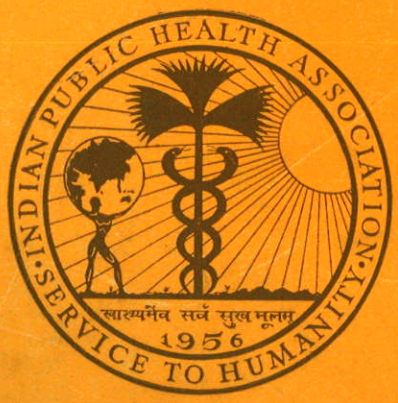
Indian Journal

OF

PUBLIC HEALTH

Quarterly Journal of the Indian Public Health Association



JANUARY, 1957

VOLUME I NUMBER 1

EDITOR :

DR. B. C. DASGUPTA, B.SC., M.B., M.R.C.P., D.P.H., D.T.M. & H.

ANNUAL SUBSCRIPTION Rs. 8/- (INLAND) SINGLE COPY Rs. 2/- (INLAND)

A COMPLETE SEWAGE TREATMENT PLANTS:

		POPULATION
1.	JADAVPUR K. S. ROY T. B. HOSPITAL ...	3,000
2.	KALYANI TOWNSHIP	40,000
3.	SERAMPORE	60,000
4.	GANGULY BAGAN HOUSING SCHEME	5,000
5.	PODDAR PARK HOUSING SCHEME ...	2,000
6.	KANCHRAPARA T. B. HOSPITAL ...	3,000

AND OTHER SEWAGE OUTFALL EQUIPMENTS, SUCH AS, AUTOMATIC DETRITUS ELEVATORS, AUTOMATIC RAKING SCREWERS, PENSTOCKS, ETC.

B. RAPID GRAVITY FILTERS (WATER TREATMENT)

AND

OTHER TREATMENTS

RANIGUNGE ... ... 60,000 Gallons/hr.

Manufacture & Installation

By

INDUSTRIAL SERVICE

&

ENGINEERS LTD.

57, SHYAMAPRASAD MUKHERJEE ROAD,
(OLD—139/1, RUSSA ROAD),
CALCUTTA—26

I am Tea take a good look at me

My teapot head is the symbol of an ever-expanding ceramic industry which is turning out every year millions and millions of cups and saucers, and thus contributing to a higher standard of living for our people.

The rest of my body consists of two-leaves-and-a-bud from which is made a beverage that is drunk almost throughout the world; besides, the green leaves should remind you of the acres and acres of land where I grow, of the thousands and thousands who tend these acres—not to speak of the impetus that I have given to the development of such industries as coal, cement, fertilisers, tea machinery, plywood and many others. Incidentally, nearly six million tea chests from plywood are now being manufactured yearly in India.

I am, therefore, a vital part of the agricultural and industrial life of India—a friend too of the worker in the field and in the factory and, above all, your friend in your worst and best moments.

TEA BOARD INDIA

I am Tea — the wealth of India

PST 171

'Cetavlon'

CETRIMIDE B.P.

(Improved Quality)

Dual Action Antiseptic

Bactericide : Detergent

Non-toxic, non-irritant, 'Cetavlon' in its new form is an ideal antiseptic. Applicable in a variety of cases, this *improved* product has the following advantages :

- Highly bactericidal in low concentration.
- Shows increased bactericidal potency against a wide range of Gram-positive and Gram-negative organisms, including the highly resistant Pseudomonas pyocyanea.
- Removes all contaminating matter in wounds and burns and therefore obviates the use of soap.
- Non-toxic and non-irritant even on raw surfaces.
- Solutions are more easily prepared and economical in use.

In hospitals, private surgeries and in First Aid, 'Cetavlon' is indispensable.

In addition to the powder, 'Cetavlon' is available as an aqueous Concentrate (20%), a Tincture (0.5%) and as a Cream ('Cetavlex').

Comprehensive literature, packings and prices on request

IMPERIAL CHEMICAL INDUSTRIES (INDIA) PRIVATE LIMITED

Calcutta Bombay Madras New Delhi

ICI

Sole Distributors in India for

IMPERIAL CHEMICAL (PHARMACEUTICALS) LTD., MANCHESTER

ICP 656

CONTENTS

CONTENTS—*Contd.*

INDIAN JOURNAL OF PUBLIC HEALTH

Official Quarterly Publication of the Indian Public Health Association

VOLUME 1 JANUARY, 1957 NUMSER 1

PRESENT DAY DEMOGRAPHIC TRENDS*

By

DR. C. CHANDRASEKARAN, M.SC., Ph.D., M.P.H.

Professor of Statistics,

All-India Institute of Hygiene and Public Health, Calcutta

Not much data exist on the dynamics of India's population in the past and on the factors which have affected its size and structure; the population censuses which are being conducted on a national basis every ten years since 1881 and a limited number of field studies provide almost exclusively the reliable information available on these sujects. The inefficient functioning of the Birth and Death Registration system which was first introduced in the year 1873 is one major reason why we, to-day, are not in a position to discuss objectively India's demographic trends in the past and their tendencies at the present time. However, the need for an appreciation of future population growth is so great at this time when the country is engaged in the planning and execution of the Five Year Plans that students of demography have to make the most of the available information and provide whatever guides they can for the use of planners and administrators. It is with this object that I have agreed to discuss before you the present day demographic trends in India. It is to be hoped that the limitations in factual data which this discussion would reveal might lead to fresh efforts on the part of Government officials and others to increase the volume and improve the quality of demographic data relating to this country. Workers in the family planning fields have an exceptional opportunity of studying current attitudes and motivations affecting fertility and with proper perspective they can in no small measure contribute to knowledge in this important subject.

Past population growth

The most significant feature revealed by the data of the population censuses is that the rate of population growth prior to 1921 fluctuated widely while subsequent to 1921, it has been maintaining a steady upward trend. From the census data presented in Table I, it is seen that in the two decades 1891-1901 and 1911-1921, the population size showed a small decline while in the intervening decade 1901-1911, the population increased by 5.7 per cent. The three decades following 1921 recorded respectively increases of 11.0, 13.5 and 14.1 per cent in population. During the thirty years from 1921-1951 the population of India increased by 108.8 million (43.9 per cent) as compared with 12.2 million (or 5.2 per cent) during the thirty years prior to 1921.

TABLE I

Census year	Population in millions	Percent increase or decrease in previous decade
1891	235.9	
1901	235.5	— 0.2
1911	249.0	+ 5.7
1921	248.1	— 0.4
1931	275.5	+11.0
1941	312.8	+13.5
1951	356.9	+14.1

*Adjusted to the present boundaries of the Indian Union.

What were the reasons for such differences in population growth before and after 1921? Some clue is given by the estimated birth and death rates during the inter-censal decades presented in Table II.

TABLE II

Estimated annual birth and death rates

Decade	Births per 1000 population	Deaths per 1000 population
1881—1891	48.9	41.3
1891—1901	45.8	44.4
1901—1911	49.2	42.6
1911—1921	48.1	47.2
1921—1931	46.4	36.3
1931—1941	45.2	31.2
1941—1951	43.1	30.9

The estimates for the several decades from 1881-1891 to 1931-1941 were worked out by Kingsley Davis and relate to India prior to partition. Those for the decade 1941-1951 were obtained by the Office of Population Research, Princeton. The Princeton estimates of 43.1 for the birth rate and 30.9 for the death rate are far in excess of the corresponding estimates of 39.9 for the birth rate and 27.4 for the death rate, made by the Census Actuary after the 1951 census. The lack of consistency of the Actuary's estimates for 1941-1951 with those for the previous decades was pointed out by me at the World Population Conference, held in Rome in 1954 and it has since been shown by Coale and Hoover in a monograph not yet published that the main reason for the discrepancy is the difference in the statistical procedures used for making these estimates.

The birth and death rates presented in Table II should not be considered very accurate as a number of assumptions is involved in their computation. As such, it will be proper to attach significance only to large differences in these birth or death rates. With this caution in mind, the major conclusion that can be reached from a study of the figures in Table II is that in the three decades from 1921 to 1951 the death rates were markedly below the levels of the rates recorded prior to 1921. It is also apparent that the birth rates have been practically stationary. Against this background we may now consider broadly the economic and social changes which have been taking place in the country and the likely effect they may have on the mortality and fertility conditions.

Trends in mortality

Decline in mortality might arise from a number of causes but the experience in Western countries in the past and in some Eastern countries more recently has shown that some of these are more important than the others. Among these which are likely to produce substantial declines in mortality are the following: the improvement in food supply and in particular the elimination of famines; the control of communicable diseases and the promotion of personal hygiene; the provision of adequate medical facilities especially for the poorer sections of the community and finally the development of a social consciousness on fundamental human needs and the provision of amenities for men and women to live in healthy surroundings and enjoy a wholesome life. In India, economic and social progress had taken place in a number of directions even prior to 1951 and the declines which have occurred in the death rates since 1921 should be largely attributed to it. The progress naturally was not the same in all spheres which had a direct bearing on the health of the nation. Foremost among the developments which occurred was the effort to improve living standards by enhancing agricultural production. The numerous famines which occurred during the middle and latter half the nineteenth century helped to focus attention on the imminent need for increasing food supplies and as a consequence large scale efforts were made to augment the area of land under irrigation and to improve the quality of agricultural practices. Along with such efforts, the development of road and rail communications also assisted in rushing food supplies to areas which became subject to famine. These advances would naturally have helped to reduce the death rates. Efforts to combat epidemics particularly of small pox, cholera and plague began to be made on a large scale in the early twenties of the present century when public health services began to be better organised in the various provinces of India. The health personnel and other facilities available were, however, extremely meagre; more often than not the public health staff were able to prevent the spread of epidemics from these diseases rather than to check their outbreaks. As would be expected, except in limited areas the health department could not prior to 1951 take adequate steps to fight out such killers as malaria, tuberculosis or the gastro-intestinal diseases. The medical facilities available during this period was also

meagre. State and voluntary aids led to the opening of hospitals and sanatoria and in some provinces mobile dispensaries helped to alleviate the sufferings of the sick. But so inadequate were these services that it is unlikely that they made a deep impression on the death rates.

When viewed against these major developments which had occurred prior to 1951, the conclusion is inescapable that the decline in mortality prior to that year should largely be attributed to improvement in food supply and the checks on large scale epidemics from a few important diseases.

Since 1951, thanks to the First and Second Five Year Plans, an all round effort has been made to improve the health and economic conditions of the nation. Agricultural development, which received the highest priority in the First Five-Year Plan was attempted by increasing the area under irrigation through numerous hydro-electric projects, by improvement in the quality of agriculture particularly through the use of Indian manufactured synthetic fertilisers and by stepping up the enthusiasm and interest of the rural population for increased production through Community projects. The First and Second Five-Year Plans have included large scale measures for the control of Malaria, Filariasis, Tuberculosis, Leprosy and Venereal diseases. The National Malaria campaign now covers a population of about 135 millions and judged by the changes in the spleen rate, the campaign appears to have begun yielding results. It has been reported that the spleen rate which in 1953-54 was 56 in Bihar, 40 in Madhya Pradesh, 34 in Orissa, and 20 in West Bengal declined to 19, 14, 18 and 7 respectively by 1955-56. As a result of the B.C.G. programme of the National Tuberculosis Control campaign 25 millions of children have been inoculated and it is hoped that by 1961 the great majority of the tuberculin negatives under 20 years of age will become protected by B.C.G. With a view to combat the wide prevalence of gastro-intestinal diseases in the country, the First and Second Five Year Plans have included large schemes for the improvement of water supply and sanitation. In addition to these health programmes, the plans have envisaged the increase of hospitals and dispensaries and the manufacture of anti-biotics within the country.

It is realised that not all the targets specified in a plan are necessarily reached at the end of the plan period. It is possible, therefore, that by 1961 when the Second Plan period will be over the achievements made may fall short of the aims. It is also to be expected that some of the programmes when carried out would not produce immediately such marked effects on health as others. For instance, anti-malarial programme through the use of the D.D.T. is not only easy to carry out but once it is conducted by the health staff its effect can be felt on the people even without any special effort on their part. On the other hand programmes designed to improve environmental sanitation such as the provision of latrines are not only more difficult to execute but also require the willing co-operation of the public in order to be effective. The benefits of such programmes are often slow to obtain as they require a change in the behaviour pattern of large numbers of the people.

Notwithstanding all these uncertainities, it can be safely stated that the effort being made since 1951 to improve the living standards and health of the population is unprecedented in India's history and bound to lead immediately to further reductions in the death rate. The two programmes which are likely to produce the quickest effect are those connected with increase in food supply and with the control of Malaria.

What is the rate at which the death rate can be expected to decline in the near future? In making any estimate it should be remembered that the death rates of infants and children are likely to diminish at a greater rate than those of persons in other age groups. The experience of Western Countries in the early stages of the Industrial Revolution points to such a possibility. Such differences in the trends of age-specific death rates have important bearing on the possible decline in India's death rate in the immediate future as the proportion of deaths of infants and children form approximately forty per cent of the total deaths in India.

In regard to future declines, any estimate made must essentially be in the nature of a guess because of the absence of basic vital statistics. Ceylon's experience has shown that as a result of widespread anti-malarial and other health measures, the death rate dropped from 20.2 in 1946 to 10.9 in 1953. Normally one should expect a faster rate of reduction in India, as its death rate is at a much higher level. However, because of uncertainties of the future, estimates based on a much slower rate of decline would not be inappropriate. It would seem reasonable to expect that the death rate of about 31 per 1,000 estimated for the two decades 1931-41 and 1941-51 would

decline to about 27 per 1,000 by 1956 and would reach 22 per 1,000 by 1961.

Trends in Fertility

The birth rates estimated for the several decades between 1881 and 1951 and presented in Table II above do not bring out any substantial change in the fertility of the Indian population during this period. In analogy with the experience of Western countries in the early stages of their mortality declines, India has generally been considered by demographers as passing through the stage of a relatively stationary birth rate after which the birth rate may be expected to fall. However, it is well known that fertility levels are determined by a number of cultural factors and that it is only by appreciating the effect of economic and social changes in any particular setting that a correct view can be had of the past or prospective changes in fertility. In this connection it is well to recognise that current Indian fertility as measured by the number of children born to women who had been exposed to the risk of child-bearing throughout their reproductive life is much less than that recorded in many Western countries before they began adopting family planning on a large scale. For instance, the maximum value recorded in the United Nations-Government of India Population Survey for the average number of children born was about 6.7 in Bangalore city and 6.5 in rural areas. These averages were obtained for women who were married before 14 years and were aged 45-54 years at the time of survey, and had their marriages unbroken at least till they were 45 years. In contrast, the 1911 Census of England and Wales showed that couples who had contracted their marriages during the period 1861-71, when the wife was aged 15-19 years and who were alive at the time of census had on an average 8.4 live births (excluding children who might have been born from other marriages of either partner). According to the 1941 Census of Canada, in rural Quebec, ever-married women aged 45 years and over, who had married when they were under 20 years had borne 9.9 children on an average, and the average number of children born would probably be higher if only those with unbroken marriages were concerned. To cite but one more example, according to the 1940 Census, women in Brazil who had their first child between the ages of 15 and 19 had throughout their reproductive life (without regard to variations and changes in marital status) borne on an average 8.8 children.*

It is apparent from the data just cited that certain factors have been at work to keep the fertility in India below the level which could be termed the "biological maximum". The possibility that with impact of modernisation some of these factors might cease to operate and as a consequence fertility might actually increase cannot, therefore, be ruled out.

