian seamen were inspected during the year.

All vessels anchoring near the wharf were systematically inspected with a view to prevent the ingress of rats from shore to ship and vice versa. The masters of such vessels were made to put rat guards over all mooring ropes and howsers.

In Willingdon Island, a regular anti-rat campaign was carried out under the guidance of the Port Health Officer throughout the year by fumigation of rat burrows, systematic trapping and baiting. At other places in the port area, anti-rat measures were carried out under the supervision of the respective Municipal Health Officers. 32,349 rats were destroyed, of which 368 were examined and 50 were found infected with plague.

Water supply to ships is obtained from Chowan Water Works and delivered through overhead tank reservoir in the Willingdon Island. Water is taken to the ships by water barges.

Anti-mosquito measures were undertaken on shore and on both country craft and barges.

Port of Chittagong.

36. 54 cargo vessels with 4,302 members of crew and 60 passengers and 3 passenger vessels with 297 members of crew and 3,564 passengers were inspected at the time of arrival.

60 cargo vessels with 45 passengers and 4,119 members of crew and 10 passenger vessels with 10,201 passengers and 1,180 members of crew were inspected before departure.

There were no cases of infectious disease, nor were there any reports of infectious disease from vessels lying in the harbour.

12 seamen were treated in the General Hospital, Chittagong. There was no death.

The general sanitation of the port was good.

As regards anti-rat measures, the masters of the vessels were asked to use concave-convex rat guards to ropes and howsers. The distance of 3 feet between ship's sides and wharfs was maintained.

Filtered and chloronised water was supplied to the ships from Chittagong Municipal Water Works and also filtered water was supplied from Bengal Assam Railway Water Supply. There was no complaint as to quality or quantity.

SECTION VI.

HEALTH ADMINISTRATION-ON INDIAN RAILWAYS.

37. The health services on the railways continued to function satisfactorily in spite of the persistence of certain difficulties which originated during the war. The cost of foodstuff continued to be high and it was difficult for the railway employees in general to get wholesome food within their means. Although there was no serious deterioration in the health of the railway population it is considered that the general state of nourishment was considerably lowered. Most of the railways report that arrangements for medical supplies worked better this year compared to the previous year. Yet they were not wholly satisfactory. Sanitary arrangements on some of the railways are reported to have been below the mark. It is satisfactory to note that the railway population was very little affected by cholera, smallpox and plague even though at places there were epidemics amongst the neighbouring general population. The railways co-operated freely with the civil authorities in enforcing sanitary measures in connection with fairs and festivals. The success of these measures in checking outbreaks of epidemics in big fairs and festivals may largely be ascribed to this co-operation.

One major cause of illness on the Railways is malaria and the railway medical authorities spend a lot of time and money in combating the menace. Trials with mepacrine suppressive treatment were undertaken in several areas. The success of the experiments in markedly reducing the incidence of malaria in these areas encourages the hope that this line of attack on the malaria problem on railways will rank equally among other anti-malarial measures. D.D.T. was still not available on any large scale and this fact restricted the use of this effective insecticide in anti-malaria operations.

The Railways are developing maternity and child welfare centres mainly under their Staff Benefit Fund. Most of the railways report that this activity suffered mainly because of the difficulty of getting the necessary qualified staff for running the centres. This is a part of the general difficulty experienced by most of the provinces in conducting their activities of maternity and child welfare.

Brief notes on the health activities of the individual railway health departments based on the Annual Reports of their Chief Medical Officers for the official year 1945-46 are given below:—

North Western Railway.

38. There was an improvement in the health of the staff and their families mainly due to the absence of epidemics and the decreased incidence of malaria. The total number of employees treated in the railway hospitals and dispensaries was 304,378 as against 320,373 in the previous year. The average number of days an employee was absent from duty on sick-leave was 4.48 as against 5.94 in the previous year. There were 139 cases of smallpox as against 103 in the previous year. Certified cases of malaria among the employees were 21,543 as against 34,910 in the previous year. The employees at Malakwal and Kotri Loco. sheds were given mepacrine or quinacrine tablets from the very beginning of malaria season and there was a marked reduction in the incidence of

malaria at both these stations. Comprehensive anti-malaria measures were continued at Rohri, which further reduced the incidence of malaria. The usual anti-larvicidal and anti-mosquito measures were continued at a large number of stations in co-operation with the municipal and the Cantonment health authorities.

The total cost of sanitary service was Rs. 10,82,318 which meant an average of Rs. 8 per employee. The disposal of night soil by composting was introduced at Ferozepur, Bhawalnagar, Kasur and Multan and the experience gained there has encouraged the idea of extending it to other stations. A scheme of quarterly medical examination of school children in 17 railway schools was introduced during the year. The number of holders of First-Aid certificates, vouchers, medallions and labels of St. John Ambulance Association and Brigade was 18,954 showing an increase of 1,919 over the previous year's figures. Two new Ambulance Divisions were formed bringing the total number to 29 with a strength of 1,130. There were 8 nursing divisions with a strength of 141. In 23 child welfare centres and sub-centres 120,433 home visits and 111,794 centre visits were recorded. These are substantial improvements over the last year's figures of 90,469 home visits and 98,462 centre visits. Trained *dais* conducted 1,487 confinements. Lady doctors were appointed in three centres. The distribution of milk to undernourished mothers and children was continued at a cost of Rs. 9,000. A Baby Health Week was held at Ferozepur Cantonment Child Welfare Centre. Instructions on health matters were given and a cinema film on domestic hygiene, prevention of tuberculosis and other health matters was shown. A grant of Rs. 62,000 was made to the Child Welfare Association by the Staff Benefit Fund of the Railway.

Bombay, Baroda and Central India Railway.

39. The total number of employees treated in the railway hospital and dispensaries was 256,993 as against 236,044 in the previous year. The average number of days of certified sickness was 10.13 as against 9.99 in the previous year. The increased figures this year seemed to be due to an all-round increased sickness. Cholera was prevalent in Ajmer in an epidemic form. Plague was absent yet as a matter of precaution an anti-rat campaign was carried on. The number of smallpox cases recorded was 213 as against 114 in the previous year. Vaccinations performed totalled 10,689 and anti-cholera inoculations given were 14,970. The incidence of malaria was less. There were 14,937 cases of malaria, showing that 19 per cent. of the staff was affected as against 24 per cent. in the previous year. The activities of Anti-malaria Squad, Bombay, were extended up to Viror. Influenza was prevalent on the line throughout the year. The number of cases treated was 8,727 giving a ratio of 11 per cent. to the strength of the staff. The number of employees treated for tuberculosis of lungs was 216. Of 301 employees incapacitated for further service 12.3 per cent. were cases of tuberculosis of lungs. Arrangements for providing a general ward of 16 beds and a cottage for the railway employees and their families in Six William Wanless Tuberculosis Sanatorium, Miraj, are being made. Of 957 workshop employees who handled lead paint 70 were found to be suffering from spongy gum. Of these 45 had inflammation of gum and 12 had anaemia. This is a very high proportion of workshop hazard and needs investigation and control.

Under a free scheme, 206 spectacles at a cost of Rs. 1,327 were supplied to low-paid staff. Under the auspices of St. John Ambulance Association, 14 First-Aid Classes and 2 Home Nursing classes were held. In First-aid and Home Nursing, 71 and 9 candidates respectively obtained certificates bringing the total of railway employees having First-Aid certificates to 6,616, vouchers 688, medallions 142, labels 49 and home nursing certificates 117.

Madras and Southern Mahratta Railway.

40. The total number of cases treated in the Railway Hospitals and Dispensaries was 395,227 against 415,094 during the previous year. Medical and preventive services were maintained on a satisfactory level although some difficulty was experienced due to the scarcity of medical stores required and to the fact that the strain on railway medical staff on account of military traffic was still heavy. Medical supplies were largely indented from the Government Medical Stores but they had occasionally to be supplemented by purchases in the open market. There were 69 cases of smallpox, 7 cases of cholera and 22 cases of plague among employees and their families residing within railway premises. This is a satisfactory record when it is considered that these diseases prevailed in an epidemic form in several areas through which the railway passes. Vaccinations given were 11,717, anti-cholera inoculations 10,723 and anti-plague inoculations 4,791. There were 6,679 cases of malaria as against 10,273 in the previous year. Intensive treatment and control measures in the railway population at Gooty, Cuddapah and other stations in Nandalur Medical Section greatly reduced the incidence of the disease. The Railway Medical and Operating staff extended its co-operation in the systematic fortnightly treatment of military specials with D.D.T. against vermins. A small quantity of D.D.T. was made available for experimental purposes. The furniture in the waiting rooms at Madras Central was treated with D.D.T. with good results.

The water supply could not be maintained at a satisfactory level of purity due to the supplies of bleaching powder deteriorating for want of suitable storing facilities. To remedy this situation arrangement has now been made for supplying bleaching powder to stations in earthenware jars with screw caps. As the water supply was inadequate, the dry system which replaced underground sewage in the Workshop Area at Perambur in 1943 had to be continued. A Food Analyst to test food articles supplied to employees through the railway grainshops was appointed. Efforts are being made to build up a properly equipped laboratory. Medical examination of railway school children was continued and medical records were kept. Only 233 employees as against 471 in the previous year were trained in First-Aid under the St. John Ambulance Association. Of these, 109 qualified for certificates and 3 for vouchers. There was a fall in the number of trainees as the staff desiring to take training could not be relieved due to rush of work on account of heavy traffic.

South Indian Railway.

41. During the year 82,196 employees were treated in railway hospitals and dispensaries as against 77,269 in the previous year. The daily sick percentage was 3.13 as against 2.92 in the previous year. This increase in sickness rate may be taken to be due to a slight deterioration in the general health of the population. With a view to

reduce this sickness, cases were watched and hospitalisation was adopted wherever indicated. The bed strength of the hospitals was increased. The number of cases of influenza was 12,054 as against 10,128 in the preceding year. Compared to this only 1,873 cases of malaria are reported which seems to be a surprisingly low figure. The incidence of malaria on three sections of the railway was unusually high. It is proposed to appoint anti-malaria staff in one of the sections next year. The incidence of the disease in broad gauge area was on the decrease as a result of the adoption of intensive preventive measures which included mepacrine prophylaxis. There was no case of cholera, 127 cases of smallpox and 3 cases of plague among the employees and their families residing in railway premises. The spread of plague epidemic was arrested by prompt control measures.

