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TREATMENT AND DISPOSAL OF PAPER MILL EFFLUENTS

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One of the important public health problems associated with the concentration of Industrial establishments along the waterways of our country is the pollution of water with sewage and industrial effluents. The practice of interfering with the natural regime of a stream or a river, if continued unabated, will eventually lead to problems such as aquatic nuisance, destruction of aquatic life, detriment to agriculture and live stock and hazards to public health. Health authorities in other countries have tackled the problem of sewage and industrial waste pollution by prescribing certain standards for effluents and ensuring that they are complied with. We in India, have paid little attention so far to this type of work and no satisfactory standards have been evolved to maintain the purity of our natural waters. Some work has been carried out during the last decade by Subrahmanyan, Bhaskaran and Seth and suitable treatment methods have been evolved for Lac Wastes. Work on sugar and distillery wastes is in progress.

One of the most difficult problems in India and abroad is the treatment and disposal of liquid wastes from paper and cardboard factories. The disposal of these wastes has long been a problem to manufacturers of Paper and Board and of concern to public health authorities. India produces about 400 tons of these products per day and the factories discharge liquid wastes of the order of 32,000,000 gallons per day with a population equivalent of nearly 500,000 people.

The distribution and location of the important paper and board factories in India is shown in the accompanied Map in the next page.

The following production figures were obtained from some of the major factories in the country in 1952:

	produced per day Number of Tons
Writing and Printing	300
Wrapping	20
Card Board	80
Specialities	10
Total ...	410

THE PROCESSES AND SOURCES OF WASTES

The raw materials that are used in the production of paper and board include, bamboo, bagasse, straw, sabai grass, wood,

* The Unit is under the Indian Council of Medical Research.

chemical pulp, paper shavings, rags and the chemicals are mainly caustic soda, sulpher, lime, bleach, clays, dyes and gypsum etc.

Paper making divides itself into two steps, pulping and paper making. In the pulp mill the wood, bamboo or any other such material is cooked with alkali or acid digesting chemicals. The object in all paper making is to remove the encrusting substances from cellulose fibers, thereby leaving fairly pure cellulose fibers.

The chief liquid wastes from the pulping process of the paper industry are the digestor liquors or the 'black liquors'. Other wastes are from sawing, barking, and chipping operations; wash waters, screen, rifflers, knotters and thickeners and bleach and bleach washes. Paper making wastes come mainly from beaters, regulating and mixing boxes and paper machines, usually called 'white waters'.

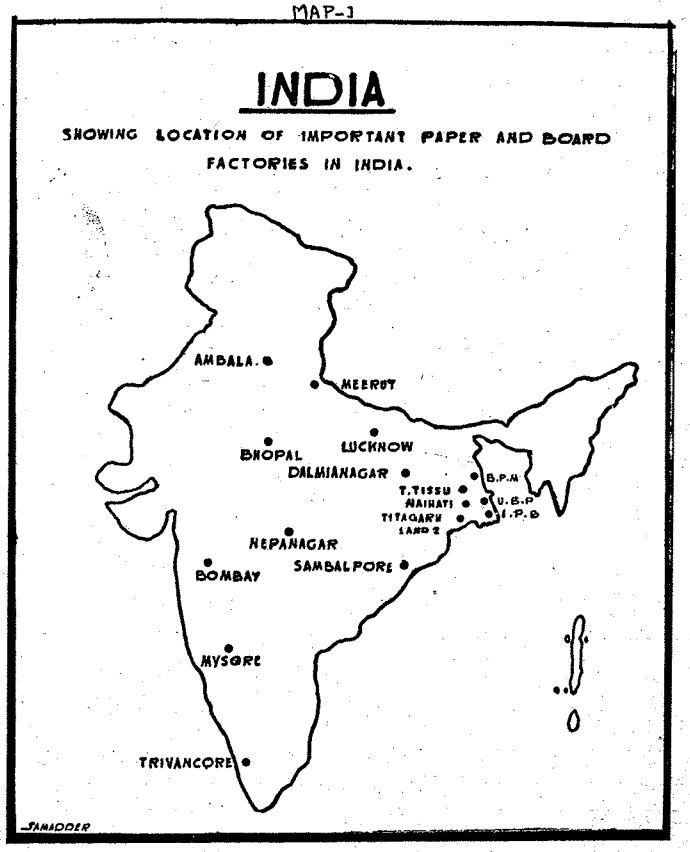
THE WASTE WATER PROBLEMS

In order to give a complete picture of the nature of pollution from paper and Board factories, the main processes of manufacturing pulp, paper and board are briefly described below:—

Sulfite pulp

Sulphite pulp is made with coniferous wood chips, which are cooked at high temperature and under pressure in a liquor containing calcium bisulfite. Following digestion, the pulp is blown into a pit where the black liquor, the so called 'spent liquor' is drained off to waste or recovery. For each ton of pulp produced about 8 tons of spent liquor waste, containing 1 ton of oxidisable materials such as lignin, polysaccharides and resins, are obtained. The presence of these materials in receiving streams causes the main pollution problem.

MAP-1



The solids also create heavy sludge deposits forming a mat over the stream bottom and destroying the aquatic plant life. Cramford has found that 600 to 800 lbs of B.O.D. per ton of pulp resulting from the sulfite process is usually discharged into the receiving waters which is responsible for oxygen depletion.

TABLE I

Load of Pollution Discharged by some Important Paper and Cardboard Industries.

Sr. No.	Industry	Production in tons/day	Volume of waste in G. P. D.	Lbs. of 5-day B. O. D. discharged	Lbs. of suspended solid discharged	Population equivalent
(1)	India Paper Pulp Co., 24 Parganas, West Bengal. ...	20 (Paper)	1,500,000	3,000	15,000	18,000
(2)	Titagarh Paper Mills Ltd., Titagarh, West Bengal ...	55 (Paper)	15,840,000	26,928	175,348	161,568
(3)	Titagarh Paper Mills Ltd., Kakinara, West Bengal ...	55 (Paper)	2,600,000	5,356	267,488	32,136
(4)	Pioneer Paper & Pulp Co., 24 Parganas, West Bengal ...	3.5 (Board)	50,000	200	400	1,200
(5)	United Board & Paper Mills, Baranagar, West Bengal ...	5 (Board)	3,000	15	24	72
(6)	India Paper & Board Co., 24 Parganas, West Bengal ...	3 (Board)	2,000	10	16	48
(7)	Triveni Tissue Ltd., Hooghly, West Bengal ...	4 (Tissue Paper)	1,000,000	2,000	10,000	12,000
(8)	Bengal Paper Mills Ltd., Raniganj, West Bengal ...	40 (Paper)	1,000,000	2,000	10,000	12,000
(9)	Rohtas Industries Ltd., Dalmianagar, Bihar ...	50 (Board)	2,000,000	4,000	20,000	24,000
(10)	Upper India Copper Paper Mills Ltd., Lucknow, U.P. ...	5.5 (Paper)	1,000,000	2,000	10,000	12,000
(11)	Sreegopal Paper Mills Ltd., Ambala, East Punjab ...	31 (Paper)	2,000,000	4,000	20,000	24,000
(12)	Orient Paper Mills Ltd., Orissa	40 (Paper)	2,000,000	6,400	12,800	37,400
(13)	National Newsprint & Paper Mills Ltd., Nepanagar, Madhya Pradesh ...	40 (News Paper)	2,000,000	6,400	12,800	37,400
(14)	Straw Product Ltd., Bhopal, Madhya Pradesh ...	16 (Board)	500,000	2,500	6,750	15,000
(15)	Punalur Paper Mills, Travancore, Kerala ...	12 (Paper)	220,000	440	2,200	2,640
	Total ...	380	31,715,000	65,244	562,826	387,464

Sulfate or Soda Pulp

Sulfate or kraft plup is made by using wood or bamboo chips which are cooked from 4—7 hrs. with sodium sulfide, hydroxide, sulphate or carbonate. The first two chemicals are active in the disintegration. The sulfide is produced by the reduction of sulphates and the hot alkali sulfide dissolves the lignin and other non-celluloss matter, leaving a very strong fiber. The production of sulfate pulp requires the same amount of water as sulfite pulp. The sulfate or kraft process is dominant

in most of the mills in our country. About 40 lbs. of B.O.D. from 1 ton of pulp produced is thrown into the receiving waters. This waste is 1/20 times weaker than the sulfite pulp waste and recovery of chemicals is possible as compared to other processes. In the recovery of chemicals the residue contains considerable amount of Na_2S and other compounds. This process operates a very complete reclaiming Unit, so that the waste problem should not be serious.

Semi-chemical neutral sulfite pulp

This process has received considerable attention in recent years in foreign countries but not so much in India. The process lends itself to the development of a high yield of pulp (65—75 per cent.) from hard woods. This method employs sodium sulfite buffered by sodium carbonate as a cooking agent. At first sight, this would appear to be a rather mild offender as regards waste. Actually, it is a serious problem. The small quantity of chemicals used does not warrant a recovery plant. The waste liquor contains sulfides or sulfites, and these have an initial oxygen requirement that is quite serious. A figure of 300-400 lbs. of B.O.D. per ton of pulp resulting from this process has been reported. These have a population equivalent of about 500 per ton of pulp produced.

Mechanical or Ground wood pulp

This is made by grinding the wood into small fibers with an abrasive wheel, either natural or synthetic stone. The stone is flooded with water to remove the pulp and cool the stone. The only waste is water soluble material in the wood, plus some of the finest fibers. The ground material is diluted with water, sorted and reduced to required consistency. The water thus extracted which contains valuable fiber is generally re-circulated. According to Doutt, with good equipment the suspended solids in the waste can be kept as low as 50 ppm. By proper recirculation, the water consumption in the mill can be reduced from 5000 gallons to 1200 gallons per ton. The fiber loss was reduced from 4 per cent to 0.8 per cent. The pulp contains lignin and resinous materials which discolour it in the light. The fibers are short and do not mat well together. It is generally used for making cheaper grades of papers, such as newspaper. Makkonen has reported that wastes from production of ground wood pulp do not seriously pollute the receiving waters.

Straw Board

In the manufacture of Strawboard, straw and lime are cooked with steam in a closed vessel under pressure. The resultant stock of softened woody fiber is allowed to drain for 24 hours and then run through washers to remove lime. The material is then passed through hollow drums which drain the water and leave a thick sheet of board which is taken on a woollen felt and is subsequently pressed, dried and cut according to the desired size. The three chief constituents of wheat straw are cellulose, hemi-cellulose and lignin. Cellulose is extremely resistant to decomposition. The rotary liquid waste from straw board mills have a B.O.D. of the order of 30,000 to 35,000 ppm (Lardieri) although a much lower figure has been obtained from one of the straw board factories in India. The waste waters present a serious problem in our country especially in Bhopal and Bihar.

Paper Mill

In the production of paper, most of the waste comes from beater, regulating and mixing boxes, screens and paper machines. For each ton of bleached paper nearly 50,000 gallons of waste is discharged, which contain from 0.1 per cent to 10 per cent of fiber used in process, plus filler material and dyes. Where bleaching is done additional organic matter is extracted and adds to the organic load on the stream. (Ohio River Polln. Contl. Report of the U.S.P.H.S. 1944).

CHARACTER AND LOAD OF POLLUTION

With a view to study the nature and extent of pollution caused by the Indian Paper and Cardboard Mills, a survey of these industries was carried out partly by visiting some of the factories and partly through the co-operation of the Indian

Paper Makers Association who supplied the necessary data on schedule forms supplied by the Unit.

Composite samples of different types of wastes were collected and analysed for various forms of solids, 5 day 20°C B.O.D., alkalinity and pH. Procedures described in the 'standard methods', were used in the analytical work. The results of survey and analyses are presented in Tables I and II.

Tables I and II

The results show that the wastes are rich in organic matter, have high suspended solids, alkaline in character and are highly coloured. Normally a very persistent foam is present.

Pulp and Paper Mills in India operate on sulfate process which has a complete reclaiming unit. But even when recovery is practised, certain residual wastes remain consisting of sludges as well as leakages and spills of black liquor. The presence of sulfides and some terpenes makes the odour very pronounced. Sulphate digestion sometimes forms small quantities of mercaptans. These have a disagreeable odour and are reported to be toxic to fish life in concentration of more than 1 ppm. The dark colour of the waste is probably the most serious offending character.

TABLE II

Analyses of representative samples of the effluent collected from a few Paper and Board Factories.

Name of Factory	Flow of Wastes in Gall. Per Day (in thousands)	Total Solids		Suspended Solids		5 Day 20°C B.O.D.		Alkalinity in PPM	P.H.
		PPM	Lbs./Day	PPM	Lbs./Day	PPM	Lbs./Day		
(1) Titagarh Paper Mills, Titagarh, West Bengal	15,840	2750	435,600	1107	175,348	170	26,928	830	9.4
(2) Sreegopal Paper Mills, Ambala, Punjab, India	2,000	2560	51,200	1376	27,520	200	4,000	232	8.4
(3) Orient Paper Mills, Sambalpore, Orissa ...	2,000	2700	54,000	640	12,800	320	6,400	74	9.6
(4) Bhopal Straw Products Ltd., Bhopal, Madhya Pradesh ...	500	3000	15,000	1350	6,750	500	2,500	—	8.4

As regards the other wastes from pulp and paper mills, those coming from the Bleach houses also constitute a serious problem. Bleaching releases additional organic material from the pulp and adds to the oxygen loads of the wastes. These wastes have solids content of 1500 ppm and B.O.D. of about 50 ppm.

Paper-making wastes, or white-water wastes, contain the fine suspended fibres mixed with clay, size alum and, at times, dye that leaves the paper machines after the sheet is formed. Although the fiber exerts a slow oxygen demand, its deposition in stream beds affects fish life.

One other waste of major importance in our country is that from straw pulping. The objectionable feature of the waste are (1) yellowish colour (2) high lime content (3) high suspended solids (4) high putrescible organic content as indicated by the B.O.D. or the oxygen consumed from potassium permanganate. The waste ferments very actively and produces undesirable characteristics in a stream where the water available for dilution is limited. The three main constituents of wheat straw are cellulose, hemi-cellulose and lignin. All of these are rendered soluble by the alkali treatment and hence found in the effluent.

TREATMENT OF WASTE WATERS FROM PULP, PAPER & CARDBOARD MILLS

These industries are such in which conditions and methods of operation differ

considerably from mill to mill, and there are corresponding variations in volume and character of the waste waters discharged. In recent years, partly due to public consciousness and partly due to rapid industrialisation in the country, the pulp and paper industries have accepted their responsibility for liquid wastes in many areas and are striving to correct or minimise the effect of these wastes in their locality. In this connection the efforts of some Paper and Board Mills, particularly the Orient Paper Mills in Orissa, Punalur Paper Mills in Travancore and Bhopal Straw Products Factory in M.P. is worth mentioning.

The treatment of Paper and Board Mill wastes is a difficult problem which cannot be solved by normal biological methods, because the wastes do not contain bacterial food in the same form as sewage does. Intensive research work has been carried out in other countries, particularly in America, England and the Scandinavian countries where paper making is a big industry. The work of the National Council of Stream Improvement of the Pulp, Paper and Paperboard industries Inc. U.S.A., Paper Makers Association of Great Britain and Ireland, Inc. England and the Sanitary Engineering Corporation, Helsinki, Finland, has contributed much towards the solution of this complex problem in their respective countries. There are already methods which are practicable from technical point of view, but unfortunately, their application entails enormous capital expenditure, and the industrialists are shy to invest the capital in treatment plants. Research work is still being carried out in this field, both in India and abroad to find out simpler methods of treatment of these wastes, particularly having to do with sulphite pulp and straw board wastes.

Gehm has stated that there is no present method of treating waste sulfite liquor that has been shown to be universally applicable from an economic stand point. This is quite so, although there are several processes, which under specialised and favourable conditions or in limited output, have been found practicable for the utilisation or treatment of waste liquor. Some of the patented methods of treatment of spent sulfite liquor include alcohol and yeast production, the use of spent liquor for road binding, and evaporation and burning to utilise the fuel properties of these wastes. The Howard process for the treatment and recovery of waste waters and Paulson's process for recovery of fuel value are in use in some mills employing the sulfite process for making pulp and paper. Murdock has reviewed the position in American Industries producing Sulfite pulp. Soda and Sulfate black liquors are processed for recovery of chemicals and heat. These liquors are evaporated, burnt in a rotary furnace, leached, causticised with lime, diluted with raw black liquor and stored for re-use in the digestor. New lime is used to replace that lost and soda ash or salt cake is added for the soda or sulfate process respectively. The two chief by-products of these recovery processes are carbon and calcium carbonates sludge. The carbon residue is activated or otherwise prepared and marketed under various trade names. Lime sludge is processed for recovery of lime or used as a filling material. Since most of the Indian paper mills operate on sulfate process, the recovery of by-products is invariably resorted to, to minimise the pollution due to the discharge of these waters. Orient Paper Mills in Orissa were creating nuisance before they installed the recovery plant for treatment of their waste waters. Some work on this problem was done by the All India Institute of Hygiene and Public Health, Calcutta and on their reommendations the factory authorities could partially mitigate the nuisance due to the discharge of the waste waters. But even after the recovery of by-products from the black liquor, the residual waste waters present problems especially from the colour and odour point of view. One of the remedies is to provide ample dilution or hold these waters in big lagoons and discharge these at regulated flows so that these get properly diluted. Moggio has reported on the removal of color from kraft wastes using high dosages of $Ca(OH)_2$ although for economic reasons the calcium present in the sludge would have to be reclaimed.

Regarding straw board factory wastes some work has been done by Subrahmanyan and Bhaskaran in Bhopal Straw Pro-

ducts factory. As a result of their studies, the factory authorities were able to improve the conditions to a considerable extent by installing a treatment plant. Plain sedimentation of the wastes accomplishes a reduction of 20-25 per cent of the total solids, and 56 to 77 per cent of the suspended matter; but the effluent still contains a large amount of calcium lignins in the dissolved and colloidal form. The addition of coagulants such as alum, ferric chloride and ferrous sulphate does not improve sedimentation. Sulphuric acid is helpful if used in doses of over 2000 ppm (0.2 per cent) but such a dose is uneconomical and impracticable. The addition of flue gases (Co_2) does not reduce the pH sufficiently low to promote settling. Trickling filter treatment of the effluent removes very little organic matter and hence it is not a very economical proposition for treatment of straw board wastes. The sludges recovered from these treatment methods may be dried and used for composting. The foregoing studies indicate that there is still scope for further research in this field. Norman has found out that fungi seem to be more active in the natural decomposition of hemi-celluloses (Pentosans) than bacteria. This indicates that it may be possible to bring about rapid fermentation by using some of the molds in the biological purification scheme for straw board wastes.

DISCUSSION

It is obvious that much work has been done both in India and abroad to improve the quality of waste waters obtained from pulp and paper board wastes. Yet the position in this regard is far from satisfactory. Literature is flooded with references on different methods employed by various workers and recently the Committee on Research, Section A, Federation of Sewage and Industrial Wastes Association, has reviewed the literature, and brought forth some of the outstanding contributions by research workers in this field.

One of the recent developments in the treatment of sulfate (Kraft) mill effluents has been the biological oxidation of selected effluents using a modification of the activated sludge process. Miller and Kniskern describe a 700 ton per day sulfate and semi-chemical plant making unbleached and bleached paper and paper-board. In-plant control practices are also summarised. Pilot plant studies of the modified activated sludge treatment of selected effluents are described. Nitrogen and Phosphorous salts are added as nutrients for the synthetic sludge. These studies have been continued by Pearman and material omitted consult original. This amounts to reducing the total mill pollution to the river by more than 50 per cent. In suspended solids removal, the plant has an efficiency of 85 to 90 per cent. This reduces the total mill suspended solids to the river by better than 75 per cent. The plant has a total solids removal efficiency of about 30 per cent and a C.O.D. removal efficiency of 35 per cent.

The economics of the whole treatment plant scheme before and after installations of various units has also been discussed, and they expect the operating costs to go down eventually. Considering the benefits of treatment of pulp and paper board wastes, the authors place their full confidence in the construction of these units in places where the mill authorities are faced with serious waste disposal problems and at the same time help the pollution control authorities in keeping the streams clean.

As far as the application of sewage treatment techniques to pulp and paper mill effluents is concerned, much progress has been made but results to date indicate that there is still considerable work to be done. In the application of activated sludge treatment methods to kraft mill waste, although high percentage removal figures for B.O.D. and suspended solids are available, yet the process produces little or no colour reduction and may even darken the colour of the waste, rendering the receiving stream less attractive in appearance than if the effluent were discharged untreated. On the encouraging side, Gehm has stated that by using the activated sludge treatment method, the sludge is able to survive over wide ranges of pH and strength variations in the feed.

Other methods, which have been used successfully for handling kraft Mill Waste, include the use of stabilisation ponds, land disposal and irrigation. The results of these treatment methods are very encouraging.

As far as the use for irrigation is concerned, two factors appear to delay wider use of kraft mill waste. One is consumer acceptance and the other is the large area over which distribution would be required to dispense off the effluent. Emphasis is also laid down by many workers to modernise plant equipment if waste disposal problem is to be made less troublesome. By-products recoveries are made more attractive, so that these may serve as incentives for the industrialists and at the same time help in improving the quality of the effluents.

Regarding Straw Board Mill Wastes the work of Bloodgood and others is quite complete. Subrahmanyan and Bhaskaran have also carried out some work on the treatment of straw board mill wastes in India and their findings show that although these wastes are amenable to aerobic biological treatment methods, it is not very economical in actual practice. It has been known that these liquors inhibit bacterial action and that lignin breaks down very slowly under bacterial action. Lardieri, has suggested the destruction of complex compounds like lignin and pentosans by the use of certain molds. It may be possible to destroy these compounds and reduce them to more simple and less objectionable end products by the use of suitable molds rather than bacterial cultures.

Summary

The problem of Paper and Cardboard wastes disposal has been discussed with special reference to their pollutional characteristics. A survey of the major paper factories in the country has been carried out with a view to assess the extent of pollution caused by them. There are nearly 20 factories producing various types of products including writing, printing, wrapping paper and cardboard. The total load of organic wastes discharged into streams and rivers has a 5 day B.O.D. of nearly 70,000 lbs. which is equivalent to sewage from nearly 500,000 people.

The majority of the Indian Mills manufacture paper by the sulfate process which has a complete reclaiming unit as part of its operation. But even after recovering the chemicals, the wastes are highly objectionable from colour and odour point of view. The wastes produce persistent foam on the surface of receiving waters. Newer processes as well as modernisation of equipment has been recommended by various workers in order to get over these troubles. These wastes are not so easily amenable to biological treatment methods, because, these do not contain the right type of food on which bacteria can flourish. But some progress in this field has been made by few workers who have subjected these wastes to the action of activated sludge treatment process after adding Nitrogen and Phosphorous compounds as nutrients for the bacteria. One of the major constituents of these wastes is lignin, which decomposes very slowly by bacterial action. On the other hand some molds seem to grow better and are able to decompose it to some extent. Work may be carried out on finding the most suitable types of molds that will decompose lignin to simpler and more stable end products.

Regarding sulfite pulp mill waste, there is no satisfactory method of treatment except by products recovery and disposal by dilution. Even after two decades of intensive research the position is far from satisfactory.

RECOMMENDATIONS

On the basis of the foregoing discussions on Pulp and Paper Mill Wastes, the author recommends that:

1. Accidental spills in the paper factory due to careless working must be avoided. An overall housekeeping campaign will go a long way in reducing pollutional loads due to accidental spills.
2. Segregation of stronger wastes should be practised wherever feasible. This will enable to handle lesser volumes of waste waters as well as bring down the cost of any treatment plant contemplated for the purpose. Modernisation of equipment and other in-plant control measures may be adopted to decrease the volume of wastes.
3. Factories producing sulfate (Kraft) paper should install recovery plants for reclaiming chemicals. If sufficient dilution is available, the effluent after recover-

ing chemicals etc. may be discharged directly into the stream without seriously affecting the quality of the water. During the summer months, when the dilution available is not sufficient, the flow of the waste should be regulated by holding in lagoons so as to ensure that the self purification capacity of the stream is not impaired.

4. In the paper mills, save all devices should be installed to check loss of fiber, and the clean water thus saved may be recirculated in the plant. Save-alls are of three types—sedimentation, floatation or board factories, the main processes of these principles and a combination of sedimentation and filtration is usually the most satisfactory.

5. Regarding straw-board mill wastes, partial purification may be obtained by proper sedimentation of the wastes. The sludge may be dried on sludge drying beds. This brings down the organic load on the stream to about half the original.

Acknowledgment

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Discussions :

There is enough scope for work in this line. Unless a close liaison is maintained between an Infectious Diseases Hospital and a Virus Laboratory, the utility of such investigations is minimal. From the public health point of view this close coordination is extremely essential.

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SOCIAL MEDICINE—A BRIEF SKETCH OF ITS DEVELOPMENT AND CONCEPT

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Service to man so as to relieve him of his illness, has been the goal of the Science of Medicine since its very inception. Relief of illness, however, depends on the application of appropriate remedies based on their correct aetiology. A ceaseless quest had therefore to be maintained to find out the correct aetiology of such illness. The course of development of Medicine furnishes a story of ever expanding horizon revealing the aetiology of human illness and consequent modifications in the concept of the practice of Medicine.

I. *Development of Medicine:*

Till its present level of development, it may broadly be divided in three stages, viz:

(i) Therapeutic Medicine:

Not very long ago the field of investigation for the aetiology was limited to the biological frame of he individtual; the treatment was based on that aetiology. The chief concern then for the practice of Medicine was the emelioration of isolated ailments by treating the biological causes only.

(ii) Prevention Medicine & Public Health:

The aetiological factors were found to exist even beyond the biological frame of man; they were traced to exist in his physical environments also. Their communicable nature was discovered in due course and the community interests were recognised. The field of investigations was correspondingly extended. The concept of the practice of Medicine was accordingly modified leading to the genesis of the sanitary science which developed in due course into Preventive Medicine & Public Health. The concern of Medicine during this era, therefore, comprised of the amelioration of ailments and the prevention of communicable diseases only.