Of the cultural practices tending to reduce the number of children born, two have been forcefully brought to our attention in recent researches carried out in India. One is the taboo on sex relation while the infant is young and the other is the prolonged lactation which presumably results in a long interval between the termination of a pregnancy and the resumption of menstruation. The Ramanagaram study in rural family planning showed that avoidance of sex relation for about six months or more after confinement was reported by about 80 per cent of the husbands interviewed and that such avoidance was facilitated by customs related to the separation of the husband and wife after childbirth. In Lodi Colony, an urban area, similar avoidance was also reported although the interval seldom exceeded three months. Such urban-rural differences were also found in regard to the interval between termination of a pregnancy and the resumption of menstruation. In Ramanagaram area out of 712 women who had expressed the desire to learn a family planning method 378 or 53 per cent had not resumed menstruation after the termination of their previous pregnancies. In Lodi Colony a much smaller per cent 166 out of 558 women or 30 per cent, had not resumed menstruation. Direct data on the length of interval obtained in Ramanagaram showed that for about half the women, an interval of a year or more elapses before they resume menstruation after the termination of a pregnancy.

Another important cultural factor which indirectly leads to the lowering of Indian fertility is the non-remarriage of widows. Interesting information on the differentials in fertility caused by widowhood and their significance for future fertility trends in India were obtained in the United Nations—Government of India Population Survey in the Mysore State. Data on the average number of children born alive per woman aged 45 years or more by duration

* The data cited above for Western countries are referred to in Chapter I of F. Lorimer and others: *Culture and Human Fertility* (Unesco 1954).

status of marriage as obtained in this survey are presented in Table III. These relate to women who had married once only.

TABLE III

Average number of children born alive per woman aged 45 or more by duration status of marriage (once married only)

Duration Status of marriage	Average number of children		Number of women	
	Rural	Bangalore city	Rural	Bangalore city
Marriages unbroken up to the age of 45 of wife	5.8	5.9	873	1164
Marriages broken by widowhood or separation	3.6	4.2	718	655
Ever-married	4.8	5.3	1591	1819

Contrary to expectations women in Bangalore city had given birth to more children during the course of their reproductive life when compared with women from the rural areas, the average number of children born being 5.3 for Bangalore city and 4.8 for the rural areas. The detailed data given in Table III show that less incidence of widowhood and delayed widowhood in Bangalore city were responsible for its ever-married women having a higher fertility than those in rural areas. Largely because of such differences in the rate of widowhood, the survey also showed that the average number of children born to ever-married women aged 45 years and over actually increased with a rise in social status. In rural areas it was found women living in huts had 4.4 live births, whereas those living in mud houses with thatched roof had 4.5 live births and those living in still better houses had 5.0 live births. Similarly women belonging to households of agricultural labourers had 4.0 live births while those of households of cultivators of "low" economic status had 4.7 live births and those of households of cultivators of "high" economic status had 5.1 live births. With improvement in health conditions, women in the lower social and economic status categories will have a greater span of effective reproductive period, as fewer of them will become widows at an early age. As a consequence, the differentials in fertility which now exist are likely to disappear and the overall fertility of the country is likely to increase. Apart from such indirect effects on fertility, improvement in medical and public health services can also be expected to have a direct effect by increasing the chances of conception. In this connection, it may be stated that fertility appears to have increased in areas which have been subject to large-scale anti-malarial measures. It is also possible that the provision of good maternity programmes especially in the rural areas would lower the dangers of sterility which may be produced by poor obstetrical services and thus tend to increase fertility.

While economic and social development might tend to increase fertility by affecting a number of cultural and health factors, it should also be recognised that changes may occur which will help to reduce fertility. In particular, it has generally been suggested that the raising of the age at marriage for women might lead to a reduction in the average number of children born. It is extremely doubtful if the increase in the age at marriage which has occurred since the passing of the Sarda Act in 1930 has had any effect on Indian fertility. The median age at marriage is still as low as 16 years for women, and it is practically certain that such minor increases do not affect the overall fertility. Larger increases are likely to have tangible effects. For instance, it has been estimated from the data of the United Nations Survey referred to previously that if no marriage occurs before a woman reaches the age of 18 and the fertility pattern after that age remains as at present, the average number of children born may be reduced by one; the overall fertility will therefore be affected about 15 per cent. A similar conclusion was also reached by the Census Commissioner after an analysis of the 1951 census data. However, since the age at marriage itself is determined by a number of economic and social factors the likelihood of any rapid increase in it occurring in the near future is extremely small.

The largest reductions in fertility in the future must be expected from a widespread use of family planning methods. Sample surveys in various parts of the country have given overwhelming evidence of a desire on the part of both urban and rural couples to restrict the number of children born. Can this be taken as proof that the provision of family planning services, as envisaged in the First and Second Five Year Plans, will lead to a correspondingly large-scale adoption of family planning methods? There are reasons why

it may not be so. Experience has shown that at the present time men and women, particularly in the rural areas, are only weakly motivated towards the adoption of family planning. Most often, the reasons adduced for this desire are economic in nature and relate to the inability to obtain the basic necessities of life. With economic development and some improvement in living standards, it is possible that these motivations may disappear altogether. In this context, it must be remembered that the family planning methods now known all demand a fair amount of self-control from one or other of the partners. Such control appears to be forthcoming only when there is a strong motivation towards family planning.

Many forces, therefore, are in operation some of which will tend to increase fertility while others will tend to diminish it. The overall effect is difficult to assess because of the lack of adequate factual data. Weighing whatever evidence is available on this subject, I feel that for some years to come the trend will be towards an increase in fertility. The birth rate which was estimated as 43 per 1,000 for the decade 1941-1951 by the Office of Population Research, Princeton University could well be about 44 per 1,000 at the present time and might reach a level of 46 per 1,000 by the year 1961.

In conclusion, the above discussion has shown that the decade 1951 to 1961 will be marked not only by a reduction in the death rate but also by an increase in the birth rate. Both these tendencies will help to accelerate the rate of growth of an already rapidly growing population. If the estimated trends in the birth and death rates prove correct, the population of India must be growing at the rate of about 1.7 per cent per annum at the present time and will attain a rate of 2.4 per cent per annum by the year 1961. These estimates may prove false mainly because either the Indian people may live more prudently than what has been assumed in this paper or because of the inadequacies of the demographic data on which these estimates are based. However, these serve to emphasise the gravity of the Population problems that lie ahead.

FAMILY PLANNING—A Preventive Public Health Programme

By

DR. (MRS.) MUKTHA SEN, M.B.B.S., D.M.C.W., M.P.H. (HARV.)

Professor of Maternity & Child Welfare

All India Institute of Hygiene and Public Health Calcutta

INTRODUCTION:

The development of preventive medicine has been very rapid in recent years. Along with this fast development the concept and scope of preventive medicine has also been broadening. Now it is increasingly realised and accepted that the circumstances created by the environment we live in, and the way of life we lead are as important as the germs in the causation of disease. Our mental make-up and our social structure have an impoirtant part to play in the health problems that confront us. Therefore plans made to deal with these causative factors are often more important than the plans for the control of germs.

This fact is apparent to all preventive medical workers, but more so to those who are in the field of maternal and child health. Because these factors have greater and more lasting influence on the health of the individual at the time he is grownig and developing than when he is an adult. Maternal & Child Health service which is meant to provide health supervision to every member in the community from the time of conception to the time he reaches his adulthood, accepts some responsibility for building-up through these individuals a society that is mentally, physically, emotionally, culturally and spiritually healthy. But to achieve full benefit from this service the child has to get proper environment. This can be assured only by the parents. Each parent should appreciate the responsibilities, privileges and duties of parenthood and plan as far as possible to give to every one of their children, what they think is the essential need. They will be able to do this only if they have that number of children that they can care for and rear efficiently. It is to assist the parents in this task of adjusting the number of children to the resources they have that family planning service is organised.

MATERNAL HEALTH AND FAMILY PLANNING:

Maternal and child health programme hitherto has been providing (1) Pre-natal care, (2) Delivery service, and (3) Post-natal care with the object of reducing maternal and infant mortality and morbidity and promoting the health of the mother and child. But now it is being realised that the basic concept of prevention has been over-looked in a programme of this nature. Because if we consider the causes of maternal deaths in the group of associated diseases like heart disease, kidney disease etc. it is apparent that the women have died because they, who were not fit to bear children, have ben allowed to become pregnant. The best chance for prevention of death has been thus ignored by allowing her to conceive. Also the deaths that occur due to pregnancy anaemia, toxaemia etc. might have a relationship to the health of the mother prior to pregnancy, especially with respect to her nutritional status. Hence, one of the important programme in maternal health is to see hat conception is prevented in those women who are medically unfit to bear children. Therefore, now to make maternal health service complete three more types of services viz., (1) Premarital health examination, (2) Pre-conceptional health examination, and (3) Advicing on spacing and planning of children are considered essential.

Sometimes parity also influences the mother's health adversely. If she has any children one more child might add too much risk to her health and life. Maternal death rate after the 4th pregnancy becomes equal to that of the 1st and thrice as much as the 2nd or 3rd. This shows that the danger to the mother's life is greater after the 3rd pregnancy. The importance of this factor needs emphasis because, here there is not only the risk of loss of a life but the loss of a *mother* to a large family. From the social aspect it is a situation that should be prevented.

CHILD HEALTH AND FAMILY PLANNING:

The problem when viewed from the angle of benefit to the child, it will be seen that neo-

natal deaths, stillbirths and infant mortality rates are more in those women (1) who bear children at short intervals, (2) who have too many children, and (3) who conceive in poor health. Also the chance of birth of a healthy child decreases if the parents or other members of the family suffer from certain diseases.

In an investigation done in a rural area of West Bengal on 2444 births, it was found that the interval between the last and the present child was—1 yr. in 246 cases, 12-18 months in 109 cases and 18-24 months in 661 cases i.e. nearly 40% of the children had a brother or sister under the age of 2 years when they were born. Also it was found that premature births were significantly more when the interval was under 18 months. The table below indicates that the stillbirth rate and the neo-natal death rate were also higher when the interval between pregnancies was shorter.

Death rate of infants in relation to interval between pregnancies

Interval	Stillbirths & deaths 0—1 week (per 1000)	Neo-natal deaths 1—4 weeks (per 1000)
—1 year	133.3	137.9
1—2 years	97.4	81.6
2—3 years	85.6	61.3
—3 years +	66.5	59.6

The above record shows that the death rate steadily decreased with the increase in interval. Woodbury (1925) and several other workers also had similar experiences. According to the former the Infant mortality rates were 146, 96.6, 86.5 and 84.6 when the intervals between pregnancies 1, 2, 3 and 4 years respectively. In another study Elizabeth Hughes found the Infant mortality rate to be 169.1 when the interval between two pregnancies was under 15 months and 102.8 when this intervals was over 2 years. Thus Nature has shown that 2 to 3 years interval is the best in the interest of the child, and attempts should be made to space the births accordingly.

With regard to the relationship between the number of children the mother already had, and the risk to the life of the unborn child, it was found that obstetric deaths (stillbirths and deaths 0-1 week) decreased after the 2nd pregnancy up to the 6th and then showed a rise. Neo-natal deaths (1-4 weeks) declined up to the 4th delivery after the 1st and showed an increase later. Therefore chances of survival of children born after the 4th pregnancy are less than those born before.

In the same investigation, mentioned above, it was found that disease in the mother also increased stillbirth and premature birth rates. Stillbirth rates were 12.9 in Fever, 12.2 in diarrhoeas and dysenteries and 8.6 in chronic diseases as compared with 3.4 for those who did not have any disease. Similarly prematurity rates were 16.8, 23.4 and 12.1 respectively as compared with 8.7 for those who were free from disease. Therefore mother's health has an influence on the birth of a healthy full-term live child.

Sometimes in the interest of children and families it is necessary to discourage parenthood in some couples, who are more likely to transmit unhealthy traits to their children, than others. It has ben found that hereditary blindness is 10% more and hereditary deafness 10-30% more in those families where these defects already exist. Malformations are 9 times more in those children whose parents had a previous child malformed. Others like diabetes mellitus, mental defects and erythroblastosis also have a hereditary tendency. Therefore such families and the society should be protected as far as possible from being burdened with too many defective and dependant children, by controlling reproduction in the couples.

ECONOMIC CONDITION AND FAMILY PLANNING:

Environmental comfort, facilities for play, education, clothing, and proper nutrition are necessary for a child for his optimum growth and development. But often it is seen that people who cannot afford to provide the minimum standard of these essentials even for a few children, have large families. Usually such families are more prone to frequent and severe illness. These factors considerably limit the chances of birth and growth of healthy children with the addition of each extra member to the family. In an investigation done in Calcutta it was found that the average number of children born to a couple in the group classes as "in want" economically and married for 20-25 years, was 7.17 while for those who were considered "just sufficient" was 5.89 and to those who were "confortable" 4.69. Some of the investigations done in U.S.A. also give a similar picture. Those who were on relief had 43% to 65% more children than those who were not on relief. In a National Health Survey done in that country during 1935-39 it was found that the frequency and severity of illness was uniformly higher in those who were on relief and in the marginal income group than those who were better off, both in the urban and rural areas. The figures given

were 62% and 23% higher respectively. The death rate of the babies was 4 times more in the poor group. Thus poor economic condition should be one of the important factors for family limitation, because each additional child beyond ones capacity of care, lowers the *effective* income level of the family and adds to its physical and mental stress and strain.

GENERAL CONSIDERATIONS:

Our Planning Commission in its report for the First Five Year Plan had emphasized the importance of the population problem in relation to the over-all planning of national reconstruction. In its draft outline published in 1951 it drew attention to the fact that, at the present rate of growth of population even the successful completion of the First Five Year Plan might help only to bring the national standard of consumption in essential articles like food, clothing etc. to the pre-war level of 1939. When western countries had to face a similar problem more than a century ago one of the methods adopted was to encourage small families. In England and Wales in mid-Victorian period the average number of children a woman of 45 had was 5.5 to 6. But in 1930's it dropped to 2.5. Therefore in the interest of individuals and nation, in our country an effort should be made to limit the size of the family. It is encouraging that an appreciable proportion of our population is anxious to have smaller families. From the enquiries done on men and women both in rural and urban areas, in different parts of the country, it was found that the number of children acceptable to a couple was on an average 3. Therefore the problem is to provide the people with the knowledge and facilities to fulfil their desire. It is often seen that the better class people are able to get it to a certain extent by reading books and getting advice from medical personnel. But the poorer and the more ignorant sector of the society are not able to practice what they feel is their need. Sometimes they take recourse to unhealthy and unhappy procedures or become fatalistic when they cannot see the way to limit their family. Therefore it is most essential that education and advice is made easily available to this group of people who form the bulk of our population.

Often a question is asked how many children a couple should have? The answer to this is that the couple should plan for themselves according to their health and resources, but the medical personnel and the social workers can help them in making a decision. One often feels that those parents who are healthy and are able to afford larger families should not restrict them markedly. Perhaps to have few children for them is to do as much injustice to the society as to have large number for those who can ill afford to do so.

SCOPE OF FAMILY PLANNING OR PLANNED PARENTHOOD:

All our plans for social and health services should aim at achieving unity, healthy and happiness of the families which form the community. The family planning organisation has been quick in grasping this concept and has expanded its scope of activity to (1) advice and treatment of sterility cases, (2) marriage councelling, (3) sex-education, in addition to the advice on birth control. Couples without children, and those who have not been able to adjust to their joint life can be as unhappy as those with too many unwanted children. Therefore this broad field of service of the family planning organisation has made the programme more acceptable to people and easy to sponsor.

(1) *Sterility Clinics:*

Help to sterility cases is an important activity for the happiness of our society especially when we have nearly 8% of the married couples without children. Children are essential for completing the home atmosphere and also for closer binding of the couple. Certain amount of service for these cases does exist, but it is able to touch only the fringe of the problem. More important than the extent of service is the nature of service that has to be stressed in the treatment of sterility cases. It is not rare to see a woman submit herself to various types of treatment and even repeated operations without realising that for procreation two partners are necessary and the defect may be in either of them. Sometimes men have married a second time when their first wife failed to conceive, without ever thinking of getting themselves checked to see if they are defective. This has often resulted only in more disappointment and increased unhappiness. So the family planning organisation by advocating examination, advice and treatment to both members of the couple in case of sterility, will contribute a great deal towards family happiness. The procedure has already resulted in the successful treatment of larger number of sterility cases.

