

CONTENTS

	<i>Page</i>
1. <i>Science and the Health of India</i>	81
By DR. A. C. UKIL	

JOURNAL
OF THE
ASIATIC SOCIETY

SCIENCE

Vol. XX, 1954, No. 2

(Pages 81-132)



ASIATIC SOCIETY
1 PARK STREET, CALCUTTA 16

Issued July, 1955

Officers and Members of Council
ASIATIC SOCIETY

1954

President

Dr. Suniti Kumar Chatterji, M.A., D.Lit., F.A.S.

Vice-Presidents

Dr. D. M. Bose, M.A., Ph.D., F.N.I.
Dr. B. S. Guha, M.A., Ph.D., F.N.I., F.A.S.
Dr. S. K. Mitra, D.Sc., F.N.I., F.A.S.
Dr. S. L. Hora, D.Sc., F.R.S.E., C.M.Z.S., M.I.Biol., F.A.S.,
F.Z.S.I., F.N.I.

Secretaries and Treasurer

General Secretary :—Prof. J. M. Sen, B.Sc., M.Ed., T.D., Dip.Ed., F.R.G.S.,
F.N.I.
Treasurer :—Dr. K. N. Bagchi, B.Sc., M.B., F.R.I.C., F.N.I., D.T.M.
Philological Secretary :—Dr. Sukumar Sen, M.A., Ph.D., F.A.S.
Jt. Philological Secretary :—Principal Said Ahmed Akberabadi, M.A.
Natural History Secretaries :—

{	(Physical Science)—Dr. U. P. Basu, D.Sc., F.N.I.
	(Biology)—Dr. Himadri Kumar Mooker- jee, D.Sc., D.I.C., F.N.I.

Anthropological Secretary :—Prof. K. P. Chattopadhyaya, M.Sc., M.L.C.
Historical and Archaeological Secretary :—Dr. J. N. Banerjee, M.A., Ph.D.,
F.A.S.
Medical Secretary :—Dr. A. C. Ukil, M.B., M.S.P.E., F.S.M.F.B., F.N.I.,
F.A.S.
Library Secretary :—Dr. (Mrs.) Roma Chaudhuri, M.A., D.Phil., F.A.S.
Publication Secretary :—Dr. P. C. Gupta, M.A., Ph.D.

Other Members of Council

Sri Nirmal Kumar Sen, M.A., LL.B.
Mr. S. Banerjee, M.A., C.I.E., I.C.S.
Prof. N. C. Bhattacharyya, M.A., LL.B., M.L.C.
Mr. William Catto.
Janab Syed Ashfaque Husain (Government of India representative).

ASIATIC SOCIETY

PRIVILEGES OF ORDINARY MEMBERS

- (a) To be present and vote at all General Meetings.
- (b) To propose and second candidates for Ordinary Membership.
- (c) To introduce visitors at the Ordinary General Meetings and to the grounds and public rooms of the Society during the hours they are open to members.
- (d) To have personal access to the Library and other public rooms of the Society, and to examine its collections.
- (e) To take out books, plates and manuscripts from the Library.
- (f) To receive *gratis* copies of the *Journal* and *Year-Book* of the Society.
- (g) To fill any office in the Society on being duly elected thereto.

SCIENCE AND THE HEALTH OF INDIA *

By A. C. UKIL

(Paper received on 10th June, 1954)

CHAPTER I

Historical Perspective

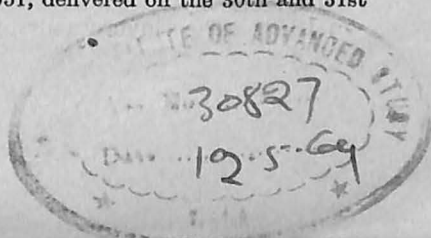
From the earliest times man has been actuated by the instinct of self-preservation and the natural impulse of life-interest and life-protection. This has been expressed in various ways such as by raising food by agriculture and by storing it, by shelter, water supply, land drainage, irrigation and by the removal of refuse. The occurrence of disease in individuals led him to evolve certain empirical rules of personal hygiene, and the urge for herding together induced him to evolve and utilize health services according to the concept of the times. Some evidence of this has been found in the pre-Aryan civilization of the Indus Valley (3500 B.C.).

Then came the Vedic period of Hindu medicine (about 1500 B.C.) which attained its highest development between 600 B.C. and 200 A.D. The available literature shows that considerable progress was achieved in anatomy, major and minor surgery, internal medicine and pathology, midwifery and children's diseases, hygiene, toxicology and elixir (internal secretions), and sexual hygiene. Hospital services, both for men and animals, existed, and nursing services were utilized. There were excellent rules of personal hygiene and some of community hygiene. Gradually the palmy days of this civilization receded and the Indian savants became speculative and bound by tradition. The period between the 2nd and 15th century A.D. was a dark period for the science of medicine, more particularly in Europe. The Arabic or Unani system of medicine made an impression during the Moghul period. When the European powers began to infiltrate into India at the turn of the 17th century A.D. the Indian systems of medicine were already in a decaying and disorganized state (Ukil, 1950).

While the trend of this agrarian civilization began to decline in India, a scientific renaissance was taking place in Europe, which led to the industrial revolution in Western Europe in the eighteenth century. The knowledge gained from successive scientific discoveries opened up new vistas of possibilities for their application to the mental, moral and physical well-being of man, and continued State action along with concurrent economic, social and political progress helped to develop the environmental and medical services. The evolution of public health in Western Europe, as is understood in modern times, may be divided into three phases: (1) the period of empirical environmental sanitation, between 1840 and 1890; (2) the period of scientific control of communicable diseases by the application of the knowledge of microbial causation of diseases, between 1890 and 1910; and (3) the period of further advances and the development of sociological medicine during the last 50 years or so.

Successive scientific advances in Western European countries, like Britain and Germany, enabled a fuller apprehension of positive health and

* Calcutta University Basanta Lectures for 1951, delivered on the 30th and 31st March and 1st April, 1954.



profoundly affected the action of statecraft. Political and economic advances were followed by legislation and State action, leading to improvement of working conditions and occupational hygiene, school health including provision of school meals and preventive treatment of defectives, the prevention of maternal and infant mortality, health, unemployment, old age and invalidity insurance, immunization against communicable disease, the provision of better and safer food; and the provision and care of mental deficiency, tuberculosis, venereal disease and cancer. Ultimately the whole population, from the womb to the tomb, has been made eligible for free medical care, at least in two countries. Socialized medical care is gaining more adherents. Subsidized housing and town-planning schemes made it possible for the eradication of slums, the construction of sanitary dwellings, the provision of cheap-rental houses and the abatement of overcrowding, resulting in a great improvement in sanitation and cleanliness. The development of civilian and military air transport made it necessary for the study of aviation physiology, medicine and sanitation. The discovery of antibiotics and synthetic pharmaceuticals has further reduced the incidence of diseases and deaths. The progress indicated above was accompanied by the establishment of a large variety of institutions and of a supply of trained personnel.

The concept that a failure of the social machinery to ensure to every individual in the community a standard of living and education adequate for the maintenance of health is responsible for much preventible ill-health has increasingly grown in England and America since the first World War. The discoveries of science and the impact of the Machine Age on the agricultural civilization of medieval times created new problems in the organization of community life. The application of knowledge, at successive periods, has helped the development of the social services, but there has always been a lag between modern knowledge and its community utilization.

The trend of public health progress in British India.

When the European powers began to infiltrate into India at the turn of the seventeenth century A.D., the Indian systems of medicine, as has been stated, were already in a decaying and disorganized state. The European doctors, who had to work under great difficulties at that time, carried the torch of western medical science from place to place. By 1800 A.D., the British were firmly established as rulers of India.

The recruitment of ship's surgeons by the East India Company led to the establishment of the Civil and Military medical services towards the middle of the 18th century, and assistants were trained to serve as dressers, apothecaries and general hospital assistants.

The first medical school was opened in 1822 and two medical colleges were established in 1835 (Ukil, 1935), one of which was recognized by the Royal College of Surgeons, London, in 1845. The General Medical Council of the United Kingdom recognized the Indian University medical degrees in 1892. The first three Universities were founded in 1857, but these and others, founded later, were mainly of the affiliating type rather than serving as active centres of teaching and research.

In the first phase, the East India Company organized medical services designed to protect primarily the health of the Army and of the Europeans and secondarily for the general population (Ukil, 1941). The Indian Sanitary Commission of 1859 first directed its attention to the three Presidency provinces. Sanitation was relegated to local self-governing bodies in 1888. The Government of India transferred the responsibility for local

medical and public health administration to the Provincial Governments; and this transfer was confirmed by the Government of India Act of 1935. Although a major part of the medical services was transferred to Provincial Governments in course of time, the Central Government, controlled mainly by British-manned I.M.S. (Indian Medical Service) officers, was responsible for research and technical training institutions, the census, emigration and immigration, port quarantine and the constitution and powers of port-authorities, air-port quarantine; the regulation and conditions of labour and safety in mines and oil-fields. The first Indian Factories Act was passed in 1881 and the Bengal Municipal Act in 1884. The need for the care of mothers and children was realized as far back as 1866, and modern nursing was introduced as far back as 1869. It is significant to note that Jennerian Vaccination was introduced near Calcutta as early as 1803 and that the Indian Quarantine Act was passed as early as 1825.

During the latter half of the nineteenth century, the policy of the Government of India with regard to sanitation and sanitary staff was marked by vacillation; but more activity was noticeable from the beginning of the twentieth century. The Government of India formulated a forward sanitary policy in 1914 (Resolution dated 23rd May, 1914) when some useful principles of sanitary organization including research, sanitary surveys, urban sanitation (conservancy, water supply, drainage) and town planning, rural sanitation, health education and the combating of epidemics, were laid down, but they were hardly properly implemented. The political and social awakening of the earlier years of the present century in India was followed by the Government of India Act of 1919, which accepted the principle of Provincial autonomy. This led to the transfer of medical administration, including hospitals, dispensaries and asylums, and the provision of medical education together with public health, sanitation, vital statistics, water supplies, control of food and drugs, and pilgrimages within India, with certain reservations, to nominated Ministers. Extra-provincial, inter-provincial and international matters, together with legislation for the control of epidemics were reserved by the Central Government. In the past, the development of these services has largely been piecemeal and sporadic. Experience during the Second World War focussed attention on some of the glaring inadequacies.

Informed public opinion gradually began to demand more expenditure on public health. In spite of this demand, nothing more than a skeleton staff could be employed, which was too inadequate to deal with large populations and areas entrusted to them. For example, in Bengal a Health Officer was put in charge (1927) of a District (approximate population—1 to 3 millions) and a Sanitary Inspector, with a Health Assistant and a Vaccinator, was posted to each Thana (approximate population—50,000 to 80,000). In most areas, the latter were expected to look after a population of 60,000 or more, living in about 170 villages spread over an area of 80 square miles or more. In some areas, the same staff were expected to look after 120,000 people, living in some 800 villages covering 400 square miles.

Measures for the improvement of *Hygiene in Industrial areas* began to be taken after 1911, as shown by the passing of the Indian Factories Act (1911), Indian Mines Act (1923), Workmen's Compensation Act (1923) Bombay Maternity Benefit Act (1920), Tea Districts Emigrant Labour Act (1932) and Employment of Children Act (1933). In spite of these, occupational hygiene is still a neglected subject in the health departments of the States. The Central Government, however, has recently started a section at the All-India Institute of Hygiene and Public Health to study the subject.

The Royal Commission on Labour (1931) recommended quite a number of health reforms in industrial areas and the influence of the League of Nations also stimulated the progress to some extent. Provincial Municipal Acts, passed during the period, aimed at improving the sanitary condition of municipal areas, but they have hardly developed any successful methodology of work, and their administration is, in a large majority of cases, extremely defective. Legislation against food adulteration was introduced in 1918-19. Attempts have also been made to stimulate maternity and child welfare work since the beginning of the century by various non-official and official organizations by offering facilities for the training of medical and auxiliary personnel and for research but the maternal and infant mortality is still appalling. No central enactments relating to sanitation or public health were introduced from 1940 till the transfer of power in 1947, and not even up to the time of writing this paper.

Medical education

In the sphere of Medical Education, a University grade and a lower (or school) grade of education have been prevalent since 1857, but the latter qualification is neither recognized by the General Medical Council in U.K. nor by the Medical Council of India (1933). The University regulations of 1906 tried to improve undergraduate and post-graduate medical education, but the progress was far too slow to catch up with world progress. The establishment of the Calcutta School of Tropical Medicine in 1920 and of the All-India Institute of Hygiene and Public Health in 1932 made it possible for the post-graduate training of medical and health personnel on a small scale. Towards the end of British rule, twelve medical colleges and 27 medical schools were annually turning out 700 graduates (including 100 women) and 1,500 licentiates. With the partition of India, the licentiate category of schools has practically disappeared from the Indian Union. At the close of 1946, there were 47,500 qualified doctors of both categories in India, or one doctor for 6,300 population, in contrast to England's one doctor for 1,000 persons. There was one qualified nurse for 43,000 persons, as compared to 1 : 4,770 in U.K., one midwife for 60,000 persons, as compared to 1 : 618 in U.K., one qualified pharmacist for 4,000,000 persons, as compared to 1 : 3 doctors, and one qualified dentist for 300,000 persons as compared to 1 : 2,700 in U.K. There is not yet a single official school-nurse throughout India, whereas England employs 5,413.

Apart from the quantitative output of medical and auxiliary personnel, and the dearth of training institutions, the quality and content of their training were sadly neglected. The methods of education in India hardly kept pace with the changing environment and requirements and with the progress of science. When the British left, medical education was still of the type prevalent in Western Europe and America at the turn of the century. Medical research and field investigations seldom formed part of the teaching and curricular activities in the various grades of the teaching institutions.

Medical Research

In the sphere of *medical research* during the second half of the nineteenth century, half a dozen names stand out prominently: they are Lewis (1872), who described *Filaria sanguinis hominis* and *Trypanosoma lewisi*; Vandyke Carter (1877-78), who described the causative organism of Indian relapsing fever; Evans (1880), who described certain bodies in Delhi Boil which were later confirmed by Leishman and Donovan (1903) as L. D. Bodies. Koch

(1883) confirmed the identity of *V. Cholerae* in Indian cholera; Haffkine (1895) introduced cholera vaccine; and Ross (1897) discovered the transmission of malaria. In quite a number of these cases, these workers had to struggle against the established policy and obstruction of the various departments of the then Government. The first Pasteur Institute was opened at Kasauli in 1893 and the Haffkine Institute was started at Bombay in 1899 for the manufacture of prophylactic vaccines against cholera and plague. The Imperial Veterinary Research Institute was established in 1893. The Indian Institute of Science at Bangalore, which is now taking a prominent part in biochemical and other investigations was started, through the munificence of the Tatas, in 1896. Antiseptic surgery was introduced between 1876 and 1881.

Fifty years of the twentieth century saw enormous advances in medical knowledge and its application by the State in England and other Western countries, along with simultaneous social evolution and political progress. Each of the new discoveries in the various sciences opened up newer possibilities for applying them to the well-being of man. The consolidation and co-ordination of the piecemeal measures of the previous century helped to develop medicine as a social science and to restrict and detect disease wherever it showed itself, to prolong human life and to build and conserve health as such in the home, in the school, in the factory and in the field.

Let us glance for a moment at what was taking place in India during this period. Noteworthy additions to knowledge were Leishman and Donovan's discovery of the kala-azar parasite (1903), the Report of the Plague Commission (1904), the discovery of urea stibamine by Brahmachari (1920), successful transmission of kala-azar to human volunteers by the bite of infected sandflies by Swaminath, Shortt and Anderson (1942), the study of the pathology of epidemic dropsy by M. N. De *et al.* (1933, 1935, 1940) and the study of the causation and epidemiology of epidemic dropsy by Lal *et al.* (1937-41), the determination of the chemical antigenic structure of the Comma Vibrios by Linton *et al.* (1935), transmission of *Plasmodium knowlesi* by Singh *et al.* (1949), and the transmission of scrub typhus by Krishnan and Smith (1949).

Since the publication of the Report of the Plague Commission (1904), which advocated the reconstruction of the Sanitary Department on a wide Imperial basis, and the establishment of the Indian Research Fund Association (1911) nine years earlier than the founding of the Medical Research Council in England, although a certain amount of medical and veterinary research was carried out in about a dozen and half research institutions, most of them were not dictated by specific unsolved public health problems in the field and, even when the results of such investigations were made known, there was little attempt to apply them in practice. The Universities also failed, so far as affiliated medical colleges were concerned, to fulfil their research functions. Only 0.015% of the national income was spent on research. Most of the senior or key posts were occupied by the British members of the service.

The status of public health in British India

In considering the public health position of India under the British, it must be remembered that British India was larger than Europe *minus* Russia; that she had a population almost one-fifth of that of the whole world, nine times that of England and Wales and eight-tenths of that of the whole British Empire, and that her population had increased by 300 millions within the previous hundred years; that 90% of her population

were rural in contrast to 20% in England, 47% in Canada, and 50% in Japan; that 70% of her population were engaged in agriculture and that only 2.5% were employed in industry; that 88% of her population were still illiterate; and that some of the social and religious customs were not conducive to good health. The density of population in Indian Union in 1951 is indicated in the map given below.

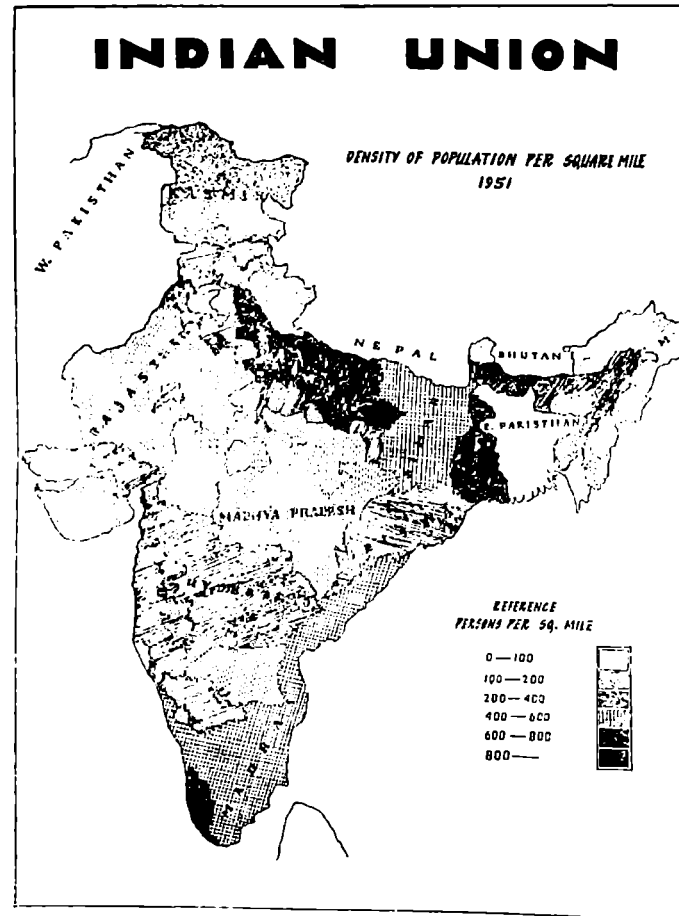


FIG. 1.