(iii) Social Medicine:

The horizon was further extended and the aetiological factors for human illness were traceable even beyond the zone of physical environments and found to lie also in the social plane. The importance of the social factors in the aetiology of the human illness had therefore to be recognised and the concept of the practice of Medicine further modified so as to be more radical in its approach towards treatment of human illness. This has brought into the field the concept of social medicine—the latest phase in its development. According to this concept, illness has a meaning much broader than mere ailments or disease; it connotes any impairment in the complete physical, mental and social wellbeing of an individual. And the concern of Medicine comprises of radical treatment of all the causes and cure of illnesses instead of piecemeal treatment and amelioration of ailements, prevention of all preventable diseases instead of communicable diseases only, and care for total health instead of its negative aspects alone. The modern concept, therefore, is far more comprehensive in all respects.

II. *Influence of social factors on health and disease:*

The importance of the social environments in relation to the health of man, leading to this new concept of medicine would be apparent if due consideration is paid to the fact that a human being is essentially a social creature and reacts to his social environment as much as to his other environments. A harmonious adjustment to his environments enables him to enjoy health and happiness whereas maladjustment particularly in the social plane may even prevent him from recognising his disease, or from taking treatment for it, or from taking the treatment sufficiently long or in the proper manner so as

to have a lasting therapeutic effect. The result is either he continues to suffer from the illness or from the recurrence of illness. The cumulative effect of such illnesses reflects adversely on the family and the community; the volume of the morbidity increases and creates innumerable problems for the society to tackle. These in their turn cause fresh illnesses. A vicious circle is thus started.

Some of the more important factors of the social environments influencing health and disease are discussed below:

(a) *Poverty:* It is the most important single social factor responsible for causing ill health and perpetuating it.

Even the medical advice which has to be purchased at a considerable cost cannot be utilised because the cost of medicines prescribed may be beyond the economic reach of the patient. Unemployment and loss of earning may further lower the standard of living leading to more disease or its perpetuation. A patient may be cured in the hospital and discharged, but when he goes back to his unsatisfactory but wonted physical and social environments he falls ill again and returns to hospital as a patient.

(b) *Ignorance:* The patient may be illiterate or even if fairly educated he may not be aware of the serious implications of his illness at the early and curable stages, or he may not be aware of the facilities that the medical science can offer for his restoration to fitness. The result is that the disease aggravates unrecognised and may become incurable.

(c) *Apathy:* It means a lack of urge in the individual for health or for treatment of illness; a lack of a sense of self-help. As Health cannot be thrust from outside and has to be generated from within, this attitude may make him liable to illness in spite of sufficient facilities being provided to him.

(d) *Neglect:* This may be the product of various circumstances e.g. (i) lack of appreciation in the capabilities of the science of Medicine; (ii) superstition e.g. having more faith in charms and amulets; (iii) lack of facilities, either in convenient medical environments, or in availing them due to apparently more urgent pre-occupations at the moment; for instance, a busy housewife and mother of many children finds it difficult, if not impossible, to attend an ante-natal clinic, absorbing considerable time though she may be aware of the need for it.

(e) *Attitude of the Society and the family:* This may not be sympathetic and congenial for the recognition and treatment of the disease or for continuing the treatment sufficiently long. The society may attach stigma to certain diseases e.g. Leprosy. The result may be concealment of the disease, or reluctance for treatment or its premature discontinuance, leading to its possible spread in the family and to the community.

(f) *Attitude of the patient:* The patient may not entertain the idea of having his disease treated at all and thereby harbour it. His attitude may be influenced by various circumstances e.g.

(i) Fear complex—e.g. fear of surgical operations, or fear of loss of position in the family, or of prestige in the society, or of earning capacity, or fear of social stigma etc.

Such a complex may scare a patient away from taking treatment or devoting sufficient time to it. Cases for treatment of cancer, V.D., leprosy etc. may be cited as examples in point.

(ii) Superstition—e.g. the belief that the disease is the product of sin and an act of God etc. and therefore not worth treatment at all.

(iii) *Worries, and anxieties etc.* Consequent on the altered social circumstances caused by the disease or connected with its treatment, the frustration may reflect further adversely on his health.

(g) *Rehabiliation Problem:* Lack of facilities for rehabilitation in his original place in society wholly or partly, would increase his worries and may retard cure, or unduly discourage him or may lead to the discontinuance of treatment.

(h) *Attitude of the medical attendant or practitioner:* Prescribing remedies with-

out due regard to the economic status, social moorings and psychological conditions of the patient, would either be useless or yield but poor results. Lack of a sympathetic and congenial doctor-patient relationship involves many avoidable obstacles to a cure. There may be multiple factors in various fields connected with the illness and unless all the factors are found out, no radical treatment can be arranged. Incomplete cure means multiplication of patients in the hospital rolls and a colossal waste of the country's medical resources.

(i) *Diseases producing social problems:*

(a) The onset of T.B. in a bread-earner may lead to unemployment and therefore to the ruin of the whole family in every sense. Vice-versa, unemployment or loss of earning may lower the standard of living and thereby lead to under-nutrition and predispose to T.B.

(b) An untreated or partially treated V.D. case may lead to the infection of the other members of the family and transmit it to the progeny, leading to serious social problems.

(c) An undetected infectious case of leprosy may spread to the family and the society.

(d) multiple pregnancy in a woman may produce multiple problems in the family.

The above would briefly illustrate the influence of the various social factors on Health & Disease and vice-versa and would emphasise that until and unless these factors are duly considered and suitably dealt with, it would not be possible to achieve any lasting effect of the medical therapy on individual patients or a reduction of morbidity in the community or a consequent reduction in the pressure on the hospitals. These facts therefore make out a strong case for making the field of investigation for the aetiology of human illness, sufficiently broad so as to cover not only the biological frame of the individual and his physical environments but also his social environments including the psychological and emotional factors involved in the illness. Besides, the outlook for treatment has to be made radical in its character, based on the total aetiology of the illness. And these form parts of what Social Medicine stands for.

III. *Genesis and the various phases or development:*

The developments that led to the genesis of this new concept of Medicine provide an interesting reading to all students of Medicine. Roughly it reads as follows: The ever increasing overcrowding of the hospitals and consequent lowering in the standard of their services provided a serious problem by the end of the nineteenth century. An official enquiry was instituted by 1891. This enquiry revealed the importance of social factors in connection with the disease as well as the health of a community and suggested, as a remedy, a re-orientation of the entire concept of the practice of medicine. The development of this re-orientation may conveniently be considered in its three phases viz:

(a) Medical Social Work

(b) Wider concept of Public Health.

(c) Social Medicine proper.

(a) *Medical Social Work:*

The causes of overcrowding in the hospitals were found to be due to—

(i) *Abuse*—of hospital charities by well-to-do persons who could well afford to procure private treatment of their ailments by the medical profession. Extent of this factor was however found to be round about 4% only.

(ii) *Social factors*—The treatment was not adjusted to the deterrent social factors involved in the cases which resulted in most cases in an incomplete cure and the return of the patients back to hospital in due course. The extent of this cause was found to be overwhelmingly large.

These findings emphasised on the need for supporting and supplementing the hospital service by a specialised type of service (viz. Hospital Social Service) to be run by specially trained workers so as to assist the medical men in tackling the social aspects of the problem and complete the medical team thereby.

These trained workers are known as the *Medical Social Workers or Almoners*. Their duty is to study primarily, in the interest of the patient, the deterrent social factors, if any, involved in his illness, the social consequences of such illness, and to find resources to enable the patient to get over the obstacles to his cure and rehabilitation on the one hand, and, to appraise the medical profession of the same on the other, so as enable them to mould the treatment accordingly.

Secondarily, their duty is to assist in research. In short they are to act as friend, philosopher and guide to the patient as well as an invaluable handmaid to the medical profession as well as to the medical and social sciences.

Their office is usually located in the hospital outdoor and their field of activities includes the patients homes, the offices of various welfare and charitable organisations and of the different departments of the Government. By training, they hold university diplomas in Social Science and having some amount of training and knowledge in physiology, social implications of diseases and the medical administration of the country. Their course of training spreads over 3 years including one year of practical training. Trainees are usually selected from females, may be males also, with a good background of general education in both cases.

Certificates are issued by the Institute of Almoners U.K. or U.S.A.—Recently similar Institutes have also been established in India (at Calcutta, Bombay, Delhi etc.). The load of work to be effective is on an average 2 Medical Social Workers per 100 hospital beds and the corresponding O.P.D. patients, supported by adequate clerical assistance.

For the purposes of Medical Social Work, most of the hospitals in U.K. or U.S.A. have been employing Medical Social Workers with encouraging results.

(b) *Wider Concept of Public Health:*

Now, so far as the problem of reducing the load on the hospitals is concerned, it would be evident from the duties of the Medical Social Workers that this type of hospital social service touches only the fringe of the problem as it is restricted to the patients that have reported themselves to the hospitals or health centres.

There remained for consideration, therefore, the unreported cases of illness and those living in substandard health in society. Their number was vast and they constituted the main potential source of patients who would, no doubt, swell the hospitals in due course unless suitable measures were taken in time to pull their health upto a standard level. Besides, those having standard health required to be prevented from sinking into the sub-standard level. All these factors therefore required to be duly considered before any substantial reduction could be expected in the total Morbidity of he country, on which the solution of the problem obviously depended. These considerations called for measures on a wider scale and on community basis.

Apart from the big question of re-orientating the *Socio-economic Structure* of a country in a manner favourable to health, on which the solution of these important facets of the problem essentially depended, it required the re-orientation of the traditional concept of the practice of Preventive Medicine and Public Health. Its outlook had to be widened from one of preventing the communicable diseases, to one of preventing all preventable diseases, e.g. Cardiovascular diseases, Rheumatism, Asthma, etc. and finally to preventing sickness as a whole. Besides the scope for their concern were extended to the all-round health of the population as a whole, instead of their traditional concern for only the negative aspects of the health of the affected sections of the population, or for the population of specific ages or under specific conditions. The Public Health machinery therefore required to be modified accordingly. It required to be made more comprehensive and socialistic in outlook.

Even this improved type of Health Services could not be considered enough to produce the desired effect of reducing the morbidity in the country to a sub-critical level. A machinery, however technically sound it might be, would be of little avail for the purpose, unless it is properly utilis-

Many may not be in a position to reap the full benefits out of it, for various reasons, e.g., their lack of "will" or resources, some adverse social factor or others, etc. as already discussed in detail elsewhere. On the other hand, the machinery itself because of its lack of humanistic touch may not be sufficiently attractive to the people and therefore less effective. The gap between the provision of the machinery and its proper utilisation therefore remained to be bridged over. 'Something more" was obviously needed beyond providing a well-equipped Health machinery, though it might be broad in its outlook and radical in its approach.

But what that "something more" represents?

On the one hand, it is to create, in the people, particularly the sufferers from sub-standard health or disease, an urge for health and to see that this urge is translated into a positive achievement of health. On the other hand, it is to humanise the health machinery so that its workers develop a more sympathetic attitude, treat the people including the sufferers as so many social units, as well, having social and emotional existence, and win their confidence by establishing intimate and friendly relationship and utilise the same in favour of their health; maintain a watchfulness with sufficient interest, over any deviation to the wrong side from the standard in the health of the people and to pursue such deviation till it is restored to the standard level. These constitute chiefly the precious links that have been missing hitherto between the health organisations and the people. The realisation of these and other facts called for the introduction of special designs, e.g., Health Centres in community Health Practice as they did in regard to Medical or Hospital Social work in the practice of clinical medicine, already discussed elsewhere.

Lastly, even the provision of all above would not be enough unless there is adequate support by the society from its economic and other fields so as to keep the people generally above poverty, illiteracy, ill-housing, under-nutrition, overwhelming worries and anxieties of life, etc. which stand as a bar between an individual and his attainment of health. Obviously, this aspect calls for mighty efforts at the national level effecting a re-orientation of the entire socio-economic structure of the country so as to ensure at least a fair standard of living to its people in general.

Even when such a standard of living has been granted to the entire population of the country, additional assistance or resources need have to be provided so as to convert the said sanctioned living into a healthful one as well as to cover the contingencies of life and the emergencies of health. Such assistance may be of various forms, e.g., general assistance, home helps, organised charities, social insurances of various types, elaborate rehabilitation programmes for the disabled, education for health, information and advisory services, etc., etc.

(c) *Social Medicine*—a unique concept.

Social Medicine is conceived to furnish, in addition to the improved health services, all these missing links between the health-organisations and the people, as well as to provide for the additional assistance or resources at all stages that might be needed for the achievement of health. As such, it promises a more satisfactory answer to our problem viz., relieving the hospitals of over-crowding, provided however that the necessary background, viz., the basic standard of living and the socio-economic structure of the country, has been made favourable to health by the powers that be, and enabled thereby to afford sufficient scope for Social Medicine to thrive.

For this task, therefore, Social Medicine has, not only to guarantee to the people satisfactory medical and hygienic physical environments but also to search out the aetiological factors including the social ones behind any untoward behaviour pattern of the sufferers (whether from disease or sub-standard health) or behind their illness; to find a remedy based on the total aetiology; to arrange suitable resources (including motivation of all concerned) so as to enable the said sufferers to avail themselves of the best of the country's medical and other welfare organisations and to get themselves fit and happily re-

habilitated in the society. In respect of the rest, it has to find necessary resources not only for developing positive health but also for stabilising it as well as for stabilising the effect of therapeutic medicine. For the purpose, it has to serve also as an invaluable link between the home and the hospital, between the home and the Public Health Organisations, between the home and the offices of the various other Social Welfare Organisations and other organised resources of the country including the Government. Its approach to the Health problems has to be broad, radical, humanistic as well as dynamic generating an active and lively collaboration for health between the people and the organisations for relief. Herein lies the uniqueness of the concept.

Needless, perhaps, it is, to repeat that its concern is to arrange necessary assistance not only for the prevention and cure of the diseases but also for the prevention and care of the sub-standard health in the community as a whole. Further, its aim is to create an universal urge for health, to pave the way for the entire community to get the best of the medical and other resources provided by the country, to arrange for additional resources according as required for health and to enable it to build as well as to enjoy sound health and the joy of life in a lasting manner. Herein lies he vastness of the concept.

To express the concept of social medicine more precisely we may quote the brilliant language of an well-known authority as follows:

"Social Medicine is not merely another name for public health or socialised medicine. It embodies a particular research method, an aspect of education for health, and above all a new point of view which often finds expression in the socialised medicine of our day.

It is the common meeting place of preventive and therapeutic medicine, borderland fringing medicine as a whole, a region where medicine merges with economics, sociology, ethics and the machinery of the Government.

Its approach to medical problems is broad and humanistic, it has much to contribute to clinical studies. It is a name for the resources—other than medical resources—which can be used to help relieve sickness and mitigate its social consequences".

(*Continued from page* 199)

required for cooking and perhaps 5 cu. ft. more for lighting. The daily yield of digested sludge is used as manure in the gardens. 'In India where the usual custom is to burn the dung for fuel thereby losing the nitrogen, or to use the dung as fertiliser thereby losing the heat value of carbon; the use of digestion to convert the carbon to methane and subsequent use of nitrogen in the soil, proves that one can have his cake and eat it too'.

Malaria Control:—

D.D.T. has practically solved the problem of controlling rural malaria in a cheap and effective manner. Yet, engineering methods like drainage, filling, sluicing, flushing etc. have their applications under many circumstances. Experience in some places of India indicates that where the local vector of anopheles breeds mainly in surface tanks, 90% of malaria in the locality can be controlled by such simple measure as keeping the breeding places free from vegetation.

Health Education:—

There is a Chinese proverb—

If I see it I remember,
If I do it I know".

The best way of educating the rural people is not only by demonstrating things to them but also by encouraging them to actually participate in the work on a voluntary basis. Most of the under-developed countries are economically too poor to be able to undertake expensive sanitary programmes; but there is always a vast source of idle man power which might be utilised if only the people could be made interested in the programme. In this field success can only be achieved if technical knowledge is supplemented by a knowledge of the social sciences of human behaviour. Great things have been achieved by tactfully enlisting voluntary co-operation and labour. Engineers and Medical Officers in charge of rural sanitation must develop not only the highest degree of technical skill and ability, but also all the qualities of leadership required to influence the public mind.

Acknowledgement:—

In this paper the author has freely quoted from the reports and various publications of the World Health Organisation.

SOME OBSERVATIONS ON THE LABORATORY DIAGNOSIS OF SMALLPOX

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Introduction:

It becomes sometimes exceedingly difficult to differentiate clinically between smallpox and chickenpox although it is imperative to do so as otherwise an incorrect diagnosis would lead to outbreak or spread of infection with disastrous results.

The present paper is an attempt on the part of the writer to corroborate with other leading workers in this line and to suggest economisation of the consumption of reagents, specially the sera for the C.F. test.

Procedure:

1. (a) Examination of smears from the fluids from vesicles, pustules and scabs by the technique of Van Rooyen and Illingworth.

In this technique better results are obtained with earlier lesions. After due sterilisation and other necessary precautions the scraping is collected from the base of the vesicles or pustules in a number of clean slides. The slides are treated for 1 minute in ether and for 2 minutes in absolute alcohol and dried. Freshly prepared Loeffler's mordant is poured over the slides and gently heated till steaming starts. Then the slides are repeatedly washed in running water, flooded with Carbol Fuchsin (1 in 20) and gently heated to steaming. They are kept for 3 or 4 minutes, washed in water, dried and mounted.

Unless a person is well versed in this technique, it becomes rather difficult to differentiate between the elementary bodies of variola and vericella obtained from the vesicles, simply from the size of the elementary bodies or from the character of staining.

(b) Cultivation on the Chorio-allantoic membrane of a growing Chick Embryo:—

It is to be noted that no difficulty is encountered in culturing the vesicular, pustular or scab materials in chorio-allantoic of a growing chick embryo. But proper usefulness of the cultivation procedure lies in cultivating the whole blood, clotted blood and sera or blood cells and sera at a very early stage, specially during the pre-eruptive stage of the disease (vide Downie, MacCallum and others). Unfortunately cases are not available at so early stage of disease and opportunities are seldom available here for the above trials. However, there appears to be some limitation to the procedure recommended and observers have often obtained negative results. Again, it is usually obtained in the very fulminating cases—haemorrhagic or severe confluent type (almost always fatal) and the virus may be detectable in the pre-eruptive stage only and the incidence of positive result diminishes day by day.

It is to be noted also that the isolation of the virus after 2nd day of illness or the detection of viral antigen in high titre indicates bad prognosis.

In the process of cultivation on the Chorio-allantoic membrane of the growing chick embryo, the writer, during retreatment with antibiotics prior to inoculation, has used only 250 units of Penicillin and 100 units of streptomycin per c.c. of the inoculum and obtained consistent good results. Rivers also has cautioned against the use of bigger amount of commercial penicillin.

2. *Serological Tests:*

Complement Fixation Test:—

The techniques of (i) Downie and co-workers, (ii) Van Rooyen & Rhodes, (iii) American Public Health Association (1948) are all highly scientific but are rather elaborate and require lot of reagents specially the sera. To economise the consumption of reagents, the present writer has modified the techniques in the following way.

Preparation of the reagents—

(1) Standard Vaccinia antigen (as positive control).

Dermal rabbit pulp as well as the Chorio-allantoic cultivation material are collected with due precaution and dried in vacuum in a deep freezer. Within 72—120 hours crusts form which are stored at −10°C. Bacteria free emulsions are made from portions of the crusts and centrifused before use. Usually 1 p.c. suspensions are used.

(2) *Hyper immune sera.*

The depilated skin of rabbit is extensively inoculated with the same strain of vaccinia as used in the preparation of standard vaccinia antigen and without collecting the pulp it is allowed to scab normally. Now I.V. injection of 10% suspension of the Standard Vaccinia antigen is given in graduated doses from 1 c.c. to 3.5 c.c.—twice a week.

Titration of the Rabbit antisera:

The titre of the samples of sera obtained here did not go beyond 1/28 and this hyperimmune sera with the above titre has been used and so far has given satisfactory fixation with samples although conventional sera was also put up as control. In the preliminary titration for determination of unit the lowest concentration of the sera that gives complete fixation to the lowest concentration of the antigen has been taken as the unit of antibody.

The titre and dilution as recommended by American Public Health Association as well as the units recommended by Downie and co-workers have been adopted here and the results appear to be identical.

For the control of antisera and to avoid zonal phenomenon the techniques recommended by Van Rooyen & Downie have been tried here and found to be very satisfactory but these are rather elaborate and require much greater amount of sera and antigen.

Inactivation of all sera was done at 56°C for 10 minutes immediately before use to remove the heat labile anticomplementary activity which develops in rabbit sera. This is according to the procedure adopted by A.P.H.A.

Regarding the use of complement in the test any of the strengths advocated by Downie, A.P.H.A. or Van Rooyen can be used after preliminary titrations.

For the Haemolytic system any of the three methods may be used but A.P.H.A. recommendations have been used here with slight modification. Fixation period as used here is 16-18 hours at 4°C (vide Downie and Rooyen).

In preparing the emulsion of the unknown antigen the diluent saline has been used in bigger amount (1 c.c. for 2 or 3 scasb) because in that way it is easier to centrifuge.

In order to economise the sera (hyperimmune, convalescent and normal rabbit sera) and at the same time to keep controls over the reagents, a slightly modified procedure has been followed by the writer which is given below:—

1st row—Unknown Antigen—dil. 1/100 then serial double dils. to 1/3200 in 0.1 c.c.

H.I.R. Sera or Convalescent Sera } dil. 1/10 in 0.05 c.c. to all tubes.

Complement— 2 units in 0.1 c.c. to all tubes.

2nd row—Controls—Antigen Control
Unknown Antigen—1/100—and serial double dils. as above in 0.1 c.c.
N.R. Sera—1/10 in 0.1 c.c. to all tubes.
Complement—2 units in 0.1 c.c.

3rd row—

(1)	(2)
Known positive antigen Vaccinia or membrane culture of Variola. 1/100 dils. (after recent titration) in 0.1 c.c. H.I. Sera in 0.05 c.c. Complement—2 units in 0.1 c.c.	Known Negative—if available (Varicella fluid)—1/100 dils. or Scab. (Same as in the tube No. 1).

(3)

Antisera Controls
Unknown Antigen—Nil.
Complement in 0.1 c.c.
Antisera „ 0.05 c.c. or 0.1 c.c.
Saline „ 0.1 c.c.

Fixation at 4°—5°C for 16—18 hours.

The racks are kept at room temperature for 15 minutes—followed by preliminary incubation at 37°C for ½ hour after which the results are read. The preliminary incubation, according to some, is not necessary. However the results as obtained here were better with the double incubations.

Complement Fixation with Unknown Sera:

Samples from the vesicular and convalescent stages were examined in the following manner:

Inactivation of the Sera at 56°C for 16 minutes.

Preliminary titration of the known Vaccinia or Variola membrane culture antigen with immune sera.

Serial dilutions of the Sera from 1/8 to 1/256 in 0.1 c.c.

Known Vaccinal Antigen—double units in 0.1 c.c.—constant.

Complements (2 units) in 0.1 c.c.

Fixation at 4°—5°C for 16—18 hours. Kept in room temperature for a few minutes.

Preliminary Incubation in water bath 37°C for ½ hour.

Addition of Haemolytic System—0.2 c.c.

Further incubation at 37°C for ½ hour.

Results are noted.

The following technique of River's seemed equally good.

2 units of Standard known Antigen in 0.25 c.c. constant.

2 full units of Complement in 0.5 c.c.

Serial dilutions of Sera (from 1/10 to 1/1600 in 0.25 c.c.

Fixation at 4°C overnight.

Haemolytic System (3% with 3 MHD Amboceptor) in 0.5 c.c.

Incubation at 37°C for ½ hour.

As there are fallacies in noting the results the test is to be repeated with

(4) & (5)

If sufficient Antisera can be spared, controls with 1 MHD of complement, one with and the other without antisera, can be put up: Only 2 tubes are put up (to detect any deterioration in the complement during the long period of fixation).

different antigens on different dates. Testing of sera from the convalescent stage may be of value from the Public Health point of view, to confirm serologically a doubtful case.

The data obtained here in a few cases are given below. Unfortunately with the exception of 2 cases, all were clinically frank cases, although for the sake of obtaining experience in these techniques, the tests were put up.

Vesicular fluids were collected in capillary tubes and swabs and diluted in 0.6 c.c. normal saline to make up to 1/100 and made serial double dilutions up to 1/3200. Scabs (2-3) were grinded in 1 c.c. normal saline, diluted to 1/100 and then made serial double dilutions. Anti-complementary scabs were not taken into account.

Detection of Viral Antigen:

Fragments of clotted blood laked with equal amount of sterile distilled water or the cells and clot after shaking with double the quantity of sterile distilled water may be used as antigen. This is successful only in very fulminating cases and since it is extremely difficult to obtain cases in the prodormal stage, investigation on this line may not be possible in our places.

Neutralisation Test:

A simplified procedure of Parker's technique has been tried a serial 10-fold dilutions of the stock virus suspensions of 'vaccinia' obtained from chorio-allantoic cultivation, are mixed with the normal rabbit sera and the antisera to be tested. This was inoculated in rabbit's skin, 4 dilutions in 0.1 c.c. amounts on 4 points. The results were not encouraging enough which might have been due to defects in the technique.

The same serum virus mixtures were cultivated on the chorio-allantoic membrane and the number of pocks induced by the different sera virus mixture dilutions were noted. The work is being continued.

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SOME ASPECTS OF RURAL SANITATION

By

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Introduction:

Rural sanitation, practised on a religious basis, developed in India earlier than 2000 B.C. In its modern conception rural sanitation refers to environmental sanitation in areas which are mainly agricultural and where there is a lack of diversity of skill and of organised community services such as water supply, excreta disposal, control of vectors of disease, and similar services at a cost suited to the economic level of the persons concerned".

