

ANNUAL REPORT
OF THE
PUBLIC HEALTH COMMISSIONER
WITH THE GOVERNMENT OF INDIA
FOR 1940



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WITH THE GOVERNMENT OF INDIA FOR 1940.**

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KEY MAP OF INDIA (SHOWING PROVINCES AND DISTRICTS).

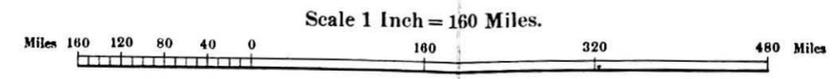
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- PUNJAB (P.)
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- 4 HISSAR
- 5 LUDHIANA
- 6 KALSIA
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- RAJPUTANA (R.)
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- 2 PARTABGARH
- 3 TONK
- 4 DANTA
- DECCAN STATES (D. S.)
- 1 AKALKOT
- 2 BANGLI
- 3 JATH
- 4 KOLHAPUR
- 5 JAMKHANDI
- 6 MUDHOL
- 7 KURANOVAD
- 8 SAVANUR
- 9 NEMUDUR
- 10 SEVANTVADI
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- 6 WADHWAN
- 7 PALITANA
- 8 LIMBDI
- 9 BHAVNAGAR
- 10 VIJAYNAGAR
- BENGAL (B.)
- 1 HOWRAH



Annual Report of the Public Health Commissioner with the Government of India for 1940.

SECTION I.

INTRODUCTION.

1. Last year in order to meet a wide demand that the Public Health Commissioner's report, constituting as it does an annual review of health conditions in India, should be available as early as possible after the close of the calendar year, a preliminary annual report was published in June 1940 for the year 1939. In previous years the Public Health Commissioner's report became available about a year and a half after the year to which it related; this was inevitable as long as it was regarded as necessary to publish full statistical data with the report. The full statistical data for 1939 together with some supplementary information about health conditions in that year were published some months after the preliminary report appeared.

The reception given to the preliminary report by the press, both lay and medical, showed that it met a genuine demand on the part of those who are interested in the progress of health matters in India. Its early publication was made possible by the cordial cooperation of the Provincial Directors of Public Health, who, in spite of their heavy duties, found time to provide the necessary material regarding the health conditions in their provinces during the previous year. The information which has been supplied by the Directors of Public Health for the year 1940 is fuller and has made it possible to prepare this report on a broader basis.

It has therefore been decided that this report published approximately six months after the year to which it relates will for the future be regarded as the regular Report of the Public Health Commissioner. The detailed statistics for Provinces and States will appear later in what will be known as the "Supplement to the Report of the Public Health Commissioner."

The year under review has been a period of wide unsettlement, of suffering and distress in many parts of the world as the result of the war. In India we were spared this agony and the peace that we have enjoyed has protected us to a large extent from that deterioration in health which is inseparable from the privations and physical disabilities attendant on war. The public health of India during 1940 reflected in a large measure the effects of our conditions of security. Apart from the usual local variations in the prevalence of the common epidemic diseases, the year 1940 was unmarked by any abnormal outbreaks of disease. In fact, with regard to the common epidemic diseases such as cholera, smallpox and plague, although final figures have not yet been received, the available information shows that, in many parts of the country their prevalence during 1940 was less than in the previous year.

War conditions create health problems of their own. Owing to the large expansion of aerial communications and the extension of the war to Africa the danger of the introduction of yellow fever into India has been increased

The Government of India have been fully alive to this danger and have taken prompt measures to avert the possibility of such a calamity. The restriction that persons arriving in India by air from yellow fever areas must produce evidence of satisfactory inoculation or, in the alternative, spend the incubation period of the disease in some non-infected area before arriving in India is being strictly enforced. Aircraft arriving from yellow fever areas are compelled to produce a certificate that they have been effectively disinfected at either Khartoum or Cairo. The scrupulous enforcement of these measures is vital to India's protection against the introduction of this disease which has wrought such havoc in those parts of the world where it has become established.

In India measures have been taken to deal with any possible outbreak of the disease. The health authorities of the Provincial and State Governments have been requested to report promptly to the Public Health Commissioner even suspected cases of the disease. In view of the fact that yellow fever has so far been non-existent in the country and that its diagnosis may, in certain cases, present difficulty, arrangements have been made by the Central Government to place an expert diagnosis unit at the disposal of Provincial and State Governments in the event of any suspected case being discovered.

Detailed instructions have been supplied to the Governments regarding the measures to be adopted in any area in which yellow fever breaks out. One of the most important measures in combating an outbreak is an intensive and efficient control of mosquito breeding in the infected area and, in order to ensure this, an expert unit from the Malaria Institute of India will be placed at the disposal of the Provincial Government concerned. Another important step in India's policy regarding the control of the disease was the decision taken to make preventive inoculation against the disease available in this country. Through the munificent generosity of the Rockefeller Foundation stocks of the vaccine are now held for use in the event of an outbreak.

It is important to remember that, as pointed out by Sir Girja Shankar Bajpai, Member-in-charge of the Department of Education, Health and Lands in the Government of India, at the third meeting of the Central Advisory Board of Health, war, however grim its reality and however imperative its claims, is only a passing phase in the course of history and the maintenance of health activities on the home front must not be neglected. Any serious reduction of the health services during war time should therefore be deprecated and it is gratifying to record that during the year under review, the pressing demands of the war did not interfere with the progress of routine health administration in the country. In the day to day administration in the provinces, in the encouragement of medical research and in the maintenance of such specialised services as those for tuberculosis and leprosy no slackening of effort took place. The annual report of the Tuberculosis Association of India states that "In spite of the fact that the country's interest and energies have been concentrated upon the successful prosecution of the war, the year 1940 has seen a consolidation of the Association's existing activities and of progress in several new directions". Organisations like the Indian Red Cross Society and the Indian Council of the British Empire Leprosy Relief Association carried on their peace time activities without any diminution. In the case of the former, there was in addition a large expansion of activity in connection with the war. It will thus be seen that the home front has not been neglected.

From the point of view of public health policy the most important event of the year was the third meeting of the Central Advisory Board of Health at

Poona in July 1940. This meeting discussed a variety of subjects, which included the reports of two committees, one on the Compulsory Inoculation against Cholera of Pilgrims and the other on the Control of Food Adulteration. Both the reports were approved by the Board and the recommendations of the two committees were commended for adoption by the Provincial and State Governments. The report of the Committee on the Compulsory Inoculation of Pilgrims expressed the desirability of Governments selecting suitable festival centres in their areas for trying out a system of indirect compulsory inoculation of pilgrims against cholera, which had been successfully worked out at the Pandharpur pilgrimage by the Government of Bombay, and of adopting certain measures which the committee proposed for providing the funds and the trained personnel necessary for carrying out mass inoculation.

The Food Adulteration Committee divided the problem of controlling adulteration into three aspects, *viz.*, the technical, legislative and administrative. In the report submitted to the Board only the technical aspect, which concerns itself with the technique of food analysis and the standards of purity to be prescribed for individual articles of food, had been considered. The Board recommended the adoption by Provincial and State Governments of the standards suggested by the committee for different articles of food. An important recommendation of the committee was that a standing committee should be set up, which will be entitled "The Central Committee for Food Standards" and which will act in an advisory capacity on the lines of the Society of Public Analysts in England and the British Standards Institution. The Board authorised its Chairman to appoint this committee and steps have already been taken to bring this about. It is to be hoped that this expert committee consisting as it will of public analysts, health administrators and representatives of dairying, agricultural and trade interests, will be able to guide Provincial and State Governments in the formulation of measures for the control of the purity of food supplies.

The Central Advisory Board of Health also considered the two questions of the teaching of hygiene in schools and of the medical inspection of school children. The subjects are so inter-related and the information available to the Board regarding the existing provisions in the provinces was so inadequate that the Board recommended the consideration of the two questions by a special committee to be appointed by the Chairman.

Among the other subjects discussed by the Board an important one was the proposal that Governments should provide laboratories at suitable centres for the free examination of clinical material from cases of infectious disease, sent either by a medical practitioner or by a Government medical officer. The Board commended for adoption by the Provincial and State Governments a plan for the provision of laboratories which had been set out in a memorandum on the subject submitted to the Board by the Office of the Central Advisory Board of Health. This plan provides for a central laboratory for each Province or State capable of dealing with the highest type of diagnostic work and research, for regional laboratories for groups of districts and for laboratories in individual districts. The memorandum also deals with the questions of personnel and of the distribution of the cost between the Government and local authorities. The desirability of raising the standard of diagnosis by medical men of the suspected cases of infectious disease which they meet in their practice is unquestioned and it is to be hoped that the Governments will now initiate steps to introduce the scheme in some suitable areas in the Provinces and States and gradually expand it over the whole territory as and when funds permit.

The effect of unhygienic and overcrowded housing conditions on the incidence of tuberculosis has long been recognised by health authorities all over the world and town planning, slum clearance and the construction of well ventilated and airy dwellings on such cleared areas have been an important part of the campaign against the disease in all progressive countries. In India, while town planning and slum clearance have been carried out in some of the larger cities by Improvement Trusts, the beneficial effects of these measures have, in many cases, been largely offset by the indiscriminate construction of insanitary buildings on the cleared areas through the failure of local bodies to exercise their powers, under the building byelaws, to regulate house construction. The Board, therefore, strongly urged on all Provincial and State Governments the necessity, in the interests of public health, for the strict enforcement of building byelaws.

The foregoing are some of the important subjects which were dealt with at the third meeting of the Central Advisory Board of Health. The full text of the resolutions passed by the Board will be found at pages 36 to 39 of this report.

SECTION II.

HISTORY OF THE CHIEF DISEASES.

Cholera.

2. Statistical studies on the epidemiology of cholera have been carried out by a number of investigators and it has been shown that a relationship exists between the incidence of the disease and various climatic factors. It has also been suggested that cholera epidemics occur in cycles of some years. All this information is interesting and, under existing conditions, may prove useful to public health workers by affording them some indication of the chance of occurrence of outbreaks. But it must be remembered that cholera and other bowel diseases are dependent for their continued propagation on defective sanitation. Protected water supplies and a sound system of nightsoil disposal will almost completely change the epidemiological features of these diseases.

The provision of protected water supplies and efficient conservancy for the large rural population of the country is the most important factor in the control of cholera and bowel diseases in general. The extent to which progress has been made in the provision of these two elementary requirements in the different provinces, during 1940 has been summarised in the section relating to rural health on page 39 of this report. Briefly stated, the bulk of the rural population lack these two principal factors of environmental hygiene. A few provinces have formulated long term schemes for the provision of protected water supplies in the villages and the selection of places for the installation of water works is being guided by such considerations as the cholera history of the villages and their importance as centres for large gatherings of people in connection with festivals and markets. The conservancy problem has also received some attention in certain provinces. The construction of bore-hole latrines for public and private use has been stimulated and educational propaganda for their more extended utilisation by the people is also being carried out. But the tempo of progress will have to be accelerated to a considerable extent if the requirements of the rural population in regard to water supplies and conservancy are to be met within any reasonable period of time.

In 1940 the incidence of cholera in most provinces was on a smaller scale than during the previous year. Coorg was completely free from the disease, in Ajmer-Merwara, only a single case was reported and Delhi Province had only six cases during the year. The N.-W. F. Province and the Punjab reported only localised outbreaks. Bihar, Bengal, Orissa, Bombay and Madras reported substantial decreases in their cholera incidence in 1940 in comparison with the previous year, while Assam recorded a small decrease. On the other hand, in the Central Provinces and in Sind the incidence of cholera was higher during 1940 than in 1939. Brief notes regarding individual provinces are given in the following paragraphs.

In the N.-W. F. Province a few outbreaks of small proportions took place in Hazara and Kohat districts, nine villages in all being infected with the disease. It is reported that the infection spread from the Punjab where in the neighbouring districts cholera was prevalent. The district travelling motor dispensary proceeded immediately to the affected villages and dealt promptly

with the epidemic. Mass inoculation and disinfection of water supplies were the chief preventive measures adopted for dealing with the disease.

The Director of Public Health, Punjab, points out that the incidence of cholera in the province is largely influenced by the occurrence of the *Kumbh mela* at Hardwar. In 1938 when an outbreak of the disease took place during the festival at Hardwar the number of cholera deaths in the Punjab rose as high as 5,760. In 1939, on the other hand, only 19 deaths from the disease were recorded in the province as a whole. In 1940 the number of deaths from cholera was 189. It is stated that only small localised outbreaks took place and that the highest number of cases that occurred in any single outbreak was 29. Preventive measures were in every case immediately instituted and it is reported that the spread of the disease was effectively checked. The number of anticholera inoculations carried out during the year totalled 274,157. These were mainly carried out in famine areas bordering on infected areas in the United Provinces. The low vitality of the people in these famine areas rendered their protection against cholera particularly necessary in order to prevent the spread of infection.

The rural areas of Delhi Province were completely free from cholera during 1940, four cases with three deaths took place in Delhi city while New Delhi and the Fort Notified Area each had a fatal case. Anticholera inoculations during the year totalled 4,801.

In the United Provinces it is reported that cholera prevailed in an epidemic form over a wide area during the year, the worst affected districts being Gorakhpur, Basti, Benares, Cawnpore, Mirzapur, Ghazipur, Bareilly; in nine other districts localised outbreaks took place. The cholera epidemic reached its height in August and September. Nearly 700,000 anticholera inoculations were given to the population of the affected areas.

The prevalence of cholera in Bihar during 1940 is stated to have been less than during the previous year. The disease first appeared in the districts of Ranchi and Manbhum in January and in March the epidemic began to spread more widely, the peak being reached in the months of August and September. During this period all districts except one are stated to have reported a relatively high incidence of the disease. In October and November the epidemic continued with lessened severity and in December a definite decline was recorded. The district of Champaran suffered most from cholera during the year under review.

It is reported that vigorous preventive measures were taken both by the Government and by the district board health staff in the affected areas and that sufficient quantities of cholera vaccine and cholera phage were placed by the Government at the disposal of the local authorities. Special doctors were also deputed for duty in the infected areas.

The incidence of cholera in Orissa showed a considerable reduction compared with 1939, the number of deaths from the disease being about 4,038 in 1940 as against 11,141 during the previous year. In the first three to four months of the year the epidemic prevailed in the districts of Cuttack, Puri and Balasore. In the Ganjam Plains cholera appeared in February and continued to prevail to the end of December. From the Ganjam Plains the disease spread to the Agency areas of Ganjam and Koraput districts in the latter part of the year but the number of deaths in these areas was relatively small. The other parts of the province were practically free from cholera during the year.

For the control of the disease the Government and local bodies appointed additional temporary staff. The Government supplied 260,900 doses of cholera vaccine and a large quantity of cholera bacteriophage free of cost to the local bodies.

The Director of Public Health, Bengal, states that the incidence of cholera in that province during 1940 was markedly less than during the previous year. Cases of cholera occurred in Burdwan, Birbhum, Bankura, Midnapore, Howrah, Murshidabad, Jessore, Khulna, Dinajpore, Jalpaiguri, Darjeeling, Rangpur, Bogra, Malda, Chittagong and Tippera districts. In the majority of districts the intensity of the epidemic was very much less than that of the previous year. In Khulna district, on the other hand, the disease occurred in a very acute form and its prevalence was more extensive than during any of the previous 15 years. In Tippera district also cholera occurred in a serious form, 775 out of a total of 7,193 villages in the district being affected with the disease, and 2,615 attacks with 1,385 deaths being recorded in these villages. The Public Health Department sent epidemic doctors, sanitary inspectors and combined medical and sanitary units to the affected districts in order to help the local authorities in the carrying out of anticholera inoculations and disinfection of infected and suspected sources of water supply. In the districts of Faridpur, Murshidabad, Jessore and Khulna temporary cholera regulations under the Epidemic Diseases Act were enforced.

There was an increase in the incidence of cholera in the Central Provinces during 1940 compared with the previous year, the number of deaths being 4,974 and 1,661 respectively. Large numbers of cases and deaths were reported from the districts of Nagpur, Wardha, Raipur, Drug, Yeotmal and Akola. The prevalence of the disease was at its height during the months July to November. The distribution of Tomb's essential oil mixture, sterilization of water supplies and inoculation of the population were carried out in all these districts. Temporary cholera regulations were brought into force in the infected areas.

The mortality from cholera in Bombay Presidency showed a substantial fall during 1940 compared with the previous year, only 716 deaths due to this cause being reported as against 1,786 during 1939. The figure for 1940 is the lowest recorded during the past 13 years, and there has been a progressive decline in cholera mortality in the province since 1936.

During the first half of 1940, the incidence of the disease was negligible, only 28 deaths being recorded during this period. With the outbreak of the monsoon there was a small rise in July. December recorded the largest number of deaths, *viz.*, 288. The districts of Sholapur, Ahmednagar, Thana, Poona and Kolaba, experienced the highest incidence of cholera mortality. In the remaining districts the disease occurred only in sporadic form. Gujarat was free from cholera except for 18 deaths in Surat district and one death in Ahmedabad district. East and West Khandesh districts usually experience a relatively high incidence of the disease but in 1940 there occurred only four deaths from cholera.

For the curative and preventive campaign against the disease, epidemic medical officers and dispensary medical officers were employed, and in addition temporary medical men were appointed in the affected districts during the cholera season. The Commissioner of the Central Division made a village uplift van available for a propaganda tour in the infected districts of that division.

During the past four years special precautionary measures have been taken at Pandharpur festival by preventing the entry of uninoculated persons to the pilgrim centre during the fair. This measure has had a considerable influence on reducing the spread of cholera infection in the presidency. In 1936, when compulsory inoculation of the pilgrims was first introduced, 50 attacks and 26 deaths were reported during the fair. Since then the public have begun to cooperate more willingly with the authorities in the carrying out of inoculation. It is reported that statistics for the incidence of cholera among the returning pilgrims in 1940 were collected from Bombay Presidency, from the Central Provinces and from Hyderabad State and only two cases were reported. The Director of Public Health states that, since 1936, the spread of cholera from this important fair, which used to play a large part in the dissemination of the disease, has been effectively checked.

The total number of anticholera inoculations during 1940 was 206,000, of which 106,218 were performed at Pandharpur during the festival.

In 1940 there was a considerable increase in the incidence of cholera in Sind, 227 deaths being reported as against three during the previous year. The district most affected was Dadu where 104 cases proved fatal. The disease appeared first in Dadu town in July 1940 and thence spread to Nawabshah and Larkana districts and the city of Karachi.

Among the measures taken to combat the disease were the enforcement of special regulations against cholera, a ban on the export of fish and fruit from the railway stations within the areas declared to be infected, inoculation of the affected population on a large scale, the prohibition of fairs, the appointment of special cholera controlling officers and the opening of segregation camps.

In Madras Presidency the incidence of cholera during 1940 was mild, the disease in epidemic form being confined to the Northern Circars. In the latter half of the year it is reported that cholera spread from Ganjam to the Vizagapatam district in Madras Presidency and to the deltaic areas of East and West Godavari and Kistna districts. Two interesting features of this epidemic are stated to be that the *Ogawa* type of the organism was responsible for the outbreak this year instead of the *Inaba* type as in previous years, and that the incidence of the disease was higher in women than among men, although the fatality rate was smaller among the former.

It is reported that, although cholera broke out in a village of Mysore bordering on Coorg, the receipt of timely information and the institution of prompt preventive measures averted the entry of infection into Coorg.

In Assam the number of deaths from cholera recored in 1940 was 2,811 as against 3,020 in 1939, a decrease of nearly 7 per cent. Most of these deaths occurred in November and December. Of the total deaths nearly 70 per cent took place in Sylhet district, the disease prevailing there throughout the year. In Cachar district there occurred in November an outbreak of the disease among immigrant fishermen who acquired the infection from an endemic area of the district and spread the disease along the villages on the banks of the rivers during their return journey to their homes. In order to prevent the recurrence of such an outbreak it is stated that measures are under consideration for the purpose of regulating boat traffic on the rivers and for inoculating the fishermen. Nowgong district also suffered from a sharp outbreak of the disease in December, the infection being brought in by immigrant agricultural labour from Bengal. The outbreak lasted about six weeks

and there were in all 316 attacks and 152 deaths. Most of these deaths occurred in the first three weeks and, on the institution of preventive measures, the outbreak was rapidly brought under control. The number of anticholera inoculations carried out in 1940 was 335,559, a substantial increase over the figure for the previous year, namely, 106,208.

There was only one case of cholera in Ajmer-Merwara during the year and that took place in September 1940; all the contacts were inoculated and the sources of water supply were heavily permanganated.

Plague.

3. In the Preliminary Annual Report for 1939 it was pointed out that a considerable diminution in the incidence of plague had taken place in India within the last decade. This satisfactory position was maintained in 1940 also. The provinces of Baluchistan, Sind, the N.-W. F. Province, Ajmer-Merwara, Delhi, Orissa and Assam reported no cases of the disease. The Punjab and Bengal were also free from infection except for a few imported cases. In Coorg there occurred a few sporadic outbreaks in a number of villages on different occasions. In the United Provinces, Bihar and the Central Provinces the plague epidemic was milder in 1940 compared with the previous year and in Madras Presidency its incidence is stated to have been about the same in both the years. Bombay Presidency alone experienced a relatively extensive epidemic of the disease, the number of deaths from this cause being 5,573 in 1940 as against 1,472 in 1939.

Under the existing conditions in India the most effective methods of control for plague appear to be by the systematic destruction of rats by cyanogas in the affected areas, by the popularisation of ratproof houses of a design suited to the requirements of the rural population and at a cost within their means and by the active immunisation of the inhabitants of the infected or threatened areas. In this connection it may be recalled that mention has been made in previous annual reports, of the extensive tests of the value of cyanogas fumigation for rat destruction which had been carried out in an endemic area for plague, the Cumbum valley in Madura district of Madras Presidency. At its last meeting in December 1940 the Plague Advisory Committee of the Indian Research Fund Association placed on record its approval of the findings of these operations which are embodied in a report on the Cumbum Valley enquiry. The report stated, "Cyanogas fumigation operations systematically carried out in the infected and threatened villages during the last six years, may be said to have been mainly responsible in reducing the endemic plague of this valley to the extent now reached." In his review of the health conditions of Madras Presidency in 1940 the Director of Public Health states that "the major portion of Cumbum valley, which had been a hotbed of endemic plague during the last two decades, has now been totally free from any evidence of infection for over 22 months". The value of cyanogas fumigation as a plague preventive measure has therefore been fully established and its intensive application in all plague infected areas should be undertaken by the health authorities concerned.

Mention was made in the Preliminary Annual Report for 1939 of a model rural ratproof hut which was constructed in the Cumbum valley. This has

now stood the test of two years and it may now be accepted as a type design for the rural areas, especially as its cost is stated to be only Rs. 75.

The incidence of plague in the provinces and the preventive measures taken against the disease are briefly reviewed below.

The Director of Public Health of the United Provinces states that the epidemic of plague in that province during 1940 was of a mild character. Fifteen districts were affected, the districts with large numbers of deaths being Gorakhpur, Jaunpur, Ballia, Azamgarh, Basti and Benares. The maximum incidence of the disease was in the months of March and April.

The incidence of plague in Bihar was less in 1940 than during the previous year. The districts which suffered most from the disease were Shahabad, Saran, Champaran, Muzaffarpur, Monghyr, Bhagalpur and Santhal Parganas. The districts of Saran and Champaran reported the largest number of cases.

A special feature of the epidemic during 1940 was the absence of an outbreak of plague in Bettiah town during the cold weather. It is stated that this might have been due to the systematic cyanogas operations for deratisation which were started in the town from November 1940. In the earlier part of the year (January to May, 1940) a plague hospital was opened in the town where the treatment of cases with a serum prepared at the Haffkine Institute was carried out under the direction of the Director of that Institute. Of 162 cases admitted into the hospital 55 died and the remaining patients were discharged cured.

During 1940 the disease was prevalent in the Central Provinces in the districts of Nagpur, Chhindwara, Betul, Jubbulpore, Saugor, Mandla, Hoshangabad, Balaghat and Yeotmal. Two hundred and eighty-three deaths were in all recorded as against 852 during 1939. The usual methods of control of the disease, such as inoculation, evacuation, disinfection of infected material and rat destruction, were carried out as far as possible in the affected areas. Cyanogas fumigation of rat holes was adopted in the municipalities of Jubbulpore and Betul.

In Bombay Presidency 1933 was a peak year for plague, the mortality from the disease being as high as 24,560. Since that year a steady decline took place in the incidence of plague during the next five years, the recorded number of deaths from this cause during the period 1936-38 being in the neighbourhood of 500 each year. In 1939 the disease again took an upward turn. In that year the deaths from plague numbered 1,472 while in 1940 the figure rose to about 5,573. Bijapur district bore the brunt of the epidemic, the number of deaths recorded being 2,434. Sholapur, Dharwar and Belgaum districts also experienced fairly extensive epidemics, the numbers of deaths reported being 1,223, 1,202 and 617 respectively.

It is stated that special antiplague measures were organised in these four districts. The affected areas in each district were divided into sectors and mobile units were organised in order to enable the medical officers to visit the infected villages as quickly as possible. Antiplague inoculations were carried out on an extensive scale and the number of inoculations performed totalled 675,000. Cyanogas fumigation and other methods of rat destruction were also carried out, wherever possible. Special facilities for the treatment of plague with the new drug, M & B 693, were provided at Barsi and Indi and it is reported that encouraging results were obtained with this drug.

An enquiry into the causes of the recrudescence of plague in Sholapur and the adjoining districts was started during the year with a view to finding out the endemic foci, if any, and the factors responsible for the spread of the

disease, the Entomologist of the Haffkine Institute being in charge of the enquiry.

The incidence of plague in Madras Presidency during 1940 is reported to have been about the normal level. The districts affected were Bellary, Salem, Coimbatore, Anantapur and Kurnool, the largest number of deaths occurring in Bellary district.

It is reported that sporadic outbreaks of plague took place in a number of villages in Coorg on different occasions. In March 1940 the disease broke out at Somwarpet and five attacks and one death took place in that village. Again in September, four attacks with three deaths occurred in the same place.

In October another outbreak took place in a group of six villages on the frontiers of Mysore State, the infection having been brought from the bordering villages in that State. The number of antiplague inoculations carried out during 1940 was 10,781.

During the last week of September a Plague Conference was held in Bangalore which was attended by the Directors of Public Health of Bombay, Madras, Hyderabad and Mysore States, and Coorg was represented by the Assistant Health Officer. The adoption of preventive measures on a cooperative basis by the different administrations and the introduction of cyanogas fumigation as a plague preventive measure were discussed at this meeting. In Coorg cyanogas fumigation was carried out at Somwarpet, it is reported, with satisfactory results.

Smallpox.

4. In the majority of the provinces the incidence of smallpox is reported to have been less during 1940 than in the previous year. In Madras it is stated to have been about the normal level while in Bombay, Sind, Coorg and in the Central Provinces an increased incidence of smallpox has been reported. Brief reviews of the history of smallpox in the different provinces are given in the following paragraphs.

In the N.-W. F. Province smallpox occurred in an epidemic form in the districts of Peshawar, Hazara, Bannu and Dera Ismail Khan, 920 cases with 374 deaths being reported in all during the year. The Director of Public Health points out that powindahs, who migrate into the province during the cold weather, are responsible for the dissemination of smallpox amongst the inhabitants of the settled areas and that the immunisation of these nomadic people is essential for checking the spread of the disease. The Government have decided that, during the coming winter, a campaign of vaccination should be started among those powindahs who settle down in the province, a warning being issued at the end of the cold weather that next year the Government would insist on the vaccination of all powindahs seeking entry into British India.

In the Punjab the Director of Public Health states that the incidence of smallpox is characterised by a periodicity of approximately five years. In recent years there has been a tendency for the epidemic outbreaks to occur with lessened intensity. For instance, the average annual number of deaths from smallpox for the quinquennial period ending 1940 was 4,089 compared with 4,795 for the corresponding period ending 1935.

It is reported that, during the past five years, some progress has been achieved in vaccinating the people. The average annual number of vaccinations carried out during the period has been between $4\frac{1}{2}$ and 5 millions while the corresponding figure used to be about three millions during previous years. It is stated that the effect of this increased vaccination is seen more in a lowering of the case mortality rate for smallpox than in a reduction of the incidence of the disease. In 1940 the case mortality rate was 31·5 per cent, the lowest figure so far recorded, while in the period prior to the intensive vaccination campaign the rates used to range between 40 and 50 per cent.

Two factors that make any rapid improvement of vaccination difficult are stated to be the fact that every year large numbers of births escape registration with the result that these infants remain unvaccinated, while the notification of cases and deaths from smallpox leaves much to be desired. The Director of Public Health points out that without an improvement being effected in both directions and without the introduction of legislation to make revaccination compulsory no real progress can be achieved in combating the disease.

The incidence of smallpox during 1940 in Delhi Province is stated to have been only a fifth of that during the previous year. There were in all 205 cases with 152 deaths. Of these, however, nearly 67 per cent of the cases took place among children under five years of age.

Smallpox was reported from all the districts in the United Provinces, the worst affected being Gorakhpur, Jaunpur, Bijnor and Basti. The disease reached its highest incidence during the months of June and July while the lowest figure was recorded in October. The eastern half of the province was more affected than the western.

In 1940 it is stated that the incidence of smallpox in Bihar was higher than during the previous year. The disease showed a tendency to increase from the month of February, the peak of the curve of incidence being reached in May. In July the incidence of smallpox began to decrease and the minimum was reached during October and November. The districts of Bhagalpur and Monghyr suffered most from the disease during the year. The Director of Public Health mentions that vaccination and revaccination were carried out vigorously in the affected areas.

The Director of Health and Inspector General of Prisons, Orissa, states that there is usually a five year epidemic cycle of smallpox in the province and that the year 1940 was the peak year of the cycle. The epidemic continued from the previous year and steadily rose to the end of May, after which it slowly declined in the latter part of 1940. The total number of deaths from smallpox recorded during the year was in the neighbourhood of 5,500 as against 3,282 in the previous year. Cuttack district recorded the largest number of these deaths, the figure for 1940 being 3,581 compared with 2,645 in the previous year. Other districts in which the disease occurred in an epidemic form were Balasore, Puri, Sambalpur and Ganjam Plains.

In last year's report it was mentioned that in certain parts of this province primary vaccination is not compulsory. Moreover, in some areas, the people have to pay a sum of two annas for each successful vaccination. A scheme for making vaccination and revaccination free and compulsory throughout the province had been under the consideration of the Government for some time and it is stated that the scheme has now been approved and that it will take effect from April 1941.

Cases of smallpox were reported from 15 districts in Bengal during 1940 but the epidemic is stated to have been of a low intensity in many districts.

A grant of Rs. 49,000 was made by the Provincial Government to District Boards for the enforcement of free vaccination. Smallpox regulations under the Epidemic Diseases Act were brought into operation in the district of Bogra, in the Diamond Harbour Subdivision of the 24-Parganas district, and the municipalities of Naihati and Titagarh.

Smallpox cases were reported from all the districts of the Central Provinces and the number of deaths from the disease in 1940 was as high as 4,607. The corresponding figure for 1939 was 762. The incidence of the disease was high in the districts of Nagpur, Wardha, Khandwa, Hoshangabad and Raipur, the height of the epidemic being reached during the months, March to May.

It is reported that temporary additional vaccinators were appointed in the districts in which the disease spread in an epidemic form, and that temporary smallpox regulations were brought into force in the affected villages in a few districts.

The Bombay Presidency experienced an increased incidence of smallpox during the year under review, the disease occurring in an epidemic form during the first half of the year. Cases were reported from all the districts in the province and a total of 10,525 deaths was recorded as against 3,756 during 1939. The epidemic was severe in the districts of West Khandesh, Nasik, Ahmedabad, East Khandesh, Ahmednagar, Poona, Broach, Satara, Kaira and Sholapur. Bombay city recorded 834 deaths due to smallpox during the year.

It is reported that vaccination and revaccination were vigorously carried out in the affected and threatened areas. A reassuring feature of the situation is the fact that the public have begun to realise the value of vaccination as a protective measure against smallpox. This is evidenced by the fact that six municipalities applied to the Government in 1940 for the enforcement of the Compulsory Vaccination Act in their areas and that the number of municipal towns in which the compulsory Act was in force has risen from 18 in 1934 to 95 in 1940.

The epidemic was at its height from January to May and the largest number of deaths was recorded in April.

The Director of Health Services, Sind, states that the province is almost invariably visited by smallpox and that its incidence is more in the rural than in urban areas. During 1940 smallpox was prevalent in all the districts; its incidence was highest in Hyderabad where 1,253 cases and 432 deaths from this cause took place during the year. Another district which was seriously affected was Thar Parkar, where 1,091 cases with 212 deaths occurred.

The recorded mortality from smallpox in Sind during the first five months varied between 155 and 224 while the number of deaths was under ten during each of the last four months of the year.

It is reported that an intensive campaign of vaccination and revaccination was carried out, additional temporary vaccinators being appointed and extra vaccine lymph being made available to them. Vaccination is now compulsory in all municipal towns. It is stated that efforts are being made to make vaccination compulsory in the rural areas also. As a first step the Notified Area or Sanitary Committees of taluka headquarter towns have been advised to agree to the extension of the provisions of the Bombay District Vaccination Act of 1892 in their areas. Seven out of a total of 37 Sanitary Committees have accepted the provisions of this Act.

The incidence of smallpox in Madras Presidency during 1940 is stated to have been about the normal level, the districts most affected being Coimbatore, Malabar, South Arcot and Vizagapatam while the municipalities of Bezwada, Cochin, Coimbatore and Villupuram also suffered heavily. These districts and municipalities together contributed about 80 per cent of the total incidence of the disease in the province. A vigorous vaccination campaign was carried out in these areas.

An innovation to which the Director of Public Health draws attention is the cultivation of smallpox vaccine lymph on the embryonic chick membrane and its use in 25 villages in Chingleput district for the purpose of comparing the results with those of glycerine lymph, which is now in common use throughout the presidency.

In Coorg a small outbreak of smallpox with five attacks and two deaths took place in March at Pulikot village. Another outbreak involving 73 attacks and 20 deaths occurred in South Coorg as the result of infection being introduced from Cannanore in Malabar district. It is stated that, owing to anti-vaccination propaganda, there was considerable opposition to vaccination among the people and that the immunity of the population to smallpox had consequently been reduced to some extent. When smallpox developed in epidemic form the Government employed an additional temporary sanitary assistant for three months and a vigorous campaign of vaccination was carried out, the total number of vaccinations performed during the year being 12,590.