The average per capita annual income was only Rs.65, or one-fifteenth of that in England and one-eighteenth of that in U.S.A. With such income and a shortage in food production, it would be anticipated that a large bulk of the population obtained neither the quantity nor the quality of diet which was necessary to contribute to physical fitness or to protect the human body against dysfunction and disease. It is no wonder that under such circumstances the people of British India were stated to enjoy the briefest span of life, namely 27 years, in contrast to 67 years in Australia, New Zealand and Sweden, 63 years in U.K., 58 years in Germany and 47 years in Italy and Japan.

0
0
0
0
0
0
0

0

0

0

0

TABLE I
Mortality figures for chief diseases in British India (1900-1940) and Indian Union (1950).

	1900		1910		1920		1930		1940		1950	
	Number of deaths	Rate per 100,000	Number of deaths	Rate per 100,000	Number of deaths	Rate per 100,000	Number of deaths	Rate per 100,000	Number of deaths	Rate per 100,000	Number of deaths	Rate per 100,000
Cholera ..	797,222	370	430,451	190	130,140	55	337,332	140	86,133	30	87,018	24
Plague ..	92,807	42.4	413,335	183	99,368	42	24,841	10	19,799	7	7,842	2
Smallpox ..	91,855	42	51,315	23	101,329	43	72,813	30	72,876	25	41,092	11
Fevers (Malaria, Enteric, Kala-azar and others) ..	4,919,591	2,232	4,341,392	1,917	4,931,202	2,068	3,787,694	1,569	3,622,072	1,249	2,587,317	1,080*
Dysentery and Diarrhoea ..	530,654	241	267,672	118	218,734	92	237,892	99	237,979	82	202,102	80*
Respiratory diseases (Tuberculosis, Pneumonia and others) ..	..	..	234,308	103	338,669	140	300,527	166	473,706	163	371,045	150*
Crude birth rate (per 1,000) ..	36.06		39.52		32.98		35.99		32.00		24.70	
Crude death rate (per 1,000) ..	38.60		33.20		30.84		26.85		21.10		16.00	

* Figures available for 1947.

Mortality Rates

In the absence of other data, the vital statistics may be considered as a yardstick of the health status of the people. But Indian vital statistics are extremely defective because of their collection by village chowkidars or watchmen in rural areas and, therefore, the information collected is not very precise, as village watchmen were and are still entrusted with the task of their collection.

The crude mortality rate was 22.4 as compared to 9.2 in New Zealand, 12.4 in England and Wales and 18.8 in Netherlands East Indies. Of the 6.1 million deaths which took place in British India in 1937, fevers (in which are included malaria, typhoid fever, kala-azar, tuberculosis, etc.) accounted for 58%; dysentery, diarrhoea and cholera together for 7.3%; respiratory diseases for 8%; infantile mortalities for 24.8%; small-pox for 1% and plague for 0.5%. Tuberculosis accounted for half a million deaths annually. There are probably one million lepers, 6 million tuberculosis cases and over 2 million infected with hook-worm.

The death of infants below one year constitutes 23.5% and death under 5 years constitutes 42.0% of all deaths. Child mortality rates, at different age periods are three to five times higher than in England. For the age group 0-10 years, the death rate in children is four times as high as in England. Nearly half the total deaths are among children under 10 years, 50% of which again occur within the first year of life. Maternal mortality due to childbearing exceeds 6.7 times that in western countries (cf. 20% in India as compared to 3 in England). It was estimated that about 30%, or 3 million women, were permanently or temporarily disabled as a result of pregnancy or labour every year. The last World War possibly helped to disseminate venereal diseases widely among the population in India. It is computed that about 50% of the deaths in India take place in individuals below 15 years and in over 18% in those aged 60 years and above (1949).

A glance at the Table opposite (Table 1) giving mortality figures for chief diseases in British India from 1900-1940 and in the Indian Union in 1950 will bear out some of the statements made above.

Decline of death rate



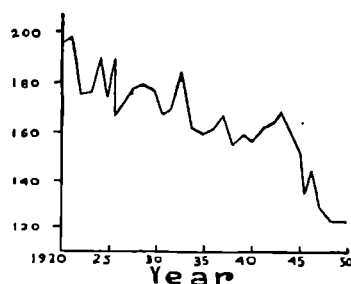
This graph shows how the average death-rate in India per 1000 population has fallen between 1901 and 1950

FIG. 2.

Trend of infant mortality rate in India (1920-1950)

The trend of infant mortality rate is taken as an index of general improvement of sanitation in a country. The following figures and a graph will indicate this:—

Year	Infant deaths per 1,000 live births	Year	Infant deaths per 1,000 live births
1920	195	1936	161
1921	195	1937	162
1922	175	1938	167
1923	176	1939	156
1924	189	1940	160
1925	174	1941	158
1926	189	1942	163
1927	167	1943	165
1928	173	1944	169
1929	178	1945	151
1930	180	1946	136
1931	178	1947	146
1932	168	1948	130
1933	170	1949	123
1934	185	1950	123
1935	163		



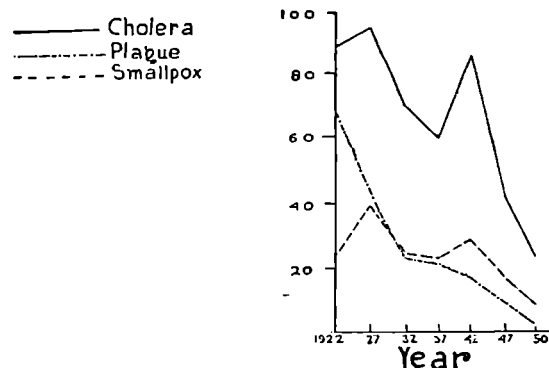
The trend of infant mortality rate per 1000 live births in India from 1920 to 1950

FIG. 3.

Variation in death rates

The following figures on five-yearly averages of death rates per 1,000 from cholera, small-pox and plague in India will be found to be interesting (Mathen, 1952):

Period	Cholera	Small-pox	Plague
1920-24	0.90	0.24	0.68
1925-29	0.96	0.40	0.46
1930-34	0.72	0.26	0.24
1935-39	0.62	0.24	0.22
1940-44	0.88	0.29	0.18
1945-49	0.45	0.18	0.11
1950	0.24	0.11	0.02



Variation in death-rates per 1,00,000 in India from cholera, plague and smallpox between 1920 and 1950

FIG. 4.

It will be seen in the above graph that except for the period 1940-44, probably due to famine conditions in some parts during the war, cholera and small-pox death rates up in the year 1945, showed little signs of reduction but a most spectacular decline occurred in the case of plague. Apart from the environmental control, including that of rodents, it is quite possible that increasing use of sulpha drugs and of streptomycin was responsible for it.

An English worker (Morris, 1945), after studying conditions in India, stated in 1945 that if the English death rates obtained in India today, there would be 3 million fewer annual deaths and the expectation of life would be above 60 years, instead of 27 years. It was suggested that the present population pattern in India was similar to its distribution in England one hundred years ago, and that the expectation of life and other mortality data corresponded to the English experience before mortality began to fall in the latter part of the eighteenth century. The death rate for India was thought to correspond with the English figures before the modern public health movement got into its stride in the sixties and seventies of the last century and the birth rates to resemble those in England and Wales before the decline in fertility which set in around 1880.

Environmental hygiene

It is well known that the incidence of bowel diseases declines with the proper disposal of refuse and night soil and with the provision of safe drinking water. Of 1,471 towns in British India, only 253 had protected water supplies. Protected water supply was available in 1939 to only 4.5% of the total population.

Medical relief.—Curative institutions and the technical personnel to man them were too few to attend to the requirements of the situation. There were only 0.3 bed for 1,000 population, as compared to 9.7 in U.S.A., 5 in England and 1.5 in Japan. One of the most effective measures known for the control of leprosy and tuberculosis is isolation of the infective case, but this was not possible with one (then existing) bed for 800 cases requiring it.

The average area covered by each hospital or dispensary varied from 24 square miles in Delhi to 1,327 square miles in Baluchistan in pre-partition India and the average population served by each of these institutions varied from 11,305 in pre-partition Baluchistan to 81,087 in the United Provinces (now called Uttar Pradesh). The per capita expenditure on medical relief varied from 1 anna in Uttar Pradesh to Re.1-2-5 in Delhi.

The expenditure in urban areas was nearly three times that in rural areas. In the year 1938-39, only 3·4% of the total revenue in British India (Central and Provincial) was spent on medical and public health measures, as compared to 22·7% in U.K., while education was allocated 8·4% of the revenue as compared to 18·2% in U.K. Naturally one could not improve the health status for nothing. Budgetary provisions were never made on a planned basis.

Social Insurance

The provisions for Workmen's Compensation were utterly inadequate. Social insurance of the industrial employees was being talked about and a report was submitted by Prof. Adarkar (1945).

Inter-departmental co-ordination

Medical relief and public health, which are only branches of social welfare, need co-ordination with inter-related departments of governmental activity. The administrative machinery sadly lacked in this direction, and a *laissez faire* and vacillating policy was followed all through. There was hardly any public health policy till the reforms of 1919 and 1935. These reforms no doubt stimulated a desire for progress, but it was being constantly hampered by the lack of a planned programme, a pitifully inadequate amount earmarked for medical relief and social services and a top-heavy administration without a sufficient number of efficiently trained technical personnel. Administrative procedures were often applied which were not based upon sound economic considerations and financial budgeting within the economic means of the population. The effect has been that although some fragmentary public health measures had been undertaken in urban areas, the rural population was utterly neglected, with the result that the villager in India at the close of the British rule was no more benefited by modern science than his forefathers before the advent of modern sciences into India.

Although there was some quantitative expansion of public health activity in the provinces since 1921, the quality of work suffered from the weak control of the Provincial Governments over the local bodies. Curative and public health services were under different Heads and their individual efforts were hardly co-ordinated to the whole design. By-laws and regulations dealing with health, housing and sanitation remained old-fashioned, without any attempts at revision and modernization for a long time.

The essential principles of sound public health administration adopted by most of the advanced countries are seen to have been violated by the administration in India. An instance might be cited by referring to the fact that although vaccination against small-pox was introduced in Bengal as far back as 1803, deaths from this disease, during the ten years ending 1938, numbered 166,000, in spite of efforts of a staff of over 2,500 vaccinators, as compared to total of 9 deaths during the same period in Java, a country with a comparable topography and population, under a staff of only 150 vaccinators. In spite of successive political reforms and the adoption of

public health procedures, the rate of small-pox mortality, which was a little over 40 per 100,000 in the year 1900, stood at about 35 at the close of the year 1938, although the situation seems to have improved at the close of 1950 (11 per 100,000). The rate per mille in India was 0.1 in 1939, while in 1944 it stood at 2.3, in 1946 at 0.2 and in 1947 at 0.1.

Space does not permit us to go into details, but it will be seen from what has been stated above that the very active period of fundamental advances in science in Europe since the second half of the eighteenth century and the concomitant political and socio-economic progress which helped to establish hygiene and preventive medicine on a firm basis in Europe, had rather poor repercussions in India. The reason is not far to seek—at the end of the British occupation, the per capita income of an Indian remained at only Rs.65 per annum along with heavy military and administrative charges, resulting in a low state of health for the ill-nourished, uneducated and technologically backward population. If the British wanted to bring about speedier reforms, India would not have been in such an undeveloped socio-economic condition as now.

CHAPTER II

The present status of health in India

It has already been stated in the previous Chapter that India stands, at the present moment from the public health point of view, where Great Britain stood 100 years ago, U.S.A. stood 75 years ago and Russia stood before the Revolution. This backward state was largely due to foreign domination for several centuries. The attainment of our freedom in August, 1947, could not change either the economic or the social regeneration of the people forthwith. Economic regeneration, education and social uplift of the people require many years of planned and sustained efforts to reach the target. The comments that I am going to make now must be judged in this context.

We shall try to assess the position first from mortality figures and sickness rates. The bar diagrams and maps given below will be illustrative.

Mortality rates

TABLE 2

Mortality figures for chief diseases in Indian Union

	1948		1950	
	No. of deaths	Rate per 100,000	No. of deaths	Rate per 100,000
Cholera	162,870	67	87,018	24
Plague	21,174	9	7,842	2
Small-pox	40,468	17	41,092	11
Fevers	2,218,018	114	2,587,317	1,080*
Dysentery and Diarrhoea	167,701	69	202,102	80*
Respiratory Diseases	327,373	135	371,045	150*
Crude birth rate (per 1,000)	25.5		24.7	
Crude death rate (per 1,000)	17.2		16.0	

* Figures for 1947.

India's position with regard to birth and death rates is indicated graphically below:—

POPULATION OF THE UNION OF INDIA SINCE 1891

POPULATION ESTIMATED AT THE END OF EACH YEAR

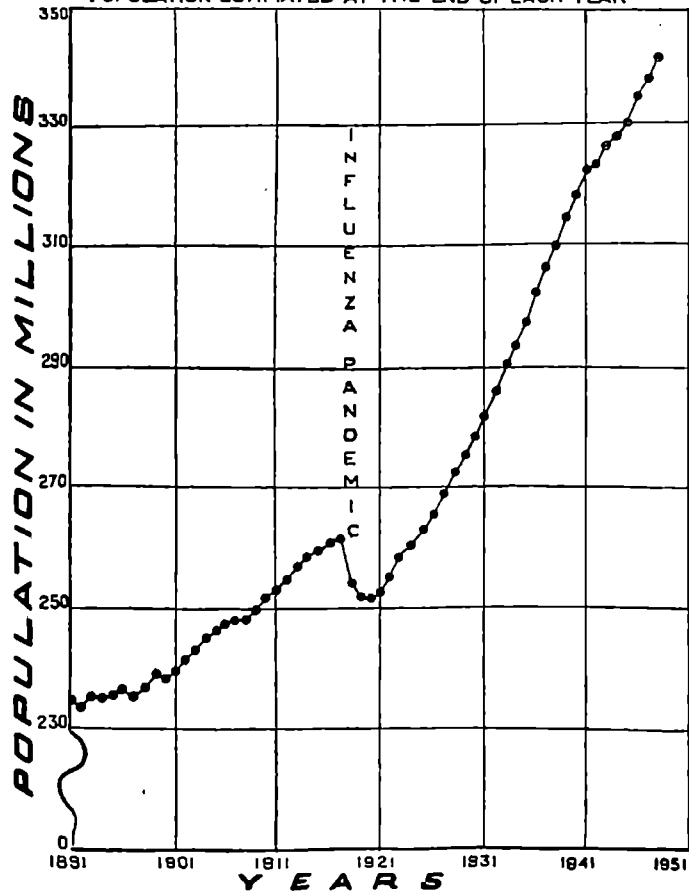


FIG. 5.

CRUDE BIRTH RATE IN 29 COUNTRIES 1950

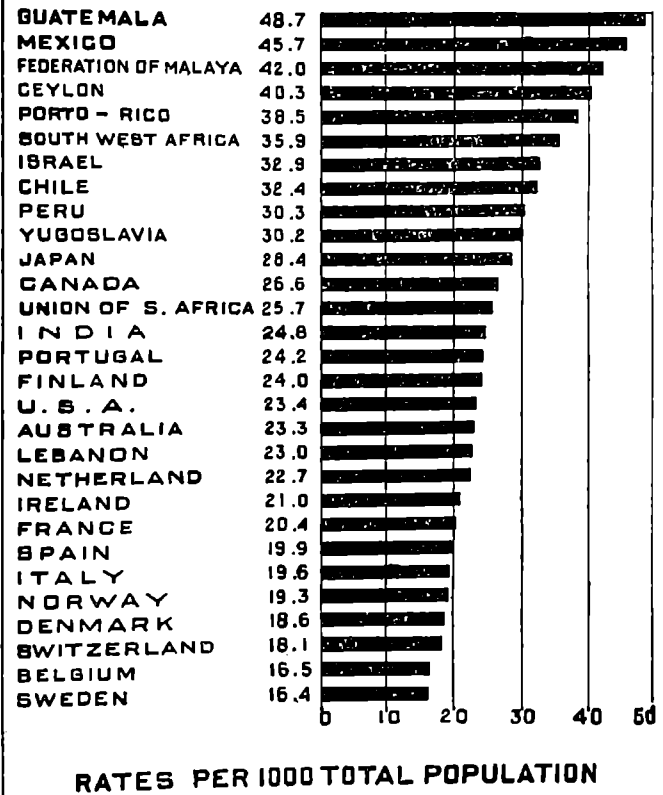


FIG. 6.

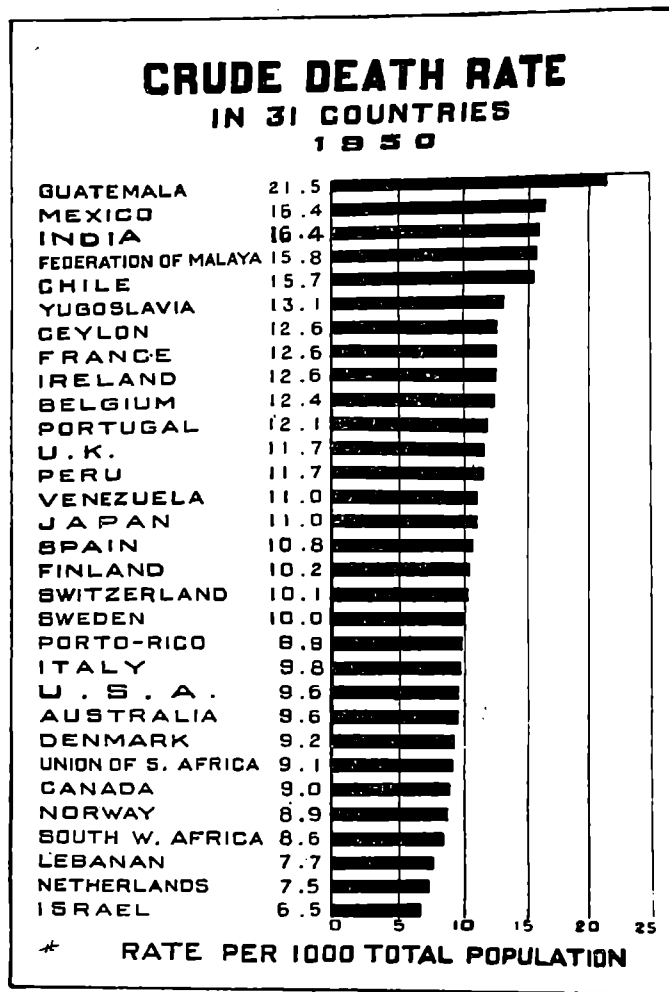


Fig. 7.

