INDIAN JOURNAL OF PUBLIC HEALTH

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THE PROBLEM OF CHOLERA IN INDIA.

Cholera is undoubtedly a disease of antiquity being prevalent in India as far back as the history can be traced. One of the earliest histories of the disease is found in Sushruta Samhita, a treatise in Indian Medicine, written not later than the 7th century B.C. Probably it had been endemic in China also for thousands of years. In the recent past it was supposed to have destroyed Ahmed Shah's Army in 1438. However, the disease gained momentum in earlier part of the 19th century and actually appeared for the first time in pandemic form in 1817 from Bengal, spreading within a short period to other parts of India and most of the Asiatic countries, as well as to Africa. It was followed by five other pandemics during the course of the next 100 years. The disease is now endemic in nearly all the Eastern Asiatic countries and hence is generally known by the name "Asiatic Cholera." In India, there are several states where the endemic foci of the disease exist but the state of West Bengal is particularly marked as the home of cholera.

Since 1873, Cholera did not succeed in gaining a foothold in European countries and even in Africa, except for a transient invasion in the wake of world war I.

In recent times cholera has not been reported from places other than the Asitatic countries including India, except from Egypt during 1947-48. Here also cholera did not establish its footing. The question therefore arises why should it persist in India particularly when a good deal of knowledge is available regarding its cause, transmission, treatment, prevention and control. The health authorities in India should now face this problem squarely.

Man is the only animal involved in this disease and one of the lessons learnt from the various pandemic occurences is that it is spread by the human agencies alone from one country to another though occasionally explosive outbreaks occur locally due to contamination of common water sources, food or drink. It was definitely established that cholera was carried from India to Arab countries through the Hedjaj pilgrims. So also in India cholera used to rage in epidemic form following aggregation of people in fairs and festivals and from there it used to spread far and wide every year.

That the above contention may have a logical basis is supported by the facts that the establishment of quarantine laws actually stopped the occurrence of cholera outbreaks in Egyptian and other Arabian countries and also in fairs and festivals in India after introducing strict immunization programme and

sanitation of the mela (fair) areas. Also, that the situation may repeat itself if opportunities are propitious, has been proved by the recurrence of cholera epidemic whenever relaxation of the control measures has been made in fairs and festivals.

The western countries and Egypt exhibit two important characteristics, viz., the people are fully susceptible to cholera but, even if the infection is brought there, it fails to have a subsequent foothold. These therefore are the attributes of the Epidemic situation as opposed to the Endemic situation prevalent in certain areas of India. The former is associated with sudden appearance of the disease due to importation with rapid spread and high fatality rate while in the latter case the infection is rooted into the soil (in man and environment) and causes sporadic cases often unconnected with each other almost throughout the year, with occasional or regular seasonal exacerbation. Both case incidence and fatality rates are much lower than in the epidemic areas, the people being frequently subjected to clinical or subclinical infection, and a large proportion of the population being thus kept partially or fully preimmunized. The infection in the latter condition need not be important though within its boundary it may move from place to place through movement of active cases or possibly carriers.

India is subjected to both kinds of situation. The handling of real epidemic situation is much easier and simpler but that of endemic situation is much more complex. In fact the problem of cholera is the problem of its endemicity. While in the Epidemic situation the problem is of prevention and at best of control if the epidemic arises but in the endemic situation it is a question of eradication. In fact, the situation is well comparable to malaria. Mere control would not do, eradication is necessory but the question is, have we ever tried the measures of prevention and control in any systematic and thorough manner? The answer is obviously in the negative. If so, the first indication is that the same should be first thoroughly tried, though in the endemic areas the problem of eradication will also come in, as by these procedures, the infection can be brought down to a minimum but the endemic foci should be rooted out to prevent the infection rising again. To be successful, however, it is necessory to have a thorough knowledge of the cause of endemicity, which we do not yet possess. For instance, there is even controversy about the causative germ itself. Suddenly a case is found to arise in a village but even a careful investigation fails to elucidate as to how and from where he might have got the infection. However, the distinguishing features of the cholera endemic areas are:

(*a*) cases are more concentrated in the deltaic areas.

(*b*) these are generally within 100 miles of the sea coast as in Madras, Orissa, West Bengal, Burma, Thailand, China etc.

(*c*) the water courses in such areas have higher salinity and sometimes higher pH.

(*d*) the population in the area are invariably rice-eaters and has generally high density.

(*e*) temperature and humdity are generally high.

The above are some of the points which may be only partly responsible for the continued prevalence of the disease in the country. To these may be added the ignorance of the people about health knowledge, inertia to practise whatever is known, economic and certain social factors, which contribute in no less degree to the perpetuation of this infection[1]. On the other hand failure of public health measures so far taken is another fact of the problem

Although a large amount of literature is now available on various aspects of the cholera problem, but so far as the dealing with the control of endemic cholera is concerned no clear cut direction can be obtained. The measures of control and prevention so far adopted are more applicable to the epidemic rather than the endemic situation.

Three articles on cholera are appearing in this issue. Dr. S. K. Chatterji[2] has recorded his observation regarding the incidence and deaths of all probable and possible cholera cases during the years 1956, 1957 and 1958, in Calcutta, Dr. D. K. Roy[3] has dealt with the conditions observed in only two constituencies (71 & 72) of Calcutta in 1958, and Dr. Abou-Garaeb[4] on the last outbreak of cholera in Kathmandu, Nepal.

Dr. Chatterji's observation shows that cholera is prevalent almost at all seasons and all throughout the city with greater incidence in some areas and less in others and there is a definite seasonal exacerbation. Since his observations are confined to the last three years it is not likely to give a complete picture. For instance, his observation that the cholera incidence decreases from the central Calcutta towards north and south is not supported by the observations if extended to more than 3 years. Besides these are the areas which have large number of service latrines. Similarly Dr. D. K. Roy's paper will show that the cholera vibrio could be isolated from Tolly's Nallah as much as from unfiltered water hydrants and the Hooghly river. Dr. Chatterji however wishes to incrimate unfiltered water supply, access to rivers and canals, bad sanitation and flies particularly in the bustee areas, high density of population, large number of open privies etc. He has also associated the Ramjan (Muslim) and Gajan (Hindu) festivals with cholera but he has not said how these are connected. On the other hand, Dr. Roy's work indicate that about 25 per cent of the cases are not reported to the city authorities, most of the cases were single cases in families and very little history could be obtained of previous contacts with a known case. Some had history of movement outside and about 20 percent gave history of bathing or using the canal water, from which agglutinating vibrios were isolated on several occasions, or of using unfiltered water, doba or open well water. But none of the patients gave history of using any water other than from tubewell or the Corporation filtered water supply for drinking purposes. Two-thirds of the patients were using open service privies. These observations lead to tentative conclusion that a generalised infection is going on in the city of Calcutta and unless the sanitary defects such as, dual water supply, insanitary latrines are removed and slums are improved along with the augmentation of filtered water supply and replace-

ment of worn out pipe lines and extension of the sewerage to cover the entire area it will be difficult to think of controlling cholera in the city.

Dr. Abu Gareeb's paper brings into lime light the cholera conditions prevailing in Nepal and from the records he has collected cholera infection seems to have established its root in certain areas of Nepal also. Further investigation is therefore warranted.

As far back as 1931 the Indian Research Fund Association undertook to study the cholera problem in India. The first stumbling block was the defining of true cholera vibrio among so many types of vibrios present in the environment. Gardner and Venkatraman in 1935 gave a definition on basis of smooth O agglutination reaction but this vibrio could not be epidemiologically correlated with the endemicity of the disease in this country. The vibrio group was studied both chemically and serologically and through treatment with bacteriophage. Out of these studies another scohol of thought developed who consider that cholera vibrio might remain in the mutated form and unless this character is recognized the problem of endemicity would not be solved. Studies on cholera are still being continued under the Indian Council of Medical Research which are now mainly directed towards the improvement of the cholera vaccine and towards the discovery of possible variants of the cholera vibrio by means of bacteriophage technique and transduction through genetic approach. The studies on Cholera toxin has also been revived in young as well as adult rabbits following newer techniques. The health authorities, however, feel that while such studies may continue for acquiring newer and further knowledge there should be concerned attempts at the state level to control and, if possible, to eradicate the disease. With this point of view the Government of India have established an Expert Committee under the Indian Council of Medical Research and similar committees at each state level. It is proposed that smallpox and cholera be included in the third five year plan for their control on a national basis. Let the committees not forget that radically the problem of cholera in India is its endemicity and foothold in certain areas. The sooner they meet and make their recommendations, and the sooner the local authority implement them, the sooner will the problem of cholera be solved as they have done elsewhere. Meanwhile we shall be watching with expectancy and interest the recommendations of these bodies in this regard.

1. Seal, S. C.—(1956), Ind. J. Pub. Hlth. I. (Inaug.), 9-19.
2. Chatterjee, S. K. (1959) Ind. J. Pub. Hlth., 3, 5.
3. Roy, D. K. (1959) Ind. J. Pbu. Hlth., 3, 33.
4. Abou-Gareeb, A. H. (1959) Ind. J. Pub. Hlth., 3, 20.

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"CHOLERA IN CALCUTTA" SOME OBSERVATIONS OF EPIDEMIOLOGICAL INTEREST AND THE PROBLEM OF ITS CONTROL

By

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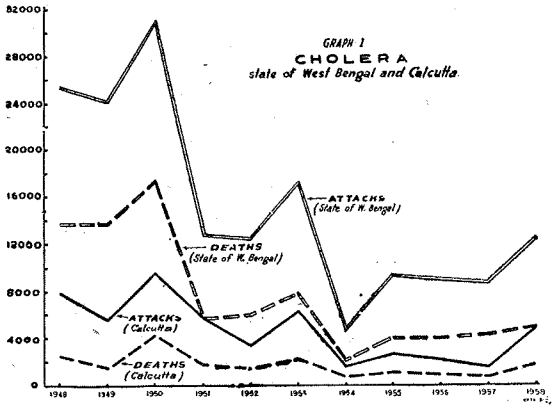
Introduction:

This article is intended to place bare facts, our expperiences in the field and some observations at the disposal of those who are engaged in "Cholera Research" as well as those who are concerned with the control of Cholera in the city.

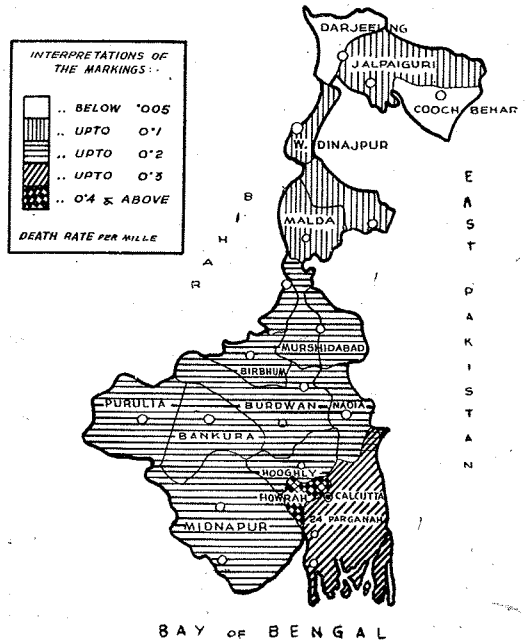
Cholera in West Bengal and Calcutta—their trends:

Calcutta contributes a considerable proportion to the total incidences and deaths from cholera in West Bengal. The official figures of the last ten years from 1948 to 1957 (Graph-1) illustrates the position, and shows the trend which appears to be steadily declining both in West Bengal as well as in Calcutta.



SKETCH. 1

MAP OF WEST BENGAL SHOWING THE DISTRICTWISE AVERAGE MORTALITY DISTRIBUTION OF CHOLERA DURING THE YEARS 1952 – 1956



Cholera is prevalent more or less in all the districts of West Bengal. The prevalence is less in the northern districts being almost nil

in Darjeeling and Cooch Behar whereas it is considerable in the southern districts. Of the latter again the areas situated around the tidal reaches of the Hooghly, which are also predominantly industrial areas, suffer most, the worst being Calcutta and Howrah. The districtwise distribution (as per mortality rates) has been shown in the Sketch No. 1 annexed.

Calcutta absorbs our interest for the present study which is based mainly on statistical analysis supplemented by some field surveys. In the interest of comprehensiveness we have preferred to base our obsevations more on the cases admitted to the City's hospitals than on the mortality figures. The average figures of 3 years viz. 1956, 1957, 1958 have been taken into consideration as they are expected to represent more recent conditions. So far as 1958 is concerned the actual figures till 31-7-58 have been taken whereas for the rest of the year still to come the rates have been estimated on the basis of the averages of the corresponding periods of the two preivous years.

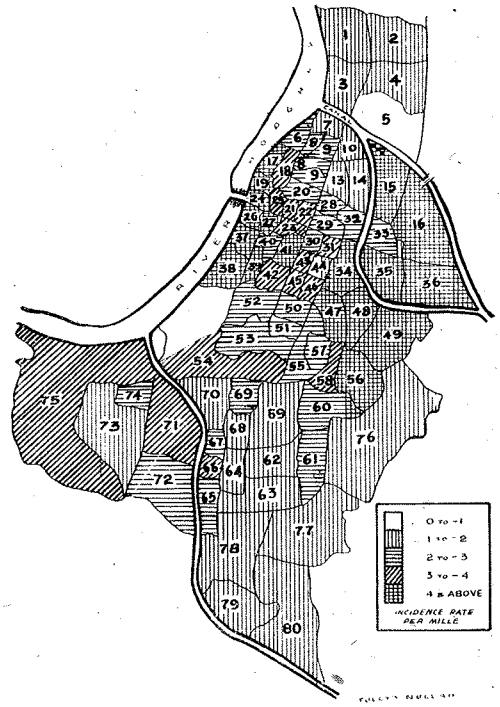
Geographical Distribution:

Calcutta is divided into 80 wards distributed over an area of 23,907 acres including Tollygunge and other added areas and having an approxmate population of 2.7 million as per 1951 census.

In these years the average number of cases per year admitted to the City's hospitals as suspected cholera was 10,823, of deaths 1060 and the average case fatality rate 9.6% (See Table No. 1).

An analysis of these suspected cases removed from different wards have been shown in Table No. 2. These have been mapped out in Sketch No. 2. The wards sending 4 patients per mille of population and above in a year have been shown in deeper shade in the Sketch whilst the wards sending at lesser rates have been shown in varying lighter shades. From above it would appear that cholera is most prevalent in wards nos. 15, 16, 17, 19, 24, 26, 27, 34, 35, 36, 37, 38, 39, 41, 44, 47, 48, 49, 56. These localities are popularly known as Ultadanga, Maniktala-Bagmari, Beliaghata, Topsia, Tangra, Sealdah Machuabazar-Burrabazar and Nimtallah. The last four localities are situated roundabout the Harrison Road and the Strand Road. It is worth mentioning here that the first six localities are situated around or about the Circular and Beliaghata Canals whereas the last two are situated on or about the Hooghly. All these areas taken together constitute what is popularly called the Central Calcutta, and include the terminuses of

SKETCH 2
WARDWISE AVERAGE DISTRIBUTION OF SUSPECTED CHOLERA CASES ADMITTED INTO THE CALCUTTA HOSPITALS (1956-58)



the two principal Railway Systems across the country, one being located within the city itself viz. Sealdah whereas the other viz. Howrah being connected with the city by a bridge across the Hooghly.

It would also appear from this Sketch that the incidences become less as one proceeds northwards and southwards from the said central portion till he reaches the two extremeties, viz. Talla-Cossipur on the north and Tollyguge in the south.

It is interesting to note from the Diagram No. 1 (showing distribution of cholera in the 80 wards during the 52 weeks of the years) that cholera prevails in appreciable quantity almost throughout the year in the wards

noted above whereas in Talla-Cossipur area as well as in the five wards (76-80) constituting Tollygunge it prevails only during a few of 52 weeks. In other words, these wards remaining deep shade for the maximum number of weeks may be considered as the areas of highest endemicity.

Distribution by Social and Religious groups:

In these wards again which has an average density of population of about 73,000 per sq. mile or 114.20 an acre, the patients are mostly drawn from the bustee and slum areas, where, as a rule, water supply per capita is far too scanty and sanitation is anything but satisfactory. From this view point many of the stately buildings in the Burrabazar area are nothing but genteel slums, sanitary conveniences being far too scanty for heavy load of residents that they have to carry leading to the accumulation of filth, files and nuisance.

Lower middle classes and still lower economic groups constitute the majority of the patients to the City's hospitals. In a survey based on mortality statistics Dr. Seal found that about 80 percent of cases were contributed by families paying rent upto Rs. 20/- per month.

Of the patients, on the average 88 percent are Hindus 10 percent are Mahamedans, 2 percent the rest. (Vide Table-3). Calculated per mille of the specific populations in the city, the incidence works out at 3.9 per mille of the Hindus, 3.6 per mille of the Mahamedans, 0.9 per mille of the others. It is interesting to note that the rate of incidence community-wise is almost the same for the two major communities viz. the Hindus and the Mohamedans in the city. The view held so long that the disease predominates amongst the Hindus therefore does not hold good.

Distribution by sexes:

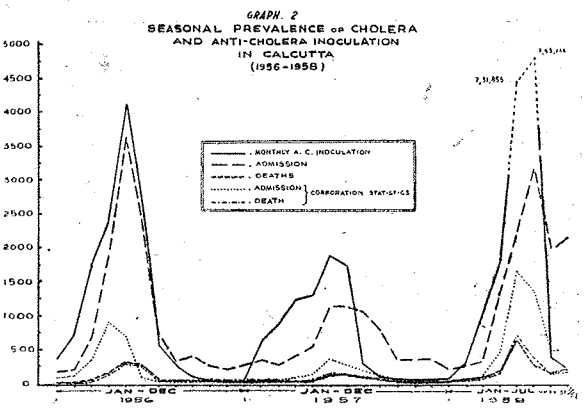
Both sexes contribute, males being 66 percent and females being 34 percent of the total admissions. Calculated per mille of the population by sexes in the city the incidence for males works out at 3.9 and for females at 3.5.

Distribution by ages:

Table No. 3 illustrates the distribution by ages. It may be seen that about 47 percent of cases are drawn from the age group of 11 to 30 years whereas least from those at the either extremities of life.

Season:

Graph No. 2 illustrates the distribution of cholera by months. It appears that cholera is endemic in the city throughout the year and reaches its peak between March-April to June-July. The popular notion that cholera visits the city only periodically during certain seasons therefore can not be held as correct.



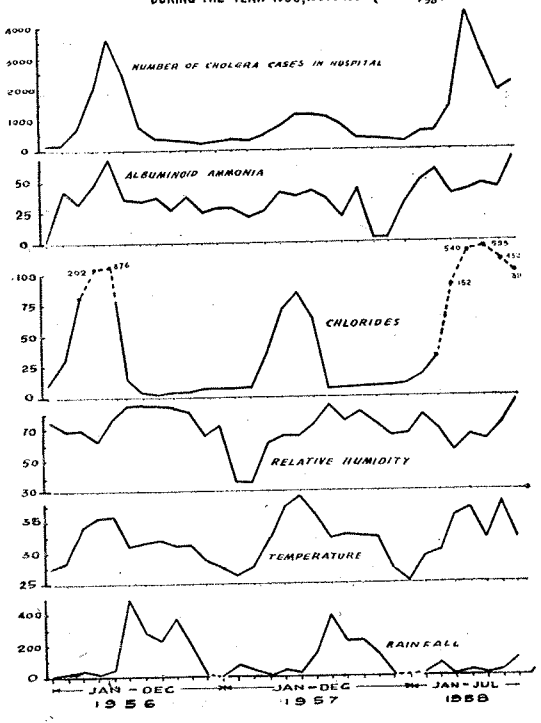
Climate:

The graph No. 3 illustrates the curves of the rainfall, temperature, the humidity, Albuminoid Amnomia and the salinity (measured as chlorides) of the water of the River Hooghly in relation to the curve of cholera. The River Hooghly is a tidal river and constitutes the ultimate source of water supply to the city.

It may be seen that of these, the Albuminoid Amnomia and the salinity curves closely correspond to the cholera incidence curves throughout the year.

The increase in the albuminoid amnomia and salinity in the water of the Hooghly is attributable to the fact that during the season the volume of the water in the Hooghly shrinks because of the flow of the upland land water becoming feebler and feebler, whereas the discharge of effluents of the industrial towns stretching over 30 miles on

GRAPH. 3
VARIATION OF TEMPERATURE, RAINFALL, RELATIVE HUMIDITY CHLORIDES, ALBUMINOID AMMONIA CONTENT OF THE RIVER HOOGHLY IN RELATION TO INCIDENCE OF SUSPECTED CHOLERA IN CALCUTTA DURING THE YEAR 1956, 1957 & 1958 (UPTO 31/5/58)



her both banks and the tidal flow from the 'Bay' remain more or less constant. The river is thus deprived of the benefits of a liberal dilution of the organic matters and the salts received from the said sources till the rains set in and swell her volume.

Socio-religious observances:

The peak season coincides with a period when certain important religious observances of both the Mohamadans and the Hindus are held e.g. the "Ramjan" spreading over a month ending with the Id festival, and the "Gajan" also spreading over a month and ending in Chaitra Sankranti and New Year's day festival.

The graph No. 2 illustrates the relation of these observances to the incidences of cholera in the city. The periods of these observances coincide with the initial spurts in the cholera curves of the years under consideration.

Contributions by the neighbouring areas:

From the Table No. 4 it may be seen that about 19 percent of the admissions in the City's hospitals are contributed by the subarban and the urban areas forming the industrial belt around Calcutta.

Reporting of Cholera in Calcutta:

The graph No. 2 offers a comparison between the cases admitted to the hospitals as suspected cholera and those officially announced as Cholera by the City's Health Authorities.

It may be seen that though the curves of deaths are more or less similar, the curves of incidences widely vary. This implies that either the incidences are not duly notified to the City's Health Authorities or that majority of these are not accepted by them as cases of cholera or both. The last seems to be the case.

Cholera—its local definition:

Cholera has been defined, in the temporary regulations under the Epidemic Diseases Act, for Calcutta and West Bengal as "any diseases accompanied by vomiting and diarrhoea".

Obviously the above definition is crude beyond measure and is of an "omnibus" type. Any case of Diarrhoea of whatever aetiology, dysentery, food poisoning and the like can be declared as "cholera" and sent to hospitals. As a matter of fact it is actually being so done.

Undoubtedly the definition has to be improved upon. But until the City's water supply and sanitation has been made satisfactory, it would be unwise to do so from the administrative point of view. This omnibus definition at least reduces the risk to the society that might arise out of a missed diagnosis in true cholera cases. Besides, the people become inoculation minded only when there is a scare of cholera in the locality.

True "Cholera":

The question naturally arises as to what proportions of these cases admitted to the hospitals are cases of true cholera.

Out of 32,468 patients, 16,756 samples of stools were examined in these years of which 2,657 were found vibrio positive which works out at 15.8 percent positive (seen Table No. 1). The stools were collected mostly by the rectal swab method and examined within a few hours of their admissions. The organisms were identified serologically.

Though the vibrio negative cases can not be taken without further investigation as being not cases of true cholera, yet the percentage of vibrio positive cases read with the percentage of case fatality rate would strongly suggest that by far the majority of the cases are not true cholera cases.

THE CHOLERA VIBRIO

(*a*) *In nature*:

Dr. Krishnan's (of the All-India Institute of Hygiene and Public Health, Calcutta) studies revealed that the true cholera vibrios in considerable numbers can be isolated from the raw waters of the Hooghly, as well as the waters of the Circular and Beliaghata Canals. The water from the city's tank, lakes and, strangely enough, the raw water of the Tolly's Nallah failed to show the presence of any such vibrios (vide Report of the Scientific Advisory Board, Indian Council of Medical Research, 1950, p.p. 8 and 9).

Dr. Krishnan further found that these vibrios could be isolated in increasing numbers and with greater ease and frequency from the aforesaid water several weeks before the epidemic outbreak starts and begins to be scarce a few weeks before such outbreaks subside. For about three months in the year during the monsoon these waters failed to offer any such vibrios open to isolation (vide Report of the Scientific Advisory Board, Indian Council of Medical Research 1951, pages 6 and 7).

The exact relationship between the appearance of true cholera vibrios in increasing numbers in the said waters during the season to the epidemic outbreaks of cholera in the city is yet to be established and the whereabouts of the said vibrios in nature in the apparent recess period during Monsoon are yet to be explored.

(*b*) *In man*:

From the graph Table No. 1) it may be seen that the vibrio positive cases have been found almost throughout the year, though their proportion increases considerably during the epidemic season.

The true cholera vibrios are thus present in the human beings throughout the year in the city.

WATER SUPPLY OF CALCUTTA

(*a*) *Drinking water*:

The city population gets a daily supply of 92 million gallons of piped water consisting of filtered and chlorinated water augmented by water of giant tubewells pumped into the water mains at the different zones of the city. Samples of water from the peripheral taps and elsewhere are, as a rule, periodically examined and corrective measures taken according as necessary.

The above supply does not cover the entire city area but leaves large pockets in the shape of bustees, parts of recently added areas etc. The people in these localities have to fetch drinking water from a distance or to collect it from some nearby tubewell, if there be any.

The supply is intermittent in character in most parts of the city being available a few hours only in the morning and the evening. This creates a temporary scarcity in the areas supplied, besides exposing the supply to contamination through suction.

Another type of scarcity also results from the relatively low pressure in areas within the distribution zone but situated higher up.

The distribution pipe lines are old and worn out and therefore liable to cracks leading to contamination of water. The liability to cracking increases particularly when water is pumped into the mains at too high a pressure.

(*b*) *Unfiltered Water Supply System*:

About 90 million gallons of raw water from the Hooghly are daily pumped and distributed throughout the city through a separate distribution system for purposes of flushing, street watering, fire fighting etc.

This supply is continuous in character, available day and night and covers a wider area.

It is common knowledge that this water is used for bathing, washing the utensils and sometimes even for drinking in the scarcity areas e.g. the Bustees, the slums or during the scarcity periods in well supplied areas as well.

(c) *Other Sources*:

Besides the above, there are about 1,703 tanks and dobas, the water of which is also used by the people in scarcity areas.

From above it would appear that the raw water of the Hooghly has access to the very homes of the people through the unfiltered water supply system and because of the continuous nature of the supply day and night, this system offers a very handy sources of water for the people to fall back upon whenever the necessity arises. Such necessities are not infrequent particularly in view of the temporary scarcity created by the intermittent supply of filtered water.

Sanitation:

Only ⅜rd of the city area is covered by sewerage whereas the rest, accommodating a population of about 10 lakhs, is non-sewered and have to depend on conservancy. The latter comprises of about 42,000 service privies in addition to a number of sanitary latrines. On the one hand these privies have to deal with a load many times more than they can usually carry, on the other, servicing in these days of labour unrest, is hardly satisfactory. The resultant fly breeding is immense during the season.

Food:

(a) The season coincides with a period when fruits e.g. mangoes, guavas, lichies, cucumbers, pine apples etc. are plentiful and often hawked about in a peeled condition ready for comsumption by customers.

There are many green vegetables e.g. Tomatoes, Chillies, Salads, Betels etc. which are eaten raw.

The chances fo their contamination go high if and when they are sold exposed to dirt, dust and flies or washed with unfiltered water during the scarcity periods in order to keep them supple.

(b) *Contamination by flies*:

Flies being generally abundant during the season, all kinds of prepared food-stuff, if and when kept uncovered, are exposed to the risk of contamination by flies.

Anti-Cholera Inoculation:

Graph No. 2 illustrates the influence of Anti-cholera Inoculation on these outbreaks. It may be seen that the Anti-cholera Inoculation exerts a profound influence in reducing the admissions to hospitals of suspected cholera cases. It also illustrates the social factor that the urge of the people to take the inoculation varies directly proportioned to the incidences of the suspected cases of cholera.

From the above Graph read with Graph No. 2 it may be seen that the number of people inoculated was much higher in 1956 and 1958 than in 1957 but the incidences of vibrio positive cases in 1957 was much lower than those in 1956 and 1958.

One of the interesting features worth mentioning is that in 1957 Anti-cholera Inoculations were generally confined to the selected areas viz. the bustees and slum areas which were considered more vulnerable. In these areas the majority of the population were inoculated before the expected season of cholera. The curve of progressive inoculation has preceded the ascending limb of the cholera incidence curve in 1957 whereas the former has succeeded the latter both in 1956 and 1958. The entire operation was conducted in a planned manner working on the hypothesis that if the number of susceptibles in these areas, could be reduced by giving them Anti-cholera Inoculations in time, the size and the duration of the outbreaks in the whole of Calcutta might at least be reduced. The results obtained tend to support the hypothesis and encourage further trials of the method.

Further, in 1958 A/C inoculations following the same pattern as in the years prior to 1957, were started in all the wards of the city in an uniform manner. Cholera spurted up though the progressive number of inoculations performed was considerably high.

The plan was modified with effect from 19-4-58 to the extent that particular attention was paid to the completion of mass A/C Inoculation, within a couple of weeks, of the people residing in the vulnerable wards stated elsewhere. The usual activities in this regard in other wards of the city were however left undisturbed. This procedure of putting special emphasis on the vulnerable wards seems to have a relation with the sharp downward trend of the cholera curve which later started in 1958 as early as May. The months of May usually constitutes the middle of the peak season in other years. This tends to support further the idea that concentration of attention to these vulnerable wards, so far as A/C Inoculations are concerned, helps in controlling the outbreaks even if it be introduced at the highest of the epidemic outbreaks.

A. *The features of the outbreaks:*

(a) Almost from the beginning of the year sporadic cases occur in some of the wards particularly in the endemic zones described elsewhere.

(b) With the progress of summer a number of cases crop up in these areas constituting the outbreaks. The incidences are rarely simultaneuos but spreads over days and weeks.

(c) The intensity of these outbreaks continues through all the summer months abating only with the advent of the monsoon. In any given area as a rule intensity seldom aggravates so much as to be called "explosive".

(d) The outbreaks are generally localised within a furlong or two of the sporadic cases.

(e) The outbreaks show very little correlation to the distribution systems of unfiltered or filtered water, where these exist.

B. *The spread—whether water or fly borne:*

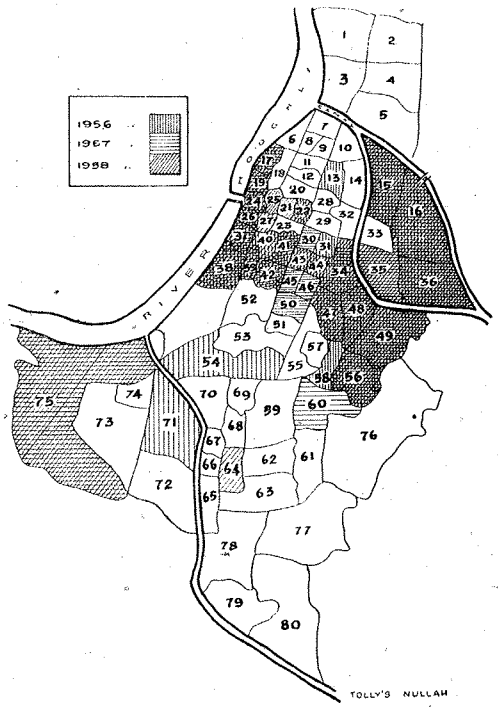
A generalised contamination of the filtered water supply system leading to the outbreaks, as is sometimes alleged, does not appear to be likely because the nature of the outbreaks is not so explosive as to justify an outright conclusion in favour of it.

Secondly because the localities where the supply of filtered water is either scanty or absent contributes more of the cases whereas the localities having a plentiful supply send the least number of cases.

There may be local contaminations here and there due to cracks in the distribution system but these are as a rule regularly checked and readily attended.

On the other hand, in those localities which constitute the actual sites of the outbreaks what catch the eyes of the field workers most are, (i) scarcity, relative or absolute, of piped drinking water supply, (ii) Tremendous nature of fly nuisance because of the insanitary conditions prevailing. (iii) frequent association of the resident population with the raw waters of the Hooghly or the canals either directly or through the unfiltered water supply system. These considerations suggest that the spread is more of fly borne than of water borne type.

SKETCH. 3
THE WARDS WITH MAXIMUM INCIDENCE OF CHOLERA CASES ADMITTED IN THE YEARS 1956, 1957 & 1958



Annual Recurrence—the features:

The geographical distribution and other features of these outbreaks follow almost the same pattern year after year varying only in their magnitudes. From the Sketch No. 3 in which the maximum incidences of the three years in order of severity in the wards have been plotted it may be seen that the wards suffering from the maximum incidences are almost indentical in the years 1956, 1957 and 1958. These wards, again, are almost the same as those that we have found, elsewhere, to be of highest endemicity and situated on or nearabout the Hooghly or the canals, the waters of which were incriminated by Dr. Krishnan for harbouring true cholera vibrios in increasing number during the season.

Causes of the outbreaks:

In the state of our present knowledge it is difficult to exactly state the factors responsible for these periodic outbreaks. In the Table No. 2 an attempt has been made (after actual survey in the field), to study the influence of the more important of the environmental factors involved. It may be seen that in the worst affected wards the common features are:

(1) Scarcity of safe drinking water, either due to the pressure not being enough and/or due to intermittent supply and/or due to overcrowding leading to relative scarcity.

(2) Easy access to the questionable water sources e.g. The Hooghly, the Canals, directly or indirectly through the unfiltered water supply system all of which are continuously avaiable.

(3) (A). The bustees and the slums, which are most unsatisfactorily sanitated, abound in these wards, the percentage of the bustee population to the total population of the whole wards being considerably high.

The bustees and slums again abound with service privies in numbers inadequate to their users and with unsatisfactory servicing arrangements, leading to immense fly breeding and nuisance.

Or,

(B). High density of population (Dr. Seal in his survey found that the space per capita was less than 25 sq. ft. in 88 percent of the affected families) rendering the existing sanitary conveniences of whatever type insufficient and thereby leading to nuisance and fly breeding and to the creation of a favourable atmosphere for the spread of communicable diseases.

On the other hand in the least affected wards e.g. wards of Talla-Cossipur what we find is that there is adequate protected water supply, either being continuous in its system of supply or copious in volume supplied. The important point to note is that there are very few cases of cholera in these wards though one or more of the rest of the above factors are also present.

In Tollygunge area however there are few cases of cholera though the protected water supply is neither continuous nor copious the rate of supply being about 3 gallons per capita daily and the sanitation none too satisfactory. This may perhaps be explained by the fact that the inhabitants have no easy access to the incriminated waters of the Hooghly or the canals or the unfiltered water supply system there being no such service there. It is true that there are the Tolly's Nallah and many tanks but the Vibrios could not be isolated from them by Dr. Krishnan. Perhaps the absence of infective organisms in sufficient numbers during the season in natural waters account for the difference.

From above it would appear that the scarcity of safe water supply together with an easy access to the infected waters of the Hooghly or the canals directly or through the unfiltered water supply system, play the vital role in the causation of these outbreaks. The other factors play contributory roles. All of them combine together in shaping the sizes of the outbreaks. The periodic exacerbation during the season, almost exactly corresponds to the appearances of the true cholera Vibrios in the said waters as found by Dr. Krishnan. The geographical distribution of the maximum incidences of cholera cases also lie in the areas around the said waters.

The chain seems to work as follows;

Apparently the scarcity of drinking water compels the people to use unfiltered water

supply occasionally. Those who use the waters of the Hooghly, the canals or the unfiltered water supply system render themselves liable to infection. The susceptibles amongst those infected develop the disease, which is subsequently spread in the locality through the agency of the flies, as is suggested by the manner of the distribution of the cases, discussed elsewhere. The spread may be carried to other localities through the flies as well as by human intercourse.

The phenomenon of the appearance in large numbers of the true cholera Vibrios during the season in the waters of the Hooghly and the canals during the season followed by their subsidence remain to be explained. The heavy lead of pollution that the Hooghly receives from the Industrials areas on boh her banks together with the shrinkage in its volume of water during the season leading to concentration of organic matters and salts (See Table No. 6) in her water seems to have an important relation with the phenomenon. Even the pH value of the said waters remains as high as 8.2 during the season (See Table No. 6). Apparently this seasonal deteriotion in the quality of the water of the Hooghly accounts for the seasonal appearance of the true cholera Vibrios in her waters. But no definite and conclusive opinion can be formed at this stage, without further investigation.

Permanent Measurers:

Permanent measures therefore would mainly be

(a) Establishment of a Metropolitan mainly Sewage Board covering the population of the entire Greater Calcutta area ensuring adequate safe water supply and safe disposal of excreta and other organic wastes.

(b) Clearance of slums bustees and khatals from these areas.

(c) Reducing the congestion in these areas by suitable dispersal schemes.

(d) Elimination of unfiltered water supply system.

It has to be appreciated however that the above measures would take considerable time to be implemented because it would depend on the availability of adequate funds as well as materials and equipments.

Some Temporary Measures:

Pending above we have to persist with the temporary and palliative measures only, the more important amongst which are:

(A) Timely immunisation of the population particularly those who are exposed to immediate risks of infection, e.g. those living in bustees, slums, etc. or near about the Hooghly and the canals. Mass inoculation of this population have to be completed before the usual epidemic season starts and repeated six months thereafter.

The ideal thing would have been if the individual citizen could get themselves and their wards inoculated in time periodically and maintained a record which could be produced before the Health Staff during the latter's routine rounds of checking. In introducing the system however education rather than legislation should be the method of approach.

(B) *Water supply*

(a) Augmentation of safe water supply may be arranged particularly in the scarcity areas at the rate of one source (which may preferably be a tubewell with storage tanks fitted with several taps) for each 200 people within a distance of 100 yds. Special adjustments may be made in areas where the pressure of water is relatively low.

(b) Preventing the wastage from house and street taps by suitable divices has to be ensured. The quantity so conserved may help in making the supply period longer, if not continuous.

(c) Preventing the creation of artificial scarcity in the premises by the landlords who often use filtered water supply as a lever against the tenants has to be prevented. This can be achieved by arranging separate supplies in the same way as is done by the Calcutta Electric Supply Corporation for the supply of electricity.

(d) In view of the fact that the distribution system is old and worn out at

many places exposing the supply to the risk of contamination, the presence of residual chlorine may be ensured in tap waters at all parts of the city.

(e) Unfiltered water supply system may be made inaecessible to the people for purposes of using or even handling it. Otherwise it may be adequately treated before distribution. The same remarks hold good for other unauthorised sources of water e.g. tanks and dobas, etc.

C. *Conservancy*:

(a) The existing service privies may either be connected or converted into sanitary latrines with arrangements for servicing them at least once daily.

(b) The general sanitation of the city may be improved eliminating the ugly sights of huge refuge dumps at street corners breeding flies.

The system, that is in the process of implementation by the Civic authorities, of collecting the garbages in covered bins by individual householders and subsequently removed by the Corporation conservancy may be expedited so as to cover the entire area as quickly as possible.

D. *Health Education*:

This should include educating the people on the dangers of using the unauthorised water and taking exposed food staffs without further adequate treatment and on the necessity of protecting themselves in time against cholera by taking Anti-cholera inoculation every six months.

E. *Food and Drinks, Sanitation*:

All Food and Drink establishments, markets etc. may be regularly inspected and provisions of the sanitary bye-laws strictly enforced. The same may also apply to all Food and Drink materials particularly those which are taken raw or without further treatment e.g. cooking or boiling; sold or hawked about in the streets and markets.

F. *Other Measures*:

The usual anti-epidemic measures e.g. proper notification, adequate ambulance and hospitals service, disinfection, disinfestation, safe disposal of the dead and of all-infected materials etc. may be tightened up and properly supervised.

G. *Organisation*:

An adequate organisation may be provided to carry out the above measures in a thorough manner after carefully drawing a detailed plan in advance. These organisations must be under the direct control of the technical officers e.g. The Health Officer, the Chief Engineer etc. and should consist of wholetime men.

Summary:

(1) The statistics of the last ten years show that the trend of cholera is declining in the State of West Bengal including Calcutta.

(2) The cholera cases admitted into the city's hospitals include all cases of acute gastro-enteritis of whatever actiology including food poisoning.

(3) Cholera is endemic in the city throughout the year and assumes epidemic proportions during the summer between April to the middle of July. The peak season coincides with a period when the salinity, albuminod ammonia and pH value of the water of the tidal river Hooghly.

(4) The seasonal spurts in the incidences of cholera coincide with the two major festivals viz. "Ramzan" of the Mohammedans and "Gajan" of the Hindus, both observed for about a month by the respective communities in the city.

(5) The incidence is highest in the localities situated around and near the canals and the Hooghly e.g. Ultadanga, Maniktala, Beliaghata, Sealdah, Burrabazar, Nimtollah etc. and these happen to be the Central part of Calcutta.

The incidences become thinner and thinner till they are found to be the lowest at the Northern and Southern extremities of the city e.g. Cossipur, Talla, Paikpara on the north and Tollygunge on the south.

(6) In these areas again, cholera rages most in those wards where percentage of slum and bustee population and/or the average density of population is high.

(7) The rate of incidence is more or less the same amongst the Hindus and the Mohammedans; as well as in the two sexes; highest amongst these aged between 10 to 30 years, lowest at either extremities of life. A considerable number of cases have been reported amongst children under 1 year of age which suggests infection through contaminated milk or water.

(8) In view of their usual features, and in the absence of sufficient explosiveness in their character, the outbreaks in their spread seem to be more of fly borne than of water borne type.

(9) So far as the causation of these periodic outbreaks are concerned, a combination of several environmental factors seems responsible, e.g. scarcity of protected water supply for drinking and coking purposes, access of the people to the waters of the Hooghly or the canals directly or indirectly through the unfiltered water supply system.

(10) Anti-cholera inoculations have a profound influence in controlling the outbreaks.

(11) Concretely speaking, the above would require as permanent measures,

(a) The establishment of Metropolitan Water and Sewerage Board covering the entire Greater Calcutta area from Bansberia-Kalayani to Uluberia-Budgebudge on either sides of the Hooghly.

(b) Elimination of the unfiltered water supply system; if it proves costly, then to make it altogether inaccessible to people.

(c) Removal of service privies or connecting them with sewers or replacement with sanitary latrines.

(d) Elimination of the unhygienic slum and bustee areas from greater Calcutta

(e) Reducing the intense overcrowding by suitable dispersal schemes.

Unless the above has been established the prevention of cholera would continue to remain a far cry only.

12. Pending above, which may cost much money, materials and time we have to persist with temporary measures yielding only indifferent results. The more important amongst them are:

(a) Timely inoculation of the people particularly those exposed to immediate risks and repeating it every six months.

(b) Augmentation of the filtered water supply so that there may be one source for each 200 people within 100 yds.

(c) Improving the general sanitary service of the city. The individual householder may be held responsible for collecting garbages and other refuge matters in covered bins within their their premises to be subsequently removed by the Municipal Conservency Service.

(d) Adequate measures may be taken for food sanitation both by the City's Health authorities as well as by the individuals.

(e) Educating the people on the dangers of using the unauthorised waters, contaminated foods and on the necessity for taking A. C. inoculations in time as well as in healthful living.

ACKNOWLEDGEMENT

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BIBLIOGRAPHY

(a) Technical Report of the Scientific Advisory Board, Indian Council of Medical Research, 1950.

(b) Technical Report of the Scientific Advisory Board, Indian Council of Medical Research, 1951.

(c) Seal, S. C. and others (1956)—A study of the contributions of social factors to the continued Prevalence of Cholera in the city of Calcutta.—Ind. J. Pub. Hlth., I, 9-19.

TABLE I

Statement showing admissions, death of suspected cholera cases admitted in Hospitals, Corporation Statistics, stools examination results and anti-cholera inocculations.

	No. of cholera cases in Hospital	No. died	% of death	No. of stools examined	No. found positive.	Percentage of stools found positive.	Corporation Statistics		Anti-cholera Inoculation.	
							Attack.	Death.	done during the month.	Total since the beginning of the year.
1956										
January	174	11	6.3%	64	—	—	Nil	Nil	33,484	33.484
February	189	12	6.3%	49	2	4.08%	1	1	70,544	1,04,028
March	698	55	7.8%	83	9	10.8%	47	26	1,74,659	2,78,687
April	1,908	142	7.4%	981	315	32.1%	356	131	2,38,987	5,17,674
May	3,666	361	9.8%	3,582	657	17.0%	910	307	4,24,230	9,41,904
June	2,364	265	11.2%	799	118	14.7%	700	268	2,56,129	11,98,033
July	734	49	6.6%	644	71	11.0%	82	38	52,933	12,50,966
August	379	18	4.7%	351	15	4.2%	21	10	27,059	12,75,025
September	400	18	4.5%	277	10	3.61%	35	23	9,846	12,87,871
October	244	18	7.3%	226	7	3.09%	18	18	3,347	12,91,218
November	214	5	2.3%	186	—	—	9	4	2,983	12,94,201
December	271	16	5.9%	176	38	21.02%	34	19	4,385	12,98,586
Total	11,241	970	8.6%	7,418	1,242	16.7%	2,213	845	12,98,586	12,98,586
1957										
January	358	31	8.6%	316	59	18.6%	48	32	63,219	63,219
February	270	30	11.1%	219	31	14.1%	48	28	85,120	1,48,339
March	419	24	5.7%	159	16	10.0%	71	21	1,23,298	2,71,637
April	792	63	7.9%	389	19	4.9%	142	67	1,30,160	4,01,797
May	1,141	121	10.6%	814	135	16.5%	348	165	1,88,058	5,89,855
June	1,132	125	10.0%	730	73	10.0%	286	112	1,75,939	7,65,794
July	1,052	88	8.3%	831	57	6.8%	183	87	29,122	7,94,916
August	769	89	11.5%	368	32	8.6%	113	54	4,940	7,99,856
September	323	37	11.3%	261	9	3.4%	60	28	3,378	8,03,234
October	339	30	8.8%	259	2	.77%	42	15	1,457	8,04,691
November	339	28	8.2%	212	1	.47%	40	15	2,893	8,07,584
December	205	10	4.8%	127	1	.78%	24	8	5,305	8,12,889
Total	7,139	676	9.4%	4,685	485	9.28%	1,405	632	8,12,889	
1958										
January	490	49	10%	268	8	2.9%	58	27	28,358	28,358
February	581	73	12%	349	X	—	93	47	1,00,333	1,28,691
March	1,334	151	11%	622	7	1.1%	461	117	1,77,560	3,06,251
April	4,414	657	14%	957	255	26.6%	1,643	698	7,31,855	10,38,106
May	3,150	267	8%	823	195	23.6%	1,352	403	7,63,746	18,43,182
June	1,959	137	7%	754	257	34.0%	452	125	41,330	18,43,182
July	2.160	199	9%	880	258	29.3%	491	168	19,961	18,63,143
Total	14,088	1,533	10.8	4,653	980	21	4,550	1,582	18,62,243	

SUMMARY

Of Case Fatality and Vibrio Positive Cases.

Year.	Admission.	Deaths.	Fatality.	Stool samples examined	Found positive.	Percentage.
1956	11,241	970	8.6%	7,418	1,242	16.7
1957	7,139	676	9.4%	4,685	435	9.2
1958	14,088	1,533	10.8%	4,653	980	21.0
Mean	10,826	1,059.6	9.8%	5,585.3	885.6	15.8

TABLE II

A Statement showing the wardwise average admissions and death rates per mile from suspected cholera and some of the different environmental factors. (1956-58)

Ward No.	Estimated average rate per mile		Filtered water supply Continuous (C) or Intermittent (I)	Unauthorised water supply			Service Latrines	Population	Area in
	Incidence	Death		Access or proximity to Unfiltered water	Ganges	Canal		Bustee	Acres
1	1.47	0.15	C	−	+	−	+	20,311	439
2	1.55	0.22	C	−	−	+	+	9,552	415
3	1.72	0.20	C	−	+	−	+	11,890	346
4	1.19	0.18	C	−	−	−	+	12,170	343
5	0.79	0.10	C	−	−	+	+	15,669	576
6	2.22	0.16	I	+	+	+	+	8,275	89
7	1.62	0.18	I	+	−	+	+	11,620	114
8	2.38	0.19	I	+	−	−	+	3,652	70
9	2.24	0.28	I	+	−	−	+	4,316	86
10	1.81	0.25	I	+	−	+	+	10,925	158
11	2.43	0.32	I	+	−	−	+	1,165	77
12	2.21	0.28	I	+	−	−	+	233	71
13	2.69	0.32	I	+	−	+	+	10,019	104
14	2.54	0.24	I	+	−	+	+	13,058	157
15	5.47	0.65	I	−	−	+	+	33,742	497
16	6.83	0.69	I	−	−	+	+	15,345	648
17	5.84	0.51	I	+	+	−	−	4,634	81
18	3.04	0.40	I	+	+	−	−	4,436	79
19	9.47	1.01	I	+	−	−	+	8,681	86
20	2.91	0.25	I	+	−	−	−	5,598	105
21	3.43	0.18	I	+	−	−	−	2,177	71
22	3.56	0.34	I	+	−	−	+	8,736	84
23	3.06	0.29	I	+	+	−	−	5,300	53
24	6.24	0.69	I	+	−	−	−	309	63
25	3.28	0.37	I	+	+	−	−	618	67
26	8.09	0.42	I	+	−	−	−	—	67
27	5.22	0.43	I	+	+	−	−	422	53
28	2.37	0.25	I	+	−	−	−	6,118	76
29	2.96	0.31	I	+	−	−	−	10,108	131
30	2.79	0.24	I	+	−	−	−	1,428	64
31	3.47	0.34	I	+	−	−	+	6,902	71
32	2.92	0.21	I	+	−	+	+	14,996	121
33	2.88	0.33	I	−	−	+	+	21,948	231
34	22.20	2.37	I	+	−	+	+	10,287	226
35	4.98	0.58	I	−	−	+	+	21,548	360
36	6.77	0.76	I	−	−	+	+	23,161	541
37	6.2	0.28	I	+	+	−	−	—	89
38	10.23	0.27	I	+	+	−	−	—	242
39	5.78	0.13	I	+	−	−	−	—	79
40	2.87	0.27	I	+	−	−	−	5,000	57
41	4.04	0.32	I	+	−	−	−	4,111	116

TABLE II—continued

Ward No.	Estimated average rate per mile Incidence	Death	Filtered water supply Continuous (C) or Intermittent (I)	Unauthorised water supply Access or proximity to Unfiltered water	Ganges	Canal	Service Latrines	Bustee	Area in Acres
42	3.95	0.31	I	+	–	–	–	887	148
43	3.99	0.25	I	+	–	–	–	1,428	64
44	4.90	0.36	I	+	–	–	–	476	57
45	3.35	0.28	I	+	–	–	–	1,890	77
46	3.45	0.31	I	+	–	–	–	3,598	84
47	4.79	0.43	I	+	–	–	+	6,630	221
48	7.85	0.98	I	+	+	+	+	27,200	259
49	6.07	0.60	I	+	+	+	+	17,595	513
50	2.58	0.19	I	+	–	–	+	6,266	113
51	2.25	0.14	I	+	–	–	+	8,665	82
52	2.76	0.21	I	+	–	–	–	4,369	287
53	2.01	0.19	I	+	–	–	–	7,321	419
54	3.36	0.03	I	+	–	–	–	—	634
55	2.11	0.10	I	+	–	–	–	5,359	191
56	6.08	0.22	I	+	–	–	+	10,658	382
57	1.87	0.08	I	+	–	–	+	14,280	144
58	3.27	0.17	I	+	–	–	+	6,936	162
59	1.68	0.06	I	+	–	–	–	7,476	551
60	2.52	0.08	I	+	–	–	–	16,247	327
61	2.36	0.21	I	+	–	–	+	3,476	260
62	1.87	0.18	I	+	–	–	+	7,900	250
63	1.67	0.11	I	+	–	–	+	—	453
64	1.7	0.07	I	+	–	–	+	2,054	184
65	2.87	0.20	I	+	–	Tolly's nulla	+	9,837	198
66	3.09	0.30	I	+	–	—do.—	+	4,148	107
67	2.56	0.17	I	+	–	—do.—	+	4,159	100
68	1.82	0.08	I	+	–	+	+	8,160	142
69	2.06	0.10	I	+	–	+	+	153	175
70	1.74	0.12	I	+	–	Tolly's nulla	+	1,040	293
71	3.20	0.27	I	+	–	—do.—	+	4,410	629
72	2.48	0.23	I	+	–	—do.—	+	16,423	665
73	1.51	0.07	I	+	–	+	+	15,668	806
74	2.23	0.20	I	+	–	+	+	18,897	200
75	3.51	0.29	I	+	+	+	+	25,658	2,280
76	Tollygunj								1,431
77									806
78	1.49	0.20	Decentralised	–	–	Tolly's nulla			792
79						—do.—	+		531
80						—do.—			1,201

TABLE III

(a) *Sex and Community distribution of suspected cholera cases admitted in Calcutta Hospitals.*

Year	Percentage contributed to total cases by					Rate per mile.				
	Males	Females	Hindus	Muslims	Others	Males	Females	Hindus	Muslims	Others
1956	66.7	33.3	88.6	10	1.4	4.2	3.4	4.1	3.7	0.9
1957	63.9	36.1	88.0	11	1.0	2.5	2.4	2.5	2.5	0.5
1958	65.0	35.0	88.3	10.5	1.2	5.1	4.6	5.1	4.7	1.4
Mean of above periods 1-1-58 to 31-7-58	65.7	34.3	88.2	10.5	1.3	3.9	3.5	3.9	3.6	0.9

(b) *Age distribution of the cases shown above (in percentage to total No. admitted)*

	Under 1 year	One to 5 yrs.	Six to 10 yrs.	11 to 20 yrs.	21 to 30 yrs.	31 to 40 yrs.	41 to 50 yrs.	51 to 60 yrs.	61 & above years
1956	1.5	12.8	8.8	17.5	27.5	15.8	9.1	5.2	1.8
1957	1.0	10.0	8.1	17.0	32.1	14.0	11.0	4.9	1.9
1958	1 0	11.7	8.9	17.8	29.4	14.9	9.8	5.1	1.4
Mean of above periods 1-1-58 to 31-7-58	1.2	11.9	8.7	17.5	29.0	15.3	9.7	5.1	1.6

TABLE IV

A statement showing the distribution of cases of suspected cholera admitted into Calcutta Hospital from outside of Calcutta.