(2) *Marriage councelling:*

In western countries where people choose their own partners, marriage councelling programme is a very useful service to guide people in the choice of a suitable partner and to prepare them for meeting the problems that might arise in their joint life. In the present system of marriage in our country the parents partly accept responsibility for the choice and guidance. But there is every reason to believe that the existing system is changing, though to a limited degree, towards that of the western countries. In such circumstances marriage councelling will be a very essential and helpful service to enable us to keep some of our existing social and cultural pattern. In western countries the priests have an opportunity to know about the marriage and have the right to talk to the couple beforehand about their responsibilities and duties in maintaining a happy home, healthful joint-life and responsible parenthood. Their maturity for such a function and their conception of marriage can also be checked by him. In our culture this relationship with the priest does not exist and therefore only the parents and the social workers can take this responsibility. The success or failure of a marriage depends mostly only on the couple but others can be of help.

Before marriage the status of health of the partners needs investigating. Because of the duties expected of them as couples, it is necessary for them to be in good health not only in their own interest but also in the interest of the society at large. If a couple are unfit for parenthood, either they should be advised not to marry or if the marriage has to take place, they should not become parents. Therefore it is helpful if the couple could discuss before they are married something about parenthood and the number of children they should have.

The adjustment to the new life is helped by explaining to them the anatomy and physiology of reproduction. Later if they need advice on day to day problems it is given both in the interest of the couple and their children. Marriage councelling service is assuming an important role in preventive medicine as the subject of mental health in relation to the happiness of the family is being appreciated. Broken homes and divorces can be reduced by an efficient marriage councelling programme.

(3) *Sex-education:*

Information on reproduction and a realistic unbiased approach to the subject of sex would help people to grow-up as healthy individuals. Hence, education of the adolescent is an important service that should be made available through preventive medical programmes. Therefore family planning organisations have accepted this as one of their responsibilities. Married couples with problems in their sex relationship are also adviced through this service.

(4) *Birth control:*

Birth control should imply intelligent and purposeful adjustment of the life or the individual and the community to its physical and social environment. In this service more than in any other we need constantly keep in mind, that we are dealing with human beings whose views on the subject differ considerably from that of the trained scientists like us. Medical profession has accepted it as an essential service and is vigorously advocating it. It is an important instrument for the prevention of disease and promotion of health. The lives saved by the maternal and child health programme can be properly cared for, only if people get that number of children whom they can afford to give the essential needs of life.

METHODS:

It is necessary to remember that any method of conception control (1) which depends on the use of chemicals or manipulation of applies by husband or wife, or (2) which interfers with the spontaneity of sexual relationship, is distasteful to many. It might seriously lessen or destroy sexual satisfaction and interfere with normal sex relationship between couples.

The individuals that seek birth control advice can be classed into three groups. Those who wish—

(1) To regulate the family size and growth by spacing.
(2) To post-pone pregnancy for certain time.
(3) To limit the family size.

Any of the above aims can be achieved by—

(a) Preventing the birth of a viable child after conception by inducing abortion.
(b) Preventing fertilisation.
(c) Preventing nidation.
(d) Preventing the maturation and discharge of spermatozoa and ovum.

(a) *Prevention of birth of viable child after conception:*

This procedure is not advocated as it is dangerous to the life and health of the mother and cannot be repeated according to need. Also it is an illegal act except when it is resorted to for medical reasons. Even when it is done for this purpose, need for repetition of this procedure after one induction is avoided by advising conception control. Some countries considering it to be a quick method for population control, have made it legal. But the merits and the demerits of such a legal sanction will not be discussed here. We only wish to say that to our cultural background it will not be an acceptable method and is considered unsafe medically. Therefore all the stress both for population control and for the improvement of health of the mother and child has to be on other methods in our country.

(b) *Preventing Fertilization:*

This can be divided into two groups:

(1) A permanent measure in the interest of the mother, the unconceived child or the family. It is done mainly for medical or eugenic reasons.

(2) A temporary one—This method makes spacing of children possible and also enables couples to plan for as many children as they wish to have, depending on their economic and other considerations. Also it helps to postpone pregnancy during a convalescing period after illness, after an operation, during travel, soon after marriage etc. In the interest of the health of the unborn child itself, pregnancy may be post-poned till the conditions for getting and rearing a normal child are created. Therefore this is a measure often esential and useful for the couple.

Both the methods mentioned above can be practised either by the husband or the wife.

(1) *Permanent method.*—This is generally done by operation. Which one of the couple should submit to this operation would depend on many factors and mainly on the problems as seen by the couples themselves. If it is done for health reasons the condition of health of the mother will be a factor that should be considered. Unfortunately sometimes it is being practiced for reasons that are not serious or important enough to adopt this drastic method. But whatever may be the cause put forward by couples for this procedure, the decision should be taken after considerable thought by the medical personnel who should clearly explain the consequences to the couples concerned. The reasons for this warning are that (1) in this country epidemics of various types of diseases in children causing premature loss of lives are not yet rare, (2) women and men marry at a very early age, the average age at marriage for women being 13 years in rural and 16 in the urban areas, and for men about 21 to 24 respectively. They get on an average 3 to 4 children before they have completed 11-15 years of married life. Since the optimum number of children that these couples may wish to have is only 3 they might seek for this procedure even when they are in their twenties. That means they will have to live more than double the number of years they have lived together without having any hope of getting a child, even if they wish to. Therefore it is too long a period in life to encourage people specially the woman, to live with the feeling that she cannot get a child. However, the procedure can be carried out—

(1) By vasectomy. It is more economical and easier. So some people are preferring this to the operation on their wives.

(2) Salpingectomy in women.

(3) Cauterisation of the uterine ends of the Fallopian tubes in women. Japan is said to be practicing it as it is considered possible to re-establish connection in the Fellopin tubes later if found necessary.

In our country it may be better to advocate the second method. Because nearly 12% of married men, are husbands to a second or third wife. So if the men get sterilised when they are married for the first time, the later wives will not be able to get children. So long the widower remarriage remains common and widow remarriage very rare men should not hastily resort to this method. One case is personally known to the author, where tension and unhappiness has resulted by this procedure as the man married for the second time after the operation. There is another reason for which the operation on the man is not advisable. If by chance the operation in man is unsuccessful, as soon as he hears that his wife has become pregnant, it becomes a real mental shock to him even more than to his wife. It is very essential to examine him and prove that he is fertile. This may not be possible always or the man may not easily accept it. So it is important that a warning regarding this possibility is given to the couple before or after operation. One such case came to the notice of the author.

Salpingectomy also is not a fool-proof method as we know of two cases of faiure in women who have undergone this operation.

However if done carefully the above two methods can give very successful results. Regarding the third one there is not enough information to comment upon.

(2) *Temporary methods.*—The main thing to remember here is that, though one of the partners can practice any of the methods suggested below, education, understanding and co-operation of both partners are most essential for the success. Also in medicine either in the preventive or in the curative line there is no drug or procedure that gives hundred per cent result. Similarly there is no contraceptive method that would give hundred per cent success and most of them have only a partial success. The effectivity will vary and give results in proportion to the efficiency and the accuracy with which the method is being practised. The temporary procedures are the ones most needed and useful. While choosing a method the factors to be remembered are that (1) it should be harmless to the patient, (2) should have high degree of contraceptive efficiency, (3) easy to practice, (4) economical, irrespective of the number of times it has to be used, (5) high acceptance rate which means that they will accept and continue to use the method, (6) aesthetic as far as possible.

The methods are listed below according to the effectiveness.

For Men—

(1) Condom.
(2) Coitus inturruptus.
(3) Abstinence—may be possible when practiced with safe period.

For women—

(1) Vaginal diaphragm or cervical cap with jelly.
(2) Sponge with jelly, cream, foam powder etc.
(3) Foam tablets, jellies, creams suppositories etc. by themselves.
(4) Safe period with any of the methods listed above.

Mention can also be made of the (a) lactation period, when women are supposed to be relatively immune to pregnancy as they do not ovulate. (b) Sponge with oil or some chemical like salt water, lactic acid etc. (c) The Experiment that is being done utilising meta-xylohydroquinol as an oral contraceptive. No reliable information is yet available on these to help us to advocate it with any confidence. (d) Vaginal douches advocated before have been discarded now.

(c & d) *Preventing nidation and maturation :*

There is not sufficient information on these subjects. But the methods suggested before with the object of interfering with nidation and maturation of ovum and spermatozoa are not practiced now. They are uterine stems and rings, application of heat to the testes and ovary, and injections of spermatozoa, harmones etc.

Among the advocated methods, both the condom and vaginal diaphrams or cervical cap with jelly, which are expected to give nearly 95% result when properly practised are possible for urban areas. For the rural areas the expenditure and the medical assistance necessary makes the latter method impractical. But condom may be possible in spite of its expensive nature, as it was found that in the rural areas on an average people do not need to use it more than once a week. More information on this is necessary before we can accept it as a method for rural areas.

Though efficiency will be much less from the practical point of view the methods considered useful in rural areas are listed below:

(1) Coitus inturruptus.
(2) Foam tablets or jelly, if jelly can be got cheap.
(4) Safe period combined with any of the above methods.

ORGANISATION :

The credit for establishing family planning advice as an essential service and opening of clinics for this purpose in this country, rightly goes to the Family Planning Association of India. But it was not able to make much headway because of many handicaps, one of them being the birth control advice which is the main activity in these clinics has a moral bias to people. Therefore they hesitate to openly visit a clinic that advices only on family planning. The place to make people conscious of the need for family planning is not an isolated clinic but an institution where they come for other health problems or for advice like maternity hospitals and child welfare centres. Specially as it is being accepted as an essential preventive service, it should be one of the advices offered in health centres and maternity and child welfare centres in rural areas and maternity hospitals and Maternity & Child Welfare centres in urban areas. By this approach there is a possibility of its gaining momentum and more popularity. Also the women will be able to get medical aid through-

out their reproductive period which makes the service to mothers complete.

Family Planning Research & Programmes Committee of the Planning Commission realising this need in the organisational se-up of the Family Planning Programme has encouraged establishment of the centres in M. & C.W. clinics. But it is necessary to remember that M. & C.W. centres generally have only women workers, and it is essential to provide the services of men workers also for the success of the programme. It involves discussions on the most intimate life of individuals both men and women. People find it easier to discuss one's problems and make the other person appreciate them if he or she belongs to the same sex. We find women often hesitate and feel shy even to discuss their marital problems with unmarried women doctors. Sex education is not taught to our young workers and they themselves often hesitate to open the subject. Therefore for efficient and successful married workers may be better as the people talk frankly and freely about their apprehentions, problems and needs.

Though all the three services mentioned above and birth control are considered helpful, at present the family planning organisations in India are concentrating mainly on (1) advice on birth control and (2) examination and treatment of sterility cases. The other two will be added on when enough information on the extent of the problem that calls for those activities is available, and the methodically for giving those services to suit our culture has been worked out.

Lastly it will be appropriate to conclude by the remark that during the past two centuries scientific development over the power of control of material universe and over the physiology and psychology of health and efficiency of human body, has increased by leaps and bounds. It would be indeed improper if the advancing knowledge were not applied to what is perhaps the most important function of the human being that of the reproduction of the race.

References

[1] Winsow, C. E. A. (1953), Birth control as a public health problem, Planned Parenthood Federation of America, Inc. New York 22, N.Y.

[2] Sen, Muktha & Mathen, K. K. (1954), Inquiry into the Vital Losses of Pregnancy and Infancy in a Rural Population, Ind. J. Med. Res., 42:267-278.

[3] Chandrasekaran, C. (1955a), Opinion Research in Human Fertility, All India Conference on Family Planning.

[4] Chandrasekaran, C., Sen, Muktha & Mathen, K. K. (1952), The Reproductive pattern of Bengalee women, I.C.M.R. Inquiry.

[5] Jenkins, Harry H. (1940), Contraception: A medical problem of growing importance, Tennessee State Medical Assoc. Chattanooga, April.

[6] Woodbury, R. M. (1925), Causal Factors in Infant Mortality—A Statistical Study based on Investigations in Cities. U.S. Depart. of Labour, Children's Bureau, Pub. No. 142, Washington, p. 67.

THE PROBLEM OF FAMILY PLANNING

(From the Common Man's Point of View)

Since the last one decade or so the talk of family planning has been gaining momentum in India. In the thirties of this century discussion on the population problem was confined solely among certain groups of scientists, economists and public health workers. Following the second World War a great deal of interest was created in the study of population of various countries beginning with the war-torn Europe. In case of India it assumed a semi-international colour before she attained her freedom, due to the colonial powers becoming suddenly sympathetic towards the over growing population of the Asiatic countries and particularly of India. Certain Western countries even employed demographers to study the problem. It does not, however, mean that they had no sincerity of purpose nor does it connote a denial of the fact that population is a problem in India at the present moment. On the other hand, following the attainment of freedom, the destineers of the country have become painfully conscious of the situation and considered expedient to study the problem from the point of view of India's progress and prosperity for which the Indians are now striving heart and soul. In fact, the dilemma before India and the similarly placed other countries is that in the face of growing population, roughly at the rate of 1.5 per cent per year since the last two decades control of population seems to be of prime necessity to check the threatened decline in the already poor living standards of the people, whereas for the successful nation-wide practice of birth control, which appeals to many as the ready made method of choice, the essential requirement is a higher general standard of education and living. In the present discussion it will be the endeavour of the writer to understand the problem as far as possible from the common man's level.

THE BACKGROUND OF THE PROBLEM:

The question is how and why the problem of family planning has cropped up. It is probably not difficult to understand that for the existence of a family, a community and in its wider meaning—the nation, there are four essential minimum requirements namely, food, shelter, clothing and bodily health. These are associated with the number of people, amount of available food (cultivable lands), space (referable to the density of population) and economic resources, knowledge about maintenance and promotion of health, and also with the socio-religious and sultural standards. To avoid critical situations or national crisis these needs should be supplied at all times at a certain specified level and under proper balancing.

Thus, the number of people brings us to the question—"Is the population unbalanced now?" To answer this question it has to be understood first that the balancing of the population primarily depends upon balancing of the nation's resources with the people's needs. On this assumption an unbalanced condition will arise whenever there will be too many people in relation to the total available resources in the country. The term has therefore only a relative significance. Such a relative unbalancing of population has been a perpetual problem in human history. It was existent even under primitive conditions. The solution of the problem came in various ways, namely, by expansion of land, cultivation and other resources, by migration and through natural calamities like famine, flood, fire, pestilence, storm, earthquakes, volcanic eruptions etc. and to a certain extent by warfares, by conquering other's territories and by a continuous evolution of knowledge of the natural phenomenon and exploiting it for the purpose of human economy and comforts.

A situation has arisen at present in India in which it may be said that she has, in terms of population, too many people in relation to the land and other resources of non-renewable character. It may be due to wasteful, inefficient and improper utilisation of the available sources. For instance, India produces a large amount of raw materials and has a good amount of mineral reserves yet untapped. Raw materials are being exported and the benefit accrued from them is derived by other countries. In other words, in terms of national standard India is still an underdeveloped country in which too many people are dependent

on too little land. The Indian Villages where 80% of the population lives are typical examples of under-development, so much so that while the changes that have occurred in the urban section of the country have little penetrated into the villages and the population growth has remained rather progressive resulting in the doubling of the strength of population in the course of the last century. The basic factor involved in this growth is the gap between births and deaths, which has been recently widening at a much faster rate than before due to the improvement in public health, leading to progressive reduction in death rate without simultaneous proportional reduction in birth rate. On an average about 28 to 30,000 new months are added daily in India. Although, a good bulk of them succumb before they cross the first year of life the resultant accumulation has far outstriped the development of resources to feed and clothe them. No doubt, the Five Year Plan projects, when fully operative, will meet the demands to a large extent for the coming few years but a stage will soon come when the balance will be again upset and very seriously too, if the growth of population is not brought up to a stable condition. The danger will then be much greater than now because hardly there will be much of the resources left untapped for further development. Thus planning for population is perhaps of greater necessity than even the planning for economic development, though both are closely related and seriously interdependent.