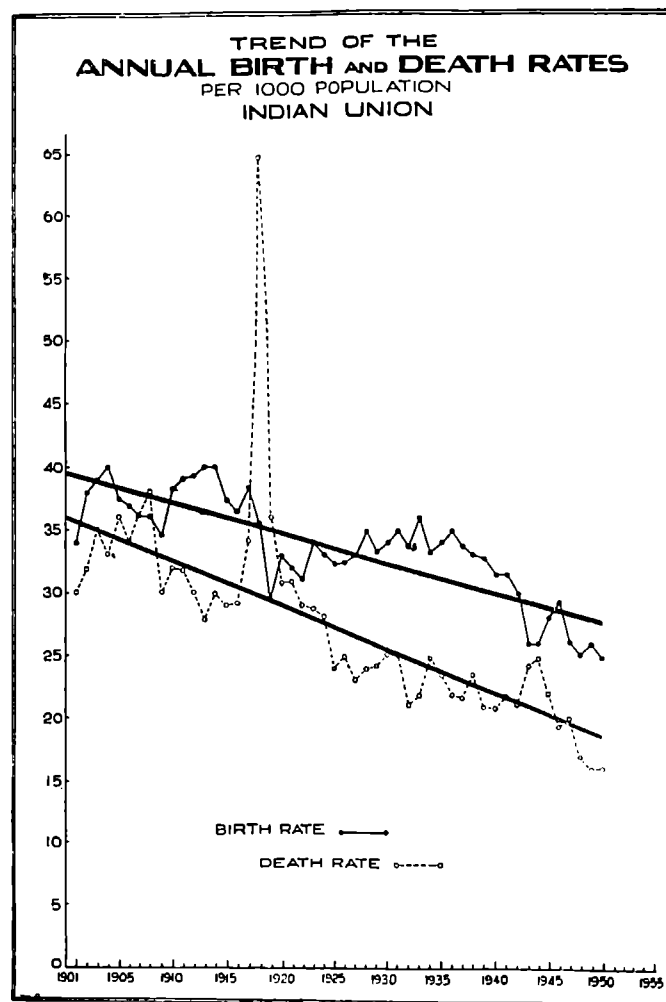


Fig. 8.

EXPECTATION OF LIFE AT BIRTH

(IN 25 COUNTRIES)

COUNTRIES	ESTIMATED FOR THE PERIOD	EXPECTATION OF LIFE AT BIRTH IN YEARS	
		MALE	FEMALE
1. INDIA	1931 - 1941	32'09	31'37
2. CANADA	1947	65'18	69'05
3. MEXICO	1940	37'92	39'79
4. PANAMA	1941 - 1943	50'54	53'46
5. UNITED STATES	1939 - 1941	61'60	65'89
6. CHILE	1940	37'9	39'8
7. CHINA (FORMOSA)	1936 - 1940	41'08	45'73
8. JAPAN	1948	55'6	59'4
9. THAILAND	1947 - 1948	48'7	51'9
10. KOREA	1938	47'20	50'59
11. ISRAEL	1951	67'3	70'1
12. EGYPT	1936 - 1938	35'65	41'48
13. BELGIUM	1946 - 1949	62'0	67'3
14. DENMARK	1946 - 1950	67'8	70'1
15. FRANCE	1946 - 1949	61'9	67'4
16. GERMANY (BERLIN)	1947	51'0	60'0
17. IRELAND	1940 - 1942	59'01	62'02
18. NORWAY	1945 - 1948	67'8	71'7
19. POLAND	1948	55'6	62'5
20. PORTUGAL	1939 - 1942	48'6	52'8
21. SWEDEN	1941 - 1945	67'06	69'71
22. SWITZERLAND	1939 - 1944	62'68	66'96
23. HUNGARY	1941	54'82	58'22
24. FINLAND	1941 - 1945	54'62	61'4
25. UNITED KINGDOM	1950	66'5	71'2

Fig. 9.

INFANT MORTALITY RATES IN 28 COUNTRIES

RATES ARE THE NUMBER OF DEATHS REPORTED UNDER ONE YEAR
OF AGE PER 1000 LIVE BIRTHS
1950

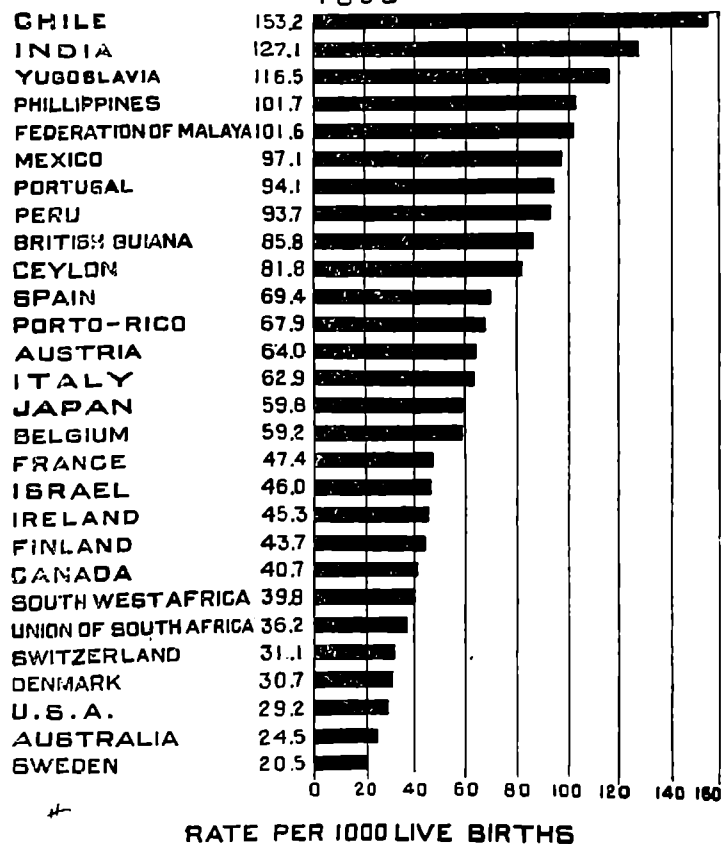


Fig. 10.

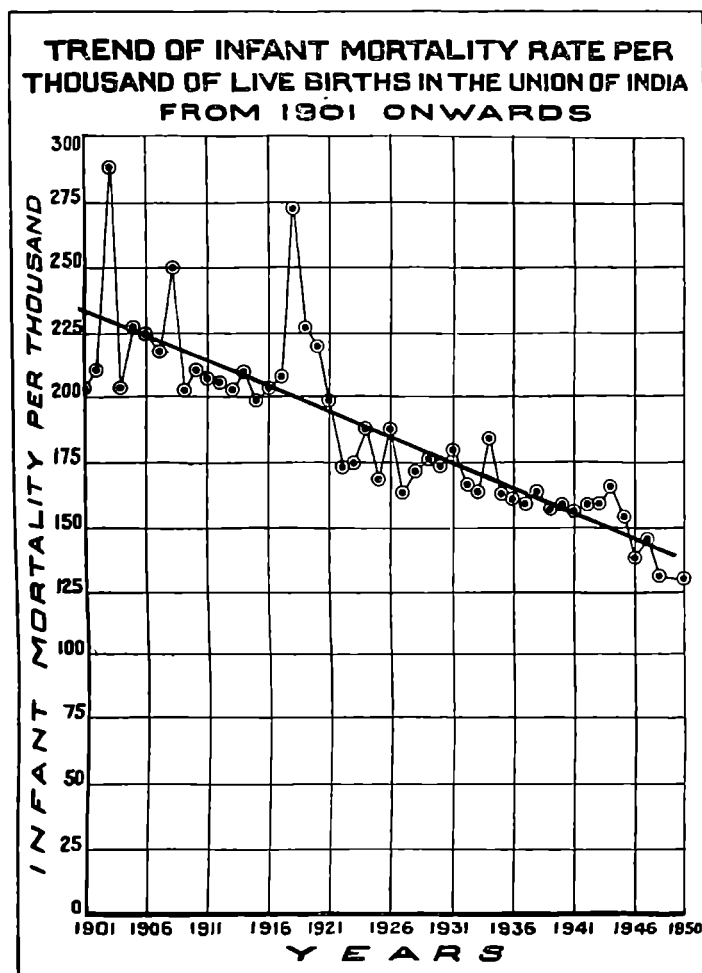


FIG. 11.

It will be seen in Table No. 1, opposite page 87, Chapter I, that the mortality from several diseases, particularly cholera, plague and small-pox, is slowly declining. The position with regard to fevers, dysentery and diarrhoea is less satisfactory. But it is difficult to say how much of the slight improvement is due to the application of sulpha drugs and antibiotics. What influence chemotherapy is having on epidemiology needs to be studied. The position with regard to respiratory diseases is, however, deteriorating. It is quite possible that the increasing mortality in tuberculosis is contributing to the increase. In the absence of correct registration of deaths and proper statistical analysis, it is hazardous to form any definite opinion in these matters.

Sickness rates

Surveys carried out by trained workers give us a more correct idea of ill-health in the community. A recent survey in a rural area in West

Bengal (Lal and Seal, 1944; Lal, 1945), covering 32.98 square miles, containing 68 villages and a population of 62,700, indicated that 12% of the population were unwell at any given time, of which 1% were found to be acutely ill, 2% chronically ill and over 8% in indifferent health. 1.6% of the population were handicapped on account of one or more disabilities. The average duration of disabling illness was 50 days per sick person, or 19.6 days per head of the population. The total loss of man-days through sickness was 1,316,700. For each death that occurred, 800 man-days were lost through sickness. The largest number of man-days lost per head was in school children. It was further noted that 3.3% of the wage-earners were unable to work at any particular time due to acute or chronic illness and that 7% could not pull their full weight owing to an indifferent state of health. Sickness was, therefore, found to aggravate poverty. Clinically recognizable malnutrition was widely prevalent, leading to poor physical development, particularly in the early age period, and to diminished resistance to infectious diseases.

As regards the incidence of diseases, malaria constituted 61%, measles 10%, diarrhoeas and dysenteries 3.8%, other fevers 1%, typhoid fever, influenza and pneumonia each 0.6% of the total sickness. 44% of the population harboured hookworm and 3.7% roundworms in the intestine. Haemoglobin deficiency was widely present. The morbidity rate was found to be the highest in infancy, quite high in the lower age groups and gradually to decrease with age.

As regards environmental conditions in this densely populated area (1,900 per square mile), the interference with natural flooding and flushing, the poor inter-village communications, the overcrowded and unhygienic houses, the low standard of general cleanliness, the existence of numerous *dobas* (small water pools), the primitive condition with regard to the disposal of faecal matter and stable refuse, the presence of large breeding areas for flies and mosquitoes, and the unclean water available for bathing and domestic purposes, could hardly be expected to support a healthy population with families of low and unstable economic status. The annual loss of man-days to wage-earners in the area has been estimated in terms of money to be Rs.1,16,810. This represents an objective picture of the major part of the rural population in India.

Similar results were obtained by a survey conducted under the Rockefeller Foundation at Closepet (Mysore), the results of which were analyzed by the author in his Presidential Address at the Indian Science Congress (Ukil, 1941) and in a paper published in 1949 (Ukil, 1949).

Ever since 1941, I have advocated the working of the Health Centres as part of community development. The Singur Health Centre's partial efforts in this direction have already achieved gratifying results, as compared with the results of the survey referred to above. Between 1944 and 1951 (Krishnan, 1953) the crude death rate has been reduced from 21.2 to 13.1, the maternal mortality rate from 11 to 3.2, infant death rate from 41.4 to 15.9, diarrhoea and dysentery death rate from 231 to 63.8, enteric fever death rate from 41.4 to 20.7 and the small-pox death rate from 28.67 to 6.4. As these figures are not collected by village watchmen as in the rest of India and as it has been carried out by scientific methods under able technical guidance, its value to future public health planning is great. The cost did not exceed Rs.2 per head, an amount which the villagers and the State Government are able to bear even now. Besides, it has awakened the consciousness of the people for co-operative effort in a joint endeavour.

Environmental sanitation

By 1948, only 209 out of 1,353 towns or 15%, representing 6.4% of the total population had a protected water supply. Despite the fact that Calcutta commenced underground sewerage only 20 years after London and 13 years after New York, the development of sewerage in towns in India has been extremely slow. Not only that, it has been unplanned in many places. For example, the nearness of the sewage pipe to the water pipe in Calcutta remains a perpetual source of water pollution until continuous water supply is ensured. Sewage disposal even in large towns and cities is of an extremely low standard. The disposal of industrial wastes is uncontrolled; and the discharge of sewage into rivers and water courses without relation to their capacity for self-purification is already causing serious problems in various parts of India, which is gradually getting more industrialized. Environmental hygiene in towns and industrial areas is thus seen to be extremely unsatisfactory. The control of rural soil pollution remains practically unattended.

Housing conditions are generally bad and there is too much overcrowding. Conditions in mining areas have been, until lately, worse and they are still worse in plantations. As part of the First Five Year Plan, industrial housing is proposed to be improved but it is disconcerting to learn that the houses in many areas will consist of one-room tenements (Govt. of India, 1954). The Bhoré Committee definitely laid down that the humblest house or flat should consist of two rooms, in order to permit the segregation of boys and girls in the family and/or to isolate cases of communicable disease occurring in the family. Housing in rural areas has not yet been touched upon (Subramanian, 1945). It is hoped that the Community Projects administration will attend to this. Town planning is still in its initial stages and there is hardly any rural planning. Industrial centres are being allowed to develop at random and no attempts are being made to plan and zone industries in terms of territorial and population requirements. Sanitary legislation with regard to these are neither up-to-date and comprehensive, nor co-ordinated.

Medical Relief

At the end of 1949, there were 12,725 curative institutions in the country, including 3,275 (or about 25%) Unani and Ayurvedic hospitals and dispensaries. Among 6,125 hospitals and dispensaries which reported for separate categories, there were 1,500 hospitals and 4,625 dispensaries having a total of 101,000 beds. This works out at 0.6 bed per 1,000 population; this is double of what the country had before partition. In 1948, 1,268 hospitals for which information was available belonged to the following categories: Government—700, Government-aided—65, Local bodies—280, others—223.

Regarding special hospitals, there are 5,400 beds (13,298 at the end of 1953) for tuberculosis cases, 10,009 beds for mental defectives, 927 beds for eye diseases, 1,938 beds for maternity and child welfare cases, 1,093 beds for infectious diseases, 12,244 beds for leprosy cases and 82 beds for the treatment of venereal disease cases.

The number of medical officers or personnel of different categories manning the medical institutions at the close of 1948 was about 13,479, distributed as follows:—

TABLE 3

Medical Officers on the Medical Side on 31-12-1948 employed under Government, Local Bodies, Missionary and Private Bodies.

States	Civil Surgeon	Asst. Surgeon	Sub-Asst. Surgeon	Sub-sidized Medical practitioners	Hono-rary Medical Officers	Others	Total
Ajmer-Merwara	2	12	24	..	1	1	40
Assam ..	12	46	414	32	2	19	525
Bihar ..	17	340	730	13	61	..	1,161
Bombay ..	28	123	483	289	362	162	1,447
Madhya Pradesh	20	140	552	4	18	57	791
Coorg ..	1	2	17	..	1	2	23
Punjab ..	14	98	288	..	3	..	403
Madras ..	36	446	70	289	215	4,287	5,343
Orissa ..	14	95	374	5	1	..	489
Andamans and Nicobar Islands	1	4	6	..	..	..	11
Uttar Pradesh ..	49	144	473	49	66	9	790
West Bengal ..	13	179	538	115	458	1,153	2,453
TOTAL ..	207	1,629	3,969	796	1,188	5,690	13,479

The number of doctors employed in public health duties is 1,206, of which only 217 possess public health qualifications. A little over 50% of the 300 districts in India employ a medical officer of health, the rest being still unprovided with. The total number of Sanitary Inspectors employed is about 3,000. At present the area and population of an average peripheral unit cover about 80 square miles and 100,000 population respectively. Such a unit is manned by a Sanitary Inspector assisted by one Health Assistant, one or more Vaccinators and a Medicine-Carrier for controlling epidemics and also for prevention of adulteration of food and other duties. One Health Visitor per 400,000 population and one Midwife per 60,000 population can hardly be expected to touch the fringe of the problem.

Apart from the insufficient number of hospitals and dispensaries, the quality of services rendered by inadequate personnel can never bring about any tangible results within a measurable length of time.

One handicap to the maldistribution of doctors is that medical graduates and many of the licentiates have a preference for towns, chiefly because of the lure of larger income in towns, and lack of communications, proper educational institutions for the children and of other amenities of life in rural areas. For example, of 15,500 qualified doctors in West Bengal, about 9,000 have settled down in towns, leaving only 6,500 for the rural areas. If the number had been properly distributed, this State would have had one doctor for 1,700 persons, in contrast to 1 : 6,000 persons in the Indian Union. The result has been that half-qualified Ayurvedic, Homeopathic and Unani physicians and quacks without any scientific background have occupied the field, partly because treatment according to Western Science is too costly for the population and partly because the people are extremely poor and ignorant. How the situation is going to improve by the recognition of the physicians of these systems by the State Governments, I do not know. What is going to happen with the increase in the number of doctors of scientific medicine, about 1,500 of whom are qualifying every year ?

The following comparative figures will help us to understand the background of medical relief and the need for accelerated training (1950):—

TABLE 4

	Population served by			
	a Bed	a Doctor	a Nurse	a Midwife
British India	4,000	6,300	43,000	60,000
If the 10 years' programme of the Bhore Committee was implemented	971	2,000	500	4,000
West Bengal State (1951) ..	1,390	2,010	8,073	8,683
United Kingdom	141	1,000	300	628

Vocational education

Sir George Newman, one of U.K.'s great health planners, has said (1939) that 'national health—in every country in the world, everywhere, and all the time—depends upon, first, the knowledge of the science or art of medicine discovered, tested, verified, proved and, then, upon its *social* application by the medical practitioner, by the State, and by the people of that State. Without that knowledge, there is no knowing, without that application, there is no going'.