Magnitude of the Problem:

Two-thirds of the world's total population live in rural areas. In India 85 per cent. of the people live in villages where there is hardly any sanitation. Water-borne diseases like cholera, dysentry, diarrhoea and enteric fevers, are estimated to cause a total of about two million deaths a year while the actual number of people suffering is about fifty million. The conditions are more or less the same or perhaps worse in most of the so-called under-developed countries representing two-thirds of the world's population. Here is a statement from an Italian newspaper quoting an official in a country in S. E. Asia.

"We have in one area here wells which furnish water indispensable to life but which are 13 to 14 kilometers (about 9 miles) distant from the community. A wife can make only one trip a day to fetch the necessary water which she carries in a bucket. This quantity of water is quite insufficient for the needs of a husband. The only solution therefore, is to have more than one wife."

Malaria affects 300 million persons per year throughout the world with 3 million deaths. In India malaria was once calculated to cause an economic loss of £80,000,000 a year. In the Philippines, out of a total population of 20 millions, two million persons used to suffer from malaria with 10,000 annual deaths. In Southern Rhodesia the loss of man power due to malaria amounted to 5 to 10 per cent. of the total labour force in that country. In Thailand there used to be 50,000 cases of malaria within a year. Schistosomiasis which is a disease caused through infection from polluted water, prevails widely over many parts of Africa, Asia and America: and in the Middle East alone 20 to 30 million persons are affected. In Mexico 90 per cent. of the rural communities were estimated to have primitive or inadequate sanitation. In 1950, 90% of the dwellings in Venezuela lacked privies or other adequate facilities for excreta disposal and were supplied with water from contaminated or doubtful sources. Although the ancient Romans were great pioneers in drainage and water works, half the population in present day Italy drinks polluted water, and in 58% of the communities there are no sewage systems. Sixty per cent. of the communities in Austria have no central water supply. Even the centralised water supplies in rural areas are of a low standard of sanitation. Disposal of sewage, in many cases, is also unsatisfactory. Sewage, even that from the hospitals of contagious diseases, is often discharged into rivers without previous purification. In Denmark, dug wells which supply rural areas are often contaminated, as confirmed by a recent bacteriological examination of samples from 13,000 such wells.

In one part of Nigeria, water is so scarce that during six months of the dry season, a single stream serves people living as far as 30 miles away. Water is carried and stored in pots which are potential breeding grounds for the mosquito Aedes-aegypti which carry the dreadful disease, yellow fever.

Statistics collected in 1947 for the U.S.A., where the rural population is 56 million (about a third of the total population), indicated that more than 27 million people in the rural areas needed new

or improved water supplies, and 33 million had unsatisfactory sewage disposal facilities. In 1950, piped running water inside the home was available in only 42.7% of farm dwellings. United Kingdom is perhaps the most advanced country with regard to water supply, where only 5% of the rural population lack piped water supplies.

Engineering Aspects of the Problem:—

Provision of pure and adequate supplies of drinking water, safe disposal of human excreta, and control of animal and insect vectors of disease are the three basic requirements in rural sanitation. Of these, the first two are wholly engineering problems, and the third also often needs engineering methods. Engineering designs for rural schemes should not be too elaborate or complicated. The best designs or the best methods are usually those which are the simplest. It should also be suited to the economic level of the local people, although it is a poor economy to introduce cheap and delicate things which would not stand rough handling. Religious and social customs of the local people must also be taken into consideration. Here is an example of failure for not taking such factors into consideration. In 1951, in two villages in Western Nigeria, wells were dug to a depth of 150 ft., properly curbed and lined, and provided with winches and steel cables to raise and lower the buckets for drawing water. On an inspection after two years it was found that the cables were gone and the bricks from the well curbs were piled up ready to be used for building purposes. The local tribes had definite rules regarding distribution of work whereby the men dug the wells and the women carried the water. Bailing water was something in between, and the women refused to do what was considered to be man's job; and the men would not turn the handle of the winch. The women preferred to bring water from a stream two miles ayay with a 20 litre jug on the head, and often a child at the back.

Problems of Water Supply:—

In most of the under-developed countries it is not economically feasible to provide piped water supplies for the rural people. The supply is usually from open wells or tube wells, and some times from rivers, tanks and canals. In Bengal it has been found that the best and the safest source of water supply is the tube well. Tube wells as well as open wells should however be protected against contamination. There should be water tight platform all round, with a lead away drain to remove waste water. Design of street hydrants required consideration. Villagers usually carry their water in pottery or brass vessels of about 20 litres capacity. The vessels are carried on the head, shoulder or back or in the hands. The height of the loading platform should be such as to prevent unnecessary lifting. There should be room for more than one container. The spout should project far enough to reach the mouth of the container without having to tip a jug towards the pillar. In some places there should be provision for a laundry slab and a bathing place to meet the customary needs of the people. One well may be used by as many as 200 people, and the strain on the pump is usually heavy. In a rural water supply scheme in Pakistan, breakage of pump handles has been a troublesome problem. Pumps are of a common pitcher type, and the handles break either at the top where they connect to the pump rod, or near the point where the handle strikes against the pump body. Malleable iron handles and tops are being tried. A cheap type of pump for rural areas made almost entirely from local materials has been developed in Japan. It consists of two pieces of bamboo, one trimmed to slide inside the other, and both provided with a simple valve at the bottom septum. Operated by a wooden rod and lever handle the inner section acts as the piston while the outer casing serves as the cylinder and discharge tube. Problems of regular repair and maintenance of rural water supplies should also be carefully considered.

Problems of Excreta Disposal:—

A person may discharge as many as thirty million millions of bacteria in his feces in the course of one day. These may contain germs of cholera, typhoid, dysentry, and diarrhoea, as well as eggs of para-

sites like hookwarms. Under favourable circumstances these bacteria may multiply extremely rapidly. Flies act as carriers and may contaminate food. Eggs of hookworms discharged through feces of infected persons hatch in soil and after a period development they are able to bore through the skin of bare footed persons. According to one estimate made in 1947, out of a total of 2,200 million world population there were 457 million hookworm infections. There are many places in India where more than 60 per cent of the population were found infected with hookwarm. In a semi tropical country the worms infesting the people may consume more of the produce of that country than do the inhabitants themselves.

Safe disposal of night soil is therefore an essential pre-requisite for the control of intestinal diseases. The aim should be to provide for the satisfactory disposal of the night-soil and urine away from the reach of insects and flies, without contamination of any source of water supply or causing any nuisance.

Various systems of disposal are in use in different parts of the world. Rural latrines must be easy to construct, must be quite cheap, and should if possible provide for the use of the night-soil as compost fertiliser. Bored hole latrines have been used successfully in many places particularly in the Philippines and in India. The squatting plates for these latrines, must not have too large slab openings as these may be potential sources of danger through which very young children might fall in. Actually three fatal accidents have been reported recently. Safe size for holes as recommended by UNRWA is 25×45 cm. opening in the upper surface of the slab tapering to a 12.5 cm. diameter hole at the bottom of the slab. Bored hole latrines should be so located as to prevent contamination of any sources of water supply, the exact distance depending on the nature of the soil, the direction of flow of sub-soil water etc. Septic tanks are also used, generally by the more well-to-do people or by groups of communities. It essentially consists of a tank having one or more chambers in which sewage and other liquid wastes from houses are collected and allowed to decompose anaerobically. The detention period is usually 24 hours. The capacity of the tank varies. The Ministry of Housing and Local Govt. in England recommend that the smallest sized tank serving upto one house (5 persons) should have a capacity of 300 gallons, and should be located atleast 50 ft. away from any dwelling or source of water supply. The liquid effluent from a septic tank is still very unstable and would create nuisance if brought in contact with air; and it is therefore subjected to further treatment usually in a sub-surface soakage system or in a percolating filter. It may also be discharged into bore holes or large volumes of water, but care should always be taken to prevent contamination of any source of water supply.

Composting:—

Composting may be defined as the preparation of manures by the fermentation of bulky organic refuse material of either plant or animal origin, brought about by a complex flora of micro-organisms. Night-soil is a very valuable fertiliser and the Chinese are so conscious about its value that the city of Shanghai once realised an annual payment of 31,000 gold dollars by allowing a contractor the privilege of entering the houses and removing the night soil. In many parts of China people in an attempt to collect as much night soil as possible compete with each other in inviting the public for free use of their private latrines by displaying notices like "Please use my latrine". The night-soil is dried on the river banks in the form of cakes and sold to the farmers for application on the soil. Handling of crude night-soil in such a way is however most objectionable from the sanitary point of view, and hookworm infection is wide spread amonght the people. Composting aims at utilising the night-soil in a safe and sanitary manner. The temperature inside a compost heap rises to as high as 65°C to 70°C which is sufficient to kill all pathogenic organisms as well as fly eggs, larvae and pupae. In Hyderabad (India) cow dung has been utilised in a specially developed gas generator in which the daily output from three cows is sufficient to produce 60 to 70 Cuft. of gas

(*Continued on page* 193)

A PILOT SOCIO-ECONOMIC SURVEY OF A BUSTEE IN THE URBAN HEALTH CENTRE, CHETLA

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All-India Institute of Hygiene & Public Health, Calcutta.

The choice of Chetla for an Urban Health Centre as a part of demonstration and teaching unit of the All-India Institute of Hygiene and Public Health, Calcutta, was based on various factors, the chief among these are: (1) It is a locality of mixed population of various economic levels, races, languages and religions; (2) It is a trading centre, interspersed with Governmental Offices, residential areas, jails, gardens as well as large number of small scale industries and includes the most congested as well as thinly populated sectors; (3) It is a mixture of good residential houses and of Bustees which accomodate 28 per cent of the population; (4) Sanitation is partly well developed and partly underdeveloped; (6) Nearness of a perpetual pilgrim centre at Kali Temple; and (6) Multiple channels of approach to the area, e.g., rail, canal and road through half a dozen bridges over the canal. There is thus enough scope of improvement, demonstration and teaching.

The bustees are undoubtedly one of the greatest stumbling blocks in the progress of improvement and one of the primary duties of the Urban Health Centre would be to carry out a socio-economic survey of these Bustee people to indicate the steps that should be taken for the basic improvement of their lot upon which the overall improvement of the area largely depends. Accordingly, a pilot survey was planned and carried out in one Bustee at 10, Gobinda Auddy Road during the months of March and April, 1956. The results of this survey is briefly described in this report.

Methods and organisation:

The information was collected in a composite schedule prepared for the purpose under the following heads:

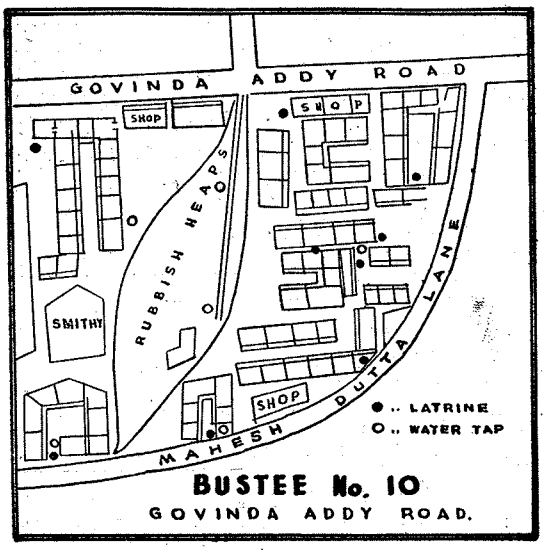
(a) *General information of the family:* The items of general family information were: Name of the head of the family with his occupation, religion, state of origin, mother tongue, residential status and period of residence in the particular slum and in Calcutta, nature of the family, total number of members, total number of births and deaths during the year, sanitary conditions of the house and family hygiene, economic conditions, expenditure on medicine and medical advice, nature of food consumption, annual expenditure on different heads, outlook on cause, and prevention of disease.

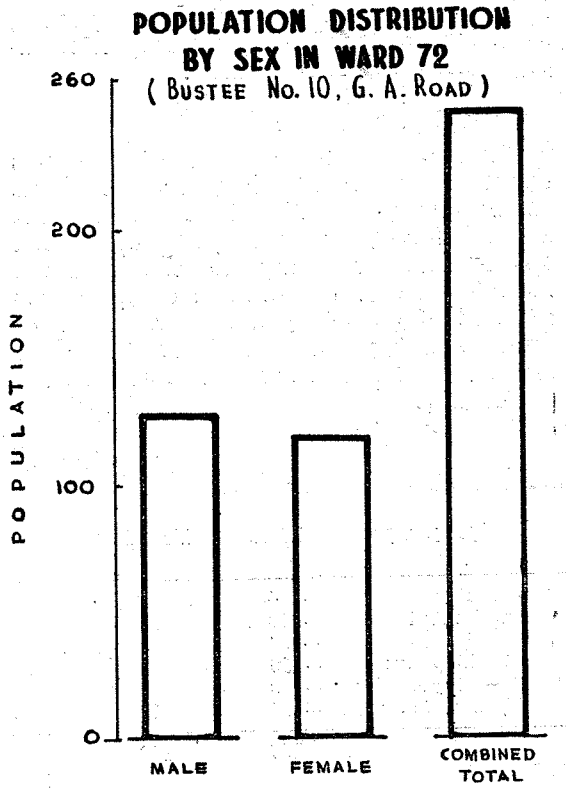
(b) *Information regarding the individual members of the family.* The information regarding the individual members of the family related to age, sex, family and marital status, age at first marriage, occupation, education, addiction, present status of health, sickness during the year, etc. In case of females additional information regarding the age of marriage, age at first pregnancy, total live births, terminations and abortions and total living children was also collected.

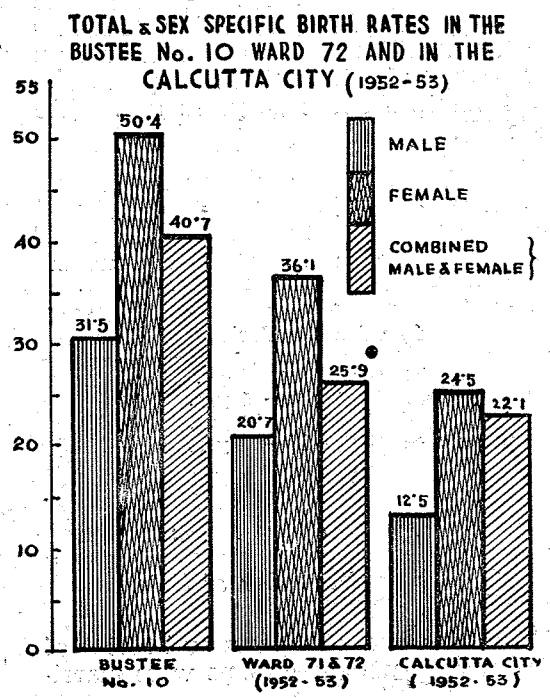
(c) *Physical examination:* Physical examination was carried out of all individuals for nutritional status, present state of health etc., supported by laboratory examinations when necessary.

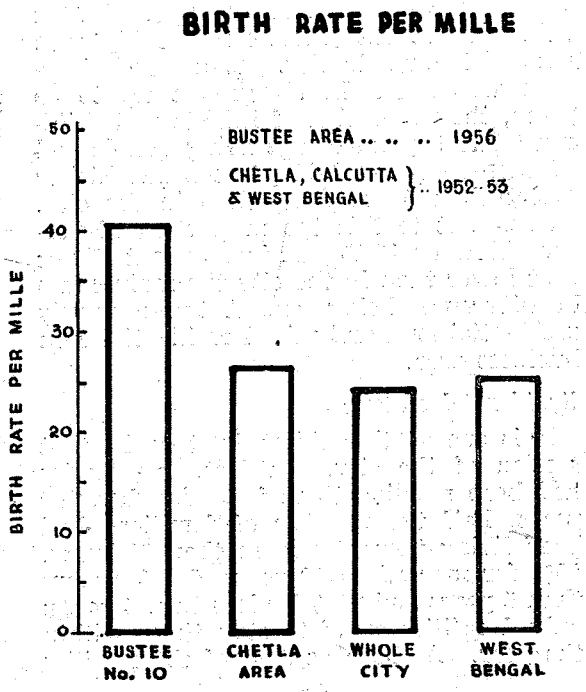
Location:

The number of bustees exceeded a hundred in the area and the present one was situated in the south-eastern part of Ward 72, the most congested part of the Chetla area. It was a triangular area bounded in the north by Gobinda Auddy Road, on the east and south by Mahesh Dutt Lane and on the west by a blind lane and a tank. Inside the bustee there was a katcha foot path, which bifurcated and encircled a big dump of rubbish heap consisting of scraps of paper, iron, tin, broken bricks and housing material, human excreta etc. and joined at the other end of the dump (see map). The level was


GOVINDA ADDY ROAD
SHOP
SHOP
SHOP
SMITHY
RUBBISH HEAPS
DUTTA LANE
MAHESH
● .. LATRINE
O .. WATER TAP
BUSTEE No. 10
GOVINDA ADDY ROAD.


POPULATION DISTRIBUTION
BY SEX IN WARD 72
(BUSTEE No. 10, G. A. ROAD)
POPULATION
260
200
100
0
MALE
FEMALE
COMBINED TOTAL


TOTAL & SEX SPECIFIC BIRTH RATES IN THE BUSTEE No. 10 WARD 72 AND IN THE CALCUTTA CITY (1952-53)
55
50
40
30
20
10
0
50·4
40·7
31·5
36·1
25·9
20·7
24·5
22·1
12·5
MALE
FEMALE
COMBINED MALE & FEMALE
BUSTEE No. 10
WARD 71 & 72 (1952-53)
CALCUTTA CITY (1952-53)


BIRTH RATE PER MILLE
BIRTH RATE PER MILLE
50
40
30
20
10
0
BUSTEE AREA 1956
CHETLA, CALCUTTA & WEST BENGAL .. 1952-53
BUSTEE No. 10
CHETLA AREA
WHOLE CITY
WEST BENGAL

lower than that of the surrounding areas, with inadequate drainage leading to flooding during the rainy season.

Area and population:

The approximate area of the bustee was about one acre. The number of resident families was 50 with 246 members, the average family size being 4.92 as against 5.21 in India according to the National Sample Survey. The number of males was 127 and of females 119, the proportion of females being 937 per 1,000 males as against 536 females per 1,000 males in the whole city.

The birth rate was 40.6 per mille as against the reported birth rates 26.0 (1952-53), 23.9 (1952-53) and 24.8 (1952) in the Chetla area, whole city and West Bengal respectively. There was only one death in the year ending March 1956, the death rate being 4.06 as against 15.11 (1952-53) in the city of Calcutta and 13.6 in the whole of India (1952). There was no death among the 10 infants (4 males and 6 females) born during the year.

Age and sex distribution:

The age and sex distribution of the population is given in Table I.

TABLE I.
Distribution of population by age and sex.

Age groups	Male	Female	Total	% of the population	Indian figure %	(1951-52) % Calcutta City
Infants	4	6	10	4.1	13.4	8.8
Pre-School	19	15	34	13.8		
5—15 years	34	26	60	24.4	24.8	18.8
15—45 years	50	53	103	41.9	45.0	58.8
45—55 years	9	9	18	7.3	8.5	8.3
55 years & above	11	10	21	8.5	8.3	5.6
	127	119	246	100.0	100.0	100.0

The distribution of population by age groups as given in Table I. approximates that of India but differs considerably with that of the whole city. While the difference was noted in all groups up to 45 years, the proportion of infants and children up to 5 years of age being double and of those between 5-11 years much higher (more than 5 per cent) than in the city. In contrast to this the proportion of persons between 15-45 years was about 17 per cent lower than in the city the main cause of difference being one between purely residential area and mixed residential cum business area.

Residential status:

It is one of the oldest bustees in that section of the city. In fact, one family had been residing there for more than 100 years, half the number of families had been living there for more than 20 years, 16% for more than 10 years, 6% for more than 5 years and 28% for less than 5 years; only 4 fafilies came to stay there within the year. As high as 82% of the families had been resident in the city for more than 15 years. Of the remaining 9 families (18%), 3 families came to Calcutta only 3 years ago, 2 families about 10 years ago and 4 families about 15 years ago. (see Table II).

TABLE II.
Distribution of population to the period of residence in the particular Bustee and in the City.

Period of residence in Calcutta		Period of residence in particular bustee.	
Period	No. of families	Period	No. of families
—3 yrs.	3 (6%)	1 yr.	4 (8%)
—10 yrs.	2 (4%)	2— 5 yrs.	10 (20%)
—15 yrs.	4 (8%)	5—10 yrs.	3 (6%)
15 yrs. & above	41 (82%)	10—20 yrs.	8 (16%)
		20—40 yrs.	19 (38%)
		40—50 yrs.	2 (4%)
		50—100 yrs.	3 (6%)
		100 yrs. & above	1 (2%)

Marital status and number of living children:

All women abcve 20 years and 85.2% of males of the same age groups were marri-

ed but among the women 34.1 per cent were widow. Of the 69 married women above 15 years of age 26 (37.6%) women had no living child including 22 (15 married and 7 widows) who had no issue at all. The average number of children born per married women was 3.47 but only 2,35 were alive during the survey, and the same per widow was 3.1 with 1.82 surviving.

The age at marriage for 70 married women was less than 10 years in 15 cases, (21.4%) between 10 and 15 years in 53 cases (75.7%) and between 15 and 20 years in 2 cases (2.9%). The number of married males was 46 of which 2 only (4.3%) were married a little earlier than 15 years of age and 22 (47.8) between 16 and 20 years and 17 (36.9) between 21 and 25 years and 4 (8.7%) between 26 and 30 years and only 1 2%) after 30 years of age. Thus a large majority of the marriages took place in the earlier ages than usual in case of both females and males. The average interval of age at marriage and age at first pregnancy was 4.3 years and varied from 1 to 10 years.

Among the 47 married women who conceived, five had given history of abortions, three having one abortion each, one having three and one having four abortions.

Literacy :

The percentage of illiterates above 5 years of age was 44.6 per cent (males 20.2% and females 70.4%). The literates comprised of 12.4 per cent just literates, 25.2% having primary, 12.3% high school and 5.5% university or vocational education. Including the children below 5 years the illiterates were 54.5% as against 56% in the whole city. (see Table III).

TABLE III.

Percentage distribution of literacy according to sex.

Literacy	Male	%	Female	%	both sexes	%
Illiterate	21	20.2	69	70.4	90	44.6
Just literate	21	20.2	4	4.1	25	12.4
Primary	30	28.8	21	21.4	51	25.2
High	19	18.3	3	3.1	22	10.9
Secondary	4	3.9	0	0.0	4	2.0
University	7	6.7	1	1.0	8	4.0
Vocational	2	1.9	0	0.0	2	1.0
Total	104	100.0	98	100.0	202	100.0

Occupation :

More than half, 56.9% of the population, were non-earning dependants. Among males 48.8% were gainfully employed 19.7% were at School and 31.5% were at home, the corresponding figures for the females were 7.6, 7.6 and 84.6 per cent respectively, (Table). Of the 70 males above 15 years, 4 were in school and 62 (about 94%) were gainfully employed whereas among 72 females of the same age groups only 1 was in school and 9 or 12.5 per cent were gainfully employed. Of the males 19 were artisans, 17 office workers and others were occupied as shopkeepers, venders, motor-drivers, teachers, technicians etc. Of the female 6 were employed as maid servants and three others as part time workers. Four males below 15 years were also gainfully employed, 2 as office workers, one as artisans and another in leather work. There were 10 other persons between 15 to 20 years of age who were earning to help their families.

A few families in the Bustee had some sort of industry of their own e.g., making and repairing of lamps, cans, jars, hand pumps (for holi festival), paper bags, etc.

Addiction :

Among males only one person (45-50 yrs.) was addicted to alcohol and one (above 50 yrs.) to opium. Thirty-eight (30%) of the males and 10 (8.4%) of the females were indulging in smoking. Pan chewing was the other type of minor addiction indulged in by 15.8 per cent males and 27.7% females.

Economic conditions :

Since the population under consideration generally belonged to the low income group no direct assessment of income was undertaken. Their standard has been judged on the basis of expenditure on different items of basic family requirements.

The average number of persons per family was 4.9 and the average annual expenditure Rs. 1,241/- i.e. Rs. 253/- per capita. This is two and half times less than the average annual consumer's expenditure in the city of Calcutta, as reported in the National Sample Survey of

1951, namely, Rs. 654/- per year; it is, however, higher than the average annual expenditure of the country as a whole, which is Rs. 220/-. The average expenditure per family per year on different items are given in Table IV. and compared with those of the cities, towns and rural areas as published in the Book on 'India', 1956.

TABLE IV

Average expenditure per family per year on different items in the Bustee as compared with that in the rural areas, towns and cities

Items	Expenditure/family/year (in rupees)	Per cent of total expenditure			
		Bustee	Rural*	Town*	City*
1. Food	858	69.10	66.30	54.70	46.10
2. Fuel and light ...	62	5.00	3.25	6.12	6.18
3. House rent or tax ...	86	6.92	0.57	2.98	6.86
4. Clothing, bedding, footwear and toilets ...	79	6.36	12.02	8.24	9.14
5. Education ...	20	1.60	0.26	2.06	2.68
6. Medical advice and medicine	55	4.40	1.27	2.73	2.29
7. Travelling (conveyance)	14	1.12	1.20	2.16	3.05
8. Miscellaneous ...	67	5.40	8.70	6.60	6.13

* The figures are quoted from the National Sample Survey data of 1952.

The highest expenditure i.e., 69% was on food, as against 66% in rural areas, 55% in the town and 46% in the cities (vide—National Sample Survey—1951). The expenditure was proportionately higher on house rent or tax as well as on medicine and medical advice.

The distribution of families according to expenditure per capita per annum is given in Table V.

TABLE V.

Distribution of families according to expenditure per capita per annum.

Expenditure per capita per annum (in rupees)	Proportion of families in the group (per cent)
—75	Nil
—100	2.2
—150	8.7
—250	34.8
—300	8.7
—400	21.7
—500	13.0
—700	8.7
—900	2.2

From Table V it will be seen that per capita annual expenditure of 45.7 per cent families fell below Rs. 250/-, and of 43.4 per cent families between 250-500 rupees and only 10.9 per cent families were spending over Rs. 500/-. The overall average per capita expenditure was Rs. 253/-. It actually ranged between Rs. 80/- and 800/-.