Year	All cases			Imported cases			Percentage to total cases.	
	Total admns.	Total Death	Percentage	No. of admns.	No. of Deaths	Percentage	Admission	Death
1956	11,241	970	8.6	2,104	165	7.8	18.7	17.0
1957	7,139	676	9.4	1,887	138	7.3	26.4	20.4
1958	14,088	1,533	10.8	2,202	280	12.7	15.6	18.2
Mean	10,822.6	1,059.6	9.8	2,064.3	194.3	9.4	19%	18.3

TABLE V

A statement showing admissions and deaths with their rates from cholera during the years 1956 to 1958.

Year	Admission	Attack rate per mile	Death	Death rate per mile.
1956	12,241	3.9	970	.34
1957	7,139	2.4	676	.23
1958	14,088	4.9	1,533	.5
Mean of the 3 years 1956-58		3.7		.36
From 1-1-58 to 31-7-58				

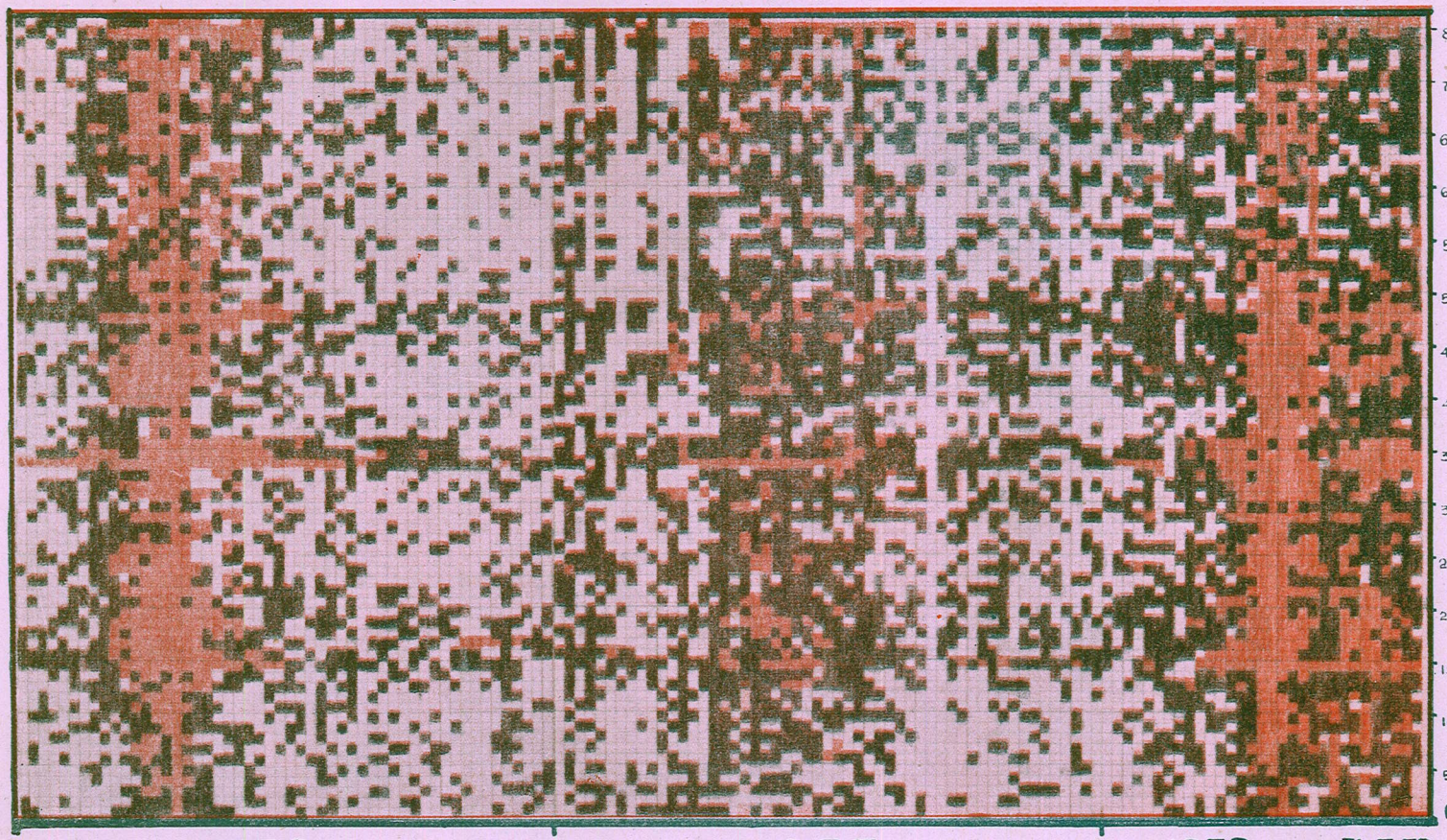
TABLE VI

A statement showing the average monthly data of Albuminoid ammonia, chloride and PH of the Ganges Water.

	Jan.	Feb.	Mar.	Aprl.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						1956						
PH. Value	8.2	8.2	8.2	8.2	8.2	8.2	8.1	8.0	7.9	7.8	7.85	7.96
Chlorides	11	31.5	82	202	376	16	4	4	5	5	7	6
Albuminoid—ammonia	0.04	0.38	0.32	0.47	0.66	0.35	0.342	0.36	0.31	0.37	0.25	0.27
						1957						
PH. Value	8.08	8.05	8.05	8.2	8.2	8.2	7.7	7.6	7.6	7.8	7.7	7.6
Chlorides	6	6	34	70	83	64	7	7	7	9	9	11
Albuminoid ammonia	0.27	0.21	0.25	0.408	0.37	0.42	0.35	0.208	0.43	0.3	0.3	0.312
						1958						
PH. Value	7.7	8.2	8.2	8.2	8.2	8.2	8.2	—	—	—	—	—
Chlorides	17	34	152	540	595	452	311	—	—	—	—	—
Albuminoid ammonia	0.485	0.57	0.408	0.42	0.46	0.448	0.69	—	—	—	—	—

WARDWISE WEEKLY ADMISSIONS IN CALCUTTA HOSPITALS FOR CHOLERA

(1956, 1957 & 1958 upto 31.7.58)



WARDS SENDING LESS THAN 5 CASES IN A WEEK

" " 5 OR MORE " " "

1 BLOCK = 1 WEEK.

SOME EPIDEMIOLOGICAL OBSERVATIONS ON CHOLERA IN KATHMANDU, NEPAL*

By

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Introduction:

Recently, in the summer of 1958, a Medical Officer of Health in Patan Municipality of Nepal mentioned that cholera had been ravaging for centuries. This story might been learned by one generation from the proceeding one.

In spite of what is mentioned above, it is presumed that cholera was not internationally reported before, from Nepal and it was considered to be the first time in July 1958 that the World Health Organization was officially approached for investigation and control. A team from W.H.O. headed by Dr. R. Pollitzer was immediately sent to investigate this cholera outbreak as an emergency measure.

Being engaged in cholera research work at The All-India Institute of Hygiene and Public Health, Calcutta the present writer took this opportunity to study this outbreak.

History of Cholera in Nepal:

As far as I could trace in my exhaustive study on cholera, the first hint that referred to the possible existence of cholera in Nepal, in the form of an official report came in the Annual Public Health report of the Province of Bihar and Orissa for the year 1926. Quoting this report, "... There was a sharp outbreak of cholera in the Purnea district early in the month of April. The infection was traced to Nepal, where cholera had occurred in the district of Morang which adjoins Purnea."

In the Sixty-third Annual Report of the Public Health of the United Provinces of Agra and Oudh (now Uttar Pradesh) for the year ending 31st December 1930 it was mentioned that, "In Gorakhpur cholera was imported from Nepal during the last days of March. Mostly the disease occurred in villages on the borders of the Bihar province". (17) In almost all the subsequent reports of this state, the same kind of statements of importation of cholera from Nepal are found and the health authorities instituted a "barrier scheme". In fact, cases arising in Basti, Gorakhpur, Allahabad, Hardwar, Vrindaban etc. were all attributed to importation from Nepal and Bihar. In any case, cholera occurs every year in both Uttar Pradesh, Bihar as much as Nepal as will be seen later in this paper.

Political, Geographical, Climatological and Social backgrounds:

Nepal is an independent state, situated on the middle northern frontier of India, lying between 80° 15′ and 88° 10′ E., and 26 20′ and 30 10′ N. Its area is about 54,000 square miles. Its extreme length is about 525m., and its breadth varies from 90 to 140 miles. It is bounded on the north by Tibet; on the east by Sikkim; on the south by Uttar Pradesh, Bihar and a little part of West Bengal; on the west by Kumaon district from which it is separated by the Kali river. Its population was estimated in 1929 as 5,500,000 (5) and 6,837,000 in 1958 (by the geometric method of estimation.)

Physically it consists of two distinct territories:—(i) The great mountaineous

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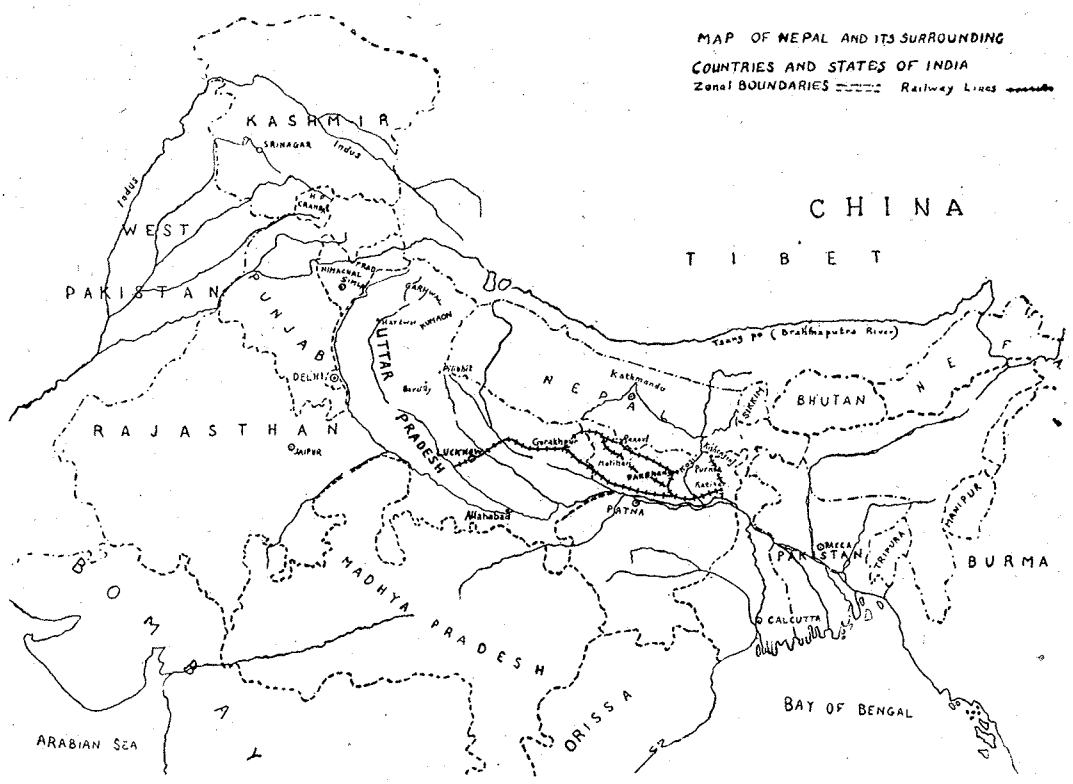


tract stretching northwards to Tibet. Along the northern forntier stand many of the highest peaks of the Himalayan range. South of these are numerous parallel lower ranges which are broken up by cross ranges that determine the course of the rivers; and (ii) The tarai, or strip of level, cultivated and forest land lying along the southern border. In this study I am mainly interested in the district containing Nepal proper in general and particularly in the capital, Kathmandu with its three municipalities, viz., Kathmandu proper, Patan, and Bhatgaon. (5)

In the Nepal valley the year may be divided into 3 seasons; the rainy (June-October), cold (middle of October to the middle of April) and Summer (from April to the beginning of June). The average rain fall is about 60″ annually. During the hot season the thermometer seldom exceeds 90° F. in the shade. The mean temperature is 60°F. Violent thunderstorms are common.

Nepal is connected with the Indian territory by a 75m. road from Raxaul in Bihar to Kathmandu and a 25m. narrow guage railway from the same station to Amlekhganj opened in 1927. An electrically operated ropeway has been constructed from Bhemphedi to Kathmandu valley. The Indian Airline Corporation has also established a daily return service between Patna (Bihar) and Kathmandu.

Nepalese are a mixed Mongol and Aryan origin consisting of various types and the groups viz., Murmis, Gorkhalis, Newars, Brahmans, Rajputs, Simbhus, Keralis, Magars, Gurungs and Bhotias. There are two principal religions, Hinduism and Buddhism, and there are numerous temples and festivals.

Among the educational facilities there is a college at Kathmandu affiliated to the Patna University and there are many schools in the Nepal valley. There are two large hospitals, civil and military in Kathmandu with provision for outdoor treatment. There is also a 60 bedded Infectious Diseases Hospital at the outskrits of the city. The trade with India is carried on through a large number of markets along the frontiers and with Tibet through Shasa.

History of the present outbreak of cholera:

On August 18, 1958, Pollitzer isolated vibrio cholerae from two out of three stools cultivated on modified Wilsons and Blair's medium; from suspected cholera cases admitted in the Infectious Diseases' Hospital in Kathmandu. During subsequent three days he collected 14 samples of stools and isolated Ogawa subtype from most of them while only one stool culture proved to belong to Inaba subtype. This identification was done by slide agglutination tests, against the high titre specific O immune sera including those of subtypes, Ogawa and Inaba. This was the first time that the diagnosis of cholera in the Nepalese Valley was bacteriologically confirmed.

The author collected 9 stool samples from cholera suspected cases in the same hospital in a preserving buffered fluid medium and brought them to Calcutta for bacteriological examination.

He was able to isolate cholera vibrios from 3 out of the 9 stool samples, two Ogawa and one Inaba subtypes. Cultivation was done 3—9 days from the date of collection of the samples.

Although it was the first time that the diagnosis of cholera in the Nepal Valley was bacteriologically confirmed, past history shows that similar outbreaks with variable intensity happened many times beforehands during a particular season. Usually the peak was reached before the monsoon, but in the present outbreak, cases mostly occurred during the monsoon period which was late and mild.

Hospital Records:

The Infectious Diseases' Hospital, under the name "Cholera Hospital" (as was written on its entrance) was situated in the outskrits of Kathmandu. Its capacity was about 60 beds. Personal communications with the medical and public health staff, pointed clearly to similar annual seasonal outbreaks for many years past.

Digging out some of the hospital records it was found that cholera used to occur yearly since at least 1939-40, except that no records could be traced for the years 1942, 1943, 1944. For the period prior to 1939-40, records were also not available, but it was apparent from the discussion with the medical staff that cholera was present in Nepal for a very long time. This year the hospital was utilized at its full capacity and still was not adequate to take all the patients who sought hospital admission. The hospital staff tried to do their best under the most difficult conditions. They had to discharge the patients just after they recovered from the initial collapse. This was done in order to face the pressing need of the new cases, with the limited number of beds in the hospital. This premature discharge of patients almost became the rule, and as a result relapses were not uncommon, requiring rehospitalization.

On the other hand, according to the local custom severely moribund cases were often collected by their relatives and carried to the Ghat, (river side) before death. Vomits and stools of such patients were washed by river water, evidently seriously polluting the river and this facilitated further spread of the infection.

Owing to the shortage of nursing staff, patients in the hospital were allowed to be nurced by their own relatives who went in and out, to and from the hospital to susceptible persons outside. It was not uncommon to find a woman who was nursing her husband or a relative, to be accompanied by a child or a breast-fed infant. At the same time these relatives sometimes offered unsuitable foods to these slightly improving cases leading to the aggravation of their conditions.

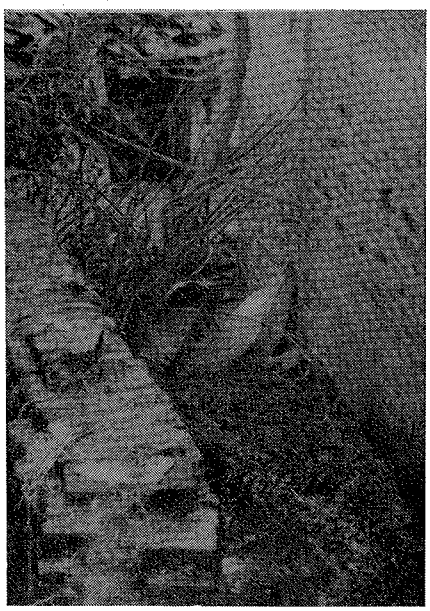
Out of the three municipal divisions of Kathmandu, Patan, was the one which was badly affected with severe cases, and most of the hospital admissions at the time of the author's visit were from this area.

House to House Visits:

It was clear that a house to house survey was essential to study the epidemiology of cholera in Kathmandu but it could not be done for want of time as well as of possible facilities. The first case in the present outbreak could not be traced. During the period between 15-3 and 14-4-1958, 17 cases with 2 deaths were reported from Kathmandu municipality to the cholera hospital.

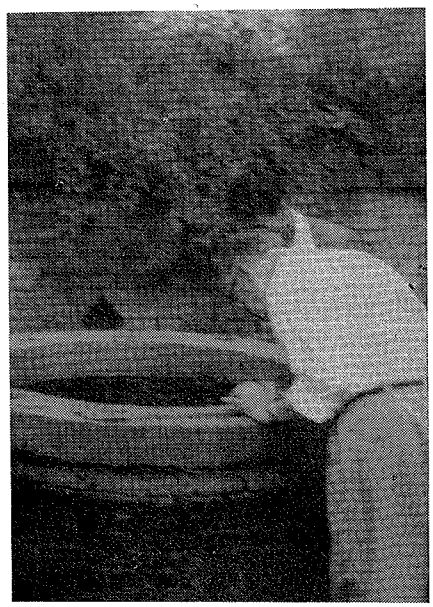
This was preceded by a whole month without reported cases to the same hospital. A decision on whether any of these cases had been away from the town within 10 days or the existence of a previous case of a new comer, could not be taken.

From the hospital, addresses of some of the fresh cases were collected and some of the houses in Patan and Kathmandu municipalities were visited. In Patan, it was not uncommonly noticed to find multiple cases in the same house and even in the same room. In one house there were as many as seven cases of cholera, only one of whom was transferred to the hospital. The total number of inhabitants was 30 persons. The house was a two-storeyed one with a basement and a kitchen above the second floor. The basement was used as a stable and had a direct connection to a small farm-yard. The first and second floors were used for human habitation (30 persons). The kitchen above the second floor was provided with an arrangement for washing utensils etc. the washings being removed directly through a short pipe to the exterior of the building, pouring the dirty water into an open land by the side of the road where the garbage was also being disposed of. (Photograph 1).



1. Open drainage and refuse disposal yard for cholera infected house.

The house had no latrine and was in a very bad sanitary condition. The members of household were using the nearby farmground for defaecation. The drains sloping downwards were found to contain a lot of fecal matter. This heavily polluted water was used for irrigation of these farms where a lot of vegetables were cultivated. The water supply of this house was partly from the municipal tap (for drinking purpose) and partly from a shallow well, the water of which was found to be dirty and unfit for domestic use (photograph 2).



2. A badly maintained shallow well.

A second house was visited in which 3 children living in the same room were attacked with cholera, and there were two cases, one active and one convalescent in two other houses around the same courtyard. There was only a narrow passage from the main road to reach the house. Even the passage was found fouled with diarrheal stools. This passage actually led to a courtyard in the centre of which there was a shallow open well with dirty water for common use. Each family was using its own bucket. So if a case of cholera was present in the house there was every possibility of contaminating this well.

Another house was visited by the author where three children were attacked and died

in the hospital. The mother sickened with cholera was the only living member of the family.

Many of the cases who were examined in this outbreak were found to be suffering from intestinal helminthic infections, particularly ascariasis. Many of the vomits and stools of these cases contained adult ascaris worms. This may add more evidence to the view that the injured or sickened intestine through intestinal parasitic infections may predispose to or precipitate cholera attacks, more commonly than in the case of individuals with healthy intact intestines.

Bhatgaon Municipality and Cholera:

Bhatgaon situated about 9 m. to the east of Kathmandu on the main road, reported only two cases of suspected cholera to the Cholera Hospital of Kathmandu, during the period between 15th May to 14th July, 1958. Visiting this town, it was learnt that there were few cases of choleraic diarrhoea one of whom died about three weeks before this visit which took place on August 22, 1958. The main road crossed the town from West to East. At either end of this road volunteer vaccinators were found vaccinating all people entering or leaving the town and were issuing the vaccination certificate. They said that since August 10, they had vaccinated 21,000 persons. On examining the vaccination registers 150 were found to be vaccinated on that day at the western end, and 120 in the Eastern end.

Cholera outside Kathmandu:

There was no proof that cholera did not involve other places in the Nepal Valley other than Kathmandu, except, perhaps the absence of reporting of cases coming to the cholera hospital during the period of this study between August, 18, 27, 1958. The absence of reporting of cases to Kathmandu hospital from outside the city may be explained by the long distance and difficulty of transport. In this outbreak from the hospital records, (Table 1) it is observed that between April 15 and August 18, there were 94 cases with 14 deaths from places other than Kathmandu.

Distribution and Intensity of Infection:

Up to the middle of June, 1958, the number of reported cases and deaths showed no particular unusual increases compared with figures of past experience in the preceding years (Table 1 & 3). From June 15, the number of cases and deaths started to show an unusual increase, the majority of which came from Kathmandu Municipality. After August 15, Patan started to contribute to the majority of cases, while in Kathmandu proper the peak of the outbreak, (may be the first peak) was reached in the period between July 15 and August 14. The majority of the severe cases were those coming from Patan.

TABLE I

The number of cases and deaths in each of the administrative divisions (municipalities) of Kathmandu during the period between 15.3 and 18.8, 1958 as well as in other places outside Kathmandu in the Nepalese Valley.

Period	Kathmandu		Patan		Bhatgaon		Other places		Total	
	C	D	C	D	C	D	C	D	C	D
15-3—	17	2	3				2		22	2
14-4										
15-4—	24	4					13	3	37	7
14-5										
15-5—	16	3	1		1	1	3		21	4
14-6										
15-6—	284	74	13		1	1	23	6	331	81
14-7										
15-7—	435	57	59	13			49	5	543	75
14-8										
15-8—	49	1	37	7			6		92	8
18-8										
Total	825	141	113	20	2	2	96	14	1,046	177

Environment Sanitation and Water Supply:

In all the three municipalities of Kathmandu houses were built mostly from good bricks and they were of solid structure. In many parts of the capital overcrowding was observed, being more marked in Kathmandu proper (about 15,000 per square mile). and Patan (14,000 per sq. m.), than in Bhatgaon (9,000). Arrangements for drainage of rain water seemed to be well established in the past, but unfortunately owing to bad maintenance and misuse by disposal of refuse or stools through this system, clogging and improper drainage resulted on many occasions. Latrines were few and mostly of the service type, and sweepers collect faeces irregularly to dispose them in the farms to be used as fertilizer. In the outskrits of the city the people defaecate in the farms or the rain water drains.

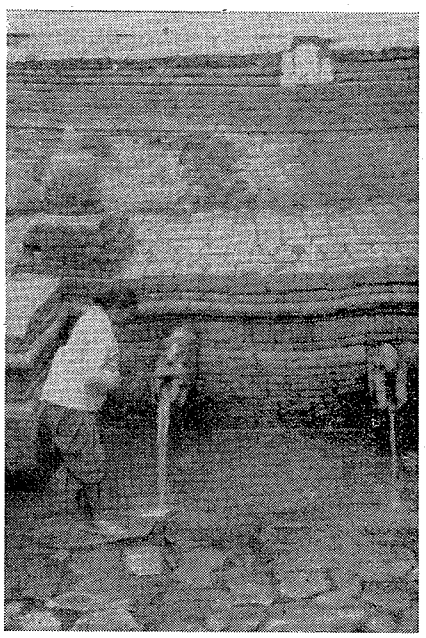
Refuse was not properly disposed and fly breeding was a menace to health in spite of the big effort done for their control by giving rewards to those who collect adult flies.

Water supply is piped from reservoirs at high land into public taps scattered all over the city. This tap water is presumably adequate to supply all the inhabitants of the city for all purposes. But unfortunately large quantities of these water were lost due to poor maintenance of taps and misuse by the public. As practiced in Calcutta the flow of water was only maintained for two periods four hourly each. Naturally the people had to resort to other sources of water at least to supplement their needs. In my opinion a slow flowing continuous water supply throughout the whole day is better than a—rapid flow for short periods.

Among other sources of water there are fountains, wells and tanks and rivers. Owing to the high level of subsoil water fountains (Photograph 3) continuously flow in low lying spots. Contamination of these springs is very probable especially due to the insecure drainage of its waters which probably recontaminate the subsoil water.

There are several open wells in Patan which although well constructed but liable to contamination by careless use. People use their own ropes and buckets in these wells. (Photograph 2)

These unsafe water sources were commonly used for domestic purposes including washing of cooking utensils more than for the purpose of drinking for which tap water was of common use.



3. A water fountain in Patan.

Vital Statistics:

It was found that there was no regular registration of births or deaths in Nepal. There was only one census which was taken in the years 1952, 53, 54. From the figures of this census I estimated the population in the three divisions of Kathmandu, for the years between 1939 and 1958, by the geometric method of estimation. The figures for cholera cases and deaths reported to the cholera hospital were collected and morbidity and mortality rates per 100,000 were calculated to illustrate the past experience of cholera in relation to the last epidemic. (Table 2, diagram 1). The degree of precision of these morbidity rates from cholera in Kathmandu, taken for the purpose of comparative study, can be taken as not worse than that of the city of Calcutta.

In Calcutta the mortality figures are dealt with as being more reliable than the morbidity figures for cholera; while in Nepal it was not possible to rely on the mortality figures due to the lack of registration of deaths as well as the early discharge of the severely moribund cases on their own risk bond to be taken to the Ghat where they usually die and escape recording among the hospital deaths. Thus the case fatality rates calculated seem to be of restricted value and even do not represent the real epidemiological happennings.

TABLE II

Showing the number of recorded cases and deaths, morbidity and mortality rates from cholera per 100,000 population and the case fatality rates, in the city of Katmandu, during the periods between 1939 and 1958.

Year	Cases	Deaths	Incidence	D.R.	C.F.R. %
1939-40	295	14	183	8.7	4.7
1940-41	222	17	137	10.5	7.7
1941-42	692	20	423	12.2	2.9
1942-44	Records were not available.				
1945-46	378	69	225	41.1	18.3
1946-47	137	26	81	15.4	18.9
1947-48	166	21	97	12.3	12.6
1948-49	638	88	371	51.3	13.8
1949-50	166	31	96	17.9	18.7
1950-51	433	62	248	35.6	14.3
1951-52	196	20	112	11.4	10.2
1952-53	181	5	102	2.8	2.8
1953-54	683	105	382	58.7	15.4
1954-55	84	10	46	3.5	11.9
1955-56	95	16	52	8.8	16.8
1956-57	79	14	43	7.6	17.7
1957-58	122	11	66	6.0	9.0
1958 (till 29-11)	2,831	454	1,526	289.0	19.5

TABLE III

Showing the distribution of cholera cases and its prevalence in Kathmandu during the different seasons of the year in the period between 1939-58. It also shows the number of months of each year with reported cholera cases as well as those without cholera during the same period. (See also diagram 2)

Year	Pre-monsoon		Monsoon		Post-monsoon		No. of months with cases.	Months without cases
	C.	P.	C.	P.	C.	P.		
1939-40	226	140	64	40	5	3	8	4
1940-41	144	89	65	40	13	8	7	5
1941-42	333	203	344	210	15	9	10	2
1942-43 1943-44 1944-45	Records were not available.							
1945-46	158	94	218	130	2	1.2	9	3
1946-47	109	64	27	16	1	0.6	9	3
1947-48	107	63	56	33	3	1.7	9	3
1948-49	509	296	129	75	?	?	6	6
1949-50	75	43	62	36	29	17	12	0
1950-51	231	133	198	114	4	2.3	12	0
1951-52	129	73	63	36	4	2.3	10	0
1952-53	117	66	357	202	7	4.0	11	1
1953-54	303	169	378	211	12	6.7	12	0
1954-55	65	36	19	11	—	—	6	6
1955-56	47	26	44	24	4	2.2	8	4
1956-57	38	21	39	21	2	1.0	10	2
1957-58	70	38	45	24	7	3.8	10	2
1958 (till 29-11)	70	37	2,217	1,190	544	290.0	8.5	0

N.B.—Pre-monsoon period from 15-2 to 14-6.
Monsoon period from 15-6 to 14-10.
Post-monsoon period from 16-10 to 14-2.

TABLE IV

Prevalence of cholera in each month of the year, in the period between 1939 and 1958. (See also diagrams 3, 4 and 5)

	1	2	3	4	5	6	7	8	9	10	11	12
39-40	24	51	58	19	8	8	4	3	—	—	—	—
40-41	—	29	50	18	7	15	—	—	—	—	8	8
41-42	16	30	144	137	33	18	22	—	2	—	7	13
45-46	7	24	62	69	46	13	2	—	0.6	—	0.6	—
46-47	8	27	27	7	4	4	1	—	—	1.8	—	1.8
47-48	16	29	16	12	6	9	6	—	—	—	0.6	1.8
48-49	10	109	177	45	23	7	Records were not available.					
49-50	7	17	17	17	7	7	4	1	6.0	3	12	3.4
50-51	15	42	73	62	34	8	9	0.6	0.6	0.6	.6	2.3
51-52	19	27	23	15	7	10	3	—	1.7	—	.6	4
52-53	15	20	28	17	5.6	6.8	2.3	2.3	—	0.6	1.1	2.8
53-54	7	17	139	170	27	9	3.9	1.7	2.2	1.1	1.7	5.6
54-55	3.8	20	11	5.5	2.2	2.7	—	—	—	—	—	—
55-56	11.6	11.5	3	9	12	1.1	2	2	—	—	—	—
56-57	5.5	4.4	10	7	6	5	—	3.6	—	—	0.6	0.6
57-58	6	18	14	5	1.6	15	2	1	1	—	1.6	—
58	12	15	11	178	527	203	295	220	290			

N.B.—1, 2, 3 . . . etc. correspond to the monthly periods from 15.3 to 14.4; from 15.4 to 14.5; from 15.5 to 14.6 etc.

Results of study of 29 cases:

Out of the 131 patients who were admitted to the Cholera Hospital during the period from 20th to 26th August, 29 blood samples were collected. Tube agglutination test was done against both Inaba and Ogawa suspensions. The strains were those same strains isolated from kathmandu cases. Both living as well as heat killed strains at 100°C. in water bath for one hour were used. The titres used were: 1/20, 1/40, 1/80, 1/160, 1/320. The following results were recorded:

(1) *All cases were from the capital of Nepal, 5 males and 24 females. All 29 patients were Nepalese Hindus.*

(2) *The age distribution is shown in the following table*:

Age	Female	Male	Total number	Percentage
10—	4	1	5	17.2%
20—	10	1	11	37.9%
30—	8	3	11	37.9%
40+	2	—	2	6.9%
Total	24	5	29	—

(3) *Time elapsed between the attack and the collection of the blood sample, is represented as follows*:

Cases	1 day	2 days	3 days	4 days	5 days
Number	2	10	11	3	3

(4) *Sources of water supply*:

Cases	Public open well only	Tap only	Tap+ well	Spring	Total
Number	9	14	4	2	29

(5) *Place of attack*:

Cases	Home	Road	Farm	Total
Number	26	1	2	29

(6) *The history of multiple cases in the house was present in 24 out of 29 cases*:

(7) *Only one case had history of immunisation against cholera*:

(8) *Distribution of cases in the different municipalities and according to cholera subtypes*:

Subtype	Patan municip.	Kat-mandu municip.	Bhatgai municip.	Total	Percent.
Ogawa	11	4	7	22	75.9%
Inaba	4	1	—	5	17.2%
Og.+In.	1	—	1	2	6.9%
Total	16	5	8	29	
Percent.	55.2%	17.2%	27.6%		100

N.B.—The sample size was very small and it was not possible to take blood samples from the general population to measure the state of immunity against cholera.

DIAGRAM 1

HISTOGRAM SHOWING THE MORBIDITY & MORTALITY RATES FROM CHOLERA PER 100,000 POPULATION IN THE CITY OF KATHMANDU DURING THE PERIOD 1939 - 58

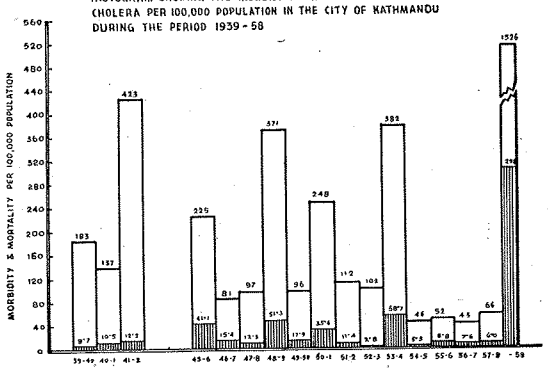


DIAGRAM 2

TO ILLUSTRATE THE PREVALENCE OF CHOLERA IN KATHMANDU PER 100,000 DURING THE THREE SEASONS OF THE YEAR, *PREMONSOON, MONSOON & POST-MONSOON* DURING THE PERIOD 1939 - 1958.

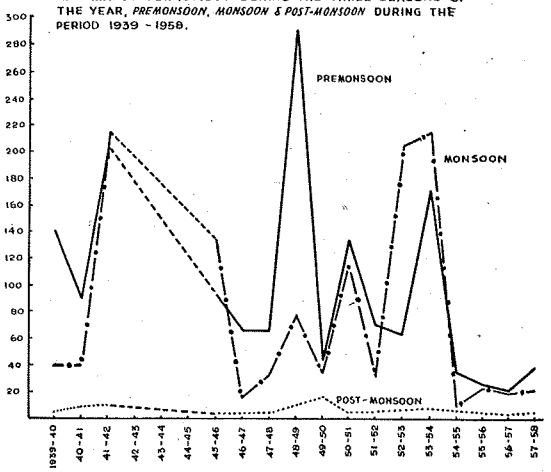


DIAGRAM 4

FREQUENCY POLYGONS SHOWING THE TRENDS OF PREVALENCE OF CHOLERA PER 100,000 POPULATION, IN KATHMANDU IN EACH OF THE YEAR DURING THE PERIODS 1939-42 AND 1945-48.

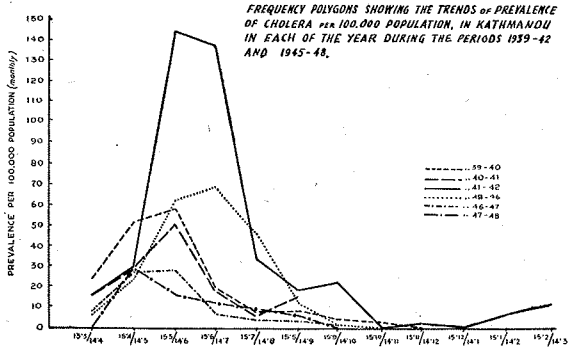


DIAGRAM 3

FREQUENCY POLYGONS SHOWING THE TRENDS OF PREVALENCE OF CHOLERA PER 100,000 POPULATION, IN KATHMANDU, IN EACH MONTH OF THE YEAR DURING THE PERIOD BETWEEN 1948-49 & 1953-4

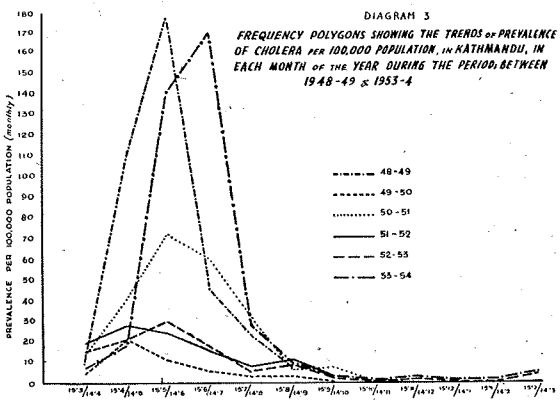


DIAGRAM 5

FREQUENCY POLYGONS SHOWING THE TRENDS OF PREVALENCE OF CHOLERA PER 100,000 POPULATIONS IN KATHMANDU IN EACH MONTH OF THE YEAR DURING THE PERIOD BETWEEN 1954 & 1958 & IN RELATION TO THE BIGGEST EPIDEMIC OF 1958

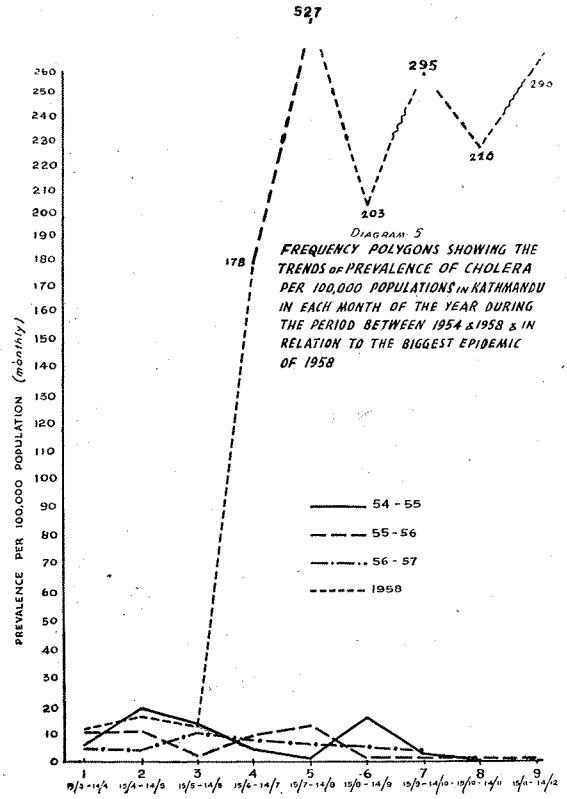
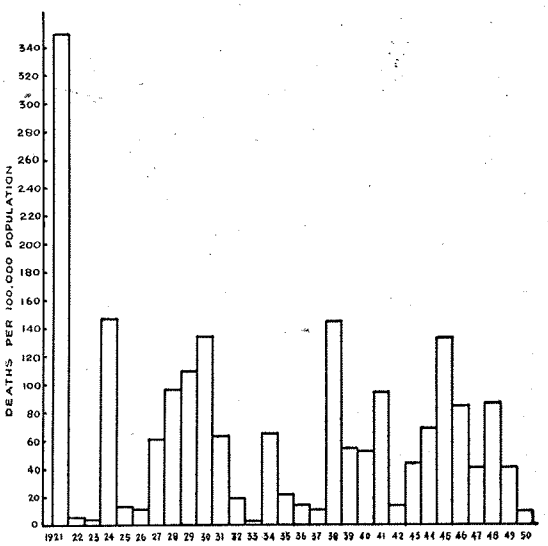


DIAGRAM 6

HISTOGRAM SHOWING TRENDS OF MORTALITY FROM CHOLERA (*Per 100,000*) IN U. P. IN THE PERIOD BETWEEN 1921 & 1950



Epidemiology:

From the statistical data analysed above, it is clear that cholera was prevalent in Kathmandu for several years with a yearly seasonal recrudescence that usually coincided with the premonsoon and the beginning of the monsoon seasons. Although the actual existence of cholera was confirmed bacteriologically during the last epidemic which was the severest yet, the existence of previous similar epidemics throughout several years with the same epidemiological pattern and natural history, the seasonal recrudescence with the same clinical manifestations throw light on the past history of this disease in this part.

Therefore, it was the magnitude and not the existence of the epidemic which was unusual, during the last epidemic of 1958, and it was reasonable to infer that the conditions which gave rise to the epidemic were not of an abnormal nature but were regular and recurring. So we know now that cholera was usually epidemic in Kathmandu to a greater or less degree at the same season every year and we know that that season is characterised by definite climatic conditions of temperature.

Periodicity:

As was observed by some workers in India and even with the help of the poorly available statistical data on cholera in Kathmandu, it seems that periodical recrudescence of cholera in Kathmandu may be observed. For the period between 1945 and 1958, (see diagrams 3, 4 and 5) a five yearly periodicity is noticeable. The years recorded with seasonal increased incidence were 1948-49, 1953-54 and the most recent epidemic of 1958. This periodicity does not coincide with the rhythm of cholera periodicity in Uttar Pradesh, the state of India which has long common frontiers with the southern border of Nepal, and in conjunction with the State of Bihar have been accused for introduction of cholera to the Napalese territory by the Nepalese Health Authorities. In Uttar Pradesh the periodicity takes longer period that may be 7 or 8 years. (See diagram 6)

The last epidemic:

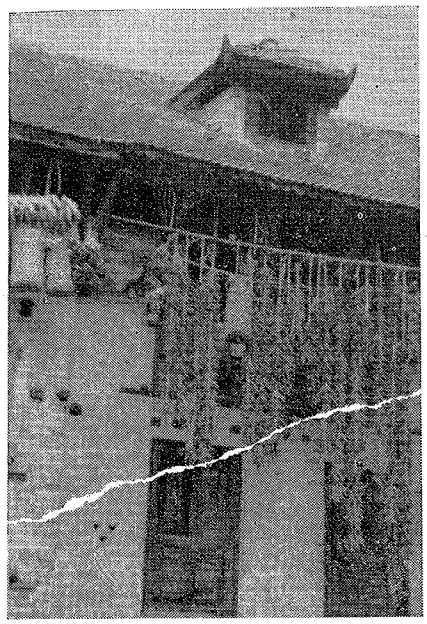
It seems that factors responsible for the spread of cholera were all together simultaneously present this season in Kathmandu to such an extent that made the seasonal increased incidence replaced by a ravaging epidemic which was protracted and covered the whole-monsoon and post monsoon periods. Up to the middle of June, (premonsoon period) there was nothing to point to the impending big epidemic, and there was no unusual increase in the morbidity or mortality from cholera than the average for the previous years.

It is worth while to note that during the last four years prior to the last big epidemic of 1958 the incidence of cholera in Kathmandu was recorded to be the least among all the records of the 17 years studied (diagram 5). It seems that herd immunity acquired during the preceding epidemics has been gradually lost during this period with the result of accumulation of large number of susceptibles among this community exposed to infection.

Suspected food stuffs:

Among the suspected food stuffs was milk curd which may harbour the cholera vibrios on the scum which was exposed to the flies and dust and sold on a large scale.

It was the season for chillis to ripen and to be collected from the farms. These are frequently spread on the soil in the lanes, frequented by flies, and then excessively handled to be attached by threads and then hanged from the windows and balconies to be exposed again to the flies. These might have played a role in the transmission of cholera as a vehicle. No work has been done to isolate vibrios from these foods and to investigate how long can the vibrios keep their viability and infectivity on them. (see Photograph 4) *The suspicion of the chillis in Kathmandu brought to the mind the role played by dates in the cholera outbreak of 1947 in Egypt where it was the season for the collection of this fruit and Medical Officers of Health reported that new foci in certain regions began with the importation of dates from infected areas, especially Korein and neighbouring localities. The Health Authorities confiscated and



4. *House with chillies hanging.*

destroyed every bit of date-palm they came across in spite of the fact that bacteriologically the vibrios could be isolated from interior of the dates within 6 hours and from outside within 5 days. (Kamal 1951).

Source of infection:

The source of infection could not be traced and the Public Health Authorities in Nepal and Uttar Pradesh implicate each other for the import of infection and interchange of new strains on the frontiers between Nepal on one side and U.P. and the State of Bihar on the other side which was quite probable. But this does not mean that the yearly seasonal outbreaks on both sides were merely due to the import of infection from one side to the other and even after the establishment of the "barrier scheme" the yearly seasonal outbreaks did not stop.

It was noticed that there was multiple incidence of cases in some families or houses and even per room in this outbreak, although not all the cases from the same house went to the hospital. The first case in a house might be transferred to the hospital late after deterioration of his condition. Sometimes after the appearance of multiple cases the household started to send fresh or old cases to the hospital as the nursing problem in the house became impossible. In 1947-48 outbreak in Egypt the cases were mostly in single in a house.

Mode of Transmission:

The mode of transmission seemed to be mainly by direct and indirect contact and the role of flies could not be ignored. The chillis which are very hot and lead to hypraemia and even injury to the gastro-intestinal tract if contaminated with cholera vibrios might have contributed to an appreciable number of cases.

Reservoir of infection:

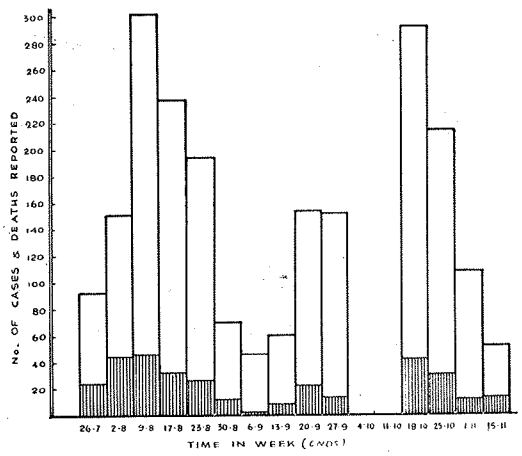
The existence of the human reservoir in an uncontrolled community was quite likely as the human being is the only known sufferers of cholera. Active cholera cases were prematurely discharged from the cholera hospital due to the urging pressure of the newcomers and the discharge of the severe cases to be taken to the 'Ghat,' failure of isolation of a large number of cases which were treated in their homes, the absence of any control to the contacts; all these might have helped in the maintenance of transmission and the protraction of the epidemic with a huge number of cases which was not known in the past history of this State.

Role of water:

Water might have played some part especially in Patan, where open wells were so many (500). These wells were shallow and their pollution was evident even to the naked eye. There were reasons to suspect contamination by vibrio cholerae in certain foci around some wells where a number of fatal

DIAGRAM 7

HISTOGRAM SHOWING THE WEEKLY DISTRIBUTION OF CASES & DEATHS OF CHOLERA IN KATHMANDU IN THE PERIOD BETWEEN 19-7-58 & 29-11-1958



cholera cases had occurred in the immediate vicinity of these wells.

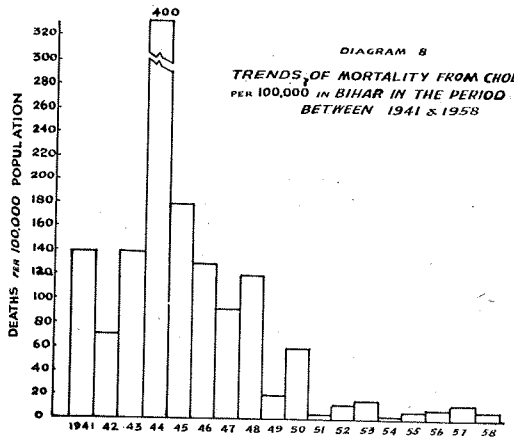
Sequence of events:

Diagram (7) shows the weekly distribution of cases and deaths in Kathmandu during the last epidemic of 1958. This shows that there was more than one peak for this epidemic; at least two peaks; if not three. This may be explained by the fact that by the time the outbreak starts to subside in the a heavily infected area, it starts to spread extensively in a new part, and a large number of cases appear among this new group of susceptibles where herd immunity against cholera had not yet been developed. Another flare up happens and it claims a large number of cases and deaths till the outbreak starts to subside when a large number of susceptibles become exhausted by attacks or developes immunity.

In Patan cholera started to flare up late in July after a month of extensive spread in Kathmandu Municipality. Bhatgaon, although considered as a part of Kathmandu, from the administrative point of view, it lies 9 miles far away from the Kathmandu Municipality and this position might have protected it from the spread of infection. Up to the end of August, Bhatgaon was practically free from cholera, but possibly it fell victim to cholera sometime afterwards. The rise and subsidence of infection in the form of epidemic waves among different communities along time intervals may explain the multiplicity of peaks of the epidemic curve. This might be called "periodical zonal distribution" of the spread of infection.

ENDEMICITY

As Nepal lies on the eastern and northern border of the two Indian States; Uttar Pradesh and Bihar, being the natural continuation of these States; and as cholera is endemic in certain parts of Bihar and possibly in east U.P. and the population movements in both directions is under limited control, it is interesting to study the situation in the Nepal Valley to determine whether cholera is endemic in any of its parts like Kathmandu or it is imported every year from outside the valley. To be in a situation to answer this difficult question, it is necessary to perform a careful and thorough investigation.



For several years and as far back as the years 1926 in Bihar and 1929 in U.P., Nepal had been accused for the export of cholera to these adjacent Indian territories, particularly in Gorakhpur district in U.P. and Champaran, Muzaffarpur, Darbhanga and Purnea districts of the State of Bihar. (*See* diagrams 8).

Many of the Hindus of Nepal cross the frontiers to these two States to join the annual as well as the six-yearly fairs and festivals that take place mostly during the cholera season. According to Banerjee (1951), about 400 fairs, attracting a total of over 12 million people, were held annually in U.P. Other than these 116 fairs are held mostly in eastern districts in the months of March and April when meteorological conditions become favourable for the spread of the disease. Besides these, Kumbh and Ardh-Kumbh fairs at Hardwar and Allahabad, the two largest fairs in India, alternate every sixth year at each place. (2)

To discuss the problem of whether cholera is endemic or non-endemic in Kathmandu, the statistics relating to the incidence of this disease should be accepted only with a certain amount of reservation, owing to the poor reporting system, and the fact that severe diarrhoeal disorders from causes other than cholera are usually masked by the existence of seasonal cholera outbreaks. The absence of a regular recording system in Nepal for deaths, and the early discharge of cases on their risk bond from the cholera hospital, may explain the low case fatality rates from cholera and makes it impossible to utilize this scale in considering the question of endemicity or non-endemicity in this part. This has

been considered by the W.H.O. Study-group on Cholera in 1949 where the case fatality rates were noticed to be low in endemic areas (often as low as 7 per cent. to 10 per cent.), and high in non-endemic areas that reached 50 per cent. and over.

Applying the criteria of endemicity presented by Swaroop and others to the figures of Kathmandu (Table 3) the average (mean) length in months without cholera cases or deaths during the period of 17 years was 2.65 months per year. The percentage of months without cholera was 22 per cent. during the same period. This being less than 30 per cent., the area might be taken as endemic area for cholera.