Medical education cannot be considered entirely apart from general education, as its efficiency is connected with the quality and content of the general and preliminary education which a student receives before taking up the medical course. Pre-medical education in our universities is extremely unsatisfactory. In order to make pre-medical education effective, the secondary education, so far as general knowledge and the knowledge of the basic sciences is concerned, must be levelled up, as the difference between secondary and university education is as the difference between immaturity and maturity. It is widely felt that the teaching of the basic sciences should begin at school and be continued to the university stage. At the present moment, didactic hours predominate far too much over practical hours, because most of the institutions are overcrowded, ill-equipped and poorly staffed and the insufficient number of teachers are inadequately trained and poorly paid. Most medical colleges are deficient in properly functioning libraries, due partly to lack of outlook and partly to inadequate funds being set apart.

It has been recognized that students receive proper guidance and supervision only through satisfactory teacher to student relationship. The ratio is generally 1 : 2 in U.S.A., 1 : 8 in U.K. and 1 : 10 in U.S.S.R. The Indian Medical Council advises a ratio of 1 : 15, but in most of the medical colleges in India the ratio varies from 1 : 30 to 1 : 102 in certain subjects. The latter ratio prevails particularly in Hygiene and Public Health and in Forensic and State Medicine. It is no wonder that Dr. Allan Gregg of the Rockefeller Foundation, after surveying medical education in India lately, remarked that medical students in our country were badly selected, under-taught and over-examined, that there were too many students and too few teachers, that the curriculum was not purposeful and correlated and that supervised hospital and field training was inadequate.

Medical education is directed towards two objectives—educational and vocational. In the former, the student is taught method so that he can

collect, analyse and interpret facts for himself, and observe and understand what he observes. In the latter, he is given such knowledge adapted to the requirements of the country as will enable him to ably practise medicine on his own account. Contact with active research programmes, or better, participation in such programmes, are factors of major influence in the educational development of the student. Unfortunately in the medical colleges in our country research programmes are sadly neglected, partly because of lack of initiative from and provision of funds by the administrative authorities and partly because most of the medical colleges have hitherto been outside the sphere of university development, control and co-ordination. The Medical Faculties should be properly constituted and the medical colleges should be brought under the financial and administrative control of the university. The whole of the medical and public health education budget of the Government should be handed over to the university, with such supplementary grants, made from time to time, as would raise the status of education in the different medical colleges to more or less the same level of efficiency. The selection and appointment of proper type of personnel should be left to the university, working through its faculty. Most universities have hitherto confined themselves to prescribe the medical curriculum and to conduct examinations on a syllabus.

It is evident that a revision of the curriculum and teaching methods is urgently called for. Such revision should ensure that each aspect of medicine receives its appropriate emphasis in a co-ordinated scheme. Each speciality should be taught to the extent and to the standard appropriate to a basic training in medicine. Social Medicine and Psychiatry should, however, be regarded as an integral part of all stages of the training. The present curriculum in Public Health and Hygiene is out of date. A new curriculum should be integrated into Preventive and Social Medicine, which should be an important department of all medical colleges. An urban and a rural Health Unit should be attached to all medical colleges for training in community structure (anatomy), community physiology (function), pathology (dysfunction), diagnosis and prevention, from the sociological angle. When this is done, the students will not only be better doctors but will learn better to identify their interests with those of the people.

Doctors have to serve a social purpose, which function has assumed more importance since the attainment of independence. The wasteful educational methods now pursued by the medical colleges are responsible for more than two-thirds of failure at examinations at some point during the period of the study of the students. The universities have to take serious note of this, as we cannot afford to lose both time and money at the present stage of the nation's progress.

The Indian Medical Council is expected to discharge its statutory responsibility to prescribe and enforce desirable standards of medical education. These standards are not only expected to meet the medical requirements of the country but also to solve various problems in the course of our national planning. At the present moment, not a single medical college in India, out of about 30, has yet been able to satisfy the minimum requirements laid down by the Council. In spite of this, it passes one's comprehension to learn that attempts are being made to reduce the period of training, to admit 25% more students in medical colleges in spite of existing overcrowding of students, shortage of beds, equipment and teachers, and to introduce double-shift training.

The number of teaching institutions must correspond with the number, quality and category of personnel—doctors, health officers, nurses, mid-

wives, dentists, pharmacists, sanitary inspectors, dressers, health assistants and health educators—needed for the requirements of the country. As at end of 1950, there were 30 medical colleges (33 in 1953), one college for public health nurses, and 307 schools for nurses. Several States have also started teaching institutions (graduate and undergraduate) for dentists, pharmacists, nurses, health visitors, midwives, *dais* (elementary midwives) and laboratory technicians. As regards post-graduate courses, apart from Doctorates in Science, Medicine, Surgery and Obstetrics, there exist Diploma courses for malariology, sanitary engineering, obstetrics and gynaecology, maternity and child-welfare, industrial health, dietetics, nutrition, tubercular diseases, ophthalmology, venereology, laryngology, anaesthesiology, radiology, child health and pediatrics.

At the end of 1950, there were 59,317 qualified medical doctors * (giving a ratio of one doctor for 6,019 persons), composed as follows:—

Graduates		Licentiates	
Men	Women	Men	Women
20,374	2,114	34,491	2,338

The number of students admitted into the medical colleges was 2,675 (men—2,218; women—457). The number of students graduating was 1,557 (men—1,316; women—241).

The number of post-graduate students who passed out in 1950-51 in different branches of medical and public health sciences was as follows:—

M.D.—58; M.S.—38; D.L.O.—9; D.Ped.—3; D.M.R.E.—7; D.C.H.—4; D.P.H.—4·7; Ph.D.—1; D.T.D.—25; D.M.C.W.—1; M.E. (Ph.)—7; D.G.O.—26; D.O.—21; D.C.L.Sc.—1; D.V.D.—nil; D.O.M.S.—8; D.A.—1; F.C.P.S.—10; T.D.D.—23; B.S.S.C.—3; Dip.Diet.—5.

Students passing out in certificate course at the All-India Institute of Hygiene and Public Health and the Malaria Institute of India in 1952 were as follows:—

Malariology course—12; Entomologist—1; Laboratory technique—7; Industrial hygiene—7; Public Health Engineering—8.

The total number of dentists and some auxiliary personnel at the end of 1950 was as follows:—

Dentists—3,407 (men—3,326; women—81) = One dentist to 104,784 persons).

Nurses—10,000 (or one nurse to 35,700 persons).

Health Visitors—600 (or one health visitor to 595,000 persons).

Midwives—12,000 (or one midwife to 29,750 persons).

Qualified Pharmacists—75 (or one to 4,760,000).

The rate of annual production of those personnel at the end of 1951 was as follows:—

Dentists—52 (men—47; women—5).

Pharmacists—75.

Nurses—1,140.

Health Visitors—55.

Midwives—1,628.

Dais—480.

* The number was 64,000 at the end of 1953.

pm

11

12

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

TABLE 4

Showing the strength of certain categories of health personnel in Indian Union (1950), as compared to Bhore Committee's estimates (1943).

Number at end of 1950	Ratio to population in Indian Union	Category of personnel	Number available in 1943	Ratio to population in British India	Ratio in U.K. in 1943	Number estimated to reach if Bhore Committee's recommendations were implemented (1971)	Ratio to the increased population (estimated 370 millions)
59,317	1 : 6,019	Doctors ..	47,000	1 : 6,300	1 : 1,000	185,000	1 : 2,000
10,000	1 : 35,700	Nurses ..	7,000	1 : 43,000	1 : 300	740,000	1 : 500
600	1 : 595,000	Health Visitors ..	750	1 : 400,000	1 : 4,770*	74,000	1 : 5,000
12,000	1 : 29,750	Midwives ..	5,000	1 : 60,000	1 : 618	92,000	1 : 4,000
75	1 : 4,760,000	Pharmacists ..	75	1 : 4,000,000	1 : 2 doctors	62,000	1 : 3 doctors
3,407	1 : 104,784	Dentists ..	1,000	1 : 300,000	1 : 2,700	92,500	1 : 4,000

* Based on 1935 figures.

The above (figures supplied by D. G. Health Services, India) will give an objective picture of the present status and will help us to estimate the requirements in terms of objectives and speed. It will appear that the country, as a whole, has slowly progressed since the attainment of freedom, but much more remains to be done. This will relate chiefly to our financial status and our purchasing capacity to secure modern public health requirements. The position may be seen at a glance in the following table giving the figures based on the present population of the Indian Union and personnel. Figures for 1950, as compared to the figures quoted in the Bhoré Committee's Report (1944) are given in the table opposite (Table 4):—

Sanitary and Medical Legislation

No Central enactments relating to sanitation or public health were introduced since the partition of India. The following Acts were either passed or implemented:

- (1) Indian Nursing Council Act, 1947 (XLVIII of 1947).
- (2) Dentists Act, 1948 (XVI of 1948).
- (3) Pharmacy Act, 1948 (VIII of 1948).
- (4) Drugs Act, 1940 (implemented).

Since then the State Employees' Insurance Act has been passed and a comprehensive Food and Drug Adulteration Act is, it is reported, in preparation.

Public Health legislation in India is generally disconnected and incomplete. The corner-stone of any organized effort to level up the public health of a community is law. In spite of the fact that consolidated Public Health Acts were published in England as far back as 1875, 1936 and 1948 and in Madras in 1939, the Central Government is not yet ready with a consolidated Public Health Act for India. Most of the States have not yet even amended their State and municipal by-laws for years and not even during the last six years since when India attained her freedom. The Acts of 1919 and 1935 decentralized public health to an extent that is interfering with co-ordinated development. Experience has proved that so long as public health services are not brought completely under State control and integrated with the State services, they will remain perfunctory, inefficient and uneconomical.

Social Insurance for Industrial Employees.

The Employees' State Insurance Act (1948) extends free medical service to industrial workers drawing a wage-income of less than Rs.400 per month. The families of these workers are also proposed to be entitled to the service. A semi-autonomous administrative organization, called the State Employees' Corporation, has been created. The Act does not cover mining, tea garden and railway labour. In creating the fund, the employees contribute 2 annas to Re.1-2-0 according to wage, the employers contribute 5% of the wage bill and the State Governments concerned one-third of the medical benefit cost. The Corporation will be responsible for administration expenses for the first five years. The expenses include (a) cash benefit, which will be borne and managed by the Employees' State Insurance Corporation, and (b) medical benefit, one-third of which will be borne by the respective States and two-thirds by the Corporation.

In some areas whole-time medical and ancillary staff has been employed, while in others the Panel system has been introduced. It has been

introduced in a few areas only, as full and timely support is not yet being offered by States and the industries concerned. This is the beginning of a scheme, although it does not approach even the minimum essentials laid down by the W.H.O. at the request of the International Labour Organization.

*Present position of the production of Drugs and Instruments in the Indian Union**

India is now self-sufficient in regard to all the galenical preparations, most of the sera and vaccines, alkaloids like morphine, codeine, strychnine, etc. India has been also self-sufficient in regard to the production of santonin, belladonna, digitalis and hyoseyamus preparations, but owing to the partition of the country the sources of the first two have been lost.

In spite of the above, it must be stated that India has made little or no progress in regard to the production of basic chemicals required for the manufacture of synthetic remedies, chemo-therapeutic compounds such as anti-malarials, anti-dysenterics, sulpha drugs, arsenicals, etc., largely used in the country. The important group of antibiotic drugs still remains practically untouched. We are informed that the production of the following synthetic drugs has already been taken in hand and that small quantities are being produced:

<i>Name of drug</i>	<i>Capacity per annum</i>
P.A.S. (Para-amino-salicylic acid)	12 tons.
Sulphones (Novitron)	4,000 lbs.
Luminal (Phenobarbitone)	180 lbs.
Para-acetyl amino benzaldehyde thio semi-carbazone	200 kg.

This meets only a small fraction of the demand and India still imports essential drugs and raw materials valued at over 10 to 15 crores of rupees annually. Among them are principally—penicillin, streptomycin and other antibiotics, sulpha drugs, gland products, vitamins, anti-leprosy drugs and also insecticides such as D.D.T., gammexane, etc. It is understood that the estimated break up of sales of different classes of medicinal preparations in India are as follows:—

Antibiotics—35%; sulpha drugs—15%; Vitamins and hormones—15%; hypnotics and analgesics—10%; other imported medicines—10%; and indigenously produced medicines—15%; (4% being made from imported raw materials alone).

This gives the present picture of India's supply position of drugs and pharmaceuticals.

The pharmaceutical industry in India is, to a great extent, engaged in processing certain products. Very few basic chemicals are manufactured at present. It is understood that steps are being taken to implement the production of the basic chemicals and raw materials required for these, as also for the production of finished products, a summary of which is given below:—

1. *Anti-biotics*—such as penicillin, streptomycin, chloromycetin, terramycin, aureomycin, etc.

The Government of India are putting up a factory at Pimpri near Poona for the manufacture of penicillin, with the help of W.H.O. and U.N.I.C.E.F. As a prelude to the establish-

* From a note kindly supplied by the Directorate-General of Health Services, India.

- ment of the penicillin factory, Government have established a bottling plant in Bombay where imported bulk penicillin is retailed and supplied to medical institutions.
2. *Sulpha drugs*.—Arrangements have been made by a foreign firm in collaboration with an Indian concern to start the manufacture of sulpha drugs at Bulsar near Bombay.
 3. *Anti-leprosy drugs*.—A firm in India has recently started limited production.
 4. *Anti-malarial drugs*.—India produces about 100,000 lbs. of quinine annually. Steps are being taken to increase the production.
 5. *Anti-tubercular drugs*.—Small quantities of para-amino-salicylic acid and para-acetylamine benzaldehyde thio-semi carbazone are already being manufactured in India.
 6. *Glandular drugs*.—Messrs. Sarabhai Chemicals have a project under contemplation for the manufacture of insulin at Baroda. Liver extracts are being manufactured by a number of concerns in India. Steps are under contemplation, so as to improve the supply position of raw livers both with regard to quality and quantity.
 7. *Vitamins*.—India produces a large quantity of shark liver oil of good quality which is rich in Vitamin A. The present production is estimated at 25,000 gallons with a potency of 6,000 I.U./G.M.
 8. *Insecticides*.—The Government of India, it is understood, have plans for the manufacture of D.D.T. in collaboration with W.H.O. and U.N.I.C.E.F., and the Imperial Chemical Industries have started the production of benzene hexachloride.
 9. *Vaccines and Sera*.—Anti-diphtheria, anti-tetanus and anti-dysenteric sera are produced in India to a large extent. India is entirely self-sufficient with regard to the following vaccines :—

- | | |
|-------------------------|----------------------|
| (a) Anti-rabic vaccine, | (b) B.C.G. vaccine, |
| (c) Anti-venine, | (d) Cholera vaccine, |
| (e) Plague vaccine, | (f) T.A.B. vaccine, |
| (g) Vaccine lymph. | |

Surgical Instruments

A large portion of the war-time supply (before partition of India) was being met by a number of factories at Sialkot, now in Pakistan. The most essential items required by Military and Civil institutions which could be easily manufactured in India are:—

Bone chisel; Stomach clamps; Forceps—artery, bone cutting, bone holding, dissecting, intestines; Pedicle; Blunt and sharp hooks; Needle holders; Saws; Scoops; and Scalpels.

Government are assisting in their production and in that of various types of surgical tables and sterilizers.

Some financial considerations in relation to Public Health.

Public health has been described in America as a 'purchaseable commodity'. Modern public health, which is an integral part of the social

services like education, agriculture, animal husbandry, industries and co-operation, has to be paid for. Let us see how we stand with regard to income and expenditure per capita.

TABLE 5

	Area in sq. miles.	Population	Population Density per sq. mile	Annual per capita income (in rupees)	Per capita expenditure on the basis of revenue (acc. to Budget 1952-53)
United Kingdom	94,279	50,033,000	541.1	Rs.1,069*	£95½ or Rs.1,272
India ..	1,217,000	342,114,000	382.4	Rs.65	Rs.12-8-0
West Bengal ..	30,689	27,787,000	808.0	Not known	Rs.15

* In U.S.A.—Rs.1,371.

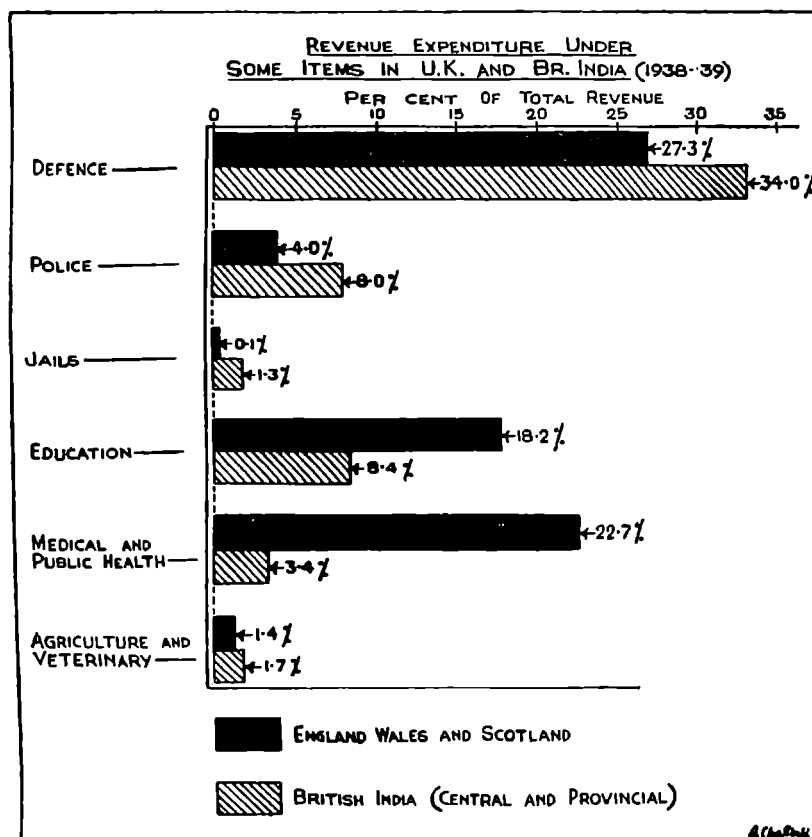


FIG. 12.

Naturally our standard of living is low; our purchasing capacity for public health is low. It may be profitable to know how the revenue is spent under certain essential heads. It may be worth while also to get an idea of pre-war status in this regard. The bar diagram inserted at foot of previous page will give us an idea of the position in 1938-39.

Let us see how we stand in the year 1952-53 (see Table 6 and Bar Diagram).