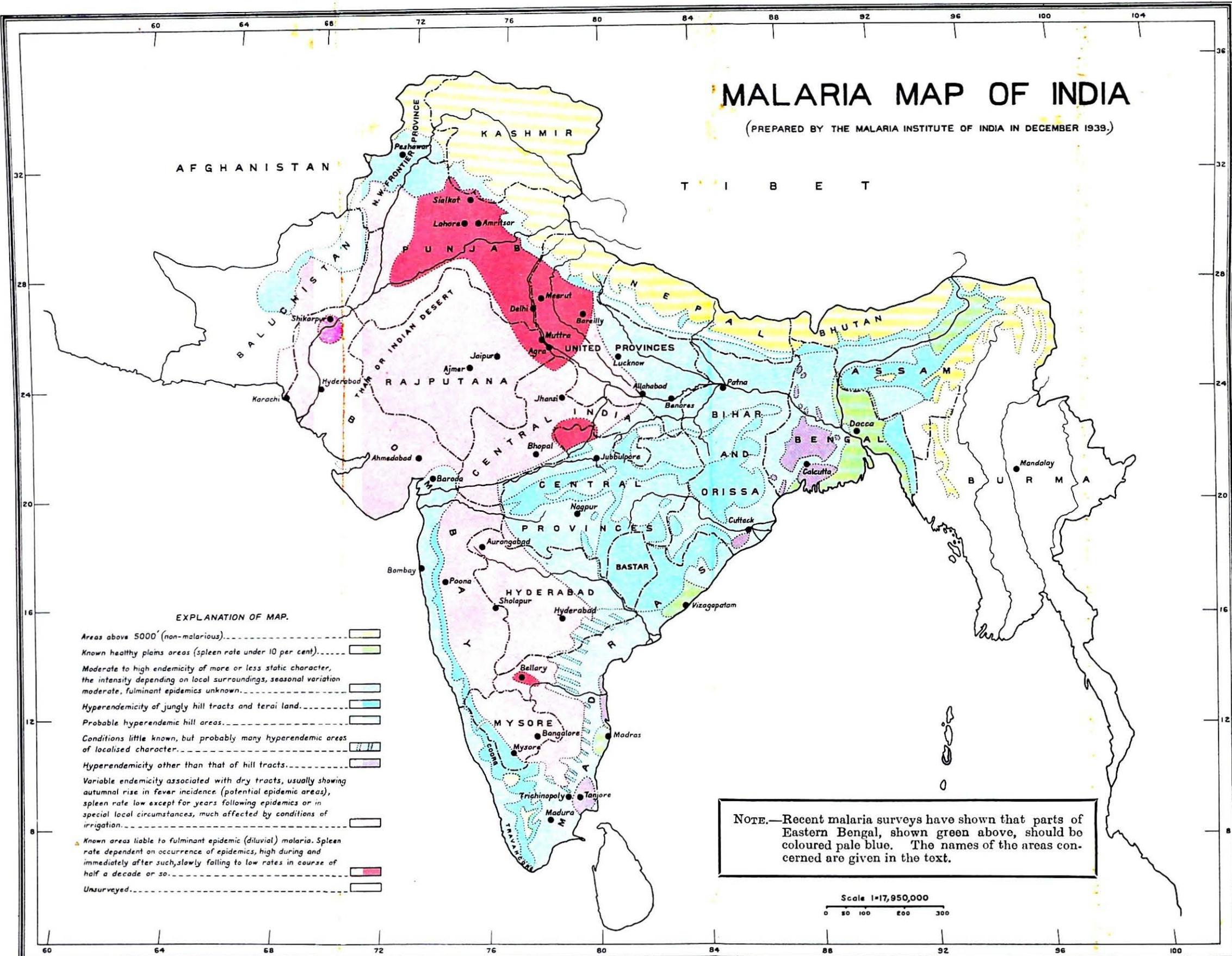
The number of deaths from smallpox in Assam during 1940 was 1,403 as against 2,197 in 1939. The Director of Public Health states that, from an examination of the figures for the previous five years, the incidence of smallpox appears to have remained at a high level. Further, of the total deaths from the disease, about 75 to 85 per cent occurred during this period in Sylhet district alone. At no time of the year was the district free from smallpox. It is stated that, while the outbreaks in other districts have a tendency to die down quickly, in Sylhet the decline is very slow. The Director of Public Health therefore considers this district to be an endemic area for smallpox. On the other hand, it is pointed out that the Brahmaputra valley has continued throughout to be free from the disease except for a few localised outbreaks. No information has been given regarding the vaccinal condition of the population of the Brahmaputra valley in comparison with that of the inhabitants of Sylhet, where the disease is stated to be endemic. Other factors have also undoubtedly a bearing on the incidence of the disease, for instance, the liability to the introduction of infection from outside in the two cases, and it would be interesting to know how far the relative freedom of the Brahmaputra valley from smallpox is due to the immunity of the population or to other fortuitous circumstances.

As regards vaccination, the Director of Public Health states that there is yet room for an improvement of the success rate although some rise has been recorded during the past few years, the rates for 1936 and 1939 being 88.1 and 95.5 per cent respectively. The Director points out that difficulties of communication in many parts of the province and the consequent delay in the use of the lymph for vaccination result in the deterioration of its potency and in some of it being wasted.

In Ajmer-Merwara smallpox prevailed in an epidemic form from the beginning of 1940. Additional staff were employed and a record number of vaccinations (65,396) was carried out during the year.

MALARIA MAP OF INDIA

(PREPARED BY THE MALARIA INSTITUTE OF INDIA IN DECEMBER 1939.)



EXPLANATION OF MAP.

- Areas above 5000' (non-malarious).....
- Known healthy plains areas (spleen rate under 10 per cent).....
- Moderate to high endemicity of more or less static character, the intensity depending on local surroundings, seasonal variation moderate, fulminant epidemics unknown.....
- Hyperendemicity of jungly hill tracts and terai land.....
- Probable hyperendemic hill areas.....
- Conditions little known, but probably many hyperendemic areas of localised character.....
- Hyperendemicity other than that of hill tracts.....
- Variable endemicity associated with dry tracts, usually showing autumnal rise in fever incidence (potential epidemic areas), spleen rate low except for years following epidemics or in special local circumstances, much affected by conditions of irrigation.....
- Known areas liable to fulminant epidemic (diluvial) malaria. Spleen rate dependent on occurrence of epidemics, high during and immediately after such, slowly falling to low rates in course of half a decade or so.....
- Unsurveyed.....

NOTE.—Recent malaria surveys have shown that parts of Eastern Bengal, shown green above, should be coloured pale blue. The names of the areas concerned are given in the text.

Scale 1=17,950,000
0 50 100 200 300

In Baluchistan only 26 cases of smallpox were reported during 1940. Most of these cases were imported from neighbouring villages in Iran and Afghanistan.

It is reported that all the contacts were promptly vaccinated and that segregation was enforced in respect of the villages in which outbreaks of the disease took place.

Malaria.

5. The geographical distribution of malaria in India and the preventive measures adopted against the disease, which is undoubtedly the most important public health problem in the country, were briefly described in the Preliminary Annual Report for 1939. The map facing this page gives some indication of the areas in which the disease exists and of the degree of intensity of its prevalence. Since the publication of this map in the Preliminary Annual Report for 1939 in June 1940 it has been brought to notice by the Director of Public Health, Bengal, that recent malaria surveys have shown that parts of Eastern Bengal shown as free from malaria are subject to moderately severe outbreaks of the disease. Such areas are the subdivisions of Mymensingh and Netrokona of Mymensingh district, Manikganj of Dacca district, Bhola and Patuakhali of Bakarganj district, Chittagong of Chittagong district and Comilla and Chandpur of Tippera district.

The problem is of such magnitude that the efforts so far made have not been sufficient to place an effective check on the incidence of the disease over large tracts of the country. At the same time it would be wrong to underestimate the value of the work so far accomplished. In 1940 Sir Malcolm Watson, the Director of the Ross Institute of Tropical Hygiene, London, paid a visit to India and toured the provinces of Madras, Assam, Bengal, Delhi and Bombay and the Indian States of Travancore, Cochin and Hyderabad. While paying particular attention to the antimalaria work carried out in the tea estates in India with which the India Branch of the Ross Institute is specially associated, Sir Malcolm inspected the preventive campaign against the disease in other places also and paid striking testimony to the work carried out in the country during the past ten years. Speaking at the annual general meeting of the Tea Association at Calcutta on 29th March, 1940, he stated, "I can say without hesitation and without a qualification that in the last decade nowhere in the British Empire has such progress been made in the control of malaria as in the tea estates in India; it is a remarkable achievement". He pointed out that, in one group of tea estates with 18,000 people, the improved health conditions gave the employees "over 100,000 days pay more in 1938 than they had ten years ago". Nor has the good work been confined to the tea estates alone. Eleven years previously Sir Malcolm had made certain recommendations for the prevention of malaria in Hyderabad, Deccan, and he noticed that a remarkable change had been brought about in the intervening years. He said, "Not only has the spleen rate of children been reduced to practically zero, but a suburb of the city which was rapidly being abandoned has again become prosperous, and an entirely new suburb is being built in an area

previously regarded as too unhealthy for habitation." Regarding the anti-malaria operations in Delhi Sir Malcolm stated that he was greatly impressed with their efficiency and with the economy with which they had been carried out and that he had no doubt that the happiest results would ensue.

This testimony of such a distinguished malariologist regarding the value of the work in India must indeed prove heartening to those who, in spite of the serious handicaps of slender resources, inadequacy of trained personnel and the wide prevalence of man-made malaria brought about through ignorance and carelessness, have carried on the fight against the disease with a stout heart and with undiminished vigour. What has already been achieved carries with it the hope that, with a wider enlightenment of the people regarding the methods of malaria prevention, the campaign against the disease will produce still more fruitful results in the coming years.

It should be remembered that malaria is largely a rural problem in India and that the people of these areas are so poor that they cannot afford to pay for any costly measures of malaria control. During the past few years different methods of combating the disease have been tried in an intensive manner in certain parts of the rural areas of Delhi Province and a brief reference to these measures will be found in the paragraphs dealing with that province. These measures deserve adoption in other parts of India also.

The campaign against the disease can succeed only by educating the people in the methods of prevention and by securing their active cooperation. Much of the minor sanitary works necessary for eradicating mosquito breeding can be carried out by the people themselves if they are prepared to devote a small part of their leisure to such works. Draining the marshes, clearing the jungle, filling up hollows in which water collects—these are all part of a village improvement scheme to which the villagers themselves should contribute their share of work for the furtherance of the common good. There will then develop, from such cooperative effort, a bond of mutual goodwill and a sense of civic responsibility which are bound to exercise a beneficent influence on the health and well-being of the population. When once the people become convinced that the malaria problem is capable of solution and that its prevention requires the active cooperation of all in the affected areas, public opinion will demand that everything possible shall be done for the attainment of the desired end.

The measures carried out in the different provinces for controlling malaria may now be briefly reviewed.

Dera Ismail Khan and Tank were the only districts in the N.-W. F. Province in which epidemics of malaria took place during the year. In Dera Ismail Khan the epidemic reached its first peak in April and May and there was another and more severe outbreak in September, October and November. In Tank a severe outbreak of malignant malaria took place during the last three months of the year. Special medical staff were employed for the treatment of the disease and for the carrying out of preventive measures in the affected areas.

In the Punjab malaria is reported to have prevailed in a mild epidemic form during 1940 from August onwards. No correct estimate of the actual incidence of the disease can be made, but there are two criteria by which the extent of its prevalence may be assessed to some extent, namely, the number of cases of fever treated at the hospitals and dispensaries in the province and number of deaths recorded under "fevers" in the death register. Judged by the first standard the districts most affected were Hissar, Hoshiar-

pur, Ludhiana, Ferozepur, Gurdaspur, Sialkot, Sheikhpura, Shahpur, Jhelum, Mianwali, Muzaffargarh and Dera Ghazi Khan. The average annual number of registered fever deaths in the province during the five years 1936-40 was 408,833 while the figure recorded in 1940 was 473,649, a difference of about 65,000. This rise in the number of 'fever' deaths is indicative of increased prevalence of malaria during 1940, although the figure is relatively small in comparison with the number of deaths from 'fevers' recorded in a year of severe malaria epidemics such as 1908, when 697,000 deaths were registered under that head.

In order to make quinine readily available to the people, the Public Health Department supplied 685 lbs. of the drug while the district boards and urban local bodies provided 1,000 lbs. of quinine and 110 lbs. of cinchona febrifuge.

No information is available regarding the actual incidence of malaria in Delhi Province but a rise in the number of 'fever' cases from 65,806 in 1939 to 75,824 in 1940 suggests that there was an increased prevalence of malaria during the year under review. Climatic factors were in 1940 more favourable for the spread of the disease than during the previous two or three years. Of the total annual rainfall of 21.7 inches in 1940, as much as 17.2 inches fell within a period of 30 days during July-August. The consequent rise in relative humidity in August was favourable to the prolongation of the life of the mosquito and therefore for the completion of the cycle of development of the malaria parasite in that insect. In 1939, on the other hand, the monsoon started in June and only 7.8 inches of rain fell during the corresponding period in July and August.

As regards the Delhi urban area, where antimalaria operations have been in progress during the past few years, the Director of the Malaria Institute states that "there was some local transmission of the disease along the riverain margin of the urban area at various points from Timarpur to Daryaganj." Some cases of malaria also took place in New Delhi, in the Electric Power House quarters, the Reformatory School, among the children of the District Jail staff and in a labourers camp situated between Purana Kila and Humayun's tomb. In Subzimandi to the west of Delhi city, in the area cultivated by the Western Jumna Canal tail distributary, there occurred a few cases but the outbreak was not serious probably owing to the oil booms installed in the canal and its tributaries. Cases were also reported from the villages of Nizamuddin and Jangpura.

An examination of the spleen rates shows, however, that in 1940 the incidence of malaria must have been definitely less than in 1936, a year of normal rainfall. In three localities, namely, Wazirabad Pumping Station, the Electric Power House and Jumna village the rates were relatively high in 1940 but, in comparison with 1936, they were definitely lower. The following figures are reproduced from the report of the Director of the Malaria Institute of India incorporated in the Chief Health Officer's 1940 report for Delhi Province.

Spleen rate.

	1936	1940	
		July.	June. . . November.
Wazirabad Pumping Station	88	7	30
Electric Power House	90	6	30
Jumna village	68	9	27

The Director of the Malaria Institute states that, except in these few places, there was little evidence of transmission of malaria. In New Delhi the percentage of children with enlarged spleens in 1940 was only 0.6, which is stated to be less than the average figure recorded in places where malaria is absent.

In connection with the antimalaria operations in Delhi urban areas engineering works of a permanent nature had been sanctioned to the extent of about Rs. 27 lakhs. Owing to certain improvements effected in the carrying out of these works, it was possible to make a saving of about Rs. 10 lakhs in the estimated total expenditure. During the official year 1940-41 a sum of Rs. 5,29,550 had been sanctioned on engineering works and by the end of the financial year all the works were expected to be completed. The programme of permanent works will then have been completed except for one item, the Western Jumna Canal scheme, which, though sanctioned in 1936, has been held up owing to certain administrative difficulties.

In addition to these permanent antimalaria works recurring measures, such as the application of larvicides and levelling and draining operations were carried out throughout the year under the direction of the Assistant Director of the Malaria Institute of India.

The Director of the Malaria Institute of India sums up the experience of antimalaria operations in the rural areas of Delhi Province during the previous three years by stating that the policy to be adopted should be one of (a) distribution of quinine by the health staff, (b) spraying of adult mosquitoes in houses, with a gradual transference of the responsibility for the measure to the people themselves and (c) antilarval measures mostly carried out by the villagers through the formation of "Malaria guards" under the supervision of the Public Health Department.

In regard to quinine distribution he emphasises the necessity of daily visits by the distributing staff to each affected village in order to ensure that all patients suffering from fever receive their dose of quinine. He states that the scheme has been shown to cost about two annas and eight pies per head of the population for the period, 15th July to 15th December, and he considers that the figure can be further reduced.

Spraying of adult mosquitoes was carried out by boys from each village who were engaged for the task at two annas per day and the cost of the scheme, excluding supervision charges, per head of the population was Rs. 0.2-8 for the malaria season. Spraying was carried out in each house once a week. It is pointed out that many of the villages have purchased their own spray pumps and antimosquito solution, a fact which gives an indication of the growing popularity of the measures for mosquito control.

Antilarval measures constitute the most costly item in the programme, minor engineering works, such as filling, levelling and draining operations, and the application of larvicides together costing Rs. 0.10-5 per head of the population. The only way in which economies can be effected will be by stimulating the people to undertake for themselves all the earth work necessary for these operations. Supervision by trained staff and the cost of larvicide will continue to remain as a major charge in respect of antilarval measures but local initiative should provide the labour required free of charge.

The antimalaria operations in the rural areas of Delhi Province fall under three heads: (1) those relating to the villages in a three mile belt around the Delhi urban area, (2) the measures carried out in Najafgarh thana and (3) the operation in the rest of the province.

In the three mile belt a sum of about Rs. 37,500 was made available during the financial year 1940-41 for permanent works in connection with the drainage of certain *nullahs*. In addition recurring measures, such as distribution of quinine, spraying of mosquitoes in houses and antilarval operations were also carried out on lines indicated above.

In Najafgarh thana, quinine distribution was done by the health staff from the middle of July to the middle of December, antilarval measures were carried out around every village in the thana and spraying of mosquitoes in the homes was carried out by the people themselves.

In the remaining villages of the province distribution of quinine was carried out by the establishment of quinine centres at convenient villages as well as by individual members of the health staff. Antilarval measures were carried out only in limited areas around each village and spraying of adult mosquitoes was done by the people. It is stated that the popularity of spraying is evidenced by the fact that the villagers purchased for themselves 348 sprayers and an equal number of bottles of the solution. The Director of the Malaria Institute also speaks of the high value of the services rendered by the "Malaria guards" in many villages. The work was carried out by these guards, in each case, under the supervision of the Public Health Department.

Malaria was reported in an epidemic form from ten districts of the United Provinces, the highest incidence of the disease being in the months of August and September. It is stated that in most districts the epidemic was relatively mild and restricted to certain localities. About 251 lbs. of quinine and cinchona febrifuge were distributed free, and 682 lbs. of tablets were sold. Dispensaries and hospitals were supplied with 3,338 lbs. of quinine powder on payment.

Malaria surveys and investigations of specific local malaria problems were carried out in a number of towns and districts. Mention was made in the 1939 Preliminary Report of an intensive malaria investigation that has been in progress since 1938 in certain villages in the Hardoi district and in the Terai and Naini Tal districts, in collaboration with the Indian Research Fund Association. These researches continued during the year.

The Director of Public Health, Bihar, reports that during 1940 malaria was prevalent in all the districts of the province, its incidence being particularly high in the districts of North Bihar. In these districts there are many rivers which flow from the foothills of the Himalayas and discharge themselves into the Ganges. The areas covered by these rivers have suffered from epidemics of malaria ever since the earthquake of 1934. However, it is reported that, by the wide distribution of quinine and the institution of antimosquito measures in some of the heavily infected areas, the prevalence of the disease has been controlled to some extent. During 1940 special centres for the treatment of malaria were opened in 48 places in the districts of Champaran, Muzaffarpur, Darbhanga, Purnea, North Bhagalpur and North Monghyr and it is reported that about 757,000 patients were treated at these centres. The incidence of the disease is stated to have been at its maximum from October to December and during the months of March and April.

Measures for mosquito control were carried out, as in previous years, in some of the worst affected areas. These measures included as usual the removal of weeds and recanalisation of dead rivers and filling and oiling operations. In certain areas it is stated that the spraying of houses for the killing of adult mosquitoes was also carried out. Financial aid was given by the Government to the local authorities towards these antilarval measures.

and quinine was supplied free. Four units for malaria surveys were posted in each of the districts of Muzaffarpur, Darbhanga, North Bhagalpur and Purnea and their investigations are stated to be in progress. In Ranchi district three centres for antimalaria measures had been working for the past few years at Kuru, Palkot and Kolebira. A new centre was started in 1940 at Jonha. Further, 13 treatment centres for malaria were opened in different parts of the district. The Government gave a free supply of quinine and a grant of Rs. 2,000 to the District Board for carrying out antimalaria operations. Government aid was given to many other local bodies also.

The Director of Health and Inspector General of Prisons, Orissa, states that during 1940 the province was comparatively free from malaria. The areas in which the disease is usually widely prevalent in the province are the deltaic portions of Cuttack, Puri and Balasore districts, the area round the Chilka lake in Ganjam Plains and the Agency Tracts of Ganjam and Koraput.

Antimalaria operations were carried out, it is reported, throughout the year in a number of centres in the district of Koraput. At Lakshmannath in the district of Balasore, the District Board carried out antimalarial measures with a grant of Rs. 800 sanctioned by the Government. In Kendrapara municipality similar measures were instituted by the local authority and the Government gave a grant of Rs. 1,300. It is reported that, in both the places, these measures reduced the incidence of malaria. The Government are stated to be considering the grant of another Rs. 500 to the Kendrapara municipality for the continuance of antimalarial work during 1941-42.

In Puri a severe outbreak of malaria took place during the last quarter of the year and an antimalaria scheme prepared by the Assistant Director of Public Health and the Civil Surgeon, Puri, was put into operation and continued till the end of February 1941. Antimalarial measures were also adopted to some extent in the municipalities of Cuttack and Berhampur. A field unit from the Malaria Institute of India investigated the causes of malaria incidence in the area surrounding the Chilka lake and it is stated that useful epidemiological information has been collected.

In order to popularise the use of quinine in the rural areas a sum of Rs. 4,700 was provided by the Government for the purchase and sale of quinine through post offices and other vendors. Quinine was distributed free in the hospitals and dispensaries of the province and a further quantity of 35 lbs. of quinine was distributed among the people during the year from the reserve stock of the Public Health Department. In order to build up a reserve of quinine for the province, the Government decided to purchase annually for four years an additional quantity of quinine besides the usual amount purchased each year. In 1940, 400 lbs. of quinine were purchased as the first instalment of this reserve stock.

It is stated that malaria prevailed in an epidemic form in many parts of Bengal during 1940. Severe outbreaks of the disease took place in the districts of Jessore, Khulna, Rajshahi, Bogra, Pabna, Malda, Mymensingh and Faridpur.

The Government of Bengal sanctioned a sum of Rs. 5 lakhs for the distribution of quinine and cinchona products during 1940. Of this, a sum of Rs. 168,750 was distributed among the district boards for the free issue of quinine through hospitals and dispensaries maintained or aided by them, and an equal amount was spent for the distribution of the drug through agencies other than hospitals and dispensaries. The civil surgeons of the province were given a total grant of Rs. 56,250 for the free issue of quinine

from those hospitals and dispensaries under them which were not aided or maintained by district boards and a similar amount was made available to the district magistrates for quinine distribution through agencies other than hospitals. The remaining sum of Rs. 50,000 was kept at the disposal of the Director of Public Health for the purpose of making special grants of quinine and cinchona products to district boards, municipalities and charitable dispensaries in order to combat malaria in those areas where the disease was particularly widely prevalent.

Malaria surveys were carried out in a number of places including the municipal areas of Nator, Faridpur and old Malda and some villages in the districts of Khulna, Midnapore and Mymensingh.

The Central Provinces recorded 265,265 cases of malaria during 1940. Free distribution of quinine amounting to 730 lbs. was carried out by Sub-assistant Health Officers and officials of the Revenue Department in the affected areas. Antimalaria surveys were carried out in the towns of Jubbulpore and Khandwa and the civil station area of Nagpur.

The number of deaths recorded as having been due to malaria during 1940 in Bombay Presidency was 29,602 as against 28,833 in 1939. The districts with a high incidence of the disease were Nasik, Poona, East and West Khandesh, Thana, Belgaum, Dharwar and Kanara. Special medical officers were appointed for visiting the malarial areas and for treating the patients.

During 1940-41, the Government sanctioned a grant of Rs. 69,900 for free distribution of quinine and for the sale of quinine through post offices and the expenditure actually incurred exceeded this amount by about Rs. 35,000. This is stated to be largely due to the heavy demands for the supply of the drug from all parts of the province. Free distribution of quinine was carried out through the agencies of school boards, Assistant Directors of Public Health and the Collectors of districts.

The Director of Health Services, Sind, reports that malaria is one of the major health problems of this province and that the number of deaths from the disease increased from 1,553 in 1939 to 2,106 in 1940. The deaths from fevers also showed a large increase from 23,964 in 1939 to 29,206 in the year under review. It is therefore likely that the actual incidence of malaria was higher than that indicated by the deaths recorded under that cause.

The Government provided a sum of Rs. 44,000 for the free distribution of quinine and for the sale of quinine tablets to the public at cheap rates. The agencies employed for such distribution of the drug were the Public Health and Revenue Departments, school boards, philanthropic voluntary societies and zamindars employing largenumbers of labourers. Touring medical officers were appointed on antimalarial duty in the rural areas, especially for visiting those parts of the province where medical aid was not easily available to the people. In addition the medical officers of two travelling motor dispensaries, which toured the villages for giving medical aid to the population, treated a number of cases of malaria among other diseases.

In the town of Larkana, the Ghar Canal which flows through the town is a vast breeding place for mosquitoes, and with an annual Government grant of Rs. 2,000 antilarval treatment of the canal was carried out. It is reported that, as a result of this measure, a reduction in the mosquito population at the centre of the town and in the immediate neighbourhood of the canal was secured, although a corresponding fall in the incidence of malaria had not so far become evident. The Director of Health Services considers that this might be due to the extensive cultivation of rice around the town and suggests

that rice cultivation should be prohibited at least within a radius of half mile beyond the municipal limits.

Educational propaganda was carried out among the people through the printing and distribution of leaflets and posters illustrating the personal preventive measures to be taken against malaria and the value of quinine in the treatment of the disease.

In Madras Presidency an epidemic of malaria broke out in certain areas of Kurnool, Anantapur and Bellary districts during the last quarter of the year. A severe outbreak of the disease took place in the northwestern part of Chingleput district and the adjoining areas of Chittoor district in December 1940. Free distribution of quinine was carried out in the affected areas of these districts.

Mention was made in last year's report of three investigations for the control of rural malaria which are in progress in this province at Pattukottai (Tanjore district), Ennore (Chingleput district) and Wynaad (Malabar district). It is reported that the incidence of malaria in Ennore has shown a decline as the result of the temporary measures adopted in that area.

A preliminary study of an outbreak of malaria in Siruguppa Agricultural Research Station was made and malaria surveys were carried out in Sidhapuram labour settlement, Diguvametta forest colony and Pulivendla town. A malaria control scheme by larvicidal fish (*Gambusia*) was started in Barua in Vizagapatam district.

In Coorg, on the recommendation of the Director of the Malaria Institute of India, spraying of houses for the destruction of adult mosquitoes was carried out in 24 forest colonies, 12 police centres and three selected villages in the rural areas. It is stated that the results recorded at these places were satisfactory. Two municipalities, three notified areas, four panchayat boards, six antimalaria cooperative societies, one forest area and fourteen selected rural areas carried out antilarval spraying as a control measure against the disease. In Mercara municipality, out of a grant of Rs. 2,000 from the Indian Research Fund Association, automatic flushing syphons were provided during the year for the flushing of the streams in that area in order to destroy mosquito larvae.

The hospitals and dispensaries in Coorg distributed quinine free to the patients and in addition 425 lbs. of cinchona febrifuge and 150 lbs. of quinine sulphate were distributed in the rural areas through the revenue officials. It is reported that the distribution of quinine to the people, antilarval measures and the spraying of adult mosquitoes in houses have resulted in an appreciable decrease in the incidence of malaria in the areas in which these methods of control were adopted and that the splenic indices of children under 12 years also showed a reduction.

It is stated that the managers of certain estates, who tried the spraying of adult mosquitoes in the houses of their labourers, have reported that the health of these people has shown an appreciable improvement.

It is reported that the number of malaria cases in Assam during 1940 was 194,691 as against 189,746 in 1939, an increase of about 4 per cent. Deaths from malaria are recorded in the province only in the towns and the number of such deaths in 1940 was 291 as against 255 in 1939, an increase of about 14 per cent. While the incidence of the disease was thus higher in 1940 than in 1939, the number of quinine treatments sold during 1940 was 5,303 compared with 7,009 in 1939. The sale of quinine decreased to the extent of about 24 per cent and the reason given by the Director of Public Health for this

is the rise in the price of each treatment packet of the drug from two annas to two annas and six pies. During the year under review an attempt was made to introduce semi-permanent antilarval measures, wherever possible, and it is reported that the results have so far been promising. Spraying of adult mosquitoes has also been tried in the campaign against the disease and the results are stated to be encouraging. In one area the experiment was tried during the year of combining general public health work with antimalaria measures. However, owing to the inadequacy of the public health personnel in the rural areas, the scheme did not make much progress.

It is reported that extensive outbreaks of malaria took place in the towns and rural areas of Ajmer-Merwara, the reason being the relatively heavier monsoon rains during 1940 compared with the previous year. Free distribution of quinine was carried out in all the affected areas and in Ajmer municipality antilarval measures were also undertaken, such as the use of paris green and crude oil in many breeding places and the supply of the larvicidal fish, *Gambusia*, to tanks and wells.

During 1940, it is reported that 82,270 cases of malaria were treated in the province of Baluchistan.

The Quetta Cantonment Board maintains a travelling dispensary for the purpose of carrying out antimalarial measures in the villages to the north and west of the Cantonment. During the year 231 lbs. of quinine sulphate and 287 lbs. of cinchona febrifuge were supplied to the hospitals and dispensaries in the province and, in addition to the treatment carried out at these medical institutions, free distribution of quinine on an extensive scale was carried out by district officials, village school masters and vaccinators.

Enteric fever.

6. While lack of facilities for the bacteriological diagnosis of enteric fever even in many large towns and the inadequacy of a trained medical service for the rural population must make the recorded figures for the disease quite incomplete, such information as is available suggests that the infection must be widespread and that many outbreaks must be occurring without their being brought to notice. In this connection a resolution passed by the Central Advisory Board of Health at its third meeting in July 1940 is important. Provincial and State Governments have been asked to provide as far as possible facilities for the laboratory diagnosis of clinical material from cases of infectious disease submitted for examination by private practitioners and Government medical officers. The value of such a service in the preventive campaign against enteric fever has been amply demonstrated recently in Bombay city. In 1938 an epidemic of enteric fever took place in that city and the Government of Bombay placed the services of the Haffkine Institute at the disposal of all medical men in the city for the free examination of clinical material obtained from their patients. This measure evoked a considerable response from the medical profession and a large number of mild cases, which would otherwise have escaped notice, were reported to the health authority. The latter was in consequence enabled to take prompt preventive measures and bring the epidemic under control. The plan approved by the Central

Advisory Board of Health is sufficiently elastic to make it applicable to the different parts of the country with such modifications as local conditions may require. In order to further the control of enteric fever and many other infectious diseases it is to be hoped that a beginning will now be made in the provinces for the provision of a laboratory service which will be available free of cost for the early detection of such diseases.

Brief notes regarding the incidence of enteric fever in the provinces are given below.

In the N.-W. F. Province it is reported that enteric fever was prevalent throughout the year, especially in the large towns. The people of the province are stated to be willing to submit themselves to inoculation. In Peshawar 6,200 school children were immunised against the disease and the Police and the Frontier Constabulary were also inoculated.

Of the 1,738 deaths recorded in 1940 in Delhi Province as having been due to enteric infection, 683 were reported from Delhi city, 72 from New Delhi, one from the Civil Lines and 982 from the rural area. The Chief Health Officer states that, although a bacteriological diagnosis was obtained only in a small number of cases, there is reason to believe that, under existing conditions in the urban and rural areas of the Province, there must be a good deal of infection. A study of the cases in New Delhi has shown, it is stated, that nearly all the cases took place in a population attracted more by the cheapness than by the quality of their food supply.

In Orissa it is stated that, while figures for the incidence of enteric fever in the general population are not available, hospital statistics suggest that the enteric group of infections forms a fair proportion of the cases diagnosed as fevers.

The Director of Public Health, Bengal, states that most of the districts in the province were affected with the disease during 1940. Burdwan district reported the largest number of cases in the rural areas and Howrah municipality in the urban areas.

Enteric fever is reported to have been prevalent in 16 districts of the Central Provinces during 1940. The total number of deaths recorded under this head in the province was 1,221 as against 1,287 during 1939. High figures were reported from the districts of Nagpur, Wardha, Saugor and Yeotmal.

The recorded deaths under enteric fever in Bombay Presidency numbered 6,779 during 1940. Among the affected districts Kolaba reported the largest number of deaths (862), Bombay city had 443 deaths from this cause as against 246 during 1939. The incidence of the disease was nearly evenly distributed through the year, although small increases were recorded in January, April and December.

In Coorg it is stated that sporadic epidemics of enteric fever occurred in a few hamlets and that suitable preventive measures were applied. The total number of antityphoid inoculations performed during 1940 was 1,630.

The Director of Public Health, Assam, states that typhoid fever was prevalent in most towns of the province during 1940. Although notification of the disease is compulsory in municipal areas, it is stated that even cases under the treatment by qualified medical practitioners are not often reported. In most instances outbreaks were discovered by the municipal health staff or the local medical staff. For instance, a severe epidemic in Barpeta was recognised by the medical staff of the local hospital through the observation that an unusual number of cases of fever was being treated in the outpatient

department at a time when malaria was not prevalent. The outbreak was rapidly brought under control by inoculation and other preventive measures. It is stated that an improvement of the sanitary condition of the municipalities can alone place a permanent check on the incidence of the disease.

Fifty-two cases of enteric fever are reported to have occurred in Baluchistan during the year under review. The disease did not occur in epidemic form. T. A. B. inoculation was carried out amongst the residents of the affected villages as a preventive measure.

Tuberculosis.

7. In the campaign against diseases such as tuberculosis, the prevalence of which is largely influenced by various social and environmental factors, it is not possible to record any spectacular progress from year to year. But the past three or four years have seen an important advance in the organised effort against the disease in India. The two most important factors in this advance are the wide and generous response from the people of India to the appeal made by Her Excellency the Marchioness of Linlithgow for the King Emperor's Anti-tuberculosis Fund and the establishment of the Tuberculosis Association of India on 23rd February 1939. The contributions to the King Emperor's Fund came from all classes of people in India and there have been signs in the press and among the public of a growing realisation of the menace of the disease and the urgent necessity for checking its spread. The Tuberculosis Association of India and its affiliated branch associations in the Provinces and in many Indian States are the organisations responsible for the administration of the King Emperor's Fund in the fight against the disease. The central organisation has formulated an antituberculosis scheme which is based on the existing conditions of this country. What has been advocated is a scheme of "organised home treatment".

While an endeavour will be made to provide institutional treatment for a certain proportion of patients, economic and other considerations in India necessitate that treatment for the vast majority of patients must be provided in their own homes. The scheme of control of tuberculosis by organised home treatment includes the following :—

- (a) the tuberculosis clinic ;
- (b) institutional treatment for a certain number of selected cases ;
- (c) close cooperation between the clinic and private practitioners ;
- (d) care and after-care committees to work in connection with the clinics and other tuberculosis institutions ; and
- (e) colonies or settlements for tuberculous ex-patients.

The tuberculosis clinic occupies a central place in the scheme, because it keeps in touch with the homes of the people and, through the examination of the patients and their contacts, discovers active carriers of infection who may be continually helping to spread the disease. The clinic undertakes some measure of treatment and, in close cooperation with private practitioners, it extends its influence to a wider circle of patients and makes available to them up-to-date methods of diagnosis and treatment. Advanced patients

require more specialised treatment than that which a clinic can offer and it has been suggested that, in the vicinity of every large city, a tuberculosis hospital with 100 to 200 beds should be made available. Such hospitals also serve the purpose of providing the necessary facilities for training medical men in modern methods of diagnosing and treating tuberculosis. One of the main tasks of the Care and After-care Committee is that of affording assistance in the economic sphere to the poorer patients and their families. Further, the committee should work in close association with the clinic and the private practitioners. Without the cooperation of the private practitioners it will not be possible to extend widely the various activities of the clinic.