The state of sanitation in some of the important stations has not shown any improvement. This is considered to be mainly due to the practical difficulties attending hand removal of filth and refuse, want of proper gradients in drains. Measures to check breeding of flies and mosquitoes and the pollution of drinking water sources require to be strengthened and improved. The Engineering Department had under investigation the question of making proper arrangements for water supply at Dindigul station, where at present water has to be fetched from Madura. A proposal to sink a well at Madura to supplement the existing loco. well was under examination. The present water supply from loco. well in Palani is not satisfactory and the alternative arrangement of obtaining water from the municipality did not materialise. The installation of a chloronome at Villupuram seems to be urgently needed.

The parents extended their co-operation in adding to the usefulness of medical examination of school children. A large number of school children benefited by the medical advice given. The Fourth Health and Baby Week was held. The proposal to open 6 more Health and Welfare centres under the Staff Benefit Fund could not materialise due to the dearth of qualified staff. The Railway Board is considering the question of taking over the staff of the Welfare Centres.

Great Indian Peninsula Railway.

42. The total number of employees treated in the railway hospitals and dispensaries was 259,839 as against 233,568 during the preceding year. The increase in the number treated was largely due to the increased strength of the staff. The cost of health services and medical services per member of staff per annum was Rs. 6.1 and Rs. 6.8 respectively. There were 807 cases of smallpox, 230 cases of cholera and 61 cases of plague. Vaccinations performed numbered 22,686 anti-cholera inoculations were 56,886 and anti-plague inoculations were 13,910. There were 14,946 cases of malaria as against 16,181 in the preceding year. Anti-larval control measures were in operation in 44 stations and control by spraying of adult mosquitoes was adopted in 9 stations. Special anti-malaria measures were taken at Bina, Barkhara and Bhusawal stations. The suppressive mepacrine treatment was started in Dongargaon Section. The proportion of staff affected with malaria which was 68.5 per cent. prior to this treatment dropped to 5.3 per cent. This treatment proved to be both economic and effective on this section and a proposal for continuing the scheme next year also has been made.

The birth rate, death rate and infant mortality rate within the railway premises were 6.2, 5.7 and 134.8 respectively as against 8.7, 7 and 143.7 respectively in the preceding year. The low birth and death rates are striking and it would be interesting to know how they come to be so low. The Infant Welfare and Maternity Centres continued to do useful work. The entire expense of the Centres amounting to Rs. 13,123 was met from the Staff Benefit Fund. A grant of Rs. 700 was made to the non-railway Welfare and Maternity Centres. During the year 56 classes in First-Aid, 5 classes in Home Nursing and one in Hygiene and Sanitation were held under the St. John Ambulance Association. At the close of the year 1945 the number of holders of First-Aid Certificates were 9,172, Voucher 883, Medallion 414 and Label 269, and strength of No. XVI Great Indian Peninsula Railway District St. John Ambulance Brigade Overseas was 28 Divisions with an establishment of 107 officers and 748 other ranks. The system of medical examination of railway school children and the maintenance of medical records continued to work satisfactorily.

East Indian Railway.

43. The number of employees treated in the railway hospitals and dispensaries was 137,622 as against 146,292 in the previous year. The decrease in the number of employees treated would appear to be more striking when it is considered that the strength of the staff increased. On Dinapore Division there was a serious outbreak of epidemic dropsy, whose origin was traced to a consignment of mustard oil. This oil had been examined and passed by the Provincial Public Health Laboratory but later examination of samples revealed nearly 10 per cent. adulteration with Argemone oil. There were 2,383 cases with 36 deaths of epidemic dropsy of which 1,089 with 5 deaths were from amongst the employees. There were 159 cases of cholera as against 172 cases last year. Anti-cholera inoculations performed were 41,752. There were 355 cases of smallpox as against 374 in the previous year. The total number of vaccinations performed was 36,978. There was no case of plague although plague epidemic prevailed among the neighbouring population in certain areas. Anti-plague inoculations given were 24,968. There was a mild epidemic of diphtheria in the Oakgrove School, and 12 cases were reported. The number of malaria cases treated was 36,542 as against 44,986 in the previous year. It is believed that due to lack of facilities for proper diagnosis certain non-malarial cases are included in these figures. In certain stations laboratory checks showed that 10 per cent. to 60 per cent. of cases recorded under malaria were really not malaria cases. Scarcity of stains reagents and microscopes does not permit a reliable diagnosis of all cases suspected to be malarial. A trial of suppressive treatment of malaria at Hardwar, Dehra Dun and Nijibabad Kotdwar sections was carried out but proved inconclusive. It is proposed to repeat the trial next malaria season. With the aid of Staff Benefit Fund 29 cases of tuberculosis were given sanatorium treatment. At the Allahabad Institute 543 cases were X-rayed. The machine at Jamalpur remained idle throughout the year, as a radiologist has yet to be appointed.

The five existing Child Welfare and Maternity Centres under the charge of qualified lady doctors continued to function during the year. Two new centres were opened during the year. The supply position

of medical stores improved and medicines had not to be purchased from the open market. No quinine was available but the deficiency was made good by synthetic anti-malaria drugs like quinacrine and mepacrine. A serious lowering of the standard of sanitation in the Railway colonies and stations, was reported and demands better supervision on the part of the supervisory staff.

Oudh and Tirhut Railway.

44. In a staff of 38,300 members the daily average attendance of employees and their families at the railway hospitals and dispensaries was 1,364. The total cost of medical service per head of staff was Rs. 7-0-9. During the year considerable difficulty was experienced due to shortage of nursing staff and licentiate doctors. Supply of medical stores from the Government Medical Stores was again inadequate and most of the hospitals and dispensaries were short of some of the essential medicines.

Preventive inoculations against cholera and plague were freely given specially in areas where the diseases threatened in an epidemic form. During the year there was a bad epidemic of smallpox. Vaccination of staff and their families was carried out on a large scale. Enteric fever is fairly common throughout the railway. Scabies were widespread in Izatnagar area.

The engineering gangs have often to work in highly malarious places and it is therefore proposed that 6 medical posts in charge of compounders should be set up to attend to their medical needs. The present supply of water which is either from shallow wells or hydrants is very unsatisfactory and needs to be improved. The sanitary arrangements on the stations are reported to be generally below the mark.

The children attending the loco. colony school at Gorakhpur were given free refreshments at a cost of Rs. 35,000. Opening of a canteen is under consideration. The work in Maternity and Child Welfare Centre at Gorakhpur suffered as the lady doctor resigned and a substitute could not be appointed till three months later. The other Centre at Izatnagar merely provides facilities for domiciliary confinement in the families of inferior staff residing in the colony. Another Centre is proposed to be opened at Samastipur. As sufficient number of candidates did not come forward no class in First-Aid was held.

Bengal Assam Railway.

45. The total number of employees treated in the railway hospitals and dispensaries was 439,050 as against 371,663 in the previous year. Only 32 cases of cholera and 50 cases of smallpox were reported as against 79 and 564 respectively in the previous year. There was a remarkable reduction in the incidence of malaria. The total number of employees and their dependents treated for malaria was 56,728 as against 113,454 in the previous year. The mepacrine suppressive treatment scheme, under which every employee residing in all highly malarious stations was administered one tablet of mepacrine a day for the full 7 months of the malarial season, has been found to be very effective. It has been found to be a valuable adjunct to the control of malaria by field measures and has become the treatment of choice for the protection of staff on running duties. Anti-larval control measures were adopted in

48 stations, spray-killing adult-control measures in 29 stations and suppressive mepacrine treatment control in 84 stations. There was an increase in cases of influenza, diarrhoea and dysentery. There were 186 cases of tuberculosis.

The special analytical section for analysis of articles of food worked satisfactorily. Water supply was maintained at a satisfactory level. Some difficulty was experienced in obtaining supply of good quality foodstuff. Twenty-four maternity centres continued to function. Training in First-Aid Ambulance work and Home Nursing which was stopped during war was restarted. There was serious housing shortage and the staff was much inconvenienced on this account.

Bengal-Nagpur Railway.

46. There were approximately 90,000 members of staff and altogether 98,554 sick certificates were issued by the various hospitals and dispensaries showing that on the average each member of staff appeared 1.09 times on the sick list. Each sick certificate covered 9.2 days on the average. There were 585 cases with 52 deaths from smallpox as against 428 cases with 48 deaths in the previous year. Altogether 64,204 vaccinations were performed as against 98,466 in the previous year. The number of cholera cases was 201 with 34 deaths as against 165 cases with 35 deaths. The number of anti-cholera inoculations performed was 29,848 as against 14,678 in the previous year. There was no plague among the railway employees although the disease prevailed at places in areas outside the railway settlements. Anti-plague inoculations given were 662 as against 1,455 in the previous year.

Anti-malaria measures were carried out on an elaborate scale at several stations. There were sharp outbreaks of malaria in Maurigram section and Bhadrak. Some of the malarious stations and sections were brought under D.D.T. control. Success there has encouraged the plan to bring some more stations under D.D.T. control in 1947. Larval control supplemented by pyrethrum spraying of superior quarters in the Korea fields showed good results.

A pathological laboratory was opened at Adra Hospital and later on a pathologist was appointed. The School Health and Hygiene Scheme which was started at Kharagpur in May 1945 was popular among the school children. The school children came under direct medical control and a large percentage of defects detected were rectified. Under the scheme expenditure came to Rs. 7.11 *per capita* on 2,208 school children for 11 months from May 1945 to March 1946. The scheme was extended in 1946 to Adra, the second largest settlement. A milk bar was opened in Garden Reach and 250 to 300 children were given 6 ozs. of milk 5 days a week. It is intended to open a milk canteen at Kharagpur early in 1947 and later to extend the scheme to other railway schools.

A grant of Rs. 3,737 was made from the Staff Benefit Fund for treatment and relief to employees and their families suffering from tuberculosis. A further grant of Rs. 8,147 was made for the treatment of cases of other diseases. A scheme for Maternity and Child Welfare Centres at some of the larger stations was under consideration. At Kharagpur there is a maternity ward attached to the hospital and there are a number of visiting maternity nurses. There are visiting maternity nurses at a few other stations.

SECTION VII.

HEALTH OF JAILS IN BRITISH INDIA.

Population, Accommodation and Overcrowding.

47. The authorised accommodation of jails excluding hospitals and observation cells and the average daily population of prisoners in jail in provinces in 1946 together with the corresponding figures for 1945 purposes of comparison are given in the following table:—

TABLE (I).

Province.	Authorised accommodation excluding hospitals and observation cells.		Average daily population.		Number of persons per hundred units of authorised accommodations.	
	1946	1945	1946	1945	1946	1945
North-west Frontier Province	4,891	4,951	3,788	4,193	77	85
Punjab	14,855	14,855	18,716	18,970	126	126
United Provinces	32,413	34,308	27,019	30,429	89	89
Bihar	17,277	17,232	14,999	16,688	87	97
Orissa	2,514	2,609	2,159	2,308	86	88
Bengal	19,440	18,991	20,227	19,022	104	100
Assam	4,209	4,190	3,626	3,740	86	89
Central Provinces	8,302	8,251	4,675	5,267	56	64
Bombay	16,812	16,988	11,960	11,628	71	68
Sind	9,324	9,411	8,419	9,424	90	100
Madras	20,545	23,175	18,214	19,076	89	82

It may be pointed out that the figures given above and in other tables in this section appertain to all classes of jails, whereas jail statistics of morbidity and mortality by specific causes refer to district and central jails only.