The problem of population growth may also arise in another way. The deficiency or overgrowth may be in respect of age and sex composition of the population. For instance, in Great Britain the birth rate having remained low for some decades a deficiency has been created in the active group of population namely, 20 to 45 years, resulting in shortage of man power in industries whereas in the matter of sex proportion females are proponderating over males, and the expectation of life (longevity) being high there is an accumulation of people in the older age groups. The situation is rather reversed in case of India, the birth rate being high there is an excessive accumulation of people in the lower age group as well as in the active population group resulting in serious unemployment. The low expectation of life does not, however, permit accumulation of people in the older age groups. Males prepondrates over females in India as a whole, particularly in the north western regions and in the towns and cities. Universality of marriage is another factor which helps population growth in India. The situation is, however, tending towards a change. The first change however, being the reduction in the crude death rate, the population has got a fresh filip to grow even at a faster rate than before and left to itself it may take decades to adjust.

What is then the solution? The answer obviously in many minds would be the controlling of births. But the remedy so easily said is the most difficult to apply, and it would be wrong to assume that the question of birth control can be settled merely by advocating the case for it or even by propaganda. It may be possible in certain advanced countries where education is widespread, standard of living is already high and the medium of dissemination of knowledge is well-developed. Even in such countries, despite the existing advantages, severe battles had to be faught for half a century or more for the acceptance of the principle and the practical application of family planning and to look upon it with respect to which it is due. It is certainly not the situation with the half-developed country like India where the literacy is still low and the printed word is not an efficient medium for the propagation of ideas and the economic situation does not permit even a square meal for the majority.

THE BASIC DIFFICULTIES:

There is a genuine difficulty in the propagation of knowledge of sex physiology and reproduction among the Indian masses who are generally guided even to-day by tradition and prejudices developed through centuries and handed down from generations. In fact, the idea of family planning, does not by itself enter into their minds, most of the rural folks still being traditionally inclined to large families. The crux of the problem is that they must themselves feel the necessity of restricting the number in their families and must also be convinced that such attainment is possible by their own effort and for their own benefit. Demand for a higher standard of living and a desire for betterment of one's own lot are, however, stimulated by seeing and coming into contact with persons in stations of life better than one's own and arise from the knowledge of how people live fuller and more abundant life without going beyond their means. Such examples are rare in the rural areas and few villagers get opportunities to visit towns and/or to travel abroad. Thus they not only lack the urge to do so but are distinctly prone to

leave everything to its fate. Even the poor does not often demand betterment of his life under the influence of the philosophy to which he subscribes. It is only those who have even slightly tasted the advantage of better (standard of) living that want more of it. Years of subjugation have confused the Indian minds to the difference between spiritualism and materialism. Having converted to lead a life of want and poverty, richness or modern scientific education and higher standard of living are now considered by them as manifestation of materialistic civilisation and are serious impediments to spiritual life, although very few do or can afford to lead a real spiritual life, as evidenced from the fact that the majority of the population have to toil from dawn to dusk for more subsistence and have little opportunities to cultivate spiritualism.

In other words the majority of the masses out of frustration and repression have allowed themselves to be degenerated to put up with miseries rather than to make serious efforts to improve their standard of living or even to maintain their spiritual mode of life, although it cannot be denied that there are persons in India, perhaps a small minority, who deliberately choose to lead a life of "plain living and high thinking."

STOPPAGE OF HUMAN WASTAGE:

The first type of human waste, as has already been pointed out, occur when the arrival of too many babies in followed by few survivals, the former phenomenon apparently being the Dame Nature's method of ensuring propagation of species. The parents also want to be certain that a few of the children will survive up to the adult age to perpetuate the process and thus an unconscious desire for more babies persists. Thus one of the reasons for advocating family planning is to reduce the inordinate infant and child mortality. The second type of human waste comes from flood, famine, epidemic and endemic diseases etc. Reduction of deaths which also include the infants, from these causes to the minimum by both public and private endeavours, is also a necessary step towards reduction of births. But to have the effect of reduction of infant and mortalities to repercuss on the reduction of number of births a lag period of several decades would be necessary. Thus it has to be realized that the control of mortality unaccompanied by the control of births may have disastrous consequence in an underdeveloped or half developed country and that is exactly what is happening in India now.

MEANING OF A LARGE FAMILY IN RURAL SOCIETIES:

Not very long ago, in rural societies the advantages of large families out-weighed the disadvantages. Birth of a baby was considered rather as the gain of two hands (Man-power). While in the urban areas a mouth has to wait for a minimum of sixteen years till the hands are expected to operate, in the rural areas even a young boy or a girl just about 6 or 7 years is made to help the father or the mother in agricultural or household work. Thus a child in the rural area who has a useful role to play in the economy of the family is rather welcomed, while the urban living tends towards reduction of fertility rate. Again, even lately multiple children in the rural families caused no impediment to the young parents because in a large family, particularly if it was a joint one, young parents were almost free to move or do their usual work, as either the aunts or the grand-mothers were only too happy to care for their children. In other words, a large family was actually a cultural barrier to the control of the number of children as the latter were not allowed to effectively interfere with the activities of the parents. There was yet another advantage of a large family. It actually served as a social security for the aged persons, stimulate division of labour and prevented fragmentation of land, and some times kept the family crafts, arts or guilds confined within the family group e.g. Dacca Muslin. But with the changing of the economic system in the country too many people in the family is now proving to be disadvantageous, joint family system is fast breaking off and lands have undergone too many fragmentations.

IMPACT OF RELIGION, CUSTOMS AND POLITICAL AND SEMI-POLITICAL TABOOS:

Folk songs are prevalent in India in praise of prolific mother while barren wife is considered inauspicious in all religious and ceremonial functions. Spinsters are looked down upon in rural societies and even mothers of girls, because bearing of a son is religiously essential for which the verse runs as follows: *"Putrarthe Kriotey Bharyya"* i.e. the purpose of marriage is to beget a son. Even marriages of girls at higher age after the commencement of mensturation are deprecated in the villages.

Again some religious comunities tend to belief that they are the chosen people of God and religious rivalries thus created lead to the planned attempt to increase their members. Poly-marriage is another method employed as many of the moslems. Hitler in Germany and Mussolini in Italy, as a political taboo, offered prizes and extra subsidies for the prolific mothers and the births are not controlled now in Russia and China, though the latter country is considered to be over-populated. Communal electorate is often another incentive to increase the number as often occurred between the two religious groups scheduled and nonscheduled castes and perhaps between two linguistic communities. But with a liberal education, socilisation of state and incentive for economic progress these religious and semi-political taboos have to be abandoned or suitably modified to bear with the run of time, which might be necessary even for the sake of mere survival. Hinduism and Buddhism, for instance, afford examples of new interpretation and permissive deviations from time to time to keep pace with the changing order. In fact, an attempt is now going on in India to reform Hindu marriage system and succession rights of women (daughters and mothers). Further compromises will have to made, sooner or later, when economic pressure, political insecurity (e.g. for the minority communities) or personal interest threatens to over-throw the basis of very existence. Intercaste, interstate marriages and finally removal of caste system among the Hindus are the expected changes in the country. Thus, the religious attitude are not likely to be an insuperable barrier in India to family planning although any suggestion counted as irreligious will still be seriously opposed. *Fortunately, there is no religious injunctions in the Hindu religion against the control of births.* On the other hand, the saint Ramakrishna not only liked but even pressed for the control of birth after a couple had 2 or 3 children. In any case, he was not in favour of any person getting more than 3 children and that seems to be most scientific for stabilisation of population growth in any country.

MATERIAL DIFFICULTIES IN POPULARISING FAMILY PLANNING:

(1) Since the family planning is primarily concerned with women and literacy among them is still of poor order (M : F-3 : 1), books, pamphlets, newspaper articles and advertisements etc. will be of no avail. The only fruitful way at the present moment is perhaps establishment of maternity and child welfare centres in an extensive scale all throughout the country and to propagate the ideas slowly through a Family Planning Division under a properly trained medical personnel assisted by specially trained health visitors, nurses and midwives, attached to each of these centres or through the M.C.H. workers themselves. Care should be taken that too mcuh enthusiasm for pushing the idea of planned parenthood does not unnecessarily arouse emotional hindrance. The scheme of planned parenthood should consists of birth control as one of the items out of several, such as (1) Healthy mother and healthy baby (ii) control of hereditory defects and diseases, (ii) knowledge and application of sex hygiene, (iv) investigation and treatment of sterility, (v) spacing of children, (vi) improvement of family budget, (vii) healthful living and so on. If the conventional channels are not effective alternative channels should be worked out. For instance, there are various other factors which reduce population growth, such as, higher education for women, improvement of women employment, increasing of marriageable age for girls, improvement of recreational facilities, urbanisation and industrialisation, improvement of health and longevity and above all the standard of living etc. In fact, the ends of family planning movement is intimately bound up with the economic, social and health planning and progress of the people. The author therefore envisages a multipronged attack on the problem, which he wishes to imphasize and recommend.

(2) *Nature and efficiency of contraceptives:*

In a poor country like India the nature of contraceptives as well as their efficiency are of prime importance. It should be cheap, simple, effective and harmless. The present day available means in the form of chemicals, tablets, tampoons or leathers cannot be made popular in the villages for various reasons. Firstly, it is not easy to make these products universally available nor acceptable because these are not made in India and if at all, perhaps in a small scale; secondly, the cost involved is high. To a villager, a baby is said to be less expensive than a contraceptive; thirdly the efficiency of the contraceptive cannot be thoroughly guaranteed; fourthly, the knowledge and the make up of mind necessary for the effective application of contraceptive are lacking; and lastly, properly trained personnel (Medical men and women, nurses and midwives etc.) for guidance and advice is also

lacking. It may be emphasized that the use of contraceptive without proper knowledge will do more harm than good not only to the persons and families using it but also to the very cause of family planning.

(3) *Sociological difficulties :*

Villages in India have been long neglected and now they are not only deficient in basic sanitation, health, and medical facilities, with unhygienic surroundings, insufficient and mostly unsafe drinking water, insanitary disposal of night soil, stable and house wastes etc. there is overcrowding due to dearth of living rooms and lack of privacy, cleanliness and tidiness. The villagers canot even think of a bath room and other privacies, running water and lights, amneties which are conducive and perhaps essential for the effective use of contraceptives. As has been already point out, low economic state is another serious impendiment, besides traditional customs and religious bigotries etc. The present attitude of the village people is apathetic and indifferent due to lack of incentive and loss of confidence in personal efforts. The proper community sense, division of labour and self sufficiency of village life have all been lost. In other words, a great deal of collateral work has to be done to create the proper field for effective introduction of the family planning schemes in the rural areas, which should receive the full emphasis in the programmes if the control of growth of population is truly desired.

First a purposive and liberal education of the all persons as citizens of India is needed. People must be made conscious of the country and her people. They should be told what are needed for the improvement of the standard of living, better hopeful life, enjoyment of better conditions of living and amneties. A demand should be created to bring about a change in culture and ideologies from within and not from the official pressure from above by coercion or persuasion. A deeper and thorough knowledge of the local cultural bias is needed and the ideas should be pushed cleverly through their own beliefs and culture. Simultaneously the benefits of technilogy and science should be brought to the door of the people. In other words, cultural integration should go hand in hand with economic change and for a lasting change the demand and consent for the change must come from within.

To quicken the above process a bilateral approach through a trained pair of village level workers, a man and a wife, should be settled in the village. Their main mode of approach to the villagers will be through their own example, social calls, discussions and solutions of the family problems. It is easier for the married couples with limited number of children to create confidence in the minds of the villagers than for the midwives, nurses and even medical personnel. They will demonstrate how within the smll income at their disposal they can live decently and cleanly through self-help and with the help of the community enterprise. They will prove to the villagers how wasteful it is to have more babies than they can rear up properly. So that they can enjoy in their turn a fuller and better life with facilities of adequate food, clothing, amneties and education, basic or otherwise. As soon as the desire is created demand will gradually follow and then this couple has only to tell the parents that the planning of parenthood or spacing of children is not irreligious and that the conception of babies in quick succession is somewhat like a disease or over-activity of certain body organs and like the treatment of disease by drugs this overactivity could also be treated by drugs or chemicals or by mechanical means and thus they will introduce the measures into the family and so family after family and then others to follow.

This venture will go hand in hand with further studies, investigation and research on the various aspects of the problem. This would undoubtedly involve the nation into a heavy expenditure but money spent now will give back its return many fold afterwards and will ultimately be a great saving if the growth of population is brought down to a sizable level.

The above are only a few of the facts of the problem of family planning. There would undoubtedly be many other points of view which also need consideration.

S. C. S.

THE HUMAN FACTORS IN ENVIRONMENTAL SANITATION*

By

DR. HUGH R. LEAVELL,* M.D., D.P.H.
Consultant on Health, Ford Foundation
New Delhi

"Why are human factors important in a field like environmental sanitation?" This is a natural question. One is likely to think at first of the engineer dealing mostly with inanimate objects like pipes and pumps, working with blue prints and surveying instruments. One of the best possible answers to the question came recently from Shri P. C. Bose, chairman of this meeting. He was talking of the problem of getting latrines installed and *used* in rural West Bengal. Most of the engineering problems, he said, could be solved without too much difficulty. But the people have not accepted latrines with any enthusiasm, and even when installed few people use them regularly. The engineer, he thinks, may have lost touch with village people due perhaps to his advanced education and his modern ways of life, dress and thought. Unless health education is emphasized, and carried on in a way the people understand, the latrine programme will move slowly indeed.

Shri Bose was also chairman of the Second Conference of Public Health Engineers meeting in Delhi a few weeks ago. This group also saw clearly the importance of human factors in sanitation, and realized that the sanitarian must use health education in his work. To enable him to do so effectively, this recommendation was made:

> "In the types of programmes which involve participation of a large number of people the importance of Health Education should be recognized. Towards meeting this objective, it is recommended that Health Eduction should form a part of the curricula in all types of train-in proposed for Public Health Engineering and auxiliary personnel."

What did the engineers mean when they mention "types of programmes which involve participation of a large number of people? I believe they were aware of the variation in the amount of human co-operation and participation required for the success of different kinds of health programmes. Perhaps one can set up a sort of measuring stick to illustrate this variation.

At one end of the measuring stick human factors would be relatively less important. For example, only a few people need to decide that a city water plant is to be set up, and public co-operation is no problem if the water is good and not too expensive. House spraying with DDT involves little more participation, perhaps, since each householder must agree to have his house sprayed. Somewhat greater are the human factors in an immunization campaign, since a needle must be stuck into the body. Consent must be secured, but only a single decision is needed, and the job is done. Maternal and child health work strikes closer tone. The mother must make some real changes in her way of life if she is to protect fully herself and her baby. But the motivation here is of the strongest possible sort, and relationships between cause and effect are not too difficult to establish.

The human factors loom really high when Shri Bose and the rest of us start trying to popularize latrines. Here we come up against a DAILY habit pattern of going to the fields, hallowed by the centuries, and even providing certain social amenities for at least the groups of otherwise house-bound women who go to the fields together for social as well as abdominal relief. When this pattern is changed, repeated decisions must be made, one after the other, day after day until a new pattern becomes firmly established. If the new pattern does not meet with approval from one's family or neighbours, or if some inconvenience is involved such as the necessity of carrying more water to flush the latrine, it is very easy to simply stop making the difficult decision.

What can we do about the human factors in environmental sanitation? If we may assume that human behaviour is predictable, within certain limits, we may study it scientifically to learn the rules that underlie our actions in different circumstances. This might be called the *"public"* part of public health—

* Presented before the Indian Public Health Association, 30th September, 1956, Calcutta.

the part that deals with people. It is here that the social scientists are working, and they are finding the scientific method of study effective just as it is in the natural science of chemistry, biology and physics upon which we base the *"health"* aspects of our public health. In this concept, public health is really the child of two parents. The "family tree", or ancestry, is illustrated in Figure 1. (This also indicates that teamwork with agriculture, education, etc. is demanded of the health worker. Perhaps this is more true in India where community development is emphasized, than in many other countries less advanced in this respect.)