TABLE 6

Comparative Statement of Budget Allocations in United Kingdom, Indian Union, and West Bengal for 1952-53

	United Kingdom (Central contribution and general grant to local services)		Indian Union (Central contribution)		West Bengal State	
	£ millions	% of revenue	Rs. 000	% of revenue	Rs. 000	% of revenue
REVENUE ..	4,778.0		4,24,98,00		35,91,06	
EXPENDITURE—						
1. Defence ..	1,377.2	28.8	1,97,94,94	46.57		..
2. Police ..	34.9	0.72	64,97	0.15	6,05,02	16.84
3. Jails .. (including convict settlements)	7.0	0.14			1,00,06	2.78
4. Education ..	259.1	5.31	3,69,46	0.86	3,99,69	11.13
5. Medical and Public Health .. (including housing and research)	470.9	9.74	1,46,15	0.34	4,90,59	13.66
6. Agriculture, fisheries and veterinary ..	39.9	0.82	3,35,57	0.79	2,60,10	7.24
7. Food subsidies on imported grains	410	8.58	25,76,56	6.06	Not known	
8. Grants in aid to States ..			20,26,92	4.76		
9. Debt charges ..		..	36,16,00	8.50		
10. Social insurance	321	6.72	Not known		Not known	

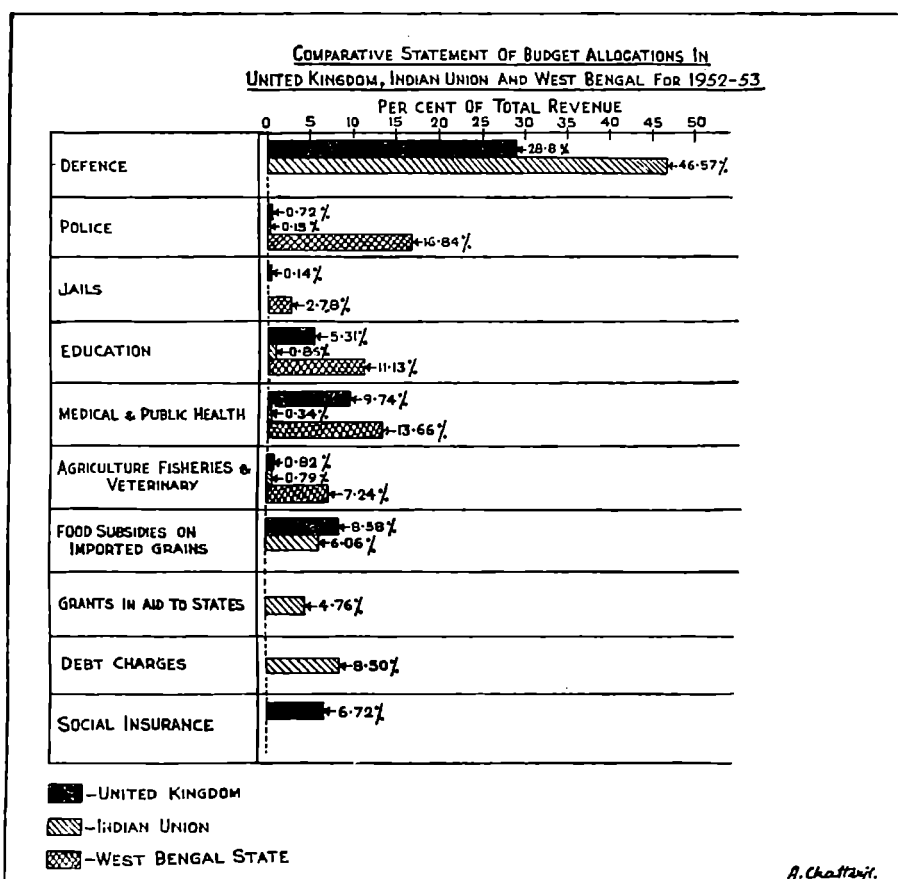


FIG. 13.

The per capita expenditure on medical relief in British India in 1939 varied between one anna in Uttar Pradesh to Re.1-2-5 in Delhi. The expenditure in urban areas was nearly three times that in rural areas. In that year, only 3.4% of the total revenue was spent on medical and public health measures. How it stood in 1944-45 in some of the States will be seen from the following figures:—

*Combined expenditure on medical and public health activities in
British India in 1944-45*

Province	Expenditure per capita in annas	% of total Provincial expenditure
Bombay	10.9	4.5
Bengal	7.1	5.7
Madras	6.2	4.7
Punjab	6.1	5.1
Assam	5.4	6.2
Uttar Pradesh	3.9	4.9
Orissa	3.4	5.9
Bihar . .	3.2	7.3
C.P. and Berar	2.8	3.1

Although we do not possess successive comparative figures for all the States, West Bengal seems to have made a commendable effort to level up things after partition, as will be seen from the following figures:—

Per capita expenditure on medical and public health services in West Bengal

				Rs.	As.	P.
1930	0	3 0
1946	1	2 0
1950	2	3 0
1952	2	6 0

Another comparative idea of progress will be seen from the following figures on the ratio of bed to population (1949).

TABLE 7

Table showing the bed accommodation available in institutions in the Indian Union in 1949 to serve the needs of the people in individual States.

Serial No.	States	Total number of beds	Ratio of bed to population	Bed ratio per 1,000 of population*
1	Assam	2,304	3,777	0.264
2	Bihar	10,365	3,881	0.257
3	Bombay	10,753	3,344	0.290
4	Madhya Pradesh	4,968	4,277	0.233
5	Madras	19,618	2,907	0.344
6	Punjab	6,727	1,879	0.432 (5)
7	Orissa	2,980	4,899	0.204
8	Uttar Pradesh	10,031	6,302	0.159
9	West Bengal	17,828	1,391	0.718 (3)
10	Ajmer	832	833	1.199
11	Bhopal	433	1,931	0.517
12	Coorg	308	744	1.343 (1)
13	Delhi	1,711	1,019	0.981 (2)
14	Bilaspur	28	4,503	0.222
15	Himachal Pradesh	354	2,777	0.359
16	Kutch	118	4,810	0.207
17	Manipur	242	2,387	0.418
18	Tripura	78	8,192	0.120
19	Vindhya Pradesh	955	3,743	0.267
20	Hyderabad	4,002	4,661	0.214
21	Madhya Bharat	2,715	2,929	0.341
22	Mysore	5,404	1,079	0.595 (4)
23	PEPSU	1,125	3,105	0.322
24	Rajasthan	4,965	3,079	0.324
25	Saurashtra	1,883	2,197	0.455
26	Travancore-Cochin	4,598	2,018	0.495
	TOTAL	113,808	3,135	0.32

* Based on 1951 census population.

(4,792 beds were added between 1951-1953.)

It appears from Table No. 7 above that West Bengal occupies the third place among the States in India, although it occupies the second place in having the total number of beds.

The programme of medical and public health work recommended by the Bhore Committee (1944) seems to have been implemented more quickly and more thoroughly in *West Bengal* than in other States. This accounts for a steady rise of expenditure under Medical and Public Health Organization. The State has embarked on the development of Primary Health Centres at Union and Thana levels, with subsequent gradual development of Sub-divisional and District Centres. The work started in 1949, and by now 160 Health Centres with 10, 20 and 50 beds have been established and it is proposed to add 70–100 centres every year, until a total of 2,080 Union Health Centres, 245 Thana Health Centres, 37 Sub-divisional Health Centres and 14 District Centres are completed. We hope the successive 5-Year National Plans will make it possible for this State to proceed with the programme. Already 37 Sub-divisional Health Officers, one for each sub-division, have been appointed. I am constrained to observe, however, that mere extension of Health Centres will not improve matters 'unless health improvement forms part of an integrated scheme of economic and social welfare' (Ukil, 1941, 1949). I suggest that priority in the establishment of these Health Centres be given to areas covered by the Community Projects, as far as possible.

The training of technical and auxiliary personnel is being attended to as far as funds are available. Efforts are being made to control malaria by residual D.D.T. spraying and mass treatment, and tuberculosis by establishing clinics, hospitals, B.C.G. inoculation and health education in co-operation with the State Tuberculosis Association. The progress with regard to environmental sanitation, collection of vital statistics and health surveys are, however, slow. It is hoped that these will be speeded up under the Hon'ble Dr. B. C. Roy, the distinguished Chief Minister and, until lately, the Health Minister of West Bengal. I hope that, with the implementation of the 5-Year Plans, other States will vie with each other in speeding up the progress.

The Administrative Framework

Separate Ministries of Health exist both in the Central and State Governments. With the expansion of work under the changed conditions following freedom, the staff has been increased, but whether there is adequate technical justification for such a large increase functionally, it is a matter of opinion. On the whole, one can say that with the first phases of the changed circumstances, the administrative efficiency of the administration has generally decreased. The Central Ministry of Health is assisted by several secretaries and a staff of 15 Senior Sectional Officers. Lack of information, inter-sectional and inter-departmental co-ordination and lack of methodological research are much in evidence.

Functions of the Central Ministry of Health

The following are quoted from the Report of the Indian Ministry of Health for 1950-51 (Govt. of India Press, 1951):—

'Matters connected with health fall largely in the State field. The Central Government has sole executive responsibility for the subject in the Union list, concurrent legislative responsibility with the States for the subjects in the Concurrent list and no strict legal or constitutional responsibility for the subjects in the State list.

As regards Centrally Administered Areas, however, the Centre is

directly responsible for State subjects as well. But while this is the constitutional allocation of the legislative functions it does not follow that the Central Government does not have any responsibility in regard to health except in relation to matters specified in the Union list. It has long been recognized that the Central Government has much wider responsibilities.

In general terms, the Central Government's functions in regard to matters in the State list, which are primarily the responsibility of the various States, can be stated to be co-ordination, the provision of facilities for discussion, the supply of information and competent advice and such other assistance as it can give for the promotion of the health and well-being of the country. The degree of influence which in Central Health Ministry can exert in the matter of improvement of health administration throughout the country will depend entirely on the extent to which it can initiate enquiry, discussion and experiment, and the extent to which it comes to be looked upon by State administrations and the professional and lay public as an organization which is competent to advise and assist in the practical solution of health problems.

With this wider aspect in mind, the functions of the Central Ministry of Health could be summarized as follows:—

- (1) To be responsible for international health relations and the administration of port quarantine;
- (2) To administer the Central health institutions—All-India Institute of Hygiene and Public Health, the Malaria Institute of India, the Central Research Institute, the Indian Serological Laboratory, the Central Drugs Laboratory and such other Central health institutions as may be created from time to time;
- (3) To promote research through the Indian Council of Medical Research (formerly called the Indian Research Fund Association) and other bodies;
- (4) To promote, in consultation with State Governments, the regulation and development of the medical, pharmaceutical, dental and nursing professions;
- (5) To promote, in consultation with State Governments, the establishment and maintenance of drug standards;
- (6) To lay down and enforce appropriate standards of medical, dental, nursing, pharmaceutical and other ancillary branches of Health Education;
- (7) To collect information regarding developments in the medical sciences and in health administration in India and elsewhere and to make such information available to State Governments and the Medical and Health departments;
- (8) To promote, through a Central Board of Health and otherwise, discussions and exchange of information on health problems;
- (9) To promote, through a Central Board of Health and otherwise, special enquiries into particular health problems and co-ordination of effort thereon;
- (10) To collate and give publicity to statistical and other information relating to health problems with the object of stimulating the interest of and educating both the professional and lay public on health matters;
- (11) To discharge the functions of the Part A and Part B State Governments in Health and Local Government matters in Part C States;

- (12) To build up and maintain a Central Health Services for the purpose of:—
- (a) Ensuring high standards of administration at the Centre,
 - (b) Collaborating with States for the maintenance of an equally efficient standard in their administration,
 - (c) Making available to the Centre and the States the services of highly qualified personnel for teaching, research and medical institutes; and
- (13) To promote proper standards in housing by collecting and distributing information, providing advice to States on housing and town planning, organizing, research and other suitable means.'

There are certain subjects for which the Central Health Ministry is primarily responsible (List I) and those in relation to which it exercises advisory and co-ordinating functions (List II).

They are given below:

List I

Subjects for which the Centre is primarily responsible

1. Port Health Administration.
2. Relations with the World Health Organization.
3. The administration of certain Central institutions, such as the Malaria Institute of India, Delhi; the All-India Institute of Hygiene and Public Health, Calcutta; the Central Research Institute, Kasauli; the College of Nursing, Delhi; the Ranchi Mental Hospital, Ranchi.
4. Central organizations of medical and allied professions.
5. Drugs Standard Control—Control of imported drugs—the Central Drugs Laboratory.
6. The Medical Stores Department.
7. Higher training of students abroad.
8. Vital statistics.
9. The Serologist and Chemical Examiner to the Government of India
10. Medical Research—the Indian Council of Medical Research—the Medical Research Liaison Committee—the proposed All-India Medical Institute for teaching and research.
11. Medical and Public Health development in all Part C States.
12. Examination and approval of State development plans.
13. Municipal and Improvement Trust administration in the Centrally Administered Areas.
14. Government Housing Factory, New Delhi.

List II

Subjects in relation to which the Centre exercises advisory and Co-ordinating functions

1. Development of the health services and in particular services relating to malaria, tuberculosis, blindness, venereal diseases, blood transfusion, maternity and child-welfare, and nursing.
2. The designing and equipment of medical institutions.

3. Nutrition.
4. Anti-malaria Drugs.
5. Drugs standard Control—co-ordination of State control of manufacture and sale.
6. The spread of disease from one unit to another.
7. Housing.

Main Activities

The budgeted provision for the Ministry for the year 1950-51 was Rs.2.2 crores.

A large part of the money was diverted to local and Centrally administered areas, which should not legitimately fall within the domain of a Central Health Ministry. For such purposes, separate provisions are made in the revenue budget of other countries. For example, in U.K. budget for 1952-53, £61.5 millions were provided for housing, under a separate Ministry, and I do not understand why it should come under the Health portfolio in India. If it had not been under technically inexperienced people, the Delhi Housing Factory scandal would not probably have occurred. In U.K., 7.74% of the total budget was earmarked for the National Health Services and £21.9 millions for assistance to local health services and £16 millions for research and development. £321.2 millions were earmarked for contribution to national insurance and pension schemes.

The *post-graduate training institutions* did good work, but more funds are needed for research and expansion. The teachers must not be burdened with too much routine work. The establishment of the Cancer Research Centre at the Tata Memorial Hospital at Bombay and the starting of a Centre for Industrial Hygiene at Calcutta were notable landmarks. The judiciousness of a Central Medical Institute at Delhi at a capital cost of Rs.5 crores and a recurring expenditure of Rs.60 lakhs is a questionable proposition, as a single Institute will not solve the needs of a growing number of medical institutions in the country. At least one Medical College in every State should be upgraded to serve as a model. The abolition of the Lake Medical College at Calcutta was a short-sighted step. Without establishing a Central Microbiological Institute, it was probably a mistake to have established a Tuberculosis Institute in Delhi, as any comprehensive research programme in tuberculosis requires the collaboration of chemists, biochemists, bacteriologists, histo-pathologists and epidemiologists. High calibre workers in these lines are not at present available in Delhi. The Central Research Institute at Kasauli, with its limited scope, seems to be a 'white elephant'. Research work cannot flourish in an environment where workers are burdened with too much routine work.

The utility of maintaining four medical store depots, with attached factories in two, in competition with private industries is not understood. One does not know when the penicillin plant at Pimpri will manufacture the drug. It is derogatory to the Government to bottle imported penicillin and to sell it to the trade.

India has been a member of the World Health Organization since 1948 and contributes 3.24% of its expenses. Several beneficent schemes have been introduced into India through the assistance of W.H.O. and U.N.I.C.E.F. (United Nations International Children's Emergency Fund). Apart from offering expert advice, they have supplied medical literature and equipment to various institutions. When a consultant in any subject is invited, the salaries and travel costs are paid by the W.H.O. or the relevant organization, the Government of India meets the incidental local expenses on account of

board, lodging and internal travel of such staff, while the cost of staff utilized by a State Government is borne by the State Government concerned. The cost of maintaining these officers is fairly high. The Government should consider whether such help should be accepted under the present terms or it would be better to send out competent workers abroad for training and undertaking the job on their return. The establishment of the B.C.G. Vaccine Laboratory at Guindy and the launching of the vaccination campaign in 1948 were notable events. It is anticipated that within a period of 7 years, 67.3 million persons under the more vulnerable age-groups of 'under 20' years who are expected to prove tuberculin-negative would be vaccinated. If the result of this campaign is to be properly assessed, there must be some machinery to ascertain tuberculosis morbidity and mortality in the country, which are at present non-existent.

A Committee for the compilation of an Indian Pharmacopoeia was formed in 1948 and a tentative list of 1,000 items was drawn up for inclusion. The work was expected to be completed by 1952. An Enquiry Committee was appointed to make recommendations regarding the steps to be taken for the development and regulation of the indigenous systems of medicine. The report of the Committee was submitted in February, 1949, and a small Committee worked out the details of facilities which should be provided for research on scientific lines in the Ayurvedic and Unani systems of medicine. A Research Institute in indigenous systems of medicine has since been established at Jamnagar. A Virus Research centre has been located at Poona.

A Central Council of Post-graduate Medical Education has been formed with a view to prescribe standards for post-graduate medical education for the guidance of universities and to advise universities with a view to securing uniformity of standards for post-graduate medical education throughout the country. Under Article 263 of the Constitution of India, a Central Council of Health, consisting of the State Ministers of Health, with the Union Health Minister as Chairman, has been established. Its functions are to consider and recommend broad lines of policy in regard to matters concerning health in all its aspects, such as environmental sanitation, provision of remedial and preventive care, nutrition, health education, and promotion of facilities for professional training and research. The Committee commenced work in January, 1953.

A Standing Advisory Committee of Parliament for the Ministry of Health has been formed to consider various matters requiring legislation or financial provision.

CHAPTER III

Probing into Future

Health is a major basis of human progress, and its lack is one of the causes that lead to national decay. Other things being equal, good health makes for physical efficiency, bodily comfort, a sense of well-being, and develops energy, alertness and keenness. The energy for creative enterprises depends upon it and the inventiveness that develops our civilization is closely related to it. On the other hand, sickness and death bring many evil results, such as poverty, crime, laziness, inadequate output of work, broken homes, hopelessness and despair. The maintenance of an adequate standard of physiological health and fitness is, therefore, of the greatest importance in a free country.

Social conditions react on health and health reacts on social conditions. It will be found that, in most spheres, the deviation from physiological health is related to problems connected with food (inadequacy and adulteration), housing, clothing, education, domestic and environmental cleanliness, water supply, and the disposal of sewage, household refuse and manure. Public health, which is a branch of social welfare, is intimately connected with the life and work of the individual, as well as of groups. The studies of Prof. J. D. Bernal (1939) have shown that 70% of illness could be eliminated by raising the standard of living with regard to food, clothing, education and social security and that with regard to the remainder the improvement of environmental sanitation and working conditions covered a substantial ground. A study of the topography of the area, the social anthropology of the population, economics, communications, health status and other factors is, therefore, needed before a programme of health reform is put into operation.