The factors contributing to the endemicity of cholera in Nepal may be the following:

(1) The high density of population in Kathmandu (being 15,000 per square mile in Kathmandu Municipality, 13,000 per square mile in Patan Municipality and 9,000 per square mile in Bhatgaon Municipality).

(2) Abundance of uncontrolled water supply.

(3) Closeness of the endemic areas in the neighbouring States of India.

(4) Large inter-State movement of population particularly in connection with religious festivals and trade.

ACKNOWLEDGMENT

The author wishes to express his thanks to Dr. R. Pollitzer and his team, to Dr. N. Jungalwalla, Director, and to Dr. S. C. Seal, Professor of Epidemiology, All India Institute of Hygiene and Public Health, Calcutta, to the W.H.O. personnel of S.E.A.R.O. in New Delhi and in Kathmandu and to the Public Health Staff in the Ministry of Health in Nepal for their valuable help.

REFERENCES

(1) Swaroop, S. (1957)—"Index of Endemicity." Bull. Wld. Hlth. Org., 16, 1,083-1,101.

(2) Pollitzer, R. (1957)—"Cholera Studies, 10, Epidemiology," Bull. Wld. Hlth. Org., 16, 783-857.

(3) Cholera Hospital Records, Kathmandu, 1939-1958.

(4) Encyclopaedia Britanica, 1929, 14th Edition, 3,294.

(5) Encyclopaedia Britania, 1929, 14th Edition, 16, 221-224.

(6) Encyclopaedia Britanica, 1929, 14th Edition, 13, 295.

(7) Joint O.I.H.P./W.H.O. Study-Group on Cholera (1949) Off. Rec. Wld. Hlth. Org., 19, 24.

(8) Joint O.I.H.P./W.H.O. Study-Group on Cholera (1950) Wld. Hlth. Org. techn. Rep. Ser., 18, 7-8.

(9) Kamal, A. M. (1951)—"Cholera, Some Epidemiological Problems," J. Egyp. Publ. Hlth. Assoc., 26, 3-39.

(10) Raman, M. V. (1956)—"Plague Spots for Cholera and Smallpox in Calcutta City," Your Health, 5, 2-5.

(11) Seal, S. C., Personal Communications.

(12) Swaroop, S. (1949), Preliminary Report, W.H.O./Cholera 5, " Endemicity of Cholera in India."

(13) Swaroop, S. (1951), Indian J. Med. Res., 39, 141.

(14) World Hlth. Org. Techn. Rep. Ser., 1952, 52, 14, Expert Committee on Cholera.

(15) Wld. Hlth. Org. (1958), Wkly. Epidem. Rec., 33, 381.

(16) 56th Annual Report of the Director of Public Health of the United Provinces of Agra and Oudh for the year ending 31st Dec., 1923.

(17) From the 62nd. to the 82nd. Annual reports of the Director of Public Health of the United Provinces of Agra and Oudh for the years from 1929 to 1950.

(18) Annual Reports of the Province of Bihar and Orissa, for the years from 1921 to 1940.

A NOTE ON THE INCIDENCE OF CHOLERA IN THE CHETLA AREA (WARDS 71 & 72) FOR THE PERIOD BETWEEN NOVEMBER 1957 TO JUNE 30, 1958.

By

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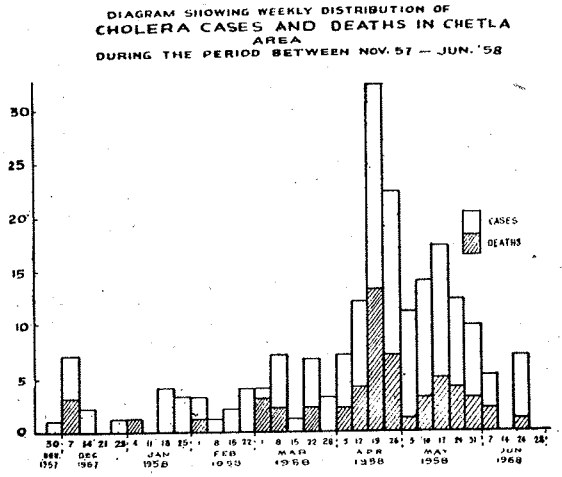
Urban Health Centre, Chetla.

1. *Area and Population :*

The area covers the jurisdiction of the Urban Health Centre, Chetla, and consists of the Wards 71 & 72 of the Calcutta Corporation. Its extent is 2.2 sq. miles with a population of 66,134 (as per survey conducted by the Statistics Section of the Institute).



2. *Period of Study :*

The period included in the study extends from November 1, 1957, to June 30, 1958. The peak period, as will be seen from the graph, was in the two weeks between the 12th and 26th April, continuing somewhat abated throughout May and declining since June, 1958.

3. *Total number of cases and their distribution :*

The total number of cases within the period under consideration was 198, divided into four main types, viz.:

(1) Cholera cases bacteriologically confirmed	17
(2) Clinical cholera cases (bacteriology not done)	121
(3) Acute gastro-enteritis (bacteriologically negative by single examination only)	55
(4) Acute gastro-enteritis (bacteriology not done)	5
Total ...	198

Age and sex distribution :

Population	Sex	Infant	Pre-school —5	School age —15	—25	—55	+55	Total	Per 1,000
38,605	Male	1	20	23	20	38	1	103	2.66
27,516	Female	3	24	11	22	24	11	95	3.45
66,121		4	44	34	42	62	12	198	2.99 (3.0)

4. *Age and Sex distribution :*

The total incidence within the period under review was 2.0 per thousand. The females suffered proportionately more (3.45 per cent) than males (2.66 per cent). All age groups have more or less suffered indicating a generalized infection.

5. *Fatality :*

Out of 198 cases 59 died giving the fatality rate as 29.8 per cent. The majority of these cases having been treated in the hospital, the fatality rate should be considered very high. The distribution of these cases according to the clinical types is given below:

Result	Bacteriologically +	Crinical Cholera (Bact. not done)	Acute-gastro enteritis (Bact. Neg.)	Acute gastro enteritis (Bact. not done)
Cured	17 (100%)	69 (57.0)	50 (90.9)	3 (60%)
Died	0 (0.0)	52 (43.0)	5 (9.1)	2 (40%)
	17	121	55	5

From the results given above it appears that the clinical cholera cases which were not examined bacteriologically had the largest number of serious cases, the fatality rate being 43 per cent, while among 60 cases classified as acute gastro-enteritis, bacteriologically either negative or not done, only 7 or 11.7 per cent died. Apparently these cases were somewhat milder in nature. Strangely, all the bacteriologically positive cases survived. Clinically also these cases were recorded as mild (82.4 per cent) or moderate (17.6 per cent) in severity.

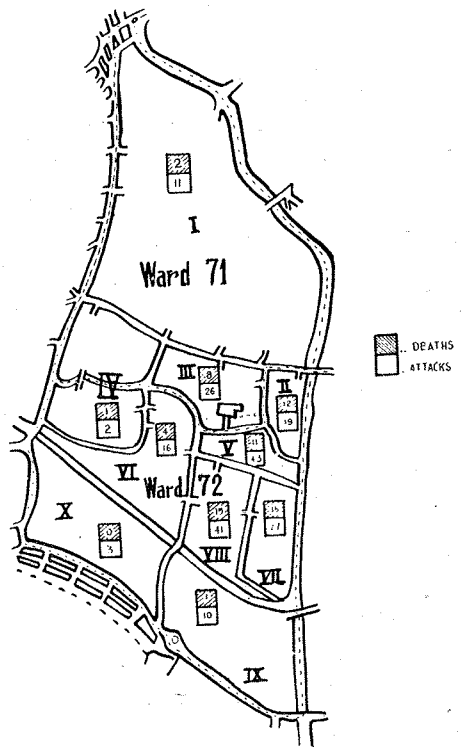
6. *Distribution of cases by circles:*

The distribution of cases by circles in the area is given below:—

Circle No.	Population	Cases	Rate per 1,000
1 ...	4,560	11	2.41
2 ...	4,777	19	3.94
3 ...	6,840	26	3.80
4 ...	2,175	2	0.92
5 ...	9,670	43	4.45
6 ...	6,467	16	2.47
7 ...	7,797	27	3.46
8 ...	11,002	41	3.73
9 ...	7,123	10	1.40
10 ...	5,723	3	0.52

According to the data given above the worst affected circles are those which have larger population and perhaps greater overcrowding and Bustees. These are: Circles 5, 2, 3, 8 and 7. Circles 4 and 10 had the minimum incidence and 1 and 6 intermediate between the heavily infected and less infected areas. On closure examination of the areas it was found that the areas inhabited by the better class of residents were much less affected than those containing Bustees. In Circle I, where better class people live, the cases actually occurred in the Orphanganj Market areas. The Circle No. 5 was however, the worst affected area and it was also highly congested. (*See* Map).

MAP OF CHETLA
URBAN HEALTH CENTRE
(WARD 71 & 72)
SHOWING CHOLERA CASES & DEATHS IN
DIFFERENT CIRCLES
(Nov '57 - Jun. '58)



7. *Type of residence and cholera cases:*

The residences were classified into bustee, isolated hut, pucca building, shop and others (including no residences temporary huts for darwans and servants) for the purpose of this survey. The distribution of cases according to the types of residence is given below:

Types of Residences	No. of cases	Percentage of cases
Bustee ...	106	53.5
Hut (isolated) ...	18	9.1
Pucca House ...	56	28.3
Shop ...	3	1.5
Others (including no residence and temporary huts occupied by persons like darwans or servants) ...	15	7.6

It will be seen from above that the bustee were the main targets of cases. Although 28.3 per cent of the cases were from the pucca houses none of these houses had less than three families, the average being six families.

8. *Length of stay and cases:*

Among the patients 42.4 per cent were living in the area for five years or more, 40.4 per cent between 2 and 5 years and the remaining 17.2 per cent less than 1 year including 12.1 per cent who had been there for less than one month. Among the 84 permanent residents who suffered from the disease 51 were mild cases, 17 moderate cases and 16 or 20 per cent severe cases. On closer analysis of these seven cases it is found that 5 patients were 60 years old and 6 were below 7 years. Of the 59 deaths only 16 were among the permanent residents. In other words, the permanent residents enjoyed some advantage over others, perhaps due to the partial immunity derived from the effect of endemicity of the disease in the locality.

9. *Number of persons suffered per family:*

198 cases recorded here were distributed among 178 families, single cases having occurred in 163 families, double cases in 13 families, 3 cases in 1 family and 6 cases in 1 family. Their distribution according to the family sizes is given below:

No. suffered in the family	No. of persons in the family																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	15+	To
1	10	9	20	30	32	13	18	9	8	4	1	1	1	—	1	1	163
2	—	2	2	—	3	2	2	—	—	—	—		1	1	—	—	13
3	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
6	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1
																	171

According to the information collected, 194 or nearly 98 per cent of cases were primary and 4 or about 2 per cent cases were secondary, most of the multiple cases having occurred either on the same day or within 2 days, in the same family. The distribution of cases in the families were irrespective of the number of persons in the family. The mode of family size being 4-5, the largest number of families having single cases belonged to this category. The general conclusion therefore, is that the infection is endemic and perhaps generalised, noly the susceptibles falling victims to it during season. The question of whether the infection could have been imbibed from outside sources or not has been discussed later.

10. *History of contact:*

There is no definite history of contact in any primary case. Only in the families where more than one case had occurred, the cases which occurred after some interval of the first case could have been considered as contacts but only four of them was actually considered as secondary.

11. *History of movement:*

Twenty of the patients gave history of visit outside the city within a week prior to the date of attack. The places mentioned are Barasat, Hasnabad, Sandeshkhali, Midnapur, Bihar, Diamond Harbour, Budge Budge, Falta and Tarakeswar. But none of them could give history of any direct or indirect contact with cholera cases.

12. *History of unusual food or drink within the incubation period:*

Three of the patients gave history of partaking of feast in the place of visit within the incubation period but they did not have any information that other participants had suffered from cholera. Those who travelled by train to and from places stated above also gave history of partaking food from vendors during the journey. No other case gave history of having any unusual food or drink within 1 week prior to the date of attack.

13. *History of bathing in the canal or river:*

Only twenty-three cases gave history of

using the Tolly's Nullah for domestic purposes including bathing. This nullah is obviously contaminated; but hundreds of persons living by the side of the nullah bathe in it as well as use the water for domestic purposes, without suffering from cholera.

14. *Water supply :*

None of the patients gave history of using any water other than from the tube-well or the Corporation piped supply for drinking purposes. For domestic purposes, however, forty-one or 20.5 per cent patients gave history of using one or more of the following sources, viz., nullah water, unfiltered supply, ponds, and open well. These supplies might acts as sources when infected. The remaining 157 patients were using tube-well or Corporation tap water or both for domestic purposes.

15. *Disposal of night soil :*

Four patients were using the canal bank or open fields or drains for evacuation purposes. One hundred and twenty-seven patients or 64.1 per cent were using open service privies and the remaining 67 or 33.8 per cent water-closet connected with sewers or septic tank.

16. *General sanitary conditions :*

The general sanitary conditions of open service latrines were highly unsatisfactory as these are used by unusually disproportionate number of people in the bustees and are not cleaned properly, with consequent profuse fly breeding.

Other sanitary conditions including disposal of refuse and garbage, waste water and general cleanliness of the houses were unsatisfactory in the houses of 64.1 per cent of the patients. Open drains are also prevalent in a large section of the area.

17. *History of inoculation against cholera :*

Only five patients gave history of inoculation against cholera within six months prior to the attack. Another six patients were also inoculated within five days of the attack, i.e., before the possible development of any immunity.

18. *Results of bacteriological examination of water sources in the area :*

There are 16 open tanks or dobas of varying sizes and more than 70 tube-wells, besides the Tolly's nullah and the Boat Canal. The sources other than tube-wells are obviously polluted. The results of bacteriological examination of these sources carried out by the Microbiological Section of the Institute are given below :

Nature of sources	Number of samples showing				
	No growth	Growth but no Vibrio	Growth of NAG Vibrio	Cholera Vibrio	Total samples
Tank	—	—	12	Nil	12
Unfiltered water Hydrant	—	—	2	Nil	2
Filtered water	1	12	2	Nil	15
Tube well	5	35	6	Nil	46
Tolly's nullah	—	3	31	7	41
	6	50	53	7	116

Altogether 116 samples of water were examined bacteriologically typical cholera vibrio was isolated from 7 of the 41 samples of water from the Tolly's nullah, whereas NAG Vibrios were isolated from 53 samples including 6 tube-wells and 2 Corporation filtered water taps. Not only the finding of AGG Vibrio from the Tolly's nullah is of importance but also of NAG Vibrio in the Corporation tap and tube-wells, because both the AGG and NAG Vibrios may have some significance from the epidemiological point of view.

The Microbiological Section of the Institute had however, been carrying out regular periodic examination of the water sample from the Tolly's nullah.

The results of monthly examination of these samples during the year 1957 and 1958 are given below :

Nature of vibrios isolated	1957									
	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
AGG Vib.	—	—	1	1	1	1	—	—	1	—
NAG Vib.	4	7	5	6	7	5	3	5	4	2
No Vib.	1	—	—	—	—	—	2	1	—	1
	5	7	6	7	8	6	5	6	5	3

Nature of vibrios isolated	1958						
	Jan.	Feb.	Mar.	Apr.	May	June	Tot.
AGG Vib.	—	4	—	1	—	2	12
NAG Vib.	3	4	9	3	7	5	79
No Vib.	2	—	—	1	—	—	8
	5	8	9	5	7	7	99

From the results it is seen that NAG Vibrio is constantly present in the Tolly's nullah. The Agglutinating Vibrio, on the other hand, was isolated in the sample each in May, June, July, August and November of 1957 and again in 4 samples of February and 2 samples of June, 1958. These are the months when cholera cases are usually prevalent in the city. Whether the presence of AGG Vibrio in certain isolated instances is the result of the cases being present in the city or the cases in the city are due to their presence in the nullah or canal or river is a question. In any case its presence in these sources undoubtedly causes a risk for the people using or handling the water and may also be responsible for certain number of cases. The finding of AGG Virbrio in 4 samples of nullah water in February when the human cases were just coming up is of greater significance than the finding of 2 samples positive in June. But the cases did not rise immediately afterwards but with a gap of about a month and a half. This has, however, been the experience of all on previous studies in the Institute.

Estimation of Cholera incidence by sample survey:

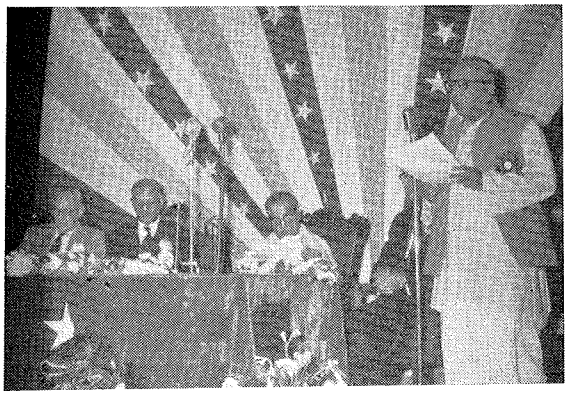
An investigation was recently conducted by the Statistical Section in the Chetla area to estimate the incidence of cholera by sample survey. The sample consisted of 20% of the households in the Bustee area and 10% of the non-Bustee area, and was drawn from the population records already collected by the Section. The survey was conducted by staff pooled from the existing staff of the Institute and Urban Health Centre. The period of survey extended from the 29th April to 14th June 1958, and information was collected for the period beginning from 1st March 1958. Altogether records of 26 cases which occurred during the period in the sample population was collected; 24 of these cases were diagnosed as cholera cases clinically and one was only confirmed bacteriologically. Seven of these cases were however not reported through the routine sources. According to this finding the estimated total incidence after correction for sample size and the time of survey (not covering the entire period of the epidemic) comes upto 200 cases for the whole area during the period under survey. The validity of this estimate is supported by the fact that when the total cases (160) obtained by routine sources is corrected for under reporting (25%) as estimated by the sample survey, the number of cases in the area during the period under survey also comes to the same figure.

According to the above calculations the total number of cases during the epidemic including the unreported ones was 248.

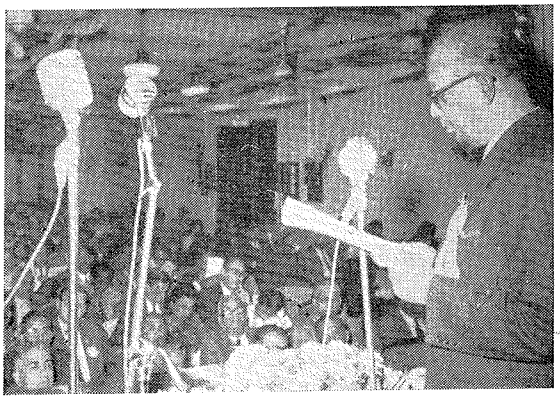
ACKNOWLEDGMENT

Thanks are due to Dr. S. C. Seal, Professor of Epidemiology, All-India Institute of Hygiene and Public Health, Calcutta for his advice and guidance during the conduction of the work and to Dr. N. Jungalwalla, Director of the Institute for initiating the study.

Dr. B. C. Roy, Chief Minister, West Bengal, delivering his Inaugural speech.



Dr. Triguna Sen, Mayor of Calcutta, delivering his Welcome address.



Dr. B. C. Das Gupta delivering his Presidential address.

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THE THIRD ANNUAL CONFERENCE OF THE INDIAN PUBLIC HEALTH ASSOCIATION

The Third Annual Conference of the Indian Public Health Association was held between the 27th and 30th December, 1958, at the All India Institute of Hygiene and Public Health, Calcutta. The Conference was inaugurated by Dr. B. C. Roy, Chief Minister of West Bengal, amidst a large number of distinguished guests, delegates and members of the Association representing the different States as well as the national and international organisations and other invited medical men and Health workers numbering about 600 in all. The ceremony was performed in the gaily decorated Auditorium Hall of the Institute. Dr. B. C. Das Gupta, Ex-Director of Health Services, Government of West Bengal, presided.

The Chairman of the Reception Committee, Dr. Triguna Sen, Mayor of Calcutta, welcomed Dr. B. C. Roy, the Chief Minister of West Bengal, the President of the Indian Public Health Association and various other people assembled in the Hall from far and near and stated that it was a good fortune for this city to see not only the birth of the Association but also to have the privilege of arranging the first three Annual Sessions in succession. The Association as he could see, started with a high hope from the very beginning and had the blessings of the then Union Health Minister, Rajkumari Amrit Kaur and the expert guidance successively of Lt.-Col. C. K. Lakshmanan, the then Director-General of Health Services, Government of India, and of Dr. B. C. Das Gupta, Ex-Director of Health Services, Government of West Bengal, respectively. He believed that the inauguration marked the beginning of the revival and revitalisation of the National Health, and reiterated the hope that the Association would continue to do the good work that it has been doing since its inauguration. He was happy to find that the majority of the leading health workers in the country were associated with this organisation in various capacities.

In this connection, he mentioned that of late the city of Calcutta had been the target of criticism from many quarters. While he welcomed all healthy and constructive criticisms he also wished to remind our countrymen that if there were problems they were our national problems and the city authorities deserved all thoughtful consideration and co-operation of the public as well as of the Government to find effective

solutions for them. He emphasized that since the city or municipal health administration was mainly based on preventive medicine and hygiene the remedy of some of the problems lay largely in the social and educational approach. Although the Government in its developmental plans had rightly emphasized on the improvement of rural health, the problems of some of the big cities in India were growing out of proportion so much so that it would be greatly unwise to neglect them any longer. He said that the health problems of Calcutta, at the present moment were largely due to the East Bengal refugees and the existing Bustees, and he concluded his address by drawing the attention of the guests to some of the brighter sides of the city including the cultural and scientific institutions whether they might be interested to visit during their stay in the city.

Dr. A. Mukherji, the Secretary of the Reception Committee then read out the messages from Shri D. P. Karmarkar, Union Minister of Health, Shri Meher Chand Khanna, Ministry for Rehabilitation, New Delhi, Dr. B. B. Yodh and Shri N. N. Modak of Bombay, Dr. K. C. K. E. Raja of the Demographic Training and Research Centre, Bombay, Dr. C. Mani, WHO Regional Director for the South East Asian Countries, Lt.-General B. Chaudhuri, Director-General, Armed Forces Medical Services, Major-General S. Narain, Director, Armed Forces' Medical Colleges, Poona, and from the Directors of many Institutions and State Health Services in India.

Inaugurating this conference, Dr. B. C. Roy, the doyen of the medical profession in India and Chief Minister of West Bengal, emphasized on the problems of rural health and the understanding of those problems on the part of students of medicine and social workers. With almost missionary zeal he dilated on the importance of knowledge of not only physical health but also of the social and psychological health of the millions living in villages. He said that if he had choice he would recommended six months' compulsory training in rural areas for students who wanted to obtain a degree in Medicine. He also stated that knowledge of the living conditions in the villages was certainly basically needed if the medical men practicing in villages and the social workers are to be of any help to the village communities. Every doctor practising in the villages should understand the people and the people should understand him. He should know that most of the recurrent diseases in rural areas were due to insanitary conditions of living and ignorance about proper and adequate dieting.

The West Bengal was short of food even before partition and now the condition had further deteriorated. So there was need for greater emphasis for increase of food production which again was dependent upon the people's health. He also emphasised upon the importance of social worker in the field of modern medical and public health practices. Finally, he expressed his appreciation for the Indian Public

Health Association dealing with some of these problems but their activities should not end with recommendations only. They should undertake practical demonstrations also. He wished the session all success.

In delivering his Presidential address Dr. B. C. Das Gupta, Ex-Director of Health Services, West Bengal, highlighted some of the health problems of the country. He regretted that not only a large part of the money provided by the First Five-year Plan for Health Services remained unspent but the indications were that the same thing might be repeated for the Second Plan period also, in which the provision was actually doubled. If this was due to shortgae of personnel in any State his suggestion was that the same could be easily drawn from the State having surplus of technical personnel. Among the various health problems, mal and under-nutrition was well-known and the solution lay in the production of sufficient food before the knowledge of nutrition or dieteties could be applied. In regard to the control of communicable diseases, major problems should be organised on a national basis just as being done for malaria, tuberculosis, filaria, etc. The complexity of factors entering into the causation of some of these diseases, he said, made it imperative that a simultaneous attack on all fronts by all the medical and social workers; the Central as well as the State Governments, the voluntary agencies, the local authorities and the public might be made. He suggested that the problem of leprosy, smallpox and cholera should be undertaken on a national basis. He sounded a note of warning that at no time B.C.G. vaccination programme could be discontinued partilularly on the face of at least 8-10 million new-comers (susceptibles) being added each year. Dr. Das Gupta then pointed out the changing patter of epidemics, there being a shift towards virological diseases, such as Poliomyelitis, Infective hepatitis, Encephalitis, etc. Diphtheria was also in the increase and needed early tackling. He then drew attention to the primitive type of environmental sanitation still being existent throughout the rural areas and in the majority of the urban areas, only 16 per cent of the towns in India having protected water supply and 3 per cent of the total population of India being served by sewers. He, however, was happy to find that the recommendations of the Environmental Hygiene Committee had been taken up by the Government with earnestness. The collection of vital statistics, the most important measuring tools in the hands of the public health workers being grossly deficient, he earnestly invited the attention of the Central Health authorities for taking immediate action is the matter.

In regard to the maternal and child health he said that in our enthusiasm for developing a service on mass scale we must guard against sacrifice of quality for quantity. Pediatrics were our weakest link in our M.C.H. practice. Family planning was another important item of public health practice for which a manual should be prepared. Its success depended upon evolving a simple, cheap, easy and fool-proof method. He

then invited the attention of the health authorities to the indifference with which the three most important health services, urgently needed for the country, viz., school health, mental health and industrial health were being treated. He suggested that the school teachers could play a vital role in developing school health services in India and that a provision should be made by the Eradication Department for the training of such personnel in collaboration with the Health Department.

In connection with the problems of rural health he mentioned that the staff pattern provided for integrated health services through health centres in the Community Project Blocks was inordinating inadequate, similarly with urban health the country was highly backward and sufficient provision for the Central Aid should be made in the Third Five-Year Plan to improve the sanitation of the towns and cities. He also mentioned that public health research in our country was still in the nebulous state. He urged that the institutional research activity should be encouraged with increasing grants every year. He also pressed for the adoption of the draft Model Public Health Act and Leprosy Act submitted in 1955 so that each State may have its own comprehensive public health Act without any further delay. Dr. Das Gupta ended his address after enumerating the activities and achievements of the Association during the last three years and he welcomed Col. Jaswant Singh to take up the helm of the Association and he wished him god-speed and greater success.

In the end, Dr. N. Jungalwalla, Director of the All India Institute of Hygiene and Public Health and Vice-Chairman of the Reception Committee offered vote of thanks to Dr. B. C. Roy, Chief Minister of West Bengal for very kindly agreeing to inaugurate the function inspite of his very busy and multifarious engagements. He said that the present day trend of health services was one of integration of curative and preventive medicine and he need not tell the audience that Dr. Roy epitomized in himself this integration by actual implementation of this principle in the health services of the State of West Bengal as well as in the under-graduate medical teaching. He hoped that the rest of India would follow his example. Also, as pointed out by Dr. Triguna Sen, Mayor of Calcutta, and Chairman of the Reception Committee, the city health administration needed multi-disciplinary approach, particularly the Engineering which he himself represented.

He also thanked Dr. B. C. Das Gupta for his able leadership he had given to the Association and for his erudite and useful exposition of the public health problems in India with suggestion for future guidance. He also thanked all those who had come from different parts of India to join the function and to take part in the Scientific discussions. Finally, he thanked those firms, institutions and persons, who contributed to the reception funds and to the tea and entertainment programmes.

The inaugural session came to a close after the *National Anthem.* The ceremony was, however, preceded by a tea-party organised by a local firm.

As in the previous year a subscription dinner was held, on the 28th January, 1958, at the Firpos' in honour of the outgoing and the incoming presidents, Dr. B. C. Das Gupta and Lt.-Col. Jaswant Singh, and was attended by a large number of members and delegates.

The addresses of Dr. Triguna Sen, Chairman of the Reception Committee, Dr. B. C. Roy, Chief Guest and of Dr. B. C. Das Gupta, President of the Association are reporduced in this issue.

S. C. Seal,
General Secretary.

WELCOME ADDRESS

By

Dr. Triguna Sen,
Mayor of Calcutta
and
Chairman of the Reception Committee

Mr. President, Dr. B. C. Roy, Delegates, Members and Guests, Ladies and Gentlemen,

It is my great privilege and pleasure to extend to you all a cordial welcome to the Third Annual Session of the Indian Public Health Association on behalf of the Reception Committee, myself and the people of this great and historic city of Calcutta.

It is a good fortune for this city to see not noly the birth of Association but also it has the privilege of arranging its first three annual sessions in succession.

This Association started with a high hope from the very beginning having had the privilege of the blessings and advice of Rajkumariji, the then Health Minister of India who performed the ceremony of inauguration and of the warm co-operation of the national and international guests and experts and of the able guidance of Lt. Col. C. K. Lakshmanan, the then Director General of Health Services as its Chairman. I believe the inauguration marked the beginning of the revival and revitalisation of the Nation's health. The important deliberations on Rural Health Services and the teaching of Preventive and Social Medicine in the undergraduate medical course organised during the inaugural and the Second Annual Conferences are the basic problems related to health whose solutions were essential for the future health services in the country and the lead that, I understand, was given by the Association members speaks for the potentiality of good work that this Association is capable to offer for the future of the health of the country and I also reiterate this hope with greater emphasis as I find that the Association has mastered the co-operation

and membership of practically all the stalwarts of health workers in this country. This year the Association has the good fortune of the guidance of Dr. B. C. Das Gupta, the Ex-Director of Health Services of West Bengal, another leading health worker of India with worldwide reputation and the next President to whom he is going to hand over the charge is Col. Jaswant Singh, the head of the health authorities in India. The subjects for deliberation have also been well-chosen namely, the problem of auxilliary health personnel, the immunisation programme and the collection of vital statistics in the rural and urban areas—all of which constitute very important problems that confront the health authority of the country to-day. I am greatly happy that this conference is being held in this city whose health problems are as great as its size and population, because inspite of our progress in many fields, *e.g.*, culture, education, commerce, industries and politics we are still labouring hard to give this city the very basic health needs, namely hygiene and sanitation.

You had already honoured this city by assembling here on two previous occasions. Last year I missed the opportunity of welcoming you here personally, being away from the city in the exigencies of other work and naturally my pleasure and gratitude is greater for your kindly consenting to join us on this occasion for a third time, and to give us that opportunity to welcome you again and to uphold to all concerned that ours is an Institute which stands for all that the Indian Public Health Association stands for *i.e.*, the mission of maintaining and improving the health of our people, largely connected with the sanitation and hygiene of the city.

Of late, Calcutta has been the target of criticisms from many quarters and I welcome all healthy and constructive criticisms but I wish to remind you that if there are problems they are our national problems and deserve thoughtful consideration and proper and effective solution. Whatever may be the feelings and failings, Calcutta stands at the cross-road of history and geography. It is not only a centre of learning, commerce and industry but an important national and international air as well as sea-ports. It is the gateway of India from South East Asia. Sooner or later it will be the centre of activity of a larger part of Asia. It accommodates millions of our countrymen from all corners of our country as well as from abroad. Its commerce and Industries cause a profound impact on the economic growth of India.

The city has also a hallowed past, and till recently it acted as the chief battlefield of moment for freedom which we enjoy to-day. Unfortunately wartime activities and ravages of famine and partition have done a great harm to this city. The excessive over-population added to the continuous influx of refugees from East Pakistan have nearly outstripped its sanitary arrangement. The density of population has gone up to 90,000 per square mile (*i.e.*, bordering about a lakh). The day time population increases by another one-fourth for which the Corporation caters for all conveniences without any return and this causes a heavy drain in the Corporation revenue which did not affect so much in the past as the population was about half of what it is now. Apparently the conveniences offered to the public could not keep pace with the growth of population. Both the State Government and the Corporation authorities have

a very tough job in keeping the city clean and healthy. But I must point out that the difficulty becomes much more intensified if the citizens' co-operation is also lacking at the same time.

I do believe that apart from the curative and preventive aspect a great deal of our maladies and trouble can be mitigated by social and educational approach. In fact the city or municipal health administration is largely based on preventive medicine and hygiene. Even so, many of our problems are mainly social. Economic disparity, educational inadequacies and political upheavals have created mounting problems. A little less than one-third of this city population live in Bustees (slums) and some of you must have known how difficult it has been to tackle this problem. On the other hand, the epidemiological investigations reveal that most of our epidemics are due to the existence of these bustees where about 26% of the city population live. Thus in a poor, undernourished and a vast country of ours Social Medicine should go a long way to solve the most difficult problem of checking and controlling the prevalence of various types of diseases at their very root.

I must also point out here that in the developmental plans our government have laid emphasis on the improvement of rural health and very rightly so. But the problems in some of the big cities, whether we like it or not, are growing out of proportion so much so that it would be greatly unwise to neglect them any longer. It is indeed a pity that all our cities are over-congested and have become the home of a large number of fell and infectious diseases like tuberculosis, respiratory diseases, smallpox, cholera, diarrhoea and dysentery, typhoid fever, diphtheria, venereal diseases, leprosy, cancer, heart diseases etc. Although each and every big city of ours has got its own autonomous administration but the evil now prevailing in the cities, particularly in Calcutta, have gone beyond the scope and limited resources of the rate-payers.

Last year, a large contingent staff was sanctioned and employed by the Calcutta Corporation for a period of three years with a view to give a thorough vaccination and inoculation drive against smallpox and cholera respectively and I am hoping to get some results but the scheme has worked for the part of the year now and the time has not come for assessment.

We are greatly worried about the health of the school children and college students of this city. The latest report reveals that as high as 60 per cent of girls and boys are undernourished and are suffering from one or the other illness and physical defects in the eye, teeth, throat etc. With such low standard of health in our growing generation it is no wonder that the resistance against infectious diseases is poor with consequent increase in sickness and premature deaths. Adulteration of food and drugs are eating into the vitals of our population. There is no room for complacency in our fight against ill health. I urge upon our government with all emphasis to take up the problem of public health particular of this city with all seriousness it deserves and devise ways and means to turn the tide from one of deterioration to that of improvement. All steps should be taken to replace slums and bustees with sanitary habitations for the poor and the labouring class who are also the essential components of the city. The refugee problem need better handling by the Centre to relieve

the unusual pressure upon the sanitary arrangements of the city and the health of the citizens.

It has to be frankly admitted that our sewerage system laid long ago on the basis of certain population pressure and for discharge of the huge effluents cannot now cope with the expanding area and population. We have more than 40,000 open privies. On the one hand it is considered to be directly responsible for the endemic prevalence of cholera, typhoid and other gastro intestinal diseases but to release the load of this entire lot to our sewerage system, on the other hand, is likely to cause even greater danger by clogging the sewerage and effluent drainage. The safe and probable water supply also has failed to keep pace with the increasing demand and necessity. But perhaps worse than this is the existence of dual water supply. Althuogh the defect lies in its original plan, its removal without replacement is beyond the capacity and resources of the Corporation fund. To partially mitigate the problem the drinking water supply has been augmented from 70 to 90 million gallons a day through installions of large-bore-tube-wells but the fringe of the problem has not yet been touched. Other problems which have also arisen simultaneously are the question of higher salinity which is associated with flow and tide of the Hooghly river and the shortage of space at Palta water works for expansion. In the meantime the water mains and the distributing pipes have also deteriorated. Governments intervention and assistance are imperative to save the city from further deterioration in sanitary conveniences. However, a good prospect is in sight of tackling the problem of milk supply and the cattle sheds (Khatal) in the city through the efforts of the Government of West Bengal in collaboration with the Corporation.

The smoke nuisance is anoher problem of greater public health importance. There is some hope that with coke oven set up at Durgapur a large part of the problem may be solved.

It was not my intention to relate to you the darker side of this historic city but the problems being concerned with the health of the citizens of Calcutta whome I represent now, I have brought them before this expert body to deliberate on some of them and offer their considered advice for us to implement, if possible.

There is, however, some brighter side too. The statistics tell us that inspite of these defects and drawbacks in sanitation most of the diseases are showing a slow but steady downward trend, disturbed by the 1943 famine and 1950-51 exodus of East Bengal refugees. Some diseases like diphtheria and perhaps tuberculosis, cancer and heart diseases are on the rise.

The city's parks and gardens have been considerably improved. I am sure these and the numerous historical monuments, its palatial buildings, hotels, artificial lakes, National Botanical Gardens, Zoo, Museums, the playful maidan with Victoria Memorial and Eden Gardens and the river strand with ships in the docks will provide you sufficient attraction for sight-seeing. There are also a large number of scientific institutions to provide you with opportunities for your intellectual satisfaction, such as, the Bose Institute, Indian Statistical Institute, University, College of Science and Technology, the S. S. Karnani

Post-Graduates College of Medicine, the School of Tropical Medicine, the All-India Institute of Hygiene & Public Health and its Urban Health Centre at Chetla, the Central Drug Control Laboratory and the Serological Institute, the Indian Cultivation of Science, the Glass and Ceramic Institute and the National Library etc., and a large number of reputed and pioneering firms for the manufacturing of drugs, chemicals and biologicals.

Hospitality is known to be legendary in our country and I hope that you will get warm reception and cordiality from every corner of our city and suburbs wherever you will have occasion to visit. It is indeed our duty to look after your comforts and accommodation but should we fall short of your expectation I hope you will excuse the same considering the limited resources of this infant Association.

Once again, before I conclude I wish to accord you our heartiest welcome to our city and wish you every success in your mission and deliberations and an enjoyable stay in this city. I also thank you all for kindly giving me the patient hearing.

INAUGURAL ADDRESS

By

DR. B. C. ROY,

Chief Minister, West Bengal.

Dr. Dasgupta, Col. Jaswant Singh, Mayor of Calcutta, Ladies and Gentlemen,

My job is to open the door so that the Association members might get the opportunity of discussing the important problems of public health. Public Health means health of the public and we have heard the impassionate plea of the Mayor of Calcutta about the public of Calcutta, but we have got to think of the public of Bengal, of the public of India and we know very well that the bulk of the people live in the villages. Do what you will. However much as you may be enamoured of the need of the city of Calcutta for its improvement of health yet we have got to think in terms of the people of the country side, 60 to 70% of the people remaining in the villages. What is the solution to this problem? Let us admit at once that we are a backward country not merely in resources but in the knowledge of the fundamentals of health and here two things seem to me to be essential. One is that our medical men who have got to take the torch of public health knowledge to different parts of the country should know the conditions in the rural areas. The syllabus of studies so far given to the students of medical colleges lack in recognition of the needs of the training of the students in matters of health assessed in the rural areas. It is true that here and there, there is an attempt to give to the students a certain modicum of knowledge about the rural areas. If I were given the choice I would say that every student before actually coming to the practice should have at least 3 to 6 months' training in the villages. He must know exactly what the conditions of the people are, not merely the physical conditions, but also mental and psychological conditions. The reason is very simple. We are attempting to be a welfare state which means that we want to increase

the welfare of all people, the villager and the city dwellers,—big and small, men and women and the people belonging to the different classes and communities. Therefore we ought to know what affects them socially and otherwise. Unless we know it we cannot get them to work with us. I am one of those who believe that apart from the old formula of "Government of the people, for the people and by the people", there should be added another phrase "with the people". You may call a representative government that you have today as the—government by the people, of the people and for the people, but that does not ensure that in the matter of development whether of public health or of any other item of life, you have got the people with you. We can only have the people with us, if you understand the people and the people understand you, and for that purpose it is essential that the students of Medicine should have some knowledge of the people and the ways in which they live.

There is another reason why that should be so. We all know, for instance, that the country needs developments, more production and everybody is emphasising the fact that we want to produce more food, which would give the people of this country more nourishment. That also is a matter of public health. More food, more nourishment. How are we going to produce more food?, you need more composts, more chemical fertilizers and also fertilizers of the organic type, that is to say, as they do in China and in Japan. I have seen in Japan that they use fairly extensively all types of organic material,—human faecal matter, urine, as well as the animal waste matter and so on. All these things are collected together and formed into a compost and used as manure which results really what is known as the part of the Japanese method of cultivation. Therefore, if you want to improve your nourishment you must increase your food. Take the case of Bengal. This state is a small one. It was small enough in the beginning. It had difficulty of food production, even when it was undivided Bengal. It is much more so now because the 2/3rd of it has gone to East Pakistan which is the richest area for production of food. What is left with us are the areas, many parts of which contain the latterite soil and the danga land, such as in Midnapore, Burdwan, Birbhum and Bankura. Therefore, if you want to increase the production in a state of this type you must increase the quantum of nourishment that we give to the plants viz., increase the manure and the fertilizers. If you want to increase the mannure, as I said, it will require not only the chemical manure but also the organic manure. Therefore, you will have to teach the village folks whether it is desirable to waste the cowdung in making the cakes and burning it as a fuel or whether this should use the cowdung for the purpose of producing composts for the increase of food production. I cannot say that there is one answer to that question, but I do say this that it requires very careful looking into in every area where the people live. Then again we know very well that there are many diseases which come from the air contaminated with various types of infections. Now if you want to produce more, you want that every body should use his hands for the purpose. If so, the chances are that we might be infected more and more with various types of organisms, like ankylostoma and so on, and it is necessary, therefore, to teach the men how to

avoid them even though they are merely engaged in producing more food. In other words, your health education must take cognisance of the social environments of the people, the manner in which they live and the way in which they go through their daily life, and in doing so it is necessary that proper direction should be given. I am glad that the Association has taken up a few of the items for discussion and consideration but mere meetings and symposium would not help unless something is done practically in order to bring into effect or fruition this objective that I have just mentioned viz., to give increased knowledge to the people in the village as to how to save themselves.

My friend Dr. Triguna Sen has very naturally stressed the prevalance of the diseases in Calcutta. What I have felt that it is true that we should improve many of the defects in sanitation that we have got here, viz., methods of distribution of water and disposal of its night soil and sewage and so on. But here also a very important part can be played by the Social workers, people who are prepared voluntarily to go to the different areas. Whenever any problem comes in for increasing the health of the community, the first thing that we say is that we have no money. It is true, we have no money. Shall we then sit idle because we have no money? Shall we sit idle because the foreign exchange is in difficulty? There are many ways in which it can be given, the health can be ensured effectively even in town life through proper work, by special workers. In fact, I would say that the social workers have come to be an important item in the management of health problems in the state and the country. I have heard it said repeatedly that during the epidemic of smallpox in Calcutta, arrangement has been made for vaccination, but the people do not come up for taking the vaccine in proper time—partly due to ignorance, partly due to superstition, but mainly due to the fact that we have not got that machinery (which does not cost us much) of carrying the message of health to all parts of the country and to all people.

I appeal to the members of the Association to consider this part apart from their training that they give to the technical men (and I call the doctors who are engaged in public health work as technical men) we would need a large number of health workers who may not be medical men at all but who are prepared to carry the message from one part of the country to another,—the message of how to improve their health even with the limited resources, that you possess. I know one gentlemen—a man from Midnapore. His name is Chandra Nath Bose. What he did was, he went and stayed in a village in Midnapore. He took some help in the beginning because he was not well off and he stayed there and lived the life of a villager and within 6 months I sent my man who found that he had completely controlled four villages so far as the removal of excreta is concerned, the problem of manufacture of compost is concerned, the removal of the jungle and the insanitary areas is concerned, and also exacavation of tanks. That is one example I am giving you of trying to help oneself. Unless we help ourselves, and this can only be done if the bulk of the people in the country is made to understand what self help means, we cannot progress. I can say that we can even with our limited resources be very much better off than we are to-day. I wish this Association all success in their discussion and I hape and trust that they will be able to give a lead to the country for better production and better protection so far as public health is concerned.

PRESIDENTIAL ADDRESS

By

B. C. Das Gupta

Dr. Roy, the Doyen of the Medical profession, Friends & Fellow-members.

My first duty is to express how deeply grateful I am to my colleagues for the honour they have done me by electing me as President of the Association for 1918. I also take this opportunity to acknowledge thankfully the trust and confidence they have placed on me and the co-operation they have rendered me during the year.

For reasons beyond his control tradition has been established by my predecessor for giving the Presidential address at the end of the term. This procedure has advantages in that it affords an opportunity for the President to recount what progress the Association has been able to make during his term of office. For obvious reasons I would take up the Association affairs last and would begin by consideration of and high-lighting some health problems of the country with which the Association is primarily concerned.

Five Year Plan :

It has been customary to discuss the Five Year Plans. But they have been discussed threadbare on various platforms and I deliberately desist from going into them again. I would however like to refer to one or two aspects of the implementation of the Plans. At the end of the First Five Year Plan it was woefully revealed that even the modest provision for health made in the Plan had remained unexpended and the shortfall in expenditure of the planned provision in some States was greater in proportion to the amount spent. In the face of the crying health needs of the country and of the pardonable impatience on the part of the people to secure full justice to the urgent health problems of their respective areas, there is but meagre justification for the performance vis-a-vis the Plan. Even if the lapse is condoned in regard to the First Five Year Plan on the grounds of lack of availability of trained personnel on the one hand and on the other of late commencement of implementation of programmes, there will be no justification if history repeats itself in regard to the Second Five Year Plan in which the provision for health has been doubled. Such States as would allow of the lapse of funds leaving the urgent health problems unattended to will remain condemned in the eyes of the people. Neither can an excuse of the lack of trained personnel hold much weight particularly in view of the recommendations of the Panel of Health set-up by the Planning Commission on the eve of the Second Five Year Plan. In fact the subject of this oft repeated excuse should have been taken care of before the First Five Year Plan was over. Granting that all States are not equally developed in the matter of trained personnel and that there is likelihood of shortage in one and surplus in another, my contention is that for purposes of Medicine and Health our country should be considered as one whole unit and language

or customs should not be considered as insuperable barriers to employment and service outside one's own State. I trust this parochial outlook and prejudice should be smothered without any delay and a more even distribution of health personnel secured from the common pool of the Union.

Some Health Problems :

(a) Nutrition :

I now turn to specific problems in the various fields of Public Health and I would like to begin with nutrition which forms the basis of all health work. It is common knowledge that malnutrition and under-nutrition are rampant in the country and with the prices of essential food commodities rising spirally high the adverse effect being produced on the health of the nation can well be imagined. A gradual decline in the general death rate has been noticed all over the country, a great deal of which is ascribable to the successful control of malaria and its effect on the reduction of infant deaths and on other diseases. Let this not build a smoke-screen of complacency blind us to facts and maintain that all is well. The effect of this adverse condition of insufficient food production, lack of availability and high cost will appear a few years hence mostly in our children, young men and women leaving these assets of the nation a prey to innumerable diseases and death. The whole picture of a declining death rate will be reversed. No doubt quite a good amount of work has been and is being done in regard to nutritional research but none of these will meet the fundamental issues involved. If Government will apply their minds to this basic question with a determination to solve the difficulties and bend their energies towards the task even at the sacrifice of some important but less urgent needs of the people, foundation of health in the form of good nutrition of the people can be better laid.

(b) Communicable Diseases :

In the field of communicable diseases problems of India are vast and varied. Being the home of many epidemic and endemic diseases, it has for many years attracted the closest attention of the medical scientists, public health workers and the Government towards their control. With the First Five Year Plan, Government commenced attack on some of these diseases on a national basis. It is common knowledge now how malaria has been brought under satisfactory control. In fact the success achieved has been so encouraging that spectacular that the country is now preparing to change over from a control to eradication programme. In a like manner, National Filariasis Control Programme has been taken up to cover up the 25 million people now at risk of the infection. Tuberculosis which is now taking over No. 1 place among our enemies, malaria having been controlled, is another disease whose control has been taken up on a national basis. In this great task the ICMR and the international agencies have taken a very large share for which the country feels grateful. Although the mortality rate from this disease has shown appreciable reduction, the morbidity rate has remained high or even increased in some areas. It is recognised that the control of this disease is not a purely medical endeavour but a medico-social undertaking. The complexity of

factors entering into the causation of this disease makes it imperative that a simultaneous attack on all fronts by all the medical and the social workers, Governments—Central & State—the voluntary agencies, local authorities and the public, be made. The rapid industrialisation and a change from the agricultural economy to industrial economy have a great bearing on this issue. The sample surveys carried out in different parts of India including cities have succeeded in giving a fair idea of the position of the tuberculosis problem in India in regard to the morbidity rate varying from 7 to 30 per 1000 population in different areas; no marked difference as regards the prevalence of the diseases in relation to the size of the population, villages, small towns and cities, that the morbidity rates are lower for females than for males and it shows a continuous increase with age. The bacteriologically positive cases for every 1000 population has shown a variation from one to eleven in the different areas and zones. Under the auspices of the ICMR, intensive study of more potent antituberculous drugs, antibiotics and chemotherapeutic drugs and their combination is opening out a new avenue of finding remedies for early cure, a very recent trend being a combination of I N H and another associated drug being employed in treating all recent tuberculin converters. This is expected to prevent progressive primary disease and also the evolution of the disease in later age periods. While all these scientific investigation for a better and quicker control of tuberculosis are being made the basic factors which have a large bearing on the prevalence of the disease and its spread, namely, nutrition, housing, care of workers in factories, etc., must also be taken care of and improved pari passu with all other measures of tuberculosis control.

There is one note of despair which I intend to strike and that is about the scant attention that has been paid to the great task of aftercare and rehabilitation of T.B. patients. This, I consider, is as important as the undertaking of control measures. Only one or two States amongst so many have taken up the problem and even there it is but the beginning of an effort albeit earnest and sincere.

In a like manner as these three diseases have been taken up for control on national basis, I would suggest that the time is now ripe, in fact it is urgent, that the Centre takes up the problems of control of leprosy, cholera and smallpox on the national basis. I would request the planners of the Third Five Year Plan to give their earnest consideration to this question if it can not be taken up within the present Plan period.

BCG Vaccination:

While on tuberculosis, I should like to say one word on the B C G vaccination programme. Undoubtedly it has proved a very strong weapon in their armamentorium against TB. It is also gratifying to note that in spite of a shaky beginning and of meaningless opposition, the B C G Vaccination Programme has been carried out steadily to complete over 110 million tests and 40 million vaccinations. In this enormous task completed within a short space of time, we owe a great deal to the aid of the international agencies for the success achieved. The ultimate target, I understand, is to test and vaccinate

most of the susceptible population in the country estimated at about 170 million, by 1961. But at no time can this work of immunisation be called to a halt for, based on the population growth rate every year, there will be an addition of 8 million new-comers and the younger people left unvaccinated for these years will amount to 40-45 million susceptibles who have to be taken care of. B C G programme will therefore continue to be a routine feature of the health services and even though the tempo of activities may be reduced as compared to the task now in hand, the work will have to be carried on. Besides follow-up work and study of conversion rate will have to be made. I, therefore, suggest that aftre the present target has been reached by 1961, these specially trained people should be absorbed into respective categories of Health services personnel, trained in general health work and those already in Health Service trained in B C G so that the whole B C G work may be merged into the routine health service of the area and the work continued on that basis more economically and equally efficiently.

Apart from the major problems which have been taken up for control on national basis, very useful work is being done in tackling local endemic problems like trachoma, yaws and guinea worm. Towards this, the contribution of the international agencies has again been great.

There are two other communicable diseases about which I would like to make a brief reference as I feel that they are raising their ugly heads rather menacingly. The first group is the virus diseases. This family of diseases has of late appeared in various States and towns and some of them have caused enormous loss of lives. Poliomyelitis has now assumed endemicity in certain cities and has commenced appearing in epidemic form from time to time. Encephalitis is another of this family becoming definitely dangerous both from the points of view of incidence and fatality. Infective hepatitis, the largest outbreak of which occured in New Delhi, has so far baffled the experts and still continues to be elusive. I C M R is doing very good work in connection with the studies of virus diseases and let us hope the efforts of the experts will bear fruit and provide the health workers with necessary means for preventing the infections and otherwise controlling them. It is, however felt necessary that these virus study units should be extended to as many places as possible. In this connection I would suggest that the State Directorates should be staffed with a properly trained Epidemiologist and where one exists for control of epidemic disease he should be trained in the special field of Epidemiology. I would also like to invite the attention of the State authorities in regard to the provision of chin of laboratories as was planned for in the Second Five Year Plan. The sooner it is given effect to, the sooner will be difficulties to meet extraordinary emergency of serious nature be removed, each entral laboratory in the headquarters of the State being provided with a virus unit.