Expennditure on medicine and medical advice:

The distribution of families according to the annual per capita expenditure on medicine and medical advice is given in Table VI.

TABLE VI.

Distribution of families according to annual per capita expenditure on medicine and medical advice.

Expenditure (in rupees)	No. of families	% of families
Nil	18	40.0
1—3	5	11.1
3.1—5	4	8.9
5.1—10	6	13.3
10.1—20	2	4.4
20.1—30	2	4.4
30.1—40	2	4.4
40.1—50	3	6.7
50 & above	3	6.7
	45	99.9

It will be seen from the Table VI that 40% of the families did not incur any expenditure on medical advice whether any illness had occurred in the family or not. Twenty per cent of the families spent less that Rs. 5/-, 13.3 per cent about Rs. 7/8/-, 4.4 per cent about Rs. 15/-, 4.4 per cent Rs. 25/-, 11 per cent about Rs. 40/- and 6.6 per cent about Rs. 50/- per capita per

year, the average annual per capita expenditure being Rs. 4/6/-.

Family outlook on cause and prevention of diseases:

The outlook of the people in the causation of disease, as far as could be ascertained, was rational in half the number of families and mixed rational and diestic in the other half including, only one of them being fully diestic. In regard to the prevention and causation of diseases 27 families (54%) was rational, 13 (26%)' were mixed rational and religious, 8 (16%) were religious, one (2%) was mixed religious and fatalistic. Thus this bustee area would need some health education programme pari passu with the adoption of preventive and curative measures (see Table VII a & b).

TABLE VII (a)

Distribution of families according to outlook on cause of disease.

Outlooks	No. of families	Percentage of families
Rational	25	50
Diestic	1	2
Mixed	24	48

TABLE VII (b)

Distribution of families according to outlook on prevention and cure of diseases.

Outlook	No. of families	Percentage of families
Rational ...	27	54
Religious ...	8	16
Rational & religious ...	13	26
Rational & fatalistic	1	2
Religious & fatalistic	1	2
	50	100.0

State of health and sickness:

At the time of survey 87.3% of the population was well and 12.7% sick including 7.9% chronically ill and 4.8% in indifferent health. No person was found acutely ill at the time. The state of health at the time of survey age and sex distribution of sickness is given in Table VIII.

At least 12% were found sick at the time of survey. This is a high figure almost equivalent to the conditions prevailing in Singur in 1944. Males were more affected than females, the sickness rates being 14.6 and 10.7% respectively.

During the year 21.7% of the population was sick at one time or the other. This figure is high compared to the Singur data of 1944 (Lal & Seal, 1944). The causes of sickness and the number o fpeople involved are given in Table IX.

TABLE VIII.

State of Health	MALE							FEMALE							Grand Total	%
	Infant	—5	—15	—45	—55	55—	Total	Infant	—5	—15	—45	—55	55—	Total		
Well	3	12	25	30	7	5	82	2	10	18	39	6	8	83	165	87.3
Acute Ill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chronically Ill	0	1	0	4	1	3	9	1	1	1	2	1	0	6	15	7.9
Indifferent Health	0	1	0	2	0	2	5	0	2	0	2	0	0	4	9	4.8
Total	3	14	25	36	8	10	96	3	13	19	43	7	8	93	189	100.0

TABLE IX.

Acute and chronic sickness during the year according to causes (number of persons examined —189, Male—96, Female—93).

Diseases	Male	Female	Total	Rate per 10,000
Throat disease	7	1	8	423
Measles	5	1	6	317
Skin diseases	1	2	3	158
Rheumatic condition	1	2	3	158
Non-venereal diseases of genito-urinary system	2	1	3	158
Diarrhoea and dysentery	2	0	2	106
Rickets	0	2	2	106
Asthma	1	1	2	106
Cataract	1	1	2	106
T.B. of respiratory system	1	0	1	53
Ulcer of stomach or duodenum	1	0	1	53
Filariasis	1	0	1	53
Leprosy	1	0	1	53
Eye, other diseases of	1	0	1	53
Typhoid	1	2	3	158
Cholera	1	0	1	53
Meningitis	1	0	1	53
Total	28	13	41	
Percentage	29.1	14	21.7	

It will be seen from the Table IX that the sickness rate was higher among the males, 29.1%, than among the female 14%, and that the diseases whose spread is facilitated by overcrowding such as, throat infections, measles, skin diseases etc. were more prevalent than others. A case of active tuberculosis was also detected. The next in importance was the presence of gastro-intestinal diseases like diarrhoea and dysentery, typhoid and cholera, which reflects on the bad sanitary conditions.

The average period of sickness during the year per sick person was 110 days and per person of all ages was 24 days. The corresponding figures found in Singur in 1944 were 50 and 19.6 days respectively. Thus in regard to the duration of sickness, the present figures are much higher than the Singur figures of 1944. Thus entailed serious economic loss to the families.

Parasites in stools:

Examination of stool samples showed 40 per cent infestation with giardia and 5 per cent with E. histolytica.

Haemoglobin content:

The low grade health conditions were also supported by the findings of the haemoglobin content of blood as given in Table $\frac{1}{8}$. Nearly two-thirds (63.8%) of the population showed less than 70 per cent haemoglobin including 3.2 per cent having less than 50 per cent. In 30.9 per cent cases the haemoglobin content ranged between 70 and 80 per cent. Thus as high as 94.7% people were partially or grossly anaemic, only 5.3 per cent having more than 80 per cent haemoglobin.

TABLE X

Distribution of population according to Haemoglobin content.

Hb. percentage	No. of person examined	Percentage of persons in the category.
–50	3	3.2
50 & above	57	60.6
70 ,,	29	30.9
80 ,,	5	5.3

General nutritional status:

The general nutritional status was fair in 69.3 per cent of the population. It was bad in 25.4% and good in 5.3% the males and females behaving equally in this respect (see Table XI).

TABLE XI

Percentage distribution of people according to general nutritional status and sex.

Sex	Nutritional status. Very good	Good	Fair	Under-nourished
Male ...	Nil	5.2	68.8	26.0
Female ...	Nil	5.2	69.9	24.7
Both sexes	Nil	5.3	69.3	25.4

Medical aid utilized:

Twenty-four per cent of the families did not utilize any medical aid and only 8 per cent utilized hospitals or dispensaries, 56 per cent qualified practitioners and 32 per cent homeopaths. Some of these families however, used more than one type of practitioners.

Sanitary conditions:

(a) *Housing*:—Most of the hutments were built, as rows of rooms around a small central courtyard, with a narrow passage of communication with outside. Others were either built haphazardly or in two parallel rows keeping a long narrow space in between. All huts had an open or closed verandah in the front part and was being used for domestic work or as a workshop for their home industry. A combination of a few of most of the following materials viz., kerosin tin, tiles, corrugated iron sheets, rags, bamboo chips, mud and tarred papers etc., were utilized to make a shelter for living. Almost all the tiled sheds were found in a state of bad repairs with complaints of leaking during the rains. The distributions of families according to nature of construction of the hutments is given in Table XII.

TABLE XII

Distribution of families according to nature of construction of houses.

Roof	Pucca floor, wall other than pucca	Mud floor, wall other than pucca or mud	Mud wall and mud floor	Total	Percentage
Tile	1	1	12	14	28.6
Tin or asbestos ...	14	2	17	33	67.3
Thatched ...	—	—	2	2	1

Two-thirds of the huts had tin or asbestos roof and the remaining had tiled shed except few huts with thatched roof. Majority of the huts had mud wall and mud floor and only 14 hutments had pucca floor. One persons having no shelter was using a verandah of another family for sleeping.

Ventilation and lighting:

In 76 per cent of the hutments ventilation and lighting were unsatisfactory including 6% huts where it was very unsatisfactory. Cleanliness was unsatisfactory in 84 per cent including 10% very unsatisfactory. 64 per cent of hutments were damp and the drainage was unsatisfactory in 88 per cent (see Table XIII).

TABLE XIII.

Distribution of huts according to their sanitary conditions.

Sanitary conditions	Percentage of huts Satisfactory	Unsatisfactory	Very unsatisfactory
Ventilation and lighting	24	70	6
Cleanliness	16	74	10
Dampness	36	62	2
Drainage	12	72	16

Space per person:

The space per person is grossly inadequate in 44 per cent of the families, inadequate in another 30 per cent; only one-fourth of these (26%) had adequate accommodation (see Table XIV).

TABLE XIV

Distribution of families according to space per person.

Space in sq. ft.	No. of families	Percentage
—10	6	12
—20	16	32
—30	9	18
—40	6	12
—50	4	8
50 and above	9	18
	50	100.0

Water supply:

There were three public filtered water taps inside the bustee, connected with the city supply. Two of these taps had no platform and drainage facilities, resulting in stagnation of water around the taps. The platform of the third was also in bad repair. Only three hutments had water tap inside their compound. For the majority of the families therefore, there was no arrangement for privacy and bathing, and the supply was inadequate for 84 per cent of the families. There is a tank on the western side of the bustee which was badly kept and served as a dumping place of waste water and even refuse and garbage. This tank is used for bathing and domestic purposes by 7 families.

Disposal of night soil:

There was only three latrines connected with sewerage and attached to the huts for the use of 8 families. The rest 42 with single seat, outside the hutments. families were using 6 other service privies The maintenance and the sanitary conditions of these privies were very unsatisfactory and the number of seats were inadequate for at least 42 (84%) families.

Disposal of refuse:

The refuse was lying heaped up in an open space inside the bustee and partly disposal of in the Corporation dustbin on the main road 50 yds. away from the bustee.

Family hygiene:

Family cleanliness was unsatisfactory in 80 per cent of the families and 2 per cent were dirty. Fifty-two of the families were using verandah for cooking purposes and 28% had no kitchen and cooking arrangement. Only 20 per cent families were fortunate enough to have a separate kitchen. The sanitary condition was unsatisfactory in all the kitchens.

Cowshed & poultry:

Only 2 families had cows, one keeping them in a cowshed by the side of the kitchen cum workshop (home industry) and the other in the open on the backside of a living room. Another family had pigeons as pet birds and a few other had dogs.

Insects and pests:

Flies, mosquitoes and rats were present in all huts. Flies were moderately prevalent in 88% and largely prevalent in 12 per cent of them. There was heavy infestation of mosquitoes in 4 per cent huts and moderate infestation in the remaining 96% at the time of survey. Rats were moderately present in all the huts.

SUMMARY

1. The Urban Health Centre, as established by the All India Institute of Hygiene and Public Health, Calcutta, is located at Chetla (Ward No. 71 & 72) where more than one-fourth (28%) of the population live in slums. A pilot socio-economic survey was carried out during the period between the 2nd March to 23rd April 1956 in one of these slums (bustee at 10 Gobinda Auddy Road) to indicate the step that may be taken for the improvement of their lot.

2. The number of families living in the bustee was 50 consisting of 246 members—127 males and 119 females. The popula-

tion of females was 937 per 1000 males as against 536 females per 1000 males in the whole city. The average size of the family was 4.92 as against 5.21 in the whole of India. The period of residence of different families ranged from 1 to 100 years.

3. All women above 20 years were married as against 85.2 per cent of males of the same age groups. The percentage of widowhood was 31.4. Twenty-six out of 69 married women had no living child but 22 (including 7 widows) had no issue at all. Out of 3.47 children born per married women 2.35 were alive during the survey.

4. The birth rate was 40 and death rate 4.06 per mille.

5. The percentage of illiterate above 5 years of age was 44.6 (male 20.2%; females 70.4%); 12.4 per cent were just literate, 22.2 per cent had primary, 12.9 per cent high school, and 5.0 per cent University and vocational education.

6. Of the 70 males above 15 years 4 were in school and 62 (about 94%) were gainfully employed, as artisan, office-workers, shopkeepers, vendors, motor drivers, teachers, technicians etc. only 6 females out of 72 women above 15 years were employed as maid-servants and 3 others as part time workers and the rest were housewives.

7. Addition to alcohol was surprisingly negligible and only one person was addicted to opium.

8. The bustee consisted of huts constructed with materials like kerosine tin, tiles, C. I. Sheets, bamboo chips, tarred paper, rags, and mud etc. Nearly one-third of the huts had, however, cemented floors.

9. The sanitary conditions were very unsatisfactory in the majority of the huts. There were 4 filtered water taps, inside the courtyard between 10 families and the remaining 40 families were using three Corporation water taps provided at the bustee, the supply of water being very inadequate. A very unclean tank was being used by a large number of the bustee dwellers for bathing and domestic purposes.

There were only three latrines attached to the huts for the use of 8 families, the rest were using six other service privies, with single seats. The maintenance and the sanitary condition of the privies were very unsatisfactory. The refuse was being heaped in an open space inside the bustee and partly disposed of in the Corporation dustbin on this main road 50 yds. away from the bustee area.

10. There was gross overcrowding in two-thirds of the huts the space per person being less than 30 sq. ft. Inspite of shortage of space two families were keeping cows and one family pegions as pet birds.

11. Family cleanliness was unsatisfactory in 80 per cent of the families, 42 per cent of the families was using verandah for cooking and 25 per cent having no kitchen arrangement.

12. Only 50 per cent of the families had a definite bias towards a rational outlook in regard to the causation of disease and 54 per cent had exhibited similar outlook on the prevention of disease.

13. At the time of survey 12.7 (male—14.6%, female 10.7%) percent of the population was sick including 7.9 percent chronically ill and the rest in indifferent health.

During the past one year 21.7 percent (male 29%, females 14%) of the individuals was sick at one or the other, the average duration of sickness being 24.7 days per person and 110 days per sick person.

The diseases occurred in the falling order: Diseases of throat and tonsil, measles, enteric fever, rheumatic condition, genito-urinary disorder, skin diseases, asthma, rickets, diarrhoea and dysentery, tuberculosis, cholera, leprosy, filariasis, peptic ulcer and eye disease. The general nutritional status was bad in 25.4 per cent, fair in 69.3% and good in the rest.

14. About 64 per cent of the population had haemoglobin below 70 per cent and about 95 per cent below 80 per cent. Five per cent of the stool samples examined showed E. histolytica.

15. The average annual per capita expenditure was estimated to be Rs. 310/-. It varied between Rs. 80 to Rs. 800, 45.7 per cent were spending less than Rs. 250 per capita, 43.4 per cent between Rs. 250 and Rs. 500 and only 10.9 per cent above 500. The proportional distribution of expenditures on different items was as follows: Food and production—69.1%, House rent and taxes—6.7%, Fuel and light—5.0%, Clothing, bedding, footwear and toilet—6.4%, Education—1.6%, Medicine and Medical advice—4.4%, Travelling and conveyance—1.12% and Miscellaneous—5.4%.

16. Twenty-four percent of the families did not utilise any medical aid and only 8 per cent utilized hospitals or dispensaries, 56 per cent qualified practitioners, and 32 pre cent homoeopaths. Some of these families, however, used more than one type of practitioners.

REMARKS

This is perhaps the first time that an integrated health and socio-economic survey of the bustee population in Calcutta has been carried out. Only one out of several bustees of the Chetla area (ward 72) was surveyed. The absence of an authentic record of any organised study of the bustee population of the city and particularly of the Chetla area where 28 per cent of the population live in bustees, prompted us to publish this preliminary report. Besides, the methodology adopted might be useful in carrying out such studies by others interested in this problem.

It appears that the conditions noted in this bustees are somewhat better than those prevalent in the other bustees where the conditions are supposed to be much worse. An attempt will, therefore, be made to cover the bustees by smapling technic so that an early picture of the slum conditions of the entire health centre area may be obtained and appropriate recommondations made, because any recommendation made at this stage might fall short in the actual requirements. However, a few salient point only may be touched here.

(1) The primary need of the bustee is improvement of the housing and sanitary conditions. It is possible to bring about this improvement within the space available, provided a planned housing scheme with a central open space for a playground or garden, is undertaken. The man-days lost in sickness is very high for which bad sanitation, overcrowding, traditional family outlook and low income status in the family are jointly responsible. Twenty-four per cent of the families could not afford to take my medical advice. Thus simultaneously with the improvement of sanitation and housing conditions certain amout of educational and social reforms would be needed in addition to the provision of necessary medical facilities and free medical care.

Although the number of children per married woman is lower than the usual Indian figure nearly 1/3rd. of those who were born died during childhood, leaving 2.35 children per married woman to attain adulthood.

Early marriage was also common and widowhood was very high. Besides nearly 1th of the married woman did not have any issue. These conditions warrant further investigation of this aspect of the problem.

ACKNOWLEDGEMENT

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MENTAL HEALTH AND HYGIENE

On even a casual survey of contemporary affairs in the various fields of activities in the country, an observation that strikes us forcibly is that there is an unfortunate tendency to allow an adverse situation to arise, grow and develop until one fine morning it explodes when we rush hither and thither for finding palliatives and remedies. Take "strikes", for instance, which are assuming features similar to those communicable diseases appearing sometimes as sporadic in different parts, sometimes endemic in others and occassionally as epidemic all over the sub-continent. We hold no brief for the strikers particularly when the strike is illegal causing as it does incalculable inconvenience, annoyance to the public and colossal economic loss to the country at a time when she is engaged in fulfilling her plan for the second Five-Year period. But if concessions are made at the intervention of high dignitaries, one wonders why with a little more anticipation, sympathy and understanding, which presumably enabled them to throw oil over troubled waters, these were found impossible by the employers themselves. Take epidemics of infectious disease in big cities as another instance. It is not the lack of knowledge as to how a particular disease appears in epidemic form year after year but it is the tendency to allow it to occur and then rush for remedies however temporary the effect may be. It is not understood why we can not take due action in full anticipation of events from past experience.

This tendency, we fear, is also getting increasingly apparent in one important phase of health services. We refer to Mental Health. Almost without our knowledge the prevalence of mental disorders and deficiency is increasing by leaps and bounds. Anyone with experience of health administration of a State or one who is adequately observant would testify to the fact that for various reasons there is a rising tide of mental disturbance and disorders among the people of the country. And need we be surprised at it when we consider the economic distress among the middle and lower income groups, the soaring prices of commodities absolutely essential for bare sustenance of the people, the jumping rise of unemployment in the country and consequent frustration, the influx of millions of refugees uprooted from their hearth and homes with psychological trauma already inflicted on them, still awaiting rehabilitation!

It is true no valid estimate with any degree of precision of the incidence of mental disorders and diseases in the country can be made. In fact, no attempt has hitherto been made to obtain such data. In U.K. and U.S.A. an estimate obtained from the ratio of mental patients treated in hospitals indicated 3.2 and 5-8 per 1,000 population respectively in different years and different States. In India there is no reason to believe that the ratio of mental disorders is in any way less than those in England and the United States. While it is possible that in our country the higher infant mortality and shorter span of life in the individual should result in reducing the proportion of persons liable to adolescent and senile psychoses respectively, there are a number of other factors influencing the development of mental disorders which are operative here to a much greater extent than in those two countries. With the operation of mass control of diseases in the country, the infant death rate as well as the expectation of life at birth have become more favourable now and therefore the trend of incidence of mental disorders would in a very short time follow that in those two countries. Chronic starvation or under-nutrition, tropical fevers and frequent child birth in women are responsible for large number of mental breakdown in this country. In the circumstances, even if the proportion of mental patients in India is taken as 2 per 1,000 of the population, at least 720,000 mental patients will be found at any one time. As against this, we had, during the pre-independence period, approximately 13,000 beds which have since been increased to 20,000. The existing number of beds in hospitals for mental patients works out as 1 for 40,000 as against the corresponding ratio of one bed to 300 of the population in England. Even on computation of the incidence on the basis of a lower rate for India, it will be observed that the provision of beds for mental disorders is desparately inadequate being very nearly 130 times less than that provided in England. Furthermore, there are large numbers of persons suffering from varying degrees of mental disorder who however may not require hospitalisation and yet should receive treatment. To this may be added cases which suffer from mental deficiency for which no estimate is possible but whose number will, in all likelihood, run into millions if the ratio of incidence in England and America be taken as a rough guide.

Psychological and medical treatment are necessary for many forms of psychoneuroses. Mental deficiency will require provision on a wide scale including special educational facilities and institutional care for children suffering from various forms of this condition. For mentally deficient adults also, provision is necessary for treatment in institutions. At present provision for these two classes of sufferers from mental diseases can be said to be almost non-existent in India. Again, a substantial percentage of murderers, of criminals, and of delinquents suffer from mental and nervous disturbances. Psychiatric surveys of offenders in juvenile and adult Courts, in institutions for delinquent children and adults, have frequently shown that from one-third to over one-half are suffering from

mental defects or from abnormal mental conditions calling for thorough psychiatric study and treatment. Two-thirds of the cases of suicides are due to mental diseases and disturbances.

The prevention and provision for treatment of mental diseases therefore becomes one of the most urgent and challenging tasks in regard to efficient health service aiming at developing a sound mind in a sound body. We fully appreciate that it is not possible for any country to face this enormous problem and complete the task overnight. The gap between the existing position and the needs of the country in regard to this problem is so wide that it will take a few five-year periods of planned action before any reasonable achievement can be made. What we regret most is the complacency with which the problem is being treated. Even as far back as 1944, Bhore Committee made several recommendations of which the first and foremost was the formulation of a mental health programme which should have as its aim provision for the community by successive stages a modern mental health service embracing both its preventive and curative aspects. Two five-year plan periods are about to be over and our progress towards implementation of the above recommendation is practically nothing. Except the increase of a few beds in some existing hospitals and the establishment of a research and teaching institute in Mysore, nothing significant in regard to a mental health service programme has so far been achieved. In fact neither the Centre nor the States have given any serious attention to the question. Except a very few States, none possesses a mental hospital of its own—let alone the question of providing institutions for preventive service. Those States appear to be satisfied by reserving a few beds in a hospital in the neighbouring State if she has one or go without the provision altogether. In a welfare State such as ours, can we justify this attitude? We have to face the problem fairly and squarely and fight for its solution on all fronts. Let the work be carried out in stages but let a start be made in right earnest and the Government—both Central and State—give the lead. The directions in which immediate action is called for are, among others, the following in order of priority:—

(a) Creation—both in the Central and State Directorates—of a division of mental health. It makes possible the acquisition and dissemination of reliable information of the subject, stimulates research into the causes of nervous and mental diseases, behaviour, and personality disorders, carrying out of surveys and studies of mental hygiene problems, the application of such studies through education and promotion of beneficial legislation finally, bringing into operation effective programmes for countrywide mental health services for both adults and children.

(b) A rapid improvement of institutional facilities and bed position for the treatment of mental diseases and disorders.

(c) Increased training facilities for training of Psychiatrists, Psychiatric Social Workers, Clinical Psychologists and other allied ancillary mental health personnel, particularly Nursing.

(d) Improved teaching of medical students in Psychiatry and Mental Hygiene.
(e) Establishment of Psychiatric Units in general hospitals where they are not in existence.
(f) Refresher courses for general practitioners and various specialists in mental hygiene.
(g) Establishment of Child Guidance and Habit Clinics of Psycopathic hospitals where early cases of insanity, which are likely to be cured, are treated and the patient returned to the community, of Psychiatric clinics attached to various institutions and agencies such as schools, colleges, factories, commercial houses etc.

If the States, with Central aid where necessary, will earnestly and seriously take up the work as outlined above, we can, along with the concurrent socio-economic and physical health improvement in the country visualised by the Plan periods about to be completed, expect to arrest the onslaught of this menace of mental ill health within reasonably near five-year Plan periods. Should we not take up the matter seriously and sincerely before the position detcriorates further?

TRANSMISSION OF HUMAN LEPROSY TO EXPERIMENTAL ANIMALS

Although leprosy was the first infectious disease known as such in the world and *Mycobacterium leprae* (Hansen, 1873) was the first pathogenic bacteria identified, two vital problems related to this disease have yet remained unsolved, viz. the organism could not be cultivated in any artificial medium and no animal was found susceptible to it experimentally. Strangely, another bacilli *Mycobacterium tuberculosis* which resembles *M. leprae* in many of its characters can not only be cultivated in the artificial media but can also be transmitted into the experiment animals. Inspite of the innumerable attempts made to cultivate *M. Leprae* and to find a susceptible animal by various workers in different parts of the world, the problem have so far defied solution. Even a smilar infection in rats called rat leprosy has no relationship with human leprosy. Besides, several attempts to infect human volunteers through the skin failed or the result proved doubtful. No subject can therefore be more interest to the leprologist, the bacteriologist, the epidemiologist, the clinician and the public health administrator than the story of a successful transmission of human leprosy to experimental animals, because if transmission to human leprosy to animals could be accomplished, the achievement would be of great value to subsequent investigations, cultivation and identification of the strains, elucidation of pathogenesis of the organism and pathology of the disease, evoluation of drugs, finding a cure and mode of transmission, and procedure of immunisation and control of the disease, assessment of control and so on.

In the past, all sorts of available experimental animals, both higher and lower, had been tried, e.g. mouse, rat, guineapig, rabbit, monkey, dog, pig, cat, cattle, hamster, fowl, frog, fish, etc. All produced negative result except for local reaction in some without any sign of multiplication. Repeated injections of live bacilli into hens caused lesions similar to the changes in nodular leprosy, but those lesions proved negative with successive inoculation. The inoculation of yolk sax of developing chick embryo by Nakagawa and Nakamura (1954) was also unsuccessful. On the other hand, several workers like de Souza Araujo (1941), Shiga (1936) and Nojima (1939) claimed success in transmitting human leprosy to white mice treated in various ways. Sellard and Pinkerton, Sujuki, Burnet, Nakagawa and Nakamura et al were of the opinion that there was no definite sign of multiplication of the bacilli with general dissemination. Thus the problem of transmission of human leprosy to mice remained unsolved.