Lastly, tuberculosis colonies are for patients who have partially recovered from their illness. The colonies serve the purpose of providing them with an environment in which they will be able to earn a living with a moderate amount of work which is not detrimental to their health.

While it is recognised that, as has been demonstrated in the West, a rise in the standard of living and an advance in environmental hygiene are powerful factors for controlling the spread of the disease, existing conditions in India hardly hold out the prospect of rapid progress in these directions. The scheme for organised home treatment therefore proposes to attack the problem by reducing the spread of infection through the detection and treatment of the infective patient, and through the education of his family to avoid infection. It will be seen that the scheme involves the coordinated activities of a number of institutions for the care of the patient and the organisation of public effort to supplement medical relief with the provision of comforts essential for the health and well-being of the patient and his family. The Provincial and State Tuberculosis Associations are entrusted with the task of administering their respective shares of the King Emperor's Fund and the earnestness and zeal with which they apply themselves to this task will largely determine the success of the antituberculosis campaign in their areas.

A few more points require mention. A central tuberculosis clinic was opened in New Delhi in November 1940 with the intention of developing it into a model institution. In May 1941 a sanatorium which will provide special teaching facilities was opened at Kasauli by Her Excellency Lady Linlithgow. This institution will provide advanced training to medical men in antituberculosis work. Recently a nine months' diploma course in the subject has been established by the Madras Government. It will thus be seen that two teaching institutions have now been provided, one for Northern India and the other for South India. In addition annual post-graduate courses of one month's duration had been organised for many years past by the King George Thanksgiving (Anti-tuberculosis) Fund before it was incorporated in the Tuberculosis Association of India. This course was continued in 1940 by the Tuberculosis Association of India and was conducted at the All-India Institute of Hygiene and Public Health, Calcutta. Thirty doctors, including two women, from different Provinces, States and Railways attended the course. Lastly, the second Conference of Tuberculosis Workers in India was held in New Delhi in November 1940 and was attended by about 90 delegates from different parts of the country. A special feature of the conference was a discussion of the influence of environmental factors, such as poverty, overcrowding, under-nourishment and occupation of insanitary buildings on the incidence of tuberculosis. Thirty-four speakers took part in the discussion and the questions of town planning, slum clearance and failure to enforce building byelaws by local bodies received prominent attention.

The antituberculosis work carried out in the provinces in 1940 is summarised in the following paragraphs.

In the North-West Frontier Province two tuberculosis clinics were opened in 1940, one in Bannu and the other in Peshawar. A doctor was sent for special training in Madras and he is now employed in one of these clinics. The sanatorium at Dadar remained full throughout the year. New buildings are now under construction for the purpose of increasing the accommodation in the institution by 36 beds.

The share of the Punjab from the King Emperor's Fund is approximately Rs. 4,14,000. Of this amount 75 per cent is to be distributed among the different districts which contributed towards the Fund. A special subcommittee of the Provincial Association has been examining the schemes submitted by the different districts. So far grants totalling Rs. 13,616 have been sanctioned of which Rs. 1,000 is given to the antituberculosis dispensary at Jullundur, Rs. 9,061 to a sanatorium in Amritsar which was built recently by private munificence, Rs. 2,400 to the District Red Cross Society, Sialkot, for a survey of the school children in the town by tuberculin testing and Rs. 1,155 to the Simla municipality for equipping the newly constructed tuberculosis dispensary in that town. The Provincial Association has also approved of schemes received from the Deputy Commissioners of Ferozepore, Gurgaon and Shahpur for the establishment of clinics.

It has been decided that a tuberculosis survey should be carried out in a typical area of the province. This area would include a number of villages and small towns. The survey is to extend over a period of five years and its estimated cost is nearly Rs. 1½ lakhs. Of this about Rs. 60,000 will be contributed by the Rockefeller Foundation, about Rs. 41,000 will be provided by the Provincial Association and the balance will be met by the Public Health Department. It is stated that the survey will start shortly.

The Inspector General of Civil Hospitals, the Punjab, and the Principal, King Edward Medical College, Lahore, have under consideration a scheme for the training of doctors and women workers in tuberculosis work.

The United Provinces Tuberculosis Association has approved of a scheme for the antituberculosis campaign in the province. This scheme provides for the establishment of tuberculosis clinics in a few centres for the purpose of demonstrating the possibility of fighting the disease effectively and for giving field training to tuberculosis workers. Lucknow has been adopted as the provincial centre for such a campaign.

In Bihar the treatment of tuberculosis patients is carried out in a certain number of clinics in different parts of the province. A clinic is run in Patna city under an honorary medical officer. Follow up work in the homes is being carried out through male and female health visitors; about 600 cases were treated during the year at the clinic and approximately 3,000 home visits were paid by the health visitors. Other clinics are run in association with Sadar Hospitals in Chapra, Purulia and Muzaffarpur and with the Pilgrim Hospital in Gaya. New clinics were opened at Motihari and Bettiah in Champaran district.

In Orissa it is reported that a provincial tuberculosis clinic at Cuttack is under construction. The Government have agreed to meet the maintenance charges of the institution at an estimated cost of Rs. 10,000 annually and provision has been made for this amount in the budget for 1941-42. It is expected that the central clinic will begin to function from September 1941.

A health visitor is maintained by the Provincial Tuberculosis Association for visiting the homes of patients within the municipal area of Cuttack. In the course of such visits she detected 90 cases of pulmonary tuberculosis in the town of whom 29 died during the year. Although advice and instruction regarding home isolation are being given by the health visitor, lack of facilities for the treatment of tuberculosis cases is stated to have prevented anything substantial being done for the patients.

A considerable amount of propaganda is stated to have been carried out during the year through pamphlets, posters and leaflets which were widely circulated for the purpose of disseminating elementary but useful information regarding the disease. The health staff under the Government and local bodies gave 820 talks on tuberculosis during the year. It is stated that a booklet on the subject with coloured illustrations has been prepared and that it is now being printed both in English and in Oriya. An examination of the cattle maintained in the municipal dairy farms and in the jails of the province has been in progress for the purpose of ascertaining the existence of tuberculosis infection in cattle.

The Director of Public Health, Bengal, states that, as a preliminary step towards the introduction of a comprehensive scheme for the control of the disease, tuberculosis surveys of the population have been in progress since July 1939. Rural, urban and industrial populations have been included in these surveys. It is stated that all the modern diagnostic methods, such as X-ray examination and tuberculin test, are being employed.

A comprehensive scheme for antituberculosis work in the province is stated to be under the consideration of the Government. The scheme includes (1) special training courses for medical and health officers and for home visitors; (2) the establishment of chest clinics in district headquarter hospitals; (3) the organisation of home treatment in urban areas; (4) the establishment of milk kitchens attached to the clinics towards the maintenance of which the Government would make a grant equal to the amount collected and spent locally, subject to a maximum of Rs. 500 per annum for each clinic; and (5) the provision of a tuberculosis hospital in the neighbourhood of Calcutta and of additional beds for the treatment of tuberculosis in the existing hospitals of Calcutta and in district and subdivisional hospitals. The Tuberculosis Association of Bengal receives a grant of Rs. 10,000 per year from the Provincial Government for organising educational propaganda.

A Provincial Tuberculosis Association was formed in the Central Provinces and started work recently. Four tuberculosis clinics were established in 1938 at Nagpur, Jubbulpore, Amraoti and Raipur respectively. It is stated that these continued to work satisfactorily during the year.

In Sind a scheme has been prepared for establishing tuberculosis clinics on modern lines, which will be run in association with the civil hospitals in the headquarters of the four districts, Sukkur, Larkana, Nawabshah and Mirpurkhas. In order to demonstrate the value of these institutions the Provincial Association has undertaken to maintain them with the help of the Government for a period of five years and a sum of Rs. 25,000 has been earmarked for this purpose. It is hoped that, after five years, either the Government or the local bodies concerned will take up the maintenance of these clinics.

As regards Karachi an up-to-date sanatorium is stated to be nearing completion eight miles outside the city. Certain additions and alterations

to the Municipal Tuberculosis Dispensary, which were suggested by the Medical Commissioner of the Tuberculosis Association of India, are being carried out.

Leprosy.

8. In recent years noticeable features of the antileprosy campaign in India have been an increase in the survey work carried out in different parts of the country and, at the same time, a modification of the methods of survey. In the past emphasis was laid mainly on sample surveys for securing an estimate of the rate of incidence of the disease in the community under investigation. However a mere enumeration of the lepers does not provide sufficient material on which to found an antileprosy campaign. The prevailing type of the disease and the proportion of infected children to the total number of lepers discovered are now recognised as being essential data for assessing the position of leprosy as a public health problem in a particular area. In the opinion of our experts if the proportion of the more severe form of the disease, the lepromatous type, is high and if persons under 15 years form an appreciable percentage of the number of lepers in an area then leprosy must be considered a serious problem in that area. For that reason the tendency now is to carry out surveys on a detailed basis. The Indian Council of the British Empire Leprosy Relief Association has carried out such surveys of the total population of certain selected areas and similar work has also been done by some local authorities. In view of the importance of carrying out such investigations on a uniform basis in different parts of the country the Scientific Advisory Board of the Indian Research Fund Association has appointed a committee to draw up a memorandum which will act as a guide for the conduct of leprosy surveys.

The results of the surveys already carried out on these modified lines show that considerable variations exist in different parts of the country in regard to the type and extent of the disease. The following figures are quoted from the report of the Indian Council of the British Empire Leprosy Relief Association for 1940.

Area.	Population examined.	Percentage of the population infected with leprosy.	Percentage of lepromatous cases.	Percentage of cases below 15 years.
1. Santalpur (Bengal)	3,600	7.4	4	17
2. Bankura (Bengal)	10,011	4.4	18	26
3. Saidapet (Madras)	2,040	6.7	25	49
4. Madras (Rural area)	2,007	4.3	25	36

Less accurate reports are available regarding certain other areas of India. A few recent figures are given here :—

Kangra district (Punjab) . . . . .	..	0.1	57	12
Jodhpur . . . . .	..	0.1	43	5
Assam . . . . .	..	1.8	9	11

The rates of incidence of leprosy in the population vary widely in these areas. What is even more important the percentages of (a) those with the promatous type of the disease and (b) infected children also vary widely. In Assam leprosy is relatively of small importance as a public health problem while in the two areas in Madras Presidency the incidence and severity of the disease are both high. The two localities in Bengal occupy an intermediate place while in Kangra district and Jodhpur, although the incidence of leprosy is low, the proportion of severe cases is high.

The main features of the antileprosy campaign in India were briefly described in last year's report. Provincial Governments have begun to take an increasing interest in the leprosy problem, particularly in those provinces in which the incidence of the disease is high. The most important voluntary organisations for antileprosy work are the Indian Council of the British Empire Leprosy Relief Association, with its provincial branches, and the Mission to Lepers. The former has taken an active part in the organisation of laboratory and field research, the provision of outpatient treatment centres, the training of doctors in antileprosy work and educational propaganda. The Mission to Lepers has built up a chain of leper homes all over the country during the past 66 years and, during 1939, the number of patients treated as inpatients in these institutions was 8,213 and as outpatients 6,096. In addition over 800 healthy children were cared for separately from the patients.

A welcome feature of the development of antileprosy work in India has been the growing co-operation between governmental and voluntary agencies. On the central and provincial committees of the British Empire Leprosy Relief Association the health administrations of the respective governments are well represented and this should help towards the elimination of any wasteful overlapping of effort.

While the magnitude of the problem in the areas in which leprosy is widely prevalent makes difficult any rapid advance in the control of the disease, and while further field studies and laboratory research are essential for the elucidation of various problems, a matter of pressing importance today is the utilisation of the existing knowledge on as wide a scale as possible. The most important preventive measures are provision for the isolation of infectious cases and the protection of children from exposure to infection. The incidence of leprosy is mainly amongst the rural population and it is to the rural areas where the disease is endemic that our attention should firstly be directed. Although isolation of the infectious patient is perhaps the most important measure in the campaign against the disease, no costly scheme of segregation can be considered in view of the poverty of the rural population.

A hopeful line of advance is the development of farm colonies. Land suitable for cultivation should be made available by the Provincial Government and only a very simple type of accommodation need be attempted. Agriculture and cottage industries are suitable occupations for leprosy patients and in order to organise such activities, the Agricultural and Co-operative Departments of the Provincial Government should give the necessary help. A certain amount of physical exercise is beneficial to the patient and graduated work will not alone improve his health but will distract him from the sad contemplation of his affliction which so frequently characterises the leper's mental outlook. A treatment centre must be provided in the colony and the local dispensary doctor, who must be trained in the diagnosis and treatment of the disease, should pay his regular visits in order to carry out treatment.

The difficulties in the way of successfully developing such an organisation are recognised. Differences in religion and modes of life make the development of community life by no means easy in a group of people drawn from different areas into a new home. Two or three consecutive years of deficient rainfall may so upset agricultural operations as to seriously jeopardise the economic stability of the colony. This is what happened in a farm colony which was set up a few years ago at Mangaltarai in the Central Provinces under the auspices of the Mission to Lepers. Another serious difficulty is that, since the giving of alms to lepers is considered a religious duty by millions of Hindus and as a lucrative business is being carried on by leper beggars in some of the larger cities of India and in places of pilgrimage, the life on the farm may prove less attractive than the beggar's profession in large centres of population. It is recognised that all these difficulties exist, but the only way in which the problem of segregating infectious cases in the rural population can be solved is by providing an alternative mode of life under conditions in which opportunities for work and for supporting themselves are made available to these patients. The provision of medical care is an added attraction to them for settling in the farm colony.

In the following paragraphs the antileprosy work carried out in the provinces during 1940 has been briefly reviewed.

Leprosy is stated to be a problem of little importance in the North-West Frontier Province. There is a leprosy centre at the Lady Reading Hospital, Peshawar, where 28 outpatients and 11 inpatients were treated for leprosy. Again in the Civil Hospital at Chitral 15 outpatients and four inpatients were treated. At other medical institutions of the province a total of 23 leprosy patients was treated.

A survey of the incidence of leprosy has been in progress in the Punjab since 1931 and the survey was continued during 1940 in the districts of Jullundur and Ferozepur. A population of 949,035 was covered by the surveys in 1940 and the number of lepers discovered was only 60. This is in conformity with the findings of previous surveys which show that the incidence of leprosy in the Punjab is small.

The Provincial Leprosy Officer carried out the lepromin test on 270 persons belonging to different age groups in an area of the province which has been known to be free from disease. This investigation was done in collaboration with the officer-in-charge of the Leprosy Research Department, School of Tropical Medicine, Calcutta. The tentative conclusions drawn from this study are stated to be that children and adolescents are particularly susceptible to leprosy and that the susceptibility decreases with advancing age.

In the United Provinces a special leprosy officer is maintained by the provincial branch of the British Empire Leprosy Relief Association and he works under the direction of the Director of Public Health. His work during the year was confined to the district of Bahraich, where he carried out treatment of leprosy cases and propaganda by means of lectures and demonstrations. Skin clinics are maintained in Benares, Cawnpore and Lucknow and in these a certain number of cases of leprosy is also treated every year.

In Bihar leprosy is widely prevalent. There are nine leper asylums and a large number of outpatient clinics. The asylums are administered by Missions or by local committees and the Government gives grants to these institutions on the basis of Rs. 3-8-0 per patient per month. These grants totalled Rs. 91,370 during 1940.

A Provincial Antituberculosis and Leprosy Officer was appointed by Government during the year. He works under the Inspector-General of Civil Hospitals. Intensive surveys have been carried out in different parts of the province. It is reported that these surveys covered, by October 1940, a population of 157,000 persons in 554 villages and that among them 2,607 cases of leprosy were discovered. In Dhanbad subdivision out of a population of 20,000 in 86 villages, 14,000 were examined and 162 cases were detected. Government sanctioned Rs. 3,900 for a leprosy survey in Santhal Parganas. The investigation started in October 1940 and was continuing at the end of the year.

In Orissa a provincial leprosy officer is maintained by the Government and six district leprosy officers and 16 leprosy assistants are maintained by the provincial branch of the British Empire Leprosy Relief Association. The number of leprosy treatment centres is stated to have risen from 115 in 1939 to 153 in 1940. It is reported that these centres are being used not only for the treatment of patients but also for intensive survey and propaganda within a radius of five miles of each clinic. Through the organisation of village leprosy relief committees, survey work in each village is linked with such preventive measures as are possible under the existing rural conditions. It is stated that sample surveys have been carried out in 53 new centres during the year under report. A new leper colony was established in 1940 at Junani district of Sambalpur. An isolation colony had been opened in 1939 at Lathi in the district of Ganjam. It is stated that the opening of other isolation centres has been planned.

The total number of doctors so far trained in the province in antileprosy work is 24.

Leprosy is prevalent extensively in certain districts of Bengal. These districts are Rangpur, Midnapore, Murshidabad, Birbhum, Nadia, Rajshahi, Bankura, Dinajpur, Dacca, Hooghly, Mymensingh and Burdwan. A comprehensive scheme for dealing with leprosy in the province has been prepared by the Director of Public Health and it is stated that this scheme is under the consideration of the Government. The scheme provides, among other measures, for special courses of training in leprosy for medical and health officers and for the establishment of leprosy clinics in Sadar, Subdivisional and Union Board hospitals. The Director of Public Health states that a beginning will be made for the inauguration of the antileprosy campaign by the carrying out of these two provisions of the scheme.

The Bengal Branch of the British Empire Leprosy Relief Association carried out sample surveys in 22 different areas of the province, the number of persons examined being 41,000. Among them 528 cases of leprosy were discovered. An examination of 86 schools showed that, among 10,000 pupils examined, there were 36 cases of leprosy. The number of leprosy clinics which functioned in Bengal in 1940 was 134.

During the year an important event was the opening of a Leper Hospital and Settlement at Asansol by the Asansol Leprosy Relief Association. Three District Leprosy Relief Councils were organised during the year for Murshidabad, Bankura and 24-Parganas districts.

The incidence of leprosy is stated to be relatively higher in the eastern and southern parts of the Central Provinces than in the remaining areas. In this province there exist several inpatient leprosy institutions which are mostly run by Missions with grants from the Government. These provide accommodation for 1,500 patients. On the other hand outpatient treatment, survey and propaganda are being carried out by the Public Health Department, a

contribution from the provincial branch of the British Empire Leprosy Relief Association being made to meet a part of the cost of this work. The number of leprosy treatment centres is stated to have risen from 41 in 1939 to 44 in 1940. Some of these centres are run by the doctors in charge of local dispensaries, but most of them are staffed by Subassistant Health Officers of the Public Health Department. In this province there are separate Subassistant Health Officers for leprosy duty and for general epidemic duty in each tehsil. The Director of Public Health reports that a scheme has recently been introduced whereby the Subassistant Health Officers on epidemic duty are also required to pay special attention to leprosy. In order to equip these officers for antileprosy work Government have issued orders that they should be given training in leprosy. Twelve epidemic Subassistant Health Officers and eight leprosy Subassistant Health Officers were given a special refresher course in leprosy during April 1940.

The Government issued orders for the establishment of district leprosy councils in Nagpur, Amraoti, Chanda, Yeotmal, Buldana and Wardha districts and also gave a grant of Rs. 600 to these district leprosy councils.

In Bombay Presidency leprosy is stated to be more prevalent in certain eastern districts than in other parts of the province. The Bombay branch of the British Empire Leprosy Relief Association maintained 45 leprosy clinics during the year. In addition 92 treatment centres were maintained in Government dispensaries during 1940 as against 70 in 1939. The numbers of new and old cases treated at the Government centres were 1,201 and 540 respectively. The clinics under the Association treated 5,199 cases during the year.

A special leprosy officer is maintained by the Government. He visited ten districts and carried out propaganda. It is stated that he has been asked to take up survey work, a few villages in each taluk being surveyed in detail.

In Madras Presidency the Government have agreed that the provincial branch of the British Empire Leprosy Relief Association should act as an advisory body to Government and that it should direct all leprosy investigations. In pursuance of this order of the Government the headquarters of the antileprosy campaign have been transferred to the Lady Willingdon Leprosy Sanatorium at Chingleput. The programme of activities include post-graduate training courses for medical men, investigations into urban and rural leprosy, a study of the problem of segregation in relation to leprosy in childhood under rural conditions and epidemiological studies by detailed surveys in the rural areas around four towns, Vellore, Madura, Cuddalore and Wandiwash.

Since 1937 the courses at the Chingleput Leprosy Sanatorium have given training to 75 medical men and 58 health officers. The urban investigation unit has been established at the Government hospital, Royapuram, in Madras city and a detailed survey of the area has been carried out. With this preliminary study an investigation of the methods of control of leprosy under urban conditions is to be started in 1941. In two villages it is stated that, with the co-operation of local authorities and influential persons 'experimentation in practical but simple rural segregation is proceeding'.

In Salem a segregation sanatorium and treatment centre for boys from selected villages is being developed in connection with a proposed Children's Home for the purpose of studying the problems of segregation in relation to leprosy in children.

The epidemiological studies in the areas surrounding the four towns mentioned above are expected to throw light on the factors influencing the spread of leprosy. In the Wandiwash area the incidence rate of leprosy is 26.6 per

cent and the child rate and open case rate are both 40 per cent. These figures indicate a serious position and the investigation of methods of control has been taken up.

Kala-azar.

9. The incidence of kala-azar is mainly confined to north-eastern India, namely, the provinces of Bihar, Bengal and Assam. The Directors of Public Health of the United and Central Provinces have also drawn attention to the occurrence of some cases in certain parts of their provinces. Brief notes regarding the incidence of kala-azar in these provinces are given below.

The Director of Public Health, Bihar, reports that the incidence of kala-azar, like that of malaria, was high during 1939 and 1940 in the districts of North Bihar. Twenty special centres for the treatment of the disease have been working since 1939 in the districts of Purnea, Darbhanga, North Bhagalpur and Muzaffarpur and these continued to function throughout 1940. Each of these centres had two or three subcentres and these were shifted from time to time according to changes in the relative prevalence of the epidemic. Kala-azar patients were also treated at the treatment centres for malaria and at district-board dispensaries. The kala-azar centres are stated to have been maintained entirely at the expense of the Government. The numbers of kala-azar cases treated at the centres in the four districts are given below.

	Number of cases treated.
Muzaffarpur	6,081
Darbhanga	14,335
Purnea	7,886
North Bhagalpur	4,891

In Bengal the prevalence of kala-azar is reported to have been high in the districts of Faridpur, Noakhali, Malda, Rangpur and Mymensingh during 1940. Grants totalling Rs. 75,000 were distributed among the different district boards and the Central Antimalaria Co-operative Society, Calcutta, for the maintenance of kala-azar treatment centres. Special drugs for treating kala-azar patients were also distributed among the local bodies for a sum of Rs. 28,000.

In Darjeeling district, the special treatment scheme which had been in operation previously, continued during 1940 and a sum of Rs. 17,000 was spent. Twenty treatment centres and three subcentres worked during the year and 1,969 new cases of kala-azar received treatment, of whom 1,598 are reported to have been cured.

The Director of Public Health, Assam, states that the main steps against the disease in that province consist of systematic surveys, detection and treatment of cases of the disease. During 1940 the number of cases treated was 21,376 as against 17,756 in 1939. Thus there was in 1940 an increase of 20 per cent in the number of patients treated. The Director considers that the increase over the province as a whole is probably due to the intensive surveys

carried out and the greater supervision exercised over bringing patients under treatment and that it does not indicate an increase in the incidence of the disease. In fact he is inclined to think that there may have been a diminution of infection in the province. As an instance he gives figures for Sibsagar district in which, although many intensive surveys were carried out during the year, only 644 cases were detected in 1940 as against 1,358 in the previous year.

Whatever the real state of affairs may be, it is gratifying to record that the methods of treatment that are in use have reduced the rate of mortality from the disease to the very small proportion of two per cent. The Director believes that, with further improvements in technique, it may be possible to reduce the death rate further. A disquieting feature of the situation is that the incidence rate has not so far shown a corresponding decline. Until more light is thrown on the transmitting agent for the disease the organisation of a preventive campaign cannot be placed on a scientific basis.

In the United Provinces it is reported that, during the year, the incidence of kala-azar showed an increase in the districts of Gorakhpur and Benares. Three treatment clinics were started in the former and two in Benares municipality in 1940.

The Director of Public Health, the Central Provinces, states that 12 deaths were reported during the year as having been due to kala-azar as compared with ten in the previous year. The districts reporting these cases were Wardha, Chhindwara, Saugor, Bilaspur, Amraoti and Yeotmal.

Cerebrospinal fever.

10. Cerebrospinal fever is reported to have occurred in sporadic form in many provinces. Eighteen districts in the Punjab reported the occurrence of this disease during 1940. There were in all 95 attacks and 35 deaths in the province. The districts of Lahore, Amritsar and Hissar reported 22, 17 and 17 cases respectively during the year. In the other districts the number of cases was less than ten. In the United Provinces the infection was mostly confined to the towns of Saharanpur, Meerut, Agra, Bareilly, Farrukhabad, Benares, Mirzapur, Ghazipur and Lucknow. The rural areas of the districts of Shahjahanpur, Fatehpur and Gonda also reported cases. In Bengal it is stated that during 1940 thirteen districts reported cases of cerebrospinal fever. Of these the Asansol Mining Settlement recorded the largest number of cases, namely 13 and 24-Parganas and Darjeeling districts nine and six respectively. The number of registered deaths from this disease in the Central Provinces is stated to have been 26 in 1940 as against 35 during the previous year. Nine deaths were reported from Nagpur city and the remaining deaths took place in nine districts of the province. Bombay city recorded 33 deaths from this cause during the year and Ahmedabad 10. In the province as a whole there occurred 64 deaths from cerebrospinal fever. Seventeen cases and ten deaths from this disease were reported from Sind in 1940 as against nine cases and seven deaths during the previous year. Except for 16 attacks and 12 deaths and five attacks and three deaths from this cause in Manipur and in the Khasi and Jaintia Hills respectively, the province of Assam was free from infection in 1940. Six cases of the disease were reported from Baluchistan during the year.

SECTION III.

HEALTH ACTIVITIES OF THE CENTRAL AND PROVINCIAL PUBLIC HEALTH DEPARTMENTS.**Introduction.**

11. As has already been pointed out in Section I of this report the year under review has been one of activity on the usual lines of progress, unhampered to any noticeable extent by the interruptions caused by the war in many other parts of the world. As has been shown in the annual reports of the Public Health Commissioner for the past few years, two welcome features of the health situation in India have been, firstly, the growing recognition on the part of Provincial Governments of the necessity for increased attention to the health of the rural population and, secondly, the development of cooperation through the Central Advisory Board of Health among the Governments of British India and the Indian States. Although budgetary vicissitudes arising from the war may temporarily impede progress, there is every reason to believe that the demand for better living conditions will become more articulate as years go by and that this demand will provide the stimulus for the betterment of the health of the nation. The Central Advisory Board of Health held its third meeting on the 22nd, 23rd and 24th July 1940, at Poona. In his opening remarks at the third meeting of the Central Advisory Board of Health held in Poona the Hon. Sir Girja Shankar Bajpai, K.B.E., C.I.E., I.C.S., Member in charge, Department of Education, Health and Lands, Government of India, and Chairman of the conference, referred to the fact that while the members' thoughts and energies were naturally centred on the war, the mere fact that the Board was meeting was proof of the confidence in the Empire's final victory and proof also of the members' determination not to neglect the home front.

As has already been indicated in the first section of this report, important health problems such as those of food adulteration, inoculation of pilgrims against cholera, provision of laboratory facilities for private medical practitioners and Government doctors for the diagnosis of infectious disease, health education of school children and of the public were discussed at the meeting. The Board after very full discussions adopted a number of resolutions and these resolutions, which are given below, indicate the scope and variety of the problems discussed at the meeting :

Report of the Committee on the Compulsory Inoculation of Pilgrims :—

(a) The Central Advisory Board of Health, in adopting the report of the Special Committee appointed to examine the possibility of introducing a system of compulsory inoculation of pilgrims against cholera, expressed its thanks to the Committee for the able manner in which it has carried out its task. The Board commends the report to all Provincial and State Governments for their detailed consideration.

(b) The Board considers that public opinion in favour of anticholera inoculation has grown rapidly in recent years and that the question of introducing compulsory inoculation of pilgrims before they are allowed to enter a festival area can now be considered by Provincial and State Governments without apprehension regarding any possible effects on the minds of the people.

(c) The Board recommends that Provincial and State Governments should study the Pandharpur scheme of indirect compulsory inoculation and that they should for a start select suitable festival centres for trying out this scheme.

(d) The Board wishes to bring to the special notice of all Provincial and State Governments the recommendation of the Committee that, to ensure the success of a compulsory inoculation campaign, a vaccine made from the true strains of the cholera organism should be used.

(e) To meet the cost of health measures including inoculation carried out at the festival centre, the Board considers the imposition of taxes not alone on pilgrims but also on vehicles and animals entering a festival area as being eminently reasonable, and emphasises that these taxes should not be credited to the general funds of the local body or of the Government which may collect them but should be used strictly for the benefit of the pilgrims. They should be administered by the Pilgrim Committee and not by the local body.

(f) For the organisation of an effective campaign of mass inoculation of pilgrims before they set out on their pilgrimage, the Board commends the following suggestions of the Committee :

- (i) the utilisation of the services of specially trained sanitary inspectors for carrying out inoculation under the supervision of qualified medical men ;
- (ii) the free supply of anticholera vaccine by Government to local bodies ; and
- (iii) the use of inoculation certificates of an official nature and of a design quickly recognisable by the inspecting authorities. These certificates should only be issued by medical officers employed by the Government or by local bodies.

(g) The Board recommends for the consideration of Provincial and State Governments the legal aspect of the question of compulsory inoculation described on pages 11, 12 and 13 of the Committee's report and recommends that the question should be examined in order to see whether the existing powers are sufficient or whether it is necessary to acquire fresh powers.

(h) The Board considers that health authorities in the Provinces and States, in consultation with railway administrations, should endeavour to devise methods for the conditional issue of tickets to pilgrims, assuming that to reduce work at railway stations as much inoculation as is possible is carried out by public health organisations in the villages and *en route* to the rail-head.

Report of the Food Adulteration Committee :—

(a) The Central Advisory Board of Health wishes to record its appreciation of the valuable report on the technical aspect of the food adulteration problem submitted by its Committee on Food Adulteration and considers that the recommendations in the report are an important contribution to the solution of the complex question associated with this subject.

(b) The Board endorses the opinion of the Committee on Food Adulteration that the improvement of methods of food analysis and the prevention of food adulteration in India will have to be a continuous process. The establishment of co-ordination between the Provinces is a matter second to none in urgency and with this object in view the Board supports the recommendation for the appointment of a Standing Committee entitled "The Central Committee for Food Standards" which will act in an advisory capacity on the lines of the Society of Public Analysts in England and the British Standards Institution.

(c) The Board recommends that immediate steps should be taken by the Chairman of the Board to nominate such a body on the lines recommended by the Food Adulteration Committee.

(d) The Board recommends that the Central Committee should take up, as early as possible, the consideration of various questions referred to it by the Food Adulteration Committee.

(e) The Board commends to Provincial and State Governments the various recommendations made by the Food Adulteration Committee in regard to definitions and standards and considers that their early adoption will help towards the removal of the restrictions which now prevent the free flow of interprovincial trade, particularly in respect of certain important articles of food.

(f) The Board expresses the hope that the Food Adulteration Committee will complete its further enquiries at an early date.

The effects of the new prohibition policy on the health of the inhabitants in the prohibition areas :—

The Board, having considered the reports received from certain Provinces on the effects of the new prohibition policy on the health of the inhabitants in the prohibition areas, considers that it is difficult on the material collected so far to draw any definite conclusions as to the effect of prohibition on the health of the people. The Board considers it desirable that further information should be collected by the Provinces concerned and suggests to Provinces that the information be collected on lines to be indicated by the Secretary to the Central Advisory Board of Health after consultation with the Provinces concerned.

Results of investigations into the prevalence of fluorosis :—

The Board has read with interest the results of investigations into the prevalence of fluorosis in certain Provinces. In regard to Madras it suggests :

- (a) the desirability of taking steps to improve the nutrition of the people in the affected areas ; and
- (b) the carrying out of further research into the problem of cheap methods of removing fluorides in drinking water supplies under rural conditions.

With regard to the Punjab, the Board draws attention to the desirability of field investigations regarding the prevalence of endemic fluorosis in those areas where the drinking water supplies contain a large proportion of fluorides. This study might also take into consideration the diet of the people of the affected areas and its bearing on the incidence of the disease.

It is recommended that other Provinces in which fluorosis constitutes a health problem should pursue investigations on similar lines.

Establishment of laboratories at suitable centres for the free examination of clinical material, from cases of infectious disease, sent either by a medical practitioner or by a Government medical officer :—

The Board considers that the provision of a free laboratory service to medical practitioners for the detection of infectious disease is desirable in the interests of the public health. With this end in view the Board commends for the consideration of Provincial and State Governments the suggestions contained in the memorandum on this subject submitted by the office of the Central Advisory Board of Health, subject to such alterations as local conditions may require.

Teaching of hygiene in schools and medical inspection of school children :—

The Board, having considered the memoranda submitted by the Governments of the Punjab and Madras and by the Educational Commissioner with the Government of India on "The teaching of hygiene in schools" and on "Medical inspection of children in schools", considers that the two subjects are closely related. Systematic attention to the health of children is an essential preliminary to any really remunerative system of instruction, whether it be in hygiene or other subjects in the curriculum. Where the physical condition of the child is unsatisfactory the money spent on educating him is largely wasted. The foregoing involves regular medical examination of school children, the treatment of illness and physical defects and the provision for undernourished children of such food as may be necessary to raise them to an average physical standard. Teaching is not likely to be a success if the general school environment does not conform to reasonable hygienic standards. Information is necessary as to what extent these requirements are met in the different provinces and how best existing defects may be remedied at the least possible cost.

The Board therefore recommends that the Chairman should appoint a special committee to report on the dual question of the teaching of hygiene in schools, primary as well as secondary, rural as well as urban, and of the medical inspection of school children and their treatment and, in the primary stage, also their nutrition.

The effect of bad housing and overcrowding on tuberculosis.

The Board commends for the consideration of Provincial and State Governments the memoranda submitted by the Tuberculosis Association of India and the office of the Central Advisory Board of Health on the effect of bad housing and overcrowding on tuberculosis. Unsatisfactory housing conditions and overcrowding tend to produce an increased incidence of tuberculosis while the transference of tubercular patients from unhealthy to healthy dwellings produces an improvement in their symptoms and the physical signs of the disease. Improvement of housing requires the clearing of insanitary and congested areas in towns and cities and the exercise of rigorous control over the hygienic standards applied to the new housing scheme on the cleared slum areas.

The failure on the part of local bodies, in many parts of this country, to enforce byelaws relating to health matters has been a subject of constant reference in public health reports for a number of years. While the rectification of defects in an existing slum area may be difficult, there can be no excuse when, after costly slum clearance operations by Improvement Trusts and other bodies, the cleared areas are permitted to be built over without due regard to the requirements of light, ventilation and sound hygienic construction. The Board, therefore, strongly urges upon all Provincial and State Governments the necessity, in the interests of public health, of strict enforcement of building byelaws.