An important step was taken recently toward determining what village people in different regions of India really believes and feel about environmental sanitation. A very outstanding group of social scientists from various parts of the country met in Delhi with a number of public health people to discuss the question. Much very useful data was brought together, and gaps in our knowledge which must be filled in by search were also pointed out. A report on this Conference on the Social and Cultural Factors in Environmental Sanitation will be available soon, and it should prove helpful.

Some points that came out in the Conference may be mentioned here. For example, anthropologists from various regions of India agreed that Indians have an immense amount of personal cleanliness, much of which is closely interwoven with ideas of ritual purification, but it is not necessarily correlated with visual, chemical or bacteriological cleanliness. Disregard of environmental hygiene is as striking as is the attention to the ritual purity of the person.

It is quite interesting to see how gingerly the social scientists handled the discussion of feces at the outset, but before long, it was said that "feces has become the anthropologists' cup of tea." This seemed specially appropriate following discussion of the tendency of groups of women to go out to the fields together in the morning for protection, sociability and sometimes even for tea at the time they were defeating in common.

A good deal of fruitful discussion followed the question, "What shall we try to teach the village people in order to persuade them to want to use latrines?" Most of those present agreed that it would be necessary to teach some of the basic reasons why latrines are important. The idea of gastro-intestinal diseases being the result of a short circuit between a sick-person's anus and well-person's mouth seemed to express the concept effectively, even if crudely. There was also the feeling tht a good many workers, including some in the health field, did not always practice what they preached, and this brought forth the suggestion that "both ends of the gastrointestinal tract—the mouth nd the anus—must speak the same language!" If we tell people to use latrines, we must be sure to use them ourselves, and to see that public buildings for which we are responsible have model latrines, in regular use and properly maintained.

Evidence was brought in from many sides to show that the villagers are not reactionary, and that change is taking place quite rapidly. In fact, one man previously interested as an archeologist digging up old ruins, become so concerned that present status of the villages may disappear before it is described adequately, that he has become a social anthropologist and is busily studying the culture of living people. Shri S. K. Dey, Administrator of the community development programme said, "People are ready to do what we ask them, but we don't yet know how to ask them." Much of the discussion at the Conference related to channels by which the message may be given in a convincing way.

The Union Ministry of Health has embarked on research-cum-action programme in environmental sanitation. This will undertake to map out the dimensions of the problem in India, and to show how the different parts fit together. It is important, for example, to state clearly the biological principles we want to achieve, as the WHO Expert Committee of Environmental Sanitation and Dr. Das Gupta's Committee on Environmental Hygiene have done. As an illustration of what is meant, the WHO Committee says:

> "Excreta disposal should be carried out so as to reduce to a minimum:
> (*a*) danger of direct contact with men;
> (*b*) the contamination of soil or of ground or surface water;
> (*c*) the possibility of transference to man through the agency of insects or animals; and
> (*d*) the possibility of creating a public or private nuisance." (1).

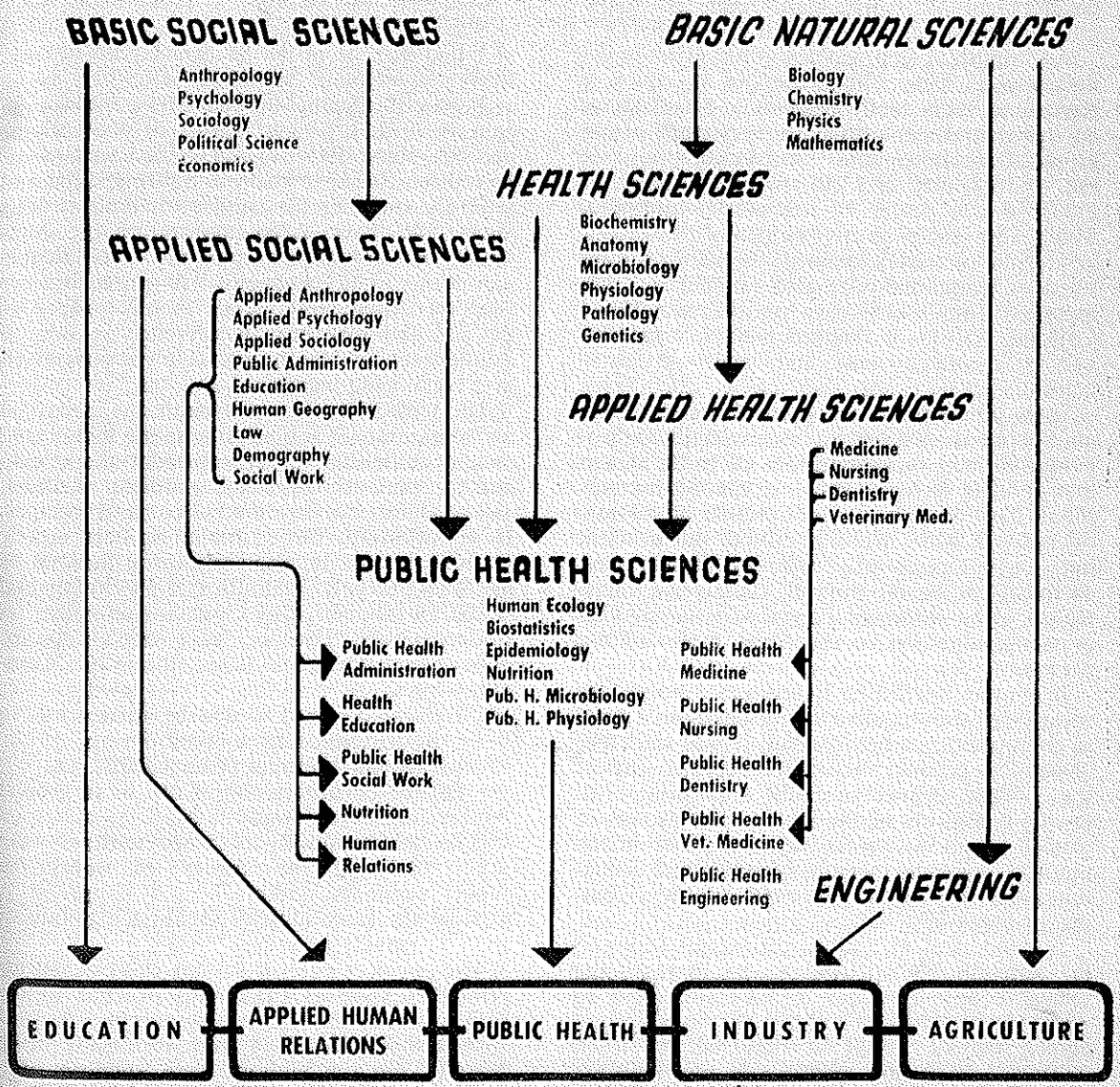
The engineer's job is to find ways of putting principles such as these into practice in the field in a way that the people accept. A great deal of very interesting work is already being done in many regions of India, and the All-India Institute of Hygiene and Public Health

(*Contd. on page 89*)

PUBLIC HEALTH

A TEAMWORK JOB BASED ON

SOCIAL and NATURAL sciences



AN OUTBREAK OF STAPHYLOCOCCAL FOOD POISONING FROM CONSUMPTION OF *DAHI*

By

DR. A. L. SAHA, M.B.B.S., D.T.M., D.P.H.
All India Institute of Hygiene & Public Health, Calcutta

and

DR. N. C. GANGULI, M.B.B.S.
Nilratan Sircar Medical College, Calcutta

An outbreak of gastro-intestinal disorder which on investigation turned out to be one of Staphylococcal food-poisoning, occurred at Paikpara in the North-Eastern Section of the city of Calcutta on the 19th March, 1956. In this outbreak 67 individuals belonging to 26 families were affected and one child died Food-poisoning due to the toxin of certain strains of staphylococcus has been reported mostly from the Western countries, like Belgium, France, U.K., U.S.A., Canada, etc.

It was Denys of Belgium who in 1894 first conceived of the idea that some strains of staphylococcus were also be produce toxin capable of irritating the gastro-intestinal tract. Following this, cases of staphylococcus food poisoning were reported by Owen (1907) in U.S.A. and Barber (1914) in the Philippines. The latter described a clear case of a toxin outbreak caused by the growth of a white staphylococcus in the milk of certain cow. He found that if the milk was consumed immediately after milching, it caused no harm to the consumer but if it was allowed to stand for a few hours at room temperature (29°-30°C) its consumption gave rise to, within 2 hours, the symptoms of nausea, vomiting abdominal pain, diarrhoea and even cramps and faintness. Similar symptoms could be reproduced in human volunteers by direct consumption of pure culture of the strain of *staphylococcus albus* isolated from the cow in question, though kitten, puppies and monkeys proved refractory. Although this report furnished almost a complete picture of a toxin outbreak, unfortunately it did not get its due recognition until Dack and his Colleagues in 1930 rediscovered the same phenomenon and brought it to the notice of the medical profession. Since then numerous outbreaks have been reported in the literature (Jordan, 1931; Jordan and Hall, 1931; Mc. Burney 1933; Jordon and Burrows, 1934; Dack et al, 1935; Dolman, Wilson and Cockroft, 1936; Anderson & Stone, 1955).

Most of the outbreaks followed the consumption of milk products, particularly cakes and eclasias filled with cream or custard, some have been traced to goary or to canned meat or fish. The circumstances have invariably been such that it favoured the multiplication of staphylococcus in the food prior to its consumption. The probability of contamination of food by Staphylovoccus is obviously high because of this organism being a common commensal in the human body, particularly skin and naso-pharynx. But perhaps only a small proportion of such strains is toxigenic. Dolman et al (1936) introduced the Kitten Test for the quantitative estimation of the enterotoxin liberated by such strains. Recently Anderson and Stone (1955) described as many as 8 outbreaks of food-poisoning occurring in school canteens in England during the months of June and July 1953, affecting 1190 persons. These were typical explosive outbreaks of Staphylococcal food poisoning with no fatality. All of them are due to consumption of a particular brand of spray-dried milk powder which was used as cream or a similar preparation.

In spite of the reporting of the above outbreaks in the literature, the subject has not yet drawn the general attention of the Indian workers although it is likely that such outbreaks are not rare in India now and are going unrecorded. The purpose of this note is to report about the outbreak that happened to arise in the same locality in which the authors were resident.

HISTORY OF THE OUTBREAK:

On return home from their work on the 19th March 1956 the authors were apprised of a number of gastro-enteritis cases in many families in the locality for which no definite

TABLE I

Age and sex distribution of cases:

	—1	—5	—15	—35	—45	45+	Total
Male	0	6	12	4	4	5	39
Female	0	6	5	2	1	2	28
Total	0	12	17	6	5	7	67

cause could be assigned. The main symptoms were vomiting and purging with or without mucus and blood, but the duration and severity of the acute phase varied considerably from case to case. The local physicians who were called to treat some of the cases did not think it to be cholera, a common cause of gastro-enteritis during the particular season. The next morning some further information was collected by the senior author before coming to the Institute and on consultation with Dr. Seal, the Professor of Epidemiology, the outbreak was considered to be one of staphylococcal poisoning and at his suggestion a brief investigation was conducted, the results of which are reported here.

A house to house investigation showed that at least 26 families were involved with not less than 67 cases. Detailed information could be collected from 10 families only with 27 cases. The remaining 16 families gave information about the name, age, sex and the history of symptoms of the memebrs who suffered. On enquiry about their movement and food-history in their past few hours every body gave a common history of consuming "Dahi"* from a particular local confectioner (S.G. by name). People themselves became suspicious of this stuff and since the result of enquiry was also leading towards the same conclusion they confronted the confectioner, who not only refuted the charge but in order to prove his alibi himself took some "Dahi" from the same lot. Within 2 hours he developed the typical symptoms, thus providing the necessary evidence. No sample could however be collected for bacteriological examination as some irritated young men got possession of the unsold pots of the Dahi, and destroyed them by throwing the stuff into the drain. Only a little of the left over Dahi was later found in a consumer's house for examination.

For fear of legal action the confectioner closed down the shop for about a fortnight. He gave the following history of the preparation of the particular lot of "Dahi." On 17-8-56, he purchased milk from a vendor who had come from a village unknown to the confectioner and who, according to his version, did not turn up since the occurrence of the outbreak. The milk was boiled as usual and after distribution in the earthenware pots was seeded when cooled, at about 10 p.m. that evening. He, however, noted some peculiarity in the formation of Dahi in this lot. It was due to be completed overnight (i.e. by the morning of 18-3-56) but the formation was so delayed that he had to wait till next day morning, e.g. 19-3-56, the day of the epidemic, for selling it to the local consumers. The available sample was examined by Dr. M. N. Lahiri, Professor of Microbiology who isolated Staphylococcus aureus from it, giving positive coagulase test.

RESULT OF INVESTIGATION:

The area affected is shown in the map. It is situated on the north eastern end of the city of Calcutta, recently developed. The total number of families involved is 26 with more than 230 members. The number of members who actually consumed the contaminated Dahi was roughly about 80, and the numbers actually showing symptoms of poisoning was 67. The age and sex distribution of the cases are given Table I. There was no consumer amongst the infants. The youngest consumer being a female child of $1\frac{1}{2}$ years old. The details about the quantity consumed and symptoms are given for the 10 families investigated in Table II.

The total number of persons in these families was 130. Of these 32 persons between $1\frac{1}{2}$ years and 70 years consumed the toxic Dahi in quantities varying from $\frac{1}{2}$ oz. to 4 oz. only 5 of them escaped symptoms. Vomiting was the only symptom in 16, and purging only in one case. Three cases including the fatal one had blood and mucus in the stool. Severity was judged not so much on the number of vomiting and purging but on the general condition of the patient. Eleven suffered severely of which one male child age $2\frac{1}{2}$ years died. All except four were treated at home. Symptoms started as early as $\frac{1}{2}$ hour after consumption and as late as $4\frac{1}{2}$ hours. Severity of symptoms did not strictly follow the age, but

* *Dahi* is milk curd.

TABLE III

Distribution of cases according to age and degree of severity.

Severity	AGE							SEX		
	−1	−5	−15	−25	−35	−45	45+	Male	Female	Total
Mild	0	3	5	0	2	0	2	9	3	12
Moderate	0	1	0	2	0	1	0	2	2	4
Severe	0	3	3	2	3	1	2	6	5	12
TOTAL	0	7	8	4	5	2	4	17	10	27

TABLE IV

Quantity consumed.

Degree of severity	½ oz.	1 oz.	2 oz.	3 oz.	4 oz.	Total
No. symptom	—	—	—	2	3	5
Mild	2	1	2	6	1	12
Moderate	0	0	1	1	2	4
Severe	1	1	3	3	3	11

to a certain extent it was related to female sex and quantity consumed & see Tables III and IV).

In one particular instance (the family No. 10) this toxic Dahi was used as a seed for home made Dahi. Three of the four people consumed the Dahi were also affected with symptoms.

DISCUSSION:

From the results of the investigation there is little doubt that the present outbreak was one of Staphylococcal food-poisoning. The question arises about the source of milk used in the preparation of the Dahi. The story of unknown milkman from the village does not seem to be a reliable one, as these vendors are fairly wellknown to the confectioners. What is most likely in the present circumstances is that either the confectioner or the milkman might have mixed contaminated milk powder with the milk to obtain the required bulk, because of the cheaper price owing to the flooding of the local market with milk powder. It may be stated here that no external evidence of skin or nasal infection was present in any of the workers of the confectionery.

SUMMARY:

An outbreak of Staphylococcal food poisoning from Dahi in North Calcutta has been described. Total number of cases reported was 67 of which only one ended fatally. A brief review of the literature on the subject has also been made. It appears that such cases of food poisoning are not rare, but are likely to escape notice for either mildness of symptoms or short period of sickness and little fatality. These are generally passed out as ordinary (food poisoning) gastroenteritis or cholera.