Diphtheria has of late been showing an increased incidence in cities, large and small. In fact, it has made its appearance in rural areas as well—a quite unusual feature. An intensive immunisation programme is becoming increasingly urgent. I visualise difficulties in immediate implementation. Toxoids having so far been imported from abroad it is necessary that a special labora-

tory should be set up for their preparation locally. Like B C G Vaccine, these toxoids should, as quickly as possible, be made available by preparing them in a local laboratory. I invite the attention of the authorities to this pressing need, for I feel that action should be taken to keep Diphtheria down by organishing immunisation programme without delay if we are to avoid serious emergencies in the future.

(c) *Environmental Hygiene :*

The history of public health during the last 100 years has amply demonstrated that environment plays a dominant role in the development of physical health and well being of the individual. It has also revealed that there is no inheritance so good that it can not be spoiled by bad environment, and none so bad that it cannot be reclaimed, in part at least, by favourable environment. The ingredients of a recent human environment are many and the picture revealed by the report submitted in 1948 by the Environmental Hygiene Committee over which I had the privilege of presiding, is desparately bleak. Of the many components that enter into the constitution of this environment in India we would confine our remarks primarily to two facets, namely, of protected water supply and of disposal of excreta. The situation in 1948 disclosed that of the 85% of population in rural areas not even 5% enjoyed a source of protected water supply. The situation in urban areas was equally depressing ; only 16% of the total number of towns in India had protected water supply serving only 6.15% of the population. In regard to disposal of human wastes it was revealed that only 3% of the total population in India was being served by sewers laid in 23 cities out of the 48 having population of over 100,000. Even these cities and towns were only partially sewered, proportion of premises not connected to sewers but served by conservancy varying from 33 to 75% of the total premises. In regard to villages where 85% of the population live, hardly 5% of the houses had latrines. We can appreciate the enormity of the task in front of the country in regard to these two items of environmental sanitation. We are happy to record that since the commencement of the Five Year Plans, the recommendations made by the Bhore Committee and subsequently by the Environmental Hygiene Committee have been taken up for implementation with earnest determination. The Central and the State Governments have been providing substantial support to the National Water Supply and Sanitation programmes through the successive national Five Year Plans. Inherent in the task itself, owing to its magnitude, financial involvement and wide coverage that it has to give, the programme of implementation has to be staggered over a number of years—may be several Plan periods. We would however like to see that the work is speeded up more and more as years pass and completed on a planned basis.

It is gratifying to note that some States have made a remarkably good progress either with urban or rural water supplies such as West Bengal, Uttar Pradesh, Madras, Kerala, to mention a few. More can be achieved if the Plan would provide the States with sufficient funds to accelerate the work. I would request the builders of the Third Plan to give their earnest consideration to this matter, for by so doing and providing adequate funds for water

supply and disposal of human wastes they will meet the demand of the people's fundamental needs and impart at the same time a death-blow to the menace of water and filth borne diseases which have been taking heavy toll of life every year. It will not be out of place to mention and inform you that in regard to latrines in rural areas, the I C M R through its Environmental Hygiene Advisory Committee has carried out a number of research investigations which have resulted in the evolution of a proper and cheap type of latrines to suit different rural areas. I would suggest to the State Governments that they may consider launching a programme of latrine construction in the villages setting up a target of achievement every year and subsidising the purchase of a sanitary concrete plate where necessary. If the programme of latrine construction in rural areas is not pursued pari-passu with that of provision of safe water supply, all the good accruing from the latter will be nullified. Concomittant with this there should be adopted health education measures in terms of the findings of the R C A and similar projects of psychosociological approach to the problem of popularising sanitary latrines in the areas. What is needed is a concerted action on the part of all of us the Government, the public health workers and the people themselves. In this phase of activity the members of the I P H Association can play a very useful part and render incalculable aid to the movement of rural sanitation.

Associated with this issue of safe water supply and disposal of human wastes very closely and vitally, is the question of river pollution not only by sewage but also by industrial wastes, thus curtailing the utilisation of the already limited sources of water supply in the country and in addition causing serious risks to health and life. A very valuable piece of investigational work has been carried out by the Environmental Hygiene Advisory Committee of the I C M R by making extensive surveys of rivers in Bihar, Uttar Pradesh add other States and by developing pilot plants for eradication of the nuisance. In a like manner, investigation and research are in hand for developing cheaper method of sewage and sullage disposal through stabilisation ponds particularly for meeting the needs of smaller towns or groups of them who can not afford the expenditure of a full-fledged sewage disposal plant now current in the big cities.

(*d*) *Vital Statistics :*

Collection and compilation of vital statistics in India has been the subject of adverse criticism both within the country and outside and yet little attempt has hitherto been made to place this vital task on a sound basis. Several conferences under different agencies have been held on this issue in pre-independent India, their reports and recommendations submitted, but no action has so far been taken. If in the new perspective of conditions in independent India such recommendations are not workable or unsuitable, it is time that the Centre had called a fresh conference to undertake the task with a view to standardising the method of collection and compilation, indicating the minimum organisational pattern from Centre to periphery for the purpose, and drafting an outline of the annual report to be uniformly followed by all

States. Before measurable positive health standards and indices are available, these vital statistics will continue to remain as tools for evaluation of the public health practices in the country. With the increasing expenditure on health all over the States and with greater and greater funds being made available by the Planning Commission for the object, time is not far when the States will be called upon to evaluate their performance. If our statistics as collected and compiled now, remain undependable, it will be a matter for great regret and disappointment. In this connection I would also like to mention in passing that the publication of the Health Report of the Government of India, which normally should furnish all-India figures, is so extraordinarily belated that it places the health workers within the country at a great disadvantage, not to speak of others who want to make comparative studies in different fields with other countries. I would very earnestly invite the attention of the Central Health authorities to this matter.

(*e*) *Maternity and Child Health :*

Though not on a planned basis, maternity and child health work has been in progress from pre-independence days. Gradual expansion of the service where it existed and establishment of new service where there was none, has been the routine followed in the States. Recent emphasis laid on the development of this work by the Planning Commission has provided further motive force to the scheme of expansion. In fitness of things the service, even though developed at some places independently through the efforts of voluntary organisations, should be integrated as fast as possible with the primary health unit services now being developed in the country. Over 2000 maternity and child health centres were planned for by the States and I venture to think that a fair proportion of them has by now come into existence. One word of caution I would like to utter in this regard. In our enthusiasm for developing a service, particularly on a mass scale, we often unconsciously allow the standard of work to become lower, sacrifice quality for quantity particularly when the availability of trained personnel necessary for the service is limited. If anything, the standard of work has to be raised and not lowered, and if for this a slower pace of the movement is inevitable, it is to be encouraged. In the ultimate analysis it would be more profitable to those for whom the service is intended. In this connection I would like to emphasise the point made by the Planning Commission about pediatrics being the weakest link in maternal and child health services. Public health practices in our country at one time developed in isolation from the clinical aspects of preventive service, and to that extent they have suffered in quality. Today with the change in outlook of the goal of health such lonely journey either of Preventive Medicine or of Medical Relief is no longer justified. It is therefore imperative that the training in pediatrics of medical as well as ancillary personnel should be provided so that the services rendered by them may be efficient and of the standard required to bring satisfactory results.

Family Planning :

Family planning is parenthood by choice and not by chance and therefore constitutes a preventive aspect of health closely associated with maternal and

child health. It is, therefore, only fit that this service should be developed both in the urban and rural areas through the agency of the maternity and child health service. Seized with the urgency of the problem, the Planning Commission has assigned a priority for this programme and provided as much as four crores of rupees. It is also expected that 300 urban and 2000 rural centres will be set up during the Second Plan, besides training of personnel, public education on the question, studies and research on human fertility and demographic research. In implementing this policy, Central and State Family Planning Boards have been established to give point and direction to the clinic workers. The State of Madras has in fact taken the lead in establishing the State Family Planning Board, the Family Planning Institute and publishing a Family Planning Manual. But among the methods of birth control advocated, most of them can only be successfully practised either singly or in combination by a very limited sector of the population who are educated, economically more sound and are possessed of the sense of family and social responsibilities. For the vast majority of our people particularly in the rural areas where the urgency of the problem is no less acute, but where the people are illiterate, ignorant and apathetic, the methods described are wholly or partially inapplicable. The concept, the desirability and the urgency of Family Planning should be put across to the masses through direct approach and talks, through agencies which have intimate contact with the rural population. Hence the value of the maternity and child health service in executing the programme. The success of the programme is pivotted on the success in evolving a simple and cheap, easy, foolproof method, be it a drug orally administered or parenterally injected which would temporarily inhibit spermatogenesis or ovulation or nidation or conception. The chemical and mechanical methods which have found wide acceptability in the West are to my mind not easily acceptable to the vast majority of our population. Research therefore should be initiated for finding out a drug or chemical substance which will answer the purpose when administered, preferably by mouth. And such institutions which are already engaged in this pursuit should be encouraged by suitable grants. Meanwhile we have to depend on methods tried and found suitable in other countries. Whatever work may have been started by various States and organisations in connection with this programme, it should be carried out earnestly, followed up systematically and observations recorded properly. In this connection we should not fail to record the good work that is being done by the Family Planning Association of India and other social welfare organisations in the country. Finally, let us not forget that family planning can not produce results overnight and that it will be little relief to the people to know that all our failures on the food front are being explained away on the basis of unplanned families and increase in population.

(f) School Health, Industrial Health & Mental Health Services:

I would now like to invite your attention to the indifference, if not neglect, with which three most important health services urgently needed for the country, have been treated. I refer to School Health, Mental Health and Industrial Health Services.

School Health :

Care of the school child is one aspect of our health services where the work has remained most superficial and perfunctory. On the one hand the work has not been developed with the rationale of school health work in the forefront, and on the other, expansion of work has been so slow that it has hardly touched the fringe of the problem. While a few cities have made spasmodic attempts to organise the work in some form or other, bulk of the schools in the villages which constitute most of the school population, have received no attention. Wherever any work of medical inspection of scholars has been done, the topmost category of defective children is formed by those suffering from malnutrition or under-nutrition. Two State departments primarily concerned with development of School Health Service are the Education and Health. The Education Departments have been bringing into life thousands of pre-basic nursery, basic nursery and basic schools all over the country. So far so good. But even more basic than the schooling they propose to give is their nutrition. A mid-day meal in the schools is imperative and yet hardly any attempt has been made by the authorities to provide it. True, it will cost enormous amount of money, but this money has to be found and investments made in this connection will certainly bring ample dividends in the form of good health of the future assets of the nation. Heroic efforts were made by the Western countries during the world war to see that the health and nutrition of their children did not suffer in the least. If it was possible for them in war time emergencies, can we not do it in peace time for our children ?

Again, the teachers play a vital role in the developing School Health Services particularly in evolving health education methods and procedures. It is through their efforts that we could expect the children to develop proper attitude towards health and health practices. No claim can be made by the Education Department of any State to have given serious thought to the question of training teachers in Health Education methods and in School Health work generally. While so much emphasis is being laid on special training in crafts and other vocational specialities it is not comprehensible why hardly any attention is being paid to the special training needed for promotion of school health. Provision should be made by the Education Department for such training in collaboration with the Health Department and at least one trained teacher per school made available on a higher basis of wages than that of teachers untrained in Health Education methods. The feeble, faint and fragmentary services developed hitherto will fetch no results and unless the work is planned and co-ordinated properly, our efforts will remain infructuous. Let us hope that while the State Health Departments are developing an integrated rural Health Service, through which School Health Service on proper lines will be carried out, the Education Department will join hands and do their bit.

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 disorders and disturbances 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, the jumping rise of unemployment 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? Even at the lowest computation there will be found a million mental patients at any one time. This is exclusive of mental deficiency cases which will run into millions. As against this the bed provision in the country is 20,000. The prevention and provision for treatment of mental diseases, therefore, becomes a challenging task for an efficient health service aiming at developing a sound mind in a sound body. Here again the task in enormous and the gap between the needs of the country and the existing position is extremely wide. A few plan periods of intensive activity will be needed before a reasonable achievement can be made. What however is regretted is the complacency with which the problem is being treated. The Bhore Committee made recommendations as far back as 1946 on this issue, of which the first and foremost was the formulation of a Mental Health Programme having as its aim the provision for the community by successive stages a modern Mental Health Service embraching both its preventive and curative aspects. Two Five Year Plan periods are about to be over and our progress towards implementation of the programme has not gone beyond establishing a solitary research and teaching institute and increase of an insignificantly few beds in the existing hospitals. Except a few States, most of them have not given any serious thought to the problem. But can we in a Welfare State justify such attitude? We have to face the problem fairly and squarely and even if we have to carry out the solution by stages, let us make a start in right earnest. To this end the Central Government must give the lead and make provisions earmarked for developing the service in the States on proper lines.

Industrial Health :

As a result of the stimuli derived from the Second Five Year Plans, industries—heavy, medium and small—are being fast developed in the country both in the public and the private sector. This is as it should be. But while the country is being fast covered with industries where large number of workers are employed, it is necessary that the environment within the premises of the industry as well as outside where the workers live, should receive due attention. If production and increasingly more production is an important remedy for inflation, for increasing per capita income, for reduction of unemployment, the man behind the machine and the peasant behind the plough should have to be kept fit physically and mentally. Working conditions should be maintained at a level that will insure the workers against health hazards. Amenities should be made available as will ensure the development of proper psychology for increasing production of goods both in quality and quantity. And yet, how many of the numerous establishments in the country today could give

a good account of themselves in this respect, how many have shown the proper appreciation of the immense value of a contented worker? Even before the two Five Year Plans came into existence, the situation except in the case of a few progressive establishments, revealed a dismal picture of the environment within them. With the development of new industries the task before the authorities is heavier. Except in a few progressive States, there is no medical section of the factory inspectorate. This callous indifference to the need of an Industrial Health Service has so overpowered the country that quite a few Indian doctors trained abroad in Industrial Health and few others trained in the country have remained either unemployed or employed in a field outside the speciality in which they were trained. It is high time and perhaps most opportune for the States as well as the industrial establishments to give due consideration to this problem concerning the physical and mental health of the workers. Another respect in which utter indifference and definite neglect of duty has been manifested by some large establishments of the country concerns the disposal of industrial wastes which, in some instances, has contributed to colossal river pollution and consequent risk to health and life of the people.

An important feature of the development of new industries is that they are attracting women workers in large numbers and as more and more avenues of service open out to receive them their number will be increasing. An influx of new workers in industries unlike in other avenues create industrial hygiene problems even though the basic essentials for maintaining healthful working environment are the same for both the sexes. An individual approach is however necessary regarding each woman worker in the light of her physical constitution and the particular job to which she is assigned. Medical control beginning with her placement and following through her entire working experience is the only assurance that her health will not be adversely affected. All this is possible only when an Industrial Health Service is established.

Rural Health:

Integrated curative and preventive service as formulated by the Bhore Committee has been accepted and planned for the country. Implementation has been made by developing health centres from which will radiate both curative and preventive services for the rural population. Resulting from a joint effort by the Centre and the States, steps have been taken during the first and second Five Year Plan periods to carry out national campaigns against malaria, tuberculosis, filariasis and leprosy.

A general plan of medical care and preventive services is being promoted, and a simultaneous approach to the problem of environmental hygiene has been made through a programme for the provision of water supplies and disposal of excreta. Areas covered by this programme undoubtedly will reap the benefits of a service which was denied to them in pre-independent India. The Committee Development Project and National Extension Service schemes have simultaneously tended to bring about improvement in the economic life of the rural areas, and the repurcussions of these multipurpose projects can reasonably be expected to reflect favourably on rural health. Furthermore,

the advent of these projects has stimulated the mass psychology of self-help and has prepared the ground for a co-operative response from the people towards all services intended for their benefit.

What, however, is essential to the issue is the speed with which we cover the country. The rate of progress must be raised. Our information is that it is at present tardy, if not poor. I understand that even such States as commenced the work with great enthusiasm have allowed the tempo of their activity to drop low. If it is true it is most regrettable. Lack of adequate trained personnel is often the excuse made for slow action or inaction. But this does not hold good for all States and where this is not the case there is hardly any justification for poor progress in spite of funds being available.

Dove-tailing and integrating the scheme of health centres with those of Community Development Projects is understandable in view of the necessity for eschewing duplication and overlap and also for conserving the resources of trained personnel. But I may be permitted to mention that the staff pattern provided for health service of these blocks is inordinately inadequate. If results from our work are intended, and I have no reason to believe otherwise, adequate minimum staff who could render reasonably efficient service should be employed. The staff recommended for serving 60-100 thousand population by the Health Panel of the Planning Commission, have been whittled down to a level as can not look after this large population except in name. I would strongly urge the Community Development Ministry to give their earnest attention to this aspect of the organisation.

Urban Health :

There are numerous aspects of urban health which need urgent attention. Housing is one, the importance of which can not be too strongly stressed. Equally pressing is the cause of improved environmental sanitation, particularly in regard to water supply and sewerage. A well built and well organised Infectious Diseases Hospital is a rarity in most of the numerous corporations in India. If left to their own resources these corporations—not to speak of the smaller towns—can hardly face these problems and find to remedies as early and as promptly as the situation demands. Adequate aid from the Centre should be made available and in regard to improvement to water supply and sewerage either long term loans or out-right grants or both, should be provided for. The Second Plan provided 25 crores for urban water supply and sanitation schemes and set apart 10 crores for assistance to Corporations. But judged on the basis of the number of corporations in the country and their needs a more liberal provision should be made on the Third Plan.

Public Health Research :

Though there are several institutions which individually carry out research work in one aspect or other of these specialities, the I C M R is the only organisation that attends to the needs of the whole country in regard to both medical and public health research. I have already referred to the very useful work that is being done by the I C M R in regard to public health research work in

connection with water supply, sewerage, disposal of industrial wastes, etc. I understand that C S I R is contemplating putting up a research laboratory on Public Health Engineering. One would welcome such a move but we must guard against duplication of work. It would be desirable if fundamental research is taken up by C S I R and applied investigation and research in the vairous States as problems in there indicate, be handled by the I C M R as at present. I would at the same time urge that institutional research activity should be encouraged with increasing grants every year.

Legislation :

In a welfare State, public health laws are as essential as security laws. Health legislation provides the working tool with which the Health Administration safeguards the communities from health hazards. At present the various laws relating to health lie scattered in many separate enactments passed piecemeal by the States over a series of years as and when the need arose. Many of them are now obsolete and outmoded and in the light of rapid advances in scientific knowledge, revision of many health practices and procedures has become necessary in order that they may conform to modern scientific requirements. The Central Health Council, convinced of the urgent need, recommended to the Government of India to appoint a committee for drafting a Model Public Health Act. The Committee, over which I had the privilege of presiding, submitted in 1955 the draft report of a fully comprehensive Public Health Act, now known as the Draft Model Public Health Act. Unlike the State or Central Public Health Acts enacted previously, this draft report dealt with all aspects of Health-administrative, organisational, medical relief, local authorities, State Health services, hospitals, laboratories, nursing, Public Health Engineering and sanitation and financial. The draft Model Act has been placed before the States by the Central Health Council for their consideration for local adaptation and adjustment wherever they deem them necessary. It is hoped that this very important step of providing each State with its own comprehensive public health act will not be unduly delayed. I would also press for bringing into effect the Leprosy Act which some of us drafted at the request of the Central Health Council in 1955.

Our Association :

The Indian Public Health Association has just completed 3 years of its life and is about to begin its 4th. Even though a toddler amongst professional Associations just trying to stand on its legs, it is gratifying to note that it has maintained a steady progress from year to year. We have been able to secure 98 new members including 60 Associate and 6 life members during the current year. Two State Branches in West Bengal and Bihar have been opened this year and, the third in Bombay is about to be established within a few days. Satisfactory though it is we desire a greater and faster progress. In this direction I invite the attention of my colleagues to do their best individually and collectively in their respective areas. Perhaps the celebration of an Association Day would lend necessary publicity and focus greater attention. We have all through adhered to our inaugural objectives namely maintaining a close

touch with the people on the one side and the Government Departments and social organisations on the other and rendering all co-operation and assistance to secure for the country a progressively rising standard of health. We have within these two years held symposia on Rural Health Services, teaching of preventive and social medicine in the undergraduate level and drafted a syllabus of studies for the same. We have also held a symposium on post-graduate Public Health Training. Besides the Inauguration Souvenir on Health of India we have been publishing a Quarterly Journal of the Indian Public Health Association through which we have been ventilating our views and suggestions on the problems of health and their solution and I venture to think they are receiving due consideration of the authorities.

I am afraid I have taken more time than I should have for which I crave your pardon. I now leave the affairs and responsibilities of the Association in the able hands of my successor Lt. Col. Jaswant Singh and I wish him God speed.

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THE THIRD ANNUAL CONFERENCE OF THE INDIAN PUBLIC HEALTH ASSOCIATION

SYMPOSIUM ON

TRAINING OF AUXILIARY HEALTH PERSONNEL.

PREAMBLE

With the achievement of independence India virtually declared a total war on disease. For her first line of attack she required to build up her man power consisting of doctors, public health engineers, nurses midwives, dais, public health nurses, health visitors, technicians, pharmacists, dentists and various multipurpose field workers and also technical man power for development of chemicals, drugs, antibiotics, sera, vaccines and other biologicals. In 1947, there was only one doctor of 6300 population. There was even greater paucity of ancillary medical and non-medical personnel. Very much indeed had to be done in bringing up our man power to optimum strength before we could come to the standard of even semi-advanced countries. During the last two five year plan periods considerable advancement has, however, been made in regard to the production of medical personnel. In 1951 we had only 30 colleges admitting 2500 students annually but now we have more than 50 colleges with an annual output exceeding 4000. But even for them proper orientation to social and preventive aspects was lacking. The Central Council of the Indian Public Health Association therefore, in their meeting prior to the last year's annual conference chose the subject of teaching of preventive and social medicine for a symposium during the 1957 annual conference. The latter was largely attended by many teachers, national and international experts and exponents of medical education in the country with conspicuous success.

The actual bottleneck is in the production of ancillary health personnel. This has to be accelerated even more than of that doctors because there is a much greater disparity here between the available personnel and the strength required under the projected plans. For example in 1950-51 the number of nurses, including auxillary nurses and midwives was 17000 and the need in India by 1961 was calculated to be 80,000. The supply must cope with the demand with so many developmental schemes in progress like the Community Development Projects and National Extension Service, each of which should have at least one health centre to begin with. But paucity of trained staff is perhaps primarily responsible for delay in implementation of the scheme.

Another newer development in this field is the increasing realization of the need of multipurpose workers in the peripheral levels rather than specialists and compartmental workers. Sanitary Inspectors were the only multipurpose health workers giving some service at the rural level. But a critical analysis of their work and achievement during the past few decades revealed that they were overburdened with so many types of duties and the area of operation so large that they could not do justice to any one of them, resulting in very little impressionable difference in the actual health problems of the rural India during the last 30 years. Their duties should not only be limited and clearly defined but their training should accordingly be reorganised. It was found that different states had been pursuing different methods of training and the period of training also varied from 6 weeks to one year. Such trained personnel were called by different names in different states such as Sanitarians, Sanitary Inspector, Health Inspector, Health Assistant, Sanitary Supervisor, and so on. Thus not only the training in all the states should be uniform for a particular type of personnel but their nature of duties should also be kept the same all over. In 1956, there were only 4000 Sanitary Inspectors but in the context of the

developmental plans envisaged by the Planning Commission and by the Central State Health Departments 20,000 Sanitary Inspectors would be required by 1961.

Recently, the country has been trying to introduce a new kind of multipurpose health personnel under the name Public Health Nurse. The training facilities are yet very limited for such personnel and the period of training is also fairly long. Although the need for such personnel for both urban and rural fields is being increasingly felt, their actual role in the health services has yet to be clearly defined *vis-a-vis* the medical personnel and particularly the health visitors for whom a large number of institutions are already in operation in different states.

The third type of multipurpose workers available at the peripheral level are the village level workers (V.L.W.'s) and the gram sevikas. Their duties have been very much highlighted by the Community Project Organizations. How far these workers being outside the administrative control of the Health Staff can be of practical utility for health work in the villages is a debatable point particularly when the area allotted to them may be as many as 10 villages.

The scientific Sub-Committee of the Indian Public Health Association in their last meeting discussed some of these problems and considered it appropriate and worthwhile to organise a symposium on the above three types of multipurpose health workers during the third annual session of the Association with a view to elicit the current opinion of the Senior Health Workers in the country and, if possible, to recommend a plan of action regarding their training and nature of duties.

The response to the invitation to various workers for participating in the symposium was spontaneous and encouraging. The record of the symposium held under the Chairmanship of Col. Barkatnarain and subsequently of Dr. N. Jungalwalla, the Director of the All-India Institute of Hygiene and Public Health, Calcutta is reproduced below.

S. C. Seal,
(Convener, Scientific Sub-Committee.)

TRAINING OF AUXILIARY HEALTH PERSONNEL

Chairman—Col. Barkat Narain.

Subject :—(1) *Training of Sanitary Inspector.*

Introduced by—Dr. S. K. Chatterjee (Calcutta).

Principal Discussant—Dr. J. K. Bhattacherjee & Shri N. Majumder.

Other Participants—Dr. Seshagiri Rau, Dr. Y. K. Subrahmanyann, Dr. A. Das Gupta, Dr. M. W. Freymann, Dr. Jagjit Singh, Dr. S. E. D. Massilamani, Sri H. B. Chakrabarti, Dr. S. C. Seal, and the Chairman.

THE SANITARY INSPECTORS AND THEIR TRAINING

By

Dr. S. K. Chatterjee, M.B., D.P.H., D.T.M.,
Deputy Director of Health Services,
Public Health, West Bengal

I. *The importance of Sanitary Inspectors in the Public Health Administration of our country.*

Needless perhaps it is to mention that the environmental sanitation, which constitutes the most fundamental factor in the preservation of health, is still in a rudimentary stage in our country in spite of our having passed through two successive five year development plans. In this state of West Bengal we have been able to provide protected water supply only to about 30% of our towns, sewerage to 7% of them, one or two tube-wells each to 50% of our villages and self-cleansing latrines to not more than 5% of our villagers whose number is about 20 millions. The total shortage in all categories of food-stuff is still acute and therefore encourages adulteration on an enormous scale. The literacy is barely 22%, health consciousness amongst the population is yet to be developed and the sense of community health is conspicuous almost by its absence. The only course left therefore for the prevention and control of dangerous infectious diseases is the continuous vigilance over whatever resources for food and drinks or the other ingradients of the environments that we have, and early interference for purposes of control when an epidemic disease breaks out. And Sanitary Inspectors are as a rule in most parts of the country the immediate officers responsible for these duties and as such have to play the vital role in the Public Health Administration of our country. Viewed in the light of our progress achieved in the course of the two five years plans it appears that they will continue to be pivots of the Public Health Administration of our country for many more years to come.

II. *The need for a standarised course and curriculum.*

For our immediate purposes therefore it is important that very careful consideration be paid to the training of this particular type of Public Health Personnel. As at present various courses of training are existent in our country, some covering 6 months, some 8 months, some 9 months and others 12 months. Further, at different parts of the country they are designated differently e.g., Sanitary Assistants, Health Inspectors or Sanitary Inspectors etc. Obviously their standard of training and therefore their efficiency are widely variable from State to State and this variability prevents, as a rule, the Sanitary Inspectors trained by one State from being absorbed by a sister state, though there might be need for it. Unquestionably this is a very unsatisfactory state of affairs, particularly for a country where the environmental sanitation is yet to be developed to even the minimum standard necessary for the healthy living of its population. It is high time that the training of this category of Public Health Personnel be standardised and a uniform course with a common curriculum be adopted for all the States in the Indian Union.

III. *What should be the course and the curriculum*:

The question is, what should be the course and the curriculum for such training? Obviously that would depend on the nature of the duties that they would be called upon to perform. Briefly speaking, their duties should include at least (i) the Checking and improvement, as far as practicable, of the standards of the different ingredients of the physical environments in which our people live, (ii) the control of nuisances and the conservancy including the sweepers, (iii) the control of insects affecting the health of the man, (iv) Prevention and control of dangerous communicable diseases including immunisation, (v) Collection and verification of the

Vital Statistics, (vi) Health Education, (vii) the Administration of the various Public Health Acts e.g. the C.P.F.A. Act, the Vaccination Act, the Birth and Death Registration Act, the Municipal Act, the L.S.G. Act, the Emergency Regulations under the Epidemic Diseases Act etc., (viii) Conducting health surveys, etc., etc. The course and the curriculum for their training therefore has to be adjusted at least to their above duties.

The above duties are satisfactorily covered by the curriculum in vogue in the Madras Medical College for the training of Sanitary Inspectors. The course is spread over twelve calender months which include 270 hours of theoretical teaching in 8 months time and four months of exclusive training and practice in the field. The said total period of training seems capable of ebing reduced to some extent without materially affecting the essence of the curriculum. But in no case it seems possible to cover the curriculum in less than 9 months' time except at the cost of the quality of the teaching imparted to and grasped by the students. It is suggested therefore that a curriculum similar to that of the Madras Medical College, taught through a period of at least 9 calendar months, may be considered as a standard course for the training of Sanitary Inspectors.

Now it may be argued that we in the Indian Union, are very much short of this type of personnel which factor is holding up our progress in developing the Public Health of our country. As such we can neither afford the period of time nor the expenses involved for the training of full-fledged Sanitary Inspectors as above. This leaves us no choice but to turn out less-trained officers for the present so as to meet our immediate requirements. There seems to be much force behind such arguments in view of the circumstances prevailing in most parts of our country. With due regard to this point of curriculum may be split up into two parts, one for 6 months and the other for 3 months only. Those trained for 6 months may be called Health Assistants and appointed as such immediately. They may in due course while in service take the advanced training in the 2nd. part (dealing generally with the legal and administration aspects etc.) for 3 months and get themselves fully qualified as full-fledged Sanitary Inspectors. Those who can afford to get the training of 9 months at a stretch may be allowed to get themselves trained outright as full-fledged Sanitary Inspectors. This procedure may perhaps solve our immediate problem. However as the question is a controversial one and the issue affects various States, perhaps an Expert Committee may be formed who should go into the various aspects of the question and endorse a generally acceptable formula.

IV. *The Training Institutions*:

The next question worth considering is what should be the type of institutions where such personnel could best be trained. Perhaps it would have been better if the training could be arranged in an institution where different categories of Health Personnel (with whom these personnel will have to dovetail in their work in their fields of duty) are being trained so that they could develop a team spirit. In this view an Institution of the type of the All-India Institute of Hygiene and Public Health would have been an ideal one. But for one such institution the loads seems to be prohibitive in so far as that roughly speaking, the Indian Union needs to-day an annual out-turn of 250 to 300 full-fledged Sanitary Inspectors alone, on the basis of one for each 66,000 of her population expected to render service for 25 years. The number of Health Assistants needed would be some six times more on the basis of one Health Assistant for 10,000 of the population.

The next alternative perhaps is to consider whether the training can be arranged on a regional basis comprising of 3 or 4 States. If that also be not feasible then each State has to make its own arrangements preferably in their departments of Preventive and Social Medicine of the Medical Colleges turning out the basic doctors. But the course, the curriculum, the system of examination, etc. should be the same everywhere.

V. *The qualifications of the entrants to the course*:

The next question may be as to what type of boys and girls may be admitted to this training. Perhaps those who have passed the Intermediate Examination in Science with Biology as one of the subjects or its

equivalent may be admitted to the full course of 9 months whereas the Matriculates or their equivalents may be admitted to the 6 months or first part of the course. The latter after passing the first part and putting in service as Health Assistants for sometime, say, five years in the field may be admitted to the 2nd. part so as to get themselves qualified as full-fledged Sanitary Inspectors. This procedure besides releasing, in a comparatively shorter period, a considerable number of Health Assistants to take the field, has the further advantage of providing some scope for their ambitions, without which no service can improve in efficiency.

VI. *Their pay and emoluments*:

Lastly, as stated already the importance of this type of personnel in the Public Health Administration of our country to-day can not be over-emphasised. But if we are to get the best out of them it is essential that we should gurantee them a fair standard of living. Further the Sanitary Inspectors are expected to act as statutory Food Inspectors and therefore it is necessary that they should have some stakes in their jobs so as to be able to resist the temptations and attempts at corruption by interested people. It is worth considering therefore as to what should be their scales of pay and emoluments. For a suggestion, we would submit as follows:—

	Scale of pay.
Health Assistants	Rs. 55 — 130/-.
Sanitary Inspectors (2nd Grade)	Rs. 100 — 200/-.
Sanitary Inspectors (1st Grade)	Rs. 150 — 300/-.

(to above may be added the—
(i) The Usual Dearness Allowance.
(ii) The Usual House Rent Allowance.
and (iii) The Usual Conveyance or Travelling Allowance).

VII. *The Gradation*:

Those who would pass the 1st. part of the examination after 6 month's training may be termed as Health Assistants. Those who would pass the examination of both the parts after 9 month's training may be graded as Sanitary Inspectors of the 2nd grade. Those amongst the latter group who would render meritorious service may be graded as Sanitary Inspectors of the 1st grade.

VIII. *A Synopsis*:

A synopsis of the Madras curriculum is enclosed which may perhaps serve as a basis for consideration. Suggestions for modification of the said curriculum have also been made in the same.

SANITARY INSPECTORS TRAINING COURSE. (A Synopsis)

Madras Medical College	Teaching Hours	Field Training
Part I.		
(1) Elementary & Applied Physiology ...	50	2 months (Vaccination, Inspection, Recording of results etc.)
(2) Elementary, Bacteriology & Parasitology, etc.	20	
Part II.		
(3) Sanitation and Hygiene	100	
(4) Preventive Medicine including vaccination	40	2 months (work two weeks each under the H.O. of (i) The city. (ii) An urban area. (iii) A Rural Unit. (iv) An Integrated Unit, etc.)
(5) Vital Statistics	10	
(6) Public Health Administration ...	30	
(7) First Aid	20	
Total :—8 months	270 =12 Calendar months.	4 months

A Suggestion

	Teaching Hours	Field Training
Part 1. (5 months)		
(1) Elementary & Applied Physiology, including Nutrition	50	
(2) Elementary, Bacteriology & Parasitology, Insects, etc.	20	1 month
(3) Sanitation & Hygiene	100	(Vaccination, Inspection,
(4) Preventive Medicine including Vaccination	40	Recording of results etc.)
Part II. (2 months)		
(5) Vital Statistics	10	1 month
(6) Public Health Administration	30	(work two weeks each under the H.O. of
(7) First Aid	10	(i) The city. (ii) An urban area. (iii) A Rural Unit. (iv) An Integrated Unit, etc.)
Total :—7 months	260 =9 Calendar months.	2 months

TRAINING OF SANITARY INSPECTORS

By

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Chadwick wrote a report which led to the passing of first comprehensive sanitary measure in England in 1848. He made it clear that it was cheaper to prevent disease by removing its physical causes, such as foul premises, leaking cesspool, impure water, overcrowding etc. Sanitation was, therefore, interpreted as the removal of nuisance. Thus, the officers concerned with the sanitation work were known as inspectors of nuisance. Parliament decided in 1929 that the inspector of nuisance may therefore be called sanitary inspectors. This is how the profession of sanitary inspectors came into existence.

Sanitary inspectors and health officers have played the leading role in the administration of sanitary laws in the process of public health development. The Sanitary inspector has indeed one of the oldest and proudest histories of all public health personnel. With ever increasing knowledge of the science of sanitation, the required training of the sanitary inspectors has progressively been changing in may countries. There work is now guided by precise scientific information. The demand for a higher quality of sanitation work in the U.S.A. and other western countries necessitated the creation of a category of health personnel known as sanitarians. In our country, however, such personnel are not existent. In some states they have on the other hand created certain lower cadres such as sanitary assistants, health inspectors and sanitary aids to whom some of the simpler duties of the sanitary inspectors have been delegated.

Sanitary inspectors in this country are required to attend to the following work:

(a) Collection and compilation of vital statistics, (b) control of communicable disease, (c) control of water supply and excreta disposal, (d) food inspection and sanitation

of food handling establishments, (e) insect and rodent control, (f) building construction, (g) sanitation of premises including enforcement of building bye-laws, (h) school health and (i) training of village volunteers and other health personnel. To perform the task satisfactorily he is to be intelligent and honest. He should possess social consciousness, a deep sympathy for the people, teaching ability, a technique of handling and persuading people, ability to work in a team and some understanding of the basic sciences of physics, chemistry and biology. Apart from these basic requirements, he is to receive adequate training for the profession he has to practice.

Capable sanitary inspectors are the backbone of public health work. To ensure proper recruitment of a right type of personnel and to keep him efficient in his job the following may be considered as essential:

(a) An interested, just and understanding health officer, (b) a salary commensurate with his responsibilities and training and (c) security in his post and scope for future promotion.

From a report published in the I.P.H.A. Souvenir (1956) it appears that there were 4,000 sanitary inspectors working in the country. In the context of the development of plans envisaged by the Planning Commission and that of Central and State Govts., 20,000 sanitary inspectors will be required. The Rural Health Conference which was held in Delhi under the auspices of the WHO also recommended the appointment of a sanitary inspector for every 10,000 to 15,000 population. At this rate we need about 20,000 sanitary inspectors for rural health work in this country. Facilities for training of this kind of personnel do not exist in some of our states while in some others the training has been kept in abeyance. There are only 3 or 4 regular training centres in the country where approximately 200 to 300 sanitary inspectors are trained every year.

The standards of training offered at these centres do not follow a set pattern. Both the period as well as the course curriculum differ. If a sanitary inspector is to perform his duties satisfactorily, as has been enunciated earlier, the training has to be fairly comprehensive and a minimum of one to one and a half year is required for the purpose. The pre-requisite for admission to the course should be a School Final Certificate. Those who have already taken the training in Inter Science may be given a reduction of 4 to 6 months in lieu of their basic training in science.

The WHO in its fourth report of the Expert Committee on Environmental Sanitation stated "The training of health inspectors must be based on a sound knowledge of the basic sciences such as physics, chemistry, bacteriology, parasitology, epidemiology, anatomy and physiology, which are fundamental to the practice of environmental sanitation. These subjects should form the foundation of their training and superimposed on them should be specialist studies in the various subjects falling within the scope of environmental sanitation. The training programme must make provision for adequate practical training. Health education is playing an increasing part in securing hygienic food practices and it is important, therefore, that personnel should be instructed in its principles and techniques". The course conducted by the Royal Society of Health is designed to produce a prototype of the British sanitary inspector adapted to local conditions. The emphasis is on laws. Our requirements are quite different and one training has to be baised more on rural sanitation than on urban.

The curriculum as suggested by the Bhore Committee in its report (Appendix 36, Vol. 3 —page 165) is fairly comprehensive. Bhore Committee rightly emphasised the importance of practical exercises and in their distribution of hours; they have allotted 534 hours of practical exercises and 140 hours didactic instruction. A summary of the distribution of hours is appended herewith. The Environmental Hygiene Committee also recommended the same curriculum for the training of sanitary inspectors. A course in health education as suggested in the WHO report and in social sciences may be profitably added to the curriculum.

Considering the large number of sanitary inspectors required for immediate utilisation in health services of the country as an interim measure, it may be necessary to train certain auxiliary personnel in health work not necessarily to the level of sanitary inspectors to assist the health officers in the impre-

mentation of the health projects. It would be necessary however, to select proper type of personnel and to give them a short training of 6 to 9 months. These personnel in course of time may be given a further training to enable them to become the sanitary inspectors. The WHO expert committee on environmental sanitarion stated that the proper utilisation of personnel is as important as their training". It therefore urges that training should not proceed much faster than the capacity of the country to use their services.

It is apparent from the nature of duties assigned to the sanitary inspector as stated earlier it is not feasible for him to attend to all of these satisfactoriay. It is well known that the majority of sanitary inspectors are not employed to-day on sanitation although they are trained for it. They are employed on miscellaneous duties such as verification of vital statistics and vaccination. The limited number of sanitary inspectors that we have and that we have and that are being trained every year can be employed more profitably in environmental hygiene work and the junior grade personnel assigned to the duties of vaccination and compilation of vital statistics etc. This point has been emphasised time and again by several committees including the last conference on rural health sponsored by the WHO.

Since the sanitary inspectors are to be utilised by the state govts. and since health proglems and public health administration of the states have their own peculiarities, it is desirable that the training facilities be made available in the states to suit the individual set ups and requirements of the states. The state health dept. should organise the course. Facilities of the medical colleges and rural health centers of the state may be made a vailable for the purpose. The services of the Health Centre to be thus utilised should be improved to permit offering of such training to these personnel.

Recently the Ministry of Education sponsored 10 rural Institutes of higher education, one being at Sriniketan. Sanitary Inspectors course will be started in near future and we should take full advantage of these institutes.

CURRICULUM FOR SANITARY INSPECTORS— (Bhore Committee Report—Vol. III—Appendix 36)

Sl. No.	Subject.	Lectures.	Demonstrations & Laboratory.
1.	Introduction	1	—
2.	Elementary Physiology & Personal Hygiene	10	11
3.	Communicable Diseases	16	80
4.	Animals, insects etc., carrying diseases	4	5
5.	Disinfection and disinfestation	3	8
6.	Surveying, levelling and drawing	4	18
7.	Building construction	8	74
8.	Water supply	6	68
9.	Collection and disposal of excreta and refuse	8	60
10.	Disposal of the dead	1	10
11.	Collection of Vital Statistics	4	4
12.	Food and milk sanitation	8	30
13.	Fairs and Festivals, etc	3	16
14.	General Sanitation	1	10
15.	Public Health Administration	2	—
16.	Public Health Laws	6	—
17.	Health Administration methods	4	13
18.	Health unit work	3	4
19.	Malaria control	4	37
20.	Office routine	2	2
21.	Methods of inspection and carrying out of sanitary surveys	12	26
22.	Maternity and Child Welfare	2	2
23.	Legal Procedures	6	5
24.	Sewerage and sewerage disposal	6	30
25.	Offensive trades, industrial hygiene	3	17
26.	Ventilation, atmospheric pollution	3	—
27.	Seminars, tests, etc.	10	—
		140	534

Dr. J. K. Bhattacharjee, *Dy. H.S., West Bengal*—The training of the Sanitary Inspector or Health Inspector as he is sometimes called must be on the basis of his functions in the context of his avocations. So long he had been working as a guise doctor and not much as a sanitarian. Water supply, sanitary disposal etc., have never been specified in any of his programme. He should be the main person in the implementation of the impersonal health services mostly emphasizing (1) the safe water supply and (2) Sanitary disposal of human excreta and refuse. The Sanitary Inspectors are not to be blamed for it. He could not function satisfactorily in these fields because of lack of support of technical personnel like the Public Health Engineer, and of equipment. The organisation must be strengthened by provision of such technical personnel and equipment, so long our health inspectors have been engaged in the collection of vital statistics, preparation of registars, various types of reports and in other activities. So far as the sanitary programmes are concerned he does them as exceptional job. In fact, in the vertical set up the sanitary inspector is alone in the field of workers. In the horizantal set up under the Community Development Scheme, he is a part of the team of multipurpose workers. We have now got higher and full-fledged public Engineer at the state level and it has been possible to do the job on the spot after actual investigation of the problem. In this way the sanitary inspectors are also doing more and more functions and in this context we must find out what training would suit him in the new programme of health, so that he may be made responsible for most of the impersonal health work of which Mr. Majumdar has just now enumerated and these must not be excluded from the training programme even if they are not mentioned in the Bhore Committee's recommendation. As a matter of fact Mr. Majumdar said that health inspectors training should include certain disciplines like biology, bacteriology, etc. They should be trained not only in the communicable diseases which are not taught to the inferior personnel, but I also wish to emphasise here that the training of the sanitary inspectors must be given by the top ranking authorities who know their job well. It is very difficult to make them understand the principals of biology, virology, and immunology. In the matter of training of sanitary inspector the faculty of the institute collaborated with us and I think that the training was of the higher order but even then we find that in actual practical field they would not given proper demonstration because of the lack of supporting services. But they not only need didactic, training but a also actual demonstration in the practice field of how to apply the knowledge during actual service period. Another point I would like to pint out that this training has been given according to the Bhore Committee's recommendation. But the Bhore Committee report has to be oriented now in the context of our changing public health programme. The training should be a uniform one. Orientation training would be of help in selection of proper candidates. The present day health programme is a collaborative one involving several depts through the aegies of this Community Development projects and therefore this programme and the methodology have to be fitted in the new context of the Community Development Programme.

Dr. Seshagiri Rau, *D.P.H., Mysore*—I must thank the Chairman for giving me an opportunity of saying a few words about the objectives and duties of the Health Inspector. All of you are interested to know the duties assigned to Health Inspector or a Sanitary Inspector. I consciously say these two words because in some cases an Inspector who usually has had proper training and employed in the municipality is designated as Health Inspector, whereas the same person who is appointed in a district board is called Sanitary Inspector. Of course there is not much difference in the educational qualification and the training of these two categories. The difference is only in designation and the field of work.

The duties, perhaps, vary from state to state. In so far as the State of Mysore is concerned the district board employs the same category of officers but unfortunately on account of short of hands and paucity of funds the sanitary inspector is being given a

very large jurisdiction extending over practically three to four Taluks of each district. Apart from the sanitation work, that he has to look to, in the municipalities, he is also entrusted with the duty of collection of revenue. He is also entrusted with the P. W. D's Public works. He is more often to tour the district. As I see, the Health Inspector devotes more attention to the revenue collection and also public works, as I am sure, it is the same in all of the states, paying more attention to public work than the public health work. It is rather unfortunate that this condition should prevail. With this purpose I like to define, specially, the duties that has got to be assigned to Health Inspector. We have to engage this category of officers purely for the promotion of health in the rural areas. In the case of a municipality, where Health Inspectors are engaged, the general sanitation of the town is entrusted with the Health Inspector and in that the energy of this category of workers is mis-spent, as we know the question of sanitation of a town could be and should be entrusted with the engineer and not with the Health Inspector. Apart from this, his duties should be firstly, to maintain Vital Statistics. This statistics when properly kept and arranged would give a lot of information to the Health Officer to enable him to formulate scientific schemes for taking preventive measures. The second important duty that I would assign to him would be "Food Control". Every municipality has by-laws. But, unfortunately, these by-laws and acts are not being enforced to the extent that we desire to be. There are so many political reasons or some obstacles for the proper enforcement of the Acts that these can not be discussed here, at length. Many of the intestinal diseases are due to the infection being conveyed into the system through food. Apart from this, the nutritive value of the food staffs is again another thing which has got to be taken into consideration. Adulteration Act in force is practically, I should say, not enforced.

The third duty I must say is the introduction of sanitary latrine which is of course very encouraging in Mysore, or any other type of latrine in other parts of the states. Dut to these sanitary type of latrines, I see, intestinal worms infestations do not spread so much. In the Second Five Year Plan, as you are aware, we have a scheme under the Rural Water Supply, Sanitation Scheme.—The introduction of proper water supply and also the introduction of drains and latrines in different places. This, as one of the speakers said, was formally depending upon the engineers and domestic cares, but now, in each of the states, I learn, the Health Inspector or the Sanitary Inspector is being trained in testing the functioning of the drains and latrines on the spot. So far as we are concerned, I think to-day we encourage what is called Hand Flush Latrine, This consists of a slab with a pan and a pipe. All these are cast and adjusted to the soil pipe about 4″ in diameter and 2′ long and thus the nightsoil is led into soak pit. We have shown that this is very useful and very popular and is rather very cheap. We are training all the Health Inspectors in fixing and testing these. One of the paramount duties of the Health Inspector is to encourage introduction of these water-seal latrines. Taking some of these duties, our programmes and the methods of work into consideration and keeping in view our ultimate objectives, the curriculum should be recast or modified to suit our purpose.

Dr. Y. K. Subrahmayam, *A.D.G.H.S., New Delhi*—Remarked the objectives of training of Sanitary Inspectors have been the subject of discussion for a long time and in many formus. I wonder whether they should be called Sanitary Inspectors if they are expected to help in the medical relief and preventive work. I would rather prefer to call them Health Assistant, a person who is something more than a Sanitary Inspector whose main job is Sanitation work and for whom the Bhore Committee have already drawn up a god curriculum. Secondly, we find difficulty in getting sufficient number of auxilliary manpower. Would you not like this personnel a little bit better than what he is now? I would prefer the basic qualification for admission to Health Assistants' Course as Intermediate science or at least a Matriculate. In a meeting of the Public Analyst it was alleged that Sanitary Inspectors did not even know how to collect samples of food such as milk etc. In the present day context it has to be decided what are the powers and duties to be assigned to

Sanitary Inspectors working in the rural areas and urban areas respectively and what share should they have in curative medicine.

Dr. A. Das Gupta, *Deputy A.D.H.S., West Bengal*—Suggested that a Rural University should be established for the training of all types of auxilliary health personnel which are required in very large numbers. Training in such a University will ensure uniform standard of curriculum and teaching. It is not possible to obtain a uniform standard of training if it is given by different agencies in different states. The advantage of a rural University training would be that he would be acceptable to all states equally.

Dr. M. W. Freymann, *Ford Foundation, New Delhi*—Said "Since there are 10 rural institutes of higher education now existing in India it is anticipated that these might soon be initiated to organise one year's training course for Sanitary Inspectors. This would be advantageous for them because there are excellent opportunities at these institutes to become skilled in the necessary educational and extension techniques. The other students at such institutes, many of whom will becomes BDO's or Social Educational Organisers in future will also appreciate sanitation work through the presence of this course at these institutes. The teaching staff which would be headed by a public health engineer would be in contact with the problems of health and would be encouraged to pursue field research to help in solving them.

Dr. Jagjit Singh, *of Punjab*—Said that the Sanitary Inspectors should have some training in causes of death, collection and presentation of vital statistics, and should be able to educate the people to use latrines and other sanitary conveniences. They may seek and utilize the collaboration of oher public health staff in the collection of Vital Statistics.

Dr. S. E. D. Masilamani, *Deputy Director, All India Institute of Hygiene & Public Health, Calcutta said*—

"(1) There are three types of auxiliary health personnel. Their separate and specific duties are to be clearly defined to prevent overlapping.

(2) The Sanitary Inspectors should not carry out the duties which are not related to health.

(3) It should also be clarified how far they should involve themselves in Sanitary Engineering work and how much in giving assistance to the Health Officer.

The Chairman at this stage called upon any Sanitary Inspector present in the meeting to give his personal views.

Shri H. B. Chakrabarti, *Public Health Instructor, Burdwan, West Bengal*—Said that from his 20 years experience as Sanitary Inspector in the District Board and Municipalities he would like to suggest that the following items might be added in the syllabus of the Sanitary Inspectors' Course:

(1) The collection of vital statistics. In the rural areas is done by the illiterate Chowkidars and the data are obviously defective. This work should no longer be entrusted with them.

(2) Early Notification of the communicable diseases which is very important from the point of view of control work, should be ensured.

(3) Some people are very much reluctant to come forward for vaccination. So the Sanitary Inspectors should know how to make social contacts with the villagers.

(4) Superstition is still persisting in the minds of the villagers. They often use polluted water. The Sanitary Inspector should therefore know how to obtain safe water for the villagers.

(5) He should know how to prepare Sanitary latrines to advise the villagers.

(6) The most important item, however, is health education which should be included in the syllabus with a rural bias.

(7) The manner is which the overcrowding can be removed from.

Dr. Seal suggested that Historical Evolution of the knowledge of sanitation and preventive aspect of medicine should be included in the curriculum, and then proposed that a sub-committee be constituted to prepare a note on the duties and standard curriculum for the training of Sanitary Inspectors with particular reference to (a)

number to be trained, (b) minimum qualification for admission, (c) period of training—didected practical and field work, and total hours allotted to each standard, (d) Standard curriculum, (e) salary scale etc. With the approval of the Chairman the following sub-committee was constituted to make a preliminary report on the subject before the end of the scientific session and later to work out a comprehensive one in subsequent meetings held for the purpose. This report should be presented before the Central Council for approval prior to circulation.

Members of the Sub-Committee:

Dr. Seshagiri Rau,
Shri N. Majumdar,
Dr. S. E. D. Massilamani,
Mrs. Uma Mitra,
Dr. J. K. Bhattacharjya,
G. Sen,
Dr. Jagjit Singh.