In the above experiments inoculum was obtained from a case either the discharges or the (lepromatons) of leprosy and tissues containing the bacilli were directly inoculated into the experimental animals in various ways and through various routes—intravenous, subcutaneous, intracutaneous, intraperitonial, intramuscular, intratesticular into the anterior chamber of the eye, intranasal and oral. Sometimes pieces of lepromatous tissue had been directly implanted into the animals. Single and multiple inoculations have been tried. In some animals the resistance was lowered by splenectony, starvation, feeding colocassia, injection of Indian ink, Kisselguhr, diatom, cortisone, cobra venom, trypan blue, potassiam iodide, etc. Attempts were also made to increase the virulence of the organism by suspending the organism in glandular mucin, human placental extract or by using hyaluronidase. The period of observation varied from few months to more than a year. Although the workers on the spur of enthusiasm often interpreted their results as a success but their claims could not finally be confirmed. The reported success was confined to local lesions only although a few workers also reported dissemination of infection.

There is yet another snag of uncertainty. It is not yet known whether the lesions which is expected to be caused in the experimental animals would be tuberculoid or lepromatous or generalized, and what should be the criteria of successful transmission. In any case, one criterion may at least be accepted and that is, if the animal shows evidence of infection in any form and the same can be transmitted from one animal to another several times successively and thereby if the organisms thus developed can be utilized for lepromin test with equal potency as that by the present lepromin reagent, the result may be considered as successful. Although some workers have claimed that they noted large number of globus formation inside the histiocytic cells of the tissues of the experimental animals, which is considered to be of some indication of proliferation and multiplication of the bacilli in the host, this could not be accepted as the dependable criterion for successful transmission.

Recently some interesting results have been obtained by the leprosy workers of the School of Tropical Medicine in the transmission experiments carried out in syrian hamsters and laboratory bred hybrid black mice (cross between the white albino mice and wild *Mus-musculus*). The preliminary results obtained by Dr. K. R. Chatterjee of the Leprosy Department of the school as reviewed in this issue of the Journal (.....) seems to be encouraging. The successful transmission in syrian hamsters was, however, previously claimed by Adler but the work could not be confirmed by Dharmenda and Lowe or Burnet. Thus the the successful transmissio to syrian hamsters reproted by Dr. Chatterjee needs confirmation and so also in black mice before coming to a defenite conclusion. Firstly, the possibility of natural infection with *Myco-tuberculosis, Myco-leprae muris* has to be completely eleminated not only by cultural method, as has been tried, but also by animal inoculation. For *M. tuberculosis* both guniapigs and rabbits may be employed and for *M. leprae muris*, both white mice and white rats should be simultaneously inoculated. However, for the genuineness of transmission intradermal reaction with lepromin made out of the organisms from the black mice was also tried (Sen, 1958). Although there is a similarity of reaction the degree of reaction was poorer. Even other bacteria like the vole bacillis, tubercle bacillis and antigens prepared from 'Stefansky' and Kedrowiky's bacilli, would give the reaction.

Secondly, it should be ascertained whether the black mice have attained the dominant hybrid character for the purpose of stable reproduction. As it was also reported (Smith, 1958) that the black hybrids were the smallest number and the other hybrids were dark brown or fawn coloured plus grey and white mice, it may be ascertained whether any of the others has also attained the same susceptibility.

Further, it might be possible to make the animals prone to the infection by using drugs like steroid hormones, India ink, trypan blue, potassium iodide. etc. or by suspending the organism in material like the gastric mucin, placental extranct etc. However, Dr. Chatterjee and his colleagues deserve full encouragement from every quarter and it is hoped that on a carefully planned further work by them as well as by others interested in the subject the hybrid black mous will finally turn out to be that missing animal susceptible to *M. Leprae*, which the leprosy workers all over the world have been trying hard to discover.

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SCHOOL HOURS

In the last issue of the Journal the subject of School Health was discussed. The importance of the school hours from the health point of view, particularly for the growing children cannot be over-emphasised. The ideal school hours for them would probably be from 8 A.M. to 12 NOON, and these hours are generally followed in the Europeanised Public Schools in the cities and towns. In the rural areas, however, 11 A.M. to 3 P.M. or 4 P.M. (according to the age group) are considered convenient in all seasons except the summer, when for about 6—8 weeks morning schools are held.

For the past few years there has been unusual demand for seats in the schools, both private or governmental, as available in the cities and towns. Although there has been some attempt to build new schools but the rate of development having fallen far short of the requirement most of the schools have been forced to take recourse to early morning school (starting from 6-30 A.M.) for children up to Class V or VI Standard. For the same reason the colleges in many cities are running two and sometime three shifts—morning, day and evening, in detriment to both physical and mental health of the scholars. This arrangement results in great physical strain on the young children during their growing period, on account of the missing of the proper meal in the morning due to great hurry, derangement in certain health habits, such as evacuation, proper mouth hygiene, exercise, etc. For the whole period of the morning hours they often go without any food which make them fully exhausted when they return home at 11 A.M. leading gradually to malnutrition and retardation of physical as well as mental growth. In other words, the introduction of morning school for the first few years of the formative period has been the cause of physical under-development, loss of stamina and even of carbing of intelligence.

Another drawback of this type of morning school is that the children cannot be looked after by the parents, particularly the male guardians who are absent from the house during the hours available for study. The evening time is also not suitable for doing the home task as they invariably get exhausted after the afternoon's play. Thus their home study suffers seriously in the early part of their formative period, with consequent weakening of the foundation. This is what appears to be one of the causes of failures in examination and deterioration of the standard of education and intelligence among the present day student community in the country at large. This may finally lead to a national calamity in the near future unless the educationists, the Government as well as the parents and the public pay a serious heed to the situation already arisen and plan out a suitable remedy for it.

CURRENT PUBLIC HEALTH LITERATURE

EXPERIMENTAL ANIMAL IN LEPROSY

Chatterjee, K. R.—**Experimental Transmission of Human Leprosy in Laboratory Bred Selected Hybrid Black Mice and Syrian Hamstess—** Bull. Cal. S. T. Med., 6, 83, 1958.

Attempts at animal inoculation with *M. Leperae* and its cultivation in artifical media have so far ended in failures. The fault may not only lie in the species of animal but also with the technique. Accordingly the author considered it necessary to try both new species of animals and change in the experimental technique.

Two varieties of animals were chosen—one a new type of hybrid black mouse resulting from the crossing of female albino swiss mice with wild caught male house mouse, *Mus muculus*, (see report by Dr. R. O. A. Smith), and the other was a laboratory bred syrian hamster. The age of the black mouse was between 12 to 20 days and that of the hamster 3-6 weeks. In the experiment 106 black mice and 48 hamsters were used. The technique for the preparation of the inoculum was as follows: Human leprosy bacilli from active cases of lepromatous leprosy were made tissue free by differental contrifugalisation and diluted in physiological saline to contain a known number of bacilli per c.c. In the preparation of inoculum from material from the infected animals also, the bacilli were separated from the tissue before inoculation. Intraperitoned and subcutaneous routes or a combination of both of these were usually chosen. For comparative tests a number of animals were also inoculated by intracerebral, intraneural, intracostal and intramammary routes.. The infecting dose for black mouse was about 1000 million bacilli and for hamsters 3000 million. It was reduced to 1 to 20 million for black mouse and 1 to 50 million for hamsters for animal to anima l inoculation. The animals after inoculation were observed for a period of 5 or 6 months and them sacrificed, if still alive, at monthly intervals upto a period of 1 year or more. The P. M. material were examined microscopically as well as microscopically for acid-fast bacilli. Tissues of animals showing acid-fast bacilli were aseptically macerated and suspended in physiological saline and various media inoculated to rule out tubercle bacilli or saprophytic acid-fast organisms.

Six of the 48 hamsters and 31 of the 106 black mice died during the period of experiment. None showed any evidence of progress of disease. Also, those animals (8 hamsters and 11 mice) wihch were sacrificed within 3 to 5 months showed very little progress of infection. Of the 16 hamsters which were sacrificed or died (2 only) between 6 months or more than 1 year after inoculation, 7 showed mild infection, 5 moderate and 4 generalised and heavy infection. Of the 59 black mice dead or sacrificed during the above period 8 were found decomposed and 51 showed mild to heavy generalized infection.

The general signs and symptoms were: sluggish movement, depilated dry and rough skin, circumoral dryness in heavily infected animals. P. M. spleens and livers were found enlarged with nodulations. Testes and lymph nodes were also enlarged in a few cases. Black mice showed intra and extracellular acid-fast bacilli in spleen, granulomatous changes were also observed. The animals sacrificed late (more than 1 year) showed heavier infection with liver, kidney, omentum, glands, testes or ovary, nerve, skin, spinal cord etc. where globus formation, while during the early period the infection was mild. In hamsters, infection quantum increased with passage from one animal to other.

According to the author, the nature of lessions observed in the tissues of black mice suggests that these animals have a greater susceptibility to human lepsosy than any other animals so far used.

PHAGE TYPING OF CHOLERA

Mukherjee, S., Guha, D. K., and Guha Roy, U. K. —**Studies on Typing of Cholera by Bacteriophage—Part I; Phage Typing of Vibrio Cholera from Calcutta Epidemics**—Annals Biochem. & Exp. Med., 17, 5, 1957.

The present series of investigations were directed finally to classify by phage cholera Vibrios isolated in Calcutta during both epidemic and interepidemic periods. According to the authors, since carriers are not supposed to be existent in cholera, it must originate from and spread via patients actually suffering from the disease in the clinical or subclinical form, 89 to 100% of the strain tested were found to be lysable by different groups of cholera phages. When such a phage was propagated on one of the insensitive strains of cholera vibrios of one type the cholera phage could acquire high lytic affinity for all strains of vibrios belonging to that type. But this adapted phage did not lose its affinity for the types of vibrios which were originally sensitive to it, unlike the Vi typhoid phages. Patterns of insensitivity to different phage groups was utilized to differentiate the types of vibrio strains and the technique of adaptation of bacteriophage to insensitive strains was utilized in finding out sub-types.

Thirty cholera bacteriophages used could be divided into 4 different groups. Bacteriophage belonging to groups I, II, & III showed restricted ranges of type affinities for the vibrio strains tested; Four of the strains only were found insensitive to only Group I phages. These were classed as type 2 cholera vibrios, further subdivided into 3 subtypes of phage adaptation. Twenty-two strains were insensitive.

Thus two hundred strains of *V. Cholerae* in Calcutta could be differentiated into 7 types and subtypes with the help of these 4 groups of cholera bacteriophages.

It was also found that phage type *V. Cholerae* other than the universally lysable type I (e.g. 3, 4, & 5) were isolated most frequently during the mild recurrence of cholera epidemic in the first two months of 1957. Ten of these strains were phage contaminated, and these being the only strains found to be so, the authors made the tentative hypothesis that in nature phage might play a role in the genesis of different types of vibrio, to be tested in future studies.

AEROBIOLOGY—Pollens, Spores & Mites.

Kalra, S. L. and Dumbrey, D. G.—**Aerobiology of Army Medical Campus—Poona Pollens, Spores and Mites.**—Armed Forces Med. J. (Ind.), XIII, 1 Jan., 1957.

To establish the hypothesis that a pollen, to produce an allergic condition, has to possess allergenic toxicity, and to establish the correlation of the pollens of flowers with the hay-fever, asthma vasometor rhinitis, and dermatitis etc., the authors made an extensive study of pollens and spores of fungi in the air by the technique outlined by Halsel and recorded the monthly fall of pollen of important plants and of different fungi. This investigation provided an opportunity to make a detailed study of morphology of 51 pollens including 13 allergenic ones. Besides pollens and fungi 101 mites of 29 different species and 4 primitive insects and scales from the wings of mosquitoes, butterflies etc., were cought in the experiments. In this study the concentration of pollens and spores were found high in the atmospheric environment during the months from January to March when the incidences of hay fever, asthma etc., are usually high.

It has been suggested that by pollen surveys one can determine the various pollens and spores and their abundance in the atmospheric environment of a person.

Based on this information plants of allergenic families can be selected for the preparation of extracts, for sensitivity tests and therapy. A careful history of the patient may indicate that the attacks are restricted to certain months. In such a case tests with pollen, that are not in the air during those can be omitted.

* To Groups II phages and these could be further classified into 3 types by testing their sensitivity to Groups I and II phages 174 strains were universally lysable by phage I.

AIR POLLUTION

Baity, G. H.—**Some Cases of Air Pollution in Europe**—World Health, V. II, N. 2, 7, 1958.

The author has summarized his findings as follows:

SWITZERLAND—Harmful effects on animals and on plant life have been reported in the neighbourood of aluminium factories.

POLAND—In some districts, where concentration of smelting and allied industries is specially heavy, the health of school children in such areas is found to be adversely affectd.

NETHERLAND—Pollution from fluorine compounds have seriously affected the health of cattle. Damage to plant life has also been reported.

GERMANY—Plants releasing arsenic compounds and metallic dust into the air have resulted in losses of animal life.

SWEDEN—Plant life has been reported to have been damaged as a consequence of flue gases from shale-oil factories, iron works, phosphate factories, carbon bisulphide factories, copper works, electrochemical factories and sulfate cellulose plants.

FRANCE—According to a recent study on air pollution in Paris, it has been found that motor traffic accounts for 30/40% of the total pollution and domestic heating for about 50%.

FINLAND—A sulfuric acid plant had to pay heavy compensation for damage caused to crops and materials.

HOUSE DUST AND ALLERGY

Sanghvi, L. M., et al.—**Significance of House Dust as a Respiratory Allergen.**—J.I.M.A., 30, 216, 1958.

The present investigation was carried out to determine the role of house dust as a respiratory allergen in Indian environments.

Out of 100 patients suffering from respiratory allergeic manifestations examined during this investigation, 55 had bronchial asthma, 23 had hay fever, 16 suffered from allergic rhinitis and 6 from allergic bronchitis.

A detailed questionnaire was compiled to help to find out the offending allergen. Blood was tested for total and differential count and erythrocyte sedementation rate, nasal smears, urine and stool were examined. Special tests were made to search for parasites in sputum and stool.

Allergy tests by intracutaneous technique with dust and pollen allergens were made. Pooled sample of dust was used to prepare the allergen extract 0.01 ml. of a concentrated extract was employed for the test. Buffer saline was used as control. Reactions after 10 minutes were noted and graded 1 to 4 according to the severety of the reactions.

79 patients out of the 100 gave history of precipitation of symptoms on exposure to dust. Positive skin reactions to dust allergens were obtained in 89 patients including the 79 cases who had given history of symptoms being precipitated by exposure to dust.

Of the 34 cases of perennial asthma, 30 were those whose symptoms were associated with exposure to dust, in 21 cases of the seasonal asthma, symptoms in 14 were precipitated on exposure to dust. In 18 out of 23 patients of hay fever, symptoms were precipitated by exposure to dust, all these 18 cases gave a positive skin reaction. Of the 16 patients suffering from allergic rhinitis, 15 had a positive history and in all these the skin reaction was also positive. The 6 patients with allergic bronchitis had positive correlation with the exposure and showed positive skin reactions.

The investigation brings to light the role played by house dust as a major respiratory allergen. Hyposensitisation of these patients with dust extracts had resulted in improvement of the conditions, amelioration of the symptoms and delaying of recurrences.

POLIO-ANTIBODIES

Bouvier, L. Le Bouvier—**On the Rise and Decline of Poliovirus Antibodies in Different Human Populations**—American Journal of Hygiene, V. 66, 3, 342, Nov., 1957.

In order to study the dissimilarity in poliovirus infection in relation to age incidence, the author carried out an anti-

body survey against poliovirus in 5 groups of population and one in Egypt, Cairo), both neutralizing and compliment fixing. The study was made of the relative frequency of high, "Medium" low and undetectable level of serum neutralizing antibody against the 3 type of poliovirus for age groups from 0 to 40 yrs. in the 5 different (1 in Cairo Egypt, 2 in Charteston W—Va and 2 in Phoeinx Ariz.). This population exhibited a gradation in economic, sanitary and hygienic standard and corresponding in the prevalence of clinical poliomyelitis 4 of them had been selected on these grounds for inclusion in the survey.

The 5 populations formed a graded series with respect to the patterns of rise and decline of heir poliovirus antibody levels with increasing age. This gradation appeared to be consistent for all 3 virus types, and could be related to the hygienic conditions of these populations.

The lower the standard of hygiene of a population, the earlier the age, and the faster the rate, at which it acquired antibodies; and the earlier the age at which the proportion of those with high levels of antibody began to decline. It is postulated that this decline reflects and actual subsidence of antibody levels in the individual members of each population, as they grow older. This decline of high antibody levels was just as rapid in the population with the lowest standard of hygiene as in those characterized by higher standards and by a correspondingly less uniform exposure to poliovirus. The possibility that populations with the lowest standards of hygiene may indeed, exhibit the most rapid rates of high-level antibody decline remains to be explored.

After attaining a certain value, the percentage of "total antibody-positives" in a population, and therefore that of the "residual negatives," tend to remain constant. The lower a population's hygienic standards, the smaller appeared to be the percentage of these "residual negatives".

A state of dynamic equilibrium apparently developed between the "antibody-positive" and "antibody-negative" segments of a population, and to some extent also between the 3 categories of different antibody levels within the positive segment.

ADSORBED VACCINES

Gupta, S. P., and Gupta, N. P., and Mullick, K. S. —**Preparation of an Adsorbed Vaccine for Typhoid, Cholera and Dysentery**—J.I.M.A., 30, 343, 1958.

Absorbed vaccines are prefered where a single dose inoculation is desired; such vaccines also show less toxicity and pyrogenicity.

The authors prepared a vaccine containing soluble antigens from *S. typhi*, *S. paratyphi A*, *Shigella dysenteriae*, *Shigella flexneri* and *vibrio cholerae*, adsorbed on calcium phosphate. The immunising properties of the vaccine were studied. Rabbits were injected subcutaneously with both the unadsorbed and adsorbed bacterial extracts. The antibody response in the different groups was determined by agglutination tests.

Analysis of the results show that soluble antigens of good antigenic value were obtained often adsorbtion from *S.typhi*. The soluble antigens prepared from *S. paratyphi A*, *Shigella* and *vibrio cholerae* were not satisfactory immunizing agents. Detailed protocols showing agglutinin responses are incorporated in the article.

INFLUENZA A-PRIME VACCINE

Gordon Meiklejohn—**Effectiveness of Monovalent Influenza A-Prime Vaccine during 1957 Influenza A-Prime Epidemic**—Amer. Journ. Hygiene, Vol. 67, No. 2, 1958.

In the field trial carried out at Lowry Air Force Base in Denver, Colo, a monovalent A-prime vaccine capable of producing a large antibody response to the homologous strain was administered prior to the out-break of an influenza A-prime epidemic.

Three aqueous vaccines were used. The monovalent influenza A-prime vaccine was prepared from the strain Ann Arbor 56 and contain 750 C.C.A (Chicken cell agglutinating) units. The monovalent influenza B Vaccine was prepared from the Great Lakes 54 strain and also contained 750 CCA units. The polyvalent vaccine had a total potency of 1,000 CCA units and contained equal amounts of 3 strains in the

influenza A group namely swine A(PR 8, 1934) and A-prime (PR 301, 1954) and 2 strains in the influenza B group, namely Lee (1940) and Great Lakes (1954). All were given in a single injection of 0.1 ml. subcutaneously.

Three separate studies were made. In the first study, members of the permanent party (seasoned troops) were divided in two groups of 1,141 and 1,153 men, the former receiving influenza A-prime vaccine and the latter influenza B Vaccine. The second study was confined to student personnel who differed from the permanent party in their short prior military service and younger age and housed in baracks of traditional type. The member who received the A-prime vaccine was 1,188 and B vaccine was 1,2116. A third uncontrolled, study was made of personnel in a specialized unit who had limited contact with the remainder of base. 552 men in this unit received the polyvalent vaccine. The first study group was vaccinated almost 3 months and the other 2 groups 4 weeks and 7 weeks before the peak of the epidemic.

The epidemic was caused by a strain which while clearly within A-prime group differed substantially from that present in the vaccine. The sera were tested initially by complement fixation test with influenza A-prime (Be 1-48) and B(Lee, 1940) antigens and with an adenovirus antigen (type 4). Subsequently hoemaglutination inhibition tests were done with sera from all men admitted during the epidemic period from both the vaccinated and control groups. In these tests Ann Arbor 56 and Denver 1-57 antigens were used. A rise in titre of 4 fold or more in any test was interpreted as evidence that patient had influenza.

The proportion of vaccinated persons in the base population was relatively small and thus provided a more rigorous test. The incidence of other acute respiratory diseases was low. The result of he study in the student group showed clearly the effectiveness of vaccine in reducing the incidence of clinical influenza. The protection ratio was approximately 5.5 to 1 and was highly significant. The incidence of other types of respiratory diseases in the vaccinated and control groups were virtually identical, indicating the homogeneity of two groups. A similar degree of protection was not observed in permanent party study and suggested no more than inadequate supporting evidence of the hypothesis of a rapidly waning immunity. The failure of influenza to be detected in the specialized unit is of considerable interest. The polyvlent vaccine produced a smaller rise of Denver 1-57 antibody than the monovalent Ann Arbor 56 vaccine. It is possible that even though the increase of antibody was small, vaccination of the whole population provided sufficient herd immunity to prevent the spread of influenza.

The stury does not support the claim that laboratory test for influenza may fail to detect the disease in vaccinated individuals.

BED REST IN PULMONARY TUBERCULOSIS

Wynn Williams, N., and Young, R. D.—**How Much Bed Rest in Pulmonary Tuberculosis?**—Tubercle, 38, 333, 1957.

The authors described observations on two comparable groups of patients suffering from active pulmonary tuberculosis. administration of anti-tuberculous drugs The patients were treated by prolonged together with the usual ancillary treatment.

The first group spent an average of 6.4 months in bed and were considered fit to take up work after an average of 15 months. The second group averaged only 1 month in bed and 2.8 months to be fit for work. The results of treatment after one year were almost the same for both the groups. The time taken for sputum conversion was almost the same and there was little difference about the sputum status after one year, closure of cavities and radiographic improvements. The authors opine that if pulmonary tuberculosis is treated by prolonged administration of anti-tuberculous drugs, prolonged bed rest is not necessary except for those who have toxic effects and have cavities or massive pneumonic disease.

GOITRE IN N.E.F.A.

Beierwalters and Raman—**Endemic Goitre**—Current Medical Practice, Vol. I, Nov., 1957.

Goitre is considered a public health problem in the villages of the North Eastern Frontier Agency. In one village 70 p.c. of the population had visible goitre, in 2 p.c. there were signs of gross tracheal obstruction and 4 p.c. were definitely cretins. In another village, 28 p.c. of the population had goitre, 3 p.c. were cretins and 2 p.c. deaf mutes. According to the author's observation, in N.E.F.A. goitre incidence is associated with cretinism, feeble mindedness and deaf mutism.

RUBELLA AND PREGNANCY

Greenberg, et. al.—**Defects in Infants Whose Mothers had Rubella During Pregnancy**—J.A.M.A., 165, 678, 1957.

Examination of babies whose mothers had an attack of rubella during pregnancy showed that out of 104 such mothers who had an attack during the first trimester, 28 delivered normal infants, there were 3 still births, 12 foetal deaths and 48 therapeutic abortions, 10 cases were not reported. 9.7 p.c. of the infants had congenital deformities. According to the authors the incidence of malformations have been exaggerated by earlier authors and therefore there is no justification for advocating routine therapeutic abortions in such cases of pregnancies.

VIRUS DISEASES & CONGENITAL DEFECTS

Hill, A. B., Doll, R., et al—**Virus Diseases and Congenital Defects**—Brit. J. Prev. and Soc. Med., 12, No. 1, 1958.

Informations were sought regarding the infants (live or still but excluding abortions or miscarriages) shortly after birth and again at an age of not less than 3 years, of women whose illness, medically observed and diagnosed, fell during or shortly before, a pregnancy. There was no evidence that mumps or measles had any deleterious effect upon the foetus. With chicken-pox there was also no evidence of the production of congental defects but the proportion of live-born children with low birth weights, relatively high. With rubella occuring early in pregnancy, the well-known congental defects of heart, vision and hearing were observed.

NOTES & NEWS

Commonwealth Advisory Bureau

The Commonwealth Medical Advisory Bureau was established by the Council of the British Medical Association ten years ago to provide a welcome for doctors visiting the United Kingdom from other countries of the Commonwealth and also to give any help and advice that they might require either before coming to this country or after their arrival. The address of the Bureau is: British Medical Association House, Tavistock Square, London, W.C.1.

The Bureau was officially opened in July, 1948, and the use that has been made of it since has shown that it provides a most valuable service. More than 10,000 doctors have sought advice, most frequently on post-graduate education, during these ten years and a similar number of visiting doctors and their wives have attended social functions arranged by the Bureau on behalf of the Association.

Steps to Develop Drug Industry in India

A number of steps have been taken by the Government of India to develop the pharmaceutical industry in the country, says an official Press release.

Existing manufacturers are encouraged to undertake production from intermediates near to basic chemicals. New manufacurers are permitted to enter the field on the basis of their undertaking production of basic drugs as soon as possible, in accordance with the programmes approved by the Government.

A proposal for the establishment of a plant to meet the requirements of intermediates, which is under consideration, is expected to be implemented during the Second Plan period.

Based on expert studies undertaken by suitable agencies, proposals for the establishment of a company for the manufacture of synthetic drugs and additional quantities of antibiotics from basic stages, are under consideration.

Special mention is made of the steps taken to expand the manufacture of penicillin at Pimpri and to set up a unit for the production of streptomycin.

A notable increase has been registered in the production of penicillin, anti-T.B. drugs like INH and PAS and anti-dysentery and other synthetic drugs. Licences have also been given for the production of essential synthetics like vitamin A, cortisone, etc.

The production of penicillin increased from 14.09 million mega units in 1956 to 23.5 million mega units in 1957. The production of INH in 1957 was over three times that in 1956 and in the case of PAS it was over 10 times. The anti-dysentery drugs, produced in 1957, were more than double the production in the previous year. The production of insecticides and sulpha drugs also increased considerably in 1957.

The Development Council for Pharmaceuticals and Drugs was reconstituted early in 1957. The Council's main functions are to suggest norms of efficiency, secure fuller utilisation of installed capacity, obtain maximum production, improve quality and promote better marketing facilities. The Council also recommends targets of production and co-ordinates production programmes.

For the manufacture of basic drugs, capacity has been sanctioned to cover the targets, set by the Development Council, for production by the end of the Second Plan period.