Public health publicity :—

(a) The Board commends for the consideration of Provincial and State Governments the memorandum submitted by the Government of Madras on "Public health publicity". While routine health administration if efficiently carried out constitutes in itself an effective means of educating the people in health matters, the absence of such administration in many parts of India makes it still more necessary for Governments to utilise the various methods of health propaganda described in the memorandum for the education of the individual.

(b) The Board recommends that Provincial and State Governments should take steps to encourage and develop the education of the people in health matters by means of well directed and carefully prepared propaganda material of all kinds, where satisfactory arrangements for the purpose do not already exist.

Reports on opium addiction and its control in Assam :—

The Board has read with interest the reports submitted by the Government of Assam and by the Director of the School of Tropical Medicine, Calcutta, on the scheme for prohibition of opium in the Sibsagar and Dibrugarh subdivisions, Assam, and recommends that copies of the reports should be circulated to all Provincial and State Governments.

Hospitalisation and treatment of plague cases :—

The Board notes the memorandum submitted by the Government of Madras containing a scheme on the hospitalisation and treatment of plague cases and commends it to all Provincial and State Governments for their earnest consideration.

These resolutions have been forwarded to the Provincial and State Governments. They lay down sound principles for regulating policy in regard to numerous public health problems. At their next meeting the Board will review the action taken by the various Governments on these resolutions.

Rural health.

12. Among the important developments in rural public health activities in India during recent years have been studies in the organisation of a rural health service through the formation of "Health units", improvement of water supplies and attempts to develop a satisfactory system of nightsoil disposal.

HEALTH UNITS.

The area chosen for a health unit usually has a population of 40,000 and the annual budgetary provision is about Rs. 30,000. The staff should consist of one medical officer of health, an assistant medical officer who should preferably be a woman, four sanitary inspectors, four health visitors, eight midwives, one clerk and the necessary menials. The health units established in the different provinces have not always had the full complement of staff suggested above. Moreover, in certain places there has been considerable difficulty regarding the recruitment of health visitors and midwives in the rural areas. It cannot therefore be said that the health unit system has functioned in this country with maximum efficiency. Nevertheless, as will be seen from the following short notes on the activities of the different health units, these organisations have served a useful purpose by stimulating intensive health work in local areas, by evoking popular support for health measures and by providing opportunities for the training of personnel for rural health work. As stated already the annual cost of a health unit is in the neighbourhood of Rs. 30,000 and it is therefore clearly impossible to cover the country with this type of organisation. However, the importance of maintaining one or two fully developed health units in each province must be emphasised. The unit will form the centre for training health personnel and for providing refresher courses for such workers. Apart from these advantages, the trained staff of the health unit with their intimate contact with the rural population are in a position to undertake investigations into various rural health problems.

During 1940 health units worked in the provinces of Madras, Bombay, Delhi, Bengal and the United Provinces. The Poonamallee health unit in the Madras Presidency completed its fifth year of co-operation with the Rockefeller Foundation on 30th September 1940. Under the arrangements between the Foundation and the Provincial Government the annual grant from the Foundation ceased from that date and the Government decided to continue the unit on a modified scale. It is stated that the unit made marked progress in maternity and child welfare work, the midwives attending 60 per cent of the total births in the area. One hundred and twenty students of the Madras Medical College took a course of practical training in the health unit area and 177 subsidised medical practitioners also underwent training there.

It is stated that the Sirur health unit in Bombay Presidency had not secured its full staff of health visitors by the end of the year. The medical officer of health, a health visitor and a sanitary inspector attached to the health unit were sent to Ceylon for training in this type of rural health work. Ceylon has been particularly successful in this class of health work. A woman doctor has been employed and it is stated that she will also be sent for training to Ceylon and Mysore. The unit has not yet developed its work to a sufficiently high level to provide suitable training for public health personnel.

The work of the health unit staff in Delhi has been considerably facilitated by the development of roads in the rural area and they can now move about from village to village more quickly and comfortably. An interesting development has been the utilisation of the services of the medical officer of health for giving instruction in the Government training school for teachers which is located at Najafgarh. This health instruction for teachers should be developed on a wider scale throughout the country as it is probably the most effective way of eventually improving the health education of the children.

The Singur health unit in Bengal is stated to have developed its work in a satisfactory way. During the year the students for the D. P. H. course in the All-India Institute of Hygiene and Public Health, Calcutta, spent two weeks in the health unit area studying the methods of rural health administration. The unit was also visited by the students of Sir John Anderson Health School, Calcutta, by officers of the rural reconstruction camp at Singur and by agricultural officers.

The Partabgarh health unit in the United Provinces has been run by the provincial authorities since 1938 in which year the participation of the Rockefeller Foundation ceased. One of the main activities of this unit has been the organisation of health leagues.

Dr. W. P. Jacocks, Regional Director in India and Ceylon of the International Health Division of the Rockefeller Foundation, has given an excellent account of the work done by health leagues. He states "The entire village population constitutes the league membership, and at meetings any member of the village community is free to offer suggestions or to discuss proposals. The usual procedure is to form a small committee consisting of a chairman, a secretary and three or more members of the village. This committee meets monthly and records its deliberations in a minutes book. A member of the health unit staff attends the meetings by invitation and gives the committee the benefit of his technical knowledge. As a result, at one of the early gatherings a programme is prepared containing various items of work to be attempted and the order in which they are to be taken up. These details include clean-up days by sweeping and by removing the cattle to the borders of the village, vaccination against smallpox and other diseases, putting ventilators and windows in homes, digging bored hole soakage pits and bored hole latrines, collecting vital statistics, and attending to other similar village needs". With regard to Partabgarh Dr. Jacocks goes on to say that "it would be possible to visit any village in which a league exists and to learn that everyone, young and old, had been vaccinated against smallpox, that all homes were ventilated, that each home had a bored hole soakage pit and bored hole latrine, and that all occurrences of births and deaths had been accurately recorded. In respect to environmental sanitation and inoculation the league has improved matters beyond all recognition. The reason for its success is due no doubt to the utilisation of the *panchayat* principle which is universally understood in India and is clearly appreciated by all village bodies. It is probable that the development of the health league idea is the most important contribution to general sanitation which the health unit system has yet made to the cause of public health."

RURAL WATER SUPPLIES.

As regards rural water supplies the information given in the reports of the Provincial Directors of Public Health regarding the developments during 1940 is briefly summarised below :—

In the North-West Frontier Province a scheme has been inaugurated by the Government for providing wells in the dry areas. It is stated that, in a short number of years, these areas will be provided with adequate drinking water.

In the Punjab it is stated that water supply schemes in large villages were completed at a total cost of Rs. 1,94,589 and that works costing Rs. 70,456 were in progress. In addition district boards were given grants by the Government for rural water supply schemes, and in 1940-41 these totalled Rs. 1,24,319.

In the United Provinces improvements to existing wells were made in many villages and new wells with hand pumps were provided in other villages. No information has however been given with respect to the expenditure incurred on these works.

It is stated that, in the Purnea district of Bihar, the water supply problem was acute in 1940. During the year 345 tube wells and 190 other wells were provided in different parts of this district. Forty wells were also provided in different villages in Manbhum district.

In the coastal areas of Orissa tanks usually form the source of water supply. The Director of Health and Inspector General of Prisons states that the district boards have been instructed to conserve certain tanks for drinking purposes only and to have these tanks well protected by high embankments to prevent contamination by men and animals.

It is stated that in Bengal a comprehensive scheme for rural water supply was inaugurated in 1938. A special committee for each *thana* prepares a priority list of villages for the application of the scheme for improving the water supply, the main considerations for their selection being the prevalence of cholera and shortage of drinking water. In order to encourage self-help it has been decided that the villages from which the inhabitants promise a substantial contribution either in money or in labour should be given preference. In the selection of sites for water works the District Engineer and District Health Officer are consulted. Committees for each subdivision in the district and a district committee have been formed in order that the requirements of the district as a whole may be considered in the distribution of the available funds. The selection of the agency for the construction of the works vests in the District Magistrate, while technical supervision of the works is entrusted to the District Engineer and his staff. The health staff have been given powers of supervision and of reporting defects to the District Engineer. The grant sanctioned by the Government is based on three considerations, *viz.*, the area, population and the average expenditure by the district board concerned from its own funds on water supplies during the previous three years. The administration of the funds is in the hands of the Commissioner of the Division and of the District Magistrate. The tube well type of water supply has been adopted as a general rule. However, special local requirements can be met by other types of water supply.

In the Central Provinces the Government sanctioned during the year the construction of 62 wells and two tanks in rural areas costing Rs. 43,149. The construction of 57 wells which had been sanctioned in 1939 was completed in 1940.

In the budget for 1940-41 the Government of Bombay included Rs. 8,50,000 for village water supply schemes. The execution of the works was left in the hands of the local bodies concerned and the amount was not fully utilised. The Government have decided that, in order to expedite the execution of such works, some of the schemes should be carried out by the Public Works Department and others by the District Rural Development Boards.

The water supply scheme sanctioned in 1940 by the Board of Public Health in Sind included the provision of a rapid filtration plant for Hyderabad municipalities. It is stated that work on these schemes was in progress during the year. In regard to a number of other municipalities water supply schemes are under investigation.

RURAL CONSERVANCY.

The problem of rural conservancy presents many difficulties. The disposal of nightsoil by manual removal is unsatisfactory even under the best conditions. Moreover, it requires the employment of a permanent staff which most rural areas cannot afford to maintain. Under the circumstances the provision of bored hole latrines, which are cheap to construct and which cost practically nothing to maintain, has been considered by different provincial health authorities as the most suitable method of meeting the situation. An important question in this connection is that of the possibility of contamination of water supplies, particularly in areas where the level of the sub-soil water is high. This possibility cannot be excluded until local investigations determine the range of extension of contamination through the soil. Certain experiments were carried out at Lahore during the year in this connection by Mr. Dyer who is a member of the staff of the Rockefeller Foundation. It was found that faecal pollution did not travel beyond ten feet from the source in that type of soil. Similar studies were started in the Singur health unit area in Bengal but they had not yet been completed by the end of the year. The necessity for such studies need not of course be emphasised. Such investigations should precede the introduction of bored hole latrines in any area on a large scale. If the soil is suitable this type of latrine appears to offer the cheapest and most efficient system of nightsoil disposal for the rural areas.

Famine relief.

13. The majority of the population in India are dependent on agriculture for their living and their economic condition is therefore largely influenced by rainfall. Failure of the crops and resultant famine occur periodically in particular areas as a result of continued deficiency of rain for one or more years, or of floods arising from abnormally heavy rainfall. In the past famine relief has consisted of providing work for the people of the affected areas and of paying them wages with which to purchase food. The physiological aspects of nutrition were not recognised and no provision was made to ensure that, under the conditions of physical strain that accompany famine, the nutrition of the people was kept up at a sufficiently high level to ward off disease. The advantage of active cooperation between the health authorities and the officials carrying out relief measures has been fully demonstrated during the past few years in the famine stricken areas of the Hissar district in the Punjab and in Ajmer-Merwara.

In Hissar a survey of the diet and state of nutrition of 90 families was carried out in February 1939. It was shown that, although the calorie value of the diet was satisfactory, serious defects from the point of view of quality were present. Animal fat was practically absent and milk was hardly consumed by the people. There was also a total absence of green vegetables in the diet. The state of nutrition of 279 workers and 144 non-workers was assessed and it was shown that, of the former, 82 per cent were physically subnormal and, of the latter, 50 per cent. Six per cent of these persons suffered from night-blindness, 25 per cent had a dry, roughened condition of the skin and 65 per cent showed smokiness of the sclera of the eye, which are all signs

of vitamin A deficiency. One per cent of these people showed signs of active rickets and six per cent of old standing rickets, thus indicating deficiency of vitamin D. During the next winter, when the physiological needs of the population became greater, the health of the people deteriorated still more and definite cases of scurvy made their appearance.

In order to meet the situation it was decided that all preventive and curative work should be carried out in a coordinated manner in the areas concerned. The measures taken were (i) reduction of the task of workers to the extent of 50 per cent, (ii) the location of new works in such places as would reduce the distance that the labourers had to walk, (iii) the division of the whole area into 50 health circles, each consisting of villages within a radius of five miles and the organisation of special treatment centres with a medical officer in charge of each circle and (iv) distribution of germinated grain and *amla* (the Indian gooseberry) to make up food deficiencies. The results of these preventive measures are shown in the following figures quoted from the "Report on Health Conditions and Public Health Measures in the famine areas of Hissar district, Punjab" by the Director of Public Health.

Morbidity in Hissar district—December 1939 to November 1940.

Month.	Total sick admitted to hospitals and dispensaries.	Cases of scurvy admitted (new cases).	Cases of night blindness attending (new cases).
December 1939	523	67	1,412
January 1940	696	80	746
February "	421	60	1,282
March "	452	9	1,167
April "	446	<i>Nil</i>	883
May "	354	<i>Nil</i>	895
June "	332	<i>Nil</i>	1,007
July "	341	2	1,510
August "	381	2	1,450
September "	427	53	1,000
October "	404	48	661
November "	423	21	419

In order to assess the value of these figures it should be mentioned that the period during which the special measures were continuously employed was from December 1939 to the end of May 1940. In June 1940 a reduction was made in the issue of germinated grain and in July, August and September the relief works and dispensaries were closed and the issue of germinated grain was gradually stopped. During October and the greater part of November relief measures and administration of germinated grain were in abeyance. The measures were then reintroduced and the scheme covered about 70 per cent of the population.

It will be seen from the above table that, in December 1939 and January 1940, the numbers of cases of scurvy were 67 and 80 respectively. The administration of *amla* was introduced in January and that of germinated grain in the first week of February. The numbers of cases of scurvy for February and March were 60 and 9 respectively and during the next three months no cases of this disease were reported. The withdrawal of the preventive measures during the succeeding months was accompanied by an increase in the incidence of scurvy. After the reapplication of the preventive measures to a

large proportion of the affected population in December 1940 scurvy again disappeared and no cases were reported in January and February 1941. These facts demonstrate the marked sensitiveness of a population living under famine conditions to alterations in the quality of their food supply. The Director of Public Health, Punjab, points out that the cost of these measures is only 1/10th of an anna per head per week. It is remarkable that the health of the population in a famine stricken area can be protected at such a small cost. The work done in Hissar is therefore bound to have a profound effect on famine relief operations in the future.

In Ajmer-Merwara, owing to the failure of the monsoon in 1938 and 39, there occurred a widespread famine. In August 1939 relief works were first opened and by the end of January 1940 over 200,000 persons or nearly two-fifths of the population in the province had to be given relief.

A special Famine Medical Officer was appointed and his activities included the supervision of all health measures at the different famine relief camps at which medical establishments were provided for the treatment of patients. Accommodation for patients was provided in a number of camps so that the seriously ill and injured cases could be observed and treated. In certain camps nurse-midwives were also provided for the purpose of giving special attention to women and children.

In order to prevent the occurrence of food deficiency diseases the distribution of sprouted Bengal gram to the people was carried out. In all except three camps, where the people objected to taking sprouted gram on the sentimental ground that they were destroying life, the labour population accepted and consumed it. It is stated that no case of scurvy took place among the famine stricken population. This and the fact that the growth and general health of children did not appear to have suffered to any great extent are stated by the Famine Medical Officer to be evidence of the value of sprouted gram for the prevention of deficiency diseases.

From the experience of the health organisation in the two areas certain valuable suggestions have emerged for the improvement of famine relief operations in the future.

Although from the quantitative point of view the amount of food that may be available in the area may be sufficient, the quality of the food supply appears to have a considerable influence on the health and wellbeing of the population. To meet the probable occurrence of deficiency diseases one of the easiest methods of relief is the distribution of germinated grain. Grain is available everywhere and the procedure for germination is simple. As has been shown by the work in Hissar the cost involved is small.

A reduction in the physical strain on the people in a famine area can be brought about either by reducing the number of hours of work or by decreasing the distance that the labourers have to walk to the site of work or by a combination of these measures. The strain of famine conditions should not be accentuated by unnecessary physical exertion.

Another important point to consider is that of conserving the available food supplies in a famine area. It is pointed out by the Director of Public Health, Punjab, that one of the most important things to consider is the care of cows and buffaloes for the maintenance of milk supply in the area. Milk provides the most important source of animal protein in its most assimilable form, particularly for children. He suggests that the supply of fodder by Government should be made conditional on an equitable distribution of the available milk among the village community.

The Famine Medical Officer in Ajmer-Merwara pointed out that the employment of women had a harmful effect on the health of the children. When women came for work they brought their children with them and these children fell ill and, in some cases, died as the result of exposure to the sun. He suggests that men should be given double wages and that the women should be left at home to take care of the children. If this be not possible it is desirable to provide creches near the work so that the women may leave their children in charge of a responsible person who would look after and feed them properly while the women are away at work. He considers that the employment of nurse-midwives to look after the comforts of women and children is essential. The grant of maternity leave just prior to and after confinement is another recommendation.

Lastly, it is desirable that the public works carried out should, as far as possible, be of such a nature as to be of permanent value to the village community. For instance, such measures as improvement of water supply, development of rural communications and planting of trees may, with advantage, be carried out. In a malaria stricken area much of the earthwork associated with antilarval measures can be carried out. The sanitation of the village site is another important direction in which the services of the people can be usefully employed. By directing the energies of the people into such useful channels it may be expected that the improvements effected will leave a lasting impression on their minds and that the development of cooperative effort among the people for the betterment of their own health will be promoted.

The activities of the health departments in individual provinces during 1940 are briefly summarised in the following paragraphs.

North-West Frontier Province.

14. In this province it is reported that the scheme for the medical inspection of school children continued during the year and that the system of giving a midday meal to the pupils was extended to additional schools.

Punjab.

15. Mention was made in the Preliminary Report of the Public Health Commissioner for 1939 that, as an experiment in the coordination of curative and preventive medicine in rural areas, the rural dispensaries in five districts were placed under the control of the Public Health Department. In July 1939 this experiment was extended by the Government to one *tehsil* in each of the remaining 23 districts of the province. Later, the same principle was applied throughout the Hissar district in order to provide for the special needs of that famine stricken area. It is reported that as a consequence of these measures, there were in 1940, 161 rural dispensaries under the control of the Public Health Department. It is stated that this coordination of medical and public health activities has been of benefit to the people. Treatment has

been brought to the homes, the early detection of persons suffering from infectious diseases and the application of preventive measures have been facilitated and the dispensary doctors have been able, it is stated, to make a contribution to the improvement of environmental sanitation in the villages through their contact with the people. The number of visits paid to the villages was 21,000 and over 30,000 patients were treated in their own homes during the year. It is also stated that these touring doctors discovered 379 cases of smallpox, ten cases of cholera, 668 cases of tuberculosis, 1,775 cases of typhoid fever and over 18,000 cases of infectious diseases of other kinds. The Director of Public Health points out that, in spite of these additional activities, the work in the dispensaries did not in any way suffer.

Industrial health has been receiving increasing attention in this province during the past few years. In 1936 only 17 factories were inspected and in 1940 the number rose to 317. Of those 108 were visited more than once. The strength of the inspecting staff was increased during the period by the appointment of one whole-time officer and by designating all district and municipal medical officers of health as part-time inspectors.

The activities for the prevention of food adulteration also increased during the past five years. In 1936 only 45 local bodies were applying the Punjab Pure Food Act. By 1940 the number increased to 160. The number of samples of foodstuffs examined by the Public Health Chemist in 1936 was 209 and in 1940 this number rose to 1,220.

In addition the Public Health Chemist carried out in 1940 the analyses of a large number of samples of ghee in order to ascertain the seasonal and other changes which may occur in the results obtained from the examination of samples of genuine ghee. It has been shown that these results differ with the season of the year and with the feeding of the animals. The question of standards of purity for ghee and for certain other articles of food has been fully discussed in a recent report by a committee appointed by the Central Advisory Board of Health to investigate all aspects of the food adulteration problem in India. The committee state that "more knowledge is required in respect of the characteristics of genuine ghee in different parts of India depending on factors such as breed of animal, method of feeding, seasonal and climatic conditions, etc.". The results of the investigation in the Punjab are in accord with the opinion expressed by the committee. It is therefore essential that, as emphasised by the committee, the values prescribed in the Provincial Food Adulteration Acts for ghee "should not be regarded as arbitrary figures which of themselves decide whether a sample is adulterated" or not, that the figures should only form a guide in reaching a decision regarding the genuineness of the sample and that the results of all the tests should be taken into consideration together.

Another investigation carried out by the Public Health Chemist in this province was that of the fluorine content of samples of water from different places. The number of samples so far examined is 434 and it is stated that, in respect of specific water supplies, no seasonal variations in the fluorine content have been noted.

In last year's Preliminary Report attention was drawn to the remarkable absence of "mottled enamel" and other serious conditions in the population of the areas in the Punjab, in which a high content of fluorine in water was shown to exist and it was pointed out that this was in marked contrast with the experience in Madras Presidency. In Madras laboratory experiments and field studies indicated that a high calcium and low vitamin C content of the

diet of the people was associated with the development of fluorosis, and it was suggested in last year's report that absence of signs of fluorosis in the population of those areas in the Punjab where fluorine is prevalent in water supplies might be due to the better Punjab diet. This question requires investigation.

Surveys have been in progress for some time past regarding the incidence of malaria, hookworm and leprosy. It is stated that, in this way, the geographical distributions of these diseases in the province are gradually being mapped out.

Delhi.

16. In New Delhi it is stated that the school medical service was in its fourth year of existence in 1940 and that progress was maintained during the year. Two large schools, namely, the D. A. V. and the Harcourt Butler high schools came into the scheme during the year. The former had its own clinic with a part-time medical officer and the latter availed itself of the services provided by the Municipal Committee.

In the case of boys the number examined during the annual routine inspection increased from 1,243 in 1939 to 1,612 in 1940 and in the case of girls from 1,427 to 1,529. The percentage of boys showing defects on medical examination was 71 in 1940 as against 70 during the previous year and among girls it was 66 as against 63 during 1939. The higher percentages of defects shown in 1940 as against 1939 are stated to be due to a change in the system of classification. On the other hand, the Chief Health Officer points out that there was an appreciable diminution in the percentage of children with defects requiring treatment. He also states that there is reason to believe that the medical care has begun to exert a beneficial influence on the general health of the children. As in previous years the main defects are stated to be malnutrition, dental trouble and defects of vision, all of which are preventable.

It is stated that the school dentist has drawn attention to the large proportion of dental defects. The dentist carried out 474 extractions, 406 fillings, 93 nerve treatments and 74 cleanings of tartar deposits. In addition treatment was given for 39 cases of gingivitis and 17 cases of calcium deficiency. The school dentist carried out a considerable amount of propaganda illustrating his lectures by films obtained from the School Medical Service Library. A special pamphlet on "The care of the teeth" was prepared and issued.

The ophthalmic specialist is also stated to have had a busy year in his clinic. The numbers of boys and girls with errors of refraction were 259 and 244 respectively. The Chief Health Officer draws attention to the fact that, although the defects were brought to the notice of the parents, in the majority of cases the advice to correct these errors was not carried out. Trachoma is said to be fairly widely prevalent among the children, 119 cases having been detected in boys and 96 among girls.

The cost of the school medical service was approximately Rs. 10,625 of which Rs. 3,397 was recovered in fees at the rate of two annas from each school child.

While in New Delhi substantial progress has been recorded in the medical care of school children the Chief Health Officer reports that the condition in Delhi city continues to be unsatisfactory. A scheme was submitted for the reorganisation of the service in that city but it was rejected by the municipality which declined to levy a charge of two annas per pupil for the maintenance of the service. It is hoped that the success achieved in New Delhi will serve as an object lesson to the authorities in Delhi city and that, in due course, a similar service will be developed there also. It should be remembered that a school medical service is one of the most potent forces for improving the health of the rising generation. In the meantime what is happening in Delhi is stated to be a fruitless inspection of the children in all schools without any arrangements for follow up or treatment of the defects discovered by such inspection. Of 15,625 boys examined in Delhi city 83 per cent and of 4,375 girls 50 per cent were found to have some defect or other. Another group of 2,399 girls was inspected under the scheme organised by the Delhi Health Society and of these 33 per cent were found to have defects.

In the Notified Area Civil Lines a school medical service has been provided only for the schools maintained by the Committee in Timarpur colony. The woman doctor in charge of the maternity and child welfare centre and the medical officer in charge of the Balak Ram Hospital functioned as school medical officers for the girls and boys respectively. Of 240 boys examined 62 per cent were shown to have defects requiring treatment and the corresponding figure in the case of girls was 52 per cent.

The Chief Health Officer states that appreciable progress was made in the development of school health work in the rural areas. The number of children subjected to routine medical examination increased during the year. In addition, the schools were visited by the members of the public health staff and it is stated that improvements were made in the sanitation of the schools. These improvements included the provision of bored hole latrines and of suitable drinking water arrangements for practically every school, the satisfactory disposal of sullage from kitchens in the case of boarding schools, the provision of bathing facilities and encouragement of the cultivation of vegetable and flower gardens by the students. First aid boxes were provided in the schools for the treatment of the children. Of 9,103 boys examined nearly 62 per cent were found to have some defect or other and among 549 girls the corresponding figure was 29 per cent. The Chief Health Officer draws attention to the cooperation that exists between the Education Department and the District Board and expresses the hope that the progress achieved during the year will be maintained.

As regards health education the most important advance is stated to have been that of making hygiene a compulsory subject in all the schools of Delhi Province. Suitable text books for the different classes have been prescribed by the Text Book Subcommittee and it is stated that courses of instruction in hygiene are arranged for teachers both in Teachers' Training Schools and at refresher courses. Special attention is paid to instruction in the use of the school medical box in order that the school master may carry out efficiently the treatment of minor ailments among the pupils. The health department staff in the rural areas also took an active part in health education and gave demonstrations of the day to day measures to be taken for the prevention of disease and for the improvement of the individual's health. It is stated that over 1,048 lectures were delivered by the rural health staff in the schools.

Health talks on the radio were also arranged for the rural population. In the urban areas it is pointed out that a considerable amount of health education is being carried out among the students, particularly by the ophthalmic and dental specialists and the antimalaria officer in New Delhi.

It is stated that advantage was taken of all fairs and exhibitions for the propagation of knowledge regarding health matters. A successful stall "Milk for the millions" was opened at the cattle show in New Delhi. Milk was available for sale at the counter and useful literature was distributed among those who visited the stall.

The Najafgarh health unit has proved to be of great value as a centre for demonstrating the methods of rural health administration. Students from the Lady Reading Health School, the Lady Irwin College and the Lady Hardinge Medical College visited the health unit for the purpose of studying such aspects of rural health administration as are useful to them.

The number of factories in Delhi Province subject to the control of the Factories Act increased during the year from 115 to 127. It is stated that, in all the factories the water supply was sufficient and satisfactory, that lighting arrangements were good and that sanitary arrangements continued to show improvement. No epidemics were reported from any factory and the health of the inhabitants was found to be generally good. In 33 thread ball factories employing mostly women, it is stated that the working conditions have shown a marked improvement since 1938, when the provisions of the Factories Act were brought into operation. Most of these factories are situated within the Delhi municipality and the Chief Health Officer states that the conferment of powers as an additional Factory Inspector on the Health Officer of Delhi city has been recommended.

United Provinces.

17. In this province there was no extension of the district health service during 1940, the number of districts employing health staff being 37. The post of Assistant Director of Public Health, Malariology and Epidemiology, which had been held in abeyance for a short period, was revived during the year.

Model byelaws for the regulation and inspection of slaughter houses in municipalities were revised in accordance with the recommendations of the Imperial Council of Agricultural Research. It is stated that a number of sanitary improvements were effected by the rural health staff. These included improvements to existing wells, construction of new wells on proper lines with the provision of hand pumps, provision of ventilators in village houses, construction of soakage and manure pits, improvement of cattle sheds on sanitary lines, provision of drains, filling of pits and excavations and removal of piggeries and manure heaps beyond the inhabited areas. It is stated that, in a few cases, prosecutions were carried out under the local byelaws for ensuring that the necessary improvements were carried out.

Revised type designs were prepared and issued in respect of infectious diseases hospitals, latrines, urinals, meat markets and village houses.

The Public Analyst examined 12,356 samples of foodstuffs including 5,769 samples of ghee, 2,705 of milk and 1,772 of oils. The percentage of adulterated samples was 21·6 as against 18·8 in the previous year.

The Hygiene Publicity Bureau of the Public Health Department is in charge of health propaganda. The officers of the Bureau are associated with the working of the Provincial Red Cross Society and the St. John Ambulance Association and by this means wasteful overlapping of effort by the Public Health Department and these voluntary organisations is prevented. The total number of magic lantern lectures was 127 and of other lectures 107. About 205,000 leaflets, booklets and pamphlets and 3,356 posters on epidemic diseases and other health subjects were distributed. A new film on nutrition was prepared. The Bureau also assisted in the training of honorary workers of the Rural Development Department of the Government and of certain other social workers.

The propaganda van maintained by the Hygiene Publicity Bureau visited 22 districts in the province covering 6,105 miles and gave 105 cinema demonstrations to a population of about 214,000. In addition a portable projector was used in five districts with audiences totalling 10,000 and 30 cinema shows were given.

Sanitary arrangements were made in respect of all fairs and festivals in the province during the year and it is reported that no outbreak of any epidemic disease took place in connection with these gatherings.

Bihar.

18. In Bihar the school medical service consists of four medical officers and four assistants. An examination of the pupils of all high schools and middle schools was carried out. A woman school medical officer is also maintained by Government and she carries out medical inspection of girls' schools. In addition health officers of some district boards carried out the examination of school children in the rural areas. In addition to these activities the school medical staff carried out health education by lectures and magic lantern demonstrations in the schools. They also inspected the school premises and gave advice to the school authorities for the improvement of environmental sanitation.

The Public Health Bureau attached to the Office of the Director of Public Health is in charge of health propaganda. Posters and pamphlets on health matters are prepared and issued to local bodies and organisers of health exhibitions. It is stated that the staff employed by the various local bodies carried out health propaganda as a routine measure and that they particularly took advantage of the various fairs and festivals in the province for carrying the message of health to the general population. The medical officer of a motor dispensary, which has been sanctioned as a permanent measure by the Provincial Government, carried out intensive propaganda among the affected population during his visits to the cholera infected areas.

Orissa.

19. The Provincial Government have under consideration the compilation of a public health code for the province and special staff have been appointed for the purpose. Under the new Orissa Food Act a set of rules was framed by the Government. Three sets of byelaws were framed to deal with the nuisances arising out of rice mills established in rural and urban areas and these byelaws have been circulated among the local bodies for adoption by them at an early date.

Arrangements were made for the medical examination of girl students in the schools situated in the towns of Cuttack, Berhampur and Parlakimedi.

With the rapid increase of work in the Pathological and Public Health Laboratory the Government agreed to appoint an assistant Analytical Chemist.

A field investigation regarding the nutrition of the population was carried out in one of the smaller districts of the province by two health inspectors under the supervision of the Assistant Director of Public Health. A special health inspector was appointed to work under the Assistant Director of Public Health for the efficient supervision and inspection of vaccination work in the rural areas and of other public health activities. It is stated that, in addition to the usual methods of public health propaganda, three health exhibitions were organised in the province during the year.

A conference of the public health staff of the district of Ganjam was held at the end of the year under the chairmanship of the Director of Public Health. A number of public health subjects of special importance to the district were discussed and programmes of work were drawn up.

The Local Self Government Act was extended to the district of Sambalpur. The compilation and registration of births and deaths in the towns of Kendrapara, Jajpur and Balasore were transferred from the Police to the respective municipalities.

Bengal.

20. The Provincial Government are contemplating, it is reported, the enactment of a consolidated Public Health Act for the purpose of incorporating all the existing health legislation in the province into a single comprehensive measure. The Bengal Food Adulteration Act of 1919 is being amended in order to remove such defects as have been shown to exist in the working of the Act.

A scheme for the complete reorganisation of health services in the province has been under consideration by the Government. It is stated that the scheme will first be introduced in the Dacca district as a whole and in certain subdivisions in the districts of Rangpur, Faridpur, Jessore and Hooghly. The district boards concerned have agreed to participate in the scheme. In the Chittagong Hill Tracts no health organisation has so far been employed; a scheme for the introduction of health administration in this area has been accepted by the Government and a few members of the required personnel were trained during

the year. A scheme for the appointment of health staff in Darjeeling district is also stated to be under the consideration of the Government. A scheme for the reorganisation of the existing municipal public health services was submitted to Government by the Director of Public Health.

It is reported that a number of health exhibitions were held in various parts of the province during the year and that the Bengal Public Health Department supplied posters, pamphlets and models relating to health subjects to these exhibitions. At a cost of Rs. 1,600 two models of clean villages were prepared and demonstrations were arranged at certain important exhibitions and in Rural Reconstruction and Settlement training camps. Enamelled posters of suitable size on "Prevention of malaria" and on "Tuberculosis" were also prepared and were supplied to railway authorities in the province for permanent exhibition at railway stations.

Three important festivals took place during the year. The Ganga Sagar *mela* was held from the 13th to the 15th January 1940 and about 80,000 pilgrims visited the festival centre. The Bengal Public Health Department took the necessary preventive measures against infectious diseases in cooperation with the Calcutta Port Health Department, the Calcutta Corporation and the District Board of 24 Parganas. It is stated that nine cases of cholera occurred at the *mela*.

The Langalband *mela* took place in the Dacca district on the 15th April and about 50,000 pilgrims were present. Arrangements were made by the district board for the continuous supply of chlorinated water for drinking purposes. It is stated that three patients were admitted into the cholera ward.

The Gajan *mela* was celebrated at Tarakeswar in the Hooghly district about the middle of April for a period of six days, the gathering being in the neighbourhood of 20,000 to 25,000 pilgrims. The necessary sanitary measures were taken.

Central Provinces.

21. The scheme under which a subassistant health officer is posted to each *tehsil* in the province was in operation in its second year in 1940. These officers are stated to have devoted special attention to water supply, conservancy and the health of the school children. Classes were held for village uplift workers and they were mainly attended by school teachers. At these classes the subassistant health officers were deputed to teach the elementary principles of public health. These officers also helped in arranging exhibitions and village uplift rallies. In addition, these officers checked vital statistics and vaccination registers.

A motor travelling dispensary has been working in Nagpur district since the year 1939 and it is stated that its services have been greatly appreciated by the people. It has 48 wayside treatment stations and people from the villages on the roadside and from villages in the interior attended the dispensary. During 1940 this dispensary treated 45,490 patients.

Bombay.

22. A consolidated Public Health Act is stated to be under the consideration of the Government. For progress of rural health work District Rural Development Boards have been established in almost all the districts. These boards are entrusted with the task of improving agriculture, animal husbandry, sanitation and health, education, communications, cottage industries, co-operation, marketing and such other activities as are concerned with the social and economic betterment of the people. In a number of villages it is stated that provision has been made for cattle sheds, for the removal of dung heaps outside the inhabited portion of the village, the sanitation of the surroundings of houses, the celebration of village improvement weeks, the construction of new wells and trench latrines and repairs to tanks and wells.