The Chairman pointed out that the training of Sanitary Inspectors should be organised in conjunction with other field workers including Block Development Officer, Social Educational Organisers etc. so as to develop the spirit of team work and mutual understanding.

Chairman—Col. Barkat Narain.

Subject :—(ii) Training of Public Health Nurse.

Introduced by—Mrs. S. Zakaria.

Principal Discussant—Mrs. Uma Mitra.

Other Participants—Dr. K. M. Lal, Dr. S. E. D. Massilamani, Mrs Uma Mitra, Dr. A. Das Gupta, Dr. Jagjit Singh.

TRAINING OF PUBLIC HEALTH NURSES

By
Mrs. S. Zakaria,
Assistant Professor of Public Health Nursing

Public Health Nursing, as known today includes all nursing services organised by an agency or community to assist in carrying out any or all phases of public health programme mainly prevention of illness and disability, rehabilitation, promotion of health and also the improvement of social and physical environment affecting the health of the people. The services are rendered to the individual, family and community in the home, clinics, schools or industries. The total "Family Health Service" is the main feature of public health nursing.

It would be of interest to trace the origin of public health nursing in few advanced countries and also in India.

UNITED KINGDOM

The history of organised visiting nursing by professional nurses started in Liverpool in 1859 when it was initiated by Mr. William Rathbone, who was much impressed by the nursing care given to his wife in his house. He realised the importance of nursing care in the home of sick poor who could not afford to keep private nurses. Under the guidance of Florence Nightingale he made arrangement for the training of selected women capable of giving nursing care in the home. Thus started the District Nursing in England. Florence Nightingale who was very much interested in the prevention of disease and the improvement of environmental conditions affecting the health, felt

that a new type of nurses were to be trained who can help the people to improve their living condition.

These nurses were called Health Nurses who were later known as Health Visitors.

CANADA

Visiting nursing started in 1896 to the request of the National Council of Women who were much interested in the health and welfare of the women and children. These nurses are known as Victorian order of nurses for Canada. These nurses also are mainly concerned with the care of the sick in the home which includes some health teaching. Later on the training of Public Health Nurses, the generalised workers was started.

U.S.A.

In 1886 District Nursing or Visiting Nursing started to improve the slum condition; in order to help the people to improve their health. Out of this grew the P. H. Nursing with the main emphasis on health teaching.

INDIA

Indigenous Dais were the first domiciliary health workers in India. Their main concern is to help the mother during delivery and post-natal period. Training of such workers started in Amritsar by Miss Hewlett in 1886. Later on the training was greatly helped by the Victoria Memorial Fund founded in 1903.

In the beginning of this century, Maternity and Child Welfare centres were started in India and were staffed by midwives and nurses. During this period it became apparent that special type of workers should be trained to supervise these centres to do more effective preventive work and also to train and supervise the Dais. This resulted in the establishment of Lady Reading Health School in 1918 for the training of health visitors. Other health schools were also started in different provinces. The health visitors limit themselves to Maternity and Child Welfare work which is mainly in preventive outlook and training and supervision of Dais. Nothing much could be done for the other members of the family mainly due to the limited training of health visitors as well as their inability to render nursing services due to lack of nursing background. There are other specialised health workers for special diseases like T.B. and V.D.

Along with recent development in public health, the need for integration of curative and preventive services and also for the integration of specialised services within the public health set up was realised. It was also felt that the family has to be considered as a unit in order to give more affective service. The outcome of this progress has been the realisation of the need for a multi-purpose health worker in the field whose centre of interest will be the health of the family as a whole. It is cheaper and also will be more appreciated by the family which might have more confidence in one person than many. With this goal in view the training of multi-purpose workers or polyvalent workers in nursing started.

TRAINING

There are two types of training for public health nurses in India:

1. Degree course in nursing in which the public health nursing is integrated in the basic training throughout the entire period of 4 years or more. There are two such training places in India—one—College of Nursing, New Delhi, and the other—Christian Medical College, Vellore, both started in 1946.

Requirements for training—minimum education qualification—Intermediate preferably Inter Science.

Second type of training—Post-Certificate course in public health nursing started in 1952 at the College of Nursing, Delhi, and in the year 1953 it was replaced by a similar course at the All-India Institute of Hygiene and Public Health, Calcutta. A similar course started in Madras a couple of years ago.

Pre-requisites—Education: Matriculation or equivalent.

Professional—Senior Nursing with Sr. Midwifery with minimum two years' experience as a Staff Nurse.

Period of training—One academic year.

No. trained—

B.Sc. Nursing—about 245 in Vellore and Delhi.

Post-Certificate Course in Public Health Nursing—103 (24 International students).

FUNCTIONS OF PUBLIC HEALTH NURSE

The activities of public health nurses vary in different countries and different States. They may vary according to the change in social, economic and cultural factors affecting the public health programme.

Public health nurse works always closely with other members of the health team. She shares informations, helps in planning, consults with physician and other medical experts, sanitary inspectors, social workers, health educators, nutritionists, teachers, village leaders and community workers who are concerned with the health and welfare of the community. P. H. Nurse provides nursing service to the individuals, families and groups. The nursing service includes, teaching, guidance, counselling, preventive care, curative care and mobilization of family and community resources for the solution of health problems. Thus she helps the family to understand and realise their health needs and also helps them in promotion of health.

Care of the sick in the home—actual bed-side care in the home is not usually done by the public health nurses. In India at the present moment it is not at all possible for any public health nurse to do bed-side care also. But she teaches the nursing care by demonstration to the patient or a member of the family and supervises the care given by that particular person. She may give the nursing care in the clinic or hospital attached to the centres. In addition to those type of care she uses all the resources for the care and rehabilitation of the patient.

Prevention of disease—She helps the family to understand the importance of immunization against particular diseases prevalent in that area. Contact investigation and follow up also is done by the nurse. Participates in immunization programme. She takes active part in teaching the family about the importance of healthful living, safe water, safe food, proper disposal of excreta and plans with the family for the solution of health problems. She helps in the collection of vital statistics, reporting communicable diseases, assists in sanitation programme and this helps the other members of the health team.

Arranges for community organisation activities. Helps in the training and supervision of nurses, midwives, health visitors, dais and arranges practice field for medical and nursing and other students. She also participates in research and studies. Above all she uses all the available opportunities for health teaching.

What can be her case load?

The recommended population for a public health nurse is 5,000. But from my experience and the experience of others who work in the public health field I find that it is not possible for a public health nurse to do comprehensive nursing service to more than 2,000—2,500 population when she has to look after most of the special services. No proper study has been yet done in India to find out the case load of a public health nurse. Therefore it is difficult to say exactly how much population can be given to a public health nurse for her nursing service.

The socio-economic condition of the family the cultural pattern, education of the members of the family and community, geographical condition of her area, transport facilities the number of trained personnel working with her, their training, their other factors have much to do with the speed interest in public health work and many and success of her work.

It is just over twelve years since training of public health nurses has been undertaken in this country.

The number so far trained is about 400. Out of which very few are engaged in public health field. It is obvious that the number to be achieved if more institutions offer training for such health workers, that means more teachers, good practice field. It is very satisfactory to note that preventive and social medicine finds its deserved place in he basic training of nurses. A great work awaits doing and it is upto the responsible people in the health services to see that the public health nurses are utilized in the right field for the right type of service for which they are trained.

1. **Dr. K. M. Lal,** Director of Health Services, Uttar Pradesh said "In the present stage of development of primary health centre, I am not in favour of training Public Health Nurses but of continuing the Lady Health Visitor's training programme. We are still very much short of nursing staff for our hospitals. Furthermore, it is doubtful whether the female workers would be attracted to work in the rural areas. I feel that the time has not yet come to seriously undertake the training of Public Health Nurses. We should rather go slow and first develop the general nursing service fully.

2. **Dr. S. E. D. Massilamani,** Deputy Director, All-India Institute of Hygiene and Public Health, Calcutta said that the course content of the P. H. Nursing should be at two levels viz. (1) for basic public health nursing and (2) supervisory public health nursing and teachers. The All-India Institute of Hygiene and Public Health should undertake only the latter type of training.

3. **Mrs. Uma Mitra,** ADHS, Nursing, West Bengal, supported the idea of Dr. Massilamani but pleaded for the continuance of the Public Health Nursing Course sometime more.

4. **Dr. A. Das Gupta,** Deputy ADHS, West Bengal said "the training of Public Health Nurse and other lady workers should include imparting of knowledge on common gynaecological disorders, their management and care. Our MCH organisation is more concerned with the prevention and control of maternal and child morbidity and mortality, but they are equipped with very little knowledge regarding gynaecological disorders. On the other hand, the lady doctor being very few the women in the villages suffering from gynaecological disorders go practically uncared for. Thus, if these lady workers are given some knowledge about the common gynaecological disorders it would largely facilitate the MCH work in the rural areas".

5. **Dr. Jagjit Singh,** District Medical Officer, Ferozepur (Punjab) raised the question what would be the future of the Lady Health Visitors. Would they be given short extension training and absorbed as Public Health Nurses? He also wanted to know whether the public health nurses would also be trained to collect vital statistics.

Chairman—Dr. N. Jungalwalla.

Subject :—(iii) Training of Multipurpose Health Workers.

Introduced by—Col. Barkat Narain.

Principal Discussant—Dr. G. S. Murthy & Dr. Jagjit Singh.

TRAINING OF MULTI-PURPOSE WORKERS

By

COL. BARKAT NARAIN,

Adviser, Ministry of Community Development, New Delhi.

1. *Definition :*

"A multi-purpose worker has been defined as a worker, who is trained in more than one technical field, of which at least one can be considered his basic field." This training enables the multi-purpose worker, when necessary, to call upon specialists in the field to meet certain special problems. These workers live with the people under the same conditions and are better placed to appreciate the local problems.

2. *Utility of the Multi-purpose Worker :*

According to the Community Development Programme, which has been adopted by our country as a national programme, there is changing emphasis in programmes of social development from governmental initiative and responsibility to village community's self-help. It has been noticed that the multi-purpose workers recruited from the rural areas have an advantage over highly trained professionals, for they have better knowledge

of the local community and its problems. They also have affinity with the local people and are easily acceptable to the local community. As such, they can serve as a means of fostering community initiative and of developing community ability to discover and mobilise its own resources to solve its own problems. Also, because the multi-purpose workers are generally recruited from the rural areas and are willing to live in the villages at the standard of village life and they know the local customs and speak the language, they are regarded as the key to the extension of health services in the rural areas.

3. *In the community development programme which covers today more than half the rural area of our country, the important categories of multi-purpose field workers are :*

   (a) Village Level Worker
   (b) Social Education Organizer
   (c) Home Economist

The above categories of workers are given special training in extension technique; how to work with the people and how to involve the people in accepting and participating in the programme which is for their good. It includes training in fundamentals of public health and the prevention of disease and promotion of health. Such are more acceptable to the people in the rural areas, both by reason of tradition and economic circumstances. The multi-purpose worker is easily understood and accepted by the community. Secondly, it is not possible at present to recruit and train a large number of auxiliary health workers to be posted for a group of villages. In the field that ordinary assistance by multi-purpose worker is generally preferred to a series of visits by specialists.

It is the responsibility of the administrative medical officer of the State to see that the multi-purpose workers are adequately trained in the fundamentals of environmental sanitation and control of communicable diseases in the Extension Training Centres.

4. *Village Level Worker :*

Among the non-medical persons working in the field, the village level worker is most important. His basic training is in agriculture but he is given special training in the extension technique for the multi-purpose Community Development Programme. He helps the people to develop the idea of self-help and to inculcate in the people the desire for higher level of living and healthful environment. He guides the people in the expression of their needs for food, clothing, health, housing, recreation, etc. He lives with the people and is in an ideal position to make an ideal health educator, if adequately trained. He covers comparatively a small area of operation as compared to the public health workers whom most of the States cannot afford to provide for a long time to come, and provides the best agency in the execution of health education. To illustrate, the village level workers covers from 5 to 10 villages as compared to the health inspector or public health nurse/lady health visitor who covers about 100 villages. This very fact shows the great utility of this multi-purpose workers in the field of health education.

The village level worker carries a two-way message :

(a) He translates the health needs of the villagers to those responsible for the development of health programme; and
(b) secures the participation of the villagers in the development of health programmes which are being initiated as a result of 'felt-needs' of the people.

During his training in extension the village level worker is not only given a thorough orientation in public health and for improvement of environmental sanitation but also receives training regarding essentials for the improvement of nutrition. Utilizing his extension technique he is capable of explaining to the people the advantage of general cleanliness of the village and dangers of soil pollution. He is in a position to help villagers to develop safe water supply and sanitary latrines as their 'felt-needs'. He can stimulate them to take advantage of the maternal and child health services available in the area and the advantages of immunisation.

It must be emphasized that it is the responsibility of the Administrative Medical Officer of the State to see that village level workers are adequately trained in the fundamentals of environmental sanitation, control of communicable diseases and health education. There are at present 75 Extension

Training Centres in the country which are training 4,450 village level workers annually. It may also be mentioned that at present there are about 23,000 village-level-workers already in the field.

5. *Social Education Organizer :*

This is a new category of field worker who is being employed in the Community Development Programme in India. At present one male and one female social education organizers are being posted in each development block. These workers possess the basic qualifications of a graduate, preferably in Social Science, and are then given six months special training in centres specifically organized for this programme, in basic principles of extension. It must be remembered that extension is education and its purpose is to change attitudes and practices of the people with whom the work is to be done. Social education organizers are specially trained in the preparation and use of audio-visual aids. He is a specialist in the art of communicating ideas to the people.

Experience has shown that in a number of cases they have succeeded in overcoming the resistance of the people to immunisation against smallpox and cholera and in seeking participation of the people in our National Malaria Eradication Programme which basically consists of spraying in inside and outside of the houses and huts.

6. *Home Economist :*

In order to create a desire for better living in each family, the family must be the focal point for the beginning of this programme. The driving force and motivation to do simething about a given problem also comes from within the family. The family, therefore, decides what the village and the community finally agrees is important; gives priority to development programmes and determines the sacrifice and effort the village will exert in solving the problem or creating the thing which they want. As such education for the family particularly the women of the family becomes an essential service which the Community Development Programme must provide if they are to meet the needs of the majority of the population living in our States. To achieve this end, home economists (gram sevikas) are being appointed after they receive special training, so that they can stimulate women to accept new methods for a better and higher living. The home economists are specially trained in the extension technique of involving the women in this programme. They are trained in rural sociology, psychology, and philosophy of community development. The home economists are trained in the basic principles of nutrition, values of available foods and of seasonal foods, requirements of the expectant and nursing mothers and children, defects in diet and how to remedy these through changes in diet. They also learn about the fundamentals of public health and environmental sanitation and health education, personal hygiene, first-aid and the need for family planning in the interest of health and welfare of the family. They are taught practical measures to improve the house and its surroundings, so as to provide healthy environment. The trainees practise these principles in their own lives, in their hostels, houses and families, and correlate them with practical work in the villages.

Apart from working in individual homes, the home economists also work through the women's clubs (Mahila Mandals) which are being organized in the villages where local women take upon themselves to teach other women.

7. *Seminars and Inservice Training :*

To maintain the enthusiasm and interest and to make the multi-purpose workers more dynamic, arrangements have been made for seminers where workers from different areas meet and discuss their individual problems and how have they tried to solve these. After a period of three or four years, it would be necessary to give these workers 'inservice' training, so that they can learn the latest scientific developments that have taken place in the technical field.

To summarise, there are already thousands of workers in the Community Development Programme all over the country who are especially equipped with the methodology of extension, and as such, it is necessary that our health workers including the doctor should make use of their services to supplement their efforts. Community Development Programme is a team work between the technical personnel and multi-purpose workers for the improvement of socio-economic conditions of our people.

Training Of Multipurpose Health Workers:

1. **Dr. G. S. Murthy** of Uttar Pradesh observed in regard to the question of utilization of multipurpose village Level Workers for public health work that in the field of actual practice the V.L.W.'s being engaged in the work of the Revenue Department find very little time or no time at all, to devote for public health work. Their whole attention is for agriculture and animal husbandry, co-operatives and Panchayat activities etc. Moreover, it would be ethically wrong to make them carry out the smallpox vaccination work simultaneously after handling cattle population. It would be preferable to have the multipurpose worker to obtain co-operation of the villagers in the collection of vital statistics, carrying out of vaccination campaign, control of communicable diseases such as malaria, filaria etc. But in that case the V.L.W.'s should be in charge of not more than 2-2500 population.

2. **Dr. Jagjit Singh** of Punjab supported Dr. Murthy and said that the V.L.W.'s do not even practice health habits themselves such as, use of latrines etc. During their training they should be taught to practice health habits. Besides it is a question whether they should also be trained in the collection of vital statistics.

THE THIRD ANNUAL CONFERENCE OF THE INDIAN PUBLIC HEALTH ASSOCIATION

SYMPOSIUM ON

IMMUNISATION PROGRAMME

PREAMBLE

Although the practice of preventive medicine in India actually started in the present century, vaccination against small pox is the oldest prophylactic measure used in India and China. The Jennerian vaccination has however been practiced since May 1802 when the first vaccination in India was performed with Jenner's lymph on an Anglo-Indian child at Bombay. It was systematically practiced since 1880 when the vaccination act was promulgated. This was followed by decreasing trend of death due to smallpox from 80 per 100,000 population to 10 in 1931. Thereafter it has been fluctuating 20 and 40 except during the year 1944 a particularly bad year for smallpox, the death rate rising to 70 per 100,000. The point at issue is that it is showing a definite tendency to rise again inspite of a very potent prophylactic measure at our hands. One of the important drawbacks which has been found to be operating in this connection is that even primary vaccination is not compulsory in some of our states. Revaccination is not compulsory any where except in the Madras City. Clearly from all points of view it is a definite cause for action. There may be valid reasons for such rise but considering the achievements of other countries and our own previous results the reasons should be investigated and defined, and measures taken before the situation deteriorates further. Every body would feel disturbed at the persistence of smallpox epidemic in India even after 10 years of Independence inspite of the known and effective methods of control available at our hands.

The second public health menace that our country has been burdened with, perhaps for centuries, is Cholera. Here is one problem for which the health workers in this country have spent some efforts to understand the problem of epidemicity but so far the position has not improved much inspite of the increasing knowledge on the causative germ and the drugs which act on them.

Although compared to decades past a tendency towards decrease in incidence is noticeable, the epidemic risings continue to occur in the endemic zones. While the

environmental sanitation is under continious blame in our country, our neighbouring countries like China and Ceylon have already brought about a complete control of this disease. Perhaps time was long due for us to plan for an active nation-wide control measure. The prophylactic vaccine in Cholera is not however, as effective as other bacterial vaccine but their is enough scope for improvement.

Among the enteric infections typhoid fever is definitely on the rise not only in towns cities but it is now spreading into the villages. Apart from environmental sanitation, prophylactic inoculation is considered to be an effective method of control. But the method is not yet popularised nor adopted as a routine practice in the public health programme of any state except of the Army.

Control of tuberculosis has been undertaken in India on a national basis through the introduction of B.C.G. vaccine as a prophylactic measure. But regarding its efficacy contradictory statements have been made from different platforms which might mislead the public and often the health workers themselves. Diphtheria is another problem which is also on the rise not only in the urban areas but also in the rural fields. So also whooping cough. Health Officers of several cities like Bombay and Delhi are seriously considering the question of introducing mass vaccination campaign, but before oding so the problem must be thoroughly investigated and the pros and cons of such a campaign in Diphtheria must be understood before launching it. Some workers are also considering the possibility of using triple vaccine-Diphtheria, Tetanus and Whooping Cough, as are being tried in some countries.

The above problems were discussed in the Scientific Sub-Committee and the members considered it worth while to organise a symposium on the immunization programmes against the diseases mentioned above. A good response for participation from among the members was obtained, and the recording of the deliberations in this symposium held under the Chairman of Dr. Seshagiri Rau, Director of Health Services, Mysore State, is reproduced below.

S. C. Seal,

(Convenor, Scientific Sub-Committee)

IMMUNISATION PROGRAMME

Chairman—Dr. Seshagiri Rau.

Subject :—(i) Smallpox vaccination.

Introduced by—Dr. K. M. Lal.

Principal Discussant—Dr. Ramchandra Rao, Major I. N. Sarkar & Dr. J. M. Dasgupta.

Other Participants—Dr. S. C. Seal, Dr. Jagjit Singh, Col. Barkat Narain, Major K. L. Kapur, Dr. G. S. Murthy, Dr. R. Banerjee, Dr. A. Das Gupta, Dr. L. M. Bhattacharjee, Dr. Mrs. Muktha Sen and the Chairman.

Opening Remarks of Dr. S. Seshagiri Rau.

Ladies and Gentlemen,

It is known that morbidity and mortality due to infectious diseases are high in India, as compared to other advanced countries. These infectious diseases are preventable. Some of the diseases being more common among children. It would be helpful, if we discuss the following subjects:

1. The standard methods of manufacture of vaccines and sera.
2. The media for cultivating the various organisms.
3. The standardisation of vaccines.
4. The periodical assessment of the potency of the vaccines.
5. The schedule of immunizations.

Smallpox :

It is unfortunate that Smallpox still continues to be one of our major infectious diseases, inspite of the fact, that we have reliable preventive measure against it. Both morbidity and mortality are higher in the lower age groups. It was estimated that during the five year period 1937-1941, deaths due to Smallpox in India among infants under one year ranged from 12.1. to 10.7% and the corresponding percentages for children between 1 to 10 years varied from 19.2. to 30.5%. Apart from the mortality, the after effects of smallpox are more alarming. It is estimated that nearly one-third of the blindness in India can be attributed to smallpox. In Vaccination, we have a very potent weapon in reducing the incidence of Smallpox. The primary vaccination of a child is compulsory in many of the States and the mothers have come to realise the significance of this minor operation. This is no doubt a very happy augury. But unfortunately, the incidence of smallpox is showing a tendency to shift from the lower age group to a higher age group, thereby indicating that the children in the lower age group are immune, due to primary vaccination being enforced and that older children are becoming more and more susceptible to the disease. It is the duty of the State to see that smallpox does not occur even in the later years of life. The only way of preventing this occurrence is to re-vaccinate all children and adults at periodical intervals. There is a contraversy as towhether the interval between the primary vaccination and re-vaccination should be five years, 7 years or 10 years. It is found by experience, that a safe interval between the primary and re-vaccination and subsequent re-vaccinations is five years. If this procedure of re-vaccination at definite intervals practised all over, I am quite sure that smallpox can easily be eradicated from our country. I am confident that with the scheme of Community Development and establishment of Primary Health Centre to cover the whole population of India, it would be possible ere long to achieve this object.

Vaccination was introduced first into Bombay in the year 1830. The other Provincial Governments developed the Vaccination Department in due course. Vaccine Lymph is manufactured in every State, with perhaps slightly modified procedures, to suit local conditions. In some Institutions sheep are used, instead of buffalo calves, but this does not make any differences, the only point for consideration being the maintenance of the petency of the vaccine lymph. This is a very important consideration, as the conditions under which vaccinations have to be performed in the field, the time taken for the transport of the vaccine from the Institutions to the farthest place, the temperature and other prevailing conditions influence the potency of the vaccines to a very great extent.

There was a suggestion at the last meeting of the Administrative Medical Officers at Delhi, that Vaccine Institutes should obtain sample of the vaccine despatched to the farthest place and test for its potency, after the expiry of the period allowing for its use. This is done in Mysore. It is gratifying to note that the vaccine thus obtained from the field has given very satisfactory results.

Another point which may perhaps be discussed fruitful is in regard to the number of insertions, whether it is necessary to have 4 and 3 insertions in primary and re-vaccination respectively or whether two insertions would do.

Diphtheria :

Diphtheria is as much a disease of the Tropical countries as it is of the temperate countries. The morbidity and mortality statistics of this disease available in India seem to be rather meagre. The number of cases now attending the various hospitals goes to show that morbidity of Diphtheria is fairly high in the urban areas and lower in the rural parts. The mortality from Diphtheria is high due to the fact that—

1. Immunization of children has not been taken up.
2. Lack of facility of detecting the disease in most places and lack of interest in patients.
3. The non-availability of anti-diphtheritic serum in all hospitals.

The facilities for diagnosis of Diphtheria should be afforded at each of the taluk headquarters hospitals by providing a

microscope and a few stains to the doctor in charge of the dispensary. In the Second Five Year Plan, a provision of Rs. 3,500/- has been made in the budget for every Primary Health Unit for the immunization Programme. This amount may not go a long way, but would help to protect a certain percentage of children, and we can create public opinion in favour of this programme and create a demand for the supply of more antigen to cover every unprotected child.

Infants upto age of 6 months may have a natural immunity to diphtheria, having acquired the same through the mother. But from 6 months upto 15 years, the child becomes susceptible and in subsequent years, the child acquires a natural immunity against diphtheria. It is, therefore, necessary that a Community Immunization programme should be launched for this purpose.

The original method of immunization was a neutral mixture of Diphtheria toxin and antitoxin. This was soon replaced by Toxid (formol-Toxiod-F. T.) It was soon found that the antigenicity of different samples of F. T. varied considerably and that this had no relation to their Toxoid content. Further, there was a high incidence of local reaction while using F. T. Therefore, for sometime F. T. was replaced by washed Toxoid-Antitoxin Floccules (T. A. F.) which provoked markedly few reactions. The disadvantage, however, was that it contained Horse protein and the immunity conferred was slow in development. It was pointed out in 1926 that when Potassium Alum was added to crude F. T., a precipitate was formed (Alum precipitated Toxoid-A. P. T.) and that A. P. T. was more antigenic than the Toxid solution. The disadvantages of A. P. T. are: —

1. That its preparation is essentially an imperical procedure.
2. The antigenicity of final product is not uniform,
3. The incidence of local non-specific reaction after injection of A. P. T. varied greatly from batch to batch.

In order to avoid the ill-effects, the method of purifying the toxoids by the addition of aluminium Phosphate was explored and it was found that antigenicity of this substance, purified toxoid aluminium phosphate precipitate, increased with the increase in the Aluminium Phosphate and the reactions were avoided. It is usually recommended before immunization against Diphtheria is undertaken, that a Schick test be performed. It will be of great advantage, if this group were to discuss, whether it is quite essential in India to first undertake Schick test and then to undertake the immunization or whether immunization can be undertaken without a preliminary Schick test. It may, however, be stated that this mass immunization has been undertaken in a certain area in Mysore without a preliminary Schick test and it seems to me, that there is no need for performing the Schick test for children below 10 years of age. The immunity conferred by this preliminary immunization lasts only about 5 years and as the age of susceptibility ranges upto 15, a booster dose at the time of enter into school, at the age of 10 and before a child leaves the school at 15 is essential.

Whooping Cough:

Inspite of decline of this common infectious disease during the last one or two decades, whooping cough is still a major problem. Its prevention remains uncertain, its early diagnosis difficult and its specific cure has yet to be established. Its complications and sequelae will give rise, inspite of the modern treatment, to long periods of invalidism. Its morbidity has also been reduced, but the total number of infant deaths is still high and stands second to gastro-enteritis. The mortality from Whooping cough shows that nearly 90 per cent of deaths occur in children under five years of age and 50 per cent of that occur in children under one year of age.

A vaccine has been manufactured and the administration of this vaccine has contributed to the reduction of the attack rate to about a third with a substantial reduction in the mortality. However, it is very important that potency of the vaccine is maintained high and that the actual procedure of manufacture of vaccine be standardised.

Cholera :

Cholera is endemic in India. The incidence of Cholera shows a wide range of variation from year to year. The statistics from 1877 to 1941 indicate that there has been a gradual decline in the incidence with occasional excerbations. The incidence of cholera varies from Province to Province, but it is high in Madras, Bengal, Bihar and United Provinces and in Orissa. The endemicity of cholera is maintained in India due to several factors.

(1) The lack of high standard of food protection,
(2) Lack of general sanitation,
(3) The prevalence of enormous fly population,
(4) The presence of common sources of water, both for drinking and for ablution purposes.

Cholera is again one of the preventable diseases and can be controlled by improving the environmental sanitation, by providing protected water supply, by satisfactory disposal of night-soil, so as to prevent contamination of food and water by infective material, by controlling fly breeding and by controlling the manufacture, distribution and sale of food. Even in places of pilgrimage and festival centres, little attention has been paid for direct enforcement of Rules for the protection and distribution of food, for supervision and protection of water sources, and to look after general sanitation of such places. Minimum standards required for the maintenance of general sanitation, for the provision of water supply and control of food establishments should be prescribed.

The endemic centres for cholera should receive priority and the attention of the Governments should be drawn to the fact, that they must pay considerable attention to such centres. Immunization against cholera is undertaken as one of the measures for controlling it. This Immunization is undertaken not only in places, which are infected with cholera, but also as an anticipatory prophylactic measure in the adjoining non-infected areas. Cholera vaccine is manufactured practically by every State for its own use. Some of the State have maintained their own strains of organisms and other depend upon the adjoining States for getting the standard strains. It is a matter for consideration whether the local strains should be used, or the standard strains from a particular institution should be used. In so far as Mysore is concerned, the 'Ogawa' and 'Inaba' strains are obtained from the Haffkine Institute, Bombay and King Institute, Guindy and are utilised for the manufacture of Cholera vaccine.

Typhoid :

Typhoid is prevailing all over the country. It occurs in the form of epidemics now and then. This is due mostly to: (1) the carriers contaminating food and water (2) due to contact infection, (3) due to transmission by flies.

Typhoid being an intestinal disease, the precautions that are taken for Cholera viz., the improvement of environmental sanitation is absolutely essential, but when Typhoid becomes endemic the value of inoculation cannot be under-estimated. After the introduction of this vaccine for general use, the statistics reveal that the incidence in India has shown a dramatic reduction. Typhoid vaccine also becomes a recognised prophylactic and on the outbreak of World War I, 30 per cent of the Expeditionary Forces received the inoculation.

In the manufacture of Typhoid vaccine, the usual procedure of growing the organisms on solid media, washing the colonies in saline, heating it to 54°C for one hour and adding a preservative is adopted. TY2 and Rawlings strains are being used. At one stage, it was considered that Rawlings strains should be discarded, but sentiment and faith in its value as an Immunizing agent were such that, it was decided not to discard it without any experimental proof.

In fact the Rawlings strain was subjected to long series of animal passages by means of which, its virulence could be greatly enhanced and its Vi antigenic content increased. After this experiment, Rawlings strain has been included in the manufacture of vaccine. So, it is a matter now for consideration to maintain this strain in a Central Laboratory, where virulence of the organisms can be maintained at a particular level and to distribute it to the various laboratories manufacturing this vaccine. The problem of the

carrier has to be tackled effectively. All food handlers, employees in dairies and water works should be tested for the presence of Vi agglutinins and those that show it excluded from such occupations.

B. C. G.:

Tuberculosis ranks high as a public health problem. There are no accurate data of the incidence of Tuberculosis in India, but according to Dr. P. V. Benjamin the mortality figure for States show a Tuberculosis death rate of 200 to 450 per 100,000 of population and that it can be safely estimated that there are at least 500,000 deaths per year from Tuberculosis in India. If it is presumed that there are 5 cases of acute Tuberculosis for every death due to Tuberculosis (and we say this rate does not apply to India; there may me 8 to 10 cases for every death) there will be at least 2.5 million acute cases in India. A survey which was undertaken in a part of Madras revealed an infection rate of 69.8 per cent for adults and 41.2 per cent among children under 15 years. Dr. Ukil estimates that the infection rate varies from 21 to 34 per cent in rural and 80 to 90 per cent in urban areas.

It will be evident from these figures that the incidence of Tuberculosis in the urban areas is much more than in the rural areas and that the infection rate increases with the rapid urbanisation and industrialisation. The death rate also varies from place to place. It is as high as 432 in Cawnpur, 140 in Bombay compared to 96 in London per 1,00,000 population. The factors that contribute for the prevalence of tuberculosis, apart from the infection with the organisms, are poverty, bad housing, high cost of living, ignorance on the part of the people as to the spread of the disease and apathy. Attempts should be made to improve the living conidtions, increase the family income, to isolate as far as possible the cases, which deserve hospitalisation and to afford facilities for the treatment of cases in the houses. In addition, prophylactic vaccination with B.C.G. is recommended. Before a child is vaccinated, it is necessary to test the child with a small dose to find out the allergic reaction to this vaccine. If the child thus tested shows a negative reaction, then the child has to be protected with B.C.G.

B.C.G. campaign has been undertaken on a very large scale by the Government of India and by the States. According to the programme, the Campaign should have been completed by 1957, but due to several reasons, it has not been possible to cover the whole population. However, attempts are being made by the State to see that the target is reached within a couple of years. It may be stated that the vaccine manufactured in Madras and supplied to the States has yielded good results. In order to assess the potency of this vaccine, a team sent out by the Government of India, who brought strains from abroad and test-checked a number of children, who were protected with B.C.G.

It is gratifying to note that the vaccine produced in India compares very favourably with those from the Continent. The only draw-back of this B.C.G. Campaign under-undertaken in India is, the lack of follow-up of cases, which are positive. It may be urged that all positive cases should be scereened and those that are suffering from T.B. given proper treatment and advice; as otherwise the scheme as it is implemented may be considered as partial and the full fruits of the campaign cannot be realised.

*SMALLPOX VACCINATION

By

DR. K. M. LAL,

Director of Medical & Health Services, U.P.

I consider it a unique honour and privilege to be asked to participate in opening a discussion on small-pox vaccination, and the honour is greater because I do not belong to Public Health Service. When Prof. Seal sent a request that I should make it convenient to open the discussion, I felt a certain diffidence in accepting the honour due to a feeling of inadequacy on my part to fulfil the role assigned to me particularly in a gathering of galaxy of Public Health workers in the country, but the diffidence was soon dispelled by his second letter, reiterating the earlier request, and this is how I am here to-day in your midst.

Smallpox stands foremost amongst epidemic diseases in tenacity and malignity with which it has pursued the human race. Thanks to Jenner, one of the greatest benefactors of mankind, it happens to be the most preventable disease through specific immunisation. It is, therefore, unfortunate, that even to-day, it remains a major public health problem with us inspite of the fact that vaccination is being practiced in our country for more than a century and a half. The present smallpox situation is all the more regrettable, since India happens to be one of the pioneer countries to fight this scourge on a scientific footing. Variolation, a wonderful endeavour in the field of preventive medicine, during the times in which it was practiced, was in vogue in India for many years before its introduction into Europe and America. It is, therefore, only appropriate that this problem should, at least now in our country, assume the importance it long ago deserved; and that the attention of every body, the people, the public health experts and the Government should be focussed on it.

Present Position :

We have not studied the mortality records of this disease for the different States in the country, but I could give you a picture of its extent of prevalence and its special features for my State viz., U.P., about which we have recently made some studies, and it is quite possible that conditions in other States are more or less of a similar nature.

During a period of 78 years (1877-1954) 1.6 million deaths from smallpox were registered in U.P. giving an annual average of about 20,000 deaths. The mean smallpox rate is 0.44 per 1000 population and 1.5 percent of all deaths were due to smallpox. The 1951 epidemic in the State which claimed more than 49,000 lives was the severest in living memory. About 1,25,000 deaths were registered during the quinquennium 1950-54; and this figure happens to be higher than the registered mortality figure for any quinquennium after 1885. The percentage of smallpox deaths to total deaths from all causes during this quinuennium (1950-54) is 3.5 as against the average of 1.5 for the period 1877-1954. These mortality figures alone are enough to stress the magnitude of our problem at present, even without allowing for the severe set back which the registration system for vital statistics in U.P. received, subsequent to the handing over of responsibility for registration from village chowkidar to the Panchayats in January, 1951.

Cyclic Periodicity—The disease has been found to exhibit a cyclic periodicity of 5-6 years, and in its secular trend is on a steady increase ever since 1922.

Steady shift in age—Deaths in higher age group—In the early days about 90% small-

* Opening address at a symposium held at the All India Institute of Hygiene and Public Health, Calcutta, on 23th December, 1958, under the auspices of the Indian Public Health Association.

pox deaths were in the age group 0-10 years, occurred during the last 50 years and at present nearly 57% deaths are in the higher age group viz., 11 years and over.

Control Measures :

No discussion on smallpox is complete without a reference to the history of the evolution of vaccination which I would like to recapitulate briefly.

More than a 1000 years ago an attack of smallpox was considered almost an inevitable event in every person's life, and was anticipated with anxious dread. In certain districts of U.P. lying between the Ganges and Jamuna it is said that the agricultural and even the wealthier classes did not count children who have not been attacked with and recovered from smallpox as permanent members of the family. The people solely relied on worship of a deity to protect themselves from the disease. No wonder all their efforts were in vain. The first glimmer of hope came with the introduction of smallpox inoculation as a preventive against the disease. The practice has no doubt resulted from the common knowledge, even in remote times, that certain diseases occur once only during the life of a man and that after recovery he is generally immune against further attacks of the same disease. It was also possibly realised that even a mild form of disease often conferred a certain protection against a further attack. Dhanwantri, the earliest Hindu physician supposed to have lived about 1500 BC, is said to have been the first to have practiced inoculation for smallpox. Inoculation was practiced extensively in India, particularly Bengal and Assam, and in China, for many years before its introduction into England and America about the year 1721. This wonderful measure was, however, doomed to disfavour because of two strong objections to it. Firstly, a certain number of deaths resulted from the practice, even under the strictest regimen enforced by the Brahmin practitioners of the day; and secondly, the disease created by it was as contagious as smallpox itself. Though perhaps the practice was of a certain advantage to the individual but was a serious evil to the community. Fortunately for mankind, Jenner's vaccination, an epoch making discovery, was to replace variolation.

The manner in which Jenner made his discovery is too well known. The first vaccination in India was performed with Jenner's lymph on an Anglo-Indian child at Bombay in May 1802. It is stated that the vaccine virus now in use in India has emanated from a pustule on the arm of this child. Efficient systems of vaccination were subsequently established in Bombay, Calcutta and Bengal, and it is now little more than a century since such a system of vaccination was introduced in Uttar Pradesh. Upto 1870 all vaccinations in India were done with humanised lymph either from arm to arm or from vaccination crusts collected from human cases. It is only in 1870 that regular production of vaccine from animals was organised in Bombay, and in 1881 in Calcutta. When the lymph from this source was found to be satisfactory, the use of humanised lymph ceased, and animal lymph became the official lymph for vaccination purposes. In the earlier years people were directly vaccinated from the calf, and no attempt was made for the preservation of lymph. Later on to make the vaccine lymph more easily available at places at some distance from the manufacturing centres, glycerination of lymph to preserve it was introduced and this practice continues to this day. In the beginning calf to calf promulgation of lymph for vaccine manufacture was adopted with an occasional passage through the rabbit in order to rejuvinate the passing the virus through different animal lymph. It was in 1923 that the utility of species for maintaining the potency, was first demonstrated in Madras. It was shown that the best method of retaining the maximum potency and immunising value of lymph was to continuously pass the seed lymph from calf through rabbit and buffallow to calf once again. At the same time techniques were also evolved to make the lymph more and more safe. In addition to the use of glycerine a preservative as well as a bactericidal agent, further purification of lymph was attempted by the use of chloroform, phenol, clove oil, anti-biotics etc. New methods for cultivation of vaccine virus in tissue culture and on the chorio-allontoic membrane of the developing chick embryo have also been developed. In view of the expense and labour involved in the production of egg vaccine, and in view of the comparatively lower number of takes with this

type of vaccine, it is doubtful whether there is a case for abandoning the well tried and much improved vaccine from the living mammals.

The most important advance in recent years, in this direction, has been the production of a stable dried smallpox vaccine. An easily reconstitutable heat stable dried vaccine is expected to solve most of our headaches regarding storage of lymph in our vaccination programmes.

Duration of Immunity Conferred by Vaccination :

I would like to say a few words on this question which now confronts vaccine producers as well as epidemiologists. Though Jenner's original contention that vaccination conferred life long immunity against smallpox is no longer tenable, it appears that the immunity conferred by vaccination today is not of the same magnitude as that conferred by the lymph used in earlier years. Now the pertinent question is whether this diminution in the magnitude of immunity conferred by the use of the present day vaccine is real, and if so what is it attributable to. Various theories have been put forward viz., that the strain of virus which is in use has deteriorated in potency or that a new strain of smallpox virus is present in the country, or that the purification processes to which the present day vaccine lymph is subjected to, is responsible for the diminution in the degree of immunity conferred by vaccination. The answer to this question possibly lies in the herd immunity structure of the population amongst whom vaccinations are performed. In the early days of vaccination, primary vaccination of infants alone was sufficient to produce a high degree of herd immunity in the community since the large majority of the rest of the community were already in possession of a high degree of immunity against the disease due to a previous attack. As a matter of fact the countries which enforced primary vaccination of children rigorously in the earlier years, could successfully solve the smallpox problem there. But in a country like ours where vaccination was never practiced so rigorously, the disease continues to prevail, though the ravages due to it have been minimised. The degree of herd immunity present in the community is low due to presence in large number of persons who neither had the disease nor are vaccinated and also due to those persons who have been vaccinated a long time ago. In a well vaccinated community, the herd immunity is said to last for 10 years though the individual protection may be much more variable. The protection conferred may not be dependent on the potency of lymph, since it has been found to result even when diluted lymph is used for vaccination. In this connection, it will not be out of place to refer to a very interesting suggestion put forward by some authorities in U.K., viz. to deliberately introduce Alastrim (Variola minor) into the country, so that in course of time, it may replace smallpox. This suggestion has been based on the observations made in South Africa where the native population which was subject to periodic epidemics of Alastrim was immune to virulent smallpox. Would it not be too dangerous to introduce this virus into a virgin soil where the virus might flourish, and possibly change to a more severe form. Could we ignore this possibility?

Smallpox Eradication Programme :

Smallpox is responsible at present in our country not only for heavy loss of life, but also for considerable suffering and disability specially blindness. But fortunately it happens to be the most perfectly preventable disease, and all the advanced and civilised countries of the world have long ago emancipated their peoples from the horrors and ravages of this disease by rigorous and systematic enforcement of vaccination. The present smallpox situation in the country is a slur and a sad reflection on the sense of our responsibility towards the welfare of the people and on the ineffective functioning of our administrative machinery and the non-appreciation of the recommendations put forth by Public Health workers, drawing repeated attention of their Government that eradication of smallpox requires two things viz., firstly a will and a determination to do it and secondly the requisite administrative efficiency. At the instance of the Union Government the States have formed expert committees to suggest ways and means for the eradication of this disease. The following are the highlights of the recommenda-

tions made by the expert committee in U.P. to make vaccination more effective:—

(1) To provide for a uniform Legislation making primary vaccination of infants compulsory throughout the State and re-vaccination compulsory at age levels 5-7 years and 12-14 years.

(2) To thoroughly re-organise and re-orientate the existing administrative set up for vaccination work. This includes recommendations for the upgrading of vaccinators with a higher scale of pay, to bring them under the direct administrative control of the Public Health Department and to employ at least one Vaccinator for 33,000 population in the rural areas. (Madras—1 for 50,000 and U.P—1 for 75,000).

(3) To provide for adequate facilities for cold storage of vaccine at district and vaccinator level, and for the transport of vaccine from the manufacturing Institute to the districts under cold storage conditions.

(4) To provide for adequate facilities for the health education of the population.

I would now like to refer to a vexed question which has been raised by some workers in my State; and possibly by some in other States as well viz., whether vaccination should be carried out on a voluntary basis, or whether it should be made compulsory by law. Smallpox can be eradicated and conquerred only by the practice of universal vaccination repeated at regular intervals, and this can be brought about only by law. "Greatest good to the greatest number" is the principle justifying enforcement of vaccination; that is to say that individual preference must yield to the common welfare. This is exactly the principle which underlines the laws requiring isolation and quarnatine of persons suffering from communicable diseases, the only difference being that the smallpox patient is an immediate source of infection whereas the unvaccinated is a potential source. Moreover we should take a lesson from the history of smallpox in the European countries and in far eastern countries Japan and Phillipines which yields convincing proof that wherever vaccination was rigorously enforced, smallpox has been effectively controlled. Wherever, vaccination was employed through voluntary means it has failed to produce the desired resuits.

In the end, I would like to touch on the oft discussed question--how frequently should re-vaccination be enforced. We in our State have recommended that re-vaccination should be made compulsory once at ages 5-7 and again at ages 12-14. In Andhra Pradesh, the experts have recommended enforcement of re-vaccination once in 3 years revising the existing procedure of once in 10 years. No doubt we are generally agreed that the immunity conferred by vaccination is adequate upto a period of 3 years. As has been observed by me earlier, it should be kept in mind that the protection offered to an individual is different from that of herd immunity which is expected to last for 10 years. The existing provision in Madras and Andhra States for re-vaccination once in 10 years may be quite adequate to eradicate smallpox, provided of course, it is effectively enforced. The two compulsory re-vaccinations at an interval of 5 to 6 years, suggested by us, would not only be administratively more easy, as with the education becoming universal this can be done easily in the schools, but the shorter intervals suggested would also be safer for our country where herd immunity is not so high.

REFERENCES

Contra indication of smallpox vaccination.

(1) Obvious malnutritions.

(2) Anaemia.

(3) Acute febrile state.

(4) Septic skin condition, specially allergic eczema.

(5) Recently discovered danger of vaccinating women within first three months of pregnancy.

SMALLPOX VACCINATION IN MADRAS CITY

By

Dr. Ramchandra Rao,

Asstt. Med. Officer, City of Madras.

Introduction :

Though Jenner was the first person to state this vaccination programme there are evidences to show that people in those days too, had some ideas about immunisation though their methods were crude and appear as unscientific to our present scientific mind. For example in China, scales removed from recovering smallpox cases were powdered and applied to the nostrils like snuff, in the middle eastern countries like Persia and Turkey, the same scales were ingested and in India they were made into emulsion and rubbed into the skin. All these were done with the sole purpose of prevention against smallpox. Later on the inaculation of variola material in variolation came into practice. At that stage Jenner stepped in and demonstrated the efficacies of inoculation of vaccinia material in prophylaxis of smallpox with rapid advances made in the technique of vaccination and also manufacture of vaccination lymph, several countries recorded a great decline not only in the mortality due to smallpox, but also in its incidence.

Unfortunately in India, smallpox is still a problem of great magnitude. We are vaccinating thousands of persons year after year but smallpox continues to occur in epidemic form periodically and shows signs of endemicity in certain areas. Naturally a man in the street would certainly question the validity of Jennerian theory. Sometimes we ourselves fail to get an answer to that question. The evidence that vaccination protects against smallpox is strong, though it is very difficult to collect the statistical data to prove the fact directly but sufficient indirect evidence is available.

Usually under any vaccination programme in Madras children are first vaccinated at the age of 6 months, again before they enter the school between 5 to 7 years and after that they may get vaccinated occasionally but not as a routine. If vaccination is to favourably affect this incidence and case fatalities, one would except amongst the vaccinated, the lowest incidence and fatality in the age group 6 months to 1 year and then a slight increase with the advance of age upto 5 to 7 years followed by a step fall and again a steady increase with increasing age. Here are some figures collected from Madras city. During the 5 year period ending December 1957, there were 3957 cases of smallpox admitted to the Infectious Diseases Hospital, Madras. Of these 2656 had evidences of having had vaccination at one time or other and the remaining 1301 were reported to be unprotected. Under the age group 0-1 years only 1% of the vaccinated got smallpox as against 23.6% of the unvaccinated. Under the age group 0-5 years 7% of the vaccinated suffered from smallpox as against 54% in the unvaccinated. This clearly shows that vaccination does reduce the incidence of smallpox. But beyond 5 years, the incidence is not affected which indicates that our revaccination programme is not as effective as primary. With reference to mortality, the overall case fatality rates for the vaccinated and the unvaccinated were 11% and 43% respectively. Thus vaccination does reduce the fatality also. But from the figures available it was found that the fatality rate for the age group 0-5 years even amongst the vaccinated is very high—3% as against 54% among the unvaccinated. All those figures show 3 things.

1. Though it reduces the incidence of smallpox, vaccination does not seem to assure cent percent protection as can be seen by the incidence of 1% of cases among the vaccinated group under 1 year.

2. The belief that primary vaccination confers immunity lasting for 5-7 years is probably not correct.

3. We are not achieving as much success as we expect with the vaccination programme.

The why of this requires further study: it may be, there are several factors which are responsible for the incidence of smallpox inspite of vaccination or our concept that the

number of marks as the true index of immunity may be wrong.

Age for vaccination: Now coming to the age for vaccination on the assumption that every child inherits certain amount of immnnity from the mother through the placenta and that this protects the child from the attack of smallpox in early infancy, the usual age for primary vaccination for legal purposes was fixed at 6 months. But it is not at all uncommon to find unvaccinated babies under 6 months developing smallpox and succumbing to it. Out of 1903 total cases of smallpox treated during the year 1956 and 1957 as many as 87 i.e. about 4.5% occurred in infants under the age of 6 months and of them only 7 gave history of vaccination but there were no visible marks. The case fatality rate for these 87 was 65%. If only the regulation of minimum age limit of 6 months was revised perhaps all these babies would have been protected and saved. These figures indicate that the possible immunity that is transferred from mother to infants is short-lived, if at all, and that it is not advisable to depend upon the so-called inherited immunity and risk the lives of infants. It is time, I think, to reconsider the minimum age limit for vaccination of children and I suggest, that as far as possible, vaccination should be done as early after birth as possible even perferably within one week. This can be tried as an experimental measure, to start with in the laying-in-hospitals when children are observed for one week. This has an added advantage that we ill not miss the vaccination for those infants that are delivered in hospitals. The only drawback in this procedure cited in the literature is that the number of successful take is less than at 6 months. I personally think that it is not a real draw back, because it would not matter if we vaccinate an immune child but it would definitely matter if we do not vaccinate a non-immune child. Even in immune children, this may act as even a booster and step up the immunity. However, those children who did not have successful takes would of course be vaccinated as usual at 6 months.

Vaccination programme in Madras city:

Primary as well as revaccination are compulsory in Madras. Every child should be vaccinated before it attains the age of 6 months and even person who has not been successfully vaccinated within the preciding 7 years (4 years when the city is threatened with epidemic) are liable to vaccination. To enforce these legal provisions, there are a net work of the vaccination depots in the city at different places manned by about 100 qualified vaccinater inspectors. They maintain registers known as 'unprotected children's register' for all children born in the city in their respective jurisdictions. They issue notices if the parents fail to get their children vaccinated within 6 months and prosecute them if they do not comply with the terms of notice forthwith. Similarly for revaccination, house to house visits are done by the inspectors, what is known as "vaccination in Block work", in such a way that every family is covered at least once in 3 years. Of course in practice there will be several omissions due to frequent changes of residences.

In spite of this organised programme, we were able to protect only 58% of the children born in the city. Here is a sample of one municipal division. There were 14,429 births during a period of 3 years 1955 to 57, of whom 58% were vaccinated, the remaining 42% were composed of 10% deaths before vaccination, 10% nontraceables due to recording of incorrect address and the remaining 22% children moving away to some other area, either within or outside the city. Thus the nontraceable and the permanent removals constitute 32% of the children which is a major omission, and they form the potential source of smallpox epidemic. Majority of these 32% were amongst the births that occurred in hospitals. The mothers who come for confinement do not give correct address and the hospital authorities too, do not care to ascertain the correct information as they are not interested in it. To avoid the missing of such a large contingent of unprotected children the age limit for vaccination as I have already suggested should be changed so that they can be vaccinated in the Lying-in-hospital before they are discharged. This suggestion should be given a serious consideration for organisation of immunisation programmes against smallpox with a view to attempt to eradicate of smallpox in this country.

Vaccination Programme and the public response :

As with any other public health activity the whole hearted co-operation and response from the public is absolutely essential in any immunisation programme. Of 8321 primary vaccinations done in the above divisions, parents of only 20% of the children volunteered to get their children vaccinated within 6 months. The majority were vaccinated at the end of 9th month and only 2% over 1 year. The usual methods employed for postponement of vaccination are:

(i) that the child has gone temporarily to a relatives house.

(ii) false medical certificates of sickness,

(iii) notice not received, etc.