The present sanctioned annual capacity for the production of penicillin is 46.6 million mega units against the arget of 40 million mega units. The target of production by 1960-61 of all varieties of sulpha drugs is 450 and 500 tons. The capacity for the production of anti-tuberculous drugs is 28 tons of INH as against 133 tons.

Discussions are going on with the Soviet expert team to finalise projects for the manufacture of basic drugs from basic raw

its tremendous power might get out of control and that a biological chair reaction would start whereby fall outs and atomic wastes would in cession would in poison air, water and soil, plants and cattle, and family man and most unfortunately his children and dependents about the ndasuaye shrm shrm shrmhm In fact, mistrust, about the sources of information about atomic energy enery was atomic energy was found to be wide spread.

The study group urged the health and other authorities to make use of the concrete contribution that the modern sciences can make to man's understanding of and adapation to atomic power. The most important task outlined was the bringing up of children to put up with insecurity and to face reality, free anxiety and haste, with self seliance and a sense of responsibility towards others. For this purpose, doctors, teaches doctors, teachers clerks and other authorities must be educated in mental health requirements.

Among the suggestion made was included the organisation locally of a community education plan in matter relating to atomic energy. Small team of psychiatrist, psychologist, sociologist and journalist would study conditions, contribute to the planning of new atomic enterprises and their acceptance by the people.

The general standard of integrity with which the Press handled atomic energy news needs improvement as its presentation under scare head lines contributes to the readers' anxiety. Atomic authorities were therefore urged to provide effective information to journalists in or that they might better understand the implications of atomic energy news.

Food Poisoning in Kerala and Madras States

According to Press reports more than 400 cases of food poisoning occurred in the two States and deaths between April 13 and May 10, 1958, were estimated at more than 200. The largest single front affected was the Lok Sahayak Sena personnel at the camp at Sasthamkotta where 60 persons were reported to have died on the 29th April often having eaten breakfast consisting of coffee and "puree." Subsequent investigation revealed that food prepared from wheat, floor, suji and sugar were entirely responsible for the poisoning cases. It was subsequently found that folido 1-E-605 an insecticide used by tea and coffee plantations was the toxic agent that caused the deaths. 12 gallons of folido 1-E-605 leaked out of containers and contaminated a consignment of wheat, atta, suji, sugar and other cereals that were in the same hold of the ship S.S. Jai Hind during transit from Bombay to Cochin.

The Government of India has appointed a committee consisting of Mr. Justice J. C. Shah of the Bombay High Court as Chairman and Maj. Genl. Sarup Narain, Principal, Armed Forces Medical College, Poona, and Capt. T. B. Bose, Chief Surveyor, Mercantile Marine Department as members. The commission started taking evidences at Bombay from 6th June and will subsequently visit Kerala and other places to collect evidences.

The Kerala Government also appointed a four-man committee to inquire into the causes of food poisoning in the State. The committee consisted of S. Govinda Menon, Commissioner of Civil Supplies, Chairman, and members, Dr. Karunakaran, retired Principal, Medical College, Trivandrum, Dr. N. Krishnan Tampi, retired Director of Public Health and Dr. N. S. Warrier, Prof. of Chemistry, Kerala University. The committee submitted its report on the 1st week of June, 1958. The committee has recommended to the Government that it bans the sale of insecticides and other poisons in shops dealing with food.

T.C.M. Aid for Tube Wells, Livestocks and Industrial Research.

On 27th May, 1958, the Government of India and the United States of America signed seven Indo-American Programme agreements under which India will receive 285,555 aid in the fields of ground water exploration, live-stock improvement, industrial research, health, co-operative membership education and agriculture. In the field of health, $7,500 is provided for audio-visual and other demonstrational materials for the Central Bureau of Health

Education and $14,430 for the procurement of microscopes and other scientific equipment needed for five regional centres concerned with the malaria eradication programme. Earlier this year, T.C.M. provided $8,735,000 for the foreign exchange costs of the malaria eradication programme.

New Freeze-dried B.C.G. vaccine

The British Medical Journal informs that a new British freeze-dried vaccine for tuberculosis is being made available for trial. Britain has been until now using liquid vaccine prepared by the State Serum Institute, Copenhagen. The drawbacks of the liquid vaccine is its keeping qualities, the freeze-dried vaccine stays pottent for longer periods. It is believed that informations about the keeping qualities of the freeze-dried vaccine at room temperative will be available after the trial period.

Wellcome Research Laboratories

The Wellcome Foundation is expanding its research resources at its Beckenham Laboratories at Kent by developing a scheme that will cost about 14 million rupees. There are at present the chemical research and pharmacology laboratories, the biological laboratories and the new building for making poliomyelitis vaccine. In the new building to provide strict conditions of sterility, exposed pipes, ducts, drains and other objects likely to catch and collect dust are virtually, eliminated from the laboratory. Many rooms have arrangements for filtered air which can be heated or cooled. Strict discipline is imposed on the movement of staff from one suite to another.

Heat-wave in Northern India

Heat-wave prevailed over a fairly wide range in North and North-eastern regions during this summer. The thermometer has recorded 117 degree—118 degree in some places in Bihar. A large number of heat-stroke cases were reported from these areas. The total death roll in Bihar is presumed to be over 300. In the Uttar Pradesh, Agra and Kanpur have been the worst affected areas. More than 100 people have died in U.P. due to the prevailing heat-wave. Deaths have also been reported from W. Bengal, Orissa and Delhi.

Small-pox Vaccination Still Needed

W.H.O. Committee on International Quarantive in their recent meeting at Geneva under the chairmanship of Dr. C. B. Spencer warned against any relaxation of vaccinatin and called for using potent vaccines and correct vaccination and called for using poent vaccines potent vaccines and correct vaccination procedures. The committee also drew the attention to the advantage of dried small-pox vaccine for mass immunisation on campaingns.

Thee International travellers in 1956 were found responsible for out-breaks of Small-pox in 18 countries. The eight countries. The eight countries in whic the outbreaks reached epidemic proportions were Ceylon, Ghana, Great Britain, Iran, Italy, Lebanon, Seria Leone and Sudan.

International Congress of History of Medicine

The 16th International Congress of History of Medicine will take place at the Faculty of Medicine of Montpellier from Monday, 22nd to Sunday, 28th September, 1958, under the general Presidency of Monsieur le Doyen Giraud, Dean of that Faculty.

Subjects selected for attention are:

1. Connections between the School of Montpellier and the medical institutions of various countries along the centuries.
2. History and expansion of Hospitable establishments.
3. Medical iconography during the XVIIth century.
4. The new world's contribution to therapeutics.
5. Varia.

Further particulars may be had from Mosieur le Professeur Turchini, President due Comite d'Organisation, Faculte de Medicine, Montpellier, (Herault, France).

Symposium on Vegetable Oils and Their Products

A Symposium on Vegetable Oils and their products will be held in October, 1958, in New Delhi under the auspices of the

National Institute of Sciences of India. The scope and subject for discussion have been kept wide and broad so that all interested in the science and technology of vegetable oils may contribute to the success of the symposium.

100-Bed Tuberculosis Hospital at Chandpur

The Chief Minister of Orissa, Dr. Harekrushna Mahatab, declared open the Basanta Manjari Swasthya Nivas, a 100-bed Tuberculosis Hospital at Chandpur, about 65 miles from Cuttack. This Swasthya Nivas is situated in idyllic surroundings about 20 miles from the sub-divisional headquarters of Khurda, 28 miles from the nearest railway station, Khurda Road. A spacious building consists of 100 beds with a total cost of Rs. 6,30,000 has been build there, to house the main building, the X-ray department and the quareers for the staff. The building has been fitted with modern equipment for taking radiographs. The unit has attached to it a patricon table which can be positioned at any angle and at the same time the patient can be conveniently placed for radiography. The The screening can be done with great safety to the patient and the operator.

Health of School Children

The Kerala Government proposes to introduce a system of medical inspection and follow-up medical care for school children on the lines of the recommendation of the Secondary Education Committee, it was officially announced.

Under the system, every pupil will be 'thoroughly' examined once every year by a competent medical officer and will receive, if necessary, adequate medical attenin the nearest hospital or dispensary. For the present, he medical inspection system will be confined to lower primary school children owing to paucity of qualified medical personnel. All hospitals in the State will give priority to children coming from schools under instruction from these medical inspectors. Certain specific hours or one or two days in a week will be reserved 'in 'the dispensaries and hospitals throughout the State for the medical care of school children.

Health of Bombay School Children

More than 35,000 out of the 42,500 school children examined by the School Health Work Department of the Bombay Municipal Corporation, were found to be medically defective according to the Corporations 1956-57 report. Nearly 28 p.c. were suffering from general debility, 24 p.c. from dental defects, 15 p.c. from throat trouble, 14 p.c. from enlarged lymph nodes, 5 p.c. from skin diseases and 3 p.c. from eye diseases.

Health School Shifted

Sir John Anderson Health School at Calcutta after being absorbed by Government of West Bengal has been shifted to Singur in the District of Hooghly and started functioning from 1-4-58. The present address of the School is: Government of West Bengal, Sir John Anderson Health School, Singur, Hooghly."

Milk Consumption in India

Only 39.2 per cent of the total milk production in the country is utilised as fluid milk, according to the 1956 livestock census. The largest percentage, 40 is converted into ghee.

Other figures of percentage utilisation are: curds 8.3; butter 6.1; khoa 4:3; cream 0.7; ice-cream 0.5; and others 0.4.

The total milk production in 1956 was 477.7 million maunds. Of this 254 million maunds was buffalo milk, 207 million maunds cow's milk and 16.5 million maunds goat's milk.

The largest milk producing State (1956) is Uttar Pradesh with 122 million maunds. Punjab comes next with over 61 million million maunds. Bombay, Bihar, Andhra and Rajasthan produce between 40 and 50 million maunds each, Madhya Pradesh 31 million maunds Madras, Mysore and West Bengal between 15 and 20 million maunds, Orissa 10 million maunds and Kerala, Assam and Kashmir below five million maunds each.

The all-India per capita consumption of milk is only 4.76 ounces per day as compared to 22.8 in Switzerland and Sweden, 17 in the U.S., 15.8 in Denmark, 14.2 in the U.K., 14 in Australia and 7.7 in France.

U.P., Punjab and Bombay are the main ice-cream producing States. The Punjabis are obviously also very fond of butter. Madras, Kashmir, Bihar and Andhra show a preference for dahi and U.P. and Assam for khoa.

Research Facilities for Army Medical Officers

The new building of the Armed Forces Medical College, equipped for research, was declared open in Poona by the Defence Minister of India, on March 30, Mr. Krishna Menon. This College was opened in 1948 on the recommendation of a committee headed by Dr. B. C. Roy in favour of a central institution to train medical officers of the armed forces. It represents the merger of old army institutions such as the Medical Training Centre, the Research Organisation, the Pathology Laboratory, the Transfusion Centre and the School of Radiology. The new home of the College has been constructed at a cost of Rs. 38 lakhs.

The Defence Minister said the research facilities proposed to be provided at the College were evidence of the Government of India's desire to go ahead step by step in the field of science. The Government has already defined its policy in regard to science and research and the place of both in the scheme of general development of the country. The object was to give a filip to scientific work and to scientists. Mr. Menon also paid tributes to the Armed Forces Medical College for its services in the cause of medical education and research. He complimented Lieut. Gen. B. Chaudhuri, Director-General of the Armed Forces Medical Services, for the standard of training imparted in the College.

Eradication of Malaria in Six Years

Work has begun throughout India for the eradication of malaria in six years.

The plan seeks to eliminate the malaria parasite by the radical cure of every malaria patient.

At the end of the six-year period it is hoped that every individual in the country will be free from the infection. The malaria carrying mosquito will then be rendered harmless as it will have no malaria parasite to transmit from person to person.

The mosquito was the target of attack in malaria control measures taken so far. The strategy of the new campaign is to destroy the malaria parasite living or lying dormant in the blood streams of persons attacked by malaria.

Sharing in the bid to rid India of the scourge are the Government of India, the State Governments and the Technical Co-operation Mission of the United States Government.

Malaria eradication programmes are being undertaken on a global basis. Among the countries in the East, India has taken the lead in the present campaign.

Experts regard the present time opportune for a change of tactics in the fight against malaria. The spraying of DDT to destory malaria-carrying mosquitoes has undoubtedly yielded spectacular results and reduced the incidence of malaria. But, in some countries, the constant use of DDT has helped mosquitoes to develop a resistance against the insecticide.

The six-year malaria eradication programme includes an intensification of DDT spraying to reduce the incidence of malaria to the minimum and the launching of a house-to-house surveillance for detecting and curing every malaria patient so that he ceases to be a source of infection.

The country-wide surveillance will begin at the end of the second year of the six-year programme and will be maintained for the following four years. To detect cases of fever 100 investigators are proposed to be appointed for a population of one million. Each investigator will be entrusted with a group of 2,000 houses. It will be his duty to visit them every fortnight and make inquiries. When a case of fever is detected, the investigator will collect a blood smear of the patient and send the slide to the laboratory. If malaria parasite is found in the blood, the patient will be sent to a doctor for intensive treatment, to be continued until the patient is free from the malaria parasite and no more a source of infection.

The insecticides equipment and the vehicles necessary to implement the

materials. This follows the visit of an Indian delegation to the U.S.S.R., Italy, Switzerland, West Germany and East Germany.

National Tuberculosis Survey

The National Pulmonary Tuberculosis Survey has just been completed by the Indian Council of Medical Research. The main object of the survey was to find the incidence of pulmonary tuberculosis, to determine from this the extent of the problem and to devise anti-tuberculosis measures. Previous surveys were so limited in scope that they could not provide a definite picture of the whole country.

Undertaken in 1956, the survey covered six zones—Calcutta, Delhi, Hyderabad, Madanapalle, Patna and Trivandrum. As skiagraphy was thought to be the essential feature, only such centres were selected which had mass miniature radiography. The sample survey covered in each zone 30 villages, 6 medium-size towns and 25 to 40 blocks of a city. Villages situated near roads which could be negotiated by heavy mobile X-ray and generator vans were surveyed. Inaccessible villages were not covered. Nearly 90 per cent of the population of the zones were covered. Of a total population of 389,844 in the survey areas, nearly 300,000 persons were X-rayed. Children below 5 years were excluded.

Field teams consisting of about 20 workkers had to camp for days together and often work early in the morning and late in the evening as people were available for examination only at these times. Films of the chest were made by a mass miniature radiography set and a schedule incorporating important and relevant information was filled in for each person. Adequate samples from all zones were examined and compared. Finally, six readers, including three senior readers, gave their independent findings.

It was observed that the bacillary rate per 1,000 persons varied from 1 to 11 in different areas, and the number of active and probably active cases from 7 to 30 per 1,000 population. The morbidity rate for women was less than for men. Rates for both men and women showed increase with age. The rate of increase with age for women was much less than that for men.

These are the tentativee findings for the large mass of statistical material which is now being tabulated and analysed.

The results seem to suggest that the disease is not showing diminished trends in cities and industrial areas. The incidence has increased in small towns and villages, which had previously been comparatively free from the menace. It is now most marked in villages where the incidence was previously 0.2 and 0.5, and shows a figure the same as in the urban areas. Preliminary results indicate that 2 per cent of the country's population is affected by the disease.

The Indian Council of Medical Research has decided to undertake a separate survey of rural areas, as it considers that the villages so far surveyed are not representative.

World Population Increasing by 5,400 an Hour

Accordingg to the Demographic Yearbook for 1957 published by the United Nations, world population is increasing by 5,500 an hour—47 million a year and will double its present estimate of 2,737 million before the end of this century. Population has increased almost by a quarter in the last 20 years. The estimated birth rate is now 34 per 1000 inhabitants against a death rate of 18.

The Dutch live longest (71 years for men and 74 for women) and the people of India die soonest (life expectancy for both men and women is 32 years). Latin America is the world's fastest-growing area, though numerically Asia leads, adding 24 million annuall.

The Year-book reaffirms that women live longer than men in every country for which statistics were available. The reasons for this has not been isolated but there were possible biological causes and "certainly the conquest of maternal mortality has aided the female in achieving the favourable position she now occupies." Accidents were a leading cause of death among males of most ages upto 44.

Infant mortality had reached "phenomenally low" levels in many countries.

But Burma, Brazil, India and parts of Africa still showed high rates. Sweden had the lowest infant mortality (71 per 1,000 live births) in 1956 with Iceland, the Channel Islands and the Netherlands close behind.

Dr. A. L. Mudaliar Addresses W.H.O. Session at Minneapolis, U.S.A.

Dr. A. L. Mudaliar, Vice-Chancellor of Madras University and a former Chairman of the WHO Executive Board, was the final speaker at the special session to commemorate the tenth anniversary of the founding of the World Health Organization, which concluded today.

Dr. Mudaliar reviewed the significant health improvements made by the countries of South East Asia with the help of WHO. He cited as examples the drop in infant mortality by as much as 50 per cent in some countries and the controlling of malaria over large areas.

No organization, he said, had ever had more contact with common men throughout the world than WHO had today and from this the idea of world citizenship was likely to spring.

After the close of the Commemorative Session the Eleventh World Health Assembly began its sittings.

The Assembly unanimously elected as its President Dr. Leroy E. Burney, Sur-Surgeon-General of the US Public Health Service in succession to Dr. Sabih Hassan Al-Wahbi (Iraq). A native of Indiana, Dr. Burney was appointed Surgeon-General in August 1956.

The Assembly also elected the following officers:

Vive-Presidents: Dr. J. Anouti, Director-General, Ministry of Public Health, Lebanon;

Dr. Tran Vy, Health Minister, Viet-Nam;

Dr. A. Sauter, Director of Public Health, Switzerland.

Chairman, Committee on Programme and Budget: Professor N. N. Pesonen, Director-General, State Medical Board, Finland.

Chairman, Committee on Administration, Finance and Legal Matters: Mr. S. Kanachet, Member of the Saudi Arabian Legation in Bonn.

Mr. Maurice Pate, Executive Director of UNICEF, greeted the Assembly on behalf of his Agency, and recalled that last year UNICEF spent$13,500,000 in aiding some 150 health projects in more than 80 countries and territories. He emphasized that governments spent more than twice this amount themselves. Mr. Pate also announced that UNICEF, under WHO technical guidance, is currently devoting four-fifths of its long-range aid in providing material help for tuberculosis and other disease control campaigns, as well as for developing basic maternal and child health services. He stressed the increasingly important role of nutrition and nutrition education, and said that UNICEF was looking forward to expansion in this field, in co-operation with FAO and WHO.

The Assembly unanimously elected delegates from the following nine countries to its General, or Steering, Committee: Chile, Ecuador, France, Ghana, India, Japan, Mexico, the United Kingdom and the USSR.

Eleventh World Health Assembly

The Eleventh World Health Assembly has concluded its three-week session in Minneapolis (Minnesota, U.S.A.).

The 1959 public health programme, adopted by the Assembly, includes nearly 800 projects in nearly every country and territory in the world. To finance it the Assembly adopted unanimously its largest budget to date...$14,287,600. The Organization is called upon to direct its health programmes more than ever towards a primary objective of WHO—the strengthening of national public health services. Here are some of the highlights of the Assembly:

Malaria eradication is now under way in 76 countries, embracing nearly one-third of the world's population. It was stressed, however, that much greater international financing is essential to bring to a successful conclusion this first concerted effort to eradicate a major disease

from the whole world in a relatively short period of time. So far, a little over $5,000,000 has been contributed to WHO's Malaria Eradication Special Account, an amount only sufficient to complete this year's programme.

The Assembly authorized the Director-General to seek funds for malaria eradication not only from governments, but from all possible sources including foundations, industry, labour organizations, institutions and individuals. The Soviet Union delegate announced that his Government was giving 100,000 tons of DDT to WHO in furtherance of this programme. He also stated that the USSR could make available technically qualified experts.

WHO was requested to promote further particularly regarding the development of mosquito resistance to insecticides.

Research: The Director-General was requested to "organize and arrange for a special study of the role of the Organization in research and of ways in which WHO might assist more adequately in stimulating and co-ordinating research and developing research personnel". For this purpose the Government of the United States is making available some $300,000 to WHO to set up studies for was and means by which research can best be promoted.

Atomic energy: On the question of the health aspect of the peaceful uses of atomic energy energy the Assembly requested the Directer-General to investigate concrete measures for dealing with this problem.

The Assembly action, based on a proposal made by the USSR, joined by the USA and 21 other sponsoring countries opens the way for the Director-General to air under-developed countries in the use of radioactive isotopes in medicine; and for a study to be made on the effect of radiation on human heredity and the relationship of radiation to health in general.

Small-pox: The Director-General was requested to study the possibilities and the practical implications involved in a universal smallpox eradication programme and to report his findings to the WHO Executive Board meeting in January 1959. Meanwhile, governments throughout the world are urged to continue the fight against smallpox with vaccination and revaccination campaigns, and medical scientists are called upon to work towards the production of improved smallpox vaccine resistant to high temperatures.

It was announced that the USSR is giving 25,000,000 doses of smallpox vaccine to WHO, and that the Cuban Government has offered 2,000,000 doses of vaccine annually to the organization.

WHO's finances: The fact was stressed that, from an initial membership of 26 countries in 1948, WHO had grown to 88 in a decade. From a 1948 budget of $5,000,000, there had just been voted a regular budget of nearly $14,300,000. To this should be added a supplemental $6,000,000 from UN Technical Assistance funds, and nearly $9,000,000 contributed so far to the special malaria eradication funds of both WHO and its regional office in the Americas, the Pan American Sanitary Bureau. In considering the total international resources made available to WHO-assisted programmes, one should also add the important UNICEF allocations of material supplies to the governments concerned.

The External Auditor's report for 1957 revealed that in the psat year the collection of contributions from active member countries reached 97·08 per cent—the highest in WHO'S history.

Contributory Health Services Scheme, New Delhi.

Dr. T. R. Tewari, Director, Contributory Health Services Scheme, D.G.H.S., New Delhi, presented a brief history of the Scheme in a seminar organised at New Delhi on the 18th May, 1958. The Prime Minister of India, Shri Jawaharlal Nehru, inaugurated the function with an encouraging speech. He was welcomed by Shri D. P. Karmarkar, Union Minister of Health.

Aims and Objects of the Scheme: In launching the scheme, the objective was not only the limited one of improvising the medical aid facilities to Government employees, but also of demonstrating by this pilot project the possibility of medical care programmes being developed on a contributory basis, in other spheres.

There is, indeed, already a growing awareness of the potentialities of such a system and evidence is not wanting of impetus having been given to this movement in the private sector.

Persons under roll: It was in this context, that the Contributory Health Services Scheme for the Central Government servants in Delhi and New Delhi, came into existence on 1st July, 1954. The scheme was started with about 53,000 Government servants on the rolls, accounting for a total of about 2·20 lakh persons, including the family members. The number has now increased to 404800 belonging to 89,807 families.

Services Provided:—The services provided under the scheme include:...

(*a*) General medical, specialist, surgical and obstetrical care, at the dispensaries or at one of the hospitals, as may be necessary.

(b) Laboratory and other diagnostic procedures.

(c) X-ray service—diagnostic and therapeutic.

(d) Dental, ophthalmic and ear, nose and throat specialist services.

(e) Hospitalization facilities.

(f) Domiciliary medical care for the family.

(g) Ambulance service.

(h) Free supply of medicines including special and proprietary preparations which may be prescribed.

(i) Special facilities for the treatment of cases of tuberculosis, cancer and poliomyelitis in hospitals in and outside Delhi.

In addition blood bank facilities and facilities for prophylactic immunisation are being extended.

There are many areas in this fast expanding metropolis, where suburban colonies have sprung up giving rise to small pockets of population scattered over large distances. A scheme of static dispensaries is not feasible for such colonies, which are being served instead by mobile dispensary vans which go to these places every morning and evening.

Results at a Glance:

(a)	Treatment Centres:	
	(1) Hospitals ...	... 2
	(2) Dispensaries ...	... 21
	(3) Mobile Dispensaries	... 3
(b)	Staff:	
	(1) Doctors including Specialists ...	... 117
	(2) Other personnel	... 404
(c)	Serves:	
	(1) Families ...	... 89,807
	(2) Persons ...	... 4,04,800
(d)	Medical Aid:	
	(1) Cases treated ...	... 42,88,110
	(2) Daily average attendance ...	... 10,656
	(3) Persons given medical aid at their homes ...	49,319
(e)	Main Diseases Treated:	
	(1) Respiratory Diseases	... 58.7%
	(2) Avitaminosis and Anaemias ...	... 20.8%
	(3) Gastro-intestinal diseases ...	... 14.1%
	(4) Trachoma ...	... 3.5%
	(5) T.B. ...	... 0.96%
	(6) Scabies ...	... 0.71%
	(7) Children's diseases (Diphtheria and Measles) ...	... 0.3% ... 0.07%
	(8) Malaria ...	... 1.46%

Expenditure.—In its first year, the scheme involved an expenditure of about Rs. 16,00,000/-. This had increased to nearly Rs. 40,00,000/- in 1957-58. The income from contributions increased during the same ptriod from Rs. 7,50,000/- to over Rs. 22,00,000/-. Between 50 to 55 per cent of the expenditure incurred is thus, made up by the contributions by the beneficiaries, monthly contribution per employee ranges from 50 n.P. to Rs. 12/- p.m. and cover the family members. It will be interesting to note that over 50 per cent of the total expenditure incurred is on medicines, the overhead administrative expenditure being kept at a very low level.

Family Planning.—Family Planning work has been carried out as an integral part of the scheme, almost from its beginning, there being nine family planning clinics associated with the dispensaries.

Medical Officers, Social Workers and Public Health Nurses trained in family

planning work have been engaged for this purpose over and above the dispensary staff. Advice and assistance to them is supplemented by distribution through these centres of contraceptive appliances entirely free of cost to the lower income group people and on the basis of a subsidy or at wholesale cost price...which is much less than the market rate—to those in the higher income groups.