ACKNOWLEDGEMENT:

Thanks are to due Dr. S. C. Seal, Professor of Epidemiology and Dr. M. N. Lahiri, Professor of Microbiology, All-India Institute of Hygiene and Public Health, Calcutta, for guiding us in carrying out this short investigation.

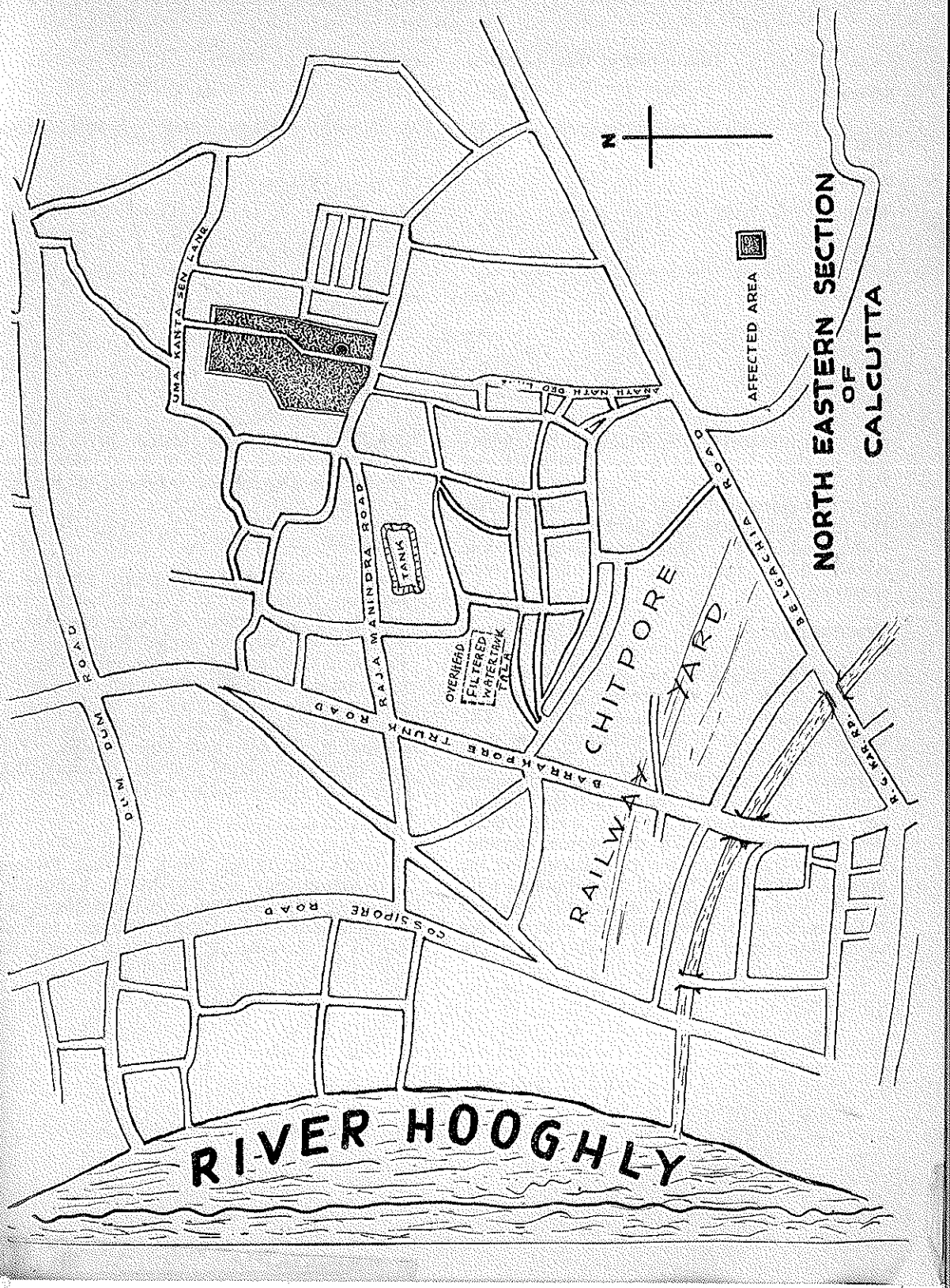

N
NORTH EASTERN SECTION OF CALCUTTA
AFFECTED AREA
UMA KANTA SEN LANE
ANATH NATH DEY LANE
RAJA MANINDRA ROAD
TANK
OVERHEAD FILTERED WATER TANK
FALTA
BELGACHIA ROAD
CHITPORE
RAILWAY YARD
BARRAK PORE TRUNK ROAD
R. C. KAR RD
DUM DUM ROAD
COSSIPORE ROAD
RIVER HOOGHLY

TABLE II

Results of investigation in 10 affected families

Sl. No. family	Total No. of mem.	Dahi consumed by Adult	Child	Total	Age yrs.	Sex	Quantity Oz.	Interval between consumption and on set hrs.	Degree of severity	Vomiting No.	Stool No.	Stool Muc	Stool Blood	Treatment at home	Total period of sickness in days
1	7	2	1	3	28	m	4	3	mild	nil	20	—	—	,,	3
					3½	m	½	2½	mild	20	0	—	—	,,	3
					24	f	2	2	severe	15	18	+	+	,,	3
2	25	1	1	2	12	m	1	1½	severe	15	15	+	+	,,	2
					50	m	3	no symptom							
3	30	2	—	2	19	m	4	3	mod.	12	6	—	—	,,	2
					25	m	2	2	mild	7	2	—	—	,,	2
4	3	2	—	2	21	f	4	1¾	mod.	12	3	—	—	,,	2
					30	m	4	no symptom							
5	10	2	—	2	42	m	4	1¾	severe	15	15	+	+	,,	3
					44	m	4	1½	severe	3	3	+	+	,,	3
6	16	—	2	2	10	f	1	4½	severe	18	8	—	—	,,	2
					8	f	2	2½	severe	18	8	—	—	,,	2
7	16	3	1	4	70	m	3	2½	mild	5	2	—	—	,,	3
					30	m	2	3	severe	6	7	+	—	,,	3
					17	m	½	4½	severe	7	8	—	—	,,	3
					7	f	½	2	mild	5	5	—	—	,,	2
8	15	1	7	8	17	m	4	no symptom							4
					10	f	4	½	severe	8	0	—	—	,,	2
					7	f	4	no symptom							
					4	f	3	½	mild	9	0	—	—	,,	2
					2	m	3	½	mild	8	0	—	—	,,	2
					14	m	3	½	mild	8	0	—	—	,,	2
					6	f	3	½	mild	8	0	—	—	,,	2
					2	m	3	½	severe	20	20	+ + +	+	,,	died on 22/3
9	—	1	2	3	38	m	3	4	mod.	10	15	—	—	,, H	4
					4	m	3	4	severe	10	15	—	—	,, H	5
					1½	f	3	4	severe	10	15	—	—	,, H	5
10	8	2	2	4	4	f	2	3	mod.	7	1	—	—	,,	1
					8	m	2	3	mod.	2	0	—	—	,,	1
					45	m	3	3	mod.	1	0	—	—	,,	4
					16	m	3	no symptom							

(One anna Dahi ($1\frac{1}{4}$ oz.) was used as seed for preparing dahi at home)

TABLE III

Distribution of cases according to age and degree of severity.

Severity	AGE							SEX		
	−1	−5	−15	−25	−35	−45	45+	Male	Female	Total
Mild	0	3	5	0	2	0	2	9	3	12
Moderate	0	1	0	2	0	1	0	2	2	4
Severe	0	3	3	2	3	1	2	6	5	12
TOTAL	0	7	8	4	5	2	4	17	10	27

TABLE IV

Quantity consumed.

Degree of severity	½ oz.	1 oz.	2 oz.	3 oz.	4 oz.	Total
No. symptom	—	—	—	2	3	5
Mild	2	1	2	6	1	12
Moderate	0	0	1	1	2	4
Severe	1	1	3	3	3	11

to a certain extent it was related to female sex and quantity consumed &see Tables III and IV).

In one particular instance (the family No. 10) this toxic Dahi was used as a seed for home made Dahi. Three of the four people consumed the Dahi were also affected with symptoms.

DISCUSSION:

From the results of the investigation there is little doubt that the present outbreak was one of Staphylococcal food-poisoning. The question arises about the source of milk used in the preparation of the Dahi. The story of unknown milkman from the village does not seem to be a reliable one. as these vendors are fairly wellknown to the confectioners. What is most likely in the present circumstances is that either the confectioner or the milkman might have mixed contaminated milk powder with the milk to obtain the required bulk, because of the cheaper price owing to the flooding of the local market with milk powder. It may be stated here that no external evidence of skin or nasal infection was present in any of the workers of the confectionery.

SUMMARY:

An outbreak of Staphylococcal food poisoning from Dahi in North Calcutta has been discribed. Total number of cases reported was 67 of which only one ended fatally. A brief review of the literature on the subject has also been made. It appears that such cases of food poisoning are not rare, but are likely to escape notice for either mildness of symptoms or short period of sickness and little fatality. These are generally passed out as ordinary (food poisoning) gastroenteritis or cholera.

ACKNOWLEDGEMENT:

Thanks are to due Dr. S. C. Seal, Professor of Epidemiology and Dr. M. N. Lahiri, Professor of Microbiology, All-India Institute of Hygiene and Public Health, Calcutta, for guiding us in carrying out this short investigation.

THE CAUSATIVE GERM IN RELATION TO THE PROBLEM OF EPIDEMICITY AND ENDEMICITY OF CHOLERA

By

DR. S. C. SEAL, M.B.B.S., D.P.H., Ph.D., F.A.P.H.A., F.N.I.

Professor of Epidemiology,

All India Institute of Hygiene & Public Health, Calcutta

The problem of epidemicity or endemicity of cholera is intimately associated with the identification of the organism or organisms causing the syndrome which is clinically called cholera. A wide difference of opinion was found to exist between different laboratories in regard to the serological character of certain virbrio strains isolated from amongst the Hedjaj pilgrims at El Tor in 1930. This incidence cast doubt into the existing methods of identification of true cholera vibrio upon which our knowledge on the epidemiology, treatment, control, immunisation, and quarantine measures primarily depend. A fresh interest was thus created for carrying out intensive investigations initiated by the then Office Internationale d'Hygiene Publique. Since then a large amount of research work has been done on the subject during the last quarter of a century, which has materially advanced our knowledge on the character of the vibrio group as a whole and of the choleragenic vibrio (popularly called true cholera vibrio) in particular, and on the chemotherapy of cholera and other associated problems. India has, however, taken the major share in this work mainly through the munificience of the I.R.F.A., (the present I.C.M.R.) Unfortunately, the problem of endemicity has remained practically in the same stage wherefrom we started. In fact, we have not yet been able to define in an unambiguous language what we mean by endemicity or endemic areas, in spite of the attempts made by Lal, Raja, Swaroop and others. Perhaps it may be worth-while to briefly review the position with regard to the knowledge that we have so far acquired about the true cholera vibrio, before an attempt is made to offer any new suggestion.

1. *Serological identifications :*

Of the two antigenic components, H and O, described by Balteanu (1926) the H component was found to be non-specific and this led Shousha (1931) to conclude that the usual antisera for the identification of cholera vibrios were useless. In the following year Abdoosh (1932) confirmed Balteanu and Shousha's work and showed that all the choleragenic vibrios had the same O antigen and shared their H antigen with non-cholera vibrios and the haemolytic El Tor strains had the same H & O components as the choleragenic vibrio. From a preliminary work with O antisera the writer (1935) pointed out that 'O' agglutinability might be a more reliable guide than H+O agglutination. The basic evidence of this hypothesis was however, provided by Gardner and Venkatraman (1935) by studying a large number of strains of the vibrio group. But out of six 'O' groups II to IV contained organisms referred to as paracholera, choleralike and some El Tor vibrios, mostly haemolytic and isolated from choleraic diarrhoea and water. Taylor (1941) who co-ordinated this study in India felt justified in taking up the decision that no series of cholera cases would be attributed to vibrio of fixed type other than that of non-haemolytic 'O' group I. He based his opinion on the following lines of evidence regarding non-cholera vibrios: (1) heterogeneity, (2) their existence in nature in places where no cholera was occurring, (3) the fact that *in vitro* they overgrow the authentic cholera vibrio and by analogy they do the same *in vivo*, thus explaining the cases of clinical cholera in which the true vibrios could not be found. Although the weight of evidence favours this conclusion in a general way, a number of facts have made its truth in this absolute form somewhat doubtful. For instance, in a group of 828 vibrio strains isolated from cases of cholera Taylor (1938) found as much as 13.5 per cent inagglutinable and serologically and biochemically diverse. In certain out-breaks such as in Manipur (Pandit, 1938), Ratanpur (Seal, 1946) and in the last Allahabad Kumbh fair (Yajnik and Prasad, 1954) only NAG vibrios were isolated.

In the last Kumbh fair more than 300 cases were involved. In a series of 90 strains of Rangoon Rough type 26 were from cholera patients thus indicating a casual relationship of this group of vibrio. Another source of doubt lay in the observation that sera prepared against NAG strains from cholera cases agglutinated a higher percentage of strains from cholera cases than carrier or water strains while the opposite was observed with sera prepared against the carrier or water strains. Anderson, according to Gardner and White (1937), isolated true cholera vibrio from cases as rare colony in the whole plate showing innumerable H & O (or NAG) positive colonies. It was therefore, necessary to assume that the organism in the isolated colony was the cause of cholera whereas the vibrios isolated in large numbers at the same time were to be considered as casual contaminants of the bowel. Anderson also reported a certain number of clinically undoubted cases of cholera in which the most thorough search would not reveal the true cholera vibrio although other vibrios were plentiful. In the Trichinopoly study in certain cases NAG's were first isolated and later (3rd or 4th day) AGG's. Again two or three outbreaks of cholera in Java were attributed to EL Tor type of organisms. No doubt, there is a wide distribution of vibrios in India unrelated to cholera but it is a question whether the high degree of serological diversity can by itself be taken as proof of non-pathogenicity. In fact, the records show that certain vibrios actually exist which, if the present hypothesis were not advanced, would undoubtedly be considered as the cause of the disease in which they were found, because not only they were agglutinable with patient's own sera (though not with V. Choleræ O' Sera) but also the antisera raised against them agglutinable *V. Cholerae* of O-group I strain. For instance, in a study of the vibrios isolated at El Tor Quarantine camp during the pilgrimage of 1941-42 and 1942-1943 Omar and Vassiliadis (1943) found agglutinins in the sera of carriers of non-agglutinable vibrios, against some of these vibrios, especially one particular vibrio (N22) which was agglutinated by its carrier serum in dilution 1/800. On the other hand, the finding of inagglutinable vibrios in places where cholera was not occurring should not exclude the possibility of relationship of some of them with *V. cholerae* as will be seen later from the discussion on the question of dissociation. Besides, the areas from which the organisms were isolated were visited by cholera epidemic in the past as also subsequent to the observation. In regard to Taylor's hypothesis that since inagglutinable vibrios overgrow agglutinable vibrio in vitro it does not necessarily follow that the same thing happens in vivo. If they really do, then according to Taylor's hypothesis a question may be asked why should the person suffer from cholera at all when the majority of the organisms were non-cholera type in the gut. Again, if the large number of non-cholera (O'inagglutinable) vibrios found in cholera cases is the result of contamination of the intestine with vibrio from environment then we have to explain why cases showing exclusively O-inagglutinable vibrios die. In fact, Taylor himself seems to have recognized this situation as he wrote: "This typical vibrio cannot be isolated in all cases, and when a suspected case occurs, the necessary preventive measures should be constituted without awaiting such isolations."