Except for some reduction in the United Provinces and Madras there was not much change in the authorised accommodation during the year. The average daily population decreased in all the provinces except in Bombay and Bengal. Compared to 1945 the number of persons per hundred units of authorised accommodation was generally less this year. There was some slight excess of average daily population over the authorised accommodation in Bengal. In the Punjab only there was such overcrowding in the central jails, district jails and sub-jails which had to be relieved by providing temporary camps. In Bihar there was frequent overcrowding in many of the sub-jails and in a few central and district jails particularly during the last quarter of the year. In Orissa

except in Koraput where the accommodation was much reduced this year there was no overcrowding in any of the district jails. In the sub-jails whenever there was overcrowding, steps were taken to relieve congestion by either transferring prisoners to other jails less full or increasing the accommodation. In Central Provinces there was overcrowding in two jails for a short period. There was a slight increase in the prison population in Bombay, which was mainly due to an increase in the admission of undertrial prisoners on account of communal riots. In Sind, Hyderabad Central Prison was continually overcrowded during the year. In Madras only the Central Jail at Coimbatore was slightly overcrowded at the close of the year owing to the influx of 'prohibition' prisoners and mill strikers. There was overcrowding in almost all the smaller jails in Assam due to a large number of undertrial and short-term prisoners. Sibsagar and Gauhati Jails remained overcrowded. In the remaining provinces, no overcrowding has been reported.

Sickness and Mortality.

48. The table below gives the average number of constantly sick and the corresponding rate for 1945:—

TABLE (II).

Province.	Average number of constantly sick.		Constantly sick rate per 1,000 of average daily population.	
	1946	1945	1946	1945
North-west Frontier Province	102	115	27	27
Punjab	503	487	27	26
United Provinces	689	742	26	24
Bihar	498	610	33	37
Orissa	68	84	31	36
Bengal	737	773	36	41
Assam	97	84	27	22
Central Provinces	94	104	20	20
Bombay	158	176	13	15
Sind	195	265	22	28
Madras	176	184	10	10

The highest sick rates were again shown by Bengal, Bihar and Orissa and the lowest rates by Madras and Bombay. Reduction in the sickness rates was seen in Bihar, Orissa, Bengal, Bombay and Sind, but in Assam the rate showed a definite increase. The United Provinces showed some increase in the sickness rate. In the remaining provinces there was not much change.

The annual hospital admissions and total deaths among the jail population along with the corresponding rates are given below:—

TABLE (III).

Province.	Admissions.		Admission rate per 1,000 of average daily strength.		Deaths.		Death rate per 1,000 of average daily strength.	
	1946	1945	1946	1945	1946	1945	1946	1945
North-west Frontier Province	2,786	2,626	735	629	23	41	6	10
Punjab	14,264	15,330	762	808	105	146	6	8
United Provinces	18,469	18,151	684	597	255	284	9	9
Bihar	9,191	9,433	613	565	136	227	9	14
Orissa	1,539	1,654	713	717	18	35	8	15
Bengal	26,696	26,735	1,320	1,405	176	295	9	15
Assam	1,749	1,573	482	421	40	68	11	18
Central Provinces	2,710	2,928	570	556	37	57	8	11
Bombay	8,015	8,670	670	746	79	89	7	8
Sind	10,407	12,237	1,236	1,298	73	161	9	17
Madras	5,019	3,894	276	204	178	253	10	13

Among the provinces Bengal and Sind continued to show markedly high hospital admission rates. Madras again showed the lowest rate. The admission rates increased in the North-West Frontier Province, United Provinces, Bihar, Assam and Madras. There was considerable reduction in the rates in the Punjab, Bengal and Bombay. The death rates were reduced in all the provinces, the reduction being more marked in Bihar, Orissa, Bengal, Assam and Sind. The figures showing constantly sick rate per 1,000 of average daily population considered with the corresponding admission rate show that the average duration of sickness increased in the case of the Punjab and Assam. While in the case of all other provinces this duration decreased. As in the previous year the longest duration was shown by Bihar.

The following table gives the percentage of prisoners who gained or lost in weight or showed no change in weight after their stay in Jail:—

TABLE (IV).

Province.	Gained weight.		Stationary.		Lost weight.	
	1946	1945	1946	1945	1946	1945
North-west Frontier Province	62	46	32	41	5	14
Punjab	43	41	49	50	8	9
United Provinces	46	52	40	37	14	11
Bihar	49	48	40	39	11	14
Orissa	58	76	28	15	14	10
Bengal	37	41	45	40	18	19
Assam	54	52	31	33	15	15
Central Provinces	59	62	32	30	9	8
Bombay	38	41	47	41	16	19
Sind	46	50	24	20	30	30
Madras	66	66	30	31	3	3

In North-West Frontier Province, Orissa, Central Provinces, Madras and Assam, a majority of prisoners gained weight. A fairly high proportion in the Punjab, the United Provinces, Bihar, Bengal and Bombay showed little change in weight. The proportion of prisoner which gained weight decreased markedly in Orissa, the United Provinces, Bengal and Sind. There was a greater proportion of prisoners which gained weight in North-West Frontier Province this year. The highest percentage showing decrease in weight was recorded in Sind. Except United Provinces and Orissa all the other provinces showed a decrease in the proportion of prisoners showing loss in weight.

Remarks on Individual Provinces.

49. *North-West Frontier Province.*—The rate of hospital admissions per 1,000 average strength was 736 as against 629 in the previous year. This increase is attributed to the indifferent health of prisoners at the time of admission to the jails. The most important causes of illness continued to be malaria, respiratory diseases, pneumonia and dysentery and diarrhoea. There was a much larger number of cases of respiratory diseases this year compared to previous year. Cases per 1,000 average daily population were high this year under pneumonia, dysentery and diarrhoea. The numbers of cases of malaria and tuberculosis were less this year. The total death rate per thousand of the average strength decreased from 9 in 1945 to 6.0 this year mainly due to decrease in deaths from tuberculosis of lungs and pneumonia. Sanitation of all the jails continued to be good. In view of the prevalence of cholera in Bannu

anti-cholera measures like inoculation of staff and prisoners and permanganation of fruits and vegetables were adopted. Facilities were provided for physical exercise for the prisoners. Out-door games, e.g., volley ball were provided for certain classes of prisoners. Facilities were also provided for the secular and religious training of the prisoners.

Punjab.—The most important causes of illness were malaria, respiratory diseases and diarrhoea. Compared to the previous year cases per 1,000 of average daily population were higher this year under influenza, other respiratory diseases and dysentery and diarrhoea. The number of cases of dysentery and diarrhoea was particularly high. There was a considerable reduction in the incidence of malaria. The largest number of deaths was recorded under pulmonary tuberculosis and pneumonia. The sanitary arrangements were satisfactory. Paid sweepers were engaged wherever necessary. Fly-proof latrines were constructed and the drainage system was improved in jails wherever necessary.

United Provinces.—The more common diseases were malaria, dysentery and diarrhoea and respiratory diseases. The largest number of deaths was recorded under pulmonary tuberculosis. There was a marked reduction in the cases of malaria, pneumonia and other respiratory diseases. There was an increase in the number of cases of dysentery and diarrhoea. New Kite motion pumps were provided in 5 district jails to improve the yield of water supply. Electric pumps were installed in two other district jails. Drains of certain jails were improved and also new drains were provided as necessary. The cook-houses in some jails were refloored and wire gauze of doors and windows was replaced.

Bihar.—The rate of hospital admission per thousand of average daily strength was 613 as against 565 in the previous year. The central jails at Bhagalpur and Gaya and the district jails at Purnea and Purulia recorded comparatively higher figures of hospital admissions. There was a marked fall in the death rate, which was 9 per mille of average daily strength against 14 in 1945 and 20 in 1944. A large percentage of prisoners on first admission to the jails was in very poor health due to the prevailing shortage of food. The Central Jails at Buxar and Bhagalpur and the District Jails at Muzaffarpur and Dumka recorded higher number of deaths. Attacks from malaria per 1,000 of the average daily strength were the highest since 1940. Compared to last year there was slight reduction in hospital admissions due to dysentery, diarrhoea, and other respiratory diseases. There was an appreciable reduction in deaths from tuberculosis of lungs. Tubercular cases were, generally speaking, transferred to Buxar and Bhagalpur Jails where there were special facilities for treatment.

The sanitation was generally satisfactory. Besides regular chlorination, water supply of all central and district jails was, as usual, chemically and bacteriologically analysed and necessary steps to remove the defects detected were taken. Prisoners who lost weight were given special diet to enable them to improve their health and weight. Intensive anti-mosquito and anti-fly campaign was carried out. There was a serious epidemic of malaria in Purnea but as a result of prompt precautions only one death from the disease was reported from the jails in the district.

Orissa.—The incidence of sickness under various causes was comparatively lighter this year. Anti-mosquito measures were introduced in all jails. Measures to prevent outbreak of epidemic diseases in the jails were adopted. Sporadic cases of cerebrospinal meningitis occurred in Koraput Jail. Cases of chickenpox occurred in the Jails at Koraput and Berhampur. In all these cases infection was brought from outside. The diseases were promptly controlled by special precautionary measures. Jail premises were kept neat and clean and jail water supply was regularly examined. Multivitamin tablets were distributed to prisoners in all the jails and sub-jails.

Central Provinces.—The health of the jail population was generally good throughout the year. The death rate showed a decrease. The incidence of influenza was considerably higher. A close supervision over the general sanitation of jails was kept. Wells were regularly permanganated. Actual and probable carriers of diseases were segregated and treated. Anti-cholera and anti-plague inoculations were given to all the inmates. The use of quinacrine hydrochlor tablets for treatment of malaria cases and for prophylaxis proved effective in reducing the incidence of malaria. D. D. T. was used in anti-mosquito operations.