Science has contributed, in the course of the last 50 years or so, the knowledge and equipment necessary to rid the world of many of its most widely spread communicable diseases. The application of this knowledge is now a question of education, economics, organization and administration. In other countries, immunization by vaccination and/or improvement of environmental sanitation, particularly in the matter of housing and water supply, have eliminated small-pox, cholera, dysentery, diarrhoea and other diseases, but it is a matter of great regret that the incidence of these diseases in India has remained almost stationary for many years, as has been indicated in the previous chapters.

With the impact of science on society, our social structure is changing and is bound to change further with industrialization of the country. India is at the cross-roads now and we have to think whether we shall allow matters to drift or we should plan and reorganize our community life in terms of *our* conception of life and democratic ideals. There is no doubt that we should accept the latter alternative in reorganizing our community life in urban and rural areas. This is how we can avoid some of the evils of industrial civilization in the West. Years of slavery, leading to long-continued prevalence of adverse socio-economic conditions with consequent high rate of sickness among the population, have brought about a spirit of passive acceptance of various evils as inevitable. The attainment of freedom has not yet been able to remove this attitude of apathy and frustration and to transform it into a dynamic desire and active co-operation with

our own Government as is to be expected from patriotic and responsible citizens. The mental outlook of this type of population is likely to change with the extension of economic development and the extension of social services. Since the acquisition of health and education is purchasable at a much higher cost than our present income *per capita* on taxation would allow, part of this purchase has to be effected in kind, i.e. by the willing participation of the citizens in developing community programmes. How quickly this improvement will be effected will depend a good deal on the efficiency of the programme in relation to the geographical region and the social status of the population.

India's health status has been low for many decades, so also her standard of living. Successive scientific discoveries and their application in western countries seem to have had little effect in our country. The lack of a scientific outlook, inadequate investigations by the administrative authorities in developing suitable methods of organization and the lack of a national policy of co-ordinated planning have been responsible for much of India's backwardness. The backwardness of India in the proper evolution of public health must be accounted for either by the progress of science not being applied to the prevention of diseases as has been done in advanced countries, or to a wrong application of the same. It is a matter of great pity that, in spite of our being masters in our own home for six and a half years, we have not yet been able to adequately shake off the old outlook, the old administrative framework and the old methods of work which were perhaps more suited to the objectives of foreign imperial administration.

Modern public health, which is an integral part of social services like education, agriculture, husbandry, co-operation, industry and social assurance, has to be paid for. Socio-economic advance is, therefore, inevitably linked with the reduction of illness and improvement of health. We have shown elsewhere (Ukil, 1945-46) that the income *per capita* of the population has to be increased four-fold before we can offer the population a basic standard of healthful life.

India is bound to be industrialized. When a country changes from agricultural to industrial economy, the social structure undergoes radical changes. No improvement in health status can be achieved *without the simultaneous development of the programme of national reconstruction* in the field of agriculture, animal husbandry, education, industry, housing and the improvement of communications—factors which are essential for improving the standard of living of the people. Without realization of an integrated development, the improvement of health may be a fleeting objective, at least in the rural areas. The activities should start from the villages which represent the base of the pyramid and should gradually develop to the top or apex of the pyramid. The utilization of the time and energy of the landless labourers and villagers with small holdings and the proper correlation between agriculture and industry and between the cottage and large-scale machine industries are important considerations for a co-ordinated planning. Such an integrated development will be facilitated by the establishment of *Gaon Panchayets* and Multi-Purpose Co-operative Societies, as has also been visualized by the National Planning Commission, to meet the requirements in the different spheres of social activities. But unless there is a *Pilot Centre* for demonstration, co-operation and technical supervision in each co-ordinated area, the experiment may prove to be slow and expensive or may meet with partial or total failure.

Although the State must ultimately provide for a social machinery to assure living standards adequate for the maintenance of health, it may not be within the competence of the State to do it so long as the *per capita*

income is low. The scheme visualized above will teach people the spirit of co-operation and self-help enabling them to contribute their share in kind (voluntary co-operation or labour) what richer countries have been able to accomplish by cash purchase. Mahatma Gandhi's '*Samagra Gram Seva*' scheme might be usefully fitted into the programme. It should be remembered that no health programme could be sponsored and carried out without simultaneous development in other spheres of human activity intended to improve the standard of living. Health planning must be an integrated component of total national planning. The diagram given below indicates a schematic representation of the above ideas at the rural level (Ukil, 1949). For further information, readers are requested to refer to the paper quoted.

**DIAGRAM OF
INTEGRATED RURAL
HEALTH SCHEME**

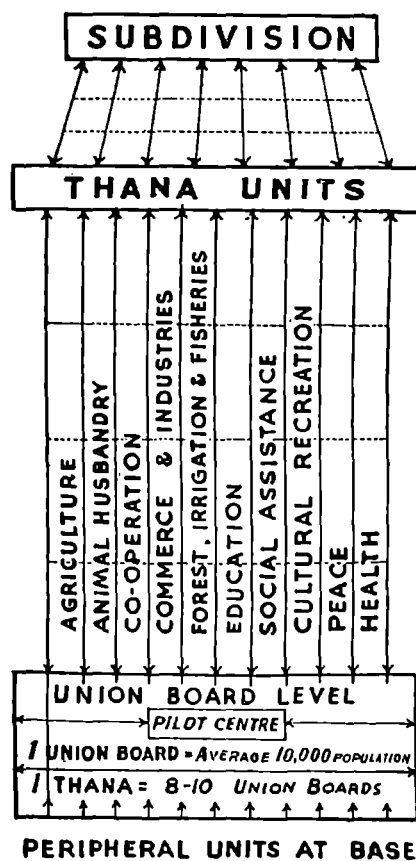


FIG. 14.

At the State or Provincial level, the writer reproduces the schema (opposite) on the organization of State Social Welfare Services indicated twelve years ago in his Presidential Address at the Medical and Veterinary Research section of the Indian Science Congress (1941). The provisions of this scheme hold good even today and, if pursued, they are likely to give better results than what are being obtained by *laissez faire* methods followed both by the Central and State Governments. I am glad to note that at least one Rural Health Centre (at Singur) (Krishnan, 1953) has partially followed the principles enunciated by me and has obtained spectacular results within five years from 1946-51.

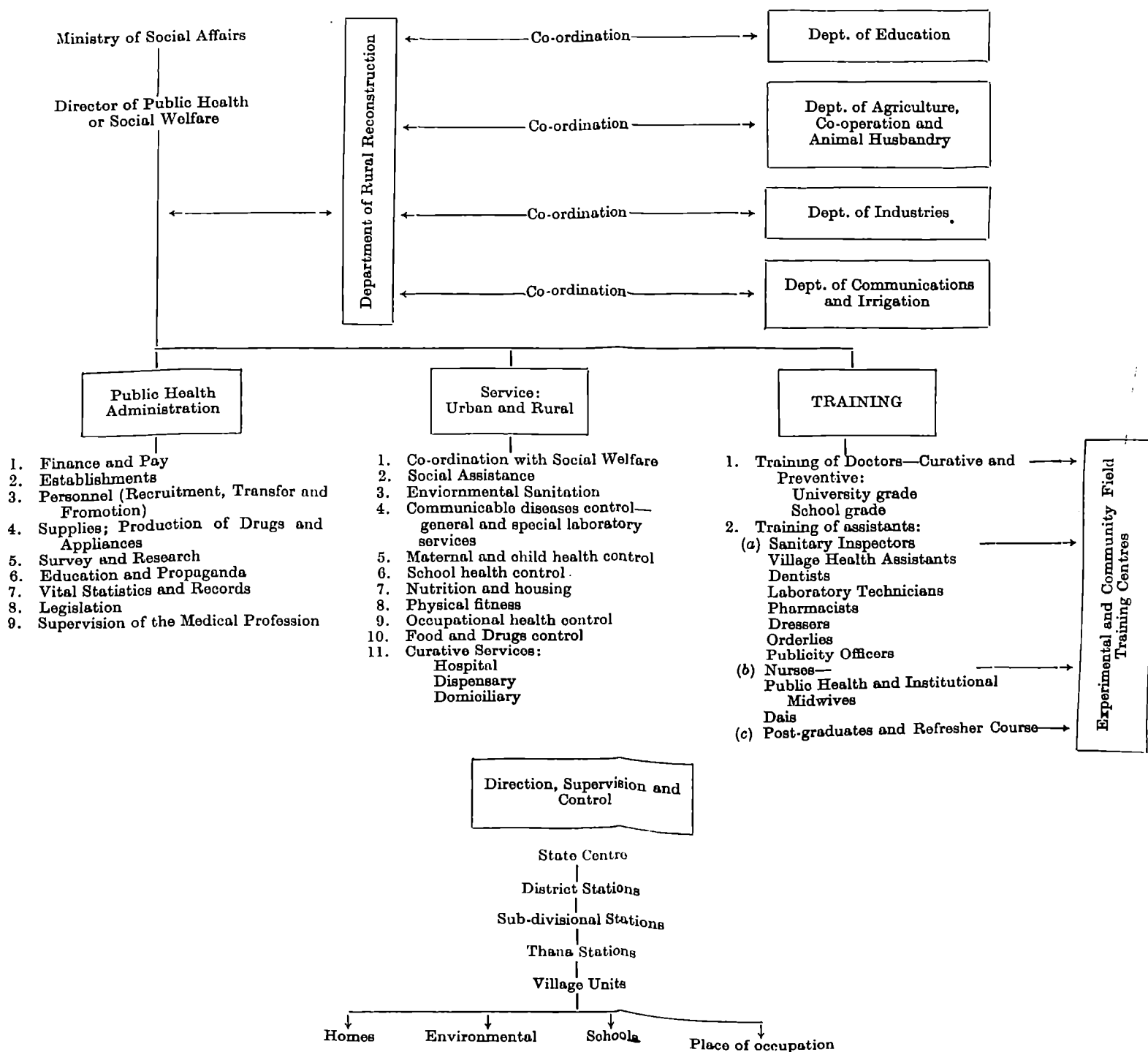
It was visualized in the above scheme that the curative and preventive services would be combined together to form a co-ordinated whole, ensuring every family the requisite medical attention and the amenities of environmental hygiene. It was pointed out that the aim should be to prepare a stage-wise co-ordinated programme covering at one and the same time both central and local administrations, both environment of the family and the individual, and both preventive and curative action. Two years later (October, 1943) a Committee was appointed by the then Government of India, commonly known as the Bhore Committee (Govt. of India Pub., 1946), to formulate plans and to 'plan boldly, avoiding, on the one hand, extravagant programmes which are obviously incapable of fulfilment, and, on the other hand, halting and inadequate schemes which would have no effect on the general health standards, and which would bring little return for the expenditure involved'. After two years' hard labour and by utilizing some of the best brains of India and other countries, the Committee published a Report in 4 volumes, which merits the closest attention of all medical and health workers and of administrators. After spending so much money, it is sad to reflect that no other State except West Bengal, and perhaps to some extent, Delhi, has tried to implement the plans within six years after the attainment of freedom.

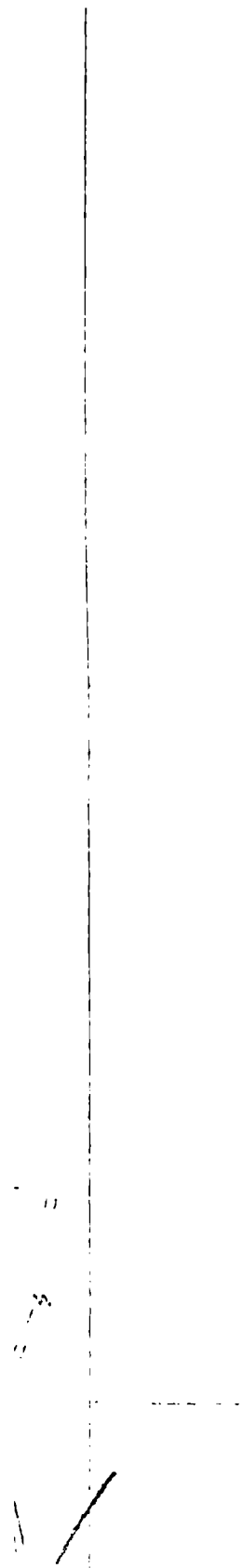
Comments on Bhore Committee's Proposals

The Bhore Committee accepted the following fundamental principles in planning for the future: (1) that every individual had a right to receive from the State free and adequate medical care; (2) that the health programme must include both preventive and curative measures; (3) that there was an urgent need to develop and maintain health services for the vast rural population; (4) that the health services should be placed as close to the people as possible; (5) that the scheme should be so devised as to secure active co-operation of the people in all stages; and (6) that the Ministry of Health in future should contain persons with an intimate knowledge of health matters who should enjoy the confidence of the public and who are thus able to secure their support in matters of legislation and administration. It was also stipulated that the scheme was expected to be put into operation by the future Government of Independent India and that she should be able to overhaul the existing machinery and to plan for the future without being weighed down by any considerations of sectional, service, communal or racial interests.

The immediate objective of the Committee was to plan for 10 years, in two periods of 5 years each. The Committee estimated that it would involve a capital and recurring expenditure of Rs.1,000 crores for the fruition of the complete scheme. The recurring annual expenditure during the first 5 years was expected to be Rs.40 crores, while that during the next 5 years—Rs.81 crores. The annual *per capita* expenditure would be raised

SCHEMA FOR ORGANIZATION OF STATE SOCIAL WELFARE SERVICES





...

-

.

.

'

from the then 3 annas to Rs.1-3-3 during the first 5 years and to Rs.2-6-6 during the next 5 years. (It may be noted here that West Bengal has already spent at Rs.2-6-0 *per capita* during the Budget year 1952-53, the rise of cost being partly due to rise in commodity prices and in cost of living).

The planning followed, to a considerable extent, the scheme visualized by the author in 1941. Apart from the organization of Primary, Secondary and District Centres, the plan included schemes for improving the nutrition of the people, environmental hygiene, the planning of rural, urban and industrial housing, water supplies, general sanitation, conservancy and drainage, river and beach pollution, control of insects, rodents and other carriers of disease, and control of offensive trades. The problems of professional education, the training of auxiliary personnel, medical research and administrative organization were also considered.

The first 10 years' period was called the *short-term plan* and the 25 years' target (ending in 1971) was called the *long-term plan*. The long-term plan stipulated an expenditure of Rs.3-3-4 *per capita*. The committee hoped that at least 15% of the Central and State revenues would be devoted to the fulfilment of the plan, in contrast to 20.4% in the United States and 25% in some other countries. It was stipulated that the ratio of beds to population would be raised from 1.03 per 1,000 population at the end of 10 years to 2 beds per 1,000 population at the end of the long-term plan. It was hoped that the fulfilment of the long-term programme (by 1971) would be able to cover three-fourths of the population of the individual districts.

It will be pertinent to point out here that India's present Planning Commission expects that the first 5-year phase will lead to an increase of 11% in national income, during which period there will also be an increase of population by 5%; that at the end of the second 5-year plan the present *per capita* income may be doubled and that a cent per cent increase in the national income will occur, after six five-year plans, in 1977-78, if at the same time the rate of saving is increased to 20% from its present 5%.

In certain respects the Committee's recommendations seem to be halting and not as bold as those of the Famine Enquiry Commission (1945). Statements on progress have been hedged in by statements which have no technical justification. For example, while the Committee advocates training of one type of, what they have called, 'basic doctors', in the same breath they state that 'it might be desirable to provide fully trained doctors and less elaborate type of medical men'. At least one State in India is trying to follow this whittled-down counsel. Our position in India today cannot be compared with Russia's position at the time of the Revolution. Russia has practically abolished the system in favour of graduate medical course, which is being given in 72 medical colleges wherefrom 18,000 doctors are passing out every year (1951). There is no justification to follow Russia's initial plans at this moment in India. Again, with regard to the admission of students into the medical colleges, the Committee's suggestion that 'one-third of the admissions to every medical training institution should be on pure merit and that the remaining seats, of which $\frac{1}{4}$ to $\frac{1}{3}$ should be for women, might be divided among all communities', goes against the requirements of technical efficiency. I hope, free India will have the courage to discard these ideas and to whole-heartedly co-operate with every phase of national planning. The whole fabric of medical and public health education should be brought, as has been indicated earlier, directly under the Universities. Without University environment education cannot thrive and a research spirit adequately fostered.

With regard to organizational set-up, the Committee tried to approach the problem at the Centre as well as in the constituent States, with the proviso that, with the attainment of freedom, a certain amount of power would be delegated to the federal administration for purposes of co-ordination in connection with certain aspects of higher technical education, medical research and the control of communicable diseases through air, water and land transport, and the control of quality of drugs, food and chemicals. The present Central Ministry of Health is trying to follow these lines as far as technical assistance and financial resources are available. Some of the items undertaken have been mentioned in the previous chapter. A comparative study of the set-up in U.S.S.R., which is making forced marches in planning, may be fruitful. Only two charts (pp. 121 and 122) to illustrate it are given herewith for the purpose. For fuller information readers are referred to author's description of the medical and public health organization in U.S.S.R. (1951).

From what has been said above, it seems that the speed of the progress will be quickened if the working of the rural health organization is linked with the Community Projects Scheme, which is expected to lead to social and cultural transformation of the population, apart from the material benefits. Where Community Projects are not being worked out, small-scale integrated rural reconstruction programmes may be associated with the health centres. The success of the scheme depends on whether all parts of India agree to level up the progress as parts of a co-ordinated whole, according to the over-all Master Design for the whole State or for the whole country. The indications are, however, that a scientific method of thinking will be disregarded, in preference to depending far too much on emotions and medieval ideas. Whether India's population will get over these handicaps in the interest of inter-related progress is more than can be predicted at the present moment. The development of a sense of patriotic citizenship and a desire for progress are essential for the application of sound principles. On the administrative side, a ruling Government has got to be transformed into a servicing Government.

The (Bhore) Committee left certain essential components of the scheme either untouched or undecided: for example, the laying down of the *requirements for a hygienic standard of living* in terms of the objectives and progress of the successive stages of the Plan. The production of drugs and chemicals is intimately concerned with the medical needs of the people and the compilation of an *Indian Pharmacopoeia* is essential for standardization and administration of drugs throughout the country. Such an urgent matter should not have been left for a future Committee to decide. The Committee was perhaps compelled to leave these and other important matters over for future consideration on account of the long period already occupied by the Committee in its deliberations.