According to Doorenbos (1936, 1937) typical vibrios isolated from the cholera cases are only modified form of a typical vibrio, the non-agglutinable vibrio being the organism of sporadic cholera and the agglutinable vibrios that of epidemic cholera. Ahuja and Singh (1939-40) found that 35 per cent of the 219 O-inagglutinable vibrios were agglutinable with H & O serum. Using chloroform treated suspension as used by Vassiliadis (1937) the percentage of agglutinable vibrios increased to 53. They also found that some strains had an antigen identical with that of *V. cholerae* and in others the major or minor portion was identical, while the remaining strains were heterogenous or only individuals. In this connection Gardner and Venkatraman (1935) had found that few minutes' heating of vibrio suspension to 100°C sufficed to remove the H agglutinability, but if the organism were to be used for the preparation of O antigen it was necessary to boil them in a water bath for 2 hours. Linton, Mitra and Seal (1946-37a) investigated into the chemical changes associated with these procedures. The results obtained suggested that destruction of H antigen was accompanied by a rapid change in the surface of the organism due to the removal of aminonitrogen and increase of surface potential; on prolonging the healing a progressive series of changes occurred which involved the gradual loss of total nitrogen, amide-N and disappearance of A-fraction (obtained by 0.025 N HCL + absolute alcohol extraction forming only 1-2% of the dry weight of organism—Linton & Mitra, 1934-36; Linton, Mitra and Seal, (1934-35)—leading to mild

hydrolysis. This study therefore explains Gardner and Ventakraman's finding as follows: "The first change destroyed the H antigen in the sense that the heated organisms with their heightened surface charge had lost the agglutinability, while the progressive change involved a loss of 10% of total N, 12% of amino-N, 45-65% of polysaccharide which constituted about 10-13% of total substance of the organism. In other words, the above amount of substance must be removed before the organisms are in a suitable condition to yeild 0 antisera on injection. These findings appear to throw doubt upon the view that H antigen is exclusively associated with the flagellar portion. White (1937) by means of precipitin tests with sera raised against polysaccharide extracts suggested at least four 'O' receiptor groups in the smooth polysaccharide of cholera vibrios of both Insba and Ogawa types; two of these were type-specific and two group specific, one in each group being alkali labile and the other alkali resistant. In contrast with this observation Burrows et al (1944) showed there were as many as 13 components (A to M) of this antigen, A being group specific and B and C being type specific forming four groups A, AB, AC and ABC which including the El Tor vibrio. Gallut (1949) studied the 'O' antigenic component of both agglutinable and inagglutinable vibrios. He noted that excepting A, the rest of the components could be found in the inagglutinable vibrios in an assorted manner. According to this the accepted conception of Ogawa, Inaba and Hikojima types seemed out-moded, as antigenic differences were found between strains which by ordinary serological diagnosis appeared identical, and accordingly Gallut advocated the use of antigen O monospecific sera A, B and C instead of Ogawa and Inaba. But these findings could not be confirmed by Singh and Ahuja (1950).

From the above findings it may be concluded that although the majority of cases of cholera is probably due to a single type of organism, but cases do occur in which other types are concerned, and that at times these may assume epidemic proportions as in the case of Celebes epidemic by El Tor strains. Attempts should therefore be made to broad base the method of diagnosis so as to include these cases rather than to labour hard to exclude them and leave lacunae for error. It is possible that if the authors who recommended the use of O sub-group I antigen had considered the question of variation (to be discussed later) of vibrios a more useful basis for classification, diagnosis and solution of the problem of endemicity of cholera would have been found.

2. *El Tor vibrio :*

The El Tor vibrios being nearest to the true cholera vibrio of Gardner & Venkatraman need consideration in this review.

The isolation of El Tor Vibrio in 1905 created interest in its haemolytic properties, these strains having otherwise resembled the true cholera vibrio, morphologically, serologically and bio-chemically. Later, these have been obtained from healthy persons, water sources and even cholera cases (Celebes). Chemically they possess Polysaccharide I of true cholera vibrio and Protein II of water vibrio (Linton et al 1934-35). In their metabolic activities they are differentiated by high respiration but practically no aerobic glycolysis (Linton, Mitra and Mullick, 1935-36). Biochemically, they fall into Heiberg's Group I. Serologically they are agglutinated by specific 'O' group I antiserum and show the same three subtypes as the true cholera vibrio, and are equally lysable by A-phage which is supposed to be specific for *V. cholerae*. Conversely also A-phage is selectively inactivated by the specific polysaccharide of smooth *V. cholerae* on El Tor vibrios while the polysaccharides of rough *V. cholerae* or non-cholera vibrios had no such effect (White, 1936). Maitra (1939) also placed El Tor vibrio in the same group as *V. cholerae* by his combined phage inhibition and precepitin tests, the other comprising atypical and rough strains and cholera like vibrios. On the other hand, a clear cut serological differentiation between the hæmolytic El Tor and the cholera vibrio was obtained by Shrivastava and Seal (1937) by using specific soluble polysaccharides of the latter against El Tor antisera for precipitin reaction. This differentiation was not possible by using the polysaccharide prepared by White (1936) from the bacterial body, although he observed that in contrast with *V. cholerae* (Indian strains) El Tor and non-cholera strains were free from this phage and nonsensitive to it (White 1937c).

In regard to the hæmolytic properties, however, there was a great deal of difference of opinion particularly in regard to the standardisation of methods, as will be seen from the list of literature on the subject (Van Loghem 1913; Greig 1914; Gohar 1932; Zimmerman, 1932, 1933; Doorenbos, 1936; Bernard et al 1937, b & c 1939; Goyle 1938-39; Beeuwkes

1939; Morten and Beeuwkes 1940; Taylor, 1941; Read, Pandit and Das 1942; Ahuja, Krishnan Pandit and Venkatraman 1951). The El Tor immune serum neutralises the hæmolysin while the antiserum prepared against a typical cholera vibrio (non-hæmolytic) has been claimed to have no neutralising action. It is however of interest to note that Vassiliadis (1935a) reported that the injection of non-Hæmolytic vibrio into rabbits gave rise to hæmolysin neutralising antibodies, while Read et al (1942) divided the vibrio strains into "Greig positive or early hæmolytic" (within 24 hours) and "Greig-negative or late hacmolytic groups the hæmolysin of the former group only being specifically neutralised by the antiserum produced against "early hæmolytic" group and of the latter group was considered identical with the hæmodigestive ferments of Van Loghem. Bernard et al (1937), however, suggested that the differences in the hæmolysin content in different strains might be explained by assuming a free hæmolysin El Tor group and partially neutralised (or suppressed by lipoid or cholesterol) hæmolysin in the true cholera vibrio. According to him both the strains contained an acetone soluble, thermostable and hæmolytic substance which lysed red cells and was quite distinct from the true hæmolysin. The observations of these workers thus suggest that the cholera vibrio forms hæmolysin as well as a digesting ferment but it is mainly intrucellular and unlike that of El Tor does not diffuse much into the medium. This is supported by the finding of Vassiliadis (1937) mentioned above.

Pathogenicity of El Tor vibrios

Normally in India *V. choleræ* has not been isolated except in the immediate presence of cholera cases barring perhaps in a few instance in the absence of cholera, while hæmolytic strains have been isolated from water and healthy human sources both in the presence and absence of cholera and in some rare instances from actual cholera cases (e.g. Pandit and Read, 1942). One interesting fact is that in India NAG or H+O agglutinable vibrios are found in association with cholera cases but El Tor is not generally found in association with *V. choleræ* in cholera cases. It either appears as a carrier organism or after the concalescent stage. But since they are occasionally present in the water sources, according to Taylor's hypothesis, at least in a few cases of cholera it should have appeared along with *V. choleræ*. The largest number of isolations has, however, been from water sources in areas with different epidemiological features namely Bengal, Bihar and Sind (Taylor, 1941) and Madras (Venkatraman et al, 1941). The strains were therefore considered as non-pathogenic till the occurrence of Celebes cases which were clinically indistinguishable from true cholera cases in sympatomatology, severity, fatality and duration of carrier state (both contact and convalescent). Calculated on the number of bacteriologically positive cases the fatality rate was 75% in 1937-38 and 69% in 1939-40 outbreaks but the cases were sporadic in nature. Nearly half the number of water sources used by the patients were found infected with the same hæmolytic type of vibrio. During the same period some healthy persons and water sources not traced to be connected with cholera cases were also found to be infected with the same type of vibrio but chronic carriers were absent (only temporary carriers). deMoor (1939), therefore, concluded that the Asiatic Cholera should be considered as disease in the same sense as the bacillary dysentery which is due to bacteriologically different organisms. Gipson (1939), on the other hand, sought to establish that El Tor vibrios occupied a position intermediate between the pathogenic and non-pathogenic strains, practically supporting the view point of Doorenbos (1936) that they are hæmolytic and at the same time somewhat pathogenic. In any case, there are sufficient points now in favour of the view that El Tor is related to *V. choleræ*. The very facts that El Tor strains have also Hikojima types and they dissociate in the same way as the *V. choleræ* (non-hæmolytic), as noted by Shrivastava and White (1947), are sufficient reasons to believe that they have descended from the true cholera vibrio.

A question may now be posed here: Is 'O' antigen specific for *V. choleræ*? If so, it should be protective also. If it is protective El Tor 'O' antigen which is common between this organism and *V. choleræ* should also be protective. But polysaccharide has been claimed as specific and has also been found to be as protective (Ahuja, Shrivastava & Singh, 1951) and furthermore it can specifically absorb agglutinins from 'O' anti-serum. But the difficulty arises in explaining the phenomenon in view of the fact that 45-65% of polysaccharide is lost during boiling in the process of preparing 'O' antigen which is supposed to be the core of the organism. It is therefore essential to know the chemical structure of 'O' antigen. Furthermore the

crudeness of the serological classification is seen by the fact that though El Tor vibrios are serologically indistinguishable from the true cholera vibrio, a clear cut difference could be shown by using specific soluable polysaccharides of the latter against El Tor antisera for precipitation (Shrivastava and Seal, 1937).

3. *Variation and dissociation of vibrios :*

Cholera workers are divided into two main groups regarding the question variation of *V. choleræ*. One school is inclined to the view that the true cholera vibrio is a single species of organism being responsible for the symptom-complex characteristic of asiatic cholera and that its range of variation is limited to smooth-rough transition and vice-versa. The other school, however, believes that the cholera vibrio is capable of undergoing variation and dissociation, though within a limited range, beyond the smooth-rough transition and is probably capable of existing in the environment and even in human beings in a form which is not now generally accepted as the organism related to the causal agent of cholera. The writer is inclined to believe that variation plays an important role in the persistence or endemicity of cholera in a locality.

(a) *Serological variation :*

Three kinds of variability in agglutination have been noted, namely, (i) strains isolated from cholera cases and so-called carriers agglutinate with the same antiserum at different titres, (ii) mutation from AGG to NAG and vice-versa and (iii) an intramural change from one type to another within the same agglutinating group e.g. O-group I. In fact the three Japanese types Inaba, Ogawa and Hikojima were originally described as original, variant and intermediate types.

Kabeshima (1918) discovered serological variants of cholera vibrio, which were further investigated by Nobechi (1923) and Inoye and Kakihara (1925) but the exact nature was not established. The first clear differentiation of smooth and rough forms in the vibrios was made by Shousha (1923-24). They were identical biochemically but otherwise different. In fact, the smooth-rough trnsition is accompanied by changes in salt stability, agglutinability, metabolic activity, chemical constitution and A-phagelysibility. (Asheshov et al, 1929-30; Goyle and Sen Gupta, 1932-33. Pasricha et al 1931; 1932; 1933; Yang and White 1934; Linton, Shrivastava, Mitra and Seal, 1935; Linton, Seal and Mitra, 1937-38; Bhaskaran, 1953). Brahmachari (1929) claimed to have transformed H. & O. agg. vibrio into NAG by passage through rabbit and reconverted it into H & O agg. by passage through guine-pig. But it is not known whether the organism actually belonged to O-sub-group I of Gardner and Venkatraman, Taylor (1935) reported a series of variants produced from Inaba, Ogawa and Hikojima strains (of O-subgroup I) and a recently isolated Indian strain by serial mouse passages. They became non-agglutinable to O-group I serum but were agglutinated by O-group VI serum of Gardner and Venkatraman and became hæmolytic. Linton, Seal and Mitra (1937-38) noted chemical and serological variation in single all cultures of *V. Choleræ* and related organisms. Again, from a rough variant Linton and Seal (see Linton, Shrivastava and Mitra, 1934-35) were able to recover by special methods a smooth colony (Rangoon Smooth Recovered) which resembled the parent strain almost in every respect and agglutinated to the full titre of the Rangoon smooth antiserum. Very recently Doorenbos and Cossery (1950) are said to have succeeded in reverting R to S type in the presence of antiphage serum.

Taylor and Ahuja (1935-36 a, b) isolated from water in an area far from any case of cholera, non-agglutinating hæmolytic vibrio which on sub-culturing for 8 months became agglutinable with O-Group I serum and non-hæmolytic. Conversey, they also found three inagglutinable vibrios became agglutinable with antisera against both H & O fraction of true cholera vibrios after serial passages through mice. That the vibrio agglutination is mutable is also supported by the work of Takano (1935) who produced immnological varieties by sub-culturing in immune sera without alteration of the biochemical, hæmolytic and other characteristics. He changed agglutinable strains into a typical forms and vice versa. Vassiliadis (1936) showed that non-agglutinable strains extracted with chloroform become agglutinable with anti-cholera serum to high titre (1 : 16000), and the sera against inagglutinable vibrio agglutinated chloroform treated cholera vibrios. Similar results were also obtained by absorption tests. The results; if repeatable, would indicate the fineness of the distinction between agglutinable and non-agglutinable types of vibrios. It is well known that inagglutinable or less agglutinable forms are more common towards the end of an epidemic and during convalescence. This is explained to be due to the increasing immunity in the population and the affected individual.

OGAWA—INABA VARIATION:

The writer while studying the cholera outbreaks in the Singur Health Centre area during 1944-45 noted a vibrio change from Inaba in 1944 to Ogawa in 1945 (Seal, 1946) and he advanced the hypothesis that vibrio types do not remain constant from year to year or even month to month in any locality in the endemic area and raised the question of intramural variation among Inaba, Ogawa and Intermediate forms just as it occurs among the three diphtheria forms. Similar changes were noted by Venkatraman (1939) in Madras, by Gupta (1943) in Calcutta and by Tang et al (1944) in Kunming (China). It is interesting to note the remarks of Reiman (1947) in this connection from his 1945 Chungking experience: "It would appear that in cholera epidemics, either a single type strain or different serological types of the cholera vibrio are rampant. Questions arise as to whether (a) epidemics begin from a distribution of a single type and others appear as a result of bacterial dissociation or type transformation or if epidemics are caused by one or more stable types of vibrios and (b) if vibrios without antigen A (Burows) may cause clinical cholera or if they are dissociant culture phase forms of pathogenic vibrios brought about by extra-corporeal growth." In a still recent paper Lahiri (1951) noted alteration of serological type of *V. cholerae* from Ogawa to Inaba and vice versa in 24 patients not under the influence of chemotherapy, but it is not known whether the possibility of cross-contamination was excluded.

The above observations and comments have been largely clarified by the work of Shrivastava and White (1947) who produced indisputable evidence of transmutability of Ogawa to Inaba and Inaba to Rough form by "focussing serous influences" on the type specific O-antigen in the use of strictly non-specific antisera. They conclude that the types are but phases of single species and probably merely an expression of the range of natural variation and thus the generally accepted serological classification is taxonomically invalid. This observation finds support from the observation of Ahuja and Singh (1948) who found that an Inaba strain vaccine afforded just as good protection against Inaba infection as against Ogawa infection and vice versa. In an epidemic areas the organism may be of single type but in endemic areas more than one tyve may be encountered in the same epidemic. For instance, Venkatraman and Pandit (1938) found all the strains isolated in a virulent epidemic in South India as of Ogawa type whereas Seal (1946) who studied the actual distribution of Inaba and Ogawa subtypes in clinical cholera in the Singur area found both Inaba and Ogawa, at the same time. Demoor (1939) obtained during the Celebes epidemic series of six strains from one case in which both Inaoa and Ogawa antigens as well as a common component were present. Sen Gupta (1951) claimed that he produced changes in subtypes by repeated subculture in 24 of the 450 strains isolated from 200 patients in Calcutta. From the culture of the same speciment of stool of a clinical cases of cholera vibrios have been obtained which resemble each other in all the characters of a true vibrio except agglutination. Again, there is a greater tendency to find non-agglutinable vibrios or less agglutinable ones during convalescence and the declining phase of the epidemics. The question therefore arises whether this inagglutinability is due to an alteration in the originally agglutinable vibrio or to an apparent alteration due to the increasing preponderance of NAG's originally present in small numbers or whether they are to be regarded as non-cholera vibrios having no causal connection with the disease, as suggested by Taylor (1941).