Bombay.—Hospital admissions per 1,000 of average strength decreased from 746 in 1945 to 670 in 1946. There was a marked reduction in admission under malaria, dysentery and diarrhoea. Admissions under tuberculosis of lungs, influenza, other respiratory diseases and helminthic infection showed an increase. A larger number of deaths was recorded under tuberculosis of lungs. The reduction in malaria was due to the intensive anti-malaria measures adopted in jails. Experiments with paludrine for treatment and for prophylaxis were carried out in two jails and were successful in checking malaria. As an anti-mosquito measure D. D. T. emulsion was sprayed in jail barracks and staff quarters every week. Among the cases of tuberculosis a majority had the disease before entering the jail. More than 50 per cent. of the cases of influenza occurred in Visapur Temporary Prison and this incidence is considered to have been due to the prevalence of the disease in areas surrounding the jail. Under helminthic infection there was an increase in the number of cases due largely to an increase in admissions in Thana District Prison from Kolaba district where guinea-worm infection was more prevalent. Some difficulty was experienced in obtaining certain drugs. Diet for prisoners was issued in accordance with the rationing scheme and the balance according to Jail Manual was made good with certain uncontrolled articles.

Sind.—There was not much reduction in the hospital admission rate, although there was a marked decrease in the average number constantly sick showing that there was a larger proportion of sickness of small duration. Hospital admission rates under malaria, dysentery, diarrhoea and other respiratory diseases decreased. There was some increase in the hospital admission rate under influenza and enteric fever but these items are not the major causes of sickness in the jails of the province. Juvenile adolescent prisoners were kept separate from adults in a special training camp for juveniles. The Hur Concentration Camp continued to function throughout the year.

Madras.—There was an increase in hospital admission rate though there was some decrease in the average number constantly sick, indicating that there was a larger proportion of sickness of small duration. Hospital admissions under influenza were abnormally high this year. Other important causes of sickness like malaria, dysentery and diarrhoea and respiratory diseases showed little change. Water supply was adequate in all the jails. The health and welfare of prisoners continued to receive special care.

The provincial notes on health conditions in jails in Assam, Coorg, Ajmer-Merwara and Baluchistan do not contain anything calling for special comments.

Conclusion.

50. The incidence of malaria has continued to decrease due largely to more effective anti-malaria measures. Influenza appears to have been on the increase in several provinces. In last year's report the disease was noticed to be increasing and this continued increase deserves consideration. No major improvement in drainage, conservancy or water supply and no new measures for promoting the health and welfare of prisoners appear to have been undertaken. Overcrowding in jails was less noticeable mostly due to the fact that the jail population had decreased.

SECTION VIII.

MEDICAL RESEARCH.

Introduction.

51. Medical research in India is mainly carried out under the aegis of the Indian Research Fund Association. The Association derives nearly all its funds from the Government of India and is the agency through which the Government performs its function of promoting medical research. The annual expenditure of the Association is now over Rs. 8.5 lakhs a year but even this figure is insufficient to carry out medical research adequately in a country as vast as India. During the year under review research has been carried out on nutrition, malaria, cholera, leprosy, indigenous drugs, industrial health and various other diseases. Every effort has been made within the funds available to increase the sphere of medical research. The appointment of a Clinical Research Advisory Committee and an Industrial Health Advisory Committee has given a fillip to research in these fields which are as yet in their infancy in India.

Apart from the work carried out at the various Government Institutes (Central and Provincial) and at institutions such as the Tata Memorial Hospital, medical colleges and research institutes under the auspices of the Indian Research Fund Association, certain amount of research is also being carried out independently with the help of funds provided by the university authorities, scientific institutions and voluntary organisations. These institutes however draw their inspiration from the Indian Research Fund Association which through its Advisory Committees and its Scientific Advisory Board guides most of the research workers in this country. The subject of Nutrition in view of its paramount importance to the country on account of continued food shortage has been in the forefront as in the previous years. Work on cholera, malaria, leprosy, plague, filariasis which continue to be responsible for much preventable mortality and morbidity has also been pursued very actively. The results of the work done during the year are described in detail in the annual report of the Scientific Advisory Board of the Indian Research Fund Association and in the papers published in the Indian Journal of Medical Research, the Indian Medical Gazette and the Indian Journal of Malariology. A detailed list of these papers is given in the Appendix to this report.

The research carried out during the year is described in the succeeding paragraphs.

Nutrition.

52. The Nutrition Research Laboratory, Coonoor, has undertaken studies on vitamins of the B complex group. Studies on the inter-relationship between the vitamins of B group in rats in thiamin, riboflavin and biotin deficiencies have shown that riboflavin concentration in the liver increased in thiamin deficient rats, whereas in riboflavin deficient rats there was an increase in liver thiamin. In biotin deficiency the riboflavin in the liver increased while thiamin showed a decrease. Methods of estimation of thiamin and para-amino benzoic acid are under investigation.

Lathyrism has been studied by observing effects of feeding experiments. Guinea-pigs fed on khesari gram (*Lathyrus sativus*) diets containing adequate quantities of vitamins were compared with controls fed on Bengal gram, green gram and black gram on diets of similar composition. It was observed that guinea-pigs grew normally on diets containing Bengal green and black grams but when khesari gram was included at a level higher than 50 per cent., the guinea-pigs stopped growing and developed symptoms suggestive of poisoning although actual paralysis did not develop. They showed reluctance to move about and alopecia, dermatitis and in some cases tropic ulcers developed on their hind legs. No paralysis of hind legs was however observed. Feeding with khesari gram at 30 per cent. level with 50 per cent. of wheat flour did not result in the development of the above symptoms. The harmful effects of khesari gram feeding could not be alleviated by the addition of vitamins A, C and B complex.

The value of food-yeast as a supplement to poor rice diets has been tested on albino rats by the growth method. The experiments show that compared to commonly obtainable supplements like groundnuts and skimmed milk powder, food-yeast shows fairly good results.

Clinical investigations on nutritional disorders are being undertaken at the Nutrition Clinic and Research Ward, Stanley Hospital, Madras. The commonest signs of malnutrition in patients coming to the hospital at Madras were those attributable to deficiencies of vitamins of the B complex.

The Nutritional Research Laboratories carried out the analysis of foodstuffs including the vitamin A content of fish liver oil obtained from different places in India and the carotene content of 23 different foodstuffs. Numerous requests for information and advice from all over India were answered.

Ascorbic Acid Enquiry at the University College of Science and Technology, Calcutta, has been dealing with the problems of the bio-synthesis of ascorbic acid by the rat. Observations so far recorded show that both ascorbic acid synthesis and pyruvic acid metabolism in rats required the intervention of thiamine and flavoprotein. From the results obtained it would appear that pyruvic acid may be the precursor for the synthesis of vitamin C by the rat.

The Nutrition Research Unit at Dacca University continued experiments on the metabolism of fat. The results of experiments conducted show that cocoanut oil has a deleterious effect on the metabolism of calcium in human beings. The work remains to be confirmed as other research workers do not agree with these findings. Ingestion experiments with vitamin B complex and growth experiments with soya bean milk are in progress. A study of lathyrism by feeding experiments on pigeons is also being undertaken.

At the Nutrition Research Unit at the Seth G. S. Medical College, Bombay, investigations into fat metabolism, nutritive value of milk and curds, and vitamin contents of vegetable are being conducted.

An important step in the direction of collaboration between agricultural and nutrition science in India was taken by this unit when it decided to study the effect of the strain and environmental conditions on the nutritive value of some cereals and pulses. The report of similar

investigations in Western countries and the United States of America are encouraging. Fifty-five samples of different strains of rice, wheat and pulses from various agricultural experimental stations in the province have been analysed. The results of work done have shown that the vitamin content of these cereals is greatly influenced by the genetic nature of the strains. The effect of environmental conditions, however, appears to be a minor character. This study emphasises the need for the development of new strains of cereals and pulses. If this can be achieved India will have advanced to some degree towards solving her nutrition problems.

The vitamin A activity of plant foods is under investigation at the laboratory of the Council of Scientific and Industrial Research, Delhi.

An interesting enquiry on poor rice diet food preparations in common use in South India is being carried out at the Women's Christian College, Madras. The present studies with separate and combined supplements to the highly deficient typical poor rice diet of Madras shows that the addition of a single food factor may actually be harmful. When fat and certain proteins were added to the typical poor rice diet and fed to rats, the rats instead of improving lost in health. There is some evidence that vitamin and riboflavin in combination are particularly important supplements. Further experiments are in progress to clarify the problem of inter-relationships of fat, protein, vitamin A, riboflavin and calcium.

At the Indian Institute of Science, Bangalore, the nutritive value of soya-bean milk is under investigation. The purpose of this research is to produce soya-bean milk at a cheap price. This milk could, if it is found satisfactory from the nutritional standpoint be used as a substitute for cow's milk. A method of a large scale production of soya milk has been standardised.

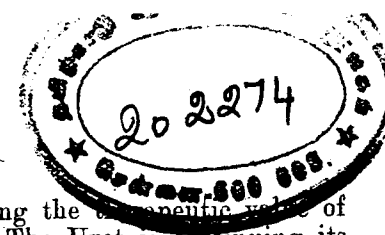
Cholera.

53. Preparation of monospecific high titre sera under the Director, King Institute, Guindy, Madras, was continued and adequate quantities of the sera are now available for issue to research workers.

Basic research on the growth requirements of vibrio cholera in synthetic media was also in progress. Attempts were being made to establish infection in experimental animals like monkeys and guinea-pigs. The results of the animal experiments have so far been inconclusive.

Enquiry on cholera under the Director, Central Research Institute, Kasauli, consisted of attempts to isolate the glucolipid and polysaccharide portions of cholera to study the immunological importance of these substances. At the invitation of the I.R.F.A., Mr. P. Bruce-White, an eminent cholera research worker of the Medical Research Council visited India. During his visit he studied the relationships of sub-types of the cholera vibrio in collaboration with Dr. Srivastava.

The Cholera Treatment Unit under the Director, School of Tropical Medicine, Calcutta, has undertaken field trials in Howrah and Nadia districts and therapeutic trials in Calcutta to ascertain the value of sulpha drugs in the treatment of cholera. Owing to the absence of any serious outbreak of cholera in Bengal during the year the number of cases treated with sulphaguanidine and sulphadiazene was few and no



definite conclusions could be drawn regarding the therapeutic value of sulpha drugs in the treatment of cholera. The Unit is continuing its work.

A report on the evaluation of anti-cholera inoculation as a personal prophylactic against cholera and its efficacy in the prevention and control of cholera epidemic by Dr. R. Adiseshan, lately Director of Public Health, Madras, and a supplementary report on the statistical analysis of the data relating to 63 cherries in the South Arcot district of Madras Presidency, by Dr. Chandrasekaran, Professor of Statistics at the All-India Institute of Hygiene and Public Health, Calcutta, were discussed by the Cholera Advisory Committee at their meeting in December 1946. The conclusion drawn by Dr. Adiseshan in his report that anti-cholera inoculation affords a significant degree of protection against cholera was on the basis of the evidence presented and accepted by the Cholera Advisory Committee and the Scientific Advisory Board of the I.R.F.A. This important research on the prophylaxis of cholera will it is hoped get world-wide recognition.