The Committee's recommendations with regard to *Medical Research* show a very poor approach. The proposals framed seem to have narrowed the scope of medical and public health research and do not constitute part of a co-ordinated scheme of organized research throughout the country.

There is no doubt that researches should be centralized in order to ensure co-ordination and to avoid overlapping. The States may take up local problems, while the Centre may take up problems of an all-India character for investigation. This necessitates careful planning and co-ordination of various schemes of research in all branches of science, whether pure or applied. The detailed planning of research must be in the hands of those with the necessary specialized knowledge and they must be able to act without suspicion of political, racial or sectional influence.

CHART I

Structure of Soviet, Medical and Health Organization

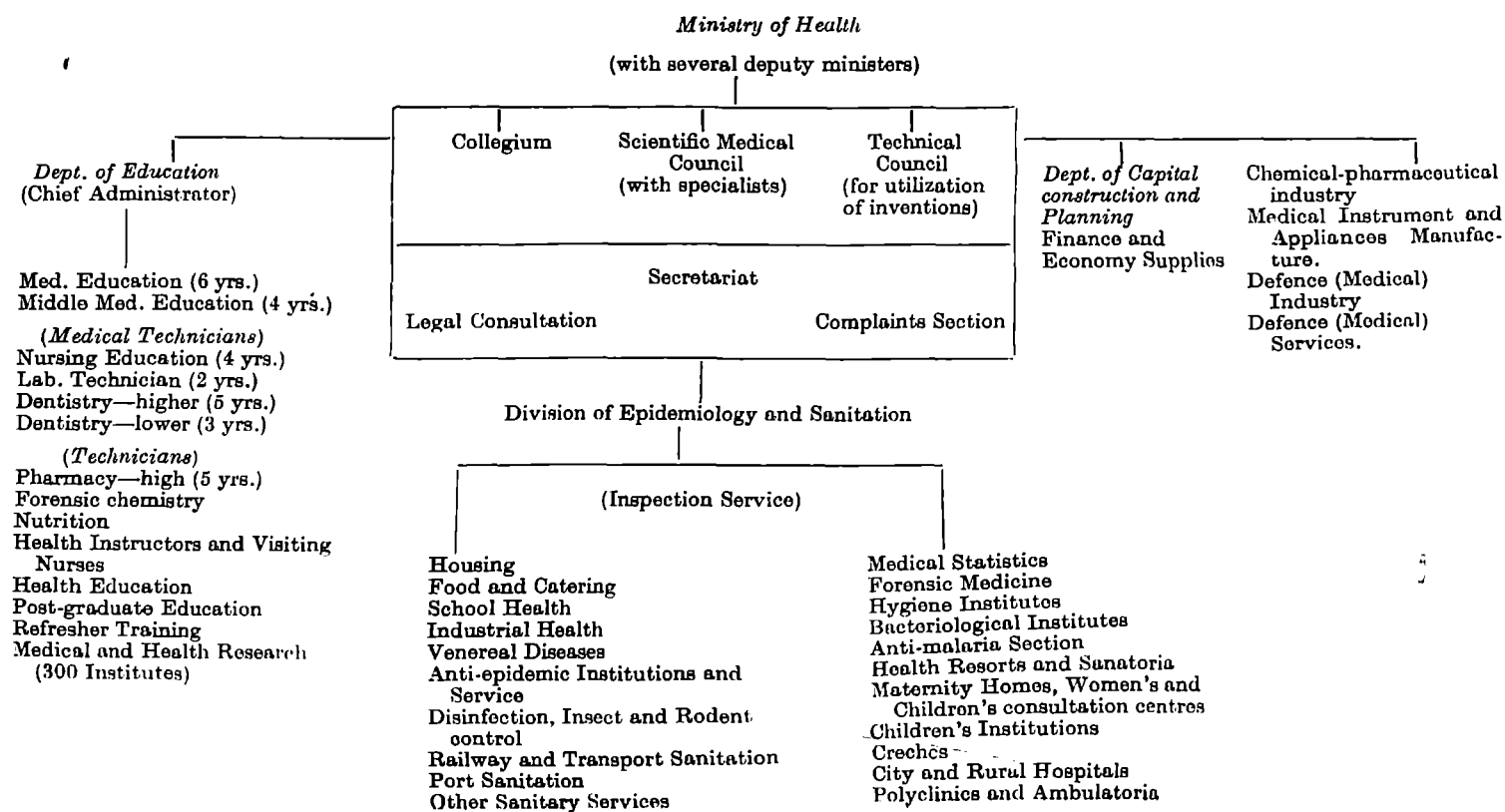
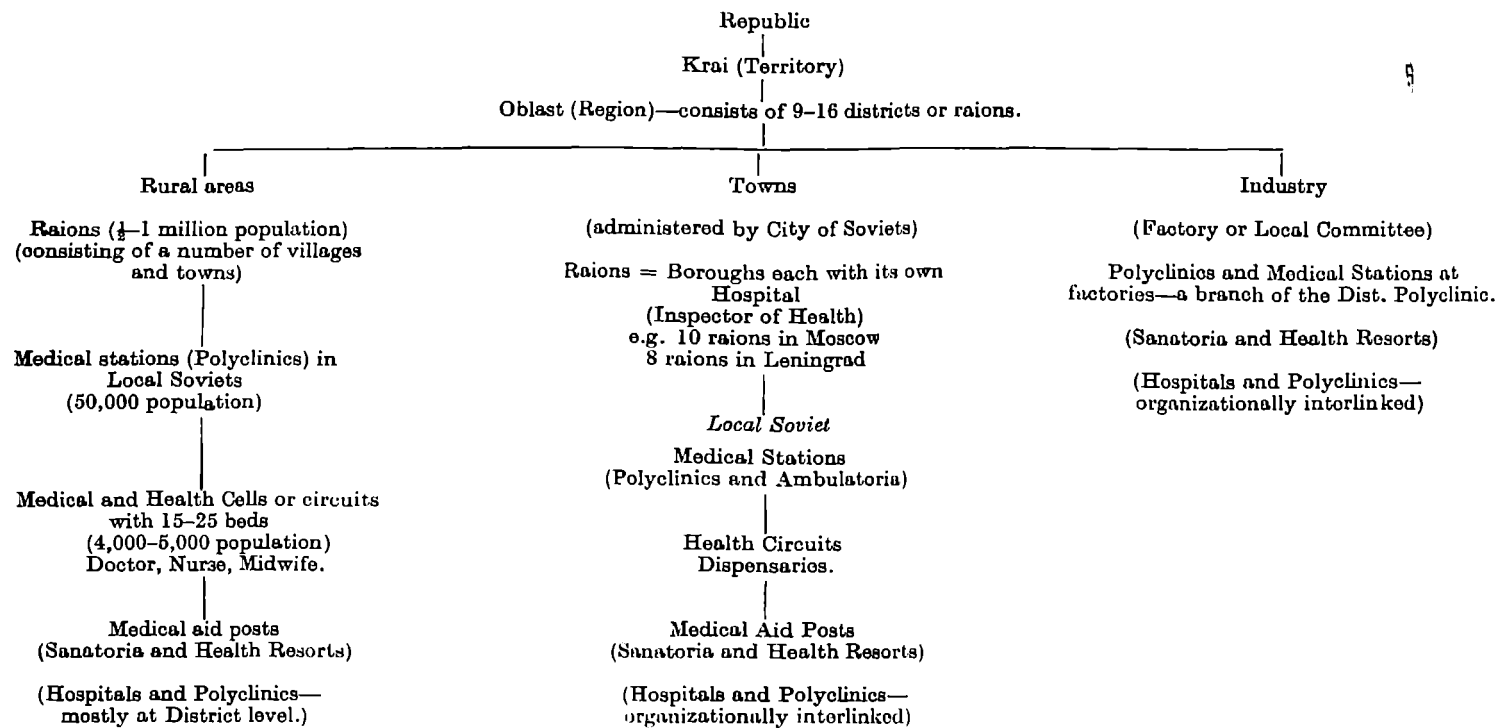


CHART II

SOVIET RUSSIA

Regional distribution of Medical Institutions (excluding Internal Affairs, Defence and Transport Sections)



The successful experiments made in Russia have indicated the need for a co-ordinated planning of research arising out of the needs ascertained at peripheral centres, whether among the civil population, in industry, in labour camps or among the troops, and then linked up with the teaching centres at universities, and ultimately with specially equipped research institutes for the investigation of problems connected with the various fields of medical and public health protection, allied with physics, chemistry, mathematics, biology and sociology where needed. If we want to harness science to the service of man, we must revise the existing machinery of scientific education in the country from the school to the university stage. The universities, which offer a much better environment for fostering a spirit of research, must have the entire control over all academic institutions, general, technical and vocational.

In this setting, the centralization of medical and public health research has got a definite advantage in functioning as a separate Board under the National Research Council, such as was advocated at two successive Symposia of the National Institute of Sciences of India, one held on the 27th and 28th September, 1943, and the other on the 23rd July, 1945. It was contemplated that all the existing research organizations in the country should be fitted into this scheme. The association of different learned bodies under such a Council is likely to raise medical and public health research to a higher level and will facilitate the co-ordination of work at university centres and at various official and non-official research institutes.

We regret to point out that the Bhore Committee's recommendations for the creation of a statutory Scientific Board and an Advisory Body are meant to perpetuate the existing (pre-Independence) defective machinery of the State laboratories, most of which are engaged in routine work, and of the Indian Research Fund Association (now called the Indian Council of Medical Research), which have failed to bring together the foci at different levels, universities, industries and non-official research institutes and to act as a limb of the Master-plan of research in India. The stature of medical and public health research will rise much higher by its close association with a National Research Council. Any attempt to sequester it is, therefore, to be discouraged.

The members of the Health Survey and Development Committee, under the guidance of the late Sir Joseph Bhore, produced a blue print which merits close study by all public health workers and administrators. If the plan has defects, some of which have been pointed out, they can be either removed or adapted to suit the altered situation in India by critical examination and trial. We need not be tied to the apron-strings of this report if it does not serve our purpose. One point, however, has to be remembered—any plan for public health must form an integral part of national planning, and whatever impedes its steady progress, in terms of the utilization of science to the specific needs of human welfare, should be promptly removed. Many Commissions had been appointed in India and many useful reports were published but most of them have been pigeon-holed. Now that we have achieved freedom, we can no longer ascribe our inability or slowness of progress to the absence of political and fiscal freedom. It entirely depends on us to execute the plan. It is a matter of great pity that most State administrations are still lukewarm about it.

Comments on the 'Health' section of India's First 5-Year Rehabilitation (of health organization) and Development Plan

The major functions of social life have been defined by an American author as follows:—(1) Education; (2) Protection of life, property and

natural resources; (3) Production of goods and services; distribution of the returns of production; (4) Consumption of goods and services; (5) Communication and transportation; (6) Recreational use of leisure; (7) Expression of aesthetic impulses; (8) Expression of religious impulses; (9) Integration of the individual (development of a balanced citizenship and service to society); (10) Expression of freedom (political education); and (11) Expression of knowledge and adaptation to invention.

In this perspective, every man should have the opportunity to obtain—(1) physiologically adequate food for proper growth and maintenance of sound health; (2) shelter which includes a house, furniture, clothing and a sanitary environment; (3) the opportunity of developing positive health and physical fitness; and (4) an education suited to his abilities and adapted to the requirements of national and world citizenship, along with facilities for fostering a spirit of exploration and adaptation to inventions, and the chance to develop and express his social and spiritual nature in an atmosphere of economic security—in work, in leisure and in retirement—to the extent which the wealth-producing capacity of his country, for the time being, can offer. This, of course, visualizes 'full employment', which is the ideal of all planning.

The Indian National Planning Commission has laid down two main objectives:—(1) a better standard of life of the people and (2) social justice. Although it advocates a more equitable distribution of wealth under a democratic economic system, it is not clear about the type of society we wish to create by our system of education, industry, occupations, and economic and political set-up. Unless we are clear about these, co-ordinated planning is not possible. The social objectives must, therefore, be clear as to the type of society we wish to create—capitalistic, socialistic, or a combination of both. For example, India's Health Minister, the Hon'ble Rajkumari Amrit Kaur, lately stated in an article (Kaur, 1953) that 'doctors and all medical personnel must be paid adequately, *private practice must be abolished*, those serving in remote rural areas should be paid much more than those in cities and under no circumstances must we lower the standard of medical education'. Evidently she has taken some idea from the Russian system and some from the nationalized health welfare scheme in U.K. I wonder if she remembers that U.S.S.R. spends 70% of her national budget in social services and U.K. allocated in the 1952-53 Budget £371.5 millions or 7.74% of the revenue for the National Health Services alone. We have no means of achieving this within the next 50 years, at the least estimate. Her statement, therefore, seems to be inopportune at the present moment as it may lead to frustration among the people. She would not have made this statement if she had based her assumptions on the results of social studies conducted by her department. Social studies, which have to be conducted from the point of view of anatomy (structure or composition), physiology (function), pathology (dysfunction), diagnosis, and prevention (of undesirable trends in the minds of people), help us to plan the type of society we wish to create. In the absence of such studies, most of the plans have been or are being evolved by Government departments, and not after ascertaining the needs by 'pilot studies' in relevant spheres. The result is that, in many parts, the plans seem to be disjointed and unbalanced and may prove futile or more expensive in the long run.

We are now already in the third year of the Plan, though the first draft was published in July, 1951, and the final or revised draft in December, 1952. This reverse action occurred because the National Government, when it came on the scene, did not have a clean slate to write upon. The formulation of the *laissez faire*, piecemeal and haphazard plans was done

by various Government departments even before the transfer of power and were accepted by the then Government and a certain amount of money had already been spent on them. The first Five Year Plan has necessarily become one of a preparatory nature.

The Plan is essentially a programme of public expenditure undertaken partly by the Central Government and partly by the State Governments. It has four components: (1) public expenditure, (2) private expenditure, (3) legislation and organization, and (4) voluntary co-operation (which constitutes payment in kind). The programme for public expenditure is the most important part of the Plan.

Of the total planned outlay of Rs.2,069 crores, the following allocations have been made:—

	Rupees in crores	Per cent of total
Transport and communications ..	497	24.0
Agriculture and community development	361	17.5
Irrigation	168	8.1
Multipurpose Irrigation and Power Projects	266	12.9
Power	127	6.1
Industry	173	8.4
Social services (which include Education, Health, Housing, Recreation, etc.)	340	16.4
Rehabilitation	85	4.1
Others	52	2.5
TOTAL	2,069	100.0

'Social Services', according to the Commission, 'include everything that contributes to the welfare of the community, such as education, health, the uplift of the backward and the underprivileged, and schemes for removing the disabilities of women, children, the youth, the deaf, the mute, the maimed and the vagrant.'

Of the total amount under social services, Educational Development has been allotted Rs.155.66 crores or 46% of the amount budgeted for social services. The Health Programme has been allotted Rs.97.76 crores or 28% of the grant under the head social services. Of this amount, Rs.47.38 crores have been earmarked for the establishment of hospitals and dispensaries and for institutions for medical and technical training, and Rs.50.38 crores for public health programmes (such as malaria control, water supply, drainage etc.) including Rs.65 lakhs for work on Family Planning. The expenditure on the installation of Penicillin and D.D.T. factories will be met from the allocation under 'Industry'. The expenditure on social services does not include rehabilitation of displaced persons.

Although Chapter XV of the Planning Commission's Report specifically deals with Health, the materials contained in chapters 16—Housing, 17—Education, 18—Social Welfare and 19—Public co-operation have to be considered together in making a connected approach to health.

We have reviewed the work of the Central Ministry of Health for 1950-51, in some detail, in the previous chapter. Let us see how the Ministry proposes to spend on medical and public health programmes during the first Five-Year Plan. Out of Rs.47.38 crores earmarked for the medical programme, more than 50% will be spent on the expansion of hospitals and dispensaries, and nearly 40% for providing medical education and training. Schemes for medical education and training, in addition to the

All-India Medical Institute, the completion of new medical colleges in Assam, Bombay, Madras, Madhya Pradesh, West Bengal and Travancore and Cochin, the upgrading of existing medical colleges and provision for training of auxiliary medical personnel such as nurses, midwives and pharmacists. The target of the total number of personnel produced and the bed ratio to population at the end of the period is not known. Unless these are taken into consideration, no assessment of the progress in terms of the Plan can be made. A provision for supplying 86 Mobile Units to the States to extend preventive and curative facilities to rural areas has been made. It is hoped that the All-India Medical Institute will, in time, serve as a Training Centre both for Indian States and for countries of South-East Asia. The promise of £1,000,000 by the New Zealand Government, under the Colombo Plan, has made this possible. It is hoped that this will be the first of several such Institutes in other zones of India, as a single institution cannot meet the needs both of India and of South-East Asian countries.

The expenditure on public health programmes (Kaur, 1953) undertaken by the Central and State Governments is 51.45 crores. Water-supply, drainage and antimalaria schemes account for the bulk of the expenditure. The provision for water supply and drainage works amounts to Rs.23.49 crores (Rs.12.12 crores for urban water supply and Rs.11.37 crores for rural water supply). Besides this, additional help is being rendered by the T.C.A. (Technical Co-operation Administration) for providing protected drinking water supply, rural sanitation and drainage in the Community Projects areas. The B.C.G. campaign for tuberculosis will be continued. With the help of W.H.O. and U.N.I.C.E.F., a number of Demonstration *cum* Training Centres for tuberculosis is being established. The National Malaria Control Scheme will cost Rs.10 crores in providing field malaria control units to the malarious parts of the country. With Central Government help, a Chest Institute has been established, under the auspices of the Delhi University, for the purpose of conducting teaching and research in tuberculosis and allied chest diseases. Three Research Institutes—one for Cancer research at Bombay, one for virus research at Poona and one for research in an indigenous system of medicine (*Ayurveda*) at Jamnagar.

As regards maternal and child health services, the Central Government proposes to open centres, each consisting of a health visitor, two midwives, a peon and a part-time sanitary worker, for urban areas, while the units for rural areas will consist of the midwives for a population of 10,000 to 12,000, ultimately linking them with higher centres at the *thana* or *taluka* level. For this purpose, the States have agreed to contribute Rs.1.35 crores, the Centre's share being Rs.53.48 lakhs. With the help of the W.H.O. and U.N.I.C.E.F., an International Training Centre for maternity and child-welfare has been started at the All-India Institute of Hygiene and Public Health in June, 1953.