Even so, it can be said that the response for primary vaccination is much better than for revaccinations. The adults have ingenuous methods of escaping the eye of the vaccinator. They run away from their houses, sometimes they bolt themselves in a room or the vaccinator is prevented from vaccinating on the pretext that the ladies are taking bath. Another superistitious pretext is refusal to get vaccinated during pregnancy, although it is known in actual experience that vaccination has no deleterious effect either on the termination of pregnancy or on the life of the faetus. Again, if vaccination is done against their wish many persons wipe away the lymph immediately after vaccination. All these contribute towards increase of unprotected population amongst adults. These, along with the unprotected children which I have referred to, and also influx of large number of unprotected population from the country side daily constitute the greatest danger to the city for perpetuation of smallpox almost throughout the year.

Thus we may have to face several types of obstacles in doing what is good to the public if the existing regulations are not strictly enforced. To enlist better co-operation, health education is the main stay for any immunisation programme. People have to be educated, convinced and won over and then only all our aims can be fulfilled.

Before concluding my talk, a word about the passive immunisation may not be out of place. A field survey was conducted in Madras By Dr. Kemps and his associate Dr. Berge who used vaccinia Immune Gamma Globulin prepared out of the plasma derived from the blood of volunteers who have been successfully recently revaccinated. The immediate contacts of smallpox cases were but a gradual and steady shift in age has vaccinated and 12 hours later they were given a dose of gabba globulin. They compared the results against a control group who had only vaccination. Their conclusion was that "vaccinia Immune Gamma Globulin may be an effective supplemental tool in preventing variola infection after intimate exposures to the disease. Early vaccination followed 12 to 24 hours later by a single intramuscular dose of 0.06 c.c./kg appears to be an effective method to prevent this disease from occuring". Those observations open out a new field for research. If we have the equipment and the laboratory facilities for the manufacturing we may even prepare Gamma Globulin out of the plasma drawn from convalescent cases of smallpox so that it can be used not only in the prophylaxis but also in the treatment of virulent form of smallpox like haemorrhagic which invariably end fatally.

In conclusion I once again would like to emphasise the need for further study on the following:

1. The various factors responsible for the incidence of smallpox inspite of effective vaccination within one year.
2. Vaccination of all children born in the lying-in-hospitals within one week after birth as a routine and reviewing of the work after some years.
3. Manufacture of Gamma Globulin from the convalescent cases of smallpox and trying it both as a prophylactic as well as curative agent.

IMMUNISATION SCHEME IN CALCUTTA—SMALLPOX AND CHOLERA

By

MAJOR I. N. SARKAR,

Dy. Health Officer, Calcutta Corporation

Under the Calcutta Municipal Act of 1923, the city was divided into 32 wards, the area varying between 129 and 2280 acres and the population between 6351 and 1,92,989. An assistant sanitary officer was in charge of one or two such wards depending on the area and population. The permanent staff for the whole city consisted of 19 assistant sanitary officers and 66 vaccinators (53 male and 13 female). Every year prior to the epidemic season, roughly about 300 vaccinators and 200 inoculators (all medical personnel) were appointed temporarily for about 6 to 8 months to carry on the immunisation work, with the assistance of some Voluntary Organisations of the city, whenever available.

Now under the Calcutta Municipal Act of 1951 and the Calcutta Municipal Amendment Act of 1953, the whole city of Calcutta has been divided into 80 constituencies or wards. Thus the area of a ward now varies between 53 and 2280 acres and the population between 7000 and 1,25,000 approximately. The standing Health Committee of the Corporation were of the opinion that the Immunisation Scheme should be more effectively operated on this smaller constituency unit basis and accordingly a scheme was prepared and the sanction of the Corporation was obtained in September 1957 for a period of 3 years in the first instance. Under this Scheme 80 epidemic officers (who are medical men) and 273 qualified vaccinators, in addition to the permanent staff, already mentioned, were appointed. These temporary vaccinators were also trained up for giving inoculations also. Thus each constituency unit at present consists of one epidemic officer (medical man) incharge of the unit, and 3 to 6 vaccinators cum-inoculators, according to the area and the population. In addition to the 29 permanent vaccination stations, there are now 80 constituency vaccination centres, one for each constituency. The Corporation vaccine depot at Ballygunge produce all the vaccine lymph required for the city but the Corporation has to depend partly on the market for Cholera Vaccine. The lymph is distributed daily in the morning from the Ballygunge Vaccine depot to the permanent vaccination station, therefrom it is despatched to the different constituency centres. Thus the work of immunisation starts right from the constituency centres in the morning according to an advanced programme with special stress and priority for the plague spots of the constituency, namely the Bustee areas. Priority is also given to schools, factories, markets, etc. Night drive are also conducted to immunise the vagrants who generally assemble during the night at certain fixed places on the pavements. Individual slips are used after immunisation in all cases to avoid repetitition. You will, no doubt, appreciate that with the small staff at the disposal of the Corporation, it is practically impossible to immunise the total population within a short period and hence the help of a large number of well known voluntary organisation are requisitioned to carry on the vaccination drive.

The difficulties encountered are manifold the two most important of which are, firstly, the people are reluctant to be vaccinated or inoculated until actual cases or even deaths occur in the locality and big headlines appear in the News papers showing alarming conditions, and secondly, some people remain resistant even then, due to prejudices or on various pretexts and manage to escape somehow. This resistance is even more marked against inoculations than against vaccination for various reasons.

There is no doubt, when the living standards of common people are raised and they become conscious about health and hygiene, this resistance will gradually disappear. But his will take considerable time to be achieved. But epidemics will not wait

when large number of susceptibles are there. The legal provisions in force do not seem to be sufficient for immunisation of the total population. It only gives powers to enforce immunisation in cases of refusal. This is a long drawn procedure and is likely to frustrate the very purpose for which it is enacted. Unless sufficient powers are given to the health authorities, till the time the general public become health conscious, to enforce immunisation when considered necessary by the health authorities by imposing penalty in case of noncompliance, the purpose cannot be effectively served and large percentage of susceptibles will always remain to favour the occurence of epidemics.

Friends, I would be glad to have your suggestions how this resistance of the public can be overcome within a short period.

PREPARATION OF CALF LYMPH VACCINE

By

DR. J. DASGUPTA,

Superintendent, Vaccine Institute,

Calcutta Corporation

Apart from the administrative efforts to raise the level of 'herd immunity' and to tackle special problems affecting different states I would like to submit for your consideration, the following technical aspects of small pox immunisation which mainly depends on the question as to why we do not get longer and better immunity.

(1) In the preparation of 'Seed whether indigeneous strains should be used. Most institutes import strains from abroad. Our country is the home of smallpox and very virulent types are in abundance, and hence is the necessity for consideration of the strains used in the preparation of the seed.

(2) For the elimination of secondary micro-organisms present in the lymph—(a) use of 50% Ether soap for the preparation of calf skin (reccal being not available). (b) Calf put in slings and special ointment applied for 2 days only. The composition of ointment is as follows:—

(Bavarian Vaccine Institute Formula modified)

30 grms of Gum Arabic Powdered
15 „ of Cera Flava
5 c.c. of 20% Sol Solusupronal
100 m.g. of Streptomicin
50 c.c. of 60% of Glycerine distilled water

(c) 50% Glycerine distilled water Sol, with ½% Phenol for grinding pulp.

3. Studies regarding Potency titre at the vaccine Institute and at the consumption points—it is necessary to know whether titre of 1/1000 or 1/2000, as at present, should be adhered to or whether the effect on Ice-box temperature on the potency should also be taken into account:—The possibilities are:—(a) Practice of carrying out potency tests with lyumph preserved at 0°—10°C may not reveal for the considerable time any weakness in fresh lyumph. (b) The weakness may be detected at 0°C or in Ice-box. The highly potent samples may reveal no weakness for 9—10 weeks at Ice-box temperature. (c) Lyumph of less initial potency may prove good at—10°C. If exposed to 9 days in a Ice-box—the samples may be found to be insufficiently potent. (d) 1% Phenol to the Glycerine Sol. acts as better preservative.

(4) Comparative Study—

(a) re: Calf Lymph
(b) „ Sheep Lymph
(c) „ Tissue culture Vaccine (Rivers and Good Pasture)

or

Freeze-dried Vaccine (Japanese)

Without extensive trials, it is risky to change over to (b) & (c).

5. Number of insertions and their size—Views of American and British Authorities are at varience. Whether ¼" insertions 2 in number should be adhered to or the number should be increased with a view to find out if there is any increase in immunological level.

6. Time of re-vaccination in consideration of hyperedemicity of this country:

In case of re-vaccination proper recording of reactions and the evaluation of the same appear to be very essential. How often it should be performed? It appears that Re-vaccination at every 2 or 3 years is safe provided the previous vaccination was recorded as successful. Enactment of law appear to be necessary in view of the presence of a big resistant group.

7. Methods of Vaccination—Comparative studies—Multiple pressure method appear to give much higher percentage of successful reactions. Local skin immunity, without systemic immunity, may be present, hence the site of vaccinations should always be changed.

1. **Dr. S. C. Seal,** Professor of Epidemiology, All-India Institute of Hygiene and Public Health, Calcutta said "Field investigation has shown that all individuals do not respond with high level of immunity after primary vaccination as there are instances in which the child has been found to suffer from smallpox as early as three years after successful primary vaccination. An investigative work is now in progress at the institute on the level and duration of immunity after primary and revaccination. Dr. Ramchandra Rao mentioned that smallpox occured among even revaccinated individuals, although he expected booster effect. Our observation show that revaccination does not enhance the immunity level unless it is followed by primary or at least vaccinoid type of reaction. There is no automatic booster effect as in case killed bacterial vaccines such typhoid, plague or cholera vaccines. Since smallpox vaccine is composed of live attenuated virus either there is mild infection followed by the primary or accelerated reaction or there is no infection at all followed by no rise of immunity. This hypothesis has been confirmed in my laboratory by employing inhibition technique of viral culture and haemagglutination.

2. **Dr. Jagjit Singh,** of Punjab described the position of vaccination in his state as follows: —

Primary and revaccination are done in all rural areas of the Panjab on the same line as in Madras city described by Dr. Rao. The primary vaccination is compulsary throughout Punjab but not revaccination. Under a notification of the Epidemic diseases Act of 1880, issued 10 years ago all health officers, sanitary inspectors, and doctors were authorised to ask any person to get himself revaccinated. This notification is being renewed year after year and is now almost a permanent feature. So revaccination is in practice almost compulsory.

We have complete population register for all villages and 1/5th of the villages are revaccinated every year and thus the roaster is completed every 5 years. Only two marks vaccination is performed. No vaccinator is now employed for the rural areas. It is given by the qualified Sanitary Inspectors designated as Inspectors of vaccination and sanitation. There are some difficulties in the urban areas due to lack of co-operation and funds. Vaccinators are some-times employed for the purpose and revaccination is not always done.

3. **Col. Barkat Narain,** Adviser, Ministry of Community Development, New Delhi, recommended the following: —

(1) Formation of Expert Committee at the state level for the control of epidemics particularly of smallpox and cholera.

(2) Formation of Expert Committee at district level, sub-Committees at Block level and the Village Health Committee at the Village level. At the block and the village levels people's representatives should be associated intimately. They should help in obtaining the co-operation and acceptance of the people in vaccination against smallpox and inoculation against Cholera.

(3) There should be general emphasis on health education at all stages and in all institutions with particular reference to primary and teacher's training schools.

(4) People's organisations such as Mahila Mandal, Youth Club etc., should be involved in securing people's acceptance of vaccination.

(5) All Vaccinators. Health Assistants, Sanitary Inspectors, or Health Inspectors should be on the cadre of the Department of Health of the state.

4. **Major K. L. Kapur,** S.M.O., Deolali, in giving his experience in the Army said that although smallpox vaccination is not compulsory in the Army but in practice all Army personnel are vaccinated or re-vaccinated at two yearly intervals. Regular vaccination programme in the army has resulted in almost complete absence of smallpox among them during the past 10 years. Thus if the vaccination and re-vaccination are performed at 2 or 3 yearly interval in the state there is no reason why smallpox would not be eradicated from the country.

Dr. Seal has proposed and pointed out that if the re-vaccination is not followed by primary or accelerated type of reaction the

immunity level does not have any booster effect but in the Army a person showing negative reaction to re-vaccination is again re-vaccinated one week later and if he still shows no reaction he is considered protected.

5. **Dr. G. S. Murthy,** of Uttar Pradesh observed that though interesting experiments are being carried out by Dr. Seal regarding re-vaccination I do not think that the result of these experiments would have much bearing on smallpox condition in the country which depends primarily on the administrative efficiency in thoroughly carrying out primary vaccination programme. In fact, Smallpox condition may be taken as an index of the standard of administrative efficiency of the state.

6. **Dr. R. Banerjee** of Calcutta, pointed out that primary vaccination was compulsory throughout the state of West Bengal under the Bengal Vaccination Act of 1880, the first vaccination Act in the country. The chairman was therefore wrongly informed when he said that it was not compulsory in this state. However, re-vaccination should be made compulsory.

7. **Dr. A. Das Gupta,** Dy. A.D.G.H.S. West Bengal stated that the records so far available of vaccination in the new born babies within 5 days of their birth showed that it was successful in 52 percent only whereas the overall success of primary vaccination amounted to 88% in the state. However, this was still being tried in hospitals and health centres of the state of West Bengal.

8. **Dr. L. M. Bhattacharjee,** Associate Professor of Epidemiology. All India Institute of Hygiene & Public Health, Calcutta said that according to his own observation the passive immunity practically disappeared after one month hence primary vaccination could be performed with high degree of success when performed after one month of age but he would prefer to do it between 2-4 months unless there is an actual epidemic and danger of exposure, in which case the primary vaccination should be performed at any earlier age. There are individuals whose immunity drops drown suddenly and he may get infected. The average duration of immunity after primary vaccination may be taken as not more than 5 years. In a survey he found that only half the population was vaccinated once in life and 45% of them gave primary type of reaction after re-vaccination. So re-vaccination should be frequently done to keep up the herd immunity.

Dr. Seal said "vaccination can be performed any time after birth for which there is no contraindiction but considering all aspects including administrative conveniences and economy it should be performed between 2-6 months unless there is an emergency. Even so, every village has to be visited four times a year in order to keep up the time interval which means that the vaccination programme should be an all-the-year-round programme. The question of vaccinating the child immediately after birth in the hospital is set with certain difficulties and drawbacks among which may be mentioned the following:—

(1) Patients are generally discharged within 5-7 days. Even if the vaccination is performed how the result will be recorded unless there is organisation to carry out the home visiting which is not arranged by the city hospitals and private maternity homes.

(2) Vaccination is not likely to be more than 50% successful which means the child has to be followed for re-vaccination. Administratively it is not practicable nor economic.

(3) All infants are not born in the hospitals and maternity homes even in the cities and towns. A frection of them may have the opportunity of being born in a hospital or maternity home in rural areas.

A concerted and thoroughly worked out plan would therefore be necessary on a countrywide basis if smallpox vaccination and re-vaccination work are to be carried out in a thorough manner in the country. The Experts Committes set-up recently by the Government both at the Central and State levels are perhaps going to prepare this plan.

The **Chairman,** Dr. Seshagiri Rau, D.H.S., Mysore, in connection with the question of number of insertion in smallpox vaccination suggested that there should be 5 marks for primary vaccination and 3 marks for re-vaccination.

Dr. L. M. Bhattacharjee said that marks should not be less than two. The contracts should be vaccinated as early as possible within 3 days of contact. Vaccination of contacts between 4 to 6 days gives rise to mild diseases whereas after 9 days it gives no protection.

Mrs. Muktha Sen, Professor of Maternity & Child Welfare, A.I.I. of H. & P.H. was in favour of vaccinating the infants as early as possible and should be completed by three months of age.

IMMUNISATION PROGRAMME

Chairman—Dr. Seshagiri Rau.

Subject :—(ii) Cholera and Typhoid inoculations.

Introduced by—Dr. M. N. Lahiri, Dr. D. C. Lahiri, Sri H. N. Bose, and Dr. M. Acharya.

Principal Discussant—Dr. G. S. Murty.

Other Participants—Dr. Jagjit Singh, Major K. L. Kapur, Dr. A. Das Gupta, Dr. L. M. Bhattacharjee, and Dr. S. C. Seal.

TYPHOID AND CHOLERA IMMUNISATION

By

Dr. M. N. Lahiri,

I feel somewhat embarrassed in participating in these discussions since many of my learned colleagues are here who have got wide experience with these vaccines and also with their trials in the field conditions on a large scale. In the circumstances, my remarks will be of a general nature.

Anti-typhoid inoculation in man was initiated by Wright in 1902. The British Anti-typhoid Committee in 1912 collected figures relating to the incidence of typhoid fever amongst inoculated and uninoculated subjects and indicated that the vaccine reduces considerably the case fatality rate. Criticisms were later offered in regard to the statistical analysis of the data, as certain factors in the light of our modern concepts were not taken into account then. In the United States of America, Russell observed that the typhoid inoculation in the military personnel was accompanied by a marked reduction in mortality and was associated with a striking decrease in the incidence. Even in the Indian Army, this vaccine has been in use for the past few decades and there is weighty evidence in support of the efficacy of the typhoid vaccine as a prophylactic agent. During the Second Great War, this vaccine was used in many theatres of war which provided further confirmation on the value of anti-typhoid inoculation.

The results so far recorded were obtained with the use of heat killed phenol preserved vaccine. The observation of Felix and his co-workers on the Vi antigen in typhoid organism pointed to the importance of selecting strains rich in this particular antigen in the preparation of vaccines. The Vi antigen is remarkably labile and suffers considerable rapid damage by the customary process of making typhoid vaccine—heating and phenolizing. As this antigen is not affected by alcohol,—killed and alcohol—preserved vaccine was recommended by Felix. Moreover, the heat killed phenolized vaccine did not provoke the appearance of circulating Vi antibody when injected subcutaneously. It is on this account that many observers were led to believe that the alcoholized vaccine is more effective than the heat killed one. In order to set all doubts at rest, particularly on the use of heat killed phenolized vaccine which held the field for a long number of years, the Yugoslav Typhoid Commission conducted a strictly controlled field trial in man with both these two types of vaccines. This study showed that the heat killed phenolized vaccine had greater effectiveness compared with the alcoholized one. It was concluded that the Vi antibody may not be quite important in man and they also observed lack of correlation between the laboratory tests and the protection afforded to man. Furthermore, the heat killed vaccine could be applied in the field without refrigeration which is an additional advantage.

It will not be out of place to mention a few

words about the use of time-barred vaccine. With each lot of vaccine, there is marked on the label a date of expiry. This does not mean that the vaccine suddenly lost all its potency on that date or it remained fully potent till before that date. It should be borne in mind that with the passage of time, there is considerable qualitative and quantitative deterioration of potency. The expired date of potency though has been fixed partly arbitrarily, is based on both experimental and field observations. The use of time-expired vaccine should never be recommended and it is emphasized that the increase in relative doses can never compensate this loss in potency. After all, a freshly prepared antigen in no doubt more effective than so to say a stale one.

Regarding cholera vaccine, although it has been in use for quite a long number of years, our experience with this vaccine has had a chequered career. The observations of the Public Health Administrators indicated that cholera inoculation considerably reduces the incidence in the inoculated group. As cholera breaks out in fairs and festivals, an indirect method of compulsory inoculation was carried out in Pandharpur Fair in Bombay Presidency and later during the Kumbh Fair at Hardwar and Allahabad where all persons were inoculated before they cougregated at festival centres. These efforts proved to check the spread of infection from the fairs to other neighbouring districts and States. One dose schedule was used for all individuals. A further work on the evaluation of anti-cholera inoculation was carried out by Adiseshan et al and the statistical assessment of their data was done by Chandrasekaran. These workers concluded that cholera vaccine reduces the incidence of the disease considerably, but so far as the fatality rates were concerned, there was no difference between the inoculated and uninoculated groups. These findings, however, were also open to criticisms.

More recently, doubts have been expressed by many not only in this country but also abroad about the value of this killed vaccine. The question is whether further improvement could be effected in the quality of this vaccine. It is considered necessary that in order to find out the real value of the vaccine, the problem should be attacked in a planned manner. To my mind, the question is still open. Finally, it is emphasized that immunization programme must be carried out prior to and in anticipation of an outbreak, otherwise immunization is not likely to yield satisfactory results when the disease has already taken an effective hold.

Gentlemen, these are a few points which I wished to mention during the limited time allotted to me and I thank you all for giving me a patient hearing.

PRODUCTION AND STANDARDISATION OF CHOLERA AND TYPHOID VACCINE IN INDIA

By

D. C. LAHIRI,

School of Tropical Medicine, Calcutta

Success of any immunisation scheme would depend on the quality of vaccine and immunisation of as nearer to 100% of population at risk as possible. It is, therefore, the quality of the vaccine which is the prime requisite for a successful scheme of immunisation.

The quality of a vaccine is determined by its (1) safety, (2) innocuity and (3) given potency. The safety of a vaccine is determined by its freedom from containing anything which endangers the life of one who receives the vaccine. The safety, therefore, is determined by absence of any specific organism in the state of virulence in a living state, and on its sterility. The innocuity of a vaccine is determined by absence of any substance in the vaccine which could produce either toxic, inflammatory, or allergic reaction in man. The potency of a vaccine is its capacity to produce high grade immuntity in man artificially immunised with the vaccine. If satisfactory test for biological potency is available for a given type of vaccine the potency of a vaccine is determined by its capacity of development of an accepted level of immunity in the immunised animals.

The safety of a vaccine is determined in experimental animals in terms of the virulence or toxicity of the organism used for the preparation of the vaccine concerned. Its free-

dom from contamination is determined by performance of suitable sterility tests.

The innocuity of a given vaccine is far more difficult to determine. A vaccine may be capable of producing undesirable reaction by virtue of its containing certain deleterious agents in the medium in which it is produced. Or such materials may be developed during the growth of the organism in the medium or may be derived from the body of the organisms themselves. In addition to that, the preservative, such an phenol which is used for ensuring the sterility of a vaccine, may produce undesirable reaction. Determination of the presence of the'se materials in harmful proportion is rather involved. White mice are, of course, sesitive to large concentrations of the phenol present in any biological product. But no other animal experiment could predict whether a given batch of vaccine would be well tolerated by human recipients or not. Hence, a recent Study Group meeting, convened with a view to laying down the international recommendation for preparation and assay of cholera vaccine recommended that prior to release of a large batch of vaccine, a small protocol should be tested in at least five human volunteers to find out whether it was well tolerated by them. Thus, it was admitted that human being is the most suitable animal for determination of innocuity of bacterial vaccines.

Determination of biological potency of bacterial vaccines is perhaps the most importent test that is required to be satisfied by a given bacterial vaccine. The test of biological potency may be useful for predicting performance of a given batch of vaccine in the field only in those cases where a close correlation has been shown to exist between the result of the test of biological potency and the actual performance of the vaccine in the field. It is, therefore, essential in case of all vaccines to show by large scale international correlative study that a correlation does exist between the test for biological potency and the prophylactic efficacy of the vaccine in the field. The cholera and the typhoid vaccine still suffer from the absence of any test for biological potency which could predict the prophylactic efficacy of these vaccines in the field.

Recent field trial performed in Osijek province of Yugoslavia has indicated that though Felix's Vi-antigen containing typhoid vaccine showed a higher degree of biological potency in mice, it proved to be useless in offering any protection in the field, while the heat killed phonol preserved typhoid vaccine, showing itself to have a smaller biological potency than that shown by Felix's vaccine, proved in the field to be capable of offering significant protection against bacteriologically positive typhoid infection. Thus in case of T. A. B. vaccine the test for biological potency as performed in white mice showed to have no correlation whatsoever with the actual prophylactic efficiency of vaccine in the field.

The situation is still worse in the case of cholera vaccine. Several tests of biological potency are available for evaluation of the potency of cholera vaccines. However, no field trial has so far been done in any part of the world to establish a correlation between one or more of these tests of biological potency and the actual prophylactic efficacy of the vaccine in the field. The Study Group meeting held in September this year in Geneva has, therefore, recommended to the World Health Organisation that a large scale correlative tests conducted both in the laboratories and in the field, would be required to evolve a suitable test for biological potency of cholera vaccine, which test could predict with reasonable certainty the performance of the cholera vaccine in the field.

In case of pertussis vaccine and the typhoid vaccine, the recent field trials done respectively in the U. K. and in Yugoslavia have at least revealed that these vaccines could offer significant protection against the respective infections. In case of cholera vaccine, however, we are still worse off. We are yet unable to answer with confidence the question whether cholera vaccines offer significant protection at all.

The prevailing state of our knowledge regarding the utility of cholera vaccine is so bewildering that the authors of Topley and Wilsons principles of bacteriology and immunity have been constrained to remark that nothing but well-controlled, field trial would tell us how far the cholera vaccine offers protection against cholera. As cholera still occurs as epidemics in certain parts of India even at present it could be expected that the well-controlled laboratory and field trial as recommended by the Study Group on Cholera would possibly be materialised.

Pending the filling up of all these existing lacunae in our knowledge it would be required to follow as well-controlled procedures for preparation and standardisation of the bacterial vaccines as possible. The section of biological standardisation of the W.H.O. has, therefore, taken up the task of laying down recommended methods of preparation and standardisation of bacterial vaccines so that they could be internationally accepted, and, thus, some unformity of procedure could be expected to be practised amidst the prevailing confusion.

The prevailing diversity in the methods of production of vaccines in general and of cholera vaccine in particular emphasises the need for efforts required for settlement of the confusion. For instance, different methods are recommended officially in different countries for killing the vibrio for preparation of the vaccine. I. C. M. R. recommends 1% phenol, Japanese Government requires heating in a water bath at 56°C for 30 minutes, while the Ministry of Health U. S. S. R., advocates the use of 0.5 per cent formalin instead. Some use solid media for the growth of vibrios, others use liquid media. The concentration or organism in the vaccine also varies in different countries. I. C. M. R. recommends 8×10^9 vibrios per ml., Japanese Government requires 6×10^9 vibrios per ml., the Ministry of Health, U. S. S. R., advocates a concentration of 4×10^9 vibrios per ml., while Sokhey's casein hydrolysate cholera vaccine contains nearly 3×10^9 vibrios per ml. These are only some of the major points of difference. Indeed, the details differ almost at each step of the production. Even in the preparation of typhoid vaccines the methods differ, the two major types being the heat-killed phenolised vaccines and Felix's alcohol-killed alcoholised vaccine.

Universal acceptance of international recommendations on requirements for cholera vaccine, which have already been laid down, and of typhoid vaccine, which is still in the offing, would naturally help enormously towards improvement of the quality of these vaccines and the immunisation scheme executed with them.

PREPARATION OF PROPHYLACTIC CHOLERA AND T. A. B. VACCINES

By

SHRI H. N. BOSE,

Bengal Immunity & Co. Calcutta.

The prophylactic use of Cholera vaccine was introduced in this country by Haffkine during the years 1893-95. Typhoid Vaccine, as advocated by Kolle & Wright in 1896/97, was ultimately used here at a later period. It took a considerable time to assess the actual prophylactic value of these vaccines. Along with the favourable results, as shown after many field-trials all over the world, the use of these vaccines gradually became wider and wider. The method of preparation of these vaccines also gradually changed according to advances in the knowledge of the antigenic nature of the respective bacteria used for the preparation of these vaccines. The doses of the vaccine also have been gradually changed. As regards the method of preparation of Cholera & T. A. B. Vaccines that is generally followed at present, I am not going into minute details but I must deal with the main points that must be strictly observed for the preparation of the same.

1. Selection of Strains:—The strains that are used for the preparation of vaccines must retain all their normal characters to the fullest extent as studied and proved satisfactory in the original culture according to the latest bacteriological knowledge regarding the respective organism. Strains maintained in artificial culture media often undergo variation and such variant strains are quite unsuitable for the preparation of the vaccine. Satisfactory strains should always be stored in freeze-dry form and should be again thoroughly scrutinised before a seed culture is done. For Cholera Vaccine smooth strains of two main serological types, Inaba and Ogawa are used, For T. A. B. smooth and antigenically typical strains of S. typhi, S. paratyphi A and S. paratyphi B are used. The strains of S. typhi must show marked presence of Vi-antigen. All these strains must be scrutinised regarding the following characters:—

(*a*) Smoothness & colony characters.

(*b*) Motility.
(*c*) Staining reaction.
(*d*) Biochemical properties.
(*e*) Stability in subcultures.
(*f*) Stability and uniform turbidity in saline suspensions.
(*g*) Virulence on experimental animals.
(*h*) Serological reaction with homologous high-titre sera.

2. Culture media:—The liquid media that are used for seed culture and the solid media that are used for massive culture must be uniformly good and suitable for the free growth of the respective organisms.

3. Any drastric treatment such as, addition of strong chemicals, excess of heat, light etc., must be avoided throughout the stages of vaccine preparation as these are liable to alter the specific antigenic nature of the vaccine.

4. Contaminating organisms should be avoided from the begining to end of the method of preparation. Preparation at different stages must be checked by purity and sterility tests.

5. Foreign impurities must be avoided throughout the process of preparation.

6. For killing the concentrated living suspensions, no heat is applied in the case of Cholera, phenol being only used for the purpose. But T. A. B. suspensions are heated to 53°—56°C for 1 hour.

7. Phenol (0.5%) or some other suitable chemicals must be present in the finished vaccine as preservative.

8. Bacterial contents of the finished vaccine must be accurately standardised.

9. Before issue, each and every batch of vaccine should be rigidly tested for sterility as specified in the Drug Rules.

10. The finished vaccines are again tested for bacterial strength, presence of preservative, purity by staining smear, absence of abnormal toxicity and antigenicity by different methods.

MANUFACTURE AND STANDARDISATION OF CHOLERA VACCINE.

By

DR. M. ACHARYA,

Bengal Chemical & Pharmactucal Works Ltd., Calcutta.

Both the Sub types Inaba and Ogawa are maintained. Source—The Central Research Institute, Kasauli.

Smooth and translucent gram negative vibrios showing uniform turbidity in broth and uniform suspension in salt solution, forming acid in glucose, maltose, mannite and saccarose, agglutination with high titre S/O sera and non-agglutination with R/D sera are selected.

From a recent solid culture a liquid broth culture is made. The young broth culture is tested for purity and inoculated into agar bottles and incubated overnight at 37°C.

The day following, washings from these bottles with physiological salt solution are collected in sterile test tubes. Inoculum taken from each suspension tube is streaked into solid agar tubes and all the tubes are serially marked and incubated overnight.

The following day the suspensions from the tubes found pure are collected in sterile amber coloured bottles.

Standardization of the concentrated suspension is generally done by the Nephelometer Method.

The living suspension is killed by 1% phenol. Sterility test is done by inoculating aerobic and anarobic broth media and incubating these media for 5 days. The killed Inaba and Ogawa suspensions in equal proportions are diluted in physiological salt solution to contain 8000 million dead vibrios per ml. and 0.5% phenol as preservative.

Sterility and animal toxicity tests are done with the finished product. Then follows testing with high titre sera. The product is then stored in the cold.

T. A. B. VACCINE

It consists of vaccines prepared from strains S. Typhi, S. Paratyphi A and S. Paratyphi B that are smooth and have the full complement of O somatic antigens.

The living suspension in this case is killed by heat at 60°C for 1 hour.

The full dose contains per ml.:—

S. typhi—1000 millions
S. Paratyphi A ... 500 millions
S. Paratyphi B ... 500 „

Immunisation Programme :

Cholera and Typhoid :

1. **Dr. Jagjit Singh** of Ferezepur, Punjab raised the folloding question :

"Shall we advise mass vaccination against Cholera and T.A.B.?

2. **Dr. G. S. Murthy** of Uttar Pradesh :

Anti-cholera inoculation has been made obligatory for persons attending fairs. It was first promulgated for Hardwar Kumbh fair in 1945. Thereafter it became a routine feature for all Kumbh and Ardh Kumbh in U.P. It is well known how cholera used to spread after each Kumbh fair but since the above measure was adopted it practically stopped outbreak of cholera in relation to these fairs. The inoculations to be effective, however, should be administered at least 7 days prior to the attendance, but unfortunately this procedure could not be strictly adhered to. In actual practice, most of the people who intend to attend the fair are inoculated at different barrier stations set up for the purpose only a few miles away from the fair area. The high standard of sanitary arrangement in the fair area is perhaps more important than even vaccination, as but such arrangements along with the immediate isolation of cases, if they arise, that the spread can be completely stopped. The last Kumbh at Allahabad is an example in view.

The role of non-agglutinating vibrios in causing outbreaks of cholera has been raised. In Uttar Pradesh certain epidemics have been due to NAG vibrios, indicating that the definition of cholera vibrio may have be modified.

3. **Major K. L. Kapur,** S.M.O., Deolali :

Cholera inoculation is not carried out as a routine in the Army. It is only when a case occurs in a Unit or when an epidemic occurs among the neighbouring civil population that all the personnel are protected by means of cholera inoculation, although the town is declared out of bounds for the troops, and strict sanitary measures are enforced within the Unit lines. Safe water supply and high standard of sanitation have controlled the incidence of cholera in the Army which used to affect large number of troops fifty years ago.

Occasional outbreaks of cholera, have, however, occurred in the Army. One such outbreak affecting about 12 persons with no death, which I had the occasion to investigate, occurred in one Unit in Gaya in the summer of 1955 when cholera was raging in the town and a couple of cases also occurred in civil jail premises adjacent to the troop camp. Consumption of green leafy vegetables obtained from fields which were being manured by raw sewage from the town, was traced to be the probable source of infection.

The incidence of enteric fever in the Army has been reduced to negligible figures as compared to the conditions twenty years back. This is due to protection of all personnel with TAB inoculation, repeated each year. However, the role of safe water supply and high standard of sanitation including personal hygiene cannot be minimised in the control of these diseases. A few cases, however, do occur every year, mostly due to individual contact with infection whilst on leave or teporary duty with missing of the regular inoculation. Now the inoculation is compulsorily given prior to going on leave or temporary duty outside.

It cannot, however, be said that T.A.B. inoulation is a substitute for good sanitation. There was a typhoid outbreak in one of the British Units in Malaya in 1947 with about 12 cases and 3 deaths. This was investigated by me. The personnel had received T.A.B. inoculation a year ago but they consumed raw river water unwillingly. This water was supplied by a truck to cover the short supply of chlorinated water.

As to the question of multiple immunisation the Army carries out smallpox vacination and T.A.B. inoculation simultaneously without any deleterious effect. Cholera inoculation with teanus toxoid has been used in the Army in the past and can be given at the same time.

3. **Dr. A. Das Gupta,** Deputy ADHS, West Bengal raised the following question : (1) what are the criteria of diagnosis of cholera : (2) when to immunise the contacts of cholera and typhoid cases?

Dr. L. M. Bhattacharji in reply to the above questions said that immunisation of contacts of cholera cases should be done under cover

of sulphaguanidine, but immunization of typhoid contacts is somewhat controversial.

In regard to the criteria for the diagnosis of cholera **Dr. Seal** said that the diagnosis should be primarily depended upon the clinical symptoms and not on the isolation of true cholera *vibrio* which may not be always found. Besides, cholera can be due *vibrios* which do not fulfil the exact definition of true cholera vibrio. These three classical clinical symptoms for diagnosis of cholera are: Purging, vomiting and rice-water stool. But it should be understood that in very early cases or mild cases rice-water character may not be evident. Isolation of *V. cholera* is certainly confirmatory. It has been found that with anti-cholera inoculation ahead of time prevents both cholera and the socalled gastro-enterities.

As to the question of administering cholera vaccine to the immediate contacts, the danger is that some of them, if already infected, will come down with symptoms inspite of inoculation which takes about a week to produce immunity, and this may have adverse repurcussions among the population. For example in a rural outbreak at Mysore 6 cases died of cholera among the inoculated contacts. To avoid this catastrophe it is better to withhold inoculation for 2-3 days during which the contacts may be given sulphaguanidine or antibiotic which may be available to avert an attack if the person is already infected. The inoculation may then be given after 2 or 3 days observation, or under the cover of these drugs if there is a great hurry, or for administrative convenience.

Dr. Jagjit Singh of Ferozepur, Punjab asked the question whether we should advise mass vaccination against Cholera and TAB?

Dr. Seal in reply to Dr. Singh's question said that cholera vaccine is not such a potent vaccine and as such it is not given as a routine procedure but generally in association with an outbreak. Although this is not a sound procedure, because the population should be protected well-ahead of time and immunisation during an epidemic is not so effective. The correct procedure should be first to ascertain the endemic areas and to carry out mass vaccination campaign in these areas well-ahead of time, preferably with 2 doses rather than one. Secondly, any person wishing to visit the endemic areas or a fair or festival area should be compulsorily protected by timely inoculation, as is now being done for Kumbh fairs and in connection with international quarantine requirements. The latter procedure should perhaps be introduced as an inter-state movement of labour and pilgrim population.

IMMUNISATION PROGRAMME

Chairman—Dr. Seshagiri Rau.

Subject :—(iii) B. C. G. Vaccination.

Introduced by—Dr. P. K. Sen.

Principal Discussant—Dr. Md. Ali.

Other Participants—Dr. Jagjit Singh, and Dr. S. C. Seal.

B.C.G. VACCINATION

(Comments at the 3rd Annual Conference of the Indian Public Health Association)

By

DR. P. K. SEN,

Professor of Medicine (Tuberculosis)

Medical College, Calcutta.

MR. CHAIRMAN, LADIES & GENTLEMEN,

Conclusive proof should not be demanded.

In a conference like this and with five minutes time at my disposal, I need not discuss the investigations and criticisms for or against mass BCG vaccination. It may be sufficient if I say that conclusive proof of its exact value should not as yet be demanded because of our basic lack of knowledge in

many aspects of allergy and immunity in Tuberculosis—a ground mostly concerned in the assessment of the value of this measure and secondly, due to great, almost insuperable, difficulties in exactly controlled human experimentation. Yet, the basis for acceptance of this programme by W.H.O. and, on their recommendation, by many countries including India is neither thoughtless nor hasty.

Reasons for acceptance :

To my mind, W.H.O., accepted mass vaccination program mainly on three grounds : —

1. Reasonable assumption that any measure which can induce allergy will also produce immunity.
2. Many fairly well controlled but limited studies showed that the vaccinated were more protected than the non-vaccinated negative reactors to tuberculin test.
3. The vaccination is as much safe as any other vaccination for mass use.

Work of T.R.O. :

W.H.O. however, is not remaining content with such reasons alone. As mass vaccination program is in progress, they, through their "Tuberculosis Research Office" is trying to assess the potency of different batches of vaccine, comparing vaccines produced in different centres, assessing convertion rates, tuberculin test results including false reactions and are working on many other problems as they meet in the conduct of this program. Valuable lights have been already thrown in many practical aspects of this vaccination by this office.

Main difficulties :

It seems to me that the main difficulties in the conduct of this program are associated with :

(1) The tuberculin test for screening. Besides many fall-outs, its interpretation in relation to the dosage used and the extent of reaction, false reactions and many other problems are causing some uncertainties. It is felt that we should have more specific test or better tuberculin and W.H.O. is already on the way of introducing tuberculin in tween solution for this purpose.

(2) Method of vaccination: injecting a definite amount of vaccine is probably a better method in very many ways—but it is associated with so many practical difficulties in the field that, in the ultimate analysis, oral vaccination may achieve more in a country like India. This method has some important advocates in the world to-day. I feel, it is time that we try this method as a controlled study in a few regions in India.

Chemo-proyhylaxis and BCG Vaccination :

In recent years chemo-prophylaxis with INH as against BCG prophylaxis or a combination of both kinds of prophylaxis using INH resistant BCG strains are extensively discussed. I need not go into merits, demerits, or possibilities of each of them but may only inform you that at a recent meeting of the International Union against Tuberculosis in Paris mass program by BCG alone had been advocated for all economically under-developed countries. Claims of others should be further substantiated by controlled studies.

In conclusion I should like to draw your attentions on the following points : —

(*a*) To achieve what is expected of mass BCG vaccination, the program should be continuous over many years to come.

(*b*) It should be clearly recognised that BCG affords only partial protection and is only complementary to other measures. Other measures should, therefore, not be neglected and propaganda for B. C. G. should be directed in this light. Over-statements should be avoided.

(*c*) Our National Sample Survey seem to show that tuberculosis is rapidly spreading into villages making control program far more difficult. I have a feeling that heavy incidence of tuberculosis in industrial areas and return of worker to village homes, when afflicted, is a great contributory cause of this spread. Wide spread use of BCG in industrial areas, specially in the pre-employment stage, will give a good dividend.

Suggestions :

In the light of foregoing statements, I would suggest to the Coference:

1. That BCG vaccination be regarded as a Public Health measure and the program be taken over by the Public Health Department like in any other vaccination program.
2. That BCG vaccination should specially be incorporated in Industrial Health program specially tuberculin test and vaccination in pre-employment or pre-placement examinations.
3. That controlled studies on oral vaccination should be started without delay.

B.C.G. VACCINATION IN IMMUNISATION PROGRAMME

By

Dr. P. Mohamed Ali,

B.C.G. Officer, Directorate General of Health Services, New Delhi.

The subject under discussion is immunization and the place of B.C.G. Vaccination therein. At the outset, it may be stated that there is no yardstick to measure exactly the degree of immunity in respect to tuberculosis. We have, however, some indications and this is what I propose to deal with during the opening of this discussion. We, therefore, often speak of allergy and resistance rather than immunity and we believe allergy can often give an indication of immunity.

Abundant evidence has accumulated during the last thirty years to substanitate Calmette's hypothesis that the primary impregnation of an organism with live but attenuated tubercle bacilli could confer to this organism a state of allergy and resistance quite similar to that produced by a natural primary infection. This has been proved conclusively in animals. True, it has not been proved equally conclusively in man; but it must be clear even to the meanest intelligence that conditions in the Laboratory in respect of heredity, nutrition, quantum of infection, number of experimental subjects and environmental factors can never be duplicated exactly in any group of human population to conduct a strictly scientific experiment to prove the efficacy of this immunization, for that matter, of any other immunization. It must be remembered that even in the case of acute infections, for example, typhoid fever and cholera, in which a much more effective immunising power of vaccination is demonstrable in experimental animals, the statistical proof of the efficacy of vaccination in human beings is beset with so many difficulties. Therefore, as Schutze remarked the statistical justification for active immunization procedures, may have in the future to rest mainly on laboratory data concerning animal populations.

The Editor of the Journal of Immunology, Dr. Edsal has recently stated that there is now much more scientific statistical proof for the efficacy of bacterial vaccines in tuberculosis and pertussis than in the case of Diphtheria and Tetanus Toxoid, which have been accepted as effective. Professor Greenwood, that meticulous Statistical luminary, has declared that there is yet no scientific statistical proof for the efficacy of the Small-pox vaccination.

Every new preventive vaccination process had evoked controversy in its initial stages. Small-pox vaccination, which is widely used all over the world, has even now its fierce opponents. The controversy about the harmlessness and efficacy of BCG Vaccination has been most stormy. No vaccine was subjected to such a severe and close scrutiny as BCG to have known better often prescribed Vaccination, and many people who ought standards for BCG, which they never cared to demand for other vaccines. Dr.

Myers, that inveterate opponent of BCG, would unhesitatingly accept Small-pox vaccination, but would have nothing to do with BCG. As I have already mentioned, if scientific statistical evidence is the test, then it is lacking equally in the case of vaccines; if the number of reported cases of tuberculosis attributed to BCG is the criterion, then Dr. Myers has more to fear vaccinea than BCG, as fatal Encephalitis has been known to occur 1 in 15,000 vaccinations in England; I have mentioned this only to show that even an eminent worker like Myers, has chosen a double standard in respect of these two kinds of immunizations.

The reasons for these scepticisms and confusions are not far to seek. The nature of tuberculous disease and the lacunae in our knowledge of immunity in tuberculosis ar etwo potent factors. By the very nature of the insidiousness of the disease, sometimes even the patient does not know that he is suffering from TB and if he is an open case, he will go on infecting all and sundry in his daily walk of life. Contrast this with a case of Small-pox. Both are communicable diseases and very infectious too. The moment eruptions are seen, a small-pox patient will be immobilised and isolated. He will not be let out unless he ceases to be a danger to his fellow-being. You know what happens in the case of tuberculosis. Therefore, a more exacting demand happens to be made on BCG vaccination.

Wrong notions as to what exactly is expected of BCG vaccination is another reason. Those who advocate it know very well that it is only a valuable adjunct to other methods of T.B. Control. What is often overlooked is that BCG vaccination is not to replace any other control mea-degree of efficacy is rather academic than relevant especially as far as Indian conditions are concerned.

We have to concede that there is a lot more to be learnt about immunity, or resistance as it should be called, in tuberculosis. Immunity in tuberculosis. Immunity in tuberculosis is somewhat different from that resulting from any other communicable disease or vaccination against it. Immunity in tuberculosis is more cellular than serological, even though antibodies, opsonins etc., are produced in the case of invasion of tuberculosis bacilli also. Hence the difficulty of accurately gauging immunity in tuberculosis.

At present, the only yardstick we have got of immunity is the allergy noted after the tuberculin test. In animals it has sometimes been possible to dissociate allergy and immunity. But so far this has not been possible in human beings and allergy which has some relationship to immunity is often the only indication of possible protection. Recent work of Frappier and others have demonstrated the possibility of dissociating these two phenomena more conclusively in animals and to a certain extent even in human being also.

It is almost a paradox that the destructive allergy should go hand-in-hand with the protective resistance in tuberculosis and what is more paradoxical higher the degree of allergy, higher is the level of immunity (resistance) in case of vaccination with potent antigenic material. BCG vaccination has, therefore, got to produce this allergy to promote resistance and to be more effective, BCG vaccine has to be made up of highly, but safe, antigenic material i.e., attenuated bacilli and not the dead ones. But allergy, while being an indication of immunity, is also the cause of exacerbation in an already infected individual. If the quantum of infection is too high for the resistance to cope with, the person goes down with active disease and vice versa. However, it has to be emphasized that because this person suffered from active disease it does not mean that he had no immunity or resistance (as

some people would contend); only that his resistance was not equal to the exposure.

Much has been written and commented upon of the fact that cases of alleged BCG-tuberculosis occurred in four vaccinated persons in Scandinavian countries. Certain facts have since come to light to support the belief that these cases were not actually due to BCG but were probably due to the recently described a typical microbacteria recuperated from humans and animals and which showed no virulence for the guinea-pig but had some virulence for human beings. Frappier makes the interesting remark that these BCG 1 like bacilli recovered from these fatal cases were quite sensitive to the antibiotics in vitro but they had absolutely no effect on these cases when treated with them. Therefore, Frappier and others are of the opinion that these four strange cases which differed from classical tuberculosis in many respects were actually a kind of cachectic and a typical disease. In this connection it may be mentioned that recent investigations are showing that TB bacilli isolated from some Indian patients (who were not previously treated with antibiotics) cannot kill guinea-pigs even though they may produce active and even fatal disease in human beings.

I do not think there is any need to repeat here the results of controlled studies of old veterans in the field like Aranson, Hyge, Ferguson, Walgren, Rosenthal, Frappier etc. However, the results of the B.M.R.C. Study (February, 1956, B.M.J.) which is still going on and which was conducted with efficiency and thoroughness have shown that BCG vaccination could effect a reduction of 82 per cent incidence of tuberculosis among vaccinated people compared to the incidence in negative unvaccinated persons. I may say in conclusion that BCG vaccination is the best way known to Medical Science at present of protecting any one against any but the most severe exposure to tuberculosis.

Immunisation Programme:

B.C.G. Vaccination:

Dr. Jagjit Singh of Ferozepur, Punjab—raised the following points for further clarification:

(1) We have separate staff for B.C.G. vaccination. Should we advise their continuation or should we advise B.C.G. vaccination by routine health staff?

(2) Can B. C. G. vaccination be combined with other preventive immunisations, e.g. TAB, Cholera and Smallpox?

Dr. Md. Ali was of the opinion that the B.C.G. vaccination staff should continue. In fact, the President Dr. Das Gupta referred to the B. C. G. vaccination campaign in his Presidential address and opined that the B.C.G. vaccination programme could not be stopped even in near future but attempts might be made to absorb the work as a regular routine of health service staff.

On the question of whether B.C.G. vaccine could be combined with other immunisation programmes Dr. Ali said that B.C.G. could be given together with Smallpox vaccination in two different arms. His suggestion was that instead of two different teams working for B.C.G. and Smallpox only one team could be employed.

Dr. Seal said that with at least 12 million infants being born every year in India it would keep the susceptible population at high level, even after the whole population is once covered, which is practically impossible. Secondly, a large section of those already vaccinated would need re-vaccination. These two groups by themselves would need the continuation of the B.C.G. programme for long years to come.

IMMUNISATION PROGRAMME

Subject :—(iv) Diphtheria and Whooping Cough immunisation.

Introduced by—Dr. L. M. Bhattacharjee.

Principal Discussants—Dr. S. C. Seal, Dr. Jagjit Singh, Dr. N. Jungalwalla.

ACTIVE IMMUNISATION AGAINST DIPHTHERIA AS A PUBLIC HEALTH MEASURE IN INDIA.

By

L. M. BHATTACHARJI,

All India Institute of Hygiene & Public Health, Calcutta.

Introduction :

One of the major successes of an artificial immunization programme in the public health campaign against a communicable disease during recent years, has been achieved against diphtheria in the western countries. Thus, in the United Kingdom since 1940, when such a programme was first instituted on a mass scale, the annual morbidity from the disease have been brought down from an yearly average of 55,125 notification during 1933-42 to only 37 in 1957 (Annual Report of the C. M. O. for 1951). Similarly deaths from the disease which in the years previous to the inaugaration of the campaign used to average nearly 3000 every year, totalled only 7 in 1957. This drammatic fall in the incidence and mortality of the disease has resulted in a great saving of hospital beds and in the provision of expert medical and nursing care for patients, with consequent prevention of financial lossess to the community. Thus, in Scotland alone, prevention of diphtheria has meant a net annual saving of nearly £2300,000 to the Scottish Exchequer. Though the incidence of the disease has been brought down in this manner, it should however be remembered that the death rates from diphtheria in these countries had tended to fall even in the years before artificial immunizations had been put into widespread practice (Thomson 1958).) This suggested that factors other than immunization had probably contributed towards this downward trend of the disease.

Recent experience also indicates that inspite of this remarkable fall in its incidence, diphtheria remains a serious disease still today and its case fatality rate in advanced countries varies from 5 per cent in U. S. A. to nearly 10.0 per cent in the U. K. Moreover, the occurrence of occasional outbreaks or small epidemics have not altogether been ruled out and as such there has been no relaxation on the part of the public health authorities of these countries, to keep up the control programme in the community.

In India, diphtheria as a public health problem is not of the same magnitude, as in the countries mentioned above. The incidence of the disease in this country during recent years has however, shown some tendency to rise and its case fatality rate is much higher than that in the western countries. It is therefore pertinent that we should in this meeting, discuss something about the programme for its future control in this country.

In the control of diphtheria, the recognised principles are (*i*) recognition of the disease and reporting of each case to the health authorities, (*ii*) isolation and treatment of the sick person, (*iii*) quarantine or exclusion from school of the contacts, (*iv*) preventive immunization, both active and combined and (*v*) investigation of the possible sources of infection.

Isolation and quarantine as a public health measure has not produced any noticeable effect in reducing the incidence of the disease

in the community at large. Similarly, anti-toxin therapy which has been in use since 1888, has only reduced the case fatality but has not affected in any way its morbidity. Passive immunization against the disease, because of the transitory nature of the protection offered and the occasional risks involved in its use, has now-a-days only a limited application in routine prophylaxis and is only given combined with active to the immediate contacts in familial and school outbreaks. In the countries where children are actively immunized in infancy, passive protection by serum prophylaxis has been considered to be needless. Investigation of the sources of infection, except in small outbreaks or in closed communities, is not administratively or financially possible. Active immunization against the disease therefore remains as the only potent means to fight the disease with.

The first large scale attempt at such protective immunization was made in Germany in 1913, when Von Behring successfully used toxin-anti-toxin mixtures, for the prevention of diphtheria. Since that year, methods for active immunization began to develop rapidly and by 1924, when the toxoids were introduced as immunising agents by Glenny and Ramon independently, the prevention of this disease was placed on a firm footing and active immunization against the disease soon found its place in the public health programmes of most of the countries in Europe and North America.

In India, although opinions have been expressed in favour of prevention of diphtheria in the community by a mass active immunization programme, it has not been undertaken anywhere, except in Bombay and Delhi. It is therefore desirable to discuss here the epidemiological criteria on which such a programme has to be based.