Plague.

54. Plague researches under the Director, Haffkine Institute, Bombay, consisted mainly of the study on the production of a direct plague vaccine grown in casein hydrolysate and its keeping qualities. This vaccine has been shown to be more potent than the original vaccine produced at the Institute in a meat-digest medium. Its keeping quality as compared to the agar grown vaccine when stored at 37°C showed retention of potency practically unaltered up to 14 months, whereas the agar vaccine lost about half its potency after two months storage.

Work is also in progress to explore the possibility of standardisation of the dosage of plague vaccine by employing passive immunity for measuring the adequate dose of plague vaccine for protection in man.

The effect of D.D.T. dust on the breeding of the Indian rat-fleas, Xenopsylla cheopis and X. astia has been studied. Experimental evidence shows that the residual effect of D.D.T. on fleas is very long. In jar experiments it was found to be effective up to 396 days and in burrow experiments effectiveness was maintained up to 428 days (the period so far tried). There was no deterioration noticed due to volatilization in the rat burrows. D.D.T. is not ovicidal and it has no effect on the pupae well protected within cocoons but adults and larvae are highly susceptible to it. The residual effect of D.D.T., is such that recently hatched larvae and emerged adults were killed off after coming in contact with D.D.T. dust.

D.D.T. was found very effective in controlling the plague epidemic in 1945 at Tumbes in Peru. Similar trials in an Indian village would prove instructive.

At a meeting of the Medical Research Liaison Committee held at the India Office, London, on the 10th September 1946, Professor Buxton suggested that more effective distribution of D.D.T. and gammexane in burrows might be obtained by the use of smokes. Ready-made generators were available from Fumite Distributors, Limited, and Imperial Chemical Industries. The Plague Advisory Committee of the I.R.F.A. has noted this suggestion for further work.

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To arrest the epidemic of plague in rural and urban areas, cyanogas fumigation was undertaken in infected villages as well as those in which a heavy death rate amongst rats was reported.

Fumigation was done monthly where heavy rat infestation was known, *e.g.*, market stalls, godowns, grainshops, etc., and only once in 2-3 months in congested residential areas. The epidemic was mild in all villages where fumigation was started. Out of the 182 rat holes excavated at varying intervals after being sprayed with a 5 per cent. kerosine oil solution of D.D.T. solution, live fleas were found in 14 out of 44 rat nests exposed. It was observed that the solution could not penetrate the burrow sufficiently deep to reach the nests, and was therefore not as effective as cyanogas, which can penetrate the most tortuous rat hole and kill both rats and fleas.

Malaria.

55. At a meeting of the Malaria Advisory Committee held in July 1946 Major-General Sir Gordon Covell gave a short resume of the work on paludrine and other synthetic drugs carried out in India and abroad. The drugs reviewed were mepacrine, pamaquine, the sulpha drugs, santochin (6911), resochin (7618), SN 13276, M 4430 and M 4888 (paludrine). The sulpha drugs are unsuitable for general use because of a number of defects. Both santochin and resochin are more effective than mepacrine and unlike mepacrine do not cause discolouration of the skin. SN 13276 is similar to pamaquine in action but is too toxic for use in India. M 4888 is a double guanidine and has entirely superseded M 4430.

Brigadier Hamilton Fairley's work at Cairns indicated that paludrine was in every respect superior to mepacrine. These findings have been accepted and in consequence the Australian forces have ceased to use mepacrine. A daily dose of 100 mgm. continued for three weeks after exposure to heavy infection of malignant tertian through the bite of mosquitoes prevented development of all symptoms of malaria. Parasites were not seen at any stage and sub-inoculation of 200 c.c. of blood from the 7th day onward failed to produce infection among the recipients; a property possessed by no other drug so far tested. A single dose of 50-100 mgm. from 48 to 120 hours after exposure to an infective bite acts as a true causal prophylactic. One tablet of 100 mgm. twice weekly completely prevents incidence of malignant tertian malaria. In the case of benign tertian infections, one tablet of 100 mgm. twice a day will prevent symptoms of malaria developing during the treatment; but after 24 to 33 days' stoppage of treatment malaria symptoms reappear. Paludrine is therefore only a partial causal prophylactic against B.T. parasite.

A complete cure of M.T. malaria infection results from 100 mgm. paludrine thrice daily for 10 days. In the case of B.T. infection 300 mgm. daily for 10 days followed by 100 mgm. once a week for six months is recommended.

The maximum therapeutic dose usually recommended is 0.3 gramme a day. One gramme of paludrine a day may cause irritation of the gastro-intestinal and genito-urinary tracts but symptoms soon subside on reducing the dose.

Field trials for the treatment of malaria with paludrine were started in July 1946 in different parts of India under the direction of the Malaria Institute of India. The tests were carried out under varying conditions such as those at rural dispensaries, hospitals, jails, tea estates and collieries.

The value of different dosage regimes was assessed on 1,891 cases microscopically diagnosed. Of this total, 1,283 were falciparum (MT), 481 vivax (B.T.), 68 were malariae (Q.T.) while the remaining 59 cases were of mixed infections.

The results obtained up to the end of the year are summarised below:—

1. Paludrine was found as effective against the strains of malaria parasites in India as those tested elsewhere.

2. A single dose of 0.1 gram to 0.3 gram of paludrine effected a clinical cure within 3 days in 84 to 89 per cent. of cases. The drug was equally effective against the three species of malarial parasites although response was more rapid in malignant tertian cases. In trials where mepacrine and paludrine were tested side by side the curative action of paludrine in the above doses was equal to that of mepacrine in daily dose of 0.3 and 0.4 gram for 3 and 4 days respectively.

3. Neither the prolongation of treatment up to 10 days nor an increase in the dosage of paludrine to 0.6 gram per day caused any appreciable improvement in the percentage of clinical cure. The readmission rates caused by relapses and or reinfections were relatively lower in cases treated with high dosage but none of the regimes tested appeared to effect a complete cure. A follow-up treatment of 0.1 gram once or twice weekly prevented the recurrence of disease in chronic relapsing cases.

4. The most desirable course of treatment suggested both in dispensaries and the hospitals is a single dose of 0.3 gram of paludrine. In the majority of cases relapses should be treated as and when they arise but for those who can be relied on to take the drug regularly a follow up treatment of 0.1 gram once or twice a week should be prescribed for a minimum period of 6 months.

5. Paludrine has proved a safe drug, free from unpleasant effects and non-toxic even in high doses of 0.6 gram per day. Patients placed on this drug experienced a feeling of well being within an hour or two of taking it. It was well tolerated by infants and pregnant women.

6. In the small number of cases with toxic pernicious symptoms tested in these trials paludrine was uniformly successful in effecting a rapid cure.

The Insecticide and Mosquito Repellent Enquiry under the Director, Malaria Institute of India, has been working on a number of experiments on the preparation of D.D.T. emulsion concentrates. An emulsion concentrate containing 35 per cent. D.D.T. has been prepared with medium kerosene extract (M.K.E.) as a solvent. This emulsion is non-inflammable. D.D.T. suspensions in water sprayed against mosquitoes are as effective as D.D.T. solution or emulsion. A stock suspension of D.D.T. concentrate of 50 per cent. is the highest concentration so far evolved.

Field trials for the testing of comparative efficacy of different doses of D.D.T. solution, emulsions and suspensions and of gammexane solution as residual sprays were undertaken in the villages of Delhi province and in Baluchistan. These trials have shown that indoor residual spraying is the most effective method. Outdoor residual spraying is not effective. For residual sprayings, emulsions and suspensions containing 1.25 per cent. D.D.T. and applied at the rate of 2 c.c. per square foot are highly effective. Only one application in the Quetta (*Superpictus*) area and two or possibly three, in Delhi (*Culicifacies*) area should be sufficient to control the incidence of malaria during the whole malaria season.

The Mammalian Malaria Enquiry under the Director, Central Research Institute, Kasauli, was continued. The transmission experiments on monkeys, histological examinations and tissue cultures were continued. This enquiry has now been in progress for 18 months but so far no evidence has been obtained that in mammalian malaria an exoerythrocytic cycle occurs comparable to that which has been described in either Avian or Saurian malaria. All observations have so far been confined to infections with *Plasmodium cynomolgi* in *M. mulatta* (rhesus) monkeys.

Leprosy.

56. Leprosy is a dread disease. It is feared by all and yet through the ages man has not been able to eradicate this scourge. Research work on this disease has been continued at the School of Tropical Medicine under Dr. Dharmendra. With a view to helping the research work on this subject the Indian Research Fund Association has appointed a committee to draw up a review of the work done so far on the subject and to suggest new lines of approach in tackling the disease.

The research work carried out under the direction of Dr. Dharmendra during the year is briefly described below.

THERAPEUTIC STUDIES.

1. *Promin and Diasone*.—Patients treated with promin for 6 months have shown clinical improvement although none of them has become bacteriologically negative. The drug had to be discontinued in a few cases as they could not stand it. Diasone has the advantage of oral administration but promin can only be given intravenously since it is very toxic when taken by mouth.

2. *Stilbamidine*.—The curative value of this drug has been investigated in rats in whom the leprosy infection has been allowed to get established before treatment is started. The results show that although the drug delays progress of the disease it does not cure it. This work is being discontinued.

3. Hydnocarpic derivatives of sulphonamides have been tested in vitro with discouraging results.

4. Streptomycin which is known to inhibit the growth of Tuberculosis and other acid fast bacilli has been studied with regard to the method of production. Attempts at procuring streptomycin for trial in leprosy having failed cultures were obtained of *Actinomyces griesens* with the object of producing small amount of streptomycin for trial in experimental rat leprosy.

IMMUNOLOGY.

A study was undertaken to find an antigen in cultures of an acid fast bacillus suitable for work in leprosy. Such an antigen has not been isolated.

Specificity of the lepromin test as reported by Fernandez, a South African worker was investigated in some villages in the Punjab where the disease does not exist in an epidemic form. The results obtained do not confirm the report made by Fernandez.

Pharmacology.

57. The indigenous drug enquiry at the Drug Research Laboratory, Jammu, continued its useful work under the eminent guidance of Brevet Colonel Sir R. N. Chopra. A large number of samples of pyrethrum heads from the various localities where pyrethrum is cultivated in Kashmir were collected and studies were undertaken to evaluate the effect of different methods of drying and of the age of plantations on their pyrethrum content. Exposure to sun for 4 days was sufficient to dry the flowers without deterioration of pyrethrins. With regard to the ageing of the plant gradual decrease in pyrethrin content of flower-heads occurs, becoming appreciable after the 3rd or the 4th year of life of the plant.