As regards health propaganda, the Bombay Presidency Baby and Health Week Association assisted 246 centres in organising health and child welfare exhibitions and in arranging cinema shows with the help of its cinema unit.

Sind.

23. Health legislation during 1940 in the province of Sind included an amending Act for the Karachi Vaccination Act, 1879, and for the Bombay District Vaccination Act, 1892, as regards its application to Sind. Section 119 of the Bombay District Local Boards Act, 1923, was amended so as to make it compulsory for each district local board to appoint a district health officer. Under this enactment appointments were made by the district local boards of Karachi and Nawabshah.

Public health works of special importance during the year included the approval, by the Board of Public Health Works in Sind, of a project for the drainage of Kambar town costing Rs. 1,00,000. Improvement to the Sukkur water supply distribution system, which is estimated to cost Rs. 3,92,500, is nearing completion. Of a total cost of Rs. 29,80,748 for improving the water supply of Karachi, works costing Rs. 2,49,213 were completed during the year and the remaining portions of the scheme are being proceeded with. Schemes for the improvement of the drainage and water supplies of a number of towns in the province were under consideration during the year.

No special staff have been maintained for health propaganda but it is stated that the importance of this subject has been constantly kept in mind and that every opportunity is taken to give instruction to the people in matters relating to their health and nutrition and to the prevention of disease. Public health stalls were put up at all rural reconstruction and other exhibitions organised in the province. Propaganda with the aid of nutrition charts was carried out in rural reconstruction and other exhibitions in the province. Nutrition charts were printed in Sindhi and distributed free of charge among teaching institutions. A pamphlet on "Milk" was prepared and widely distributed. A simple pictorial poster illustrating the value of milk as food is said to be under preparation and will be ready for issue shortly.

A scheme for a separate staff for health propaganda was submitted to the Government and the scheme has been accepted in principle. The medical officers in charge of the motor travelling dispensaries in the province were

supplied with magic lanterns and propaganda material in order that they might combine health education of the people with the administration of medical relief.

The medical officers in charge of the dispensaries in the rural areas have been directed to carry out a monthly medical examination of the children attending elementary schools situated in the villages in which the dispensaries are located.

Facilities have been made available to registered medical practitioners at all Government hospitals for the free microscopic examination of sputa from patients suffering from or suspected to be suffering from tuberculosis. The Government also issued orders that all laboratory examinations for the inpatients and outpatients of Government or Government aided hospitals and dispensaries should be carried out at the Chémico-bacteriological Laboratory, Karachi, free of charge for a period of three years. In 1937 the Government prescribed provisionally for a period of three years in the first instance, an average rate of Rs. 2 for the bacteriological examination at the Chémico-bacteriological Laboratory, Karachi, of each specimen sent by a local body from cases of infectious disease. As a measure of further assistance the Government have directed that, for a period of one year in the first instance, five samples of such material sent by local bodies should be examined free of charge and that any sample in excess of this number should be examined at the rate of Re. 1 per sample.

The provisions of the Prevention of Adulteration Act, 1925, were enforced in 14 out of a total of 26 municipalities in the province. Some of the poorer municipalities have suggested that this work should be undertaken by the Government. A scheme was prepared for this purpose and for the control of adulteration in rural areas. This scheme is stated to be under the consideration of Government.

Sanitary boards have been formed at all district headquarter towns in order to ensure the cooperation of the local health authorities in each area on the carrying out of health measures.

Madras.

24. A comprehensive Public Health Act was passed in Madras Presidency during 1939 and this has been followed by the issue of rules under the various sections of the Act during 1940. The Madras Prevention of Adulteration Act was extended to more local areas and, during the year, 104 local bodies were enforcing the Act. A consolidated set of instructions has been issued with respect to the control of factories, workshops, etc., outside industrial areas.

As regards health propaganda it is stated that the health staff gave a large number of lectures and magic lantern and cinema demonstrations on health subjects during the year. Broadcasts on public health subjects were given from the radio stations at Madras and Trichinopoly. As in previous years the "Health week" was celebrated in almost all parts of the Presidency.

In order to combine medical and preventive health work in the rural areas three groups each consisting of 61 rural medical practitioners were trained in public health work during the year.

It is reported that adequate sanitary arrangements were made for all fairs and festivals in the province and that no outbreak of any infectious disease occurred during or after these festivals.

Coorg.

25. A Public Health Act and a Food Adulteration Act for Coorg are stated to be under consideration. New conservancy byelaws were brought into force in the municipalities and notified areas of the province during the year. Pressure was brought to bear on the local authorities to prosecute householders who failed to provide latrines.

The Education Department agreed to making hygiene a compulsory subject in all schools and a textbook was prepared during the year for facilitating the teaching of the subject. Diet surveys were carried out in hostels, hospitals, villages and among the labour population of certain estates by an officer trained at the Nutrition Research Laboratories, Coonoor, and he was assisted in these investigations by a research worker from the staff of the Laboratories. These two officers also carried out anæmia surveys in certain schools and the results of administration of iron to cases of anæmia were also investigated.

Improvement of environmental sanitation included the provision of 1,088 bore hole latrines, 90 pit latrines, six latrines on the bucket system, ten soakage pits, five urinals, 51 rubbish pits and 22 temporary trenches.

Assam.

26. The Director of Public Health states that proposals for the reorganisation of the Public Health Department were under consideration by the Government. A scheme for the establishment of a "Health unit" in Golaghat subdivision with the cooperation of the International Health Division of the Rockefeller Foundation was approved by the Government and it is stated that the unit is to start functioning during 1941. An officer of the Department was deputed for training before taking up his duties as the medical officer of health of the health unit.

It is stated that plans were completed for a scheme of general public health work in Hojai. Here it has been proposed that, in a group of 16 villages, a trained staff will be employed for vaccination, registration and verification of vital statistics, maternity and child welfare work, prevention of epidemics and the improvement of village sanitation. The scheme provides for cooperation with the Assam Medical Research Society, whose malaria staff will assist in dealing with malaria problems, and with the local board, which will provide the midwives for rural maternity relief as well as the quarters for the staff. The intention is to investigate the possibilities of developing a rural health organisation on cheap and efficient lines and to expand the scheme to other parts of the province as and when funds permit.

The appointment of a special engineer in the Public Works Department for drainage and embankments has been proposed and the Director of Public Health expects to be able to carry out permanent antimalaria measures with the cooperation of this officer. As a beginning, flushing syphons in streams and channels have been provided and it has been proposed to expand this work with the help of the Assam Medical Research Society.

There is only one festival centre in the province attracting a large number of pilgrims, namely Kamakhya. Numerous smaller festivals are held in different parts of the province. It is reported that in 1940 no outbreak of an epidemic disease occurred at any of these centres.

SECTION IV.

MATERNITY AND CHILD WELFARE.

Introduction.

27. A special section on maternity and child welfare appeared in the annual report of the Public Health Commissioner for the first time in 1927. At that stage this branch of public health work had not progressed far in India, but the degree of prominence which it had assumed in other national health programmes was compelling attention in this country. It was therefore considered essential that greater publicity should be given not only to the various aspects of the maternity and child welfare problem in India but also to the newer developments in other countries, with a view to stimulating progress in India.

The pioneer work for the improvement of the health of mothers and children by voluntary organisations and by certain progressive local authorities in England, together with the stimulus provided by the war of 1914-18 for a betterment of social conditions, led to the passing of the Maternity and Child Welfare Act in England in 1918. Under this Act local authorities were enabled to make further provision for the health of expectant and nursing mothers and children under school age. Schemes approved by the Ministry of Health receive a grant from the Exchequer of 50 per cent of the expenditure.

At the end of 1938 there were in England and Wales 3,261 welfare centres and a staff equivalent to the whole time services of 2,877 health visitors for a population of approximately 41 millions. A special department of the Ministry of Health, employing one senior medical officer, one deputy senior medical officer, four medical officers and three women inspectors, supervised the schemes under the local authorities. In India, for a population ten times as large, there were in 1939 approximately 1,020 welfare centres employing 351 health visitors. Although the population of several of the provinces of India exceeds that of England and Wales, only two, namely Madras and Bengal, have a maternity and child welfare section at the headquarters of the provincial public health department with a woman medical officer possessing the necessary public health training to qualify her for supervising and organising the work.

Progress in this branch of health administration has therefore been disappointingly slow in India during the twelve years since the first special section devoted to maternity and child welfare appeared in this report. The following quotation from the 1927 report indicates some of the main obstacles to progress. "Maternity work is not likely to advance much until the general level of education in the country, especially among women, is raised. Unless and until this happens progress is hindered in three important ways (1) lack of public opinion, (2) inability of the women to appreciate new methods and especially the principles of preventive medicine and (3) lack of educated women to take up the work which is waiting to be done." Although there has been a recognisable, if minor, advance in the education of Indian women in recent years, each of these obstacles still continues to bar the way and each reacts adversely on the other. The demand from the individual and from the public for a higher standard of preventive health work will arise only when the value of such a service has been demonstrated to the people. Their general outlook is conservative and their reaction to newer methods and ideas is still largely one of opposition. The provision, on a wide scale, of health services for mothers and children depends

largely on the availability of trained personnel and until the women of the country are prepared to qualify themselves for preventive health work in sufficiently large numbers no reasonably rapid advance can be made in this branch of public health administration.

Maternity and child welfare work in the Provinces suffers from lack of a planned programme and often from misdirection. The preventive and educational aspects of the work are not fully understood, and many welfare centres still exist which function mainly for treating minor ailments and for providing comforts to those mothers and children who are too poor to buy them. The Central Advisory Board of Health, at its second meeting in 1939, reviewed the position regarding maternity and child welfare work in India and recommended to the earnest consideration of all Provincial and State Governments a comprehensive report on the subject prepared by a special committee appointed by the Board. The Board drew attention to the undesirability of welfare centres assuming the functions of a hospital or dispensary and pointed out that the preventive aspect of maternity and child welfare centres is primary and that it is most important that this should always be kept in mind. In order that preventive work in this branch of health administration may be placed on a sound basis, the Board recommended the appointment of trained women doctors to take charge of maternity and child welfare centres in municipal and local board areas and to conduct prenatal and postnatal clinics in these centres. The Board also recommended the appointment in each Province or State of a senior woman medical officer with special qualifications and experience in maternity and child welfare work.

The replies received from the Provinces to the recommendation of the Board regarding the appointment of a senior woman medical officer show that in Madras and Bengal alone has such an officer been appointed. In the United Provinces the present arrangement is that the work is carried on by a medical woman employed by the provincial branch of the Indian Red Cross Society. In the Punjab a senior woman doctor has been appointed as Assistant to the Inspector General of Civil Hospitals and it is stated that she visits welfare centres from time to time. Further, an experienced health visitor has held the dual appointment of Inspectress of Health Centres and Principal of the Health School, Lahore, since 1927 and she acts as an assistant for maternity and child welfare to the Director of Public Health. Bihar has under consideration a scheme for the appointment of a medical officer for the combined post of supervisor of women's hospitals and of maternity and child welfare services. The N.-W. F. Province is planning to appoint a senior health visitor as supervisor of maternity and child welfare services and midwives. The replies of the remaining provinces indicate that no such appointment is contemplated in the near future. It is certain that, without the appointment of a suitably qualified woman medical officer at the headquarters of the provincial health organisation, little progress can be expected in the organisation of maternity and child welfare work on proper lines.

The position in regard to midwives and health visitors also requires mention. The shortage of educated women for training as midwives and health visitors is gradually being made good. Schools and classes for the training of *dais* are attracting a better type of candidate. The progress will be considerably accelerated if the women trained can be absorbed into a well regulated salaried service and if a public demand for a higher standard of midwifery can be created.

The number of health visitors trained annually in India is approximately 60, a number too small to meet the demand for their services. In Madras and

the Punjab, where the maternity and child welfare centres are organised by the provincial public health department and the training schools for health visitors are Government institutions, there appears to be no difficulty in securing a full complement of students each year and, although the number of students trained is small, it is approximately equal to the number which can be absorbed annually into the provincial organisation. In other provinces suitable candidates are not forthcoming in sufficient numbers. This may be due to the fact that the health visitor's life is a hard one. In her daily contact with the people she meets with apathy, ignorance and at times active hostility. Hers is essentially the work of educating the womenfolk in hygienic modes of living and in the principles of mothercraft. The results of such educative work are very slow to appear and there is not therefore the satisfaction of quick and obvious achievement as a compensation for the hardships of her official life.

The rural areas present a difficult problem in regard to the employment of trained staff. The health visitor or midwife who has been brought up in a town finds it difficult to give up the amenities of urban life to which she has been accustomed. The conditions of travel in the rural areas are trying because dust and heat and the absence of rapid means of conveyance make work difficult, and perhaps no other profession makes so great a demand on the endurance, courage and mental equipment of a woman worker. There is therefore considerable difficulty in recruiting and maintaining, for the rural population, trained *dais*, midwives and health visitors. As regards the *dais*, the Chief Health Officer, Delhi, has been giving training to selected village girls in order that they may return to their homes and work among the people. The results of this experiment will no doubt be of interest to the health authorities of other parts of India also.

As regards health visitors an initial difficulty is that the candidates for training require a higher standard of general education than the *dais*. Until the level of education in the countryside rises appreciably it may not be possible to obtain sufficient numbers of village girls as candidates for training as health visitors. But the desirability of selecting candidates from the rural areas, wherever possible, must be kept in mind. Further, the offer of a compensatory allowance for rural work and better conditions of service, such as security of tenure and liberal leave rules, may make rural service attractive to health visitors from urban areas.

Remarks on individual provinces.

28. Brief notes on the activities in the different provinces during 1940 are given below.

In the North-West Frontier Province the provincial *dais* training centre in Dera Ismail Khan ceased to be financed by the Government and was taken over as a district centre by the Red Cross Society. This leaves only one official *dais* training centre in the province, namely, Peshawar. Welfare centres were opened during the year in Dag Ismail Khel in the Nowshera tehsil and in Charsadda respectively.

New rules under the Midwives Act for the training of *dais* were drafted and approved by Government.

The appointment of a Provincial Inspectress of *dais* was made during the year. Her duties are to tour the whole province for inspecting welfare centres and the work of subsidised *dais* in the villages.

In 1936 there were 77 maternity and child welfare centres in the Punjab with 119 subcentres. By 1940 the numbers rose to 106 centres and 149 subcentres. The health visitors attached to these centres have all been trained at the Punjab Health School and they are stated to be busily training *dais* in towns and rural areas. In 1936 there were 1,147 certificated *dais*; in 1940 their number was 2,250 while 2,181 were under training. Approximately 25,000 cases of labour were conducted by trained *dais* in 1936 while in 1940 the number was over 39,000. These figures indicate steady and satisfactory progress.

The Chief Health Officer, Delhi, states that in New Delhi appreciable progress was achieved in maternity and child welfare work during 1940. The number of confinements undertaken by the centres rose from 1,218 in 1939 to 1,235 in 1940. In the areas served by the centres it is stated that 60 per cent of the births were conducted by the centre staff and that, of the total number of births registered in New Delhi, the centres conducted 33 per cent. A gratifying feature is that, while the maternal mortality rate for the city as a whole was 4.6 *per mille*, no death from childbirth took place among the confinements for which the centres were responsible.

The infant mortality rate in New Delhi was 84 per thousand in 1940 while the rate among infants cared for by the welfare organisation was as low as 51.

A committee exists for coordinating the activities of the welfare centres and of maternity hospitals known as the Delhi Maternity Services Coordinating Committee and it is stated that full advantage has been taken of this organisation by the New Delhi centres. The success achieved in the control of maternal and infantile mortality is stated to be largely due to the many consultations which took place, chiefly at the Lady Hardinge Hospital.

The three centres in the Civil Lines are also stated to have shown progress. They supervised 66 per cent of the confinements in their areas and 25 per cent of the total births registered in the Civil Lines. It is stated that, for the first time, the infant mortality rate fell below the three figure mark to 98. Another encouraging fact is that no maternal death took place among the confinements conducted by the centres. The doctor in charge was given a three months' training in the preventive aspect of child welfare work at the Lady Reading Health School during the year, and it is stated that the value of this training is evident in the improved administration of the centres.

As regards Delhi city it is reported that a different state of affairs exists. It is pointed out that "there is no booking of cases, no systematical clinic organisation and that the health visitors' time is taken up with work for which they are neither fitted nor intended". The Chief Health Officer states that the infant mortality rate has been rising and he expresses the hope that this will serve to remind the Municipal Committee of the urgent need for reform.

As regards rural areas maternity and child welfare work is done in the Najafgarh health unit and in the remaining rural areas of the province. In the Najafgarh health unit it is stated that the percentage of the total confinements conducted by the staff of the centres rose from 27 in the previous year to 36 in 1940. An encouraging feature is that 76 per cent of the cases attended by the staff received adequate prenatal care both in their homes and at the centre.

It is stated that, apart from the education of the women in mothercraft, sanitary inspectors have been instructed to include the responsibilities of fatherhood in their talks to menfolk.

Of the 1,775 infants on the cards of the centres in the health unit it is stated that 48 per cent attended the clinic regularly and that the mortality rate among these infants was 57·5 per thousand compared with 164 per thousand for the unit area as a whole. However it is pointed out that, of the 102 deaths among the infants in the care of the centres, 29 per cent were due to respiratory diseases and 37 per cent were due to gastro-intestinal diseases which are both preventable conditions. There appears therefore to be considerable scope for a further reduction in infantile mortality through the education of mothers.

It is stated that among 901 confinements conducted by the staff of the health unit centres not a single maternal death took place.

In the remaining rural area of the province three centres were at work at Nangloi, Narela and Mahrauli. These centres conducted 1,120 confinements, or nearly 70 per cent of the total number of births in that area. These figures give only an average figure of eight cases per month for each trained *dai* employed at these centres, and the Chief Health Officer points out that a considerable increase on this figure is desirable. It is stated that maternal mortality figures among the cases undertaken by the centres and also among those registered in the thana were very low, these being 1·7 and 2·6 per thousand respectively. During the year a new centre was opened at Shahdara, a growing suburb of Delhi. It is stated that this centre is doing good work.

The application of the Punjab Nurses Registration Act to Delhi Province resulted in the extension of recognition to the existing untrained *dais* of the Province. The Chief Health Officer states that this has had a harmful effect on the working of centres since untrained *dais*, armed with the certificate, have been able to question the superiority of the trained *dais* employed in the centres. There is however hope for the future because, when the present generation of untrained *dais* ceases to exist, this class of untrained person will be eliminated from the practice of midwifery.

Four selected village girls were trained at the Victoria Zenana Hospital, Delhi, for a period of two years in order that they might go back to their homes and work among the people under conditions familiar to them. The Chief Health Officer considers that this is perhaps the only way of providing skilled attendance during confinement in the rural areas, because the midwife brought up in the town is unwilling to give up the amenities of urban life and to settle contentedly among the village population.

In the United Provinces the total number of maternity and child welfare centres which functioned during 1940 was 334. Among the centres which worked during the previous year nine were closed and 16 new centres were opened. It is stated that new buildings for centres were constructed in Benares, Almora and Lucknow cantonment. During the year a children's nursery was started in the Silver Jubilee Health School in order to provide practical training to the pupils of the school.

In Bihar it is reported that there are three child welfare clinics in Patna and that each has a large regular daily attendance. Attempts are being made in this province to train the indigenous *dais* for performing a better type of midwifery. In two women's hospitals a brief course of practical training is given to these village women by lady doctors and then the women return to their homes as practising midwives.

It is reported that maternity and child welfare work is being done at several centres by the Jharia Mines Board of Health and at Jamshedpur. Arrangements are being made by the Hazaribagh Mines Board of Health to start similar work at Giridih, Bhurkunda and Argada. It is stated that prenatal work is done at the Lady Elgin Hospital, Gaya, 698 cases being dealt with during the year.

In the province of Orissa, well organised maternity and child welfare centres exist in the four towns of Cuttack, Balasore, Sambalpur and Berhampur. Besides the above centres smaller organisations exist in some other places also, *viz.*, Khurda and Puri in Puri district, Bargarh in Sambalpur district, Parlakimedi and Russelkonda in Ganjam district, Koraput, Jeypore and Umerkote in Koraput district.

Indigenous *dais* trained under the Victoria Memorial Scholarship Fund have been employed in certain rural hospitals and dispensaries for work among the rural population.

In Bengal the organisation of maternity and child welfare work is being attempted on systematic lines. A post of Superintendent of Maternity and Child Welfare was created with effect from September 1939 for the purpose of organising the work in the province as a whole. The Superintendent makes local inspections and advises the local authorities and voluntary organisations in the starting of welfare centres and in their efficient maintenance. The Government have prepared two type schemes for welfare centres ; one consists of the centre alone and the other has an attached maternity ward having two to six beds. Provision is made for the housing of the centre staff ; the minimum staff required for each welfare centre consists of a health visitor, a trained *dai* and the requisite menials. Fifty per cent of the capital expenditure is met by the Government in the case of a scheme brought into being by a local body subject to a maximum of Rs. 3,000 for a centre without maternity beds and a maximum of Rs. 4,000 where a maternity ward is attached to the centre. The pay of the health visitor is also met by Government.

It is stated that there has been a good response from local bodies for the starting of maternity and child welfare schemes and that in 1940, nineteen schemes were approved and recommended for Government aid and that twelve of them have already begun to receive grants. During 1940-41 the Government provided a sum of Rs. 50,000 as grants-in-aid for the establishment of maternity and child welfare centres in the province and a sum of Rs. 35,000 to meet the recurring grants for welfare centres and the training of *dais*.

One of the objects of providing a maternity ward to the welfare centre is stated to be that of securing facilities for the training of *dais*. It has been suggested that, in order to ensure proper control of practising *dais*, the Provincial Nursing Council should make provision for their registration.

The Central Provinces and Berar Red Cross Welfare Committee maintained 79 welfare centres (57 urban and 22 rural) in 1940 compared with 74 during the previous year. The total expenditure incurred during the year was Rs. 51,430 towards which the Government gave a grant of Rs. 32,500.

Dais are trained at almost all centres and 77 *dais* were examined and given certificates during the year.

In Bombay Presidency a new centre was affiliated to the Bombay Mofussil Maternity, Child Welfare and Health Council during the year. The Council aided in all 46 centres with a sum of Rs. 31,879. The Council also gave

grants to the extent of Rs. 2,195 to a scheme for the training of *dais* at various centres under the auspices of the Lady Wilson Village Maternity Association. These grants amounted to a third of the total cost of the scheme.

The Bombay Presidency Baby and Health Week Association assisted 246 centres in organising health and child welfare exhibitions including cinema shows on health subjects at different centres.

The Government of Sind have sanctioned a proposal for the establishment of subsidised maternity centres in rural areas. The minimum staff for a centre consists of a trained *dai* and a peon. The Government will bear a third of the recurring expenses. At a place where no Government or local board maternity home or hospital exists, voluntary associations are also eligible for the Government grant for any centres they maintain.

Under an eight year scheme five candidates are to be trained as midwives every year at the Lady Dufferin Hospital, Karachi, and the first batch of five candidates underwent training during the year under review. It is stated that, in spite of the payment of a monthly scholarship of Rs. 20 to each pupil and the guarantee of appointment to successful candidates great difficulty has been experienced in obtaining suitable Sindhi girls to take up the course.

In Madras Presidency it is stated that maternity and child welfare work has developed steadily and satisfactorily during the year, and that local bodies cooperated with the Public Health Department. The organisation and routine inspection of these activities were carried out by the Assistant Director of Public Health (Maternity and Child Welfare). The post graduate course in maternity and child welfare was held as usual during the year and was attended by women medical officers from local bodies. The health visitors who passed out of the Government Training School for Health Visitors in April 1940 have been provided with work under local bodies and private associations and another batch is undergoing the course.

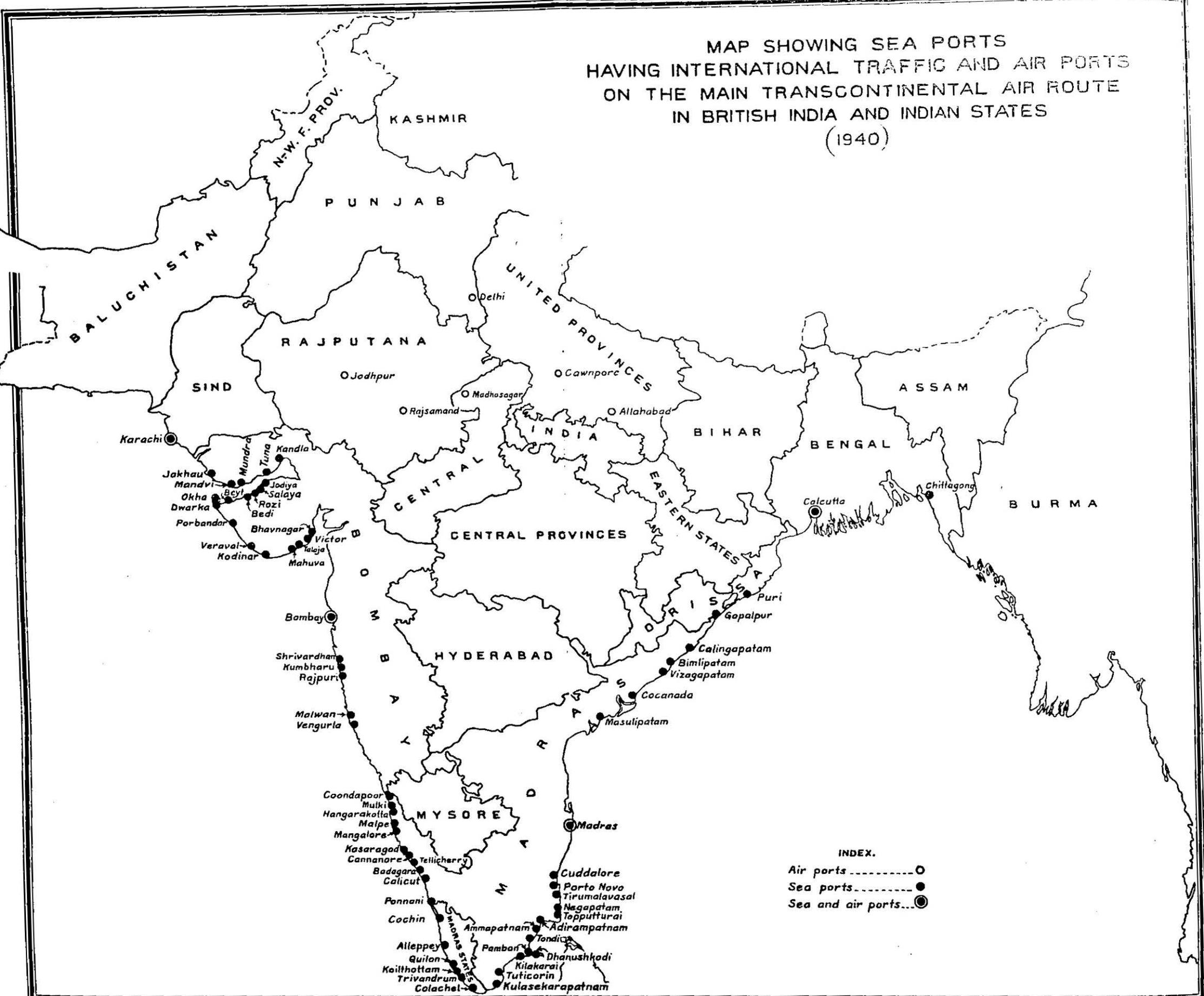
In Coorg a health visitor was appointed in September 1940 to work in Mercara municipality and it is reported that good work has been done. Since this appointment was made the number of maternity cases delivered in Mercara Civil Hospital has greatly increased. Two days in the week, the health visitor holds clinics in the hospital. On other days she pays house to house visits and advises women regarding care of the house, environmental and personal cleanliness, care of expectant mothers, attention during confinement and care of children under five years of age. It is stated that some measure of her success may be gauged from the large increase in the number of cases delivered in the Mercara civil hospital after her appointment.

The infantile and maternal mortality rates for 1940 were 132.6 and 10.4 respectively as against 141.7 and 11.0 for the previous year.

In Ajmer the King George V Memorial Maternity Home was constructed during the year and it is stated that the institution has already begun to prove its usefulness. There was no other new development in the field of maternity and child welfare work during the year.

In Baluchistan three child welfare centres exist in Quetta. They are all under the charge of qualified health visitors. In the districts midwives are present on the staff of most of the Government hospitals and dispensaries for the practice of midwifery among the people.

MAP SHOWING SEA PORTS
 HAVING INTERNATIONAL TRAFFIC AND AIR PORTS
 ON THE MAIN TRANSCONTINENTAL AIR ROUTE
 IN BRITISH INDIA AND INDIAN STATES
 (1940)



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SECTION V.

PORT HEALTH ADMINISTRATION.

Introduction.

29. This section deals with the health administration of both seaports and airports. The administration of the seaports is governed by the Indian Port Health Rules which were revised and republished as recently as 1938. An important event in the year 1940 was the publication in June of the Indian Aircraft (Public Health) Rules. The section of these rules which deals with the prevention of the entry of yellow fever into India by aeroplanes had been in existence since 1936 as emergency regulations. At first the Aircraft Companies were inclined to regard these regulations as troublesome, but the experience of the last five years has shown how necessary they are and they are now working smoothly.

The prevalence of infectious diseases in ports.

30. Cholera, smallpox and plague continued to be present in some part or other of the country throughout the year and for that reason an efficient quarantine organisation in Indian ports is essential, if the health authorities of other countries are to be assured that adequate control is being exercised against the export of these infections. That the measures in force at the ports with foreign traffic were efficiently carried out in 1940 is proved by the small number of cases of infectious disease which developed on ships after they left India. A careful examination is made of all passengers and crew leaving India and the results of these examinations are given in the notes relating to individual ports. Brief notes on the incidence of cholera, smallpox and plague in the seaports and airports of British India are given below.

As regards cholera fourteen seaports with international traffic were infected during 1940 as well as three airports on the transcontinental air route. The figures for attacks and deaths at each of these ports are as follows :—

Name of the port.	Cholera.	
	Attacks.	Deaths.
<i>Seaports—</i>		
Calcutta	2,556	588
Puri	165	21
Cocanada	103	33
Karachi	59	20

	Cholera.	
	Attacks.	Deaths.
Calingapatam	59	17
Vizagapatam	19	13
Masulipatam	14	5
Chittagong	12	9
Bimlipatam	10	6
Bombay	9	6
Cuddalore	2	1
Madras	1	..
Porto Novo	1	..
Kasargod	1	..
<i>Airports—</i>		
Cawnpore	664	228
Allahabad	18	13
Delhi	6	5
	3,699	974

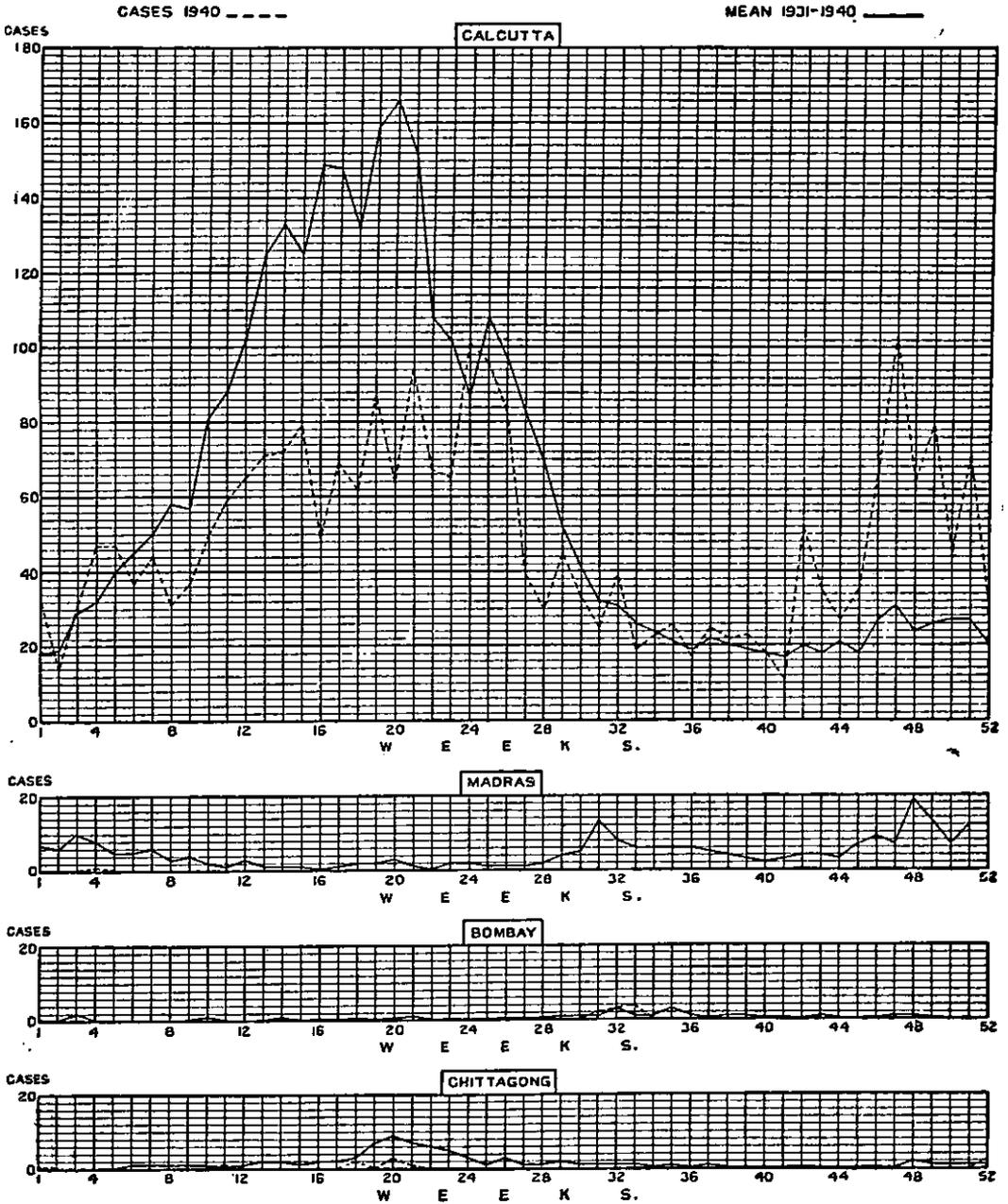
It will be seen that Calcutta had the highest incidence of cholera among the seaport towns. The infection in this city was distributed throughout the year, the monthly figures ranging from 87 attacks in September to 295 in November.

In Cawnpore, the town with the highest figures among airports, the epidemic of cholera started at the close of the first quarter of the year and a few cases a week continued to occur till the end of July. The height of the epidemic was reached when 184 attacks were recorded in the third week of August. The epidemic ceased by the middle of October except for three sporadic cases in the third and fourth weeks of November.