The change of originally agglutinable vibrios to inagglutinable forms has been attributed to one the following factors, viz. (1) symbiosis with other intestinal organisms (2) growth under increasing immunity in the body and (3) phage action. In regard to the last point it may, however, be mentioned that cholera has been recorded as due to NAG only, in the absence of cholera phage in the patients. Lal and Seal (1938) made an attempt to answer the above points by selecting 3 convalescent cases of cholera who were originally excreting only AGG vibrios and by watching them under strictly segregated conditions having nursed and supplied them with food and medicines in a way by which all possible contamination from any outside sources were eliminated. Cases were observed for two weeks and generally all colonies developed in a plate were examined each day. Case No. I (R.M.) showed NAG vibrio of Heiberg I on the 5th and 6th days of the onset, after which the case became completely vibrio negative for 4 days and then showed Inaba O+ vibrio again on the 11th day. Case No. 2 (Sanu) showed NAG on the 4th, 6th and 7th days and only Inaba O+ on the 8th and 9th days. The NAG's on the last two days belonged to Heiberg II. The first isolation of NAG in case No. 3 (Indrasan) was on

the 9th day and the case continued to excrete it for the following 3 days. Inaba O+ appeared again on the 13th day along with NAG, all isolations being Heiberg I.

The above studies plainly show the lability of the agglutination reaction in the vibrios and this makes one cautious about accepting the complex serological classification which have been formed upon the assumption that serological variation will not occur.

(b) *Variation in hæmolytic properties* :

The true significance of the hæmolytic test in the epidemiology of cholera has still remained vague, the test being complicated by the fact that hæmolysis itself is quite a variable property. Some of the anomalies were cleared up by Van Loghem (1913) who showed that the apparent hæmolysis of blood by *V. choleræ* was a hæmodigestion and not hæmolysis as produced by El Tor strains. Pollitzer (1934), however, noted that vibrios which possesed both hæmodigestive and hæmolytic properties had a tendency to lose the former reading rather in a permanent manner. After the study of the hæmolytic properties of the El Tor strains isolated in 1930 Van Loghem (1932) posed two question (1) "can a non-hæmolytic vibrio become hæmolytic? and (2) can a hæmolytic strain cause cholera?" The second question has been answered in the affirmative by the occurrence of Celebes epidemic.

As regards the first question variable results have been obtained by different workers. For instance, Heiberg (1935) found that rabbit's blood was extremely susceptible to vibrio hæmolysin, while the goat's blood was resistant. Even confining his experiments to the use of goat's blood he found a large number of strains to give first test of hæmolysis positive and second test negative and also vice versa in a few cases. In his hands, even individual colonies picked up from the same plate showed hæmolytic powers ranging from active to negative. Goyle (1939-40) found that bloods from different animals varied in susceptibility to hæmolysins, but not in the same order as Heiberg had reported. Otten (1939) pointed out the three factors which must be considered in the study of hæmolysis and in the interpretation of the results, viz. the age of the culture, the method of incubation of the mixture and the way in which the blood is subject to the hæmolytic action Taking into consideration all these factors Otten showed that the Celebes strains occupied an intermediate position in hæmolytic power. He also confirmed Doorenboo's (1936) observation that when conditions were suitably adjusted *V. choleræ* itself constantly produced hæmolysin after short periods of growth. On this account Otten preferred to leave it an open question whether the Celebes strains were to be considered as belonging to El Tor type with weak hæmolytic power or as *V. choleræ* with strong hæmolytic power. He also holds the view that early hæmolysis cannot be used to differentiate various types of vibrios derived from cholera cases. In this connection a study of the lipoid polysaccharide structure of these Celebes strains would have been interesting.

It seems that the conditions for hæmolysin production need delicate adjustment and as such the value of many observations may be lessened if the technique which has been followed is not revealed. For instance, using more than 500 freshly isolated strains Geneveray and Bruneau (1938) found most of them producing hæmolysin in 24 hours while De Vogel (1932) reported that none of his freshly isolated strains was hæmolytic. Similarly in a recent observation Gohar and Isa (1948) noted that when the cultures of cholera vibrio were kept in the incubator for three days the clearing was just as intense as that produced by the truly hæmolytic El Tor vibrio, suggesting that the difference between the two organisms is more of a quantitative than of qualitative nature.

By means of phage treatment of 70 non-hæmolytic vibrio strains Doorenbos (1932) found 14 of the secondary cultures becoming hæmolytic and hence postulated that the phage action caused the change. This was confirmed by Scholtens (1935) who showed that this mutated form was auto-agglutinable, phage resistant and non-lysogenic, but Heiberg (1935) found the same kind of variation in the phage-free strains. The answer to the first question would therefore appear to be a possible affirmative. The moot question, however, is whether the reverse variation i.e. hæmolytic to non-hæmolytic is possible or not. Very recently Krishnan (1950) is said to have succeeded in achieving this transformation and the work is awaiting confirmation.

From the observations noted above and in the subsequent pages the author is inclined to the view the El Tor type strain is only the mutant form of *V. choleræ*, and that along with the latter and perhaps a few other dissociated forms play an important role in the persistence of vibrios in the endemic areas. The author thinks that if on the basis of the above hypothesis a concerted attempt is made

there is every possibility of success in bringing about the change from the El Tor to non-hæmolytic cholera vibrio. The possible role of intestinal flora or a substratum resembling the intestinal content in this respect was indicated by the author in 1945 (Seal, 1945) and is further discussed later.

(c) *Bacteriophage in relation to variation:*

Under the action of bacteriophage lysis of the organism can be produced. Nearly 15 types of cholera bacteriophage (A-N including LL) have so far been described. A vibrio may be resistant to one phage and lysed by another. A-phage lysibility was considered specific for smooth and agglutinable vibrios and the test was often utilised for identifying *V. choleræ*. The other cholera phages lyse some non-agglutinable vibrio also, including certain percentage of cholera-like water vibrios. Antigenic changes have been noted in the "Secondary Cultures" after phage treatment. The appearance of a large percentage of NAG vibrios towards the declining phase of an epidemic has been attributed to some of this phage action. But according to Taylor (1941) these organism are actually intestinal contaminants from the environmental sources.

Pasricha, De Monte and Gupta (1931, 1932 and 1933) worked extensively on the mutation of cholera vibrios due to bacteriophage and also stated that the El Tor vibrios could be experimentally produced in the laboratory. The probable role of bacteriophage in changing the agglutination reaction and hæmolytic properties (Doorenbos, 1932; Scholtens, 1935) have already been mentioned. Vardon (1940) from his work assumed the phage-infected water vibrios to be avirulent but if they were able to get rid of this phage infection they would revert to the parent phage-free cholera vibrios and become pathogenic. S-R transition was also considered to be due to phage action but Yang and White (1934) showed it could as well be brought about without bacteriophage and also by using activated smooth anti-cholera serum. In their opinion the resistant elements are present in the ultra-pure culture and survive lysis. Seal (1935) however pointed out that although variations due to bacteriophage had been noted in the laboratory no dependable proof of such changes occurring inside the human system or in nature had been advanced. Gardner and Venkatraman (1935), on the other hand, were of the opinion that no transutation of species occur under phage action. It was also once believed that the decline of the epidemics was due to bacteriophage but epidemics did come down without the presence of any phage (e.g. the recent Egyption epidemic). Thus the exact significance of the role played by Cholera bacteriophage in nature is not yet fully known.

(d) *Chemical basis for variation (Qualitative and Quantitative)*

Damboviceanu and Barber (1931) Linton and his coworkers (loc-cit) and Bruce White (loc-cit), all have shown variation in chemical constitution of vibrios with or without serological variation. The four ways in which Linton et al (1934-35; 1936-37) observed the vibrio strain to vary were: (1) by loss or gain in the proportion of a constituent (as in Smooth-Rough transition), (2) by the complete replacement of a constituent part by another of a different chemical constitution, (3) by the presence in an organism more than one type of chemical structure, in which case the variation consists in the proportion of the two constituents and (4) by changes in the surface electric charges. But the variation remained strictly limited within the six chemical groups of Linton et al.

(e) *Lipoid-polysaccharide structure and variation:*

Linton, Shrivastava, Seal and Mookherjee (1938-39) while studying the specific polysaccharides of strains belonging to different chemical groups noted the presence of two chemically and serologically distinct types among the cholera vibrios. The chief point of difference was that the strains from the early part of the epidemic contained a lipoid-polysaccharide complex, which was absent in strains obtained from the latter part of the epidemic and in strains maintained for a long time in the laboratory or isolated from water and carriers. The polysaccharide containing lipoid was, however, found to react better with antisera produced against organisms containing liopid than with antisera raised against strains containing the polysaccharide only, thus srowing that in the lipoid-polysaccharide complex it is the lipoid portion which dominated the specificity and that when the lipoid was absent the specificity was determined by the polysaccharide. More detailed work would be necessary to determine the relationship of this lipoid factor to virulence and to specificity. It is quite possible that the observed changes in chemical constitution may have a bearing

on the epidemiology as well as on the usefulness of such strains in the preparation of cholera vaccines.

(f) *Variation of vibrios in house flies:*

The role of house flies as a mechanical carrier in the spread of cholera was first scientifically studied by Maddox (1885). Gill and Lal (1931), however, suggested that flies might play a more fundamental part in the epidemiology of cholera by acting as biological carriers of the organism. In an extended study Lal, Ghosal and Mukherji (1938-39) founded that three to ten serial passages, lasting from 6 hours to six days, of vibrios of various types through house flies, bred in the laboratory in a sterile manner, resulted in changes in chemical structure and metabolic activity, but not in the fermentation or O-agglutination reaction. A typical cholera vibrio belonging to Linton's chemical Group I changed into Group V in the third passages. Again two strains from different water sources belonging to Linton's chemical Group V and II respectively changed into Group I in their fourth and eighth passages respectively. This work was followed by Lal and Seal (1938) with a single cell culture of a non-agglutinable vibrio (but Heiberg I) isolated from a water source. Starting with a chemical structure typical of water vibrio i.e. Arabionose + Protein II, they observed varying changes in the organism, assuming the character of Groups II & VI in the tenth passage. In this experiment the vibrio became Inaba H & O positive beginning from the 7th passage and also gave doubtful 'O' reaction after the 9th passage. More variable results have been noted in regard to metabolic activity. Such intermediate results are not unlikely with organisms in the process of dissociation, making the interpretation somewhat difficult. Shortt (1937) and Soparker (1938) could not obtain survival of vibrio in the flies longer than a few hours except in a few instances and they found that extracts made from the intestine or abdomen of the fly had vibriocidal effect. It may be that the survival period to a certain extent depended upon the initial dose. These workers, however, did not try to find out if any change had occured in the vibrios which were isolated. No regular paper was presented by them nor any attempt has so far been made to correlate these contradictory observations on the experients with house-flies.

(g) *Variation and intestinal flora:*

The popular beliefs prevalent in Bengal during an outbreak of cholera are that no one should go on empty stomach and nothing should be eaten which may upset it and that even trivial intestinal disorders should not be neglected. These ideas must have arisen out of certain observations and expeprience, and obviously there is some scientific basis also. The writer himself noted during an outbreak that fasting members fell easier victims to the infection than others in the same household. Recently Freter (1955) emphasised on the importance of intestinal flora in determining the resistance of experimental guinea-pigs. By reducing the normal intestinal flora of the animals by starvation, and inhibiting it by streptomycin, he was successful in causing regular infection in the animals with a streptimycin resistant cholera strain. Also, in the so-called endemic areas the first cases of cholera were often found to occur in persons suffering from some chronic intestinal disorders like colitis, dysentery, indigestion etc., and in some of these instances no source of infection could be traced. Cases were also found to arise after indulging in a particular kind of fried food called "Pampar" made out of fermented dal (pulses) and usually sold on a large scale during fairs and festivals. Out of 2,000 patients suffering from diseases other than cholera Pasricha, Lahiri and Das (1938) isolated typical non-hæmolytic 'Inaba 'O' positive vibrios from three individuals with history of (1) ill defined abdominal symptoms for 2½ years before admission, (2) chronic diarrhoea on admission and (3) dysentery for 6 months prior to admission.

Similar observations are also occasionally seen in the literature though no significance seems to have been attached to them so far. For instance in discussing the mode of spread of cholera in the recent Egyptian epidemic which started at El Korein, a town in the date-growing province of Sharkieh, Abdou (1948) made the following observations: "Dates and escaping settlers are incriminated as the agents of cholera. It seems to have been proved that cholera vibrio cannot live in compressed dates but that it can live for some time in the skin of ripe-dates. It is interesting to find a brief reference to the report of medical mission sent to investigate the first case of cholera in this region in 1895 outbreak—"Clinical and bacteriological examination has proved that the disease prevaling at El Salheih is a gastro-enteritis due to over-eating of dates and salted

fish . . . . . ' (Experience of cholera outbreaks in the riverine delta of Iraq during the date season in the first World War may be re-called). The same writer in another report (Abdou, 1948) in connection with this outbreak remarks "One family of 150 persons contrasted markedly with the rest, for it was free from parasitic infection and all of them inspite of their varied economic status escaped infection. There were 52 cases of cholera with 25 deaths which were distributed among those suffering from intestinal schistosomisis or some other parasitization with or without pellagra". Peculiarly, in concordance with the observation of Lal and Seal (1946) the above worker also noted in this outbreak that seldom more than one member of any household was attacked. This nature of case distribution is generally met with in the so-called endemic areas of Bengal. How can this be explained when *V. Cholerae* is known to be such a virulent organism? Can it be in any way related to the intestinal flora as sugested above?

In India, cholera very often broke out whenever there was a mass congregation in fairs or festivals. How the case arose in such a situation was generally a difficult epidemiological problem. It is known that low or absence of gastric acidity will allow the vibrios to pass into the intestine (Napier and Gupta, 1942; Abdou, 1948) and in this respect the more resistant organism like the rugose or other dissociated forms will have still easier access. In the last Kumbh fair held during January & February of 1954 there were 339 cases (9 fatal) in which only NAG's were isolated, (Yajnik and Prasad, 1954). This may be explained as the initial phase of an epidemic. Is it not interesting to know what is the effect of this environment on the organism? The importance of the substratum has been shown by Linton, Shrivastava and Seal (1937-38) who found that the yield of specific substance differed considerably with changes in the constitution of the media. It has also been shown by Knight (1936) that the training of bacteria to grow on various media is a distinct response to the chemical stimulus of the charged nutrient conditions. The changes in chemical structure were likewise a response to different types of growth media and it is not unlikely that such changes are brought about in some instances by the production of enzyme to synthesize new cell constituents. This may be the only basis on which the derivation of dissociant forms from single cell (Linton, Seal and Mitra, 1937-38) can be explained.

Tomb and Maitra (1926) have claimed that cholera vibrios lose there specific serological properties by residence in water and have suggested that agg. vibrios become non-agg. in the intestine of convalscents. It may also be that the changes in the intestinal flora may be brought about by the other intestinal organisms working in symbosis or in antagonism. In the opinion of Horowitz (1911) atypical vibrios are only extracorporeal phase of true cholera vibrio in a state of transition from a wholly parasitic state to an incompletely parasitic state. This may be due to immunity in individuals or symbiosis with intestinal organisms. Ghosh and Mukherjee (1941) showed the presence of *B. coli* autolysates in the cholera stools and