Before taking up such a widespread programme throughout the country, careful considerations need to be given to the following factors, viz:

(*i*) Prevalence and fatality of the disease in the community,

(*ii*) Proportion of population that are at risk and need protection,

(*iii*) Age at which immunization should be given and duration of such immunity,

(*iv*) Choice of the different prophylactics,

(*v*) Cost of the Programme

and

(*vi*) Administrative machinery available in country to implement the same.

Prevalence and Fatality from the Disease:

In India, diphtheria occurs both in the urban and rural areas and on an average, nearly 2000-3000 cases are annually admitted to the hospitals in the cities like Calcutta and Bombay.

In the rural areas also, the disease occurs sporadically and in Singur, we had in 1958, a total of 178 suspected cases of this disease in a population of over a lakh. Thus, the morbidity rate in Singur was in 1958, nearly *1 per 1000.* Studies of registered deaths from diphtheria in Calcutta, Bombay and Madras between 1952 and 1958, go to show that the death rate per mille from this disease in these cities had varied from 0.04 in 1952 to 0.50 in 1958.

During a study made by us in Calcutta (1955), we had observed that in persons between infancy and 15 years of age, the specific mortality from this disease was only 0.27 per mille, while the general death rate in the ages below 15 years was 19.5 per mille. In infancy, when the chance of death in this disease is the highest, the mortality rate had been only *1 in 1000.* In Bombay, during recent years, diphtheria has never accounted for more than 0.5 per cent of the total deaths in any year, while in Madras, the percentage of these deaths, had been 0.10 per cent of the total deaths recorded in the city as a whole.

These observations have been cited to show that even in big cities in India, where diphtheria is the most prevalent, the disease is much less a problem today, compared to other communicable diseases like Smallpox, Tuberculosis, Cholera, etc. Hence, I have it to the experts present here today, to ponder and decide whether a programme of mass immunization of infants and children on the lines similar to those practised in the western countries, is called for at this stage of our development and financial resources.

Proportion of Population to be Immunized :

For any immunization campaign to be effective, it is desirable that as high a proportion of the susceptible population as possible, be protected against the disease. The target set for this purpose in England and U. S. A. has been 75 per cent; but inspite of getting this percentage of susceptibles immunized against this disease, there are reports about occasional outbreaks of diphtheria in communities where, even as high a nearly 90 per cent of the children population had been so protected. Failure to keep the herd immunity at a very high level as above, may not only render the campaign a failure, but is also likely to bring discredit to the programme. Experiences in other countries have also shown that during the times of occasional epidemics, the disease may even take place in the immunized individuals, though in a mild form. This is because, not only highly toxigenic strains like the *Gravis* or the *Intermedius*, but even the comparatively lesser virulent strains such as the *Mitis*, may at times succeed in breaking through the body defences of an immunized individual, at a time when his artificial immunity is on the decline. The duration of protection offered artificially in infancy or childhood by a course of only primary immunizations, unless reinforced by either natural immunization or a booster dose, is not permanant and does not last for more than 4 to 5 years in the maximum. Hence, to maintain the herd immunity of the community at a level as high as 75 or 90 per cent as said above, a programme of administering booster doses of toxoids, to children given primary injections in infancy, have been lately advocated. In countries where this has not been administratively possible to be carried out, diphtheria has not only tended to occur in those who had been primarily immunized in earlier life but the age incidence of the disease has tended to shift to older children. It has also to be borne in mind that as the incidence of the disease in the country tends to decline, there grows a natural reluctance on the part of the parents to get their children immunized with a reinforcing dose (Parish 1954). This also affects the hend immunity.

Age of Immunization :

The most accurate guide for determing the effective age at which to start the programme, is the age distribution of morbidity and mortality from the disease in the community. In Calcutta, we have found that 85 per cent of the total attacks from the disease admitted in the hospitals in the city between 1955 and 1956, were in children between 2-10 years of age, in another 11 per cent of these admissions, the attacks were in infants, while children above 10 years formed only 4 per cent in this series. A more or less similar age distribution of morbidity was observed in the Singur area, where Schick Test surveys also indicated that the highest percentage (23.45 per cent) of Schick reactors were in the pre-school age group. This showed, as observed elsewhere too, susceptibility to the disease was the greatest in pre-school life and they consequently, needed protection most.

Reviews of active immunization campaigns in the western countries indicated quite clearly that, unless children of pre-school age were also included in the immunization programme, the campaign, by directing attention only to school children often ended in failure, and immunization of children of school age alone would not lower the incidence of the disease in any community.

Consequently, if the disease in this country has to be reduced or controlled, the need for protecting children below 5 years is therefore the greatest. To achieve this, every effort has therefore been made in the countries, where mass immunization against diphtheria are in progress today, to immunize the children as early in life as possible, preferably in infancy after 6 months of age. Some experts even advocate that such immunizations be given at a much earlier age, *i.e.*, between the 3rd and 4th months of life, when diphtheria prophylactics can also be effectively combined with whooping cough vaccine and tetanus toxoid. Until recently, it was believed that immunization of an infant against diphtheria, at ages earlier than 6 months of life, might not succeed because the antibodies inherited from the mother present in his blood, migh interfere with the stimulus of an artificial immunization. Hence, to keep up the immunity of such infants, at high level it was considered necessary to give him a reinforcing does of toxoid at the end of first year of his life.

Recent studies by Greenberg (1955) indicate however that such a course is not necessary; for these infants who had been immunized either with diphtheria toxoids alone or with triple antigen, at ages between the 2nd and 4th months of their lives, have shown even after 18 months, persistence of anti-toxins in their blood, at a level higher than the Schick negative level. There may be according to him, some initial depression in the antibody response due to the presence of maternal anti-toxins in the blood, but as soon as the latter disappear, the titre of artificial immunity goes up and tends to remain at a high level for quite a considerable time. He therefore feels no necessity of giving any reinforcing dose at the age of one year.

Choice of Diphtheria Prophylactics:

In the choice of any prophylactic for use against diphtheria, the safety, antigenicity and the degree of disturbance produced in the host by such an antigen, should have to be taken into consideration. The prophylactic in most common use today, are the *APT* or *PTAP* (Purified toxoids). The latter has the advantage, that it produces much less reaction in the host and tends to produce in him more circulating antibodies even after a single dose, than those toxoids which contain alum. Moreover, alum induces the risk of invoking paralytic poliomyelitis in those who harbour latent infection and hence the use of *APT* has since been disfavoured. Both the above prophylactics are equally effective and are to be administered deep subcutaneously in the buttocks, in two doses of 0.5 ml. each, at intervals of 4 weeks or even 6 months. For the primary immunization of older children or of adults, the prophylactics of choice are either *TAF* or *Formol-toxoid*, which are given in 3 doses of 0.5, 1.0 1.0 ml. at weekly intervals. For reinforcement in adults, Formol-toxid is recommended and its dose should not exceed 0.2 ml. given as a single injection. These latter preperations are not so highly antigenic as the adsorbed toxoids, but they have the reputation of producing much less reaction. As regards other prophylactics, of which there are quite a few, mention has to be made of *NAFT* (Natural Adjuvant Factor Toxoid). This product elaborated by Dr. D. C. Lahiri of Calcutta who is here amongst us today, is highly antigenic, but it has not yet found wide application in preventive practice.

Use of Combined Prophylactics:

Since the use of a combined antigen reduces the number of injections in a child's life, it is advantageous to combine diphtheria prophylactics with whooping cough vaccine and tetanus toxoid. Diphtheria toxoids and pertussis vaccine have been combined and experimental evidence indicates that the product is highly antigenic. In deed, some people seem to think that the immunity response is much better with a combined than after a single prophylactic, but care should be taken not to use any of these antigens singly, before giving a combined prophylactic, as the secondary response to the same antigen given earlier may interfere with the primary response to the other antigens in the combined product.

Cost of Application and Organisation:

In recommending a programme of this nature, we have always to bear in mind the cost involved. On a modest estimate, the per capita cost of immunising each child in the Singur area with the two doses of *PTAP* (Glaxo) has been calculated to be nearly *Rs. 2.50 nP.* Hence, to protect atleast 75 per cent of the 150 million infants and children in India, it will mean an annual recurring expenditure amounting to several crores of ruppes. Can we provide the same in our budget, or have we the proper organisation at this stage of our finances to implement the programme even if accepted? It is for you, my colleagues to ponder over it. For my part I would say that the diphtheria situation as it stands in the country today, does not warrant us to go in for such a mass campaign immediately, but we should remain vigilant and in the meantime, should try to increase our resources by (*i*) trying to produce in this country potent diphtheria prophylactics both active and passive at as low a cost, as possible, (*ii*) to create more opportunities for training of health and technical personnel and (*iii*) to open more facilities for institutional isolation and treatment care of the cases that occur.

Before I conclude, Ladies and Gentlemen, I must thank you all for giving me a patient hearing.

REFERENCES

1. Parish, H. J. (1954) : Practitioner, 173, Oct., pp. 426-432.
2. Bhattacharji, L. M. & Ghosh-Hazra, A. K. (1955) : Bull. Alumni Assoc., All-India Instt. Hygn. & Pub. Hlth., Cal.—II, 3, Oct., pp. 21-25.
3. Greenberg, L. (1955) : Bull. Wld. Hlth. Org., 12, pp. 751-760.
4. Ministry of Health, London (1957) : Ann. Rpt. by C.M.O., Eng. & Wales.
5. Thomson, L. V. R. (1958) : Microbiology, & Epidemiology, W. B. Saunders & Co., Philadelphia, U.S.A., pp. 405.

Immunisation Programme:

Diphtheria:

Dr. S. C. Seal, Professor of Epidemiology, All-India Institute of Hyriene and Public Health, Calcutta:

"The incidence of diphtheria is actually rising both in the urban as well as in the rural areas. The Schick positive rate in the urban area ranges between 20-25 per cent as against 5-10 per cent in the rural areas. In a recent rural outbreak, however, this rate was found to be about 23 per cent. The increase in the incidence of diphtheria may be due to the fact that larger number of children are now attending schools in the rural areas as well as in the cities, where residential schools are also getting more popular. In Calcutta, due to influx of refugees there is now more overcrowding and proportion of people living with families has also greatly increased along with the increase of children population.

There is yet another point to be considered namely, whether the indiscriminate use of antibiotics has been preventing the growth of alien organisms which used to produce or helped to produce throat infection and ev,entual rise of alien-antibiodies against diphtheria also. Perhaps in the rural areas this has been the mechanism by which the children are becoming Schick negative even at a very early age.

Another point of importance in diphtheria is that pure toxin or toxoid may not prevent bacterial infection of diphtheria. One of the reasons of immunity rising with age may be the continuity of infection in the presence of immunity against diphtheria toxin. The other explanation of increasing immunity against diphtheria with age, which has been offered, is the physiological maturity of cells giving the protection against infection.

Whooping Cough:

Dr. S. C. Seal explained the reasons for including whooping cough in the symposium of Immunization programme. He said that this most troublesome disease of children was also on the rise both in the urban and rural areas. Our country does not possess sufficient data even about its incidence and mortality and about the sequelac thnt it produces. Immunisation against this disease has not yet been popularised, nor the vaccine prepared with great care and standardisation. I would therefore like to offer the following suggestions:

(1) The real position about the disease in our country should be ascertained.

(2) Phase I vaccine should be prepared in standard manner preferably by the State Government's laboratories and its use should be popularised for protecting the contacts;

(3) The strains may be maintained by a reference laboratory which may also check the potency of the vaccine produced from time to time;

(4) The results of vaccination against whooping cough may be scientifically assessed.

Dr. N. Jungalwalla, Director, All-India Institute of Hygiene and Public Health, Calcutta, advocated the use of triple vaccine-Diphtheria, tetanus and whooping cough, and this should be prepared in sufficient quantities in India from the point of view of economy at the Central Research Institute, Kasauli. The price of the Glaxo Laboratories Whooping Cough vaccine is high (Rs. 5/- per vial). According to him the disease is now being increasingly noted in the primary health centres, where large number of children who were attending O.P.D. had to wait for long resulting in transmission of the infection to other children. This could be avoided by previous screening and keeping the infected children isolated from the rest.

Dr. Jagjit Singh of Ferozepur, Punjab—wanted to know whether in view of the points explained by Dr. Jungalwalla, Dr.

Seal and Dr. Bhattacharji, we should advise whooping cough and diphtheria immunisation on a mass scale or only for contacts of actual cases.

Dr. Seal, in reply to Dr. Singh's question supported Dr. Bhattacharji's suggestion that in view of the present position of diphtheria in the country and of the huge cost involved in keeping 75 per cent of the children immunized and in maintaining the large number of technical personnel in continuous engagements for the purpose mass immunization programme is not warranted at this stage but that we should remain vigilant, provide most facilities for institutional isolation and medical care, deal with the contacts of cases, produce sufficient prophylactic toxoids at low cost and carry out investigations to assess the extent of the problem. The same principle should be adopted for whooping cough as well.

THE THIRD ANNUAL CONFERENCE OF THE INDIAN PUBLIC HEALTH ASSOCIATION

SYMPOSIUM ON

COLLECTION OF VITAL STATISTICS IN THE RURAL AND URBAN AREAS

PREAMBLE

The fundamental and the basic need for a well-planned health administration is the proper collection of health statistic and their interpretation. It helps in determination of the public health problems, assignment of priorities and appraisal of results after institution of specific measures. Some of the routine health measures such as smallpox vaccination, infant and child care, collection of infant mortality rates and life tables etc. are directly dependent upon the correct registration of births and deaths. But colletion of this statistics are probably defective. Data on births are grossly incomplete, those on deaths, a little better and those on causes of deaths frankly unreliable, and very little data are available on morbidity except the hospital and dispensary statistics. Among these also, dispensary statistics are not so reliable. In one of the recent reports of a Director of Public Health the following remarks appear, "In the present system of collection and compilation of vital statistics 64% of total mortality is due to causes which are not previously determined" * * * * . The more than 30% of the causes of death is due to "other feavers" is obviously untenable. In the earlier phases of public health work in India mortality data and causes of death might have been considered enough but for evidence of sickness (with a view to build-up positive health as a long term measure) morbidity statistics are much more essential that mortality data. It is true that sufficient attention has been paid to it by the Health Departments in India. It is no doubt that collection of morbidity data and causes of death is beset with many real difficulties and it cannot be done without properly trained persons, but improvement in the systematic collection of births and deaths is long over due. Some decades ago, chowkidar or village patel was entrusted with this job and the channel of information was through the Police station or revenue collectors and the District Magistrate to the health authorities. In other wards, the entire collection and transmission of the information were in the hands of agencies other than the health department. It is therefore a matter for serious consideration whether the collection of vital statistics should be organised by the health department as its entire responsibility or the dual system to be allowed to continue or it should be collected and compiled by the channel established by the Registrar General of India. In any case, with the introduction of health centres all throughout the country is it not essential for such authorities to know the day to day events in their own area?

Again, what responsibility should the medical profession discharge in connection with the collection of Vital Statistics, particularly regarding the causes of sickness and death. So far the medical practitioner in the country have not fulfilled their obligations by reporting cases of infectious diseases which are notifiable whether in the town

or villages. In certain states Cholera and smallpox are notifiable in rural areas and multiple agencies such as family members, attending physicians and even village committee members, besides Chowkidars, are mentioned as the reporting agents but none except the chowkidar fulfils his obligation only perfunctrily, if at all. A definite lead in this regard is therefore long over due.

These and various other considerations prompted the members of the Scientific Subcommittee to arrange for a Symposium on the subject with a view to obtain the current views of the Health workers and if possible to recommend certain specific measures for improvement of collection of Vital Statistics in India. This symposium was very successfully held under Dr. Chandersekaran, Professor of Statistics All India Institute of Hygiene & Public Health, Calcutta and the record of deliberations is reproduced below.

S. C. Seal,
(*Convenor, Scientific Sub-Committee*)

Chairman—Dr. C. Chandrasekaran.
Introduced by—Dr. P. G. Chowdhury and Dr. R. N. Basu.
Principal Discussant—Dr. S. K. Chatterji.
Other Participants—Dr. G. S. Murthy and A. Das Gupta.

A BRIEF ACCOUNT OF THE DEVELOP MENT PROJECT IN THE FIELD OF HEALTH STATISTICS IN WEST BENGAL—1958

By
Dr. P. G. Chowdhury, M.B.B.S., D.P.H.,
Deputy Director of Health Services.
Govt. of West Bengal

(1) *Area and population :*

The State of West Bengal has an area of 34,205 square miles with an estimated population of 2,85,66,608. The density of population per square mile is 835.2 being the second highest in India. In this State there are about 38,821 villages, 2342 unions, 276 police stations, 88 towns and 16 districts. The area in square miles and population are 0.87 and 567 respectively to a village, 14.4 and 9427 to a union; 123.9 and 103216 to a police station. About 6.39 lacs births and 2.84 lacs deaths are registered in a year on an average.

(2) *Source of Information :*

Morbidity and Mortality data are usually received from the local Registrars of births and deaths and the Medical Officers of Hospitals and Dispensaries. This State is fortunate in having the highest ratio of Medical and para-medical personnel in India. Population served by a bed, doctor, nurse and midwife etc. are 1200, 1100, 5000 and 13,000 respectively. Annually, about 6.6 lacs patients are treated as indoor patients of whom about 24,000 die in hospitals. About 1,50,000 mothers are admitted in the hospitals and health centres for confinements and about 1,05,00000 people attend the out door department of hospitals, clinics etc. annually. Thus morbidity data as available from hospitals and dispensaries account for about 39% of the total population. Births and deaths occurring in hospitals cover about 24% and 8% of total registered events respectively. Besides the above, the medical certification of cause of deaths is compulsory in the city of Calcutta. The estimated coverage of certification of cause of deaths by doctors comes to the extent of about 10% of total registered deaths in West Bengal.

With the expansion of hospital services in this State the coverage of medical certification would further increase and consequent to that the reliability of the data on causes of death will be more ensured.

(3) *Registration system in West Bengal :*

The registration of births and deaths is compulsory throughout the State. Births and deaths are registered within 8 days of occurrence. The onus of reporting of vital events to the local Registrars rests on the near relatives or the inmates of house where in an event takes place. In the towns, midwives and doctors who attend such cases, are also held liable in the matter.

Though the registration of births and deaths is a statutory state function, it is mainly administered by local bodies. As the people are not very keen of their civic responsibility, the village chowkidars usually collect the information on vital occurrences and submit them to the local Registrars for registration.

(4) *Registration Unit :*

The geographical unit for registration is a city, town, police station, union, railway station or other units served by a local Registrar of vital statistics. At present the total number of such registration units comes to near about 2557. The area and population of registration units vary with the type of such units and the variates lie between 0.9 and 131 in square miles and 333 and 1,11,298 in the population.

(5) *Local Registrars of Births and Deaths :*

The system, now in vogue, comprises in some cases one registration unit under one Registrar while in other cases for instance a Rural Public Health Circle, ten or more registration units under one Registrar. As such, there are at present 1104 Local Registrars of births and deaths in the State of whom 307 are doctors, 225 Sanitary Inspectors, 28 Police Officers and 451 Railway Station Masters and 93 other officers. Local Registrars maintain a register of births and a register of deaths for the area concerned. The percentage of population covered by medical and para-medical registrars are 10.2 and 77.7 respectively. The para-medical registrars are officers of the local bodies. But it has been decided by the Government that their services would be brought under the State Government and in that case the majority of the local Registrars will come under the direct control of Government. So far 331 Health Centres have been established and the medical officers of 307 Health Centres have been appointed as Registrars of Births and Deaths for the unions wherein the Health Centres are located. With the establishment of more Health Centres in the unions, the number of medical Registrars of births and deaths will increase proportionately and the present position in respect of registration by medical men will improve to a considerable estent.

These local Registrars are required to see that the particulars of information for each vital event obtained are complete and accurate, before they are entered into the Register of births and deaths for registration.

(6) *Collection and Complication of data :*

(A) The present system of multi-stage local collection and complication of vital and hospital statistics has been changed and a new system of collection of original records from the local Registrars of births and deaths and the medical officers of hospitals and dispensaries has been adopted in the State of West Bengal.

Accordingly the forms have been revised to suit the newly introduced procedure. Instead of sending the monthly vital statistical returns, the local Registrars of births and deaths are now to despatch duplicate copies of each and every registered event direct to the vital statistical office at the Headquarters.

(B) Similarly the medical officers of hospitals will not have to send monthly and annual returns but they will fill up the newly designed in-patient cards for each and every patient admitted into the hospital and sent duplicate copies of the same for each patient direct to the vital statistical office at monthly intervals. The in-patient card contains all information about the patient, wherein columns for provisional diagnosis on admission as well as the final diagnosis on discharge or death have duly been provided. The international form of medical certification of cause of death has also been incorporated in the card design so that the underlying cause of death can be tabulated for patients dying in hospitals and thus the international comparability in the matter will be ensured.

The morbidity data on out-patients treated in hospitals and dispensaries will be available from the monthly returns containing information on morbid conditions and diseases as per the International Intermediate list of 150 causes on morbidity.

(7) *Basic documents at the Headquarters :*

The State Central Office for vital statistics will thus have copies of all original documents hitherto not available under the present system. It is expected that on an average statistical information in respect of 50,000 births, 25,000 deaths, 4,500 in-patient cards and about 1,750 returns on out-patients will

be received in this office every monhs for tabulation and thus there will be no loss of information at the Central Office as recorded in the original documents at the peripheral units of registration and medical institutions These will be examined and kept as records after necessary tabulation and will be preserved systematically for issue of births and deaths certificates to persons in need of them. The Central Office will be a General Registration Office of the State and function as the Legal Records Depository on Health Statistics and furnish materials for statistical analysis research and interpretation of various health problems.

Data will be scrutinised and coded according to the International Detailed List of three digit categories on morbidity and mortality statistics. Vital Statistical data will be tabulated as per List 'B'—Abbreviated List of 50 Causes for Tabulation of Mortality and the hospital statistics will be tabulated according to the List 'A'—Intermediate List of 150 causes for Tabulation of Morbidity and Mortality. The tabulation will be done with the aid of Hollerith Machines. It will thus enable this office to comply not only with the statistical requirements of the Director General of Health Services, India according to W.H.O. Regulations but also the statistical needs of the State Health Directorate. As a sequel to mechanisation—the local officers will be relieved from the load of manual compilation and will thus be able to devote more time towards improvement of the primary data as well as detection of omissions in registration of vital events. The Central Compilation of data with tabulating machine will secure elimination of errors interent to the multi-stage manual compilation system. Collection of data will be possible from the habitual defaulting areas, that cannot be detected, under the existing system. It will thus help in the adjustment of population for the areas submitting the returns and thus better and more accurate estimates could be made possible.

Recently, District Inspectors for Statistics have been appointed—one for each district. Now the supervision of the work of registration at the periphery will thus be possible.

It is expected that with the help of these District Inspectors, the Local officers will be able to send the documents to the Vital Statistical Office in time. The unusual delay in the present system of collection will thus be remedied ensuring the timely publication of the Statistical Reports on Health for the State—an essential necessity in the present context of development in the country.

In order that the health statistical work can be done in a uniform way, a manual on health statistics has recently been prepared. It lays down the procedure of registration work and contains the signs and symptoms of chief diseases and explains the principles of finding out the underlying causes of death. All local officers concerned will be supplied with a copy of the manual so that a uniform procedure in the field of registration can be adopted in the State.

International comparability of the morbidity and mortality data will thus be ensured in the Report on State Health Statistics. Besides, the local Registrars and Medical Officers will be supplied with many useful printed tables containing data not only for their own area but also for the entire State. They will know the facts on health and use these materials to better advantage and be interested in the work of health statistics, a basic fundamental achievement so needed for improvement towards collection of statistical information. Moreover, medical officers comprising the State Health Services, a batch of three at a time, will be deputed to the Vital Statistical Office for training in the selection of the underlying causes of death and for assisting in coding periodical returns as will be received from the local offices.

Iastly, in the perspective of the present deficiencies of vital statistics of the country, it has been imperative to have Ideal Registration Units in order that a correct picture on health statistics could be made available. Such data are necessary for comparison and evaluation of the current vital statistics of the country. It is for this purpose that nine such units are being established in nine unions provided with health centres. These units will work in close collaboration with the Union Health Centres for pursuing the policy of positive health programme in the State. It is aimed that all births and deaths occurring in the Union should be attended by the medical officers of the Union Health Centre

concerned, either at the Health Centre or at the domicilliary level—as the case may be. Complete and accurate recording of vital statistics will thus be possible. The data on the sickness load and the growth of population will be collected by house to house enquiry for study of health condition of the people. Medical certification of cause of death will also be ensured in these areas. Separate tabulation of the mortality and morbidity data of these specific areas will perhaps be of great value and immensely useful in the assessment of health condition in the State of West Bengal.

Lastly, there is no denying the fact that the deficiencies in the field of vital statistics cannot be made good unless the people take sufficient interest in the matter and report vital events to the Registrars out of their own accord. The Government will also have to give cognizance to the importance of birth and death certificates and consequent upon that the people will realise all the more the utility of these certificates as evidence in courts of law for succession certificates, inheritance, attainment of majority age, and the like. The people will also find these certificates as personal documents of real value in acquisition of citizenship, right to franchise, as well as in proving the age of new entrants to schools, and while entering private or public services.

The advancement in the field of registration of vital events for correct assessment of health condition of a people in the perspective of second and third plan periods is thus a real necessity.

COLLECTION OF VITAL STATISTICS IN THE RURAL AREAS

By

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D.P.H. (Medalist), B.A. (Statistics), P.H.S.

There are three known methods of gaining scientific knowledge about any subject or field of enquiry-intuitive, experimental and statistical. These methods can also be used if we want to study the human life—how it originates, how it continues to exist under various conditions and how it ends.

The intuitive method can be used to any marked extent only by a handful of gifted individuals, and cannot be verified by others using the same method. In other words we cannot say with any degree of certainty whether anyone who claims to have the power of intuition, is truly a gifted person, is generally mistaken, or is trying to play a hoax on us.

The most useful method of acquiring knowledge of dynamic phenomena is unquestionably the experimental method. When we deal with phenomena of human biology, however there is a wide range of matters in which the laboratory experimental method is, in the nature of the case, ruled out. Unfortunately, one can not breed homozygous strains of men at will for experimental purposes, nor subject them methodically to desired environmental conditions.

The only way open to us interested in the characteristics of human life, to increase his knowledge is, by fieled studies influenced by multiplicity of causes, and to analyse the findings so as to determine the exact influence of each cause or condition. This is the Statistical method.

The term "Vital Statistics" in its widest sense includes the whole study of man, as affected by heredity or by environment, so far as the results of the same can be arithmetically stated. In the narrow sense (in normal usage), this term is used to denote data regarding the occurrence of the major vital events taking place in a community, viz. births, deaths, foetal deaths (still-births) marriages, divorces, adoptions, legitimations, recognitions, annulments, and separations, in short all the events which have to do with an individual's entrance into or departure from life, together with the changes in civil status which may occur to him during his lifetime.

Vital statistical data on an essential basis on which policies and plans of hygiene and public health are chalked out for every state or local area. Thus current and exact statistics must be collected to meet the statistical needs or progressive health department.

It has been demonstrated that the development of vital statistics systems in the countries came about not by chance but in response to the need for records and statistics. The demands for vital records stem from their value as legal documents. These documents acquired their evidentiary value as society became more and more complex and man began to be required to prove his right to his name, his citizenship, and his place in society, especially with respect to the privilleges and duties of a member. The more complex the society, the more uses are found for records to prove facts which in previous years may not have required any type of proof at the most a verbal certification. It needs hardly be pointed out that needs for vital records change with the time.

With increased development in all sphares in India, there has been a growing recognition of reliable vital statistics in the countary, especially during the first and second five Year Plans.

No registration of marriages, divorces, etc., normally takes place in India. However, marriage at or even before pubert is almost universal amongst us, and divorces are practically unknown. Therefore, in our discussion of today, I will confine myself to births deaths and diseases.

The collection of morbidity statistics for the communitics presents a difficult problem even in countries in which the development of health services has advanced much more than in India. It is only when an adequate medical service covering the whole population and offering protection to all, irrespective of their ability to pay, becomes established and operative over a reasonable period of time that morbidity statistics of the requisite quantity and quality will develop. At present, we are collecting morbidity statistics from the State managed hospitals and dispensaries only.

Whether these morbidity statistics can be put to any use is very doubtful. They represent only the patients coming to hospitals for treatment, which is a patently biased sample of the sickness in the community at large. As is well known, it is only the acutely ill, intelligent and co-operative patients who come to the hospitals. Majority of our people go about untreated; or are treated by quacks and private practitioners of various systems of medicine allopathic, Ayurvedic, Unani, Homoeopathic etc.

I cannot think of any method of improving these morbidity statistics, untill we have provided for comprehensive health service for the whole of our nations.

Registration of births and deaths was first introduced in certain parts of India in 1863. It is only voluntary in certain parts of the country so far as my information goes. Even in places where it is compulsory, a strict enforcement of the law is not resorted to. The main defects of the existing records, as pointed out by the Health Survey and Development Committee are:—

(1) Omission to register an appreciable number of births and deaths.

(2) Inaccuracy of the recorded cause of death.

In towns and cities, the municipal authority is responsible for the registration of births and deaths. The head of every household is required by law to inform the municipal health department of any birth or death occuring in his house-hold. Every medical practitioner is also required to inform the municipal authorities of the death of any person whom he attended during his last illness. But these requirements of law are honoured more often in breach than in practice. In addition to the omission of a large number of births and deaths, the cause of death is almost always inaccurate and in exact, chiefly due to illiteracy and ignorance. The World Health Organisation has prescribed a standard International Form of Certificate of death, on which all deaths must be recorded. The Director Health Services, Punjab, ordered in 1954 that all deaths occuring in towns must be recorded in this form, but these instructions have remained a dead letter so far due chiefly to the illiteracy and ignorance of our masses and lack of co-operation on the part of our medical practitioners.

In the rural areas the registrar of births and deaths is the police officer incharge of the thana. The man responsible for reporting these statistics from individual villages is the Chawkidar who is the lowest grade of

public servant and is almost always illiterate. He reports these events every two weeks to the police station in whose jurisdiction his village is situated. He is provided with small birth and death registers in which he is supposed to maintain a record of these events in his village as and when they happen, so as to be able to report them correctly as he is not expected to remember detailed particulars of all events for two weeks. As already stated, the Chawkidar is almost always illiterate and ignorant of the importance of this record. He is also busy with many other duties which he considers much more important. Just before his fortnightly visit to the thana, he catches hold of any easily available person (usually semi-literate) and gets entered in his registers such particulars of vital events as he happens to remember at the moment. He is not worried about omissions or inaccuracies, but is interested only in getting some entries made so that he is not taken to task by the police. The only checking of his records is by the Vaccinator when he visits the village for vaccination against Smallpox once a year.

At present it is unfortunately true that the existing system includes many agencies whose attitude towards this work seems to be hardly satisfactory. We have the police which appear to have relegated the vital statistical work a secondary and unimportant role. The Chawkidars, illiterate and ignorant, as they are, are held responsible for maintaining the village birth and death registers. While checking village birth and death books, the vaccinator finds hundreds of omissions in births and deaths every year. The Public Health staff in the limited amount of checking of birth and death registration discovered 4652 nnregistered births and 1409 deaths in 1957, in the Punjab State alone.

One of the most important columns in birth and death records is the cause of death. This entry is made on the basis of the information supplied by the chawkidar. It is well known that a large percentage of the deaths occuring in the rural areas are of the persons who cannot have the benefit of a qualified doctor's attendance and as such the cause of death reported by the information is more or less a crude guess.

It is interesting to note the cause of death entered in death books of any village Chawkidar, most of the deaths are recorded as due to "Khansi Bukhar" (Fever and Cough).

It is difficult to say how these defects can be removed in an under-developed country like India. The Health Survey and Development Committee, Government of India (the Bhore Committee) drew up in 1946 a detailed scheme for alround improvement in the health service of the country including the collection of Vital Statistics. But in the present state of finance and technical manpower, it may not be possible for us to implement it fully in the near future. In the Singur Health Centre attached to the All India Institute of Hygiene and Public Health Calcutta, the Union Board Sanitary Inspector or Rural Medical Officer of Health is the Registrar of Births and Deaths. He receives reports of vital events independently from the village Chawkidar, the Lady Health Visitor or Midwife working in the village and from the village Health Committee member. Further he visits every village of his area at least once a month and checks most of these reports personally. The provision of such a large staff throughout the country cannot be expected at the present moment. Hence arises the necessity of a cheap and effective plan for the improvement of the system of collection of Vital Statistics in the rural areas of the country.

I today intend to place before this gathering experts such a plan for consideration. The Punjab State Health Officers' Association at its meeting at Chandigarh in December, 1953, considered the necessity of reliable and adequate Vital Statistics, and the present inadequacies in our records. After a thorough discussion, it asked me to make a special study of the system of the collection of Vital Statistics and to try to devise a plan for its improvement in the rural areas.

After repeated discussions with the staff of the Health Department, revenue and Police Officials, village Chawkidars, Headmen and Sarpanches of Hoshiarpur District, where I was posted at that time, an experimental plan was drawn up for the purpose. It was tentatively designated the "Hoshiarpur Plan".

It was decided to appoint honorary writers for the purpose of recording births and deaths in the Chawkidar's registers. They were requested to do it in a spirit of com-

munity service, and were told about the responsibility involved. They were given the necessary training on the spot how to fill up the record. Special stress was laid on the cause of death. They were told how to recognise the common causes of deaths from the history of sickness. They were advised to avoid indeterminate terms, such as fever, The Chawkidar was directed to bring the head of household or another member of the family in which a birth or death occurred, to this voluntary agent so that the latter might get first hand information about the vital event while filling up the register. The villagers were also told about the importance of these statistics and instructed to bring a chit about the cause of death where possible from the doctor, vaid or hakim who attended the deceased in his last illness.

However, only 2,347 writers in 1199 villages out of a total of 2203 villages in the district were trained, when I was transferred from the Hoshiarpur District in January, 1955. Due to various reasons both administrative and personal, I have not been able to try this plan in any other district after that and to evaluate the results statistically.

However, the results of this plan as tried in Hoshiapur district are shown in Tables I, II and III. As already stated, beginning in January, 1954, a total of 2,347 writers were appointed and trained in 1,199 out of a total of 2,203 villages of the district by the end of December, 1954. The monthly distribution of this work is given in Table I.

On an average there were trained writers in 26.40 of the villages of the district throughout the year. The results of this plan may now be examined for improvement of the main defects an our records viz. omissions and inaccuracies of cause of death. Table II shows the omissions in birth and death records detected in 1953 and 1954 by the health staff during their routine tours.

It may be pointed out the health stuff was especially alerted to the need for detecting the omissions in the year 1954.

The common cause of deaths, as recorded in our villages, birth and death registers is simple "Fever" or "Fever and Cough" which have both to be classified under the heading "Other Fevers". Table III shows the position in this respect.

TABLE 1.

Number and percentage of villages with Writers in Hoshiarpur District in the months of 1954.

Month	No. of writers trained	No. of villages in which trained.	Cumulative total.	Percentage of the villages possessing writers.
January	104	52	52	2.36
February	56	28	80	3.63
March	47	24	104	4.72
April	8	5	109	4.94
May	304	152	261	11.84
June	280	147	408	13.52
July	489	245	653	29.61
August	433	220	873	39.62
September	328	154	1,027	48.62
October	67	47	1,074	48.75
November	136	74	1,148	52.11
December	95	51	1,199	54.42

TABLE II.

Birth and death Omissions Detected in Hoshiarpur District in the year 1953 and 1954

Event	Omissions in 1953.	Omissions in 1954	Reduction	Percentage reduction
Births	127	94	33	23.98
Deaths	90	70	20	22.22

TABLE III

Total Deaths and Deaths caused by "Other Fevers" Registered in Hoshiarpur District, 1952 to 1954.

Year	Total Deaths	Deaths caused by "Other Fever"	Percentage	Percentage of reduction
1952	22,375	12,978	58.00	—
1953	23,368	12,764	54.62	5.58
1954	18,202	7,216	39.45	27.77

Both these tables show that the main defects in our registration have been rectified by this plan in proportion to the number of villages in which this plan has been tried.

I am aware of the defects in this plan and in the way this has been tried. As there was no staff specially deputed for this purpose and the writers were trained by the Public Health Staff during their routine tours. the figures of births and deaths could not be calculated separately for villages with trained writers and for a control group of villages. I wanted to train writers in the whole of the district, and then to compare its records with these of a neighbouring district, which could be considered to be a control group. But, as already stated the work could not be completed when I was transferred from the Hoshiarpur District.

It is also true that there may still be a considerable number of deaths of which the cause has been incorrectly recorded. The village doctor, vaid or hakim having in many cases very little clinical training except his own experience, may not be able to reach correct diagnosis. In some cases, even his diagnosis may not be available, and the writer has to ascertain the probable cause of death from the history given by a member of the family. But further improvement will probably have to wait till the provision of proper medical facilities in all the villages of India.

It should however be borne in mind that this appointment of writers has no legal sanction behind it and if some of the writers do not prove willing workers or if some of the village Chawkidars do not go to these writers and get entries made in their registers by other persons, no legal action can be taken against either of them. Thus, if this vital record has to be made up-to-date the State Governments should make necessary amendments of the relevant Acts, to obviate this difficulty, and to provide for compulsory registration of all births and deaths by the head of the family or any other adult member.

The other step taken in the matter was that in Police Stations, the Station House Officers were advised to get all death entries verified by the local Medical Officers and to depute one police official only for recording all birth and death entries in the thana registers. But to facilitate the registration and compilation work, full time workers would be needed who should be given sufficient training in vital statistics work so that they may do their work efficiently and also guide and supervise the work of the village chawkidars.

Every district and big town should be divided into suitable blocks and put under a public health worker fully conservant with the momenclature of the cause of death and otherwise well up in general statistical work. The size of the block should be such that the Public Health Worker can in addition to his other duties, complete the check up of all entries in birth and death register of village and town within a month. For this, it is very essential that the State Governments should provide adequate and well paid health staff and if the finances of the State are not enough for the purpose, Central Government should come to their rescue and assure that public health problems of the country do not remain unsolved due to lack of funds.

The basic public health worker in charge of each block many work in the following manner as far as the collection of vital statistics is concerned:—

1. He will first scrutinise the birth and death registers and in case of any mistake in the entry he will explain to the voluntary writer how to avoid it.
2. He will then get the entries verified by reading out the records to any adult member of the family concerned and find out whether any birth or death has been omitted in the registers or whether some entries have been made late or with wrong particulars.
3. He will correct the registers accordingly and will prepare birth and death omission forms and forward all such papers to the office of the District Medical Officers of Health for getting the necessary alterations made in the registers.
4. The basic health worker will also keep a record of all omissions and other defects with him for purposes of monthly, half yearly and annual returns. He will also see that the Station House Officers send fortnightly goshwaras on the 5th and 20th of every month.

To ensure that the basic worker is discharging his duties efficiently, the superitendent of vaccination and rural sanitation and Sanitary Inspector of the area should check up thoroughly some of the villages or wards as the case may be, and submit a report to the District Medical Officers of Health for necessary action.

The District Medical Officer of Health will supervise the work of the subordinate staff and guide them wherever necessary. He will

see that vital satatistical work is efficiently and promptly done and that his statistical clerk is ever vigilant. He will get necessary alterations made in the relevant birth and death registers as reported by basic workers and launch prosecutions against offenders and get them suitably punshed and thereby set an example to others to promptly report all births and deaths to the officials concerned.

No scheme or plan can be a complete success without full and unstinted co-operation of the public. There is no denying the fact that very few people yet realise the value and importance of accurate and prompt notification of vital events and that a sound education programme in this respect is the most vital need of the time. Leaflets and phamphlets written in local languages in the importance of vital statistics should be freely distributed among the public on the occassion of fairs and public health exhibitions, and lectures should be given to the people by the Public Health Staff during their routine tours. Over and above this the subject of vital statistics should be included in the curriculum of Middle and High School Classes in all the States. Thus the citizens of to-morrow will realize the importance of correct Vital Statistics.

Now that the whole of the country is proposed to be covered by Community Development Blocks and Primary Health Units, it has become necessary to modify the plan so as to make use of the increased staff of the Primary Health Units for this work and to provide for registeration on a Block basis instead of the present Police Station-wise registration as desired by Col. Barkat Narain A suitable modification of the "HOSHIARPUR PLAN" is now at the discussion stage, and I hope to try it in the area of at least one Primary Health Unit during the year 1959 so that I may be able to put forward new proposals by the beginning of 1960.

Elementary, as this plan is, I have ventured to present it to this gathering of experts in the hope that some of the eminent Public Health Workers of the Country gathered here may suggest some modifications and constructive criticism of the HOSHIARPUR PLAN for the collection of Vital Statistics very vital for our progress, as the very name suggests.

In the end, I thank you all for the patient hearing and apologise for any inaccurate statements and mistakes that I may inadvertently have made.

"ANOMALIES IN REGISTRATION OF VITAL STATISTICS IN BAREILLY DISTRICT OF UTTAR PRADESH DURING PRE AND POST PANCHAYATS ERA"

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Vital statistics form the foundation of all planned health work. "As ultimately preventive and curative work must be organised on the basis of accurate knowledge of the diseases and disabilities in an area, the importance of collecting accurate vital statistics can not be over emphasised." This was stressed as long ago as 1937 by the Intergovernmental conference on Rural Hygiene in Java under the auspices of the League of Nations. But if we pause to consider how much we have succeeded in maintaining, much less improving, the mortality and the morbidity statistics after a lapse of 20 years, we can not feel happy with our achievements. Health Survey and Development Committee (Bhore Committee) in its report published in 1946 pointed out that errorrs in registration of Vital Statistics fell under three heads:—

1. Incompleteness in recording of events.
2. Inaccuracy of the registered causes of deaths.
3. Faulty compilation.

Registration not only continues to be erroneous in these three aspects but also deteriorating. A look at the Infantile Mortality statistics from 1941 to 1956 in Bareilly district (Tables A & B and the graph) will amply prove this. Infantile Mortality Rate is considered to be the best yard-stick for judging the health standard of any community, for assessing the progress of the health

measures especially maternity and child welfare services and their effects. But in Bareilly district, improvement and increase in the district health, maternity and child welfare services has not shown any corresponding reduction in the infantile mortality. Contrary to expectations, the statistics indicate an increase from 141.08 in 1941 to 234.8 in 1955. Whereas the maternity and child welfare services have doubled from 4 M & C.W centres before 1950 to eight after 1950, I.M.R. instead of halving has more than doubled itself from 1949 to 1955. But for all practical purposes, this upward trend in the infantile mortality after 1950 as seen in the graph is in fact not due to any actual increase in mortality. There have been no special causes like unusual epidemics or famines operating in the district during this period. This apparent increase in infantile mortality, to my mind, is only due to defective registration. Perusal of table A and Part 1 of the graph will indicate that the I.M.R. in Bareilly district fell from 141.08 in 1941 to 121.5 in 1950. Howsoever vague the statistics would have been, there was uniformity of error through out. Moreover, our I.M.R. in 1941-42 approximated more or less to that of the All India rate of 158 in 1941. So, judging from the statistics prior to 1950, we can reasonably assume that with the improved health services, the health of the community also showed gradual improvement as reflected by a steady decrease in the I.M.R. But then the inevitable happened. Responsibility for registration shifted from Chaukidars to the Panchayats. With this change, registration also deteriorated tremendously. This was a change from the frying-pan into the fire. In the succeeding 4 years, I.M.R. as registered by the Panchayats, started showing an increase every year. Deaths being a prominent casuality were registered more accurately than the births. As a result, the denominator in the formula for the calculation of the I.M.R. was lowered and hence the subsequent appearent increase in he I.M.R.

So it will appear that if people were to judge the standard of our health services from the existing vital statistics, it will not take them long to condemn us out right. We have got to do something to improve the methods of registration. Now, with the establishment of the Primary Health Units, let us hope that some inprovement may be achieved in this respect, provided the recommendations of the Bhore Committee are followed in toto. If the health personnel in a Primary Health Unit, the Sanitary Inspector, the health visitor, the midwives and the dais are entrusted this sacred job of registration of vital statistics, much can be attained and then the lessons learned from there can be applied in other areas. Bhore Committee recommends that, "It should be a part of their (health personnel in primary health unit) function to collect in the course of their routine duties, information regarding the occurance of births, deaths and cases of infectious diseases and to pass it on to the registrar. It will be one of their functions to contact as many expectant mothers as possible and to follow them through child birth into the postnatal period. We anticipate that the contribution that all these officials will thus make to the improvement of vital statistics on the side of reducing omissions will, in a short time, be considerable."

TABLE A

Table showing infant mortality Rate in Bareilly district from 1941 to 1950, (when registration of vital statistical was done by choukidars)

Year	Total of births	Total of deaths of infant	Ratio per thousand of live births
1941	43,201	6,125	141.1
1942	43,184	7,059	163.4
1943	36,537	5,732	156.9
1944	39,231	4,988	127.2
1945	42,327	6,250	147.6
1946	40,431	5,193	128.4
1947	35,585	5,115	143.5
1948	38,565	4,903	127.1
1949	37,739	4,271	113.1
1950	29,979	3,642	121.5

TABLE B.

Table 'B' showing I.M.R. in Bareilly District from 1951 to 1956. (When registration of V.S. was done by Panchayats).

Year	Total of births	Total of deaths of infant	Ratio per thousand of live births
1951	32,129	4,198	130.6
1952	32,286	5,193	160.8
1953	27,371	5,546	202.6
1954	22,290	5,485	246.0
1955	21,328	5,009	234.8
1956	23,261	4,340	186.6

HEALTH RECORDS IN A HEALTH CENTRE—FAMILY AS AN UNIT

By

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Introduction :

The main object of a Health Centre is to cater health services to the community for preservation, restoration and promotion of health of all individuals. With this objective in view, a statistical system of record keeping has to be devised so that the services can be extended evenly to all cross-sections in the area not only geographically but also in regard to age, sex and other characteristics. At present, the different records maintained in the Health Centre, give as a rule separate accounts of the various activities performed such as antenatal care, immunisation, etc. They do not give an integrated picture of the coverage of the area or the cross-sections of the population reached. The current method of record-keeping is also responsible for the individualistic method of approach even in public health work. To implement the idea of giving total family care, maintenance of a family record is a long felt need. A re-orientation of the procedures by which problems are diagnosed and services are rendered so that the entire community will be fully served is essential. The concept of using family as the Unit of reference instead of the individual is likely to go a long way in achieving this objective. The statistical system of record keeping which will enable the application of the principle of family as a Unit will be discussed in this paper.

Basic Records :

The registers and forms maintained by the Health Centres in this Country are somewhat standardised. Some of these are the results of statutory obligations while others have been evolved by the exigencies of various types of services which are offered. The records which are required to be maintained by law in West Bengal are mentioned below:—

(*i*) *Vital Statistics :*

(*a*) Hatchita of Births—
(*b*) Hatchita of Deaths— Maintained by Village Chowkidar submitted once in a month to the M. O. of Health Centre, who is at present Registrar of Births and Deaths.

(*c*) Monthly Return of Vital Occurrences— to be sent on 10th of the month to the District Health Officer.

(*ii*) *Communicable Disease Control :*

(*a*) Weekly Epidemic Return—
to be submitted by S. I. or M. O. to the higher authority regularly in case of incidence of communicable disease.

(*b*) Statement showing the seizures and deaths from epidemic disease—
this has to be filled up and sent every Thursday to S. D. H. O. and D. H. O. Record of vaccination and its inspection for each village.

(*c*) Vaccination Roll—
Record of vaccination and its inspection for each village.

(*d*) Monthly Return of Vaccination—
this return has to be forwarded by the Vaccinator to S. I. or M. O. as the case may be.

Apart from this, every Health Centre has to maintain the following records also in connection with its activities.

(*i*) *Medical Relief :*

(*a*) Out-patients' Register—

(*b*) Admission Register—

(*ii*) *Maternity and Child Welfare Programme:*

(*a*) Ante-natalCard—
(*b*) Post-natal Card—
(*c*) Infant Card—
(*d*) Toddler Card—

In some Health Centre a composite, Maternity and Child Welfare Register is maintained.

(*iii*) *School Health Programme:*

(*a*) Medical Inspection of Students.
(*b*) School Health Clinic Form.
(*c*) Records of Height and Weight.

The above list is by no means complete. Yet an analysis of the existing record system shows that it does not permit the noting of many of the important activities which are performed by various health workers, such as disease investigation, treatment of minor ailments at home, persuasion made for construction of latrine etc.

Why Family Folder:

While the statistical forms statutorily asked for will require to be continued, there is enough latitude for health centres to develop the rest of their statistical system in a manner which will be most useful. Some of the advantages of the use of the family folder proposed here are the following:

(*i*) to know whether health services are being catered to all sections of the village and community. As an example consider the re-vaccination programme. It is customary to enforce that re-vaccination should be given every 3 to 5 years and administration remains happy if the total re-vaccination in a year numbers 1/5 to 1/3 of the population of the area. But it may happen that some persons are vaccinated every year and some persons are missed for many years. It is not unusual to find that the revaccination figures become high because of those done on school children every year while those done on the adults remain below expectation. The maintainence of the family folder will point out the persons who have not been vaccinated within the last 3 to 5 years.

(*ii*) to know whether health services are being utilised by all section of the people. The various clinics are usually conducted in a central place. The usually large attendance at these clinics may be due to more frequent visits from persons living in villages close to this central place rather than from those far away it. The family folder will indicate this discrepancy and point out to the needs for investigating the underlying causes.

(*iii*) to organise follow-up service. In case of communicable diseases, action has to be taken for home contacts for prevention of spread of disease among them. The list of members in the family, which will be available from the family folder, will help in contacting those persons and noting the measures taken for them.

(*iv*) Exchange of information between various members of the health staff. The various staff of the Health Centre are working in the clinics and villages for rendering different type of health services. The head of a particular house-hold may come to the out-patients' department for treatment of some minor ailments, his son may be immunised against cholera in the school and wife has been contacted at home for ante-natal care. Thus three members of a family have been contacted in different phases of their lives by three workers on one day. All these family information can be recorded in one place, *i.e.*, family folders so that each member of the health staff can have access to the findings of the others.

(*v*) Conservation of the time of the health staff. All health workers must act like multipurpose workers. A health visitor finding that a family needs installation of a soakage pit can draw the attention of the sanitary inspector by making the suitable notes on the family folder. Similarly the Sanitary Inspechearing of a new pregnancy can draw the attention of the M. & C. W. Staff to contact this woman. Such exchange of information will be conducive to better efficiency. In addition independent visits by different workers

to the same village within a few days of each other can be prevented by judicious organisation of the data in the family folder.

(*vi*) To assess the relation to health of social and economic factors of the family. The health of the members of the family as a Unit can be studied and can be used in the organisation of social medicine.

Preliminary House-hold Survey :

The use of the family folder necessitates a house-hold survey before starting health work. This survey will obtain two types of information (See Appendix A).

(*i*) house-hold information common to all individuals of the house-hold, such as sanitation of the house,

(*ii*) information concerning each individual of the house-hold, such as sex, age, relationship to the head of the house-hold, immunisation status and present health etc.

The time spent and labour involved for this initial survey, will prove to be economic in the long run, such as indicated above, will help in maintenance of subsequent records, utilisation of the existing resources for the immediate problem and in assessment of services rendered. Experience has shown that for an area with a population of 15,000, services of two full-time workers for a period of 3 months will be required to collect this basic information.

Maintainence of Family Folder :

The envelope of folder which will contain the different individual cards, should be of the size considering the maximum size of Maternity and Child Welfare Card and the size of home-visiting bag into which the family folder will require to be fitted. On one side of the folder the information collected during house-hold survey, will be directly entered. On the other side will be provided space for showing the services rendered by the Health Centre to individual members of the house-hold (Appendix B).

Each family folder will have a serial No. and the folders will be kept in a cabinet village-wise. An index book will be of help for putting out the family folders knowing the name of the head of the house-hold. Some special identifying device may be adopted so that important things draw immediate attention, *e.g.*, tuberculous family may be attached with red flag. The folders could be accessible to all the staff, who can note down in the folder the services rendered by them. Alternatively it can be consulted for planning an action programme. The folders of the patients attending the clinic will be placed before Medical Officer for getting the history of past sicknesses of the individual or other members of the family.