Filterable Viruses and Influenza Vaccine Manufacture.

58. Enquiry on filterable viruses under the Director, King Institute, Guindy, comprised: (I) The evolution of the technique for the manufacture of influenza virus A vaccine and (II) studies on the behaviour of membrane vaccine lymph.

The results of work on the subject having been found satisfactory the Government of India agreed to meet the cost of trials to evolve a technique for a large scale manufacture. Earlier a few doses of vaccine had been made on an experimental scale by propagating influenza virus A in eggs from material obtained from the United States of America. A technique of manufacture has now been evolved, more or less, on the lines followed elsewhere.

VACCINA VIRUS.

Experimental studies of the reactions produced by membrane lymph and calf lymph showed that in all cases of membrane lymph vaccination the reaction was delayed by 24 to 48 hours at all stages till the maximum development of the pustules. At the full pustular stage reaction with both the types of lymph was indistinguishable. Cross revaccination tests to study the immunity reaction in the membrane and calf lymph groups by revaccinating the initial membrane group with calf lymph and *vice versa* had been in progress for some years. Using vaccina virus as the indicator, it appears that the resulting immunity with membrane lymph is of shorter duration than that obtained with calf lymph. Protection against small-pox afforded by the two types of lymph was judged by the general incidence rate of small-pox in the groups. Data collected within the period of observation of 5 years seem to show that there was no noticeable difference in the protection afforded against small-pox by the two types of lymph. The results obtained are being examined statistically.

SECTION IX.

VOLUNTARY ORGANISATIONS.

59. The various voluntary organisations continued to carry on their humanitarian task in the field of public health and supplemented usefully the work of the Government. They had to work against most of the war-time difficulties which still persisted. Their progress was further hampered in several important centres of their activities by civil disturbances. A brief review of the main activities of the more important voluntary organisations is given below:—

Indian Red Cross Society.

60. The Society had 33 Provincial and State branches and 344 District branches with an adult membership of 39,986. Two new branches, the Punjab States Red Cross branch and the Kolhapur and Deccan States branch, were formed during the year. The Punjab branch had the highest membership with 20,692 members followed by Bengal which had a very successful membership drive. As in the previous three years, the most important activity of the Society was its milk distribution service. The Society readily extended this service to large parts of Bombay, Madras, the Deccan and Mysore States which were threatened with famine. The Government of India convened a conference of the Local Governments concerned and certain voluntary organisations including the Society, to discuss measures for the protection of vulnerable groups in areas affected by food scarcity, the importance of milk in this connection, arrangements for importing and distributing it and the role of voluntary organisations in connection therewith. It was decided that relief work in this direction should be organised in co-operation with voluntary organisations. It was also suggested that with a view to co-ordinate effort additional milk supplies which the Indian Red Cross might be able to obtain on its own account be pooled with the Government supplies. Thirty tons of milk powder were handed over by the Bombay and forty tons by the Madras branch to the Government Centres for distribution. Another two tons were provided by the Madras branch for distribution at the Red Cross Maternity and Child Welfare Centres. A quantity of 20½ tons of milk powder was distributed in the various States through the Deccan States Branch. The Mysore State branch distributed 60 tons of powder through its local branches, government relief centres and in far off areas through village panchayats. The Provincial and State Red Cross branches were further requested to give full assistance in disseminating advice regarding the conservation of available food, growing of vegetables and the like.

In view of the improved situation in Bengal the number of milk canteens was reduced from over 2,000 to 1,417 still feeding nearly a lakh of people; but again during the last five months when conditions began to deteriorate, the number of canteens was increased to over 2,000 feeding more than two lakhs of people. Nearly 1,515 tons of powder were distributed during the year. Of this quantity the Society supplied 92½ tons. The American Friends Service Committee supplied some quantities free but the bulk of the supplies was provided by the Provincial Government. The Bengal branch arranged for relief supplies for the flood affected areas in Chittagong, Noakhali and

Mymensingh and also during disturbances in Calcutta and East Bengal. During floods, milk powder was dropped from the air and floating canteens were set up in boats. Assistance was rushed to Bihar and five tons of milk were provided for the refugee camps. Extra inspectors and milk canteen organisers were appointed and the management was vested in Red Cross Committees composed mainly of representative non-officials with the District Magistrate or Sub-divisional Officer as Chairman. In addition to the supply of milk, six million multivitamin tablets presented by the American Friends Service Committee, 628 gallons of vinomalt tonic and 413 gallons of shark liver oil supplied by the Bengal Government were distributed.

In Cochin State 31½ tons of full cream milk powder were distributed to certain categories of children, nursing and expectant mothers through hospitals, health centres and ladies' clubs. On an average about 179 canteens per month were in operation during the year. From the beginning of the service in 1944 to August 1946, over four million milk feeds had been provided by this State branch. A total of 209½ tons of milk was made available to Travancore State Branch. Milk was also distributed to school children in 37 out of 100 selected primary schools and 1,766 children were being supplied towards the close of the year. Special attention was focussed on relief work in areas where cases of malnutrition or deficiency diseases were noticed. In such cases vitamin tablets were also distributed.

Apart from the food scarcity areas, 20,000 multivitamin tablets, 500 lbs. of milk powder, 500 blankets and Rs. 1,000 in cash were supplied for distribution among sufferers from floods in Assam and 1½ tons of milk powder were sent for plague affected areas in Monghyr district in Bihar. Another 2 tons of milk powder were provided for certain necessitous areas. Following Bihar disturbances 25,000 articles of comfort and medical supplies, 100,000 multivitamin tablets, 1,008 blankets and five tons of milk powder were despatched for distribution among the sufferers. For the relief of refugees in Tripura State 500 blankets, 100,000 multivitamin tablets and 5 tons of milk were distributed. Four tons of milk powder were sent to Orissa for destitute children and mothers. A special grant of Rs. 1,215 was made to St. Joseph's Hospital in Kashmir State for provision of some hospital equipment.

Milk required for the above purposes was collected from various sources, 137½ tons of full cream milk powder was imported from Canada, 150 tons of separated milk and 150 tons of full cream milk from the United States of America and 44 tons of condensed milk through the Australian Red Cross Society. This Society sent another 54 tons of full cream milk powder and met half of its total cost amounting to about £10,000. The American Red Cross sent a generous donation of 100 tons of full cream powder and another 15½ tons from their stock in India. It also made a gift of three millions surgical dressings for distribution and a large quantity of other surplus stores at Calcutta. The British Red Cross and St. John War Organisation donated a large quantity of surplus stores in Bangalore. Towards the close of the year the International Red Cross Committee was requested to make a grant for famine relief fund from the revenues of the Empress Shoken Fund.

Assistance was given to 375 new cases under Indian Forces Medical After-Care Fund, the total number of cases helped till the end of the

year being 660. A sum of over Rs. 84,000 was paid out in grants during the year, bringing the total disbursement since the inception of the Fund to Rs. 1,55,308. His Excellency the Viceroy was pleased to make a grant of Rs. 12 lakhs to the Fund from his War Purposes Fund. The grant to Mount Abu Hostel was continued till June 1946, when the institution was closed. The hostel contributed to the recovery of 50 *ex-servicemen* from Rajputana during its two years existence. The War Organisation of the British Red Cross and St. John sent a remittance of £1,000 out of which Rs. 6,435 were granted to eight disabled British *ex-service* officers and men.

In international relief, financial assistance amounting to Rs. 17,000 was given by the Society to sister institutions in Albania, Dominica, Hungary and Yugoslavia. The amount of Rs. 10,000 initially donated in aid of refugees in France which had remained unused to the banks throughout the war was made over to the French Red Cross. A sum of Rs. 1,000 contributed by the Trained Nurses Association of India for the benefit of war distressed nurses in occupied countries was forwarded by the Society through the League of Red Cross Societies. The Society assisted in getting together and packing parcels of warm clothing and food articles arranged by the Government of India for the use of Indian nationals in Germany.

The Indian Red Cross took active part in International Red Cross events like the Advisory Conference of National Red Cross Societies, Standing Finance Commission of the League of Red Cross and the XIXth Session of the Board of Governors of the League of Red Cross Societies. The Advisory Conference appointed three Commissions to study the question of revision of the existing Geneva Conventions relating to relief of the sick, and wounded prisoners of war and for the adoption of new conventions for the protection of civilians during war. Valuable ground work towards securing a wider application of the Red Cross principles in the field of international law was done by these commissions. In recognition of the services rendered by the Secretary General of the Indian Red Cross at the Conferences and the interest taken by the Society in the alleviation of suffering, the Greek Red Cross awarded him its highest medal. The Indian Red Cross Society made a contribution of Rs. 10,900 to the League of Red Cross Societies and of Rs. 1,000 to the International Red Cross Committee.

The value of diversional therapy as an aid to rapid recovery of hospitalised patients having been established, the Managing Body of the Society formally recognised the advisability of establishing a similar service for civil hospitals as a permanent peace-time activity. A comprehensive plan in this connection was adopted by the Bengal Provincial branch which appointed a special Secretary to develop this activity in the civil and military hospitals in the province. The Joint War Organisation agreed to lend for a year at its own expense the services of some of its welfare workers to help in organising the service in civil hospitals and three of these welfare workers actually started working in hospitals at Lahore, Peshawar and Dadar.

Junior Red Cross movement recorded good progress in various directions. Its membership in India increased from 830,782 in 1945 to 864,454 in 1946. The policy of introducing the movement in reformatory schools and other institutions for young delinquents continued to

prove a valuable move in the right direction. Under the scheme of inter-provincial study visits introduced in 1944, a delegation from Delhi province to the United Provinces and exchange visits between Madras and Mysore representatives were arranged. The educational campaign for the prevention of blindness was carried on with the grant of £150 from the British National Institute for the Blind. A similar campaign for the prevention of tuberculosis which was started as an experimental measure with the assistance of Tuberculosis Association of India two years ago, proved to be increasingly popular. With the return of normal communications, Indian Juniors exchanged inter-school correspondence with Junior Red Cross groups in Australia, Canada, France, Indo-China, New Zealand, Kenya and United States of America. A batch of twenty Polish refugee children established personal contacts with some Junior Red Cross workers of Mysore branch. The Madras branch is arranging to hold a provincial Junior Red Cross Training Conference for all its District Secretaries and representative counsellors in April next.

The publicity work of the Society made satisfactory progress. The Red Cross Journal and the "Indian Junior" continued to be published quarterly. A large number of pamphlets and posters were reprinted and distributed. The reprints included 65,000 copies of 34 different items of Junior Red Cross literature which was nearly double the quantity brought out in the previous year. A record number of 5,302 slides on various subjects was produced. Three films were duplicated and supplied to the Public Health Departments of Baroda and Travancore States. Five short talkie films of Red Cross interest were given as gifts by the Government of India on the closing of its Department of Information and Broadcasting. The Film Circulating Library sent out films over two hundred times to regular subscribers and other bodies. Propaganda material of the value of Rs. 22,651 was sold and Rs. 128 worth was supplied free of charge.