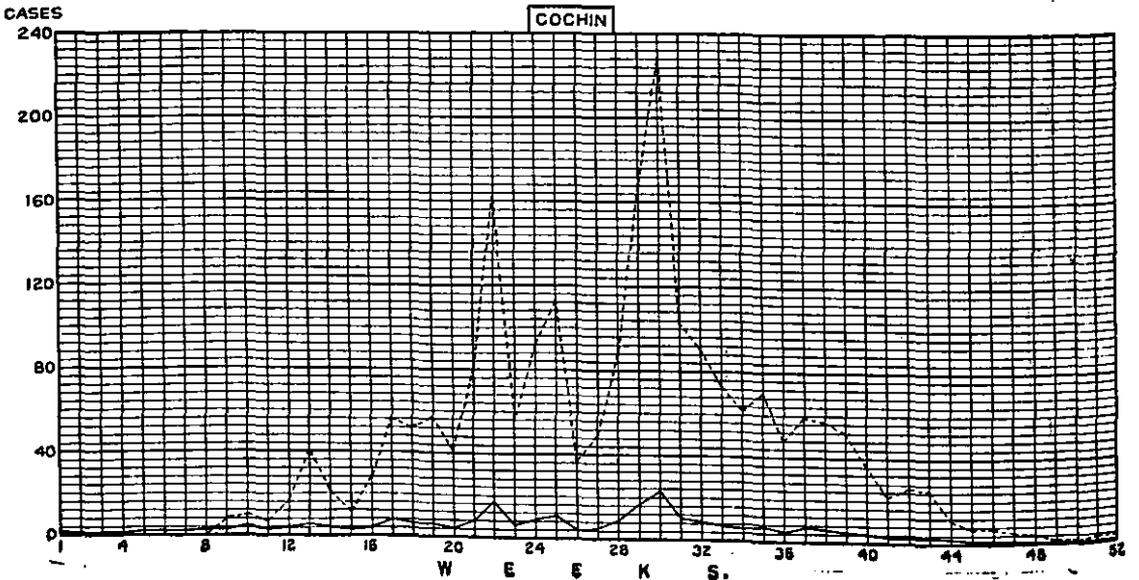
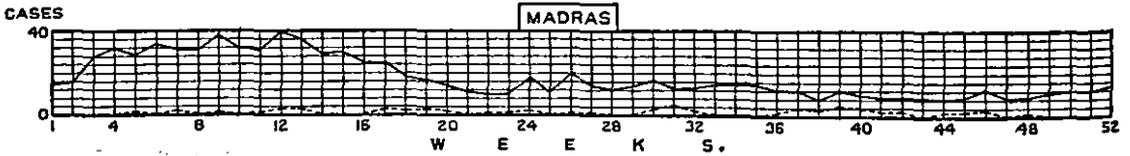
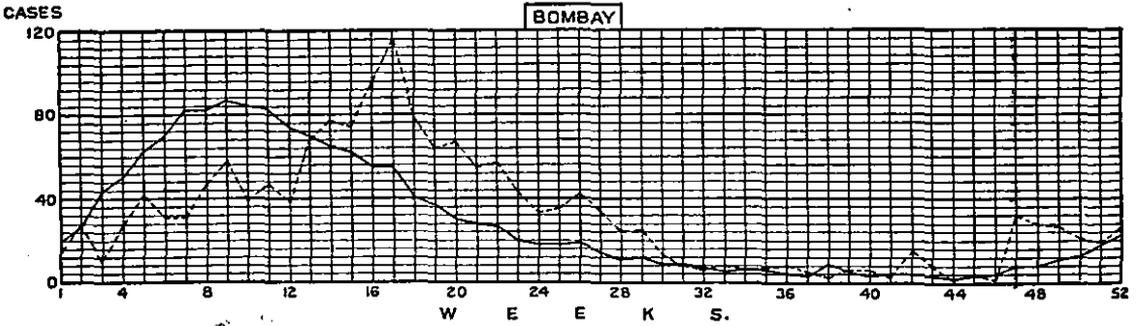
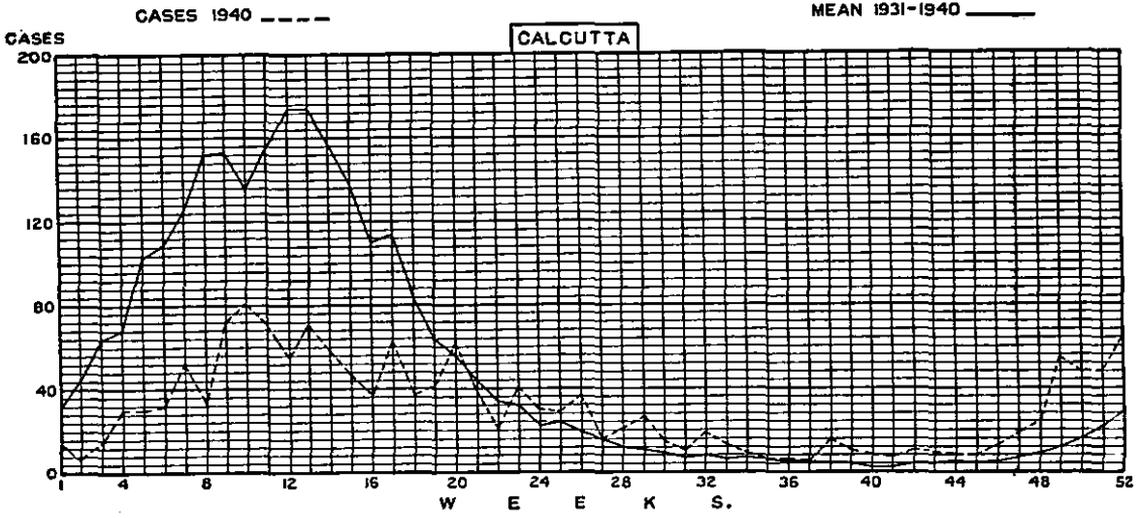
Of the seaports with international traffic seven are classed as major ports. These are Chittagong, Calcutta, Vizagapatam, Madras, Cochin, Bombay and Karachi. In the diagram facing this page graphs are given showing the incidence of cholera in four of these ports during 1940 and the mean incidence of the disease during the ten year period, 1931—1940. In the remaining three major ports the incidence of the disease was relatively insignificant and graphs are therefore not given. It will be seen that Calcutta has easily the highest mean incidence of the disease. The average prevalence of cholera in the other three towns is insignificant in relation to that of Calcutta.

The number of seaport towns which reported smallpox during 1940 was 18. Of these Cochin, Bombay and Calcutta had a high incidence of the disease with 2,092, 1,730 and 1,570 attacks and 791, 834 and 1,098 deaths respectively. In three more towns, Cannanore, Negapatam and Karachi the numbers of smallpox attacks were between 100 and 200 while in the remaining towns the

WEEKLY DISTRIBUTION OF CHOLERA CASES IN CERTAIN SEAPORT TOWNS IN BRITISH INDIA



WEEKLY DISTRIBUTION OF SMALLPOX CASES IN CERTAIN SEAPORT TOWNS IN BRITISH INDIA



numbers of attacks were less than 100. All the infected airports had a relatively high incidence. The figures for individual ports are shown below :—

	Name of the port.	Smallpox.	
		Attacks.	Deaths.
<i>Seaports—</i>			
	Cochin	2,092	791
	Bombay	1,730	834
	Calcutta	1,570	1,098
	Cannanore	168	28
	Negapatam	147	72
	Karachi	105	21
	Madras	98	31
	Calicut	44	11
	Masulipatam	34	9
	Tellicherry	20	3
	Puri	14	4
	Malwan	11	3
	Cuddalore	11	3
	Vengurla	5	2
	Cocanada	3	..
	Vizagapatam	1	..
	Addiramapatnam	1	..
	Mangalore	1	..
<i>Airports—</i>			
	Cawnpore	374	234
	Delhi	187	150
	Allahabad	76	65
	Jodhpur	Not available.	301
		<u>6,692</u>	<u>3,660</u>

Graphs representing the incidence of smallpox in some of these ports during 1940 and the mean incidence of the disease during the ten year period, 1931—1940, are given in the diagram facing this page. The curves for average incidence show that, in Calcutta, Bombay and Madras, the height of the epidemic is reached in the early months of the year. In Cochin, on the other hand, smallpox incidence is low at the beginning and at the end of the year while, during the intervening months, the disease is fairly evenly distributed.

None of the seaports in the Indian States reported cases of cholera. The figures of attacks and deaths from smallpox reported from certain ports in different Indian States are shown below :—

Name of the State.	Name of the port.	Smallpox.	
		Attacks.	Deaths.
Bhavnagar	Bhavnagar	6	6
Junagadh	Veraval	69	13
Baroda	Kodinar	26	6
Baroda	Dwarka	20	4
Travancore	Alleppey	74	27
Kutch	Mandvi	4	4
Kutch	Kandla	1	..
Porbandar	Porbandar	306	157

As regards plague infection, human cases were reported only from three ports, Alleppey, Cochin and Calicut. Alleppey had four fatal cases during the year while Cochin and Calicut recorded one fatal case each. Plague infection in rats was reported only from the ports of Alleppey and Cochin.

Control of plague infection in rats is a very important measure in ports in order to prevent the export of infection to foreign countries. In most of the important ports in British India a continuous campaign against rats is being carried out and the rats caught are examined for signs of plague infection. In Bombay, Karachi and Calcutta facilities are available for the deratisation of ships, and certificates of deratisation or of exemption from deratisation are issued by the Port Health Officer.

To give some idea of the extent of these operations the following figures are quoted with respect to the three major ports of Bombay, Karachi and Calcutta. During the year 691,223 rats were caught and destroyed in Bombay city and 13,032 in the port area. All the rats caught in the port area and about 32 per cent of those caught in the town were examined. No case of plague infection was detected. The number of ships which were deratised and granted deratisation certificates was 38 while the number of ships that qualified for deratisation exemption certificates was 54. In addition, 142 country craft were granted deratisation certificates after fumigation and 3,799 country craft were granted deratisation exemption certificates.

In Karachi, the number of rats caught and destroyed in the port area was 5,142 of which 44 were examined and none found to be infected with plague. Seven ships were deratised and granted certificates. Exemption certificates were granted for 16 ships. On board ships the total number of rats destroyed was 494.

In Calcutta the number of rats caught and destroyed in the port area was 4,896. Of these 2,135 were examined and none was found to be infected with plague. Seventyfive ships were deratised and given certificates. Deratisation exemption certificates were granted to 107 ships. The number of rats caught and destroyed on board ships was 1,316. One hundred and sixtyfour rats were examined and none was found infected with plague.

Port of Bombay.

31. Fourteen ships were found to have had cases of infectious diseases on board at the time of arrival or during the voyage. In these vessels there were on arrival 42 cases of chickenpox and one case of cerebro-spinal meningitis. Two of these vessels with onward bound passengers and with 13 cases of chickenpox were allowed to continue their journey and the cases were not removed from the ship. The bills of health were, however, endorsed to the effect that chickenpox had occurred and that measures to prevent its spread on board, with possible introduction of infection into other ports, had been taken prior to the departure of the vessels. On board a cargo vessel there occurred a non-fatal case of measles.

No coastal vessel arrived in quarantine during the year. The infected parts of 11 vessels from foreign ports which came in quarantine were disinfected on arrival. No measures enforcing isolation, observation or surveillance of

cases of infectious disease were imposed during the year. The infectious cases which landed in Bombay together with their contacts were sent to the infectious diseases hospital for disposal.

Vessels leaving for foreign ports were inspected before departure and five passengers and two members of crew were not allowed to sail as four of them were found to be suffering from chickenpox and the fifth from smallpox. Eight contacts of these cases were also prevented from sailing. In addition to the above, eight cases of undiagnosed fevers with ten contacts, two of measles with two contacts, and four of scabies with two contacts were rejected by the ships' surgeons, these cases having been brought to their attention at the time of medical inspection by the port health staff.

The infected parts of two passenger vessels, on which there were cases of infectious disease among the onward bound passengers, were disinfected prior to the departure of the vessels from Bombay.

Among the vessels lying in the harbour there occurred during the year three cases of chickenpox on three different vessels. The bedding and clothing belonging to 67 members of the crew on these vessels were disinfected.

Measures to prevent ingress of rats into vessels were taken by the Bombay Port Trust and a certificate was furnished to the Port Health Department by the Docks Manager of the Port Trust.

Two hundred and sixtyfive inspections were carried out in connection with the supervision of provisions for lascars on board ships. Seven samples of ghee and seven of lime juice were submitted for examination. Of these two samples of ghee and six of lime juice were condemned by the Chemical Examiner to the Controller of Customs, Bombay, and they were replaced. Margarine to the extent of 2,016 lbs. was also rejected and replaced.

The pilgrim traffic from this port does not correspond strictly to the calendar year. Pilgrims started leaving Bombay during the period from December 1939 to January 1940 and 3,768 pilgrims went on the Haj pilgrimage. Before embarkation all pilgrims had been vaccinated against smallpox and inoculated against cholera. Eight vessels brought back the pilgrims, who numbered 3,268. Of these vessels four came back infected with chickenpox. The necessary precautionary measures were taken.

The sanitation of the port area is looked after by a staff employed by the Bombay Port Trust under the supervision of a medical officer employed by that organisation. Antirat and antimosquito measures were also undertaken by the staff of the Bombay Port Trust, acting under the orders of the same officer. It is reported that adequate attention was paid to both these measures of prevention. Water was supplied to shipping from the municipal water supply. The water boats which were in use were periodically cleaned out.

Port of Karachi.

32. Seven ships arrived in this port infected, four with chickenpox, one with smallpox and two with cases of smallpox and chickenpox. All the necessary precautionary measures were taken on each occasion.

All the vessels which departed for foreign ports were inspected. No passenger or member of the crew was prevented from sailing during the year on account of infectious disease, nor was there any case of infectious disease on the vessels while they were in the harbour.

Provisions for the use of Asiatic crew were inspected on 13 ships and eleven samples of ghee were sent for analysis. Of these one was reported to be unfit for human consumption.

The outward pilgrim traffic began on the 7th December 1939 and ended on the 5th January 1940. Five pilgrim ships sailed from Karachi during this period. They arrived with pilgrims on board from Bombay and after embarking additional pilgrims sailed for Jeddah. The total number of pilgrims from Karachi was 2,875 which was smaller than usual owing to the abnormal conditions resulting from the war. Returning pilgrims were brought back in eight ships and 3,727 disembarked at Karachi. It is reported that the total number of deaths during the voyage on incoming pilgrim ships was 24 and that all were cases of non-infectious disease. Immunisation against smallpox and cholera of all the pilgrims was carried out before embarkation. It is reported that cases of cholera did not occur among the pilgrims and the number of smallpox cases on board the ships among the returning pilgrims was as small as six.

Antimosquito measures in the harbour area and the adjoining Karachi Port Trust Estates were carried out throughout the year under the supervision of the Port Health Officer by the staff maintained for this purpose by the Karachi Port Trust. It is stated that the whole area is divided into six parts and that each part is inspected one day in the week. In addition, all the newly arrived country craft are boarded and inspected for mosquito breeding. Further, country craft remaining in the harbour for more than 10 days are inspected again. It is stated that breeding of mosquitoes in the land area is insignificant and that the main source of stegomyia breeding is the country craft. Country craft with iron tanks appear to be less favourable to the breeding of mosquitoes than those with wooden tanks. It is stated that the number of country craft with iron tanks has been steadily increasing. The measures that are being carried out have had evidently a considerable effect as will be seen from the steady decrease in the stegomyia index of country craft and fishing boats during the past four years.

Stegomyia Index.

	Year.	Country craft.	Fishing boats.
1937	28.36	13.07
1938	18.36	7.05
1939	15.95	5.36
1940	10.31	3.27

The Port Health Officer points out that the provision of an approved pattern of water tank preferably made of iron, fitted with mosquito proofed cover and tap, would be the ideal to aim at from the point of view of eliminating the breeding of mosquitoes.

Water supply to ships is from the municipal mains. Ships are supplied with water from the Karachi Port Trust water main running along the wharf.

Karachi Marine Airport.

33. The Marine airport is situated at a distance of about 2½ miles from the inhabited area of the city. There are no residential buildings in the vicinity. This airport is fully equipped from the point of view of health administration. In the administrative building of the marine airport an efficient mosquito proofed isolation room has been reserved for the temporary segregation 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 the medical inspection of the passengers and crew of outgoing and incoming flying boats.

During 1940 the number of persons who arrived from yellow fever infected areas within nine days of their leaving such areas was 243 members of crew and 13 passengers. Of these, 234 members of crew and 10 passengers had been protected by inoculation against yellow fever and the remaining persons were unprotected. The inoculated persons were allowed to enter without restrictions, while the unprotected persons were isolated at Drigh Road until nine days had elapsed since they had left the yellow fever infected areas.

All flying boats coming from yellow fever areas had already been disinfected by the health authorities at Khartoum or Cairo. Those flying boats which brought in the uninoculated persons from a yellow fever area were immediately disinfected at Karachi.

All eastbound flying boats were inspected on arrival and all westbound flying boats before departure. In view of the fact that the Karachi marine airport is the port of entry for all flying boats coming into India from the west, vigorous antimosquito measures were carried out in and around the vicinity of the airport and in the whole of the harbour area. These measures have already been described in a previous paragraph relating to Karachi seaport.

The sanitation of the marine airport is reported to be satisfactory, the conservancy work being carried out on behalf of the Karachi Port Trust by the Karachi Corporation. The water supply is from the Karachi municipal water works.

Karachi Airport.

34. The general sanitation of the area is reported to have been satisfactory during the year. Steps were taken to remove certain defects in the sewage farm.

Antimosquito measures included the regular supervision of springs, the filling up of a large number of burrow pits left over by the contractors during the construction of temporary military camps, the closing of a number of new wells dug in various places by the villagers and the regular treating of other wells with petrol. Little progress was made during the year in the filling of burrow pits in the North Western Railway area as the railway authorities were busy with other programmes of work. These pits were, however, regularly oiled in order to prevent mosquito breeding. Wherever the draining of water was not practicable, the pools were treated with malarial.

Good results are reported from the fumigation of village huts. Fumigation was also carried out in all residential buildings of the airport.

The mosquito index remained lower in 1940 although the rainfall was three times as much as during the previous year.

No outbreak of any epidemic disease took place during the year under review. The residents of the airport colony and of the adjoining villages were inoculated against cholera when the disease broke out in Karachi city.

The health authorities at Alexandria and Khartoum cabled advance information in respect of passengers leaving yellow fever infected areas for India. During the year 12 persons, who landed at Karachi within nine days of having left a yellow fever infected area, were placed in quarantine in the isolation hospital.

Certificates of health were given to all westbound aircraft.

Port of Calcutta.

35. Eight infected vessels arrived at this port during the year. Of these three ships were infected with chickenpox, two with smallpox, two with cholera and one with diphtheria. All necessary preventive measures were taken in each case.

At the medical inspection of outgoing ships 59 passengers, seven members of the crew and 38 contacts were prevented from sailing on account of infectious disease. Fifteen passengers suffering from fever, three from mumps and one from measles were also rejected by the ships' surgeons, to whose attention these cases had been brought at the time of medical inspection by the Port Health Department.

Disinfection of infected parts of outgoing vessels was carried out when necessary.

Two cases of cholera and three of chickenpox occurred on five vessels lying in this port. All the necessary precautionary measures were taken on each occasion.

In order to prevent the ingress of rats into vessels lying in the harbour the fumigation inspector continued to enforce the measures designed to prevent the ingress of rats into vessels. It is stated that these inspections have proved a success and that masters of vessels cooperated in carrying out the prescribed measures.

In accordance with Rule 61 of the Indian Port Health Rules, 1938, 75 deratisation certificates and 107 deratisation exemption certificates were issued by the Port Health Officer during 1940 as compared with 77 deratisation certificates and 66 deratisation exemption certificates in 1939.

The provisions for the crew on board ships were inspected during the year. Thirtysix samples of ghee and one of mustard oil were sent to the Bengal Public Health Laboratory for analysis. Ten of the samples of ghee were reported to be adulterated. Both the masters and the agents of the vessels concerned were made to replace the unwholesome stock by genuine ghee.

Only one pilgrim ship sailed from the port of Calcutta during the year 1940. She left for Jeddah on the 30th November 1940 and carried 1,312 pilgrims all of whom were medically inspected before going on board. All pilgrims had been vaccinated against smallpox and inoculated against cholera.

Sanitary arrangements were made as usual in Calcutta for the pilgrims to the Ganga Saugor *mela* held in January 1940. No death took place among the pilgrims on any vessel on the journey down or on the journey back to Calcutta.

Special attention was paid during the year to the sanitary condition prevailing on the vessels in the port, the cleanliness of sleeping quarters, mess rooms and food stores being particularly stressed. Supervision of the sanitation of the port area was carried out by the sanitary staff employed by the Port Health Commissioners. The Port Health Department took a keen interest in the work and brought to the notice of the Port Commissioners all existing nuisances for necessary action.

Antimosquito measures were in operation on shore and on vessels. On shore these measures were carried out by the Garden Reach Antimalaria Association staff on behalf of the Calcutta Port Commissioners. The Port Health Department undertook a special *Aedes* survey on all types of vessels entering the port. It was shown that *stegomyia* breeding was extensive on these vessels. Taking all classes of vessels into consideration, the *Aedes* index was shown to be 16.6 per cent. The indices of different classes of vessels were as follows :—

	<i>Aedes</i> Index per cent. (Monthly average.)
Seagoing vessels	1.4
Class 'A' barges	17.5
Inland steam vessels	15.2
Launches	4.6
Country boats	17.9

Mosquito control measures on these vessels included daily inspection, emptying of bilge water wherever necessary, the issue of strict instructions that all drinking water tanks in use should be effectively closed and the adoption of the Bombay pattern of mosquito-proof cover and tap for drinking water receptacles on class "A" barges.

Municipal filtered water was supplied to the shipping. Samples from all the shore hydrants as well as from all water barges and boats used in the port were collected twice monthly and sent for bacteriological analysis. The cleansing, lime washing, chlorination and refilling of the water containers in the boats with fresh supplies were systematically carried out on every occasion when an adverse laboratory report was received. It is stated that a weekly inspection of all water boats was carried out and that no complaint about the drinking water supplies to them was received during the year from any of the vessels.

Calcutta Marine Airport.

36. At the Marine Airport which is located at Bally Bridge within the limits of the Port of Calcutta, inspection of seaplanes was carried out by the

Port Health Officer and his staff. Facilities exist for the conveyance of cases of infectious disease by motor ambulance to the Campbell Hospital in Calcutta. In order to meet emergencies first aid equipment is maintained at the airport. Eastbound seaplanes at the time of departure and westbound seaplanes at the time of arrival were inspected during the year. No case of infectious disease was discovered among the crew or passengers of the seaplanes inspected during the year.

Dum Dum Aerodrome.

37. The aerodrome area consists of two parts, the newly built area and the area consisting of the old hanger and a few quarters. The new area has been fitted with water carriage system and the sewage is treated in a septic tank. The construction of a new incinerator for the disposal of house refuse has been sanctioned.

A mosquito survey of the area has been in progress. Breeding of mosquitoes was found to exist in most of the water collections around the aerodrome area practically throughout the year. Adult mosquitoes were caught at 25 catching stations. The *Aedes* index of the aerodrome proper has been reduced to zero. A survey was made of large collections of water around the aerodrome for ascertaining the varieties of larvicidal fish that are present and among the different species found, *Panchax panchax*, it is reported, is effective against larvæ.

All the buildings of the area were sprayed once a week to kill adult mosquitoes. For antilarval work malarial and paris green were used. Proper surface drains have been constructed by the Public Works Department and these will no doubt help to drain away the surface area and thus contribute to the success of the mosquito control measures. In the villages and schools around the aerodrome area 335 children below 12 years of age were examined for enlargement of spleen. The splenic index was shown to be 11.04 per cent.

All those who worked or resided at the aerodrome and who were not able to produce evidence of having been vaccinated during the previous three years were instructed to get themselves vaccinated. Altogether 270 persons were vaccinated during the year.

The health of the passengers and crew on the incoming and outgoing aeroplanes was satisfactory during the year. No case of infectious disease was discovered among them. The general health of the aerodrome personnel was also satisfactory. Three cases of infectious disease occurred during the year among them, of which two were cases of chickenpox and one an imported case of smallpox.

Eastbound aeroplanes at the time of departure and westbound aeroplanes at the time of arrival were inspected during the year. No necessity arose for carrying out disinfection on any of these aircraft.

Fifteen samples of water from different sources were sent to the Director, All-India Institute of Hygiene and Public Health, for bacteriological analysis and two samples for chemical analysis. The water samples from the reservoir

near the old hanger were found to be bacteriologically unsatisfactory while those from the tube well were reported to be satisfactory. The aerodrome officer was advised to instruct all concerned not to use the water of the reservoir near the old hanger without boiling.

Port of Madras.

38. No deaths from infectious disease were reported on incoming vessels during the year. The infected parts of two vessels and the effects of passengers and crew were disinfected.

Three members of the crew of ships leaving for foreign ports were not allowed to sail as they were found to be suffering from chickenpox. In addition, four cases of undiagnosed fevers among the passengers were rejected by ships' surgeons. The infected parts of three vessels and the effects of the crew were disinfected.

Three cases of chickenpox were reported on vessels lying in harbour.

The inspection of provisions for lascars was carried out by the Port Health Department. Fiftysix inspections were made during the year and four samples of ghee were sent for analysis. Of these samples one was condemned and the consignment from which it was taken was replaced. Other provisions were found to be good in quality and sufficient in quantity.

It is reported that the sanitation of the port area was maintained satisfactorily by the Madras Port Trust.

The Port Trust employs one overseer and two lascars and the requisite number of subordinate staff for antimosquito work. All places which are likely to breed mosquitoes in the harbour area are examined once a week and, during the rainy season, special measures are taken to drain away, as far as practicable, all collections of water. It is stated that, since the antimosquito campaign was started, the nuisance has considerably abated. The mosquito index during the year ranged between 0.2 and 1.4.

At the request of the Traffic Manager, Madras Port Trust, the Port Health Department inspected 31 consignments of foodstuffs and a number of articles were condemned as unfit for human consumption.

The water supply for shipping and for other purposes in the port area was obtained from the Corporation of Madras. Vessels at East quay and moorings were supplied with water by water barges. These barges were kept in sanitary condition.

Port of Chittagong.

39. Three infected vessels arrived at this port during the year. The cause of infection in respect of two vessels was chickenpox and of the third smallpox. The necessary precautionary measures were taken by the Port Health Department. Twelve European and 24 Asiatic seamen were treated in hospital for various illnesses.

Measures for the destruction of rats were carried out on a small scale. Rats were caught and killed every week from the port area by using traps. No case of plague infection was discovered among these rats.

Antimosquito measures included the cleansing of bilges and fumigation of the holds of ships for the purpose of keeping down the mosquito population. Stagnant collections of water in the jetty area of the Assam Bengal Railway were treated with kerosene oil to prevent the breeding of mosquitoes and the drainage of this area was also improved during the year.

The medical supplies of 14 ships and the provisions for lascars in 21 ships were inspected. Three tins of ghee, three of sardines and one bag of dried fish were condemned and replaced. Articles of food meant for sale by licensed vendors to passengers on ships were also inspected and found to be satisfactory. Filtered water was supplied to the shipping from the Chittagong Municipal Water Works and by the Assam Bengal Railway. No complaints were received during the year regarding its quality and quantity.

Port of Vizagapatam.

40. Only one case of infectious disease occurred on the vessels arriving in the port, this being a case of chickenpox. He was landed, segregated and treated at the municipal isolation hospital. Thirtysix members of the crew of a cargo vessel were revaccinated.

The provisions and drugs on board vessels were examined in respect of two cargo and three passenger ships. It is reported that in all cases the supplies were up to the required standards of purity.

The extent of the port area under sanitary control was about 200 acres. It is reported that the sanitation of the place was satisfactory during the year. A rat campaign was maintained throughout the year and the number of rats caught and examined was 382. No case of plague infection was discovered among these rats.

Antimosquito measures were carried out over an area of about 2,160 acres, of which about 1,430 acres were under the influence of tides. The area was divided into eight districts and each district received antilarval treatment once or twice a week as was found necessary. Paris green and a mixture of crude oil and cresol were used as larvicides.

The sources of water supply to the port are from underground springs, the water being collected through infiltration galleries. The quality of the water is reported to be satisfactory even without chlorination.

SECTION VI.

HEALTH ADMINISTRATION ON INDIAN RAILWAYS.**Introduction.**

41 The Indian railway administrations constitute the largest employers of labour in India, just over seven hundred thousand persons having been employed during the year 1938-39. The health services for this population are maintained at a high level of efficiency. Clear evidence of this is given by the fact that, in spite of the wide prevalence of the common infectious diseases such as cholera, smallpox and plague among the general population, their incidence among the railway employees and their dependents who live in railway premises is very low. The position in regard to malaria differs however from that of the diseases mentioned above. It is extensively prevalent in many areas through which the railway lines pass and the railway population has also been subject to malaria in such areas. However, the reports of the Chief Medical Officers of the railways show that the gravity of the malaria problem has been fully recognised and that preventive measures are actively being carried out.

In addition to the provision of medical relief, the medical departments of the railways are carrying out a large amount of preventive health work. These include the general sanitation of the railway colonies, of the stations and of railway carriages, control over water and food supplies, antimalaria measures, maternity and child welfare work and the training of the railway staff in first aid, home nursing and ambulance work. A welcome feature of recent years has been the increasing collaboration between the railway, the civil and the military health authorities, through the establishment of local committees, in the investigation of common problems with a view to taking appropriate action for their solution. Another direction in which valuable results have followed from the cooperation of the railway and civil health authorities is in respect of the measures necessary for safeguarding the health of the pilgrims attending large fairs and festivals. Some of these festivals are attended by several hundreds of thousands of pilgrims, who come from all parts of India, and it is only with the fullest coordination of effort between the railway and civil health staffs that the comforts of the travelling pilgrims can be catered for and, what is equally important, that the danger of outbreaks of infectious disease, particularly cholera, can be averted.

In the following paragraphs are briefly described the activities of the railway health departments under these different heads. The administration reports of the health departments of Indian railways have been compiled in the past for the official year and it has not therefore been possible to obtain figures relating to the calendar year 1940. The figures given in the following paragraphs relate to the year 1939-40.

North Western Railway.

42. The cases treated by the railway medical staff included sixteen of cholera, 93,683 malaria, 57,704 injuries, 14,698 trachoma, 9,670 dysentery, 317 smallpox and 801 enteric fever. It is stated that 226 persons including employees and members of their families, were given antirabic treatment. During the year medical and sanitary arrangements were made by the railway administration in connection with 20 different festivals.

No separate organisation exists for antimalaria work. Cleaning and oiling of drains, drainage of stagnant pools, filling up of small pits and depressions and similar activities were carried out by the engineering branch in cooperation with the medical branch. Spraying of selected quarters with Pyroside 20 was continued and valuable results are stated to have been obtained. Fortyone classes in first aid and three in home nursing were held during the year. A total of 778 candidates was trained in first aid and 18 in home nursing. Eight child welfare centres were maintained at different places on the railway. The total expenditure of Rs. 23,800 was met from the Railway Staff Benefit Fund. In addition this fund made grants towards the cost of spectacles supplied to employees of the railway drawing Rs. 30 or less.

Bombay, Baroda and Central India Railway.

43. The number of employees treated for allcauses of illness during 1939-40 was 187,577 as against 191,024 during the previous year. Of these 268 were treated for enteric and 13,609 for influenza. There was only one case of cholera during the year and it proved fatal. Plague was absent and 260 cases of smallpox occurred among the railway employees and their dependents.

Six qualified dentists were given facilities for working in the hospitals and dispensaries of the railway. They were allowed free passes for themselves, their dental kit and servants in return for free treatment to menials and treatment to others on reduced fees. In all 1,672 cases were treated, of whom 609 cases were treated free.

Antirabic treatment was given to 205 patients. Antimosquito measures were carried out in 25 stations. Primary and recrudescent cases of malaria among the employees of the railway during the year were 11,266 and 5,716 respectively as against 8,512 and 8,693 during the previous year. There was thus an appreciable increase in primary infections. This is reported to have been due to a severe malaria epidemic in Bombay district during the latter part of the year.

An intensive drive for the abolition of sumps in railway areas was made during the year, the sullage and waste water being run into oleander plantation beds. It is reported that this method of treatment has been shown to be satisfactory. The disposal of nightsoil by the Indore process was also tried in a number of stations. The end product is stated to be of good quality as manure and to have secured a growing demand amongst agriculturists.

Fortyfour classes in first aid were held during the year as against 39 during the previous year, and of the 536 persons who underwent training 322 received certificates. Two classes in the Mackenzie course for school children, three in home nursing and one in junior first aid were also held.

Madras and Southern Mahratta Railway.

44. The Chief Medical Officer states that the major epidemic diseases, namely cholera, smallpox and plague, had only a very low incidence among the railway population. It is also stated that the majority of the cases occurred among the employees and their dependents living outside railway premises. It is claimed that the prompt preventive measures taken by the railway health staff are largely responsible for these results. For instance, it is pointed out that, while in Madras Presidency there occurred during the year an increase of about 15 per cent in the incidence of smallpox, only 34 railway employees contracted the disease and, of these, 32 cases occurred among those living outside the railway premises. Plague claimed three attacks among the employees and six among their dependents. The corresponding figures for cholera were two and six respectively. Among the affected population 1,457 inoculations against cholera and 2,275 against plague were carried out and the numbers of primary and revaccinations against smallpox totalled 5,546.

As regards malaria the position is different. Its incidence was high in the railway colonies at Guntakal, Dronachellam and Gooty and among the engineering gangmen resident in the neighbouring villages of these areas. It is stated that all possible steps were taken to control its prevalence, including antimosquito measures in and around the railway colonies. As effective control measures cannot be carried out without the cooperation of the civil health authorities, it is stated that meetings took place between the railway and civil health staffs for the purpose of developing joint action against the disease.

The railway administration has been carrying on an active antimalaria campaign for a number of years and it is pointed out that, during 1939-40, such measures were in operation at 45 stations. The Chief Medical Officer has given an interesting table in his report showing the results achieved by the antimalaria campaign. Figures for the numbers of malaria cases treated and the numbers of days lost by the employees on account of malaria in the year prior to the commencement of antimalaria measures and during 1939-40 are given for eleven stations. In every station there has occurred a considerable reduction in the incidence of the disease. The total number of malaria cases treated during 1939-40 in these eleven stations was 720 as against 6,662 before antimalaria operations started. The number of days lost by the railway staff on account of malaria during 1939-40 was 2,366 as against 8,111 before the adoption of preventive measures. In regard to the splenic index remarkable reductions have been recorded in these places. In one station, Mamanduru, the spleen index was reduced during the period from 33.3 per cent to 0.0 per cent.

It is reported that the system of medical examination of railway school children and the maintenance of medical records continued to work satisfactorily throughout the year. A grant of Rs. 100 was made from the Staff Benefit Fund for the free supply of spectacles to employees drawing Rs. 30 and less. In addition the payment of salaries and allowances to the midwives at three stations was also sanctioned from the Staff Benefit Fund.

As regards water supply it is reported that many improvements were carried out at Gooty, Nandyal, Tungabhadra, Nagarur, Majorda, Nandalur and Castle Rock.

An effort was made to train large numbers of volunteers in first aid and instruction in stretcher drill was added to the course. Revision classes were also conducted for first aiders who had qualified in past years.

South Indian Railway.