In most parts of the Health Section of the Plan, broad generalizations on some health principles have been made but there is hardly any indication of an approach for stage-wise integrated and co-ordinated development. The various projects proposed to be undertaken hardly form parts of a cognate whole. Nearly three-fifths of the expenditure for schemes are devoted to the upgrading of certain Central Government institutions, while two-fifths are proposed to be spent on some health projects to be developed in association with certain international organizations. The development of health and social services must have a social objective. The graded steps in planning must be component parts of the great Master

Plan for the whole country and they must be executed simultaneously in harmony and with speed. The federal plan must be linked with that of the constituent States in such a way that the whole country makes an advance and reaches the target through each successive 5-year plan. This is how U.S.S.R. finishes each 5-year plan, often within 3½ years. Unless the people know that everybody will get benefited and they feel about it, the co-operation of the people, which accelerates the speed, cannot be secured in full measure. Reference to a few problems may be made now.

The *health of the mind* has not received adequate attention from the planners in our country. Of recent years, it is being increasingly realized that the health of the mind is inseparable from that of the body. The development of technology and technocracy in the post-industrial revolution era has unfortunately fostered a mental attitude which leads to undue ambition, greed and selfishness and accentuates exploitation of men and countries. The result is that with increased plenty and leisure one does not find the happiness which comes from a poised and satisfied mind. The consequent emotional imbalance, worry and unsatisfied mind are probably responsible for a steady increase of certain types of cardio-vascular diseases, which now rank as the most frequent cause of death in the industrialized countries. A similar trend is already noticeable in India. The science of Psychology has hitherto occupied itself mostly with the study of abnormal variations. It is time that psychologists or workers of Social Medicine devoted their attention to devise methods of developing balanced-personality citizenship. We leave too much to chance at the present moment.

Contrary to the principles laid down in the previous Chapter, Health Centres are being opened both by the Central as well as by the State authorities which are unconnected with community development and in localities where there is neither the highest incidence of disease, nor the facilities of communication, nor administrative convenience.

With regard to the acknowledged matter of the *improvement of the nutritional status*, targets have not been fixed with the Community Projects administration in terms of the deficiencies in production and supply of the different constituents of diet in short supply in the different zones. It is no good saying that the nutritional status of the people has to be improved. Even if the income per capita is raised, one may not be able to offer balanced food to different groups of the population. No reference has been made to the subject of *public catering*. In view of the increasing use of public catering among the urban and industrial population, it is necessary that public catering should be placed on a more scientific and hygienic basis. Half a line occurs in the body of the Report about the necessity (?) of preventing *adulteration of food*. No financial, technical or legislative provisions have yet been made for either of them. It is heartening to learn, however, that a Prevention of Food Adulteration Bill will be presented before the Parliament in the near future.

There is no indication in the Report laying down a policy and programme ensuring gradual and progressive advance towards achievement of positive *health of the industrial workers*. It has remained chiefly a 'treatment of disease' policy for many years. A *housing programme* has just been undertaken for industrial labour but with one-room tenements (Govt. of India Ministry of Labour, 1954), the recommendations of the Bhole Committee have been violated. The recommendations of the Royal Commission on Labour in India (1931), made twenty-two years ago, have gone unheeded. The growth of technology has led to a new branch of medicine, called *Industrial Medicine*. New techniques of manufacture and the use of new substances are creating new industrial diseases. Some

have direct action on the skin and mucous membranes, some have injurious effects on the kidneys or liver, while the inhalation of dust or fumes may lead to diseases of the respiratory tract. The latest is concerned with the application of radio-active isotopes. It is necessary to lay down safety limits of exposure of laboratory workers to radio activity and also of packing and transportation of the same. The opening of a department of Industrial Hygiene at the All-India Institute of Hygiene and Public Health, chiefly for purposes of survey of occupational diseases, is not adequate for the purpose. An Industrial Health Research Board should be formed to stimulate the designing of investigations and to recommend measures for combating the dangers, including administrative procedures, rules or laws, with a view to secure increased efficiency of the working population in production.

The interlinking of urban and rural health plans as regards *Housing* has not been indicated in the programme. While urban population has increased by 66%, housing has increased by only 20%. Type designs of houses suitable for rural and urban areas, at a cost within the purchasing capacity of the people of different climatic zones and of rural and urban areas, should be made and supplied to the various States. This involves a considerable degree of research and co-ordination. Instead of that, the Central Ministry has wasted a huge amount of money to erect a pre-fabricated housing factory at Delhi, through the help of foreign firms who have no idea of the climatological and anthropo-sociological variation in different areas of the country.

No reference has been made to the subject of *Institutional Planning*. It refers to the location of different types of institutions and their construction and lay-out in different areas of the country, according to the requirements of the areas concerned. This is a neglected subject in India and for the violation of accepted principles a lot of money is wasted. The general tendency in our country is to design big buildings and to sink most of the available money in brick and mortar, leaving very little funds to carry out the functions. Cheap structures, enough to last for 15-20 years, by which time India would be able to replace them by more stately and durable buildings, should be designed by those specially trained for the purpose. Studies, in co-ordination with State Governments, should be carried out at the Centre. At present, there is no specialized department of this nature either at the Centre or in the States. The Centre should have a Committee on Hospital Planning and Standardization.

Drugs and appliances.—A scrappy treatment has been accorded to the plans to develop the pharmaceutical-chemical industry and the manufacture of medical instruments and appliances. A description of the present position has been given in the previous Chapter. The Commission has failed to realize that, without the development of the basic chemical industry and the removal of certain Excise and Customs barriers, the manufacture of chemotherapeutic drugs cannot be made successful and supplied at a competitive price to the whole population. The subject of manufacture of instruments and appliances like operation theatre equipment, dental chairs, microtomes, microscopes and other optical instruments, X-ray machines, X-ray tubes and X-ray films, etc., have been omitted altogether. If another world war breaks out, the work of numerous institutions will be at a standstill. Any planning for a vast country like India must aim to make her self-sufficient with regard to drugs and scientific apparatus, in order not only to supply things at a cheap price but also to save dollar and sterling expenditure.

It seems that two successive wars have not made us wise. During the

last World War, 70% of our drug requirements were met from Indian manufacturers but as soon as the war ended the import gates were opened to all sorts of drugs to the detriment of those which are being manufactured in India. There is no adequate agency in India and her constituent States today to assess and control the purity and therapeutic efficiency of drugs manufactured in India, with the result that there is no effective check over the growth of mushroom companies and the sale of spurious drugs.

It is believed that of the drugs and medicaments needed by the profession, about 40% is accounted for by antibiotics, 20% by chemotherapeutic drugs and about 15% by vitamins, hormones and certain other groups. Few of these drugs are being manufactured in India today and the chief handicaps to progress are the want of basic chemicals as raw materials, lack of proper equipment and of chemical engineering facilities, and the apathy of the Government.

A new danger has arisen in the drug manufacturing firmament of India, viz., the establishment, with Government approval, of factories by big foreign firms who are either importing half-finished raw materials and bottling finished products locally, or setting up plants for the large-scale manufacture of antibiotics and proprietary drugs. Unless the Indian drug industry is helped by Government to develop them, it is in danger of being smothered by superior foreign resources and price-cutting.

No planned programme for the study of the *indigenous systems of medicine* and the *indigenous drug resources* has been envisaged in the plans, except the starting in 1952-53 of an Institute for research in indigenous system of medicine at Jamnagar. It is not understood how an Institute in an isolated place like Jamnagar away from Centres of allied types of research and clinical facilities can effectively cope with the needs. It must be remembered that the Calcutta School of Tropical Medicine and other institutions have covered investigations, during the last thirty years, on only ten per cent of the Indian indigenous drugs selected for investigation. A great handicap to the application of scientific method to level up these systems is the official recognition which several States have given to the Ayurvedic, Unani and Homoeopathic systems of medicine. The basic sciences of chemistry, physics, biology, physiology, pharmacology, pathology and bacteriology are the same all over the world. The present tendency to sponsor education of a medieval system without further research and to register practitioners of the above systems of medicine, which lack systematic scientific training, is a move in the wrong direction. Science is progressive and must be the same throughout the world. The criterion of the right of a doctor to medical practice or the privilege of registration must depend on the basic knowledge he possesses of the fundamental sciences and the modern scientific interpretation of the different branches of medicine. No system of medicine, Ayurvedic, Unani or any other, can get on without the help of modern basic sciences. There should be no spirit of compartmentalism or opportunism and of false economy concerning life and death of millions of people. The question of prevention of epidemic diseases cannot be successfully solved unless scientific methods of proven efficacy are adopted. The proper method in free India should, therefore, be to have only one medical science which has been worked out by scientists all over the world, incorporating into it and enriching it by whatever useful things there may be in the old system of the country. The proper procedure should be to allow graduation in modern medicine and then to pursue researches into the old systems. If this is done there will be only one Medical Register in the country, which would facilitate control of medical relief and sanitation for the entire population.

If arrangements are made for the collection, compilation and subsequent statistical analysis of *vital statistics* in the country during the first five-year plan, it will usher in a great progress over the wrong method of collection of births and deaths, chiefly in rural areas but also in urban areas.

The Population Problem and Family Planning.—India has now (according to 1951 census) a population 356,829,485 with a density of 281 persons to the square mile. In spite of famines, flood, diseases and epidemics in the past, there has been, during the last few decades, an average increase of 1% to 1.5% per annum. The rate of increase has been further made serious with a high birth rate and a decreasing death rate. The countries which developed a high density of population and wanted to maintain a high standard of living at the same time had to look for *lebens raum* in and exploit other lands, with consequent political friction and international turmoil.

There is an acute land shortage in India's 530,000 villages, 30% of whose population are already landless labourers. Land hunger has already deprived the cattle of their grazing lands. The development of industry, however rapid, cannot absorb a large percentage of this landless population in the near future. The results of the First Five-Year Plan will be diluted by fifteen million more persons, who will be in India by that time.

What is happening at the present moment is that the increase of a disease-ridden, ignorant and disorganized community is proving a drag and a burden, whereas if we improve the quality of the population by ushering into the world healthy babies from healthy mothers and bring them up as a strong, alert and socially conscious population, the emphasis will be shifted from quantity to quality, thus developing an asset to the nation. If we wish to improve our standard of living, there is no other alternative but to agree to voluntarily lower the birth rate by means of widespread education in birth control and the knowledge of contraceptives. The National Planning Commission has wisely said that 'in the interest of social economy, family happiness and national planning, family planning and limitation of children are essential; and the State should adopt a policy to encourage these. It is desirable to lay stress on self-control as well as to spread knowledge of cheap and safe methods of birth control. Birth control clinics should be established and other necessary measures taken in this behalf and to prevent the use of advertisement of harmful methods.'

Of the various methods of birth control suitable for poorer groups of the population, who need it more than others, the method advocated by Dr. Marie Stopes of occluding the cervix with cotton wool soaked in coconut oil, which is a cheap and easily available material, sounds practical. The W.H.O. experts are advocating the Rhythm method, which does not involve any cost, but which is not only not easily understandable by the ignorant and poor population but is stated to be successful in only 70% of cases. The Five-Year Plan's allocation of Rs.65 lakhs might be usefully employed in studying a cheap and fool-proof method for the ignorant and poorer sections of the population. Comparative studies may be made on previously designed samples of population and statistically analyzed. A recent paper by Sanyal (1951) claims the protective value for one month of an intramuscular injection of the oil of *Pisum sativum* Linn. The author's claims might be profitably tested in the Planning Commission's experiments.

Finance.—The Union Health Minister has complained more than once that she has not been provided with adequate budgetary grants for purchasing public health in India. I sympathize with her, but, at the same time, she should realize that the primary emphasis in the first Five-Year Plan has

been justifiably placed on, what are called, the 'basic overheads of economic development'. 'Irrigation not only steps up the production of food but also that of raw materials; increase in food production will diminish imports and thus release foreign exchange for importing capital goods, while an increase in raw materials is directly related to the growth of industry. Power not only enables a more efficient functioning of irrigation, especially minor irrigation works such as tube-wells, but also facilitates rural development in the larger sense of the term and makes for industrial expansion, especially the growth of small-scale industries.' Development of communications is necessary for agriculture, industry and reaching medical aid to rural areas. All these will indirectly help in raising the standard of living, leading to better health.

But I would plead for a much higher allocation in the annual budget for the Health Ministry than a paltry 0.34% of the revenue. I would advise the Finance Ministry to have a look at the bar diagram given on page 108 in chapter II of this Monograph.

ACKNOWLEDGEMENT

I gratefully acknowledge herewith the help I have received from the following friends in preparing these lectures.

(1) To the Director-General of Health Services, Government of India—for supplying statistical figures on health and medical education.

(2) To the late Dr. Syamaprosad Mookerjee, M.P., Sri A. P. Chaudhuri, M.L.C., West Bengal, and the U.K. High Commissioner's office at Calcutta—for supplying budget figures.

(3) Sri B. K. Sen, Financial Adviser to the Development Commissioner, West Bengal, for analyzing budget figures in U.K., India and West Bengal.

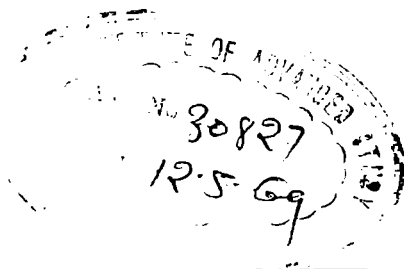
(4) The Director and Prof. K. K. Mathen of the All-India Institute of Hygiene and Public Health and the Director of the School of Tropical Medicine for supplying diagrams and photo prints.

(5) Mrs. Arminé Levonian, Sri M. K. Mitter and Sri Aurabinda Ukil for assistance in making the bar diagrams and typing some tables.

SELECT REFERENCES

- (1) Adarkar, B. P. (1945). Report on Health Insurance for Indian workers. Govt. of India Publications, New Delhi.
- (2) Bernal, J. D. (1939). The Social functions of Science. George Routledge & Sons, 346.
- (3) Director-General of Health Services, Govt. of India (Personal note, 1952).
- (4) Government of India (1945). Report of the Famine Enquiry Committee, Government of India Press, New Delhi.
- (5) Government of India (1946). Report of the Health Survey and Development Committee, 1-4.
- (6) Government of India (1949). Report of the Environmental Hygiene Committee, 20.
- (7) Government of India (1951-53). Report of the Ministry of Health, Government of India Publications, New Delhi.
- (8) Government of India (1951). Outline of the First Five Year Plan, 194, 208.
- (9) Government of India (1952). Report of Census of India, 1951. Government of India Press, New Delhi.
- (10) Government of India (1954). Progress of National Plan (1951-53). Planning Commission, Government of India Press, New Delhi, 82, 97.
- (11) Government of India (1954). Low-cost housing, Ministry of Labour. Nat. Print Works, Delhi, 2.
- (12) Kaur, Rājīkumari Amrit (1953). National Plan to build a healthier India. *Amrita Bazar Patrika*, Calcutta, August 15.

- (13) Krishnan, K. V. (1953). How India's rural health problems can be conquered. *Statesman*, Calcutta, August 15.
- (14) Lal, R. B. and Seal, S. C. (1944). Report on the rural general survey. Government of India Publications, New Delhi.
- (15) Lal, R. B. (1945). Philosophy of Public Health. *Science and Culture*, 11, 489.
- (16) Mathen, K. K. (1952). Measuring the nation's health. *Your Health*, 1, 293.
- (17) Morris, J. N. (1945). Health for 400 millions. *Lancet*, 1, 743.
- (18) Sanyal, S. N. (1951). Population Problems of India. *Journ. Ind. Med. Asson.*, March, 215-220.
- (19) Subramaniam, K. (1945). The minimum requirements of a house in rural areas. *Science and Culture*, 10, 300.
- (20) Ukil, A. C. (1935). The Centenary of the Medical College of Bengal, Calcutta, 3-9.
- (21) Ukil, A. C. (1941). Some aspects of public health in India. *Proc. Ind. Sci. Congr.*, 2, 269.
- (22) Ukil, A. C. (1945). A minimum standard of hygienic living in India. *Sci. and Cult.*, 11, 192-99.
- (23) Ukil, A. C. (1949). Integrated rural health planning. *Sci. and Cult.*, 14, 297-302.
- (24) Ukil, A. C. (1950). History of Indian Medicine. Proc. U.N.E.S.C.O. Symposium on History of Science in South Asia.
- (25) Ukil, A. C. (1953). Medicine and Public Health in U.S.S.R. *Journ. Ind. Med. Asson.*, October, 31-39.



NOTICE

The **Journal of the Asiatic Society (Science & Letters)** is a continuation of the following four types of periodicals published by the Society:

Asiatick Researches, I-XX, 1788-1839.

Journal of the Asiatic Society of Bengal, I-LXXIII, 1832-1904.

Proceedings of the Asiatic Society of Bengal, I-XL, 1865-1904.

Journal and Proceedings of the Asiatic Society of Bengal, New Series, I-XXX, 1905-1934.

Journal of the Royal Asiatic Society of Bengal (Science, Letters and Year-Book), Vols. I-XVI.

Journal of the Asiatic Society (Science, Letters and Year-Book), Vols. XVII-

Single numbers are charged for at the rate of One Rupee for each 16 pages or part of 16 pages text, and for each plate, map, table, etc., not included in the text. Postage extra.

Members of the Society receive the current numbers of the **Journal** free, by virtue of their membership, and, if ordering back issues direct from the Society, have a right to a discount of 40% on their prices.

Bona-fide Book-Sellers are entitled to 25% discount.

The Asiatic Society publishes also:

Bibliotheca Indica, a series of Oriental books, since 1849.

Catalogues of Manuscripts.

Monographs.

Miscellaneous publications.

The Society published also **Memoirs** from 1905 to 1940, and **Numismatic Supplements** from 1919 to 1938.

Information about the publications and price lists are obtainable from the Asiatic Society or its Agents.

A number of complete volumes or loose numbers of the older periodicals of the Society are still available for sale. Reprints of some of the important articles are also available for sale.

Revised prices of loose numbers of the **Journal**.

All previous prices as printed on the various "Journals" published by the Royal Asiatic Society of Bengal are cancelled.

Old loose numbers are available for sale at special rates.

All old sterling equivalents are cancelled.

Obtainable from the Asiatic Society, No. 1, Park Street, Calcutta 16, or from the Society's Agents:—

MESSRS. LUZAC & Co., 46 Great Russell Street, London, W.C.

MESSRS. THACKER, SPINK & Co. (1933) LD., 3 Esplanade East, Calcutta.

MESSRS. THE MOORE-COTTRELL SUBSCRIPTION AGENCIES, NEW YORK, U.S.A.

MESSRS. OXFORD BOOK & STATIONERY Co., Scindia House, New Delhi.

Residents of Europe and America should order from the local Agents.

When ordering direct from the Society the following rules should be observed:—
Orders should be addressed to the Asiatic Society, and not to any Official by name or title.

All Cheques, Money Orders, etc., should be made payable to the "Treasurer, Asiatic Society".

- In India books are supplied by V.P.P.