Organisation of Field Programme :

The medical officer of the Centre should go through the family folder occasionally not only to examine the completeness and correctness of the date entered in it but also to guide the different workers how to cover the whole area and population. The medical officer can scrutinise it a tuberculosis patient has been followed up, whether a person who has purchased a squatting plate has constructed the latrine and if a six month old infant has been vaccinated. Looking at this information, he will have an overall picture of the work in the village. According to necessity, he may issue a slip to different workers stating the cases requiring immediate attention. The proforma of the slip may be like this.

Sri.....is requested to perform the following work in the week ending .....19.....

Sl. No.	Village.	No. of family.	Nature of work.	To be filled by field workers		
				Date of contact	Work done.	Remarks

Appendix A

FAMILY HEALTH REGISTRY

Union..... *Village*..... *Head of House-hold*.....*House-hold No*.....

Type of house.....*Source of Drinking Water*.....*Type of latrine used*.....*Economic condition*.....

(Hut, Katcha, Pucca) (Tube-Well, Well, Tank) (Dug-well, Service, Septic, Nil) (Poor, Middle, Well-to-do)

Date of information.	Sl. No.	Name.	Relationship to head.	Sex	Age	Education	Occupation	Marital Status	Past sickness	Present health	Immunisation status	Date of closure and reason

Appendix B

References by appropriate Nos. to services rendered by the Health Centre to individual members.

Sl. No.	Out Patient Deptt.	In Patient Deptt.	Ante-natal & Post-natal	Family Planning	Infant	Toddlers	Child Guidance	Paediatric	School Health	T. B.	Nutrition	P. H. Lab.	Imminisation	Sanitation	Any other service	Remarks

The field workers can prepare the advance programme by consulting the family folders and Medical Officer.

Conslusion :

Keeping the family as the Unit in our view will help the Health Centre not only to render better and effective service but also will help to collect accurate birth, death and morbidity statistics and on the fact of it has much to command itself. The problem involved in its operation can be envisaged only by giving the system a trial. A beginning has been made in part of the Singur Health Centre Area and the results of which will be watched with much interest.

COLLECTION OF VITAL STATISTICS IN THE RURAL AND URBAN AREAS

Dr. S. K. Chatterji, Deputy Director of Health Services, West Bengal:—

The development of any public health campaign depends on the correct registration and compilation of vital statistics. By no means this can be divorced from public health. For the present deplorable position of vital statistics to-day in our country the responsibility does not lie with the public health workers who only compile the data. The collection and registration at the family level are yet done by the chowkidar, a multipurpose worker under a department other than that of Public Health. All that the public health worker can do now is to detect the omissions.

To improve the situation the following may be considered among other suggestions: (*a*) Impressing the public on the importance of registration. (*b*) To insist on presentation of Birth Certificate for entering into the primary school. This will be fully effective when the primary education becomes compulsory all throughout the country (*c*) Burning ghats and burial grounds may be officially organised throughout the country and sub-Registers appointed so that no death body may be disposed of except in these places, (*d*) For correct recording of causes of death we need to cover the country with primary health centres and the R.M.O.H. can then act as the Register of Births and Deaths. The registering unit will then be smaller than what it is to-day (*e*) The family folder system may be introduced.

Dr. G. S. Murthy from Uttar Pradesh:—

The Public Health Dept. is responsible for compilation of vital statistics, registration being dealt with by various other departments. The Census Commissioner in his Census Report of 1951 classified the states broadly under two categories, *viz.*, the states in which the statistics are reliable and the states in which the data are unreliable or less reliable. Different systems are adopted in different states. In Uttar Pradesh Panchyats have been made responsible for collection of vital statistics since 1951 but it is not at all working efficiently though in theory it seemed to be an ideal one. What is necessary is a uniform system all throughout India under the direction of the Central Government.

Since we have infant mortality rate as a reliable index of the socio-economic condition of the state, a study of this index would reveal the degree of improvement in the country brought about by the five years plans, we should therefore either have a system making it obligatory by law on the house holder to register births and deaths or have a system of collection through a regular and reliable agency. It is no good trying to do both these systems at the same time. The best way to improve the statistics is to produce an incentive in the people to report by making birth certificate essential in schools, courts etc. Similarly if death certificate by medical practitioners is made compulsory it would help in improving death registration. Of course, the time is not yet ripe for this latter measure, the number of medical practioners being yet so few in the rural areas. Even when this measure comes up the question of classification of causes of death will arise due to the existence of so many systems of medicine officially recognised in the country. Really I would like to suggest that if we can not have a reliable and uniform system of vital Satistics for any reason or reasons the question of relying on regular sample surveys, as is done by the Agricultural other departments, may be considered.

Dr. A. Dasgupta, Deputy A.D.H.S. West Bengal:—

The registration and compiliation should be placed in the hands of the Public Health Department for the following reasons:—

The death registration is very often the first information of an outbreak of epidemic disease. The preventive measure actually starts from this point. If the registration is taken out of our hands such information will be received after long interval. As a result, the whole communicable diseases control programme will be seriously delayed and disorganised.

Even if we cannot provide doctors for checking of cause of deaths we have provided at least quasi-medical men like Health Assistants, for checking such data. These staff have got the opportunity of consulting the doctor and the margin of error will be minimized.

Our public health organisation is fast developing, and very soon we shall have a net work of health centres all through our States. Thus within a few years we can have all births and deaths and causes of deaths checked by competent medical men.

If the vital statistical work is taken out of our hands this work will have a severe set back. The collection of vital statistics by the agencies previously entrusted was not at all satisfactory and we have to come into the picture to take up the responsibility. The work already being done under the Health Directorate has been found to be much superior even on the face of tremendous difficulties. Any organisation other than health department will have to use some agencies as are being now utilised and therefore the data collected will be subjected to the same kind of error unless it is done by medical people or by staff under his direct guidance. Since we have also under us staff for health education we are in a better position to enlighten the people about the desirability and importance of correctly recording births and deaths.

The registration of vital statistics has already improved where health centres have been located and the State Government is now paying more attention to this very important work.

FIRST REPORT OF THE SUB-COMMITTEE ON THE TRAINING OF AUXILLIARY HEALTH PERSONNEL HELD ON 29-12-58

At the discussion that took place on 28th Dec. it was considered necessary to go into the details of the training programme and to recommend for guidance of various state Govts. The course of training, the curriculum and syllabus that have to be followed and the qualification for admission to this course and to indicate also a reasonable basic salary for the employees of each catagory. The sub-committee consisting of the following was constituted with powers to co-opt.

1. Dr. Massilamani,
2. Mr. Majumdar,
3. Mrs. Uma Mitra,
4. Dr. J. K. Bhattacharjee,
5. Dr. G. Sen,
6. Dr. J. Singh,
7. Dr. Seshagiri Rau,

Dr. (Mrs.) Sharada Kasliwal of Gwalior was co-opted in the committee. The committee met this morning and discussed the syllabus prescribed by the Bhore Committee report and that followed in Madras. In so far as the health inspector's training course is concerned, the committee after due deliberation came to the following conclusions.

(1) The Health Inspectors' training courses are to be attached preferably to the medical colleges wherein they exist. The Prof. of Preventive Medicine be placed incharge of the training programme, but he should be provided with the additional and adequate staff to carry out the training programme efficiently.

(2) The course should extend over one academic year. Due importance and emphasis should be laid on practical exercises and demonatrations and there should be one thousand hrs. of theory and practical of which 250 to 300 hrs. should be devoted to lectures and 700 to 750 hrs. to practical training. In addition, the students should undergo practi-

cal training in rural and urban areas for a period of 3 months in order to get orientation of the living and working conditions and the problems that are confronted in urban and rural areas so that he would be better fitted person to undertake this important public health work assigned to him.

(3) The question of qualification for admission to this course was considered. It was brought to the notice of the committee that there is no uniformity in qualification obtaining in various states. In some cases vaccinators who have passed only the VIth standard in vernacular and who have worked for about 10 years are also admitted for short course resulting in producing substandard workers. The committee was of the opinion that the minimum qualification should be matriculation with science.

The objects of the training of health inspectors are (i) the person should be able to compile vital statistics and just to draw an information about the problems, (ii) to detect and counted communicable disease, (iii) to improve the general sanitation, (iv) to carry on health education in the field (v) and to discharge his sanitory obligation. The curriculum syllabus should be formulated in such a way that health inspector during the course of training is taught of all aspects of subjects that he has got to deal with. With this in view, the committee suggested that the subjects to be included in the syllabus should be such as to give due importance to topics with which he has to deal with in his day to day work. (The subjects that should be taught are shown in the appendix).

The duties that may be assigned to the health inspectors vary depending upon his positing to urban, municipal or to health unit. But in general the following duties may be assigned.

(1) Verification and compilation of vital statistics, (2) detection and control of communicable diseases which specifically include vaccination and inoculation, (3) improvement of environmental sanitation, (4) disinfection of water sources, (5) health education including propaganda on family planning and (6) implementation of the several public health Acts in the area including the food adultration Act.

The staffing patern of the health unit as envisaged by the Govt. of India is such that one health inspector for a population of 66,000 will not be able to discharge his duties satisfactorily. The Committee is of opinion that there should be one inspector for a population of 15,000. The committee is also aware of the difficulty in procuring sufficient number of health inspectors to man the health centres but the ultimate goal should be to have one health inspector for every 15,000 population.

The Committee considered whether health inspectors could be given training in curative medicine for a short period and their services utilised in the rural areas as para medical personnel on account of great paucity of medical men. It is the considered opinion of the committee that health inspectors should not be utilised as para medical men and should not be allowed to treat cases. If they are utilised as para medical men it would definitely be retroget step. They can, however, be trained in first-aid.

The question of their salaries was also discussed, the salary that is given to the health inspectors has a bearing on the prevailing salaries of similar personnal in the states. The committee did not deem it agreeable to specify any scale but it was of opinion that a minimum basic salary of Rs. 80/- per mensem should be given to the health inspectors.

Public Health Nurse, Auxiliary Nurse and Midwives: —

There are at present four catagories of personnel, (1) the publil health nurse, (2) the health visitors, (3) the auxiliary nurse midwives and (4) the midwives. The ultimate goal is to have only 2 catagories of personnel namely the public health nurse and the auxiliary nurse midwife. The other two are only temporary and are to be merged with the other categories. The committee is of opinion that the standard laid down by the Indian Nursing Council in regard to the age and qualification for the nurse, and the health visitor may be accepted. Similarly the standard pattern for each school undergoing this training programmes may also be accepted for the present. The course of syllabus suggested by the Indian Nursing Council is being implemented by state govts and the committee sees no reason why this should be modified now.

The salaries of each of the above mentioned four catagories of personnel were also considered. As in the case of health inspectors the committee thought it fit to prescribe the minimum salary and to leave to the states to determine the scale depending upon the local conditions. The salary prescribed for the mid-wife is Rs. 60/- per mensem, for an auxiliary nurse mid-wife Rs. 80/- for a health visitor Rs. 100/- and for a public health nurse Rs. 120/-. The allowances and other facilities offered to these categories will depend upon the existing conditions in each state.

Multi-purpose community worker:

The committee is of opinion that the services of the village level worker and gramshevak should be utilised to the fullest extent possible for implementing and furthering the public health programmes in the community development blocks. They will be most useful in propaganda. With this in view the committee suggests that the curriculum may be modified suitably to achieve these objectives.

CURRICULUM FOR SANITARY INSPECTORS— (Bhore Committee Report—Vol. III—Appendix 36)

Sl. No.	Subject.	Lectures.	Demonstrations & Laboratory.
1.	Introduction	1	—
2.	Elementary Physiology & Personal Hygiene	10	11
3.	Communicable Diseases	16	80
4.	Animals, insects etc., carrying diseases	4	5
5.	Disinfection and disinfestation	3	8
6.	Surveying, levelling and drawing	4	18
7.	Building construction	8	74
8.	Water supply	6	68
9.	Collection and disposal of excreta and refuse	8	60
10.	Disposal of the dead	1	10
11.	Collection of Vital Statistics	4	4
12.	Food and milk sanitation	8	30
13.	Fairs and Festivals, etc	3	16
14.	General Sanitation	1	10
15.	Public Health Administration	2	—
16.	Public Health Laws	6	—
17.	Health Administration methods	4	13
18.	Health unit work	3	4
19.	Malaria control	4	37
20.	Office routine	2	2
21.	Methods of inspection and carrying out of sanitary surveys	12	26
22.	Maternity and Child Welfare	2	2
23.	Legal Procedures	6	5
24.	Sewerage and sewerage disposal	6	30
25.	Offensive trades, industrial hygiene	3	17
26.	Ventilation, atmospheric pollution	3	—
27.	Seminars, tests, etc.	10	—
		140	534

Resolutions passed at the Third Annual Conference of the Indian Public Health Association held in Calcutta on the 27th, 28th & 29th December, 1958.

Resolution 1.

The Association recommends that primary vaccination be made compulsory in states where it is not compulsory at present. The vaccination must be done soon after first month of the birth and should be completed within six months.

Resolution 2.

The Association recommends that before embarking upon statewise immunisation programme against Diphtheria, Whooping Cough and Tetanus the data regarding the incidence and mortality in different diseases for past 10 years may be collected from different states and surveys undertaken to finally formulate the programme.

Resolution 3.

This Association recommends that members of the Parliament and State Legislatures may be requested to take lively interest in the collection of vital statistics in the country to provide the basic data for improvement of the health of the nation and to stimulate peoples' participation and co-operation in the drive.

Resolution 4.

The Indian Public Health Association notes with interest the attempts being made by the public health departments of various states in India for the improvement of the registration of births and deaths.

The Association recognises the need for further improvement in the obtaining of vital statistics data in the country so that essential information necessary for working out the development plans would be available, and to this and would:—

(i) Urge that greater responsibility might be given to the public health departments in the collection and compilation of vital statistics.

(ii) Urge public health workers in the country to take active interest in his work.

(iii) Would recommend the envolving of uniform procedures for collection.

Resolution 5.

The Association recommends that an early action may be taken by the Central Council of Health on the draft mannual of Public Health Act completed in 1955 and placed in the hands of various State Governments to enable them to adopt it with such modifications as are necessary to suit the local conditions.

Resolution 6.

In view of the increasing sale of adulterated and substandard food in the country inspite of Food Act, being passed by the Central Government two years ago the Association urges upon the State Governments to fully implement the provisions of the Act by providing the necessary staff and equipments for the purpose.

ASSOCIATION NEWS

REPORT OF THE GENERAL SECRETARY,

INDIAN PUBLIC HEALTH ASSOCIATION FOR THE YEAR 1958

Mr. President, Members and Friends,

It is my great privilege to welcome you all to this third Annual Conference. Our Association has just completed three years of existence. Although we started with a sort of difference and uncertainty we have been able to pull through successfully so far, through the co-operation and good will of our active members. During this period we have had the good fortune of having the benefit of the guidance of two stalwarts in public health as our President namely, Lt. Col. Lakshmanan, the Director General of Health Services, Govt. of India and Dr. B. C. Dasgupta, Ex-Director of Health Services, Govt. of West Bengal. As a very young association our achievements during the period may not be phenomenal but not negligible. The first year's deleberations on Rural health services and the recommendations made were very much appreciated by the Government as well as others concerned. In fact, we were able to mobilize the opinions and suggestions of a large number of experts. Last year the deleberations were confined to the teaching of Preventive and Social Medicine in the under and post graduate medical colleges in India. There was a good response and the discussion held indicated a good success.

The Association's main activities during the year under review namely, 1958, were limited to the following aspects:

1. Opening of Branches.
2. Running of the Journal of the Association.
3. Meetings of the Central Council and activities of the sub-committee.
4. Membership Position.
5. General Administration.

1. *Opening of Branches*:

The question of formation of state branches was approved by the first annual general meeting. It was agreed that this was necessary to bring about greater stability and strength to the organisation and to encourage the members to start activities on state-wise as well as local basis. Accordingly in the first meeting of the Central Council held on the 8th March 1958, a subcommittee consisting of Dr. K. S. Viswanathan, Dr. S. E. D. Masilamani, Col. N. D. P. Karani, Dr. K. C. Patnaik and Dr. S. C. Seal, was formed to proceed in the matter.

It may, however, be stated that inspite of the formation of this sub-committee the progress regarding the opening of State Branches was not at all satisfactory. The two states which had taken initiative in the matter were Bihar and West Bengal. The following personal contacts were made by the author during his visits to Madras, Talcher (Orissa), Lucknow and Nagpur. In Madras he saw the Chief Health Officer of the city Dr. Sundarababu and the Director of Health Services Dr. Parthasarathy. This contact was followed up by Dr. S. E. D. Masilamani, but so far no request has been received from Madras for opening a state Branch. In Orissa, a meeting of the local medical practitioners was organised by Dr. S. C. Das, Civil Surgeon of Sambalpore and of a large number of health workers at Lucknow by Dr. A. C. Banerjee, in which the author explained the purpose and function of the State Branch. In Nagpur he met the Regional Director of Public Health, the Health Officer of the Corporation and the Professor of Preventive and Social Medicine. From all these places he returned with the hope that besides West Bengal and Bihar, the States of Madras, Bombay, and Uttar Pradesh would soon organise their branches. Further contracts have been subsequently made with Dr. Sundarababu of Madras, Dr. T. B. Patel of Poona, Dr. C. S. Naidu of Hyderabad and Dr. U. C. Bardoloi of Assam to take steps in the matter of opening of State Branches.

The application from the Bihar members was considered in the First meeting of the Central Council. As certain obvious discrepancies were noted in the Rules and Regulations drawn up by them the matter was referred to a sub-committee consisting of Dr. S. E. D. Masilamani, Dr. K. S. Viswanathan and Dr. S. C. Seal. The report of the sub-committee as well as the application of West Bengal members were considered by the Central Council in their Second Meeting held on the 26th August, 1958. The Rules and Regulation being found in order the West Bengal State Branch was accorded due recognition by the Council and the Bihar State Branch was provisionally recognized to the resubmission of the Rules and Regulations according to the suggestions made by the sub-committee. These modified Rules and Regulations have since been received and it is now for consideration of the Central Council.

2. *Journal of the Association:*

Four issues of the Journal have been published this year along with a special supplement for the symposium on the Teaching of Preventive and Social Medicine in the Undergraduate Medical Colleges in India. The latter was circulated among all colleges, universities and members of the Association and also sent to the Indian Medical Council.

Although it was announced that the Associate Members could subscribe the Journal at a concession rate of Rs. 6/- per annum it did not elicit any appreciable response from them. Also for the reason stated last year publicity for the Journal inside or outside the country could not be undertaken for want of any assistance from among the committee members. During the author's visit to Europe in September this year he contacted several Institutions in Geneva, London, Prague, Rome and Alexandria and succeeded in establishing exchange relationship with their respective publications. To maintain the standard already achieved it is highly desirable that some of our members should take special interest in its publication by encouraging the members to write and contribute public health matters in the Journal for the benefit of the health workers in India.

The advertisement in the Journal suffered a set back this year, as many of the foreign firms withdraw their advertisement on the plea of import restrictions. Besides, a large number of members defaulted in paying their subscription but the journals were supplied to them for some months before stopping. This entailed an additional loss in the shape of postage which is rather heavy 37 to 50 nP. per copy.

The Journal Committee met five times during the year. The press was not giving satisfactory service as reported last year. The Committee, therefore, approved of its change. Accordingly the last two issues of the year were published by the Eton Press Private Ltd. The total number of pages of reading matter published this year is 356 as against 294 of the last year. If sufficient interest is taken by the members, this journal will not only be an asset to the Association but also will prove valuable to the public health institutions in India and provide the steps for the development of science of public health.

Meetings:

(a) *Meetings of the Central Council:*

The Central Council met four times including the annual meeting. These meetings were held on the 8th March, 26th August, 15th and 27th December respectively of the five sub-committees proposed to be set up the following three were approved by the first meeting of the council.

(1) Formation of Branches Sub-Committee composed of the following members, Dr. S. E. D. Masilamani, Dr. K. S. Viswanathan, Dr. K. C. Patnaik, Col. N. D. P. Karani and Dr. S. C. Seal, (Convenor).

(2) Medical Education Sub-Committee—composed of the following members:—Dr. B. S. Das Gupta (President), (2) Dr. N. Jungalwalla (Hygiene Institute), (3) Dr. A. K. Niyogi (Baroda), (4) Dr. B. N. Kolekar (Gwalior), (5) Dr. S. G. Vengsarkar (Bombay), (6) Dr. J. K. Bhattacharjee (West Bengal), (7) Dr. K. N. Gour (Kanpur), (10) Dr. L. R. Allen (New Delhi) and (11) Dr. S. C. Seal (Secretary)—Convenor.

(3) Scientific Sub-Committee consisting of Dr. B. C. Das Gupta, Dr. N. Jungalwalla,

Shri P. C. Bose, Dr. K. S. Viswanathan, Dr. Mrs. Muktha Sen, Dr. A. Mukherji, Dr. J. K. Bhattacharjee, and Dr. S. C. Seal, (Convenor).

Besides above Dr. K. S. Viswanathan was requested to contract members for Scientific articles for the Journal and Dr. C. Chandrasekaran, Dr. M. N. Lahiri and Dr. A. L. Saha and Dr. S. K. De, were requested for Abstract writing and Dr. S. P. De was proposed to act as the Assistant Editor in place of Dr. S. R. Sengupta who regretted his inability to serve as Asstt. Editor of the Journal due to heavy pressure of official work.

The Secretary suggested that a day should be fixed to be called as "Association Day" in memory of the Inauguration Ceremony. On that day all throughout India where the Association will have a registered member would initiate some health slogan or health theme and would actually participate in the programme of the theme proposed and circulated by the Central Council ahead of time. The idea was considered useful but the members agreed to start this day after the Branches were opened.

A symposium on the standerdisation of Postgraduate teaching in Public Health was organised by Dr. N. Jungalwalla at the All India Institute of Hygiene & Public Health, Calcutta in October 1958. It might be worthwhile to publish the proceedings through our Journal.

The Second meeting was devoted mainly to the consideration of the opening of State Branches, approval of recommendations of the curriculum Scientific Sub-Committees and to the drawing up of a tentative programme for the Third Annual Conference. The proceedings of these meetings have already been published.

(b) *Other meetings:*

Besides the Journal Committee, the Sub-Committee for drawing up the curriculum for the teaching of Preventive and Social Medicine in the Undergraduate Medical Course met three times and the Scientific Sub-Committee only once during the year. The final recommendations of the curriculum Sub-Committee were approved by the Central Council and already circulated and also published in the October issue of our Journal.

Membership Position:

The membership position has not yet stabilized, a considerable fluctuation having been noticed since its inauguration when the total number of membership registered was 542 including 168 Associate members. In 1957 although the membership stood at 670 the annual subscription remained unpaid for 325 members. Including the new members the membership of good standing remained at 345 only, the majority of Associate members having declined to continue. This year one hundred members have newly registered largely through the auspices of the Bihar State Branch but the membership position did not materially improve as the number of defaulting members rather increased inspite of the circulars and reminders. The total membership of good standing stood at 324 only on the 30th September, 1958. This is undoubtedly not a very happy picture except that the Association has now as many as 37 life members in its register.

The position was brought to the notice of the Central Council which approved of the procedure of sending the membership card by V.P. as is done by the Indian Science Congress Association, on the premise that those members who might forget to send the subscription due to oversight would appreciate this procedue. Altogether 75 cards were sent by V.P. but the total response was only 40. The best way to overcome this difficulty is to open the State Branches. This procedure will not only make the Association popular as it will give some opportunities to the members to meet among themselves and take some active parts in the Association's work but will give a better stability to the organisation and will permit the annual function to be held at different states in different years. In this respect our members belonging to different states can help the Association by taking a little more lively interest and bring the other members together to form the branch, which is all to their advantage. Without any extra subscription they will be able to retain one third of the amount for the activities of their State Branches. Besides, there will be other ad-

vantages already mentioned. I would, therefore, urge upon our members to follow the steps taken by the West Bengal and Bihar Members.

General Administration :

The administrative work has increased greatly due to the activities of the various sub-committees, larger number of meetings, notices and correspondence inland as well as foreign. The load has particularly increased due to the defaulting members because to prevent determination of the already precarious financial position, the members have been approached several times with reminders. The Journal work, as it is, is heavy and is also increasing. In view of this financial position inspite of the sanctioned budget this heavy work has been managed with the same staff namely, one part-time clerk cum accountant and one part-time peon, and by employing typists temporarily for the Journal work. The Central Council, however, made an ad interim grant of Rs. 50 for the clerk and Rs. 30 for the peon, and an increase in the monthly salary by Rs. 10/- for each. All members agreed that they deserved this advance. The management is now considerably strained and the author is afraid that if the members do not take lively interest to increase the membership to enable the administration to utilize additional staff it would be difficult to maintain the efficiency. Already complaints have been received for delayed or non-receipt of journals, delaying in receiving replies of letters and in issuing of notices for council and committee meetings and so on. It may be stated in this connection that since inauguration, for some reason or the other, no assistance was available for Association work from any of the Joint Secretaries so far elected. The Association can run only when the individual members fulfil their respective obligations to the Association and not depend upon one or only few office bearers. Although the budget was provided for appointment of a clerk with typing experience for the journal, it could not be translated into action as the membership subscription was in great deficit.

Accounts and Budget :

The accounts are now being maintained according to the methods suggested by the Auditor last year. The Journal account is being kept separate and two accounts have been opened in the State Bank of India, one in the name of "Indian Public Health Association", and another in the name of "Indian Public Health Association (Journal)" to facilitate collection of advertisement bills as well as payment of the press and paper bills etc. The Audit report is, however, presented below as a single Association Account for the period between 1st October, 1957 and 30th September, 1958:

Receipts and Payment Account for the year from 1st October, 1957 to 30th September, 1958:—

RECEIPTS		PAYMENTS	
	Rs.		Rs.
To Opening Balance—		By Establishment	1,700.00
Cash at Bank	1,929.53	„ Advertisement Commission ...	1,682.19
„ Membership Subscription ...	4,219.50	„ Postage and Telegram ...	1,402.24
„ Advertisement Bills realized ...	9,896.00	„ Printing and Stationery ...	2,395.52
„ Loan from Souvenir Account ...	285.00	„ Journal Account	3,462.50
		„ Auditor's Fee	100.00
		„ Subscription Account Return ...	173.32
		„ Conveyance and Travelling Account	330.34
		„ Miscellaneous Account ...	449.86
		„ Closing Balance in Bank ...	4,140.46
		„ Cash in Hand	493.60
	Rs. 16,330.03		Rs. 16,330.03

ASSETS

	Rs.
Income upto 30th Sept., 1958 ...	16,330.03
Advertisement Bill unrealized ...	1,823.50
Excess of Expenditure over Income ...	2,951.67
Rs.	21,105.20

LIABILITIES

	Rs.
Expenditure up to 30th Sept., 1958 ...	11,695.97
Commission payable to Advertisement	138.50
Press Bill unpaid	4,282.73
Photographic Bills unpaid ...	178.00
Loan from Life-Membership Account	4,525.00
Loan from Souvenir Fund ...	285.00
Rs.	21,105.20

It will be seen that the financial position as shown above is not at all satisfactory. Although apparently the position has remained the same as last year it is highly desirable that the condition should not be allowed to continue like this. It must be understood that the work so far carried out could be done with meagre staff under great strain. Additional staff is now essential for better management. Another point of importance is that with the opening of branches the present income will be reduced to two-third which is the Central contribution of the membership fee by the state branches. Since the Association has proved its worth by now, I would strongly urge upon the Council to approach the Central Government for a substantial grant to cover up this deficit followed by a recurring annual grant of at least Rs. 3000/- to support and maintain the activities of the organisation.

A comparative statement showing the estimated and actual income and expenditure and the proposed budget for 1958-59 is given below: It will be seen that although a budget estimate of Rs. 19,300/- was made for the year 1957-58 the actual expenditure was Rs. 11695.97 as the actual income was only Rs. 14293/-. A considerable cut was made on the Journal expenditure, recruitment of the proposed new staff and purchase of typewriter machine etc. were suspended. A more restricted budget is, therefore, presented this year namely, for Rs. 17050/- with an expected deficit of Rs. 3050.00. The reason for reduced income unless the membership is considerably increased has already been stated. This position thus substantiates the proposed recurrent grant from the Government.

EXPENDITURE

	Budget for 1957-58.	Actual Spent for 1958.	Budget for 1958-59
	Rs.	Rs.	Rs.
Establishment	4,500.00	1,700.00	3,600.00
Postage	1,200.00	1,402.24	1,500.00
Printing and Stationery	1,500.00	2,395.52	2,500.00
Auditor's Fee	100.00	100.00	100.00
Advertisement Remuneration ...	2,500.00	1,682.19	2,000.00
Journal Printing	7,500.00	3,462.50	4,500.00
Typewriter and Furniture	1,500.00	—	1,500.00
Subscription Returned	—	173.32	—
Conveyance and Travelling	—	330.34	350.00
Contingencies and Miscellaneous ...	500.00	449.86	500.00
Expenditure for the Annual General Meeting	—	(included in the above account)	500.00
	19,300.00	11,695.97	17,050.00

INCOME

	1957-58 Estimated	1957-58 Actual	1958-59 Estimated
	Rs.	Rs.	Rs.
Membership Subscription	7,200.00	4,219.50	5,000.00
Subscription from Journal	200.00	678.50	200.00
Advertisement Bills	10,000.00	9,896.00	8,000.00
Expected Deficit	1,900.00		3,650.00
			Paper stock 800.00
	19,300.00	14,293.00	17,650.00

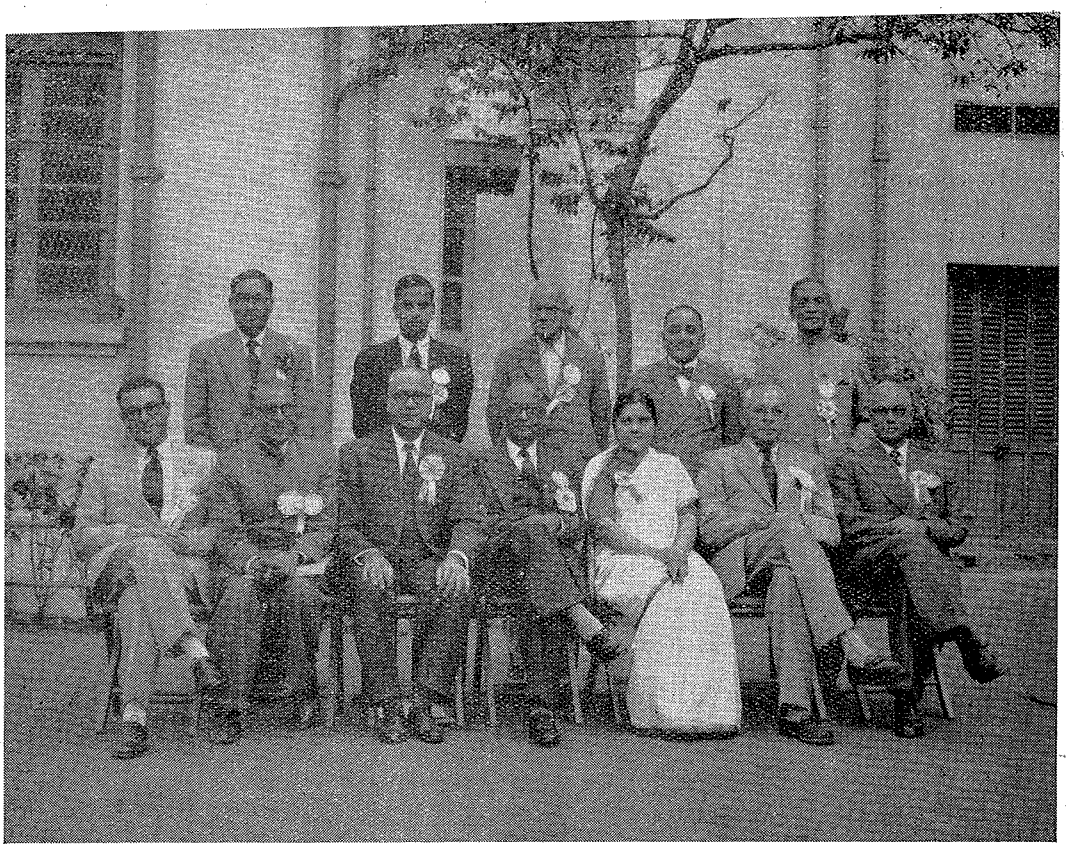
Concluding Remarks :

The Association is still in its formative period. A great deal of spade work by the Central as well as the State Branches, when they come, would be necessary including the active support of the Government as stated above. Naturally the members themselves might have noted some of the shortcomings which is bound to occur for shortage of staff and funds.

Before I conclude, I feel it my duty to express our gratefulness to the Director of the All-India Institute of Hygiene and Public Health, and the Director General of Health Services for giving us the permission not only to locate the Association at the Institute but also to hold the Annual Conference consecutively for the last three years free of all cost with other conveniences needed from time to time. I am also grateful to Dr. B. C. Das Gupta who has taken active interest in the activities of the Association not only with his guidance and advice as its President but also as the Editor of the Journal. My thanks are also due to other colleagues in the Council and members of the Journal Committee, and various other Sub-Committees for their ready help and spontaneous co-operation in the management of the Association activities. I also owe my indebetedness to Dr. Masilamani for kindly accepting the responsibility of the Treasurer and to Dr. A. L. Saha and other staff of my section for their help and co-operation in managing the Annual Conference.

Lastly, I wish to express our great appreciation and thankfulness to the entire Reception Committee at Calcutta through whose efforts and co-operation the Association could hold its Annual Conferences successfully in this city for the last three years.

CENTRAL COUNCIL 1958



Sitting :—Dr. N. Jungalwalla, Shri P. C. Bose (Vice-President), Lt.-Col. Jaswant Singh (President-elect), Dr. B. C. Das Gupta (President), Dr. (Mrs.) Muktha Sen, Lt.-Col. C. K. Lakshmanan (Past President), Dr. Seshagiri Rau.

Standing :—Dr. S. C. Seal (General Secretary), Dr. S. K. Sinha, Dr. B. Ganguly, Shri K. R. Bhide, Dr. S. E. D. Masilamani (Treasurer).

Proceedings of the Third Annual Meeting of the Central Council of the Indian Public Health Association, held on the 27th December 1958 at 2-30 P.M. at the Lecture Theatre No. 1 of the All India Institute of Hygiene & Public Health Calcutta with Dr. B. C. Dasgupta, the President, in the Chair.

Members present were:

Dr. B. C. Dasgupta—(*President*).
Lt. Col. C. K. Lakshmanan—(*Past President*).
Lt. Col. Jaswant Singh—(*President-elect*).
Dr. N. Jungalwalla.
Dr. B. Ganguly.
Dr. S. E. D. Masilamani.
Dr. Mrs. Muktha Sen.
Dr. S. K. Sinha.
Shri K. R. Bhide.
Shri P. C. Bose.
Mrs. Uma Mitra.
Dr. Seshagiri Rau.
Dr. S. C. Seal—(*General Secretary*).

Other members were present as observers.

The Agenda of the meeting were as follows:

1. To confirm the proceedings of the last meeting of the Central Council.
2. To receive and consider the annual report of the General Secretary for the year 1958.
3. To receive and consider the accounts of the past year.
4. To consider the budget estimate for the year 1959.
5. To consider the reports of the State Branches.
6. Election of Honorary members.
7. Selection of Office bearers of the Central Council and scrutiny of ballot papers for the election of President-elect and two Vice-Presidents for the year 1959.
8. Suggestion for election of 10 Members of the Central Council for the year 1959.
9. Suggestion for the appointment of an Auditor and his remuneration, if any, for 1959.
10. To consider resolutions brought forward by members.
11. Fixation of time and venue of the next Annual General Meeting.
12. Any other business.

1. The proceedings of the last meeting of the Central Council was confirmed unanimously.

2. The Secretary read out the Annual report for the year 1958. It was adopted by the meeting on the proposal of Dr. B. C. Dasgupta.

3. The Secretary reported that pending the Bank confirmation a provinsional audited account was prepared for presentation before the Council and this was circulated to the members. Sri P. C. Bose asked for the clarification of the Life Members' subscription fund vis-a-vis the deficit. The Secretary explained that in the last Annual General Meeting it was proposed that the Life Members' subscription should go for the building of the reserve and if any money was spent from this subscription fund it should be considered as loan to the Association. If on that basis the entire amount of Rs. 4,525/-, the total subscription received on account of 37 Life Members was set apart the excess of expenditure over the income would amount to Rs. 2951.57 nP. The Secretary, therefore, proposed that the Central Council should approach the Central Govt. to donate a lump sum grant to cover the deficit and thereafter to sanction a recurring annual grant of Rs. 3,000/- till the Association attained the position of self sufficiency. The members agreed that the help of the Govt. might be sought for, and if not available a reserve fund might be developed with lesser amount such as Rs. 1,500/- and then to build it up gradually. The members also recommended that the final audited accounts should be presented before the first council meeting of the year 1959. The audit report was then provisionally adopted.

4. The Secretary explained the proposed budget for 1959 and the comparative statements already circulated. The budget was passed for Rs. 17,050/- for 1959, including Rs. 500/- to meet part of the expenses of the annual general meeting. It was also agreed to take certain extra staff.

5. The report of the Bihar State Branch was read and recorded.

6. The Secretary then presented the recommendations of the last Central Council meeting in regard to the election of Honorary Members. Of the 8 names proposed the following six name was recommended:

(1) Dr. B. C. Roy, Chief Minister of West Bengal.
(2) Dr. A. C. Banerjee, Ex-Director of Health Services, Uttar Pradesh.
(3) Col. C. Mani, South East Asia Regional Director, W.H.O., New Delhi.
(4) Dr. M. C. Balfour of the Rockefeller Foundation stationed in India.
(5) Dr. John C. Homes, of the T.C.M., New Delhi.
(6) Dr. Le Roy R. Allen, of the Rockefeller Foundation, New Delhi.

Shri K. R. Bhide proposed that the honorary membership should be restricted to two members in any one year. This was accepted by the members for future elections but for this year's election the names of all the six members were approved.

7. Altogether 94 ballot papers were received by the Secretary. Although 25th December was announced as the last day for receiving the papers this being a holiday, papers received on the next day were also accepted for counting.

The Chairman requested Dr. P. K. Ghose and Dr. P. M. Roy to count the votes on behalf of the council. Out of 94 ballot papers six were rejected as these did not conform to the rules. The results of counting the ballots were as follows:—

(A) *For President-Elect.*

Col. Barkat Narain	58	Votes
Sri P. C. Bose	30	,,

(B) *For Vice-President.*

Col. N. D. P. Karani	42	Votes
Dr. T. B. Patel	41	,,
Major K. N. Rao	25	,,
Dr. B. B. A. Dalal	29	,,
Col. Barkat Narain	31	,,

The Chairman declared Col. Barkat Narain as President-Elect for 1959 and Col. N. D. P. Karani and Dr. T. B. Patel as the two Vice-Presidents for 1959.

Among the other office bearers Dr. S. C. Seal and Dr. S. E. D. Massilamani were requested to continue as the General Secretary and Treasurer respectively by the Council, to which both agreed inspite of personal difficulties. Dr. R. K. Banerjee and T. B. Bhaskaran were selected as the two Joint-Secretaries.

8. Of the ten members the Council recommended the names of the following persons for final consideration of the Annual General Meeting.

Dr. Seshagiri Rao, (Bangalore, Mysore).
Dr. Mrs. Muktha Sen, (Calcutta).
Sri K. R. Bhide, (Patna).
Dr. G. P. Chakravarty, (Lucknow).
Dr. S. K. Sinha, (Patna).
Mrs. Uma Mitra, (West Bengal).
Dr. P. K. Ghose, (Calcutta)—Proposed by Dr. B. Ganguly, and seconded by Sri P. C. Bose.
Sri P. C. Bose, (West Bengal)—Proposed by Dr. Massilamani and seconded by Dr. Seal.
Major K. N. Rao, (Andhra State)—Proposed by Dr. Massilamani and seconded by Dr. Seshagiri Rao.
Dr. B. Ganguly, (Calcutta).

9. The appointment of auditor was referred to the next meeting of the Central Council pending the receipt of the final audited report for the year ending 30th September, 1958.

10. This item having been considered already in the previous Council Meeting was not discussed further.

11. Shri K. R. Bhide of Bihar State Branch provisionally invited the Association to hold its annual session at Ranchi next year subjected to his government's approval.

Col. Jaswant Singh said that other branches might be also approached and after their replies have been received the question of venue of the next annual Conference might be decided. Dr. B. Ganguly suggested that it might be held in New Delhi next year. The Chairman said that the invitation should of course come through the Delhi State Branch which is not yet formed. Since no offer other than from the Bihar State Branch, though subject to further confirmation, was made in this meeting, other offers could only be considered by the next meeting of the Central Council, and the Secretary might approach the different State Branches for obtaining their views in the meantime.

The outgoing President, Dr. Das Gupta thanked the members of the Central Council for their kind co-operation and active interest in the management of the Association throughout the year and welcomed the new President, Col. Jaswant Singh and wished him greater success during the coming year.

The meeting of the Council then ended with vote of thanks to the Chair.

Proceedings of the Third Annual General Meeting of the Indian Public Health Association held on the 28th December, 1958, at 5 p.m. at the All India Institute of Hygiene and Public Health, Calcutta, under the Chairmanship of Dr. B. C. Das Gupta, Ex-Director of Health Services, Government of West Bengal.

Many local and outside members numbering about 150 were present in the meeting.

The agenda were as follows:—

1. To confirm the proceedings of the 2nd Annual Meeting (printed in January, 1958 issue of the Indian Journal of Public Health).
2. To receive, consider and adopt the Annual Report of the General Secretary for the year 1958.
3. To receive, consider and adopt the Annual Accounts of the past year (1st October, 1957, to 30th September, 1958).
4. To pass the budget estimate for the ensuing year.
5. To announce the office-bearer of the Association for the year 1959.
6. To elect 10 members of the Central Council.
7. To elect the voting members from among the associate members according to the Rules 9 B (ii).
8. To consider the resolutions brought forwarded by the Central Council and by the individual members.
9. To elect the venue and time of the next Annual General Meeting.
10. Any other business.

Agenda:

1. The proceedings of the Second Annual General Meeting held on the 29th September, 1957, were published in the January, 1958 issue of the Indian Journal of Public Health and were circulated among the members. Dr. B. Ganguli having proposed, the proceedings were confirmed by the meeting.

2. The General Secretary then presented the Annual Report for the year 1958, as passed by the Central Council in its Third Annual General Meeting held on 27th December, 1958. After a brief discussion on the membership position which was not very satisfactory due to large number of members defaulting the report was adopted by the meeting.

3. The Secretary reported that due to the discrepancy in the cash in the Bank on the 30th September, 1958, and the balance shown in the account book on that date, the reason for which was explained to the auditor, he not only submitted a provisional audited account pending verification of Bank deposits, and this was circulated to the members. The Secretary stated that the reason for this discrepancy was that some of the cheques deposited towards the end of September had to be sent out for Bank's confirmation and thus the money was credited by the Bank at a date later than the 30th September. Dr. P. K. Ghose proposed that since it was not a final audited account the members could not pass it in this Annual General Meeting but the members agreed that the Secretary might present the final audited accounts before the first meeting of the Central Council to whom the power was delegated for scrutiny and necessary action.

4. The Secretary then presented the budget for the year 1958-59 and explained the income and expenditure on different

items. He also stated that as the expected income out of membership subscriptions did not materialize no extra staff other than that of a part-time typist could be employed during the last financial year with consequent heavy pressure on the Secretary himself and the part-time accountant and the peon. The Central Council, however, sanctioned an interim relief to these workers after the Pujas. A comparative statement of the budget and actual expenditure during the last year was also circulated among the members. (*See* Secretary's Annual Report). After deliberations the members agreed to the recommendations of the Central Council and passed a budget of Rs. 17,050/- for the year 1958-59 which will cause a deficit of Rs. 3,050/-. The meeting also approved the recommendation to approach the Government for financial help.

5. The President announced the results of election of the President-elect the Vice-Presidents and of other office-bearers of the Association for the year 1959 as selected by the annual meeting of the Central Council held on 27th December, 1958. The following were declared elected as office-bearers for the year 1959.

President-Elect :—
Col. Barkatnarayan (New Delhi).

Vice-Presidents :—
Col. N. D. P. Karani (Poona).
Dr. T. B. Patel (Poona).

General Secretary :—
Dr. S. C. Seal (Calcutta).

Joint Secretaries :—
Dr. T. R. Bhaskaran,
Dr. R. K. Banerjee.

Treasurer :—
Dr. S. E. D. Massilamani.

6. To minimise the time in regard to the election of 10 members the President placed before the house the recommendations of the Central Council. After some brisk discussion the Council's recommendations were accepted and the following were elected or re-elected to the Council for 1959.

1. Dr. Seshagiri Rao (Poona).
2. Dr. (Mrs.) Muktha Sen (Calcutta)
3. Sri K. R. Bhide (Patna).
4. Dr. G. P. Chakravarty (Lucknow)
5. Dr. S. K. Sinha (Patna).
6. Mrs. Uma Mitra (West Bengal).
7. Dr. P. K. Ghose (Calcutta).
8. Sri P. C. Bose (West Bengal).
9. Major K. N. Rao (Andhra).
10. Dr. B. Ganguli (Calcutta).

7. The names of the three voting associate members as elected according to rules by the Bihar Branch were approved by the meeting.

8. Altogether 8 resolutions were placed before the meeting, the last one consisting of a proposal for a series of changes in the rules and regulations of the Association. The following resolutions were passed after discussion.

(1) *Proposed by Dr. B. Ganguly and seconded by Dr. A. L. Saha.*

The Association recommends that an early action may be taken by the Central Council of Health on the draft mannual of Public Health Act completed in 1955 and placed in the hands of various state governments to enable them to adopt it with such modifications as are necessary to suit the local conditions.

(2) *Proposed by Dr. B. Ganguly and seconded by Dr. P. K. Ghose.*

In view of the increasing sale of adulterated and substandard foods in the

country inspite of the Food Act being passed by the Central Government two years ago the Association urges upon the State Governments to fully implement the provisions of the Act by providing the necessary staff and equipments for the purpose.

(3) *Proposed by Dr. A. L. Saha and seconded by Dr. B. Ganguly.*

Resolved that only the ordinary and voting Associate members of good standing, that is members whose all membership dues including that of the current year have been paid before the 30th September of the year will be eligible for voting in the Annual General Meeting of that year and for serving as office-bearers of the Association.

Other resolutions were discussed and rejected by the members.

9. The Secretary informed the members that Sri K. R. Bhide of the Bihar State Branch provisionally invited the Association to hold its session at Ranchi next year subject to the approval of his Government. After a discussion on this issue in the last annual meeting of the Central Council it was recommended that the final decision might be made by the newly-formed Central Council after Secretary had ascertained the views of the other newly-formed branches. The members approved of the procedure.

10. The out-going President then thanked the members of the Association for their kind co-operation and interest in the activities of the Association and welcomed the new President Col. Singh and wished him god-speed and greater success during the coming year.

The meeting terminated with the vote of thanks to the chair.

CLOSING SESSION

Minutes of the closing session of the Third Annual Conference of the Indian Public Health Association held at Calcutta on the 29th December, 1958 with Dr. Seshagiri Rau, Director of Public Health, Mysore State, presiding in absence of Dr. B. C. Das Gupta, President of the Association.

Nearly 100 members were present.

Resolutions were moved by different panels following the deliberations on the various symposium held during the Annual Session.

Panel—I.

'Training of Auxilliary Health Personnel':

A sub-committee consisting of the following members was set up to draw up recommendations for the training of Auxilliary Health Personnel:

1. Dr. S. E. D. Basilamani.
2. Shri N. Majumdar.
3. Mrs. Uma Mitra.
4. Dr. J. K. Bhattacharjee.
5. Dr. G. Sen.
6. Dr. Jagjit Singh.
7. Dr. Seshagiri Rau.

The report of this Sub-Committee is appended at the end of the Panel discussions:

Panel—II.

Immunization Programme:

Three of the four resolutions presented before the meeting were passed by the members (see under Resolution passed in the Third Annual General Meeting).

Panel—III.

Collection of Vital Statistics in the Rural and Urban areas:

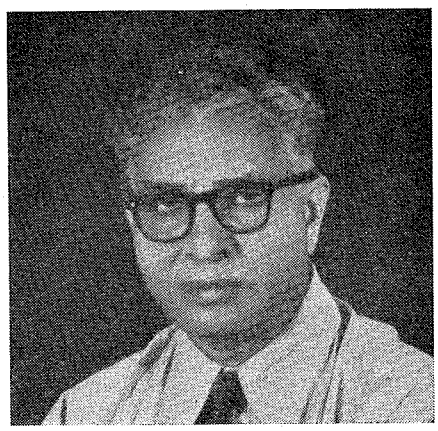
The resolution adopted by the members is given under Resolution passed by the Third Annual General Meeting:

Dr. Jagjit Singh proposed that a uniform basic syllabus and curriculum for the training of Sanitary Inspector in different states of India should be prepared by the Sub-Committee already formed in connection with the panel dealing with the training of auxiliary health personnel. The Secretary was requested to convene the meeting of the above Sub-Committee and submit the report to the Central Council for approval and circulation. This was agreed to.

In regard to the resolutions passed Dr. B. Ganguly proposed that these may be sent to the Central and State Health Ministries and Directorates and to other appropriate authorities and the resolution No. 3 related to the vaccination programme to the members of the Parliament and State Legislature in India. This was agreed to.

Before the conclusion of the Session the Secretary offered a vote of thanks, with hearty approbation of the members, to Dr. Seshagiri Rau for kindly agreeing to conduct the proceedings of the meeting in absence of the President and to all members and delegates who made it convenient to attend the Annual Session. He also thanked all the Chairman of the Panels and the members who participated in the Symposium all of which were a great success.

OBITUARY



Dr. G. Sankaran, M.B.B.S.

Professor Dr. Ganapathi Sankaran who served at the All-India Institute of Hygiene and Public Health, Calcutta, as Professor of Nutrition and Biochemistry between 1938 and 1955 and finally became the Works Manager of the Hindusthan Antibiotics, Pimpri near Poona, suddenly passed away on the 18th December, 1958, after a brief illness following a heart attack while he was engaged in the installation of an antibiotics plant in a pharmaceutical concern of Calcutta. He had undertaken this assignment only a few months ago after retiring from the Hindusthan Antibiotics.

Being born in Masulipatam on December 15, 1900, Dr. Sankaran had just completed 58 years of his life. He graduated from the Presidency College and Medical College, Madras, in 1925. After working with Dr. Newcombe in the office of the Chemical Examiner with the Government of Madras for two years, he was appointed Biochemist at the Nutrition Research Laboratories, Coonoor, in 1928 where he did important work in the field of Biochemistry and rabies. He spent a year (1932-33) at the Cavendish Laboratories, Cambridge, on an I.R.F.A. fellowship. Returning to Coonoor he specialised in Tissue culture work. He joined the All-India Institute of Hygiene and Public Health Calcutta, in 1937 as Assistant Professor in the Nutrition and Biochemistry Department. He became Professor in 1938 and retired from there in 1955. During the Bengal famine of 1943, he did very valuable work in the field of Nutrition. He was associated along with Dr. Grant, Professor Subrahmanyam and Dr. Krishnan to establish a Blood Bank at the Institute—the first of its kind in India. He was particularly interested in the formation of a freezeding apparatus which he successfully did for the drying of human plasma. Soon after he was ready with a blue-print for an integrated chemical industry for India. During his tour abroad in 1945-47 he gained considerable American know-how of the mass production methods of Vitamins and Antibiotics. In October, 1950, he was transferred from the Health Ministry to the Ministry of Production and appointed executive head of the Indian Penicillin Committee, the fore-runner of Hindusthan Antibiotics.

Dr. Sankaran was greatly interested in the technical side of production of food, drugs and biologicals and particularly Vitamins and Antibiotics in India. He was in fact a blend of Chemist, a chemical engineer, a biochemist, a Physicist, a medical man and a nationalist in the true sense of the terms, with a flare of engineering right from his early days.

Simple in habits and broad at heart he commanded the respect and administration of all who knew him. He was still full of vigour and zeal for national work and the country has indeed suffered a great loss by his premature death. He is survived by his wife and five children—4 daughters and one son. We all deeply mourn for his loss and offer our heart-felt condolence to his bereaved family.

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