45. The number of employees treated during 1939-40 was 19,747 as against 16,281 during the previous year. Only one case of cholera took place. It occurred in the family of an employee residing within railway premises and the case proved fatal. No case of plague occurred during the year. On the other hand 62 cases of smallpox with eight deaths took place, of which 12 attacks and two deaths were among the employees and their families residing within railway premises. The general health of the railway population is stated to have been satisfactory during the year.

Antimalarial measures are stated to have been carried out in Shencottah Ghat section with a reduction in the incidence of the disease. Besides the usual measures, spraying of open spaces with Pyroicide 20 was also carried out. In the Salem-Morappur section of the railway spraying with Pyroicide 20 is stated to have reduced the incidence of malaria by 58.3 per cent.

Ninety cases of enteric fever were admitted into the Golden Rock hospital; of these seven died. It is stated that this outbreak took place as the result of an extension of infection from an epidemic in Trichinopoly city.

There were no big festivals during the year. Adequate arrangements were made for minor festivals at certain places. The water supply on the railway is stated to be of good quality.

During the year 95 employees including seven officers passed the first aid examination. One First Aid Division for men is in the stage of formation and it is stated that two Nursing Divisions are also being formed.

All existing train accident boxes were overhauled and altogether 104 boxes were in use during the year.

Great Indian Peninsula Railway.

46. The total number of patients treated amongst the employees of the railway during the year 1939-40 was 133,456 and of their families 91,449. The corresponding figures for the previous year were 126,348 and 86,430. The increase is stated to have been due mainly to malaria and other fevers. The percentages of cases of malaria and of total 'fevers' to the deaths from all causes during the past three years are given below :

Year.	Malaria.	Total fevers.
1937-38	6.9	31.9
1938-39	8.9	38.7
1939-40	12.6	45.2

The intermittent rainfall that took place during the year is stated to have been responsible for the high incidence of malaria. In addition to this disease influenza was also prevalent throughout the year and it reached its maximum incidence in the month of October. The number of cases of influenza reported was 8,709 with ten deaths as compared with 7,886 with four deaths in the previous year.

As regards cholera 17 cases with seven deaths were reported within the railway premises and six cases with one death outside the railway premises. The corresponding figures for 1938-39 were 122 and 53 within railway premises and 57 and 26 outside the railway premises. No case or death from plague occurred during 1939-40. On the other hand, the incidence of smallpox was high with 446 cases and 43 deaths within the railway premises and 404 cases with 12 deaths outside the railway premises, as compared with 126 and six within railway premises and 171 and seven outside the railway premises during the previous year.

The number of anticholera inoculations carried out in 1939-40 was 5,827 and of vaccination against smallpox 20,334. Antirabic treatment was given to 372 persons as against 360 during the previous year. The two maternity and child welfare centres at Bhusawal and Manmad continued to do good work and an additional centre was opened at Jhansi in August 1939. The expenditure on these centres was met from the Staff Benefit Fund. In addition, a grant of Rs. 200 per annum from the Staff Benefit Fund was sanctioned to the non-railway maternity home at Dhond on the condition that the families of railway employees were visited in their homes on payment of an agreed scale of fees. The Staff Benefit Fund also provided a sum of Rs. 3,043 for the supply of spectacles free of charge to employees drawing Rs. 30 or less per month.

Thirtyfour classes in first aid were held at 20 stations. First aid was rendered to 8,596 patients either in the railway workshops or on the open line by staff qualified for rendering first aid.

The Hazardous Occupation (Lead) Rules, 1937, are being enforced in respect of 64 employees working in Parel, Matunga and Wadi Bunder workshops. A systematic six-monthly medical examination of such employees was introduced in June 1938. Any workman found to be suffering from signs or symptoms of lead intoxication is declared unfit for the continuance of such work and placed under treatment. Those who are found particularly susceptible to lead poisoning are recommended for other occupations. In 1939-40, 111 persons were re-examined and all of them were found fit.

East Indian Railway.

47. The total number of persons treated on this railway including employees and their families was 504,245 as against 473,354 during the previous year. The increase is stated to have been mostly due to influenza. In consequence of an epidemic of smallpox in Bengal and Bihar it is stated that a number of cases occurred in the railway colonies at Bandel, Sahibganj, Jamalpur and Jhajha. All possible preventive measures were taken and the number of vaccinations performed was more than double that of the previous year. The number of cases of cholera was 146 among the railway employees. It is stated that preventive inoculation has been found to be effective in controlling the disease and that, where this is efficiently carried out, sporadic cases need cause no alarm. Antirabic treatment was given to 875 persons. The incidence of tuberculosis among the railway staff and their families is stated to have increased as compared with ten years ago. The cases seen are mostly pulmonary and cases of visceral, glandular and bone tuberculosis are stated to be rare

The antimalaria measures at Lillooah, Barwadih, the Doon and Terai sections and Tatanagar are reported to be continuing. While it is reported that excellent results have been achieved at Lillooah and Barwadih, the Chief Medical Officer considers that in the Doon and Terai sections similar success has not been attained.

The central laboratory at Allahabad is carrying out the examination of samples of water and articles of food as well as pathological and bacteriological examinations of clinical material sent from the different stations on the railway.

Eastern Bengal Railway.

48. During 1939-40 the total number of new cases treated at the railway hospitals and dispensaries was 197,250. There was a reduction of 3,062 cases compared with the figure for the previous year. Of the common infectious diseases there were 26 cases of cholera, of which 19 were among employees and seven among their dependents. Anticholera inoculation was carried out among the affected population, the total number being 3,520.

Owing to a sharp epidemic in Calcutta district the incidence of smallpox increased during the year under review; the total number of cases was 45 among employees. The number of vaccinations performed during the year by the railway medical staff was 23,725.

Malaria is stated to be responsible for approximately 1/6th of the total loss on the Railway in sick-man-days, and it is also stated to be the greatest single factor in the invalidism of the staff. During 1939-40 the number of malaria cases treated was 10,073, a reduction of 3,109 cases as compared with that of the previous year. It is stated that the reduction in the incidence of this disease was particularly noticed in the Calcutta district. Malaria control measures, including those for the eradication of mosquitoes and prophylaxis against infection by regular administration of quinine, were carried out by the railway authorities at sixteen stations. At seventeen other stations antilarval measures were taken by the railway in conjunction with other public bodies such as municipalities, military cantonments and district boards. At seven other stations the prophylactic administration of quinine was alone carried out.

The Chief Medical Officer's report emphasises the value of antimalaria measures to the railway administration. It is stated that the withdrawal, for a period of six months between October 1939 and March 1940, of the antimalaria measures which had been in operation since 1928 in Rajbari, a highly malarious place, resulted in a loss of work amounting to the cash value of Rs. 4,500 apart from the additional expense involved in treating the patients. It is also stated that at the stations of Khulna and Siliguri, the cessation of control measures similarly caused an increase in the incidence of malaria.

The use of pyrethrum insecticide spray for killing adult mosquitoes was also tried but the experiment was not carried out on a sufficiently large scale to permit of any conclusions regarding its value being drawn.

During the year 106 new cases of tuberculosis were treated among the railway staff, an increase of 24 cases over the figure for the previous year.

Antirabic treatment was given to 168 persons during the year, and of those 54 were employees.

A scheme for the supply of filtered water at Kanchrapara was completed during the year under review. A total of 600,000 gallons a day is being supplied to the railway colony at this place. Weekly bacteriological examinations of samples of water are carried out by the bacteriological laboratory at Sealdah for maintaining the desirable standard of purity of the water supplies.

Bengal and North Western Railway.

49. Malaria is an important problem on this railway. It is stated that during the year nearly 50 per cent of the cases of illness were due to this disease. Of the total number of malaria cases nearly 60 per cent were relapses, which shows that treatment was not continued sufficiently long to effect a cure. To get the people to realise the necessity for persisting with the treatment is therefore essential in order to achieve success in the campaign against malaria.

It is stated that tuberculosis was responsible for about 17 per cent of the loss of working days in the railway. The incidence of the disease is stated to be higher among the clerical staff of the Traffic and Audit Departments owing to their sedentary habits and overcrowding in their homes.

Two outbreaks of cholera in railway quarters took place during the years one at Mokamehghat and the other at Gonda. In both cases infection was brought from outside and its spread was controlled by disinfection of the wells and inoculation of the people.

First aid classes were held at Gorakhpur, Benares Cantonment, Samastipur and Sonepur during the year 1939. Of the 88 candidates examined 63 passed the examination.

The railway maintains a maternity and child welfare centre, and it is stated that its work is steadily growing. Of the expectant mothers attending the centre 112 were admitted to hospital for confinement and 27 were confined at their homes. A number of abnormal cases were referred by the centre to the hospital and the Chief Medical Officer draws attention to the value of co-operation between the centre and the hospital in the treatment of serious cases.

Antirabic treatment was given to 22 cases during the year.

Assam Bengal Railway.

50. The total number of cases of illness treated during 1939-40 among railway servants was 101,883. Of these nearly 27 per cent were cases of malaria. Cholera cases totalled six among the employees and one among the dependents. There were eight cases of smallpox, all among dependents. Among other infectious diseases enteric fever accounted for 44 cases among the employees and 43 among the dependents.

The number of inoculations against cholera and against enteric fever were 1,014 and 2,853 respectively, while vaccinations against smallpox totalled 4,069. Fiftyeight cases of kala-azar were treated in the different medical institutions maintained by the railway.

A midwife was maintained out of the Staff Benefit Fund at each of the stations of Pahartali, Lumding and Badarpur. These midwives carried out 66, 45 and 39 confinements respectively.

Bengal Nagpur Railway.

51. As the result of a recent reorganisation all the sanitary inspectors were placed under the direct control of the Chief Medical Officer. It is stated that considerable efforts have been made during the past two years at Bilaspur, Adra and Waltair to improve sanitary conditions. During the year under review 53 septic tank latrines were provided for staff quarters and 21 public latrines of this type were also constructed. Since 1932, when the construction of this type of latrine was started, the total number of private and public septic tank latrines has arisen to 163 and 80 respectively. Examination of the sewage effluents of these septic tanks has been started for the purpose of keeping a record of their performance.

A survey has been carried out of the drinking water supplies of all the important railway stations and full records regarding these supplies are being kept in the office of the Chief Medical Officer. During the year 155 samples of drinking water were examined. Common problems regarding water supplies were discussed by the Directors of Public Health of Madras and of the Central Provinces and the Chief Medical Officer.

Frequent inspections of the different stations are undertaken by the Chief Medical Officer in order to improve the standard of sanitation. Small stations, which cannot afford to maintain a sanitary inspector, are under the charge of specially trained conservancy supervisors. During the year 19 candidates received training and 12 passed the examination. In August 1939 all the railway public health staff and antimalaria inspectors were brought together for a conference at headquarters. At this conference the scope and functions of the public health organisation were explained to them. Book clubs are maintained by the Chief Medical Officer and the Malariologist of the Railway and public health and malaria inspectors who are all members of these clubs, are supplied with books and journals to keep them in touch with current practice in their respective spheres of work.

Malaria was present in epidemic form. Antilarval measures were carried out in many stations. Weekly doses of quinine and tubes of antimosquito cream for application to the exposed parts of the body were distributed to the running staff.

At Bhadrak malaria control continued to function well. A comparison of the average incidence of malaria in this station during a period of five years before preventive measures were started with the corresponding figures for six years of control shows that there has been an appreciable financial gain to the administration. In Khurda Road the staff were given prophylactic

quinine from September onwards. In Puri a sharp outbreak of the disease took place but no vector was incriminated. The newly appointed Malaria Officer of Orissa Province has begun to investigate the problem and the Malariaologist of the Bengal Nagpur Railway is cooperating with him.

In the Chilka Lake area *A. sundaicus* had been, for some unexplained reason, almost entirely absent during the greater part of 1939. In December of that year it is reported that this mosquito reappeared in large numbers. There was a definite increase of malaria in Vizagapatam town and this affected the railway colony at Waltair. It is pointed out that if *A. sundaicus* establishes itself in the extensive swamp in the backwaters, a very serious situation will develop both for the railway colony and for the harbour. At Dongargarh a severe outbreak took place and no intensification of antimalarial measures could allay the situation. An unsatisfactory feature of the outbreak is stated to be the fact that the mosquito carrier still remains obscure.

In regard to the treatment of tuberculosis patients it is stated that negotiations have been entered into with the Pendra Road Sanatorium for the reservation of a number of cottages and beds for the treatment of the railway staff. During the year a start was made for placing the diagnosis and treatment of venereal diseases on sound lines. Treatment record cards have been prepared and issued to District Medical Officers and Assistant Surgeons. Sufficient time has not elapsed for assessing the results of the new measures.

Antirabic treatment was carried out in four centres and in all 160 patients were treated. Epidemic dropsy is stated to have caused some amount of incapacitation among the crews of the ferries and launches at Garden Reach and Shalimar during the year. Two hundred and eleven samples of cooking oil were sent to the Bengal public health laboratory for examination and seventeen of these were found to be contaminated with argemone oil. The necessary measures were taken.

The usual medical arrangements for the Rath Jatra and Dol Jatra festivals at Puri were made. Special arrangements were also made for the Congress Session at Ramgarh in March.

SECTION VII.

HEALTH OF JAILS IN BRITISH INDIA.

General.

52. The figures given in tables, VII (i) to VII (iv), relate to all classes of prisoners in the different provinces of British India. The health of the jail population in the Andamans is discussed in a separate paragraph of this section.

Population, accommodation and overcrowding.

53. The following table gives information regarding the authorised accommodation, excluding hospitals and observation cells, and the average daily population of jails in each province for the years 1939 and 1940.

TABLE VII (i).

Province	Authorised accommodation, excluding hospitals and observation cells.		Average daily population.		Number of persons per hundred units of authorised accommodation.	
	1939	1940	1939	1940	1939	1940
N.-W. F. P.	5,263	4,941	5,666	5,753	108	116
Punjab	14,713	14,713	20,543	21,589	140	147
U. P.	36,067	31,984	32,895	30,966	91	97
Bihar	13,013	9,541	11,876	12,769	91	134
Orissa	2,257	1,872	1,620	1,666	72	89
Bengal	16,584	16,871	19,057	19,234	115	113
C. P.	6,697	6,697	5,044	5,285	75	79
Bombay*	13,271	13,776	8,433	9,337	64	68
Sind	5,205	5,342	4,758	5,940	91	111
Madras	18,401	18,696	14,157	15,922	77	85
Assam	3,776	3,958	3,216	3,194	85	81

*Including Dharwar Borstal School.

The authorised accommodation increased during the year under review in Bengal, Bombay, Madras, Sind and Assam. The last two columns give the numbers of persons per hundred units of authorised accommodation in 1939 and 1940. It will be seen that, in both the years, there was no overcrowding in the United Provinces, Orissa, the Central Provinces, Bombay, Madras and Assam. In Bihar and Sind no overcrowding existed in 1939 while in 1940

the average daily number of persons was definitely in excess of the available accommodation. In the remaining provinces overcrowding existed in both the years. These two columns show that the highest figures were recorded in the Punjab in 1939 and 1940 and the lowest in Bombay. In the North-West Frontier Province the excess number of prisoners were kept in verandahs, hospital wards, tents and factory sheds.

Overcrowding existed in all the different types of jails in the Punjab, though the provision of temporary camps in certain jails helped to relieve congestion to a considerable extent. There was continued overcrowding in all the central and district jails in Bihar, the population being usually much in excess of the accommodation available in the jails. The overcrowding was due to large admissions of undertrial prisoners. In Bengal the male wards for the undertrial prisoners continued to be congested. In Sind owing to the abnormal rise in the number of convicted and undertrial prisoners all the large prisons and subjails were overcrowded. A new central prison at Sukkur and a training centre for adolescent and juvenile prisoners at Hyderabad are reported to be under construction.

Sickness and mortality.

54. In table VII (ii) are given the average daily number of constantly sick and the constantly sick rate per 1,000 of the average daily population. The rate decreased in the provinces of Bihar, Bengal, the Central Provinces, Bombay, Sind, Madras and Assam. The provinces of Orissa, the Punjab and the N.-W. F. Province recorded, on the other hand, increases in the rate.

TABLE VII (ii).

Province.	Average numbers of constantly sick.		Constantly sick rate per 1,000 of average daily population.	
	1939	1940	1939	1940
N.-W. F. P.	99	105	17	18
Punjab	336	403	16	19
U. P.	532	494	16	16
Bihar	211	219	18	17
Orissa	32	39	20	23
Bengal	735	669	39	35
C. P.	65	54	13	10
Bombay*	142	129	17	14
Sind	79	93	17	16
Madras	176	164	12	10
Assam	77	59	24	19

*Including Dharwar Borstal School.

Table VII (iii) shows the numbers of annual hospital admissions and deaths from all causes during the years 1939 and 1940. In 1940 the admission rate was highest in Sind and lowest in Assam. Assam on the other hand recorded the highest mortality rate of 18 per 1,000 of the average daily strength. Mortality rates above 10 per thousand were also recorded in Bihar, Orissa and the Central Provinces.

TABLE VII (iii).

Province.	Admissions.				Deaths.			
	Number		Rate per 1,000 of average daily strength		Number		Rate per 1,000 of average daily strength	
	1939	1940	1939	1940	1939	1940	1939	1940
N.-W. F. P.	2,008	3,204	354	557	20	40	4	7
Punjab	9,163	12,220	446	566	132	146	6	7
U. P.	14,275	12,265	434	396	244	261	7	8
Bihar	3,968	4,177	334	327	110	156	9	12
Orissa	714	589	441	354	16	19	10	11
Bengal	18,814	19,180	987	997	204	181	11	9
C. P.	1,679	1,444	333	273	76	66	15	13
Bombay*	5,082	6,067	603	650	58	66	7	7
Sind	3,845	6,437	808	1,084	31	48	7	8
Madras	3,965	4,248	280	267	88	128	6	8
Assam	1,092	816	340	255	85	58	26	18

*Including Dharwar Borstal School.

Weight of prisoners.

55. Table VII (iv) shows for the years 1939 and 1940 the percentages of prisoners who, at the time of their discharge from jail, showed an increase or decrease in weight and those whose weight remained stationary. It will be seen that, in every province, the majority of the prisoners gained weight during their stay in jail, which is indicative of an improvement in their health. The highest percentage of prisoners who showed loss in weight during 1940 was recorded in Sind. The Central Provinces recorded the highest percentage of prisoners who showed an increase in weight.

TABLE VII (iv).

Province.	Gained weight.		Stationary.		Lost weight.	
	1939	1940	1939	1940	1939	1940
N.-W. F. P.	55	61	39	31	6	8
Punjab	47	41	45	51	8	8
U. P.	50	56	41	35	9	9
Bihar	57	56	30	30	13	14
Orissa	68	59	27	33	5	8
Bengal	44	44	41	39	15	17
C. P.	66	67	25	25	0	8
Bombay	52	51	32	31	16	18
Sind	57	51	18	18	25	31
Madras	60	59	36	35	4	6
Assam	57	57	29	28	14	15

Remarks on individual provinces.

56. Brief remarks on the health administration of jails in the provinces are given below.

Apart from the care of the sick and the enforcement of a high standard of sanitation in jails and of preventive measures against infectious disease, the provincial jail health authorities also paid attention to certain measures which have an indirect bearing on the health and wellbeing of the jail population. These included the encouragement of general and physical education among the prisoners, improvements to their diet and lectures in first aid and health propaganda.

N.-W. F. Province.—During 1940 the jails remained free from cholera, smallpox and plague but there occurred a severe epidemic of malaria; 1,297 attacks and one death from this disease were recorded. It is stated that the incidence of dysentery, pneumonia, tuberculosis of the lungs, other respiratory diseases and influenza also showed an increase during the year compared with 1939, the recorded figures for these diseases in 1940 being 52, 85, 67, 428 and 72 respectively.

The general sanitation of all the jails is stated to have been satisfactory. Prisoners were allowed physical drill and took part in games according to the facilities available in the different jails.

Punjab.—Malaria contributed the largest number of admissions to hospital in the district and central jails. The total number of admissions was 4,222. The three jails at Multan alone were responsible for 2,170 admissions. Two attacks from smallpox were recorded but the jails were free from cholera and plague. Tuberculosis of the lungs and other respiratory diseases were responsible for 181 and 566 admissions and for 37 and four deaths respectively. Although, as stated previously, overcrowding was acute, the Inspector General of Prisons points out that non-official and other visitors to the jails reported that the general sanitation of the jails was good.

United Provinces.—In 1940 malaria was responsible for the largest number of admissions (2,824) and pulmonary tuberculosis for the largest number of deaths (52) in the jails of the United Provinces. Dysentery and diarrhoea caused 329 and 182 cases and six and three deaths respectively. Five attacks and three deaths from cholera were also recorded. Among the respiratory diseases pneumonia and pulmonary tuberculosis accounted for 273 and 124 admissions and other respiratory diseases for 957. The deaths from pneumonia, pulmonary tuberculosis and other respiratory diseases were 48, 52 and 17 respectively.

Bihar.—The sickness rate among the prisoners during 1940 was 17 per thousand of the average daily population as against 18 per thousand during 1939 although, as pointed out already, a definite rise took place in the average daily population, which resulted in overcrowding. Malaria was responsible for 934 admissions and six deaths as against 763 admissions and three deaths during the previous year. The number of admissions and deaths from dysentery rose from 530 and eight in 1939 to 664 and 23 in 1940. In the case of tuberculosis of the lungs the admissions decreased from 94 in 1939 to 79 in 1940 while the deaths increased from 18 to 28. Cholera was responsible for 11 admissions against one in the previous year. None of these proved fatal. Fifteen cases of smallpox with two deaths were recorded against five cases and one death in 1939. The jails were free from plague. Twelve sporadic cases of cerebrospinal fever with four deaths were recorded in the different jails of the province. The general sanitary condition of the jails is stated to have been satisfactory.

Orissa.—The jails were free from cholera, smallpox, plague and cerebrospinal fever. There were 126 admissions from malaria and 61 from influenza. Routine examination of every prisoner for the detection of hookworm infection on admission to the jail was continued throughout the year.

The sanitation of all the jails and subjails was satisfactory. Sanitary works such as improvement of the water supply and provision of smoke outlets and of impervious floors to kitchens were carried out in certain jails.

The diet of the prisoners was improved by increasing the supply of vegetables. During the year an investigation into the incidence of vitamin B₁ deficiency among the prisoners on their admission to jail was carried out.

The conditions in the subjails of the province are stated to be unsatisfactory and the Inspector General of Prisons has submitted proposals to the Government that the supervision of these jails, which now rests with the Revenue Department, should be transferred to him.

Bengal.—There was one attack from cholera and three from smallpox. All of them recovered. Malaria was responsible for 3,640 admissions and six deaths. Among the total deaths the largest number was due to tubercle of the lungs (39), the next in order of frequency being pneumonia (27) and dysentery (17). Influenza was responsible for 1,549 admissions and 7 deaths. Arrangements are reported to have been made, in the central and district jails of the province, for outdoor games in addition to physical exercise.

Central Provinces.—The largest number of admissions was from malaria (380). The incidence of dysentery showed an appreciable fall from 433 admissions in 1939 to 153 in 1940. The highest number of deaths was due to pneumonia (13), tuberculosis of the lungs producing the next highest number (9). Influenza was responsible for 120 admissions but there was no death from this disease. Two attacks from smallpox were recorded but the

jails were free from cholera and plague. The health of the jail population is reported to have been generally good throughout the year. Compared with the year 1939 decreases were recorded in the death rate and in the constantly sick rate [tables VII (iii) and VII (ii)].

Bombay.—The chief causes of sickness were malaria, dysentery, respiratory diseases and diarrhœa causing respectively 1,308, 165, 150 and 86 admissions. The largest number of deaths was due to tuberculosis of the lungs (10) the next in order of magnitude being pneumonia (4). No attacks from cerebrospinal fever, cholera, plague and small-pox occurred during 1940 in any of the jails in the province.

The health conditions in the jails are reported to have been on the whole satisfactory. The Inspector General of Prisons states that the majority of sub-jails are located in buildings belonging to the Revenue Department and that the cells are mostly dark and ill-ventilated. These defects are being gradually remedied.

Sind.—Admissions from malaria rose from 1,087 during 1939 to 1,813 in 1940. This was largely due to an epidemic of malaria in the Sukkur district prison where the admissions rose by 752. The incidence of dysentery also rose from 149 in 1939 to 261 in 1940. An outbreak of cerebrospinal meningitis took place with nine admissions and five deaths.

The spraying of "pyroicide 20" was regularly carried out in all the large prisons of the province, except the Karachi district prison, during the malaria season of 1940. The results are reported to be good. The use of mosquito nets by all malaria cases in prison hospitals was enforced.

The disinfection of blankets before reissue to prisoners was continued. Aged prisoners were given milk at the discretion of the medical officer.

Madras.—In the jails of Madras Presidency special attention was paid to conservancy. It is reported that the latrines in all jails except in the Penitentiary, Madras, are fly-proof. In the Penitentiary the construction of flush-out latrines was sanctioned. The drains in the garden of the central jail, Salem, and in the Borstal School, Palamcottah, were reconstructed. It is reported that measures were taken to prevent the introduction of infection into the jails, which continued to be free from cholera, plague and cerebrospinal fever. However, three non-fatal cases of smallpox occurred. The largest number of admissions to hospital was due to influenza. Malaria accounted for 166 admissions, dysentery 133, pneumonia 66, tuberculosis of the lungs 61 and other respiratory diseases 99. The largest number of deaths took place from pneumonia (24), other diseases in order of mortality being tubercle of the lungs (23), dysentery (7), diarrhœa (3), other respiratory diseases (3), malaria (1) and enteric fever (1).

Assam.—The largest number of admissions (191) was due to dysentery. Next in order of frequency were malaria (154), other respiratory diseases (122), pneumonia (48) and tubercle of the lungs (30). Tuberculosis was responsible for 11 deaths, dysentery for 10 and pneumonia for 9. All the jails remained free from cholera, plague, and enteric fever. The general sanitary condition of the jails was satisfactory. Pucca drains were provided in the jails at Tezpur, Mangaldai and Golaghat.

Coorg.—The accommodation available in the Mercara jail, excluding the hospital and observation cells, was 113 and the average daily population was only 40. Out of a total of six attacks, two were due to dysentery and one from each of the diseases, viz., malaria, ankylostomiasis, pneumonia and gastric

ulcer. Only two deaths were recorded among the jail population. The conservancy arrangements are stated to have been satisfactory and the health of the prisoners was satisfactory.

Ajmer-Merwara.—In the Ajmer central jail the maximum population on any one day was 536 and the accommodation available was for 555. The daily average population of the jail was 476. During the year 11 attacks were recorded from malaria, two from dysentery, one from pneumonia, two from tubercle of the lungs, 44 from influenza, one from enteric fever, 12 from pyrexia of uncertain origin and 26 from other diseases. Two deaths, one from influenza and the other from valvular disease of the heart, were registered. The sanitary condition of the jail is stated to have been good. The scale of diet for the prisoners was improved during the year.

The Andamans.

57. The health of the prisoners in the Andamans is discussed below under two heads, (1) those living in cellular jails and associated barracks and (2) *talab-dars* and self-supporting convicts. Of the prisoners in the second group, some live in single barracks, some in married quarters and the rest in the compounds of officers to whom they are attached as domestic servants, or in Government or private buildings.

In the cellular jails and associated barracks the average daily population during 1940 was 421 while the accommodation available was for 834. No overcrowding therefore existed in these jails. The total number of admissions to hospital during the year was 208 giving a hospital admission rate of 49.4 per thousand compared with 62.2 during 1939. The death rate was nil as against 2.2 during 1939. The constantly sick rate during 1940 was 1.8 compared with 2.6 in 1939.

Of 131 cases of illness that occurred among the prisoners 48 were cases of malaria, 27 of dysentery, 23 of diarrhoea and of influenza respectively, two, in each case, of pneumonia and tuberculosis of the lungs and 6 of other respiratory diseases. No case of cholera, smallpox, plague, enteric fever or cerebrospinal fever occurred among the prisoners.

The decreases in the sickness and mortality rates, to which attention has been drawn above, indicate that a higher standard of health was maintained among the prisoners of the cellular jails and associated barracks in 1940 than during the previous year. The sanitation of the prison is also stated to have been satisfactory.

The average daily strength of *talab-dars* and self-supporting convicts during 1940 was 6,178. The question of overcrowding among them arises only in respect of the *talab-dars* living in single or married quarters. The maximum number, on any one day, of the *talab-dars* living in single barracks was 2,705 while accommodation was available for 3,501. In the case of married *talab-dars* accommodation was available for 597 while the maximum number on any one day was 581. There was therefore no overcrowding throughout the year.

The rate of hospital admissions and the constantly sick rate per thousand of the average daily population were 512 and 21 compared with 508 and 24 respectively during 1939. The total number of deaths was 51 giving a rate of eight per thousand of the average daily population compared with a death rate of nine in 1939.

The following table shows the attacks from the principal diseases among *talabdars* and self-supporting convicts. Figures for 1939 are also given for comparison.

	1939	1940
Malaria	981	1,004
Dysentery	138	133
Diarrhœa	24	45
Influenza	49	188
Weil's disease	49	44
Tubercle of lungs	17	13
Ankylostomiasis	94	78

Apart from an appreciable increase in the incidence of influenza there was little variation between the two years in respect of the other diseases. In addition to the above diseases, a case of smallpox and four cases each of chicken-pox, measles and mumps were recorded. No death occurred.

Malaria has claimed, as usual, the largest number of patients. There was a small increase of 23 cases in the total incidence of the disease during 1940. Antimalarial measures have claimed considerable attention during the past years. A permanent antimalaria labour squad has been formed and it is reported that, along with antimosquito measures, an endeavour is being made to treat and cure as many patients as possible in order to reduce the reservoir of infection. The prophylactic administration of quinine to the convict population during the malaria season has also been carried out during the past few years. The beneficial effects of these measures are shown by the following figures for the incidence of malaria in the Settlement :—

Year.	Number of malaria cases.	Convict population.	Number of cases per 100 convicts.
1921	5,618	11,182	50
1931	3,334	7,622	44
1939	981	6,125	16
1940	1,004	6,178	16

Mention was made in the previous reports about the prevalence of Weil's disease in the island. In 1940 its incidence was the lowest on record during the quinquennium ending with that year. It is reported that the case mortality rate continues to be about 20 per cent in spite of the use of antisera prepared from local strains of the organism. The Senior Medical Officer states that a prophylactic vaccine has been prepared from three common Andaman strains and that, as its use among a selected group of convicts has given encouraging results, the work is being continued.

In regard to the water supply of the settlement new wells were constructed and existing ones were repaired. A large reservoir was in the process of construction at Lamba Lines village.

A voluntary organisation, the League of Health, has been formed for carrying out the health education of the general population and of the convicts. On the committee of this organisation the Senior Medical Officer is serving in an advisory capacity. Apart from propaganda, the League of Health has taken part in the carrying out of sanitary works, such as the construction and repair of wells and the provision of cement latrines in certain places.

Conclusion.

58. From the paragraphs in which the sickness and mortality among the prisoners in the provinces have been briefly reviewed it will be seen that the usual standard of efficient health administration was maintained during 1940. The low incidence or complete absence of the common infectious diseases such as cholera, smallpox and plague, among the prisoners, in spite of their wide prevalence in the surrounding general population, indicates that the control of these infections is being effectively carried out.

As regards the Andamans, it was pointed in last year's report that the year 1939 was one of the healthiest on record. The sickness and mortality rates for 1940 show a further improvement on those for 1939. Special mention may be made of the measures taken for the control of malaria and Weil's disease.

SECTION VIII.

MEDICAL RESEARCH.

Introduction.

59. The progress of preventive medicine is dependent on continuous medical research. In the words of Sir George Newman*, "The chief business of conservative or preventive medicine is to apprehend the true nature of man and his environment, to learn how to strengthen and use the constant internal environment (physical and mental) and control the variabilities of the external environment, and thus establish and maintain harmony between them." Within the last few decades the scope of medical research has considerably widened. The study of man's internal environment has opened up a wide field in which the physiologist, the pathologist and the clinician have to work in close collaboration with the bacteriologist, the biochemist, the nutrition expert and the psychiatrist. The control of the external environment of man brings in the study of climatological and social factors which have a bearing on the health and wellbeing of the individual and of the community. In regard to the factors affecting man's internal and external environment, it is being increasingly recognised that the variability in respect of individuals demands that generalisations, before they can be taken as scientifically sound and administratively acceptable, should be based not on a few observations but on a large number of recorded facts. Modern research, whether it be in the field of social conditions or of bodily functions, has therefore tended in the direction of accumulating observations on a sufficiently large scale to justify the deduction of conclusions. Therefore the trained statistician also finds a place in the scheme of medical research because his services are required both for the planning of the experiment and for the interpretations of the results.

In India also there is evidence of a widening of the scope of medical research during recent years. In the past these studies had been mostly conducted by medical men in the bacteriological laboratories maintained by the Central and Provincial Governments and, to a smaller extent, by a few interested doctors in the wards of hospitals or in the field. The relatively rapid expansion of biochemical studies and of field investigations of an epidemiological or social nature has brought a wider range of workers into the health field. Studies in nutrition have also helped to bring about this welcome increase in the number of medical research workers. The scientific departments of the Indian Universities have begun to take an increasing interest in the furtherance of basic research in the fields of biochemistry, nutrition, physiology, pathology and clinical medicine, while even voluntary organisations and social workers are beginning to interest themselves in the investigation of socio-economic factors influencing the health of the community. The official public health departments are also engaging themselves in field studies for the investigation of health problems, such as those of malaria, nutrition, maternal and infantile mortality. This is all to the good. Preventive health work can only be based on an increasing mastery of man over his internal and external environments,

* "The Rise of Preventive Medicine", page 151, published by the Oxford University Press.

and the quest of knowledge for the attainment of this mastery demands the services and cooperation of all who are properly equipped for investigating the various problems of public health.

The main lines of medical research in India have been described in the Public Health Commissioner's Preliminary Annual Report for 1939 and in the Annual Report for 1937. The Indian Research Fund Association is the premier organisation concerned with the direction of medical research and, in view of recent developments, the grants sanctioned by the Association are being made available for suitable workers and research schemes in universities and even to voluntary organisations interested in health problems. While it is obviously impossible to record any spectacular results from year to year, it may be stated that satisfactory progress was maintained during 1940 in the different researches financed by the Association. A detailed summary of the investigations carried out under the auspices of the Indian Research Fund Association and in different research institutes in India, including the medical colleges, will be given in the Supplement to this report, which will be published at an early date. In the meantime a brief survey of medical research during 1940, from the point of view of public interest, is given in the following paragraphs.

Nutrition.

60. The problem of improving the nutrition of the people of this country presents many difficulties. The dietetic habits of the inhabitants of any locality are largely determined by the articles of food that are produced locally. In order to obtain a balanced diet it is often necessary that the locally available foodstuffs should be supplemented, in a larger or smaller measure, by articles which can be obtained from outside. Any long term plan for improving the nutrition of the people must therefore provide for a change in agricultural policy in order to introduce the cultivation of other desirable articles of food as well. In this connection the recommendation of Sir John Russell regarding agricultural policy in India may be quoted. "The first need in my view is to make a nutrition survey in each province so as to discover what are the chief deficiencies in dietary; the medical authorities should then meet the agricultural experts to decide what crops, including fruits and vegetables, should be grown to supply the missing elements. The approximate quantities needed should be indicated, and the agricultural staffs acting along with the rural development authorities should then encourage by all means in their power the growth of these crops."