The work started at these centres with the object of helping people to plan their families, is taking more and more the complexion of family welfare work. The relationship between family planning in a technical sense and activities like cookery, tailoring and literacy classes may not be apparent at the surface but this is an approach which is helping us in creating the required atmosphere and in winning the confidence of the people we serve. This has also given a wider meaning to the welfare activities.

Stimulus to Community Activities.—The interest and enthusiasm thus, aroused among the communities has led to the formation of Ladies' Clubs, Better Living Societies, Children's Libraries and similar other groups, largely as the result of the effort of the people under the guidance of our staff. This wider outlook on health work in general, is, in fact, beginning to permeate the entire range of activities under the Contributory Health Service Scheme.

Although the Family Planning Clinics, better situated as they are in this respect, are the spearheads of this movement yet the stance of the entire scheme is being re-oriented in a way that medical care is given the concept of health care and health care in its turn is tackled by the doctor as a social scientist and not merely a physician.

Administrative Set Up.—To make such a programme as broad-based as possible, association of the representatives of the Community with the working of the Scheme, is one of its features. At the ministerial level, there is an Advisory Committee on which are the chosen representatives of the Government servants through various Service Associations.

This Committee is taken into confidence in important matters and provides a forum on which the views of the beneficiaries are freely expressed. Such adjustments as may be necessary are made from time to time in the light of the suggestions or recommendations of this Committee.

At the ground level, action is now being taken to set up local Advisory Committees in association with each dispensary. The two-way exchange of experiences and ideas is expected to improve the efficiency of the service.

*Success of the Scheme....*The Contributory Health Service Scheme was started as an experimental measure less than four years ago. The fact that it was placed on a permanent footing last year, may be taken to mean that it has justified itself and that it fulfils a distinct need. The sense of security thus created among the workers of the scheme has enabled them to devote themselves wholeheartedly to their task. In as far as their technical equipment for the performance of this task is concerned, facilities in the way of refresher courses, opportunities for further study and advancement in other ways are proposed to be given. The Seminar being held today is one of such means. Scientific discussions and meetings will be held frequently so that we benefit from each other's experience and knowledge.

What the Contributory Health Service Scheme is attempting to do, is a drop in the ocean, in the context of the health problems of the country. One takes courage from the fact, however, that at the time when health insurance came into existence in Britain in 1911, its most ardent supporters could not have conceived that it was destined to prepare the ground for the National Health Service in that country nearly 30 years after. Small beginnings may lead to big results and it is not too much to hope that a scheme although started primarily with a limited objective among a selected community will yet pave the way for the emergence of medical coverage plans in this country, on a prepayment or contributory basis.

Socialistic Outlook.—In so far as class and income distinctions have been eliminated in the matter of determining the nature and extent of services rendered, another step, however small, may be said to have been taken towards the evolution of a socialistic pattern of society. To that extent, the Scheme has a wider significance than in the orbit of medical care alone.

Expert Committees to Advise on Small-pox and Cholera

The Union Health Ministry has recommended to the State Governments the constitution of expert committees to investigate the causes of the recent rise in the incidence of small-pox and cholera and to suggest short and long-term measures for their control.

At the same time Government of India have requested the Indian Council of Medical Research also to set up an expert committee at the Centre for a similar purpose. There will be close collaboration between the commtteesi set up by the State Governments and the one set up by the Indian Council of Medical Research.

The Union Health Ministry has recommended three measures in regard to small-pox.

Firstly, they should consider whether the present system of registration of births in rural areas is satisfactory as non-registration of all live births results in the escape of a considerable number of primary vaccinations.

Secondly, they should consider the introduction of compulsory revaccination, the need for which was recommended by the Central Council of Health in December, 1956. As an emergency measure the State Governments could promulgate the emergency small-pox regulations under the Epidemic Diseases Act, 1897, making vaccination compulsor, or under any other suitable legislation in force in the State.

Thirdly, the State Governments should investigate the complaint that small-pox vaccination lymph manufactured in some Institutes does not fulfil the required standards of potency and that supplies are irregular interfering with the satisfactory working of the vaccination programme.

Regarding cholera, the Union Health Ministry has suggested the following precautionary measures.

Firstly, stock-piling of necessary anti-cholera drugs, disinfectants and water sterilising agents like bleaching powder.

Secondly, regular disinfection of all sources of water supply three weeks prior to the usual cholera season and thereafter at regular intervals.

Thirdly, strict control over sanitation in fairs and festivals and compulsory inoculation of pilgrims attending.

Fourthly, all municipalities and local bodies should be instructed to take particular care of sanitation, food control, etc. during this period.

Need for more Hospitals and Psychiatrists

There are probably more than 1.5 million mentally ill persons needing hospitalization in India to day. This somewhat alarming estimate of the Bhore Committee was mentioned by Bombay's Health Minister Mr. M. S. Kannamwar, while inaugurating the eleventh annual conference of the Indian Psychiatric Society, at Poona on 7-2-58. He said, hospital accommodation for the mentally ill was far short of the demand. The problem could be effectively tackled only with more hospitals and psychiatrist appreciative of both curative and preventive treatment.

In a country like U.S.A. the money spent by the Government on the treatment of mental diseases and hospitals amounted to half the expenditure of health services. In India, it would be impossible even in the next 50 years to provide a number of hospital betds commensurate with the incidence of insanity both on account of lack of finance and of psychiatrists, social workers and nurses.

Mental Health Versus Atomic Energy

The W.H.O. study group of mental health recently discussed in Geneva mental, health problems associated with the advent of atomic power. The meeting was attended by representatives of Psychiatry, atomic and radiation medicine, public health, social anthropology and journalism. Reports from many countries about the emotional impact of atomic energy developments reflected in every day life, public statement, the Press and the letters from atomic, health and political leaders were presented by this study group of mental health aspects of the peacefulness of atomic energy. In general, it was found that irrational fears were expressed far more than rational hopes. The popular imagination about the terrifying aspects of atomic energy leads to the fear that

MALARIA ERADICATION PROGRAMME, INDIA (1958-64) AT A GLANCE

I Phase of Programme	ATTACK PHASE			CONSOLIDATION PHASE		
Year of Operation	1958-59	1959-60	1960-61	1961-62	1962-63	1963-64
Activity	TOTAL COVERAGE			INTERRUPTION OF SPRAY*		
				SURVEILLANCE		
Areas to be covered	All hyper and meso-Endemic areas. Intensification	All areas including hypo-endemic areas		All areas including hypo-endemic areas		
No. of units in plain areas	190	350	350	350	350	350
" " in difficult areas	40	40	40	40	40	40
" " Total	230	390	390	390	390	390
SUPPLIES :	71 tons per unit in hyper and meso-endemic areas and 35.5 tons for units in hypo-endemic areas			RESERVE STOCKS		
(i) DDT : (75%) per unit				5 tons per endemic-unit	5 tons per endemic-unit	5 tons per endemic-unit
(ii) Anti-malarial (per unit)						
(a) Primaquin†	—	—	tablets	tablets	tablets	tablets
(b) Chloroquin/Resochin‡	—	—	tablets	tablets	tablets	tablets
(iii) Transport						
(a) Trucks	4 per unit			Nil		
(b) Jeeps	1 per unit			Nil		
SPRAYING EQUIPMENT :						
(i) Stirrup Pump						
(a) for units in plains hyper, meso and hype endemic	50 per cent re-inforcement. (Total 108 per unit)			Nil	Nil	Nil
(b) units in hilly or other difficult areas	100 per cent re-inforcement. (Total 144 per unit)					
(ii) Hand Compression sprayers						
(a) for units in plains (hyper, meso and hypo-endemic)	50 per cent inforcement. (Total 54 per unit)			Nil	Nil	Nil
(b) units in hilly or other difficult areas	100 per cent re-inforcement. (Total 72 per unit)					
(iii) Field workers and superior field workers (for spraying season)						
(a) for units in plains (hyper, meso and hypo-endemic)	50 per cent reinforcement (Per unit superior field-workers ... = 36) (Per unit field-workers =180)			Nil	Nil	Nil
(b) units in hilly or other difficult areas	100 per cent reinforcement (Per unit superior field-workers ... = 48) (Per unit field-workers ... =240)					
SURVEILLANCE STAFF Superior Field Workers	Nil	Nil		100 workers per unit or a permanent basis**		
ESTIMATED COSTS :						
(i) Central	Rs. 15 crores			Rs. 12 crores***		
(ii) States	Rs. 15 crores					
(iii) U.S.T.C.M. and W.H.O.	Rs. 18.29 crores (38.4 million)					

†Criteria for Interruption of spraying.
(i) Child spleen index—below 1%
(ii) Child parasite index—below 1.0%
(iii) Infant parasite index—zero
} Over two successive years.

* Each tablet mg.
** Each tablet 100 mg.
*** For the entire 3rd plan period. (The cost is estimated to be Rs. 2 crores per plan period during the 4th and subsequent plan periods, to be at entirely by the States).

‡ The supervisory staff will continue. The spraymen will be dispensed with from 1961-62 on units satisfying the criteria for interruption of spray. In the year 1960-61, however, both surveillance and spraying staff will be employed.

scheme will be supplied by the U. S. Government under the Indo-U.S. Technical Assistance Agreement. The Government of India will share half the increased costs on the additional work with the various State Governments and also increase the staff at the Malaria Institute of India, both for supervision in the field and for training new perconnel.

Union Health Minister's Welfare and Discretionary Fund

Answering questions in the Rajya Sabha on April 28, 1958 on the Health Minister's Welfare Fund and Discretionary Grant in 1957, Shri D. P. Karmakar, Minister of Health, said that the T. B. Association of India was given a grant of Rs. 1,43,000 from the Welfare Fund in 1957. Among other grantees from the Fund are the Medical Superintendent, Safdarjang Hospital, Rs. 1,000 for amenities to patients; the Ministry of Health Sports Club, Rs. 500, and Shri Tikam Singh of Bulandshar district, Rs. 25 for distress.

The Minister also laid on the table a statement giving the names of 108 institutions which were given help totalling Rs. 5 lakhs from the Health Minister's Discretionary Grant during the year 1957-58.

Gift of Vaccines for Pakistan

To meet the outbreak of epidemics in East Pakistan, the Government of India have made a gift of one lakh doses of cholera vaccine and one lakh doses of smallpox vaccine to the Government of Pakistan. These have been despatched to East Pakistan by air.

WHAT IS NEW IN SOVIET MEDICINE?

Bandages From Aluminium Foil

Bandages have been made from aluminium foil 0.01 mm. thick covering a celluloid film. It satisfies the requirements of modern medicine ever better than the inventors expected. The new dressing material does not adhere to the wound and bandages can be changed painlessly.

Ultrasound Against Cancer

Ultrasound has come to the aid of medicine. The new apparatus works on the principle of an echo. Its special radiators send ultrasonic signals into the body. Easily penetrating through the internal organs they are partly reflected from them and pictures of the examined portions of the body appear on the screen of a kinescope (resembling that of a TV receiver). It consists of light and dark spots. The denser the tissue the lighter the spot on the screen because it reflects more ultrasonic signals.

The "sound eye" immediately finds the cancerous tumour which is denser than healthly tissue. The location and nature of the light spot on the screen enables the physician so recognize the disease when it is still amenable to treatment. Ultrasound helps medicine make a new stride towards complete victory over cancer.

Hearing Device for Spectacle Wearers

Making use of semiconductors Soviet engineers have been able to place all the parts of an electric hearing aid in the frame of ordinary spectacles. One of the frame sticks contains the volume modulator, the other—the timbre modulator. The battery in the form of a small tablet is also invisibly fastened to the rim.

Encephalitis on the increase.

Last few weeks cases and deaths due to Encephalitis were being reported from different cities in India, particularly Lucknow, Nagpur and Delhi. In Lucknow 181 cases had been admitted into the hospitals since July 1, 1958 and 35 deaths were recorded. In Nagpur 46 children died since the outbreak. In Delhi 88 cases were reported, of which 46 proved fatal. Within 4 days from 9th July 6 deaths took place in the city. In the previous year (1957) 77 cases with 41 deaths were reported. In Calcutta also, sporadic cases of Encephalitis are reported from time to time, mostly proving fatal.

It may be recalled that there was a sever outbreak of Encephalitis during the year 1954, starting from Jamshedpur in Bihar and finally affecting other towns in various states e.g. Bilaspur, Nagpur, Mysore, Monghyr, Patna, Allahabad, Lucknow, Kanpur, Agra, Delhi, Hardoi, Barielly, Sitapur, Panipat, Sonepat, Sahabad, Ambala, Pondro, Kenthal, Karnal,

and Vellore. The causative organism was unanimously considered to be a virus; but the type of the virus has not yet been isolated from the cases in any hospital, except by Dr. S. Padmabati, Professor of Medicine of the Lady Hardinge Medical College, Delhi, who in collaboration with Dr. Baldeo Sing, Neuro-Physician, claims that there is some evidence that Encephalitis in Delhi might have been caused by the Echo Group of Virus. The Experts in Lucknow have recommended that an extensive epidemiological survey of the disease should be made in the town. While strongly supporting this recommendation it may be suggested that a well-planned investigation should be conducted in all the towns which have been affected by this disease.

NOTICE TO CONTRIBUTORS

The Indian Journal of Public Health is issued quarterly, one volume appearing in a year. The Journal is meant to publish mainly original contributions and results of original investigations relating to the problems of public health, which broadly includes, personal hygiene, public health service, vital statistics and population studies, social and preventive medicine, microbiology and public health laboratory service, mental health, public health engineering, housing and sanitation, tropical medicine and hygiene, epidemiology and communicable disease control, industrial and physiological hygiene, occupational health, maternal and child health, health education, nursing, midwifery, health visiting, food and nutrition, school health, dentistry, veterinary hygiene, medical education and history of medicine, etc.

Manuscripts for publications, books for reviews, field news, reports of associations or societies and correspondence relating to the editorial management, published papers, questionnaires and business matters concerning subscriptions, advertising, reprints, order for copies, change of address, exchange, etc., should be sent to the Managing Editor, Indian Journal of Public Health, All-India Institute of Hygiene and Public Health, 110, Chittaranjan Avenue, Calcutta-12.

All scientific papers, reviews, letters to the Editor and other original contributions should be sent exclusively for the Indian Journal of Public Health, and no articles published elsewhere or submitted simultaneously to other periodicals can be accepted. The Editor's or Referee's comment on the article or any part thereof which needs clarification or modification and acceptance or non-acceptance of the article for publication in the Journal will be duly communicated to the authors concerned.

All manuscripts should be sent in duplicae type-written, double spaced with good margin on one side of the paper only. Authors are requested to enclose line drawings of all the diagrams in their paper drawn in Indian ink on smooth white Bristol Board. The drawing should be twice the size they will occupy in the Journal. Good prints of Photographs and Microphotographs should be sent to obtain clear impression in the final print. Authors are particularly requested to reduce the number of diagrams to an absolute minimum.

References to literature should be arranged thus : The Author's name, initials, year, abbreviation of Journal, volume and page. In the case of books or reports, the Author's name as above, the Title in full, with the place and year of publication and page.

Contributors receive 25 reprints free of charge. Additional copies may be obtained at cost. The requirement of such copies should be indicated at the time of submission of the manuscript. Remittances should be made by draft or cheque or by postal order payable to the Managing Editor. For cheques on Banks outside Calcutta collection charges be added. Every paper submitted to the Journal will be subjected to the Editorial scrutiny and such modifications as are deemed necessary for clear expression and maintenance of standard.

REPORTS & REVIEWS

PUBLIC HEALTH & ATOMIC ENERGY

Katharine Williams, Public Health Aspects of Atomic Energy, Royal Society of Health Journal, Vol. 78, No. 1, 1958.

Application of radio-active isotopes to the solution of public health problems are manifold, and varied investigations range from sewage pollution of beaches to the dissemination of communicable diseases by arthopod vectors, by animal reservoirs and by water-borne and air-borne routes, and also to the studies of the ecology and natural control of insect vectors of disease.

To safeguard public health, the Atomic Energy Authority has carried out a considerable amount of work with the disposal of waste products, in gaseous, liquid or solid form. In general, either storage of disposal must be used in dealing with radio-active waste, since the rate of decay of radio-activity cannot be altered. High-activity liquid wastes can be stored for a time to allow the activity to die down sufficiently to reach the level low enough for disposal. The actual bulk of liquid waste is very small and can further be reduced by evaporation and the concentrate stored in special storage tanks. The cost of such storage from nuclear power plants is likely to contribute only one to two per cent of the cost of nuclear power. Some of these fission products are valuable radiation sources and recovery of radio-active caesium and strontium for use in medicine and industry is notable. Large volumes of low activity wastes, arising in ordinary course from plant washing, laboratory operations, laundering of clothes and other such processes can be treated with chemically to clarify the liqour by standard weighting and flocculating agents in order to transfer the radio-activity to a solid phase of small bulk, which can be treated as a solid waste. The remaining activity is so low that it can be dispersed as a liquid effluent.

The amount of activity which is considered permissible in a liquid effluent depends on whether the effluent is discharged into river or sea; and if river, whether it is a drinking water source or not. But wherever disposal of radio-activity into natural environment is proposed, a detailed investigation of the conditions is a pre-requisite. In the sea, studies of movement of water and of currents, biological behaviour and uptake of fission products by marine life, require extensive study before any discharge is made. Continuous surveys, with regular sampling of sea bed, shore sand, mud from river bottom, sea and river weeds, and fish and marine life, all ensure that the level of radio-activity in the discharges of effluent cannot possibly produce any harmful effects.

"Run-away" or other major accident in a nuclear reactor involving release of radio-activity has public health importance. The nuclear power industry has only just started and our experience of operating nuclear reactors is limited, so even though the design is "inherently safe," the dictates of prudence require that some years' experience of operation is advisable before departing from a cautious policy of siting and the first station will be built away from heavily built up areas. In the unlikely event of some release, the most important factor to be considered would be any deposition of the radio-active material on the soil and herbage. A survey of the area would reveal this and the amount and strength of deposit could be determined by monitoring instruments. The worst weather conditions with inversion favouring deposition are considered. In such a case, close to the point of release, it might be necessary to get people away from the vicinity and for them to stay away till the deposit had been removed or had died down from the radio-active decaying process.

Radio-isotopes have been used in research on water-borne diseases involving drinking water analysis and as a tracer in studies of sewage oxidation ponds. Anthropods can be tagged with isotopes and various species of mosquitoes have been labelled with radio-phosphorus or radio-strontium by growing the larvae in solution of these radio-active substances. The tagged adults can be released in large numbers and can be identified when recovered later. In this way, the range of effective dispersal and maximum flight is found and dissenimation, vector ability, and dispersal habits of mosquitoes have been studied in a number of countries. Similar studies have been made with different species of flies. Studies have been extended to the mortality rates and longivity of various insects by tagging with radio-isotopes and finding the generation time and size of broods. Insecticides labelled with radio-isotopes have proved of use in tracer-studies of their physiological action after uptake. Radio-isotopes have been used to study arthropod resistance to insecticids.

By grading the dosage of radiation, with pasterilization or complete sterilization of foodstuffs can be obtained—the dosage varies since the sensitvity of microorganism to radiation differs considerably according to the dosage. The immediate or early deaths of insects infesting grams, flours and cereals can be achieved by doses of 25,000 to 50,000 rads. It is possible to interrupt the trichinosis cycle in pork through the irradiation of the larvae encysted in meat and it is thought that this treatment will be economical. Work is being carried out on the effect of radiation from radio caesium—a fission

product—are equally as effective as those from radio-cobalt in breaking the cycle. Considerable work on the irradiation sterilization of food has been carried out as yet the total sterilization of food is not possible because changes in flavour occur. Most soft fruits give unattractive products, though sour rhuburb turns sweet. Of some interest in public health is a project to sterilize by irradiation liquid imported whole egg which may be found infected with salmonella. Blankets in hospital use can be cold sterilized by irradiation and this appear promising. Thus, radiation, may, however, have a significant contribution to make to public health in future by the cold sterilization of food, in food storage problems and in the control of vectors, parasites or organisms causing disease.

BRIEF REVIEW OF THE ACTIVITIES OF THE HEALTH DEPARTMENT, MADHYA PRADESH, 1957.

Dr. G. L. SHARMA, Director.

The New State of Madhya Pradesh was formed on 1st November, 1956. It has a population of 2,61,00,000, covering an area of 1,71,200 sq. miles. The administration of Health Services is in the charge of a Director who is assisted by three Deputies and five Assistant Directors, one each for Accounts, Planning and Development, Maternity and Child Welfare, Control of Diseases, Statistics and Epidemiology.

Hospitals and Dispensaries

The total number of Medical institutions at the beginning of the year was 973, while during the year under report the following 36 new Medical Institutions were opened with a view to provide more facilities for Medical relief to the Urban and Rural population of the State.

(1) T.B. Hospital, Indore, having an accommodation of 70 beds.

(2) T.B. Clinic, Shajapur, with 6 beds.

(3) Family Planning Centre, Barwani.

(4) Family Planning Centre, Mandsaur.

(5) Civil Hospital, Kotri (Distt. Sehore), having 16 beds.

(6) 31 Subsidiary Health Centres in the rural areas of Sehore and Raisen Districts.

Increase of General, Tuberculosis and Maternity Beds

Two General wards of 60 beds, one infectious ward of 30 beds, one 180 bedded wing for women and children. A ward of 24 beds was added to the Sultania Zanana Hospital, Bhopal. A total number of 198 general beds were provided in the different hospitals of the Madhya Bharat Region. A Maternity wing of 30 beds was added to the District Hospital, Sehore. A total number of 139 maternity beds were increased in the various hospitals of the Madhya Bharat Region.

Two wards with 80 beds were added to the Tuberculosis Hospital, Bhopal, bringing the total to 224 beds and one ward having 25 beds was added to the T.B. Hospital, Nowgong (District Chhatarpur).

Thus there has been a total increase of 853 beds over and above 11,392 beds of the previous year.

Control of Communicable Diseases

(i) Malaria

In the field of communicable diseases control M.P. State has made a significant achievement in the control of Malaria. This insect-borne disease is a major public health problem in the rural areas of this State. During the year under review, 23½ National Malaria Control Units were in operation. The areas covered by these units, was 1,29,809 sq. miles, 44,82,420 houses were prayed and this total population protected in 1957 was 1,15,21,794.

(ii) Filaria

There were two Survey Units one each at Satna and Raipur and one control unit at Chhatarpur. During the year under report the survey work was done in 63 towns and 308 villages of 7 districts with a total population of 5,57,559 persons. From the studies made it appears that roughly 13 per cent of the population in these areas are affected by the disease. The incidence of the disease is more in urban than in rural areas. This is probably due to the provision of protected water supply in urban areas without adequate drainage facilities. This results in heavy breeding of culcine mosquitoes which are responsible for the transmission of the infection.

The Chhatarupur control unit started functioning in the second week of March, 1957. The pre-control Survey work has been completed. Mass therapy campaign covering the urban areas with a population of about 2 lakhs spread over in three districts of Panna, Chhatarpur and Tikamgarh in the Vindhya Pradesh Region will be started shortly.

(iii) Tuberculosis

Control of Tuberculosis includes preventive as well as curative aspects. 181 beds were provided by opening one T.B. Hospital, one T.B. Clinic and three T.B. Wards. The existing 11 B.C.G. Teams continued to operate carrying out tuberculin tests and B.C.G. Vaccinations. During the year 1957 these units tested 4,45,547 persons and vaccinated 1,69,455 persons bringing the progressive total to 70,05,611 tested and 23,60,242 vaccinated.

(iv) Yaws

There were 5 anti-yaws teams working in the rural areas. They completed the Survey of Bastar District in 1956, examining 2.25,922 persons out of which about 8.0% were found to be infected. Resurvey of this District was conducted in 1957. In the resurvey 78,106 persons were

examined and it was found that on an average the infection rate was brought down to 3% after the first injection. During the year 1957, initial treatment survey was done in Bilaspur District. 52,376 persons were examined and the number of cases found was 200.

(v) Leprosy

There were 10 hospitals for the leprosy patients with a total accommodation of about 2,000 beds, out of which 5 were run by the State Government and 5 by the various Missions. Two Leprosy Colonies were also maintained in Bastar District one in Chitlanka in Dantewara Tehsil and the other at Brehebeda in Narayanpur Tehsil, with 21 and 8 inmates, respectively. There were 16 special leprosy clinics under specially trained assistant health officers. Sixty-nine Leprosy Clinics were attached to various hospitals and dispensaries in the State. Nearly 8,000 cases of Leprosy were treated during the year under review.

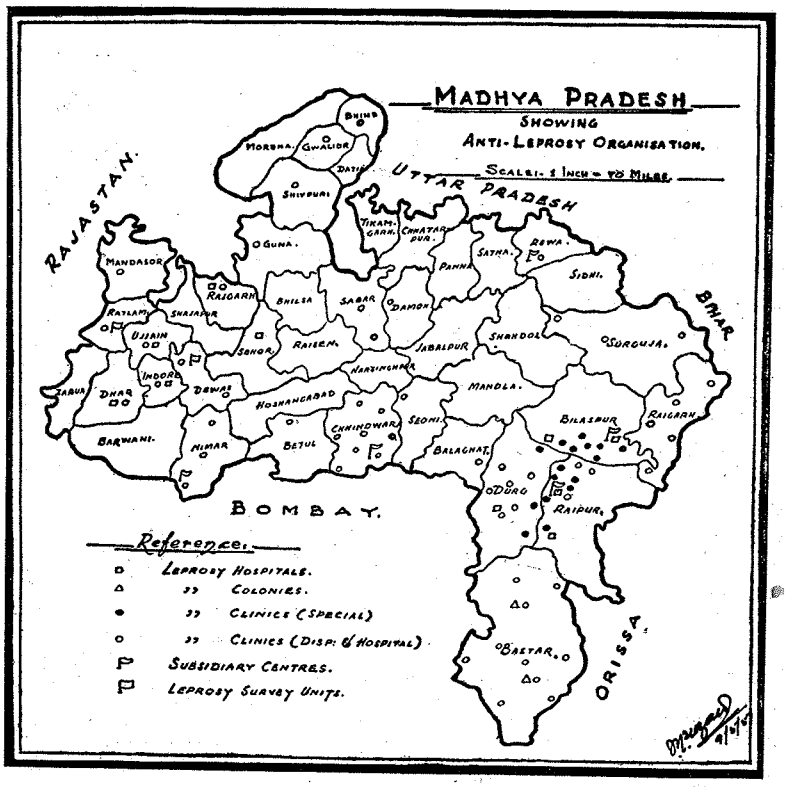
(vi) Venereal Diseases

During the year under report about 30,000 cases were treated in all the hospitals and dispensaries. The disease was more common in urban than in the rural areas. V.D.R.L. is being carried out in all the district hospitals. All the hospitals and dispensaries have got facilities for the treatment of this disease. **UNICEF** has allocated serological equipment to the V.D. Clinic working at Ambikapur where 3,029 cases were treated during the year under review. Besides this V.D. Clinics existed at the following 8 places :—Gwalior, Indore, Bhopal, Satna, Chhatarpur, Ambikapur, Shahdol, Datia.