One scholarship for post-graduate training in nursing was awarded by the Florence Nightingale Memorial Fund. Two candidates who were selected in 1943 were able to proceed abroad this year and after completing their training returned in December. The activities of the Society's Maternity and Child Welfare Bureau are reviewed in Section IV of this report.

The Society is no longer directly responsible for Blood Transfusion Service but its branches continued to do propaganda work and assisted Provincial Governments in this direction. The headquarters awarded seven certificates of merit to those who gave at least 10 donations of blood.

The Indian Red Cross and St. John War Organisation was closed down on 30th September 1946 after serving for seven years the needs of the sick and wounded servicemen and prisoners of war of India's Armed Forces. Under the scheme of distribution of its assets, a Joint Council was formed to start Homes for disabled service and *ex-servicemen* of the Indian forces and to provide Red Cross Service to the members of the Armed Forces in existing and future service hospitals in India or Overseas wherever Indian troops may be serving. Twenty-five per cent. of the assets are to be transferred to the Indian Red Cross Society and St. John Ambulance Association for the benefit of service and *ex-servicemen* and women and for other objects consistent with the appeals made during the war.

The St. John Ambulance Association (Indian Council) and St. John Ambulance Brigade Overseas.

61. The Association rendered invaluable service during the period of food scarcity conditions in the country and again during the civil disturbances. First Aid attention was given to over 2,300 victims of disturbances in Bombay and Calcutta. Gifts of blankets, clothing, medical supplies, tonics, barley, biscuits, ovaltine, etc., were distributed by the Medical Units of Calcutta Ambulance Divisions among a large number of refugees in the villages of Noakhali and Chandpur.

On the instructional side 1,954 courses of lectures were arranged which were attended by 35,441 persons. Of these 2,410 qualified for the Association's certificates, 22,511 in First-Aid, 2,459 in Home Nursing, 207 in Domestic Hygiene and Mother Craft and 192 in Hygiene and Sanitation. In addition, 2,410 qualified for Vouchers, 1,112 for Medallions, 231 for Pendants and 1,390 earned labels. Amongst the railways, North Western Railway trained the highest number of employees thus keeping up its lead during last five years. Among the Police Forces the largest number was trained in the United Provinces. Among the States the largest number of candidates was trained in Baroda State. Training classes were also held for the benefit of military forces, mines and factory workers, prisons, reformatory schools and educational institutions.

The number of persons taking up St. John training this year was higher than in any pre-war year. A higher percentage of candidates qualified for certificates. There was an increase of over 60 per cent. in the number of those who qualified for various re-examination awards showing that there was a continued interest in the Association's training. In order that the certificate holders may keep abreast of the continuous improvements that are being made in the methods of treatment of the various illnesses, it has been decided to place a life on the first-aid certificates. In future these will not be recognised either for higher awards or for admission to the Brigade if they are more than five years old.

There was a heavy demand for the manuals of the Association but it could not be fully met due to paper shortage; 58,000 copies were required but only 25,000 copies could be supplied. Similarly in regard to the supply of ambulance equipments for St. John workers orders had to be kept pending. Stores worth Rs. 73,363 were sold during the year. The Association had 700 Annual Members, 382 Annual Associates and 11 Life Members. The largest number 416 was enrolled by the Bombay Provincial Centre.

The Bombay Mofussil Maternity, Child Welfare and Health Council.

62. In accordance with the policy of reducing grants to centres in large municipal towns and starting Welfare Units in rural areas, the third rural Unit was started in October at Palghar in Thana district. The Government of Bombay sanctioned a non-recurring grant of Rs. 50,000 for the purpose. The Unit was under the charge of a Medical Officer assisted by two health visitors and two trained *dais*. The preliminary work of home visiting was started in August. Clinics and a dispensary for women and children were also started. The Unit gave medical relief to the poor in distant villages and has become popular

The other two Units at Chakan and Bhilawadi carried on their useful activities. The amount spent on the three Units was Rs. 31,274. The Council distributed grants-in-aid amounting to Rs. 30,685 among 17 maternity homes, 9 maternity and child welfare centres and 10 child welfare centres. The Council gave grants to 17 institutions for training senior *dais*. Help by the Council was given to four centres for training assistant midwives and five institutions for training midwives. A total grant of Rs. 11,394 was made for these purposes.

The Poona Health School admitted 10 students. Of the six students admitted last year, five passed the Health Visitors Diploma Examination. The Bombay Government gave an annual grant-in-aid of Rs. 5,000 and the Maternity and Child Welfare Bureau of Indian Red Cross Society gave an annual donation of Rs. 3,600 to the School. Propaganda on matters relating to health, maternity, child welfare and nutrition was carried on by means of health exhibitions, cinema shows and lectures. The Rural Development Boards of 5 districts sanctioned donations for organising rural health exhibitions and cinema shows. The Council merged itself into Bombay Mothers and Children Welfare Society from 1st April 1947.

The Bombay Presidency Infant Welfare Society.

63. The Society voluntarily wound itself up in November 1946 and founded a new Society called "The Bombay Mothers and Children Welfare Society". The Bombay Mofussil Council also merged into this Society later on. The Society ran 3 Maternity Homes, 7 Infant Welfare Centres and one Creche. The work carried out at these institutions suffered a set-back owing to the disturbed conditions in the city during the last four months of the year. Six stipendiary and three non-stipendiary students were trained in the Society's Health Visitors School, where education is given free of charge. The Bombay Government continued its annual grant of Rs. 5,500 to the School. The three Maternity Homes of the Society were affiliated to the Bombay Nurses, Midwives and Health Visitors Council and trained 16 probationer midwives. The Homes continued to co-operate with the Nowrosjee Wadia Maternity Hospital for a further three months' course in nursing of operation and septic cases. The Delisle Road Unit of this Society continued to be recognised by the University of Bombay and the College of Physicians and Surgeons, Bombay, for practical training in infant welfare work for Diplomas in Paediatrics and Gynaecology and Obstetrics.

Dacca Maternity and Child Welfare Trust.

64. The Trust completed its 26th year of existence in 1946. The activities of the Trust were hampered to a certain extent by the disturbances in the city. The Trust staff dealt with 15.4 per cent. of all registered births in the city during or immediately after confinements as against 19.5 per cent. in the previous year. Infant deaths among children within 10 days of birth among Trust cases showed a rate of 9.7 per 1,000 births against a rate of 42.1 per 1,000 births among non-Trust cases. There were no maternal deaths among Trust cases. The work of 30 indigenous *dais* was supervised by the Trust staff. It is suggested that the registration of midwives must be enforced so that indigenous *dais* may be interested in taking training. The Trust staff kept under observation 196 babies, 88 toddlers and 314 expectant mothers

by systematic home visits. The staff continued to pay due attention to ante-natal work. To impress on the people the necessity of seeking help of the staff during early carrying stages, a policy of refusing to attend on confinements unless the case was booked early in the sixth or seventh month of pregnancy was followed. Three free milk canteens were run throughout the year for destitute mothers and babies.

The Association for the Prevention of Blindness, Bengal.

65. The Association's five travelling eye dispensaries treated 54,127 cases and performed 1,808 operations. They delivered 71 lectures on the prevention of blindness and care of the eye, and carried out an enumeration of the blind in 100 villages containing a population of 74,826. The number of blind persons found were 121, which represent a rate of 162 blind persons per 100,000. An Eye Examination Unit worked in Calcutta and suburbs and examined 524 school students.

Bengal Health Welfare Committee.

66. The Committee continued to be responsible for co-ordinating the work of the four Health Sections of the Bengal Provincial Branch of the Indian Red Cross Society. A review of the main activities of these Sections is given below separately:

The Calcutta Maternity and Child Welfare Committee continued to do useful work although full progress was hampered during the concluding portion of the year due to unrest and trouble in the town. The Committee ran three centres, where 787 women received ante-natal care. The number of births under care was 1,377. Only 505 infants attended the clinics. This number is an improvement over last year's figures though it is still small. In the cases under care there was no maternal mortality. The still birth rate was less than that in the previous year. The infant mortality rate was 32 per thousand of live births. The number of toddlers on card was 1,259. The mortality rate of toddlers was low being 2.4 per thousand. There was no death from small-pox among the cases under care this year. The centre staff also undertook relief work during the Calcutta disturbances.

The District Maternity and Child Welfare Committee gave grants to 19 centres, all of which were affiliated to the Committee on fulfilling the recognised minimum standard of work. No new centres were affiliated this year. The aim of the Committee is to improve standards of work in the centres and with this end in view steps were taken to ensure that the centres have a minimum equipment of essentials. The centres were inspected by the officers of the Committee to obtain a correct estimate of the centres' work and needs. There was expansion of work in several centres. At present 8 centres have maternity wards with a total provision for about 56 beds. While the provision of maternity wards in centres where there are no suitable hospitals nearby is welcome, the chief object of the centres has been to supervise domiciliary midwifery cases.

During the year the centres attended to 2,051 domiciliary confinements and 744 confinements in maternity wards. Special attention is paid to ante-natal work. During the year 11,155 home visits and 8,548 centre visits were recorded. Among the post-natal cases there were 7,759 home visits and 8,863 centre visits. The attendance of post-

natal cases at the clinic is not satisfactory and efforts to educate mothers for the purpose require to be made. Among the infants 13,202 home visits and 333,422 centre visits were recorded. Among toddlers 11,117 home visits and 40,957 centre visits along with 7,157 friendly home visits and 8,752 friendly centre visits were undertaken. All the centres had milk canteens attached to them. Activities of five centres suffered severely as they had to carry on without a health visitor for long periods in the year. Nearly 150 *dais* were under training at the various centres. In some places refresher classes for *dais* were arranged. In several centres classes on sewing and on health and simple hygiene talks were held for the benefit of mothers and girls.

The Sir John Anderson Health School and Training Centre Committee continued to run the Health School and the Training Centre. For the first time in the history of the school a second session was started in the same year with seven students. The students were given a month's rural training in the Singur Health Unit. They were given practical training in dietetic survey and home visiting. Owing to limitations of space the projected Nursery School could not be started.

The Training Centre served as a practice field for the Health School. The All-India Institute of Hygiene utilised it for Domiciliary Midwifery Child Welfare and Maternity Child Welfare Students. The activities of the Centre were spread out in various directions this year, among which Domiciliary Midwifery Service may be specially mentioned. This Section was started during the year with Miss Joan Court, S.R.N., from Friends Service Unit as Honorary Tutor Midwife. To begin with, response of the local people was poor, but during the latter part of the year the attendance at the Centre had grown considerably. Students at the Health School were the first to benefit from this training. Two students at a time were in residence at the Centre and completed the prescribed course. Efforts are being made to train indigenous *dais* of the area.