It will thus be seen that the collection of information regarding the diets consumed by the people is the first step towards the formulation of a nutrition policy. Towards this end, within recent years, over 50 surveys have been carried out in various parts of India. The results of these surveys have been brought together in a booklet entitled "Note on the results of diet surveys in India" issued in 1940 by the Indian Research Fund Association.

The majority of the surveys were carried out in rice producing areas and valuable information regarding the deficiencies of the rice diet and the ways of making up such deficiencies has been embodied in the Note. Although rice supplies 80 to 90 per cent of the total calorie value required, this cereal is deficient in certain essential requirements such as calcium and vitamin A. While attempts have been made to cultivate strains of higher nutritive

value the results so far achieved do not suggest that any striking success is likely to be obtained. It has been demonstrated that, apart from intrinsic deficiencies in certain directions, the processes of milling, washing and cooking the rice contribute largely to a reduction of its vitamin content and therefore its nutritive value. Parboiled rice, even when highly milled, retains certain vitamins in considerable quantities and is therefore to be preferred to raw rice.

Animal experiments have shown that even a partial substitution of rice by wheat or one of the millets grown in the country improves the diet considerably. The cultivation of wheat in India is limited by climatic conditions, but the millets can be grown all over the country and the desirability of developing the cultivation of millets and of encouraging their use by the people of the rice producing areas requires consideration by the authorities.

Further, the pulses can supply some of the important factors in which rice is deficient. The question of increasing the consumption of pulses has been considered by the Imperial Council of Agricultural Research. This organisation has initiated a coordinated scheme of research in the provinces in order to investigate the possibility of developing strains of higher yield as well as of encouraging the extension of areas of pulses under cultivation.

The surveys show that the consumption of fruits and vegetables is much below the desirable level. Leafy vegetables are particularly rich in vitamin A, vitamin C and calcium and they form therefore a valuable supplement to rice diets. It is pointed out that the commonest and cheapest varieties are usually as valuable as the more expensive. It is stated that, in many parts of India, the villager is not interested in growing vegetables even when land and water for this purpose are available. The staff of Health Units working among the rural population are laying special emphasis on the development of kitchen gardens. A good deal of educational propaganda for persuading the people to produce and consume more fruits and vegetables will have to be carried out before any marked improvement of the existing state of affairs is produced.

The proportion of fat in the common Indian diet is definitely below the required standard. It has been suggested that the intake of vegetable fats and oils should be increased and that it is desirable to increase the production of oil seeds by selective and other methods.

The addition of meat and fish to the diet markedly improves its quality. Under existing conditions meat is too costly to become a general article of food. The possibilities of developing the fish industry require, on the other hand, serious consideration. In India the industry is in a backward state and, if efficient methods such as those employed in Europe and Japan are applied to this country, a valuable supplement to the diet of the people can be provided and the general level of nutrition can thus be raised.

For the past few years investigations regarding the vitamin A content of Indian fish liver oils have been in progress in the Nutrition Research Laboratories, Coonoor, and in some other institutions in the country. It has been shown that certain varieties of fish available in Indian waters are particularly rich in vitamin A. A cod liver oil substitute prepared from shark and saw-fish liver oils combined with groundnut oil is being prepared in Travancore, Malabar and Bombay, and it is likely that, as far as the vitamin A fraction is concerned, the replacement of cod liver oil by locally produced fish liver oils has now become a feasible proposition. In South and Central India the need for vitamin A is greater than that of vitamin D. In North India where in certain parts rickets prevails, vitamin D is of great importance. Mixtures of shark liver oils

with groundnut or some other vegetable oil can be reinforced with vitamin D^s in order to produce a mixture with its content of vitamin D as great as that of cod liver oil.

An appreciable section of the population of India is vegetarian by habit and religious custom. Red palm oil as a substitute for cod liver oil for the purpose of supplying vitamin A is of particular interest in this connection. The possibility of producing a palatable and commercially suitable mixture with approximately the vitamin A activity of good butter has been under investigation in the Harcourt Butler Technological Institute, Cawnpore. Experiments have shown that the refining and deodorisation of this oil lowered its carotene content and its vitamin A activity by about 50 per cent. In regard to the keeping qualities of various mixtures of red palm oil with other vegetable oils it has been found that such mixtures, when exposed to light, are bleached within 11 months with the result that carotene is destroyed. If the mixtures are kept in tin containers it has been shown that the loss of vitamin A activity is less.

Education of the people regarding food and nutrition is an important part of the general campaign for raising their level of nutrition. The best results are likely to be obtained by concentrating on children in the schools, and one of the subjects discussed by the Nutrition Advisory Committee of the Indian Research Fund Association at its meeting in December 1940 was the necessity for providing for the education of children in this subject. It has been decided to prepare a textbook in very simple language dealing with the different aspects of nutrition. An elementary primer, based on the data accumulated by nutrition workers in India, will be of value to educational authorities.

Other researches relating to nutrition carried out in 1940 under the auspices of the Indian Research Fund Association included (1) enquiry on cheap well balanced diets under the Bombay Presidency Baby and Health Week Association, Bombay ; (2) ascorbic acid enquiry under Dr. B. C. Guha at the University College of Science and Technology, Calcutta ; (3) nutrition investigation of Bengal fish under Dr. B. C. Guha at the University College of Science and Technology, Calcutta ; (4) studies on human nutrition with diets under Dr. K. P. Basu at Dacca University ; (5) enquiry on the working efficiency of Indian labourers under Professor W. Burrige at the King George's Medical College, Lucknow ; (6) enquiry into calcium metabolism in health and disease under Dr. V. N. Patwardhan at the Seth G. S. Medical College, Bombay ; (7) tissue culture enquiry under Dr. G. Sankaran at the All-India Institute of Hygiene and Public Health, Calcutta ; (8) enquiry into malnutrition of Bengali boys with reference to vitamins A, B and C deficiency under Professor N. M. Basu at the Presidency College, Calcutta ; (9) enquiry on nutrition and its bearing on preventable blindness and eye disease in Bengal under Lieut.-Col. E. W. O'G. Kirwan, I.M.S., Professor of Ophthalmic Surgery, Medical College, Calcutta ; (10) enquiry on the seasonal variation of vitamin A content of liver oil of sea fish and the effect of parching on the biological value of proteins of cereals and pulses in the Physiology Department of Seth G. S. Medical College, Bombay.

Maternal mortality.

61. Maternal mortality enquiries have been completed in Calcutta, Bombay, Delhi and Madras. For the past two years maternal mortality returns have been collected by the Director General, Indian Medical Service, from hospitals

with 300 or more deliveries per year in different parts of the country and this information has been published in the annual reports of the Public Health Commissioner. The Maternal Mortality Advisory Committee of the Indian Research Fund Association at its meeting in December 1940 expressed the view that the findings of these investigations constitute a sufficient basis for administrative action by provincial health authorities and that further enquiries which may be found necessary in rural areas in different parts of the country or in areas with special problems should be undertaken by the public health departments concerned. A subcommittee of the Maternal Mortality Advisory Committee has prepared a memorandum for the conduct of maternal mortality enquiries and this memorandum contains the necessary instructions for the guidance of local health authorities for carrying out their investigations on proper lines.

The Committee also considered that investigations into the predisposing and clinical causes of infant morbidity and mortality are important in view of the large amount of preventable suffering that this section of the population is subjected to in India. In order to secure uniformity of action by health authorities the Maternal Mortality Advisory Committee recommended that a subcommittee should draw up a memorandum for the carrying out of such investigations.

Cholera.

62. Field studies were in progress during the year in Khulna in Bengal and in the Cauvery delta in the Madras Presidency. Laboratory studies were carried out at the Central Research Institute, Kasauli, the School of Tropical Medicine, Calcutta, the Indian Institute for Medical Research, Calcutta, and at the Carmichael Medical College, Calcutta. The reports of these different enquiries were discussed in detail by the Cholera Advisory Committee of the Indian Research Fund Association and the main points that emerged were:—

(i) The field investigation in Bengal showed an exact relationship between the distribution of the non-hæmolytic agglutinable vibrio of 'O' group No. I and the cholera case, such vibrios not being found except in the cholera case, its immediate contacts and water in the vicinity. On the other hand the hæmolytic vibrio of the same serological type (the El Tor type) was found to have a wide distribution in water supplies and often without any relationship to cholera. The experience of the Madras field enquiry corroborated this finding. The El Tor vibrio was not found in the stools of cholera cases or normal individuals. The conclusion reached was that the findings so far obtained do not suggest that the El Tor vibrio plays any part in the ætiology of cholera in India. It is considered that the two agglutinable types of vibrios should be further studied for the purpose of ascertaining whether any differences exist other than in respect of hæmolysis.

(ii) The observations made on the incidence of cholera in the Cauvery delta suggested that the opinion hitherto held that cholera is endemic in the area required further investigation. The significance of the distribution of the Inaba and Ogawa types of infection in different parts of the province should be further investigated. The determination of the type responsible for particular outbreaks might be of value in tracing the lines of spread of infection.

Plague.

63. Plague researches were confined to the Haffkine Institute, Bombay, and the Cumbum valley in Madura district in the Madras Presidency. At the Haffkine Institute various laboratory studies were in progress including trials of the value of antiplague serum and two synthetic drugs, namely, sulphathiazole and sulphapyridine for the treatment of the disease. In laboratory animals sulphapyridine produced the same effect as sulphathiazole in the early stages of the infection while, after septicaemia sets in, sulphathiazole is more effective. It was possible to carry out a field trial of these three forms of treatment during an epidemic of human plague in Bettiah Raj, Bihar. The numbers of cases treated were not large but, on the information available, all the three, serum, sulphapyridine and sulphathiazole gave a significant reduction of mortality in comparison with the control group; but no significant difference was shown to exist between the values of the three forms of treatment.

Other studies included the investigation of the factors responsible for the production of resistance against the disease.

In the Cumbum valley epidemiological studies of a useful character have been in progress for some years past. An important finding from the point of view of preventing epidemics of the disease is that, by the repeated cyanogassing of the rat holes in a plague infected or threatened area, the incidence of the disease can be definitely controlled.

Malaria.

64. The Malaria Institute of India which was previously known as the "Malaria Survey of India" was established under the Indian Research Fund Association in 1927. The activities and scope of the Malaria Survey widened rapidly. Its advice was sought on malaria problems both by the Central and Provincial Governments and it soon became apparent that the Survey had a dual rôle, firstly that of malaria research for which it was originally constituted and secondly that of advising public health administrations in regard to the control of malaria. As a result the Malaria Survey of India became organised in two sections known as the 'Research' and 'Public Health' Sections and an important stage in its history was reached on the 1st of April 1940 when the Public Health Section was taken over by the Government of India. The research side continues under the Indian Research Fund Association.

An important function of the Institute is the holding of malaria courses for medical officers. The first course was given at Amritsar in 1910. Between that year and 1925 six more courses were given and these were conducted at Delhi and Amritsar. From 1925 onwards the malaria course has been held every year. The courses were financed by the Indian Research Fund Association. In 1940 in addition to the usual annual course, five special courses were held for Army personnel, and an innovation was made by instituting a course for engineers. The necessity for *liaison* between the Public Works and the Public Health Departments is recognised by all who are concerned with the

control of malaria and a significant advance towards this *liaison* was made when sixtyone engineers from all parts of India attended this course at the Malaria Institute.

A conference of chief medical officers of Railways was held in Delhi in February 1940 and the members visited the field station of the Institute and discussed with the Director various malaria problems in which the Railway authorities are interested. The members of the annual conference of irrigation engineers also paid a visit to the field station. The increasing interest and cooperation of the engineering profession in India in regard to the control of malaria is one of the most encouraging signs of progress in the campaign against India's major health problem.

A number of insecticides were tested biologically at the Institute, including extracts of pyrethrum flowers grown in the Punjab, Kashmir, the Nilgiris, Travancore and in the Palni Hills of Madura district. It is stated that flowers from all these sources yielded excellent results.

The antimalaria operations in Delhi continued to be supervised by the officers of the Institute. In conjunction with the engineers a special technique has been evolved by which the drainage of extensive areas can be accomplished at a low cost. In certain villages in Delhi Province field researches continued with special reference to the effect of spraying operations with pyrethrum insecticide in the homes of the villagers.

In the Terai areas of the United Provinces a research unit of the Institute completed two years' observations and the data collected are being analysed. In the Wynaad district of Madras controlled experiments were carried out during the malaria season for testing the value of herbage packing as an anti-malaria measure. The results, though successful, served to emphasise the necessity for constant skilled supervision throughout the premonsoon season. In a number of villages in the vicinity of Chilka Lake in Orissa, epidemiological studies were continued throughout the year. As a result of more than 19,000 mosquito dissections it has been established that *A. sondaicus* is the chief vector in this area and probably the only one of practical importance. It has been shown that malaria exists in this area in hyperendemic form in some of the islands situated near the mouth of the lake. The epidemics which occur from time to time in the villages along the shores of the lake owe their origin to these islands.

Other activities of the Institute included the testing of the effect of drugs on animal malaria, work on malarial immunity, investigations on the malaria parasites of man and animals, study of mosquito bionomics, investigations on malaria transmission and the determination of food preferences of anophelines.

At the Haffkine Institute, Bombay, the action of sulphathiazole on *rhesus* monkeys infected with *Plasmodium knowlesi* was investigated. It was shown that radical cures were obtained with a total dosage of three grammes given over a period of three days. The drug produced no toxic symptoms. When it was given in smaller quantities relapses occurred.

In regard to the action of atebirin it was demonstrated that, in order to eliminate *Plasmodium knowlesi* from the peripheral blood of monkeys with their spleen removed or blocked, the amount of atebirin required was found to be considerably greater than in normal monkeys. The inference appears to be that the reticuloendothelial cells of the spleen probably play an important

part in promoting the action of these drugs. Other experiments at the Haffkine Institute indicated that the problem of immunity in malaria involved the possible interaction of both humoral and cellular factors.

Studies on the mechanism of defence against malaria were carried out by the Director of the Pasteur Institute, Coonoor. These studies also pointed to the conclusion that the mechanism of defence against malaria is partly cellular and partly humoral and that it is effective only in the presence of an adequate measure of both these factors. Certain experiments carried out on malaria and nutrition in collaboration with the Nutrition Research Laboratories, Coonoor, showed no significant difference in the course of malarial infection in monkeys fed on a well balanced diet and in monkeys receiving diets deficient in quality but not in quantity.

Leprosy.

65. Leprosy research was in progress during 1940 mainly at the Calcutta School of Tropical Medicine under Dr. J. Lowe and in the Lady Willingdon Leper Settlement, Chingleput, Madras, under Dr. R. G. Cochrane. The field epidemiological studies that have been carried out seem to suggest that wide variations exist not only in the incidence but also in the severity and the age distribution of leprosy cases in different parts of the country. Dr. Lowe considers that the chief factor producing these differences is race, although he believes that there may be other possible factors also. For instance, it is stated that in certain races, *e.g.*, the Santhals, leprosy may be quite common but mild in its manifestations, while in other racial groups and in hill tribes leprosy is rare but severe.

In considering the importance of leprosy as a public health problem, it is necessary not only to take into consideration the figures of incidence but also the type and age distribution of cases based on detailed surveys. In order to carry out leprosy surveys on a uniform basis in different parts of the country and to ensure that the information collected is comparable, the Leprosy Committee of the Indian Research Fund Association appointed a subcommittee to prepare a memorandum on the method of conducting a leprosy survey. The report of this Committee will, it is hoped, prove to be of great value to public health authorities all over the country.

Studies carried out in the leprosy out-patients' department of the School of Tropical Medicine, Calcutta, have indicated the occurrence of seasonal variations in the clinical and epidemiological findings of patients. The reasons for these changes are under investigation.

The value of the addition of skimmed milk to the diet of children suffering from leprosy has been under investigation by Dr. Cochrane in Madras. Preliminary investigations seemed to suggest that some benefit was being conferred on the lepromatous type of patients; further work has not, however, confirmed this view. On the other hand, the value of wheat in the relief of chronic bone and nerve pains in leprosy has, it is stated, been confirmed. The value of M. & B. 693 in the treatment of leprosy was tested. While no beneficial effects on the disease could be shown, it is stated that the drug is of value in the treatment of intercurrent conditions, such as sepsis and pneumonia.

SECTION IX.

VOLUNTARY ORGANISATIONS.**Introduction.**

66. The reports received from the Provincial Directors of Public Health show that voluntary workers are taking part in an increasing measure in health activities. In maternity and child welfare work voluntary effort has led the way and provincial health administrations are now reaping the benefit of the pioneer work of voluntary organisations. This closely follows the train of events in England where unofficial organisations first stimulated the interest of the public in special aspects of public health work such as the care of mothers and children and the prevention of tuberculosis. Health propaganda is another channel into which unofficial workers are directing their activities in India. It is reported from the provinces that, through cooperative effort, local resources for service to the community are being mobilised by the people themselves for such objects as the improvement of village sanitation, the prevention of malaria and other infectious diseases, the provision of medical relief and the organisation of preventive health measures in connection with festival centres. This is all to the good because, apart from the fact that such activities supplement what the Government and local bodies can provide for the welfare of the people, the development of the spirit of self-help and of cooperation among themselves forms the best guarantee of continued progress in the community.

In the following paragraphs the activities, during 1940, of some of the more important voluntary organisations working in different parts of the country are briefly summarised.

Indian Red Cross Society.

67. The year 1940 was a period of considerable activity for this Society. One of its primary objects is the relief of sickness and suffering in war and an effort was made during the year to contribute as much as possible out of the funds of the Society towards the welfare of the sick and wounded. It is gratifying to record that these activities did not cause any curtailment of the normal peacetime functions of the Society.

In accordance with its policy in past years the Society assisted the activities of corresponding associations in other countries. At the beginning of the year an earthquake of major proportion occurred in the province of Anatolia in Turkey killing over 24,000 persons and rendering many more thousands homeless. The Indian Red Cross Society cabled Rs. 2,000 to the Turkish Red Crescent and invited Provincial and State branches also to contribute. His Excellency the Viceroy issued a Turkish Earthquake Relief appeal and the Red Cross Society was made responsible for the disposal of the

money received. At the end of 1940 the Society had remitted as much as Rs. 3,81,000 to the Turkish Red Crescent for the relief of the suffering in the devastated areas.

The increasing problem of war refugees in Europe also claimed sympathy and help. The sums of money sent abroad included Rs. 1,35,000 for the relief of French refugees, Rs. 1,972 for assistance to destitute Finnish children, Rs. 1,000 for relief work in Poland and Rs. 13,100 as a contribution to the Greek Red Cross on the invasion of that country by Italy. A contribution was also sent to the National Red Cross Society of China. In addition the Society made its usual contributions to the International Red Cross Committee and the League of Red Cross Societies, the amounts being Rs. 1,000 and Rs. 4,181 respectively.

In India a sum of Rs. 3,000 was contributed towards relief measures in the famine stricken areas in the Hissar district of the Punjab.

A grant of £150 was received from the National Institute for the Blind in London for carrying out educational propaganda on the prevention of blindness in India and for the preparation of a cinema film on the subject.

The St. John Ambulance Association, Indian Council.

68. Through this Association men and women are trained in first aid, home-nursing and allied subjects. The subject of air raid precautions has also been added recently. The number of persons trained in these subjects during 1940 was higher by 14 per cent than the figure for 1939, which was also a record year. In all 58,011 persons attended the different courses of training in 1940 and of these 38,596 qualified themselves for the Association's certificates. In first aid the number of persons granted certificates was 35,166, in home nursing 2,894, in hygiene and sanitation 342 and in domestic hygiene and mothercraft 194. In addition 87 persons received voucher certificates by passing a second higher test in first aid, 229 obtained medallions for a third higher examination in the same subject while 72 persons earned labels and two obtained pendants as the result of passing further examinations in first aid and home nursing. The A. R. P. courses were attended by 2,902 persons of whom 936 were awarded ordinary certificates and 310 certificates as instructors. The Mackenzie course for school children was given to 10,918 persons and of these 7,647 qualified for certificates.

The Bombay Mofussil Maternity, Child Welfare and Health Council.

69. During 1940 the Council employed 66 doctors, either paid or honorary, 29 health visitors, 13 nurses, 17 midwives and 22 trained *dais*. The organisation consisted of nine maternity homes, 17 infant welfare centres and 21 institutions which combined the functions of a maternity home and welfare centre. District committees of the Council exist for Poona, Satara, Ahmednagar, Sholapur and Dharwar districts. The touring lady doctor maintained.

by the Council was given three months' training in maternity and child welfare at the Lady Reading Health School, Delhi, during the year. She inspected the various maternity and child welfare centres affiliated to the Council and six local board centres approved by the Surgeon General for maternity work. She also delivered lectures in each of the centres on welfare work and hygiene. Practical demonstrations in midwifery were given to the local staff and the midwives.

The Council maintains the Poona Health School. The School has now received recognition from the Bombay Nurses, Midwives and Health Visitors' Council. Seven students were trained in 1940-41.

The Council receives an annual recurring grant from the Bombay Government of Rs. 17,000 for its general expenses and for the Poona Health School. Another Government grant of about Rs. 2,200 was received towards the expenditure incurred by the centres in connection with the training of *dais*. Besides various charitable institutions the Bombay branch of the Indian Red Cross Society also makes an annual grant of Rs. 3,000 towards the funds of the Council.

The Bombay Presidency Infant Welfare Society.

70. This organisation started work on a modest scale in the year 1920. In the intervening period of 20 years the Society has been able to establish an excellent record of valuable work as will be seen from the figures shown below :—

	1922	1925	1930	1935	1940
New admissions of infants at clinics	1,798	4,024	5,112	5,823	7,103
New admissions of expectant mothers at clinics	559	1,269	2,458	5,510	8,437
Cases sent to maternity hospitals	135	199	2,036	3,079	3,933
Cases delivered in the Society's maternity homes	..	..	352	2,122	2,648

The number of expectant mothers who attended the centres maintained by the Society during 1940 was 9,635, and of these 28·3 per cent had four or more attendances. The total number of visits paid by these mothers during 1940 was 35,726, an increase of 6,764 over the figure for the previous year. It is stated that the women are gradually beginning to realise the importance of regular examinations during the period of pregnancy.

The Society maintains three maternity homes. They are at Wadi Bunder with 16 beds and at Worli and DeLisle Road with 32 beds each. Clinics for venereal diseases also function once a week at these centres.

Of the expectant mothers cared for by the Society throughout the period of their pregnancy 93·8 per cent had skilled attendance at the time of confinement, practically all of them having been admitted to maternity homes. It is stated that the existence of facilities for free transport has made it possible for the health visitors of the Society to direct these women to the different maternity institutions in the city.

A system of follow up exists for the mothers delivered in the Society's maternity homes and they are stated to be under observation for a period of three months. The health visitors instruct the women in mothercraft and in

the modes of hygienic living. These friendly visits to the homes of the people are stated to have increased the popularity of the centres and the attendance of babies at the clinics showed an increase of 6,800 during the year. Mothers are becoming interested in the records of weight of their babies and are said to be anxious to learn about the methods of keeping up their own and their children's health.

A creche is maintained by the Society at the DeLisle Road centre. Children up to the age of five, whose mothers go to work, are admitted to the creche. The woman in charge is trained in kindergarten and she teaches the children drill, reading and writing in Marathi and music. They are properly fed at regular intervals and cases of children losing weight or not improving in health are brought to the notice of the woman medical officer. The average daily attendance is stated to be 58.

In addition to the above activities the Society gives training to probationer midwives. Permission has been granted by the Bombay Nurses Midwives and Health Visitors' Council to the Society to train 16 probationer midwives at the three maternity homes of the Society. Of the 13 admitted for the course in 1939 eight passed out during 1940. It is also stated that medical graduates are given facilities for three months' training in all branches of maternity and child welfare work and that nine women doctors received this training during the year.

The Bombay Presidency Baby and Health Week Association.

71. This Association has been actively engaged in health propaganda. For this purpose it has maintained three cinema units, a large number of exhibits, magic lantern slides, posters and other material for health education. In 1940 the Association organised 23 health and child welfare exhibitions in different parts of the province. Cinema shows numbered 226 as against 154 in 1939. The Provincial Education Department has encouraged the authorities of primary schools to purchase the posters, charts and models on health subjects prepared by the Association for the teaching of hygiene in schools. A book in Marathi dealing with nutrition has been published and it is stated that the Director of Public Instruction has recommended it for use in secondary schools.

In addition to these activities the Association conducted researches on nutrition with the help of grants from the Indian Research Fund Association. It is stated that a balanced vegetarian diet with a supplement of six ounces of milk per day has been shown to be of value and costs Rs. 5/8/- per month per person. The nutrition investigations also included analytical studies of various articles of food. One of the results to which attention is drawn is that the parching of cereals and pulses increased the biological value of their proteins and, in the majority of cases, their digestibility.

Association for the Prevention of Blindness, Bengal.

72. As has been shown in previous annual reports this Association has been carrying on good work by treating the rural population for eye conditions and

by carrying on active propaganda amongst them regarding the hygiene of the eye and the common causes of blindness in India. The Association has now reached the tenth year of its existence. A survey of its work in recent years is interesting.

In March 1936 the first travelling eye dispensary was started and was financed by a grant of Rs. 35,000 received from Their Majesty's Silver Jubilee Fund. In August 1937 a second travelling eye dispensary was brought into existence. These dispensaries proved to be extremely popular with the rural population. The demand that came from the villages for an extension of this service attracted the attention of the Provincial Government. In 1939-40 an annual grant of Rs. 15,000 was sanctioned by the Government for a period of three years for starting two more travelling eye dispensaries under the auspices of the Association. The third and fourth dispensaries started work in February and March 1940. The Government of Bengal have under consideration a proposal to increase the annual grant so as to enable the Association to start a fifth travelling dispensary.

The medical officers in charge of the dispensaries have all had special training in diseases of the eye. The dispensary halts in a centre for about three months and, during this period, carries out the treatment of different eye conditions and performs operations either at the subdivisional hospitals, wherever available, or in buildings improvised as hospitals. The preventive aspect of the problem has not been neglected. Propaganda by lantern lectures and other modes of educating the people is carried out. In addition sample surveys have been done in order to ascertain the prevalence of blindness and of diseases of the eye among the population. The dispensary has proved itself to be so useful that a prolongation of its stay in the same area is often demanded by the people and, in many cases, the inhabitants are willing to subscribe and pay for its maintenance during that period.

Although the figures for blindness given in the 1931 census report are defective, they give some indication of the relative incidence of this condition in different parts of the country. Thus, in Rajputana, the Punjab and the United Provinces, hot and dusty areas where glare is trying to the eyes, the proportions of blind persons were reported to be 386, 245 and 291 per 100,000 while the greener and shadier provinces of Assam and Bengal had an incidence of only 97 and 72 per 100,000. More information than is at present available is required regarding the extent of prevalence of eye diseases and of the disability arising from partial and total blindness in different parts of the country. As has been pointed out already, sample surveys are being carried out by the medical officers in charge of the travelling eye dispensaries in Bengal and in this way much valuable information is gradually being collected in that province. The data thus collected will present a fuller picture of the province as a whole and will undoubtedly help towards the formulation of an adequate programme of preventive and curative work.

Action on similar lines is eminently desirable in the other provinces of India. Variations in the relative intensity of prevalence of specific eye conditions are bound to exist in different parts of the country. For instance, there is reason to believe that the incidence of trachoma is higher in northwestern India than in the other parts. The Bengal scheme of rural eye dispensaries has much to commend itself for adoption in other parts of India in order to provide the rural population with facilities for the treatment and prevention of eye diseases. In order to help Governments and public bodies interested in developing such work the Association has published a booklet entitled "Details of a Travelling Eye Dispensary" and copies of this publication can

be had, free of charge, from the Secretary of the Association whose address is No. 94, Chittaranjan Avenue, Calcutta. It is to be hoped that this important problem, which is responsible for a large amount of suffering and disability in the country, will receive adequate attention from the health authorities in the provinces.

The Bengal Health Welfare Committee.

73. This Committee coordinates the activities of several organisations engaged in health work. Brief notes on the activities of these individual organisations are given below.

The Calcutta Maternity and Child Welfare Committee controls the work of six welfare centres in Calcutta city, four of which are maintained by the Red Cross Society and the remaining two by other organisations. Of 1,690 pre-natal cases on the rolls of the centres 990 or 53 per cent attended the prenatal clinics at the centres. However, only about 20 per cent did so with sufficient regularity to have attained to the minimum standard of care which is considered necessary for the expectant mother. This minimum standard is stated to be the following :—

- (1) the patient should be under observation by a health visitor or doctor from a period not later than the 30th week of pregnancy ;
- (2) the patient should follow to the best of her ability the advice on diet and hygiene ;
- (3) if any treatment is advised the patient or her relations should secure it for her and see that it is carried out ;
- (4) the urine should be examined for albumin at least twice during the last ten weeks and one of these examinations should be in the last four weeks ; and
- (5) an abdominal examination should be made during the last four weeks.

The maternal mortality rate in the population served by the centres was 11·7 per 1,000 live-births in 1940 as against 12·9 in 1939 and 23·7 in 1937. It is stated that the average standard of health of the women during the pre-natal period was low, that nearly every woman appeared to be anæmic and that quite a number of cases showed definite signs of severe anæmia. The majority of such cases are reported to have responded to treatment with a full dose of iron and a diet rich in vitamin B. Further, as pregnancy advanced, most women showed signs of calcium deficiency and daily administration of 30 grains of calcium lactate was found to be useful.

The infant mortality rate for the centres is stated to have been 117 and the neonatal mortality rate 42 *per mille*. The causes of death for 181 infants are given ; of these 65 occurred within the first month. During the first month prematurity appears to be the most important cause of death while causes associated with environmental conditions such as respiratory diseases are relatively unimportant. For instance, out of a total of 65 deaths among infants under one month, the cause of death in 33 cases was prematurity while

only one death was due to gastro-intestinal diseases and six due to respiratory diseases. On the other hand, in the age group 1-12 months, prematurity was responsible for only seven out of a total of 116 deaths, while respiratory diseases accounted for 33, gastro-intestinal diseases for 12 and neglect or starvation for 32 deaths.

The District Maternity and Child Welfare Committee is concerned with the organisation of this class of work in all parts of the province except Calcutta. It is stated that there is a growing demand from the rural areas for the establishment of maternity and child welfare centres and that one of the main difficulties in meeting this demand is the inadequate supply of health visitors. The health centres maintained by the Committee at Chapra, Rangamati, Orakandi, Shibchar, Kalimpong, Darjeeling, Kaurapukur, Raniganj and Noakhali are stated to have made satisfactory progress. Three other centres are receiving financial help and are stated to be doing well.

The Sir John Anderson Health School Committee's Report shows that, during the year, school medical inspection work and visits to the homes of the pupils requiring special care and treatment were added to the curriculum for the first time. A short course in tuberculosis was also given to the students.

The Bengal Health Education Committee has been fostering health education in the province by assisting local authorities in the organisation of health exhibitions and by making grants of money and propaganda material to approved exhibitions. During 1940 the grants totalled Rs. 1,215 while the value of literature distributed was Rs. 861. In addition the usual grant of Rs. 800 was made to the Calcutta Health Week Committee. Another sum of Rs. 600 was given to the Bengal Nutrition Committee to assist them in the preparation of propaganda literature in the field of nutrition. In consultation with the Director of Public Health, Bengal, arrangements were made for the purchase of posters on different health subjects and for their distribution throughout the province.

The Calcutta Health Week Committee is concerned with health education in the city of Calcutta. A subcommittee of this Committee entitled "The Cleaner Calcutta Campaign Committee" has been formed. Attention has been concentrated on the cleaning of *bustees*, inspection of tea shops and markets and on propaganda. It is stated that two *bustees* have been selected for concentrated work, that the owners have been induced to build proper impervious drains, repair old privies and provide new ones, that the cleaning of drains has been carried out through the help of the inmates of the *bustees* and outside volunteers and that intensive health propaganda has been carried out in these areas. It is stated that 129 tea shops were visited repeatedly by the members of the committee and that improvements have taken place as the result of these visits. Eleven markets were inspected but the response from the owners of private markets to the committee's suggestions for improvement is stated to have been unsatisfactory.

The International Health Division of the Rockefeller Foundation in India.

74. During 1940 four medical men and two engineers of the field staff of the International Health Division of the Rockefeller Foundation were located in India, three in Bengal, two in Madras Presidency and one in Delhi. The Central office of Dr. W.P. Jacocks, the Regional Director in India and Ceylon of the

International Health Division continued to be in Delhi. In 1939 an accessory office was opened in Calcutta and the health work in which the Foundation has been cooperating with the health authorities in Assam, Bengal, Bihar and Orissa was supervised from the Calcutta office.

The activities of the Division consisted as usual of research, public health education and assistance in developing rural health work in India through the organisation of health units.

The research work undertaken during 1940 related to malaria and to the investigation of soil pollution. Malaria researches were carried out by Dr. Paul Russell of the Foundation in the laboratory of the Pasteur Institute at Coonoor. Studies were made on sporozoites of *P. gallinaceum*. Field surveys were undertaken in fifteen villages in the neighbouring foothills. The mosquito vector was shown to be *A. fluviatilis* and this mosquito has been shown to exist in other parts of the Western Ghats also and to be highly susceptible to infection. Other researches in malaria were in progress at Pattukkottai in the Tanjore district of Madras Presidency. Ecological studies in respect of *A. culicifacies* were undertaken in an irrigated area in which malaria is widely prevalent as well as in another irrigated area where the disease does not exist. The investigations included medical studies on school children and studies on irrigation methods in relation to the incidence of malaria, and the effect of spraying of adult mosquitoes in controlling the disease.

As regards soil sanitation, researches on ground waters which had been in progress for some time at Lahore were concluded in June 1940. This work showed that faecal pollution did not travel ten feet from the source in the type of soil in which the experiment was carried out. This work was undertaken in order to determine the possible limits of contamination of water supplies from bored hole latrines. Similar studies have been started in the Singur health unit area in Bengal but were not completed by the end of the year.

As regards public health education there was a considerable curtailment in the number of scholarships awarded by the Foundation as a result of the war and the consequent difficulties of sea travel. Only two fellowships were awarded during the year. In addition four travel grants were awarded to the members of the staff of the All-India Institute of Hygiene and Public Health, Calcutta, for study tours in India and Ceylon. Five fellows returned from foreign study.

Dr. J. B. Grant of the Foundation continued to be the Director of the All-India Institute of Hygiene and Public Health, Calcutta, his services having been lent to the Government of India for a further period of one year from 1st July 1940. Pending the selection of a suitable candidate for the post of the Professor of Sanitary Engineering at the Institute, Mr. B. R. Dyer of the Foundation staff was lent to the Institute in January 1940 to act as Professor of Sanitary Engineering in addition to his other duties.

Brief accounts of the activities of the Tuberculosis Association of India and of the British Empire Leprosy Relief Association have been given in the paragraphs dealing with tuberculosis and leprosy in section II of this report.

NEW DELHI ;
The 1st August, 1941.

E. COTTER, LIEUT.-COLONEL, I.M.S.,
Public Health Commissioner with
the Government of India.