3 candidates were sent for V.D. refresher course at Safdarjang Hospital, New Delhi for 3 months' training.

(vii) Epidemic Diseases

Cholera.—There were 4,631 cases and 1,763 deaths during the year, giving a death rate of 0.07 per 1000 of population. The highest



The State Government has taken up the question of shifting healthy children of the leprosy patients from the Ghogranala Colony in Champa. A grant of Rs. 10/- per child per month was sanctioned by the Government. About 40 such children were accommodated temporarily pending better arrangements in Shri Theodore's Home at Champa. This will prove useful in preventing these children from developing the disease.

number of deaths (485) was recorded in the month of June and the lowest number of deaths (0) in April. The disease first broke out in the district of Balaghat in the month of April, 1957 and continued till the month of December. The highly infected districts were Mandla, Sagar and Rewa.

Besides routine preventive measures: 18,93,602 persons were inoculated against Cholera and 22,803 wells were disinfected.

Smallpox.—There were 5,266 cases and 978 deaths during the year, giving a death rate of 0.04 per 1,000 of population. The highest number of deaths (181) was recorded in the month of December, the lowest number of deaths (10) in October. A total number of 11,58,478 vaccinations were performed during the year under report.

Plague.—There was no out-break of plague epidemic during the year under review.

Influenza.—The country-wide influenza epidemic broke out in this State also claiming 2,44,997 cases and 9 deaths. Prompt and adequate measures were taken by the Department. Special arrangements were made at all the hospitals and dispensaries for the treatment of Influenza cases. Besides propaganda work, schools and cinema houses were closed during the peak period of the epidemic, wherever necessary and restrictions were imposed on public congregation at places including fairs and festivals. Emergency influenza regulations were also enforced by the State.

Maternity and Child Welfare

The total number of Urban and Rural Maternity and Child Welfare Centres in Madhya Pradesh is 89. Two Maternity Centres—Saragaon and Belsondha were opened in rural areas near Raipur under Kasturba Trust, during the year under review. With the establishment of Primary Health Centres in N.E.S. and C.D. Blocks, every attempt has been made to convert Maternity and Child Welfare Centres into Primary Health Centres with the addition of suitable staff. During the Second Five-Year Plan emphasis has been placed on establishment of Primary Health Centres which offer Maternity and Child Welfare Services to the Community. The year opened with 86 Primary Health Centres and 19 were opened during the year under review thus bringing the total number to 105.

Family Planning

During the year under review nine Clinics previously established in urban areas at Indore, Gwalior, Ujjain, Bhind, Ratlam, Mandsaur, Guna Barwani and Chhatarpur were continued. One urban Clinic was established with the assistance of the Government of India at Seoni by a Voluntary Organisation.

In the middle of the year the Family Planning Programme proposed formerly was reviewed after taking into consideration the total needs of the State in the light of Government of India's new proposals and a comprehensive modified Scheme was proposed. It is learnt that this modified proposal has been approved by the Government and it is expected that it will be implemented during 1958-59.

It is proposed to establish a regional training centre at Indore where training will be imparted to Doctors, Nurses, Health Visitors, Midwives and Dais in service. To impart Family Planning training to under-graduates, Nurses, Midwives, Health Visitors and Dais under training, it is proposed to establish 17 Family Planning Clinics at 17 teaching institutions, four of which will be Medical Colleges. The proposed teaching clinics will also offer F.P. service to the community.

Besides this, 24 urban and 200 rural Family Planning Clinics will be established where Family Planning service will be offered to the community. Each Primary Health Centre established in C.D. or N.E.S. areas will be a nucleus for Family Planning work in rural areas. To implement the scheme fully a whole time Family Planning Officer at State level will be appointed. According to modified proposal estimated expenditure is Rs. 16,35,785 out of which Rs. 11,73,490 will be met by the Government of India. Proposals for formation of the State Family Planning Board have been submitted to the Government and are under consideration of the Government.

Medical Education

The training of health personnel has necessarily a high priority in the programme for developing health services, more so in view of the shortage which exists in relation to medical and auxiliary personnel. There are 4 medical colleges in the State admitting 350 students as against 286 students admitted during the preceding year. 127 students passed the M.B.B.S. examination during the year under report. For post-graduate training of Doctors they are sent to Calcutta for Diploma in Public Health and for D.M.C.W. to New Delhi for D.T.D. to Indore for D.C.H., T.D.D. & D.O.M.S. and to Gwalior for D.M.R.E.

Training of Para-Medical Personnel

Sanitary Inspectors' Training.—There are two centres for the training of Sanitary Inspectors in the New Madhya Pradesh State (i) G. R. Medical College, Gwalior, which has 45 seats, and (ii) Gandhi Memorial Hospital, Rewa, which has accommodation for 25 seats. Besides this the Government of Bombay have also reserved 10 seats for Sanitary Inspectors' training at the Public Health Institute, Nagpur, for nominees of the new Madhya Pradesh State.

Besides above the State provides facilities for—

(a) T.B. Health Visitors' Training.

(b) Radiographers' and Lab. Technicians' Training.

(c) Compounders' Training.

(d) Nursing Education.

(e) Training of Auxiliary Nurse-Midwives.

(f) Training of M.C.W. Health Visitors.

Eye-Camps in Rural Areas

With a view to provide medical treatment facilities to the eye-patients in rural areas of the State, Eye-Camps were held at the 9 places during the year under report. In all 10,283 patients were treated and 1,578 operations performed.

Indian Red Cross

There was a former Madhya Pradesh State Branch of Red Cross Society at Nagpur. Owing to reorganisation of States new Madhya Pradesh State, comprising of Mahakoshal, Vindhya Pradesh, Madhya Bharat and Bhopal Regions, was formed and consequently, new Madhya Pradesh State Branch of the Indian Red Cross Society at Indore was constituted at the General Meeting held on the 5th August, 1957, under the presidentship of the Governor of the State of Bhopal. The Minister for Public Health is the Vice-President.

Employees' State Insurance Scheme

During the year under report the Employees' State Insurance Scheme continued at the following Industrial Centres. The number of factories and number of industrial workers covered under the Scheme are mentioned against each centre:—

Names of Centre	Factories No. of	No. of Industrial workers insured under the Scheme
1. Indore	... 47	38,872
2. Gwalior	... 28	21,287
3. Ujjain	... 23	13,000
4. Ratlam	... 10	4,000
5. Burhanpur	... 7	4,888
	115	82,047

Besides this, the Scheme was extended to a new centre at Jabalpur. This was implemented on 28-9-57 covering 41 factories and 5,000 workers . Under the Scheme medical care is provided to insured persons through (a) Service System and (b) Panel System.

Appointment of Chemists.—Approved chemists have also been appointed at the four Centres—Indore, Gwalior, Ujjain and Ratlam for supplying special medicines to insured persons.

Medical Boards and Employees' Insurance Courts have been established. Arrangements for keeping serious cases in the hospitals have been made at all the Centres.

Increase of Beds.—Twenty beds were added to the Maternity and Child Welfare Centre, Nandanagar Labour Colony, Indore.

The details of medical benefit provided to insured persons during the year 1957 are given below:—

No. of patients attended ...	1,46,122
No. of Injury reports received ...	2,353
No. of Operations performed ...	2,533
No. of Injections given ...	2,44,548
No. of Home visits ...	5,665
No. of cases referred to Hospitals:—	
(a) For Laboratory Examinations	4,547
(b) For X-Ray ...	3,526
(c) For Specialist advice ...	9,031
No. of cases admitted to hospitals	2,033

Fairs and Festivals

During the year 18 fairs were held. Large congregations attended each fair. To preclude outbreak of any epidemic all possible precautions were taken and large-scale extra staff were deployed round-about the venues of fairs. Preventive cholera inoculations were arranged at several several places. Adroit public health operations during the fairs triumphed over outbreak of epidemic.

Singhast at Ujjain

Singhast Parva is held at Ujjain every 12 years. The main bathing days were 29th April, 2nd May and 13th May. A mammoth congregation of no less than 10-12 lakhs attended the fair.

Sanitary and health operations during April and May were conducted with marked success. The water supply was controlled, Sullage water flowing into the river was diverted. Temporary latrines and urinals were constructed and drinking water taps were fixed all over the mela area. Continuous health education programmes were launched. Flies in Ujjain and surrounding villages were destroyed by profuse spraying with Gemaxine. Preventive Cholera inoculations were made compulsory for the Ujjain population as well as those who came from outside for the fair. This year continuous and adequate preventive measures successfully prevented the out-break of cholera and related diseases.

UNICEF Assistance

The year commenced with 88 UNICEF assisted centres in the four integrating units and pool of 8 UNICEF MCH B type sets, 139 midwifery kits and 241 dais kits, at State level, received as our share of UNICEF equipment from erstwhile Madhya Pradesh for Mahakoshal Region.

This State has during the current year received equipment and medicines and dietary supplements from UNICEF for free distribution to the extent of Rs. 2,88,270/-.

Towards the close of the year the State Government have also signed an agreement with UNICEF and Government of India for comprehensive assistance to C.D. and N.E.S. Blocks wherein assistance to the extent of Rs. 31.17 lakhs can be expected during the next 2 years towards technical aids. Transport, Ward Demonstration equipment and financial support.

Community Projects

The State Government Planning and Development Department have established 13 C.D. Blocks with effected from 1-4-57 and 6 C.D. Blocks with effect from 2-10-57. The Department has already

created the posts of health staff for the Primary Health Centres in each of the Blocks established with effect from 1-4-57. Action to create posts of health staff for 6 C.D. Blocks established with effect from 2-10-57 is in progress.

Very munificent grants have been offered by the Central as well as the State Governments for research in Ayurveda. This will enable Ayurveda to pass the ordeal of research so vehemently demanded by its opponents. Schemes have been submitted already. Should they bear fruit, "Deo Volente," posterity will appreciate our work.

Under the Superintendent of Ayurvedic and Unani dispensaries, Bhopal, there function a Unani Pharmacy and nearupon a dozen Unani dispensaries, which are treated on par with the Ayurvedic dispensaries.

The Madhya Pradesh Board of Homoeopathic and Biochemic Systems of Medicine registers practitioners of the systems of medicine in the Mahakoshal area. A project of establishing a Homoeopathic College at Nowgaon Sanatorium in the Chhindwara district is on the tapis.

Budget

The total budget provision of the department for the year 1957-58 is as follows :—

Normal	Rs. 2,05,62,600	Rs. 25,57,800
Plan	,, 76,58,700	,, 49,26,900
Total	Rs. 2,82,21,300	Rs. 74,84,700
Grand Total	Rs. 3,57,06,000	

Demographic Data of New Madhya Pradesh, 1956

(i) Area in sq. miles	1,71,200
(ii) Population	2,60,84,986
(iii) Density per sq. mile	152
(iv) Percentage of males to total population	50.7
(v) Percentage of urban population to total population	12.04

Birth rate and Death rate per 1,000 population and Infant Mortality rate per 1,000 live births in the New Madhya Pradesh State

Year	Birth Rate	Death Rate	Mortality Infant Rate	
1950	N.A.	21.75	168.83	
1951	N.A.	N.A.	N.A.	
1952	24.22	N.A.	167.19	
1953	35.24	26.68	164.7	For former M.P. State.
1954	34.83	19.80	97.95	
1955	34.98	18.44	66.99	

WEST BENGAL HEALTH SERVICES RULES, 1958

Extracted from the Calcutta Gazette (Extra Ordinary), January 31, 1958.

Rules :—

1. to have come into force on the 1st January, 1958.
2. (a) One unified cadre of Health Services—comprises all posts, permanent or temporary—incorporates :—
   (i) W.B. Higher Medical and Health Services (Grade I).
   (ii) W.B. Higher Med. & Health Services (Grade II).
   (iii) W.B. Medical and Health Service including rural branch.
   (iv) Gazetted posts of Med. Officers not included in any of above cadres.
   (v) W.B. Junior Med. & Health Service including rural branch.
   and (vi) Licentiate Med. Officers carrying time-scale pay of W.B. J.M. & H.S.

2. (b) Terms Civil Surgeon, Asst. Surgeon, Sub-Asst. Surgeon, etc. shall be abolished—all officers shall be called "Medical Officer",
3. (i) a leave reserve calculated at 8 per cent of total permanent duty posts,
   (ii) a deputation reserve—strength to be notified later,
   (iii) a training reserve calculated at 10 per cent of total posts (excluding leave reservists and temporary posts).
4. No specific pay-scale for any particular post —shall draw from 1-1-58 pay as may be admissible as per his own grade, irrespective of appointments, until promotion to next higher grade—however, shall be eligible for special pay and allowances, attached to a particular post, in addition to own grade pay.
5. (a) All Medical Officers, excluding non-gazetted M.O. and others as per (v) and (vi) of Rules 2, shall draw in the unified scale ranging from Rs. 250—1,600 p.m., subject to limitation as below :—
   (i) **Basic Grade :**—Rs. 250-20-650 p.m. (efficiency bar after 12th and 18th stage) 12th stage—to pass a departmental examination; 18th stage—on basis of officers' record of service.
   (ii) **Selection Grade :**—Rs. 600-50-1250 p.m. No. of posts shall be 8 per cent of total posts, excluding temporary posts, except on special order.
   (iii) **Special Selection Grade :**—Rs. 1200-100-1600 p.m. No. of posts shall be 2 per cent of total posts, excluding temporary posts, except on special order.

(b) Fitness of promotion to selection grade or special selection grade shall be decided by departmental committees.

6. All posts in the cadre are gazetted except items (v) and (vi) of Rules 2 (a). These non-gazetted Medical Officers shall continue in existing sanctioned rates and shall enjoy privileges to revision on modification. In case of selection and promotion of these gazetted Medical Officers to the basic grade, resignation, retirement, death or other causes, the posts shall be converted to gazetted posts on the basic grade.

7. **Non-Practicing Allowances** :—(a) all posts shall be made non-practicing with effect from 1-1-58 No Medical Officer shall be allowed private practice of any kind in future except :

Medical Officers with specialist qualification or experience posted (i) at hospitals in district and sub-divisional headquarters and (ii) in non-teaching institutions may at the discretion of Govt. be allowed controlled private practice on terms and conditions prescribed from time to time but private practice shall under no circumstances be allowed to any Medical Officer holding posts (i) in teaching institutions and (ii) in non-teaching institutions other than in hospitals at district and sub-divisional headquarters.

(b) Under no circumstances shall any Medical Officer, whether he be allowed controlled practice or not, be permitted to have any financial interest in nursing homes, Industrial concerns for manufacture of drugs, appliances or other hospital requisites and similar other establishments.

(c) Medical Officers serving at District and sub-divisional headquarters, hospitals, or non-teaching institutions, who may be permitted controlled practice, shall not be entitled to any non-practising allowance; but those serving in institutions where private practice of any kind is not permissible, shall be given non-practising allowance at the following rates :

(i) Officers in the basic grade :
upto 5 years' service—Rs. 75 p.m.
above 5 years and upto 15 years' service—Rs. 100 p.m.
above 15 years' service—Rs. 150 p.m.

(ii) Officers in the selection grade—
Rs. 200 p.m.

(iii) Officers in the special selection grade—
Rs. 300 p.m.

(iv) Director of Health Services—
Rs. 400 p.m.

(d) Non-practising allowance shall be treated as compensatory allowance.

8. **Specialist Pay**—(a) Medical Officers not exceeding 25 per cent of total strength of cadre (excluding temporary posts, except on special order) shall constitute "Specialist Pool" and shall be given a specialist pay (to be treated as special pay) of Rs. 50 p.m. Medical Officers possessing post-graduate degree or diploma and Medical Officers though not possessing post-graduate degree or diplomas but obtained training or experience in a particular speciality shall be eligible for inclusion in the specialist pool. Inclusion or removal of names from the pool shall be decided by a special committee appointed by Government.

(b) Medical Officers in receipt of teaching allowance, public health pay or administrative pay shall not be eligible for the specialist pay under this rule.

9. **Teaching Allowance** :—(a) Medical Officers holding the following posts in teaching institutions shall be entitled to teaching allowance (to be treated as special pay) as follows:—

(i) Directors of Departments and Professors : Rs. 100 p.m.;
(ii) Associates Professors and Assistant Professors : Rs. 75 p.m.

(b) Medical Officers in receipt of teaching allowance shall not be eligible for specialists pay or public health pay.

10. **Public Health Pay** :—(a) Medical Officers posted for public health duties, whether integrated with curative work or not, shall be eligible for a public health pay (to be treated as a special pay) of Rs. 50 p.m.

(b) Medical Officers of health centres who were borne on W.B. Medical & Health Service cadre on 31-12-57, and who may opt for new terms and conditions of this rules, shall be eligible for public health pay of Rs. 50 p.m. instead of public health (Compensatory) allowance of Rs. 200 p.m. in Thana Health Centres.

(c) Public health pay shall not be admissible to those who are in receipt of specialist pay, teaching allowance or administrative pay.

11. **Administrative Pay** :—(a) Medical Officers holding administrative posts in selection grade or in special selection grade shall be eligible for an administrative pay (to be treated as special pay) as below :—

(i) Director of Health Services, W.B.—
Rs. 250 p.m.

(ii) Principals of Medical Colleges, Deputy Directors of Health Services, and Superintendents or Head of large Hospitals or Institutions as well as similar other posts involving administrative functions of

equivalent magnitude as may be authorised by Government from time to time—Rs. 150 p.m.

(iii) Asst. Directors of Health Services, Chief Medical Officers of Health (formerly Civil Surgeon), Directors of different departments of teaching institutions and Superintendents of Hospitals or Institutions as well as similar other posts involving administrative functions of equivalent magnitude, as may be authorised by Government from time to time—Rs. 100 p.m.

(b) Medical Officers in receipt of administrative pay shall not be eligible for specialist pay or public health pay. Teaching allowance may however be drawn in addition, by Director-Professors of Teaching Institutions.

12. **Hazard Allowance** :—(a) The risk allowance (Special pay) which was admissible to the Medical Officers employed in tuberculosis, leprosy, and other infectious diseases hospitals or in institutions shall be abolished. They shall, instead, be entitled to free treatment including accessory treatment in State Institutions for infectious diseases. For such treatment, disaiblity leave, not exceeding 24 months at a time, during which full average pay shall be given, if appointed on permanent basis or full pay equivalent to that drawn before the commencement of leave in case of appointment on temporary basis. The diseases should be certified by Medical Board to have been contracted during official duties. In case of permanent disability extraordinary pension or gratuity, as the case may be, at rate prescribed by the Government, shall be given in addition to normal pension or gratuity.

13. **Existing Special Pays attached to particular posts.**—All special pays and allowances attached to particular gazetted posts in the previous cadre, including those sanctioned for part-time services rendered to other department, e.g., Jail, Police, etc,. shall be abolished.

14. **House Rent Allowance and Lodging** :—(a) Medical Officers who are debarred from private practice of any kind and are or may be posted in Calcutta, South Subarban Municipal Area or Garden Reach Municipal area, shall be eligible for house-rent allowance as admissible under W.B. Finance Rules.

(b) Medical Officers posted in health centres, clinics or other institutions in areas outside the headquarters and subdivision shall be given free unfurnished quarters or actual house-rent in lieu thereof subject to a maximum of 10 per cent of their pay, including special pay, if any.

(c) Concession for free quarters for Medical Officers in district and sub-divisional hospitals are withdrawn. Officers shall be required to pay rent for occupation of Government residences as per Service Rules.

(d) In exceptional circumstance, and with prior approval of the Government, medical officers may reside outside the Government quarters, but shall have to forego 10 per cent of pay including special pay, so long the quarters lie vacant.

15. **Total Emoluments** of a Medical Officer shall not exceed Rs. 2,000 p.m. excluding dearness allowance and house-rent allowance.

The Director of Health Services, shall however be permitted to draw a total emolument excluding dearness and house-rent allowances upto a maximum of Rs. 2,250 p.m.

16. (a) Candidate for recruitment at basic grade shall be at all age not lower than 20 years and higher than 32 years. Ante-date of appointment in the basic grade is :—

(i) Six months in case of possession of post-graduate diploma in any branch of medical science provided the diploma is for a period of not less than 9 months.

(ii) One year—in case of possession of higher post-graduate qualifications.

(iii) 18 months in case of possession of more than one post-graduate degree or diploma.

(b) Full period of ante-date shall count totowards pay but not for leave.

17. (a) Specialists, ordinarily not less than 28 years and not more than 45 years, possessing post-graduate degrees, diploma or equivalent qualification and or experience may be recruited to the basic grade and shall be eligible for antedate as :—

(i) Half the period from the date of graduation to the date of assuming the appointment.

(ii) Three-fourth of the period from the date of assuming appointment pertaining to a speciality in a recognized hospital or institutions till the date of joining the W.B.H.S.

(b) Total period of ante-date shall be counted in terms of years only.

(c) Medical Officer possessing specialist qualification, whose total period of antedate exceeds 12 or 17 years, may be considered for direct appointment in selection grade or special selection grade, provided he is fit.

(d) Periods of ante-date shall count towards his pay but not for leave and shall also count for pension upto a maximum of 5 years, except in certain conditions.

18. Initial recruitment shall be made through Public Service Commission, West Bengal.

19. All Medical Officers shall be liable to be transferred to any post in that cadre including posts in rural areas in the exigencies of public service.

20. **Age at Super-annuation** shall be 55 years.

21. All permanent posts shall be pensionable.

22.-27. Vide Gazettee for details.

VITAL STATISTICS, WEST BENGAL.

	1948	1949	1950	1951	1952	1953	1954	1955	1956	Provisional)	1957 (Provisional)
Birth rate per mile ...	21.3	22.8	20.3	21.9	23.1	22.7	23.0	25.5	23.7	—	20.9
Death rate per mile ...	18.1	17.4	16.7	13.0	10.8	10.2	9.3	8.9	8.2	—	9.8
Infant Mortality rate per 1,000 live births ...	136.7	130.0	129.8	109.5	99.6	94.0	86.9	78.9	79.9	—	93.9
Maternal death rate per 1,000 total births ...	8.5	8.2	6.5	5.9	5.5	5.7	4.9	4.5	4.2	—	3.8
Tuberculosis death rate ...	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	—	0.2

SPECIFIC DEATH RATE PER MILE, WEST BENGAL.

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Cholera	0.6	0.6	0.8	0.2	0.2	0.3	0.08	0.2	0.1	0.2
Smallpox	0.4	0.06	0.6	1.1	0.1	0.02	0.03	0.02	0.03	0.3
Malaria	3.6	3.6	2.7	1.5	1.3	1.1	0.9	0.6	0.4	0.3
Fevers (excluding Malaria)	5.5	5.1	5.1	3.9	3.3	3.3	3.1	3.0	3.1	3.6
Dysentry and Diarrhoea ...	1.1	1.1	1.2	0.8	0.7	0.7	0.5	0.6	0.6	0.7
Respiratory diseases ...	1.7	1.6	1.6	1.3	1.2	1.1	1.1	1.0	0.9	1.0
Other diseases ...	5.2	5.3	4.7	4.2	4.0	3.7	3.6	3.6	3.1	3.7

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ASSOCIATION NEWS

Dr. K. S. Viswanathan

Dr. K. S. Viswanathan, Professor of Public Health Administration of the All-India Insitute of Hygiene and Public Health, Calcutta, and the Associate Editor of the Indian Journal of Public Health has been appointed as a Member of the WHO Expert Advisory Panel on Professional and Technical Education of Medical and Auxilliary Personnel for a period of five years. He has also been appointed as a Member of the Expert Committee on the same subject and invited to attend the Expert Committee Meeting at Geneva from 7th to 12th July, 1958.

Moving of resolutions in the next Annual General Meeting of the Indian Public Health Association.

The attention of the members of the Indian Public Health Association is hereby drawn to the procedure relating to resolutions to be moved in the next annual meeting of the Association for any change, modification or repeal of the rules and regulations of the Indian Public Health Association or any other resolutions in connection with Public Health' subject.

As per General Rule (a) Clause IV of Rule 18 of the Memorandum and Rules and Regulations of the Association, the copies of all such resolutions should reach the Central Council at least four months before the date of the next Annual Meeting which is expected to be held this year in the month of December, 1958. Members are therefore requested to send the copies of all such resolutions intended for move in the next Annual General Meeting to reach the Secretary by the 31st August, '58, at the latest.

ANNOUNCEMENT

Symposium on Fungus Diseases in India

It is proposed to hold a symposium on "Fungus Diseases in India" under the auspices of the School of Tropical Medicine, Calcutta, in the third week of December, 1958. The symposium will be divided in the following sections:—

1. Internal medicine.
2. Paediatrics.
3. Gynaecology and Obstetrics.
4. Dermatology.
5. Surgery.
6. Medical mycology.

Papers are invited for the presentation at the symposium. An abstract of the paper (in duplicate) not exceeding 300 words, should be sent to the Director, School of Tropical Medicine, Calcutta, not later than September 15, 1958, and the full paper (in duplicate) should be sent by November 15, 1958. Dr. C. G. Pandit, Director, Indian Council of Medical Research, New Delhi, has kindly consented to preside over the symposium. Scientists from the U.S.A. and U.K. are expected to participate in the symposium. For any further information and details regarding the symposium, kindly write to the Director.

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