Malted milk and milk powder received from the Red Cross was distributed to mothers and children. Regular clinics for ante-natal, post-natal, infants and toddlers were conducted twice a week. In view of the very high percentage of anæmic mothers visiting the centres two days in the week were fixed for liver extract therapy. The liver extract for injections was generously supplied by the Friends Service Unit. A large number of cases of head lice were treated with D.D.T. Instructional classes for mothers were held once a week and lectures on varied subjects were arranged. Attendance at sewing classes increased with the supply of free wool for baby garments. Baby frocks, shirts and blankets were distributed among infants and toddlers.

Eighteen health exhibitions were assisted with grants-in-aid and propaganda literature and posters were supplied. Literature for distribution among persons attending the centres in Calcutta and the mofussil was supplied free of charge. Health posters were supplied to several industrial organisations in and around Calcutta.

The Tuberculosis Association of India.

67. The Association has been able to build up during the past few years a chain of non-official organisations in different parts of the country.

There are to-day thirty-four Provincial and State Associations affiliated to the Central Association. Despite difficulties these associations have been able to record progress in their work. They undertook to train doctors and health visitors. They paid increased attention to undertaking anti-tuberculosis propaganda in the local languages. Some of them recommended useful schemes to their Governments for the establishment of clinics and care and aftercare committees. Several associations formed district and branch associations. The Lady Linlithgow Sanatorium, Kasauli, and the New Delhi Tuberculosis Clinic, the two model institutions run by the Association, trained 3 doctors in clinical work. The Delhi University decide to start a T.D.D. Course from 1st March 1947. The University of Calcutta has also decided to institute a T.D.D. Course. The University of Madras instituted a T.D.D. Course which was in addition to the one conducted by the Madras Government. The Central Committee of the Association recommended to the Universities and Medical Colleges that ample facilities for training in tuberculosis should be provided to the undergraduates. Such facilities exist in the Universities of Lucknow, Agra, Bombay, Madras, Bengal and Hyderabad. A Post-graduate Refresher Course was held in Calcutta in January for 31 doctors. Sixteen candidates including 6 women joined the course of training for tuberculosis health visitors at the New Delhi Tuberculosis Clinic. The Central Committee of the Association has recommended to the various Provincial and State Tuberculosis Associations to train health visitors in their areas. Health visitors with knowledge of local conditions are bound to prove more useful. Requests for technical advice on planning and construction of tuberculosis institutions and conducting surveys were given to the various associations and Governments. The Technical Adviser of the Association visited 10 centres in this connection.

The Fourth Tuberculosis Workers' Conference organised by the Association was held in Delhi in November and discussed important technical and non-technical questions of the tuberculosis problem in India. Well-known tuberculosis workers in foreign countries have accepted the invitations of the Association to become corresponding members. So far 36 members have been enrolled and many of them have sent valuable informative literature concerning tuberculosis in their countries.

Leave concessions to Government servants suffering from tuberculosis were extended by the Governments of Mysore, Travancore, Kashmir, Baroda, Ajmer-Merwara and Coorg. Such facilities had already been given by the Central Government and seven Provincial Governments. The Association hopes that the remaining provinces also will fall in line. A grant of Rs. 10 lakhs was received from His Excellency the Viceroy's War Purposes Fund for assisting ex-servicemen suffering from tuberculosis. A sum of Rs. 61 lakhs was also granted to the Lady Linlithgow Sanatorium, Kasauli, for certain specific purposes. The Association was holding Rs. 1 lakh on behalf of Raghunath Premii Trust for establishing a Central Tuberculosis Institute in Kathiawar. The amount was passed on to the trustees as it was decided to build the Institute at Senoadh. The construction of the hospital building has been started. The R.K.O. Radio Pictures, Limited, Bombay, made a further donation of Rs. 427 from out of the earning from the film 'For

Ever and a Day' bringing the total of such contributions to the Association to Rs. 25,208.

The Association continued its publicity and propaganda activities. Useful broadcast talks on tuberculosis were arranged on the All-India Radio. It has been arranged with Broadcasting and Information Department of the Government of India that anti-tuberculosis slogans, which the Association may suggest, will be announced in news bulletin programmes. The slogans are also printed on the stationery of the Association and have been recommended for display by other health and industrial organisations. The concession regarding free display of anti-tuberculosis posters on railways was communicated to all affiliated associations. Valuable material was prepared for use in pursuance of the scheme of anti-tuberculosis propaganda through newspaper insertions donated by business firms. However, it was felt that the method to be effective should be broad-based and continuous. The Association continued the token grant of Rs. 100 to the Indian Red Cross Society for anti-tuberculosis campaign through the Junior Red Cross in Delhi and Ajmer-Merwara. The branches organised fifteen lectures, which were attended by nearly 4,000 students. In addition to free issues of literature, posters and leaflets worth Rs. 2,158 were sold. The Hassan Masud Suhrawardy Memorial Anti-tuberculosis Challenge Shield for the best anti-tuberculosis activities in 1945 was awarded to The Rai Bahadur Amar Nath Tuberculosis Institute, Lahore. This Institute carried out a useful programme of educative work among the medical students and practitioners as also among the general public. The next best record was shown by the Bombay Municipality.

The Mission to Lepers.

68. The Mission continued to carry on its humanitarian work despite the increased difficulties in obtaining supplies to meet the demands of its Leper Homes. The number of inmates in the leper homes and hospitals and homes for healthy children of lepers owned or aided by the Mission on the 31st December 1945 was 10,085 against 9,643 on 31st December 1944. The details given below show the number of houses and total inmates in each of the Provinces of India:

Province.	Number of Homes.		Total inmates on 31st December.	
	1945.	1944.	1945.	1944.
Punjab	5	5	829	796
United Provinces	5	5	858	836
Bihar	4	4	1,480	1,453
Orissa	1	1	377	369
Bengal	4	4	520	469
Assam	2	1	229	77
Central Provinces	6	6	2,387	2,260
Bombay	5	5	479	449
Madras	8	8	1,582	1,587
Indian States	6	7	1,344	1,347
	46	46	10,085	9,643

There were 8,697 inmates under treatment at the end of the year. The number of out-patients treated was 11,684 and of these 4,976 improved and in 438 cases the disease was arrested. Among the

in-patients 11,024 were treated for three months and upwards; 3,145 cases showed great improvement and only 488 became worse; in 711 cases the disease was arrested without deformity and in 608 cases, though the disease was arrested, deformity remained.

There was a considerable increase in the expenses of the Mission. In 1945 the total expenses were Rs. 13,61,453 as against Rs. 12,91,924 in 1944. During the year Rs. 5,87,080 were received as Government and Local grants, Rs. 23,333 as direct contributions to the Mission's institutions and the balance was met from the contributions by the Mission which included trust contribution and donations and subscriptions received. The Mission to Lepers also supported work for sufferers from leprosy in China, Africa and several other countries.

The British Empire Leprosy Relief Association (Indian Council).

69. The Indian Council in collaboration with the School of Tropical Medicine and the Indian Research Fund Association carried on its activities of research, teaching, propaganda and routine clinical work. The research activities have already been reviewed in Section VIII on Medical Research. The Annual Leprosy Training Course was held, but owing to the disturbed conditions in Calcutta only 12 doctors attended the course and the usual examination at the end of the course could not be held. The duration of the course was further extended to one month and the numbers of lectures, demonstrations and practical work were increased. The usual course of 8 lecture-demonstrations was given to the D.T.M. and L.T.M. classes of the School of Tropical Medicine, Calcutta.

Propaganda material consisting of 1,143 booklets, 3,779 leaflets, 252 posters and 750 slides was issued from and sold through the usual channel of Red Cross Depots. A set of 18 coloured wall posters depicting the main facts about leprosy such as its distribution, clinical forms, cause, spread, treatment and prevention was prepared and will be printed in the various local languages. The quarterly journal "Leprosy in India" was published by the Council and continued to serve a useful purpose.

The diagnostic and treatment clinics continued to work throughout the year. During the year 1,889 new patients attended for diagnosis. Of these 1,312 were found to be of "neural" type and the rest of "lepomatous" type. Of the neural type 12.5 per cent. showed bacilli in smears taken from lesions. It is remarkable that the Military Hospitals in Calcutta referred to the clinics a large number of cases.

The provincial branches showed a steady progress and carried on their various activities such as treatment, propaganda, teaching in medical institutions, surveys, etc. Clinical and epidemiological studies in Madras were continued. The important question of isolation of infectious cases received increasing attention.

The International Health Division of the Rockefeller Foundation in India.

70. The Division continued its co-operation with the Government of India and the Provincial and States Departments of Health. The financial aid to the Training Programme, Gastro-Intestinal Diseases Inquiries in the Singur area conducted by the All-India Institute of Hygiene and Public Health, Calcutta, and the Rural Water Standards Project was continued. The last-named project terminated during the

year. A fund to aid the development of nursing was provided. It was utilised for getting some essential teaching equipment and selected books on nursing and magazines for distribution to nursing institutions in Provinces and States. The services of Nursing Consultant to the Foundation in India were loaned to the Government of India as Vice-Principal for Public Health Nursing in the newly opened College of Nursing at Delhi. Dr. George K. Strode, Director of International Health Division, New York, arrived in Delhi in January and accompanied by Dr. Balfour, the Regional Director, and the Nursing Consultant toured India for 3-4 weeks to study public health and nursing activities in the country. Miss M. E. Tenant the Nursing Consultant in the New York Office of the Foundation arrived in Delhi towards the end of December for a similar tour.

In June the Regional Office for the Far East returned to Shanghai but the Delhi Office was also maintained with the arrangement that the Regional Director will visit India and Ceylon periodically. It is hoped that a full-time medical member of the staff will be assigned to India and Ceylon. During the year 8 foreign fellowships and 1 foreign travel grant were given. Of these 2 were in public health administration, one in maternity and child welfare, one in medical entomology, two in public health nursing and three in public health laboratory practice. One travel grant for studying public health organisations in India and Ceylon was also awarded.

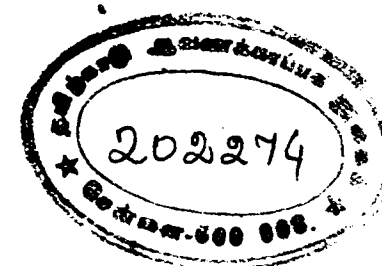
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JIVRAJ N. MEHTA,

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The 29th November 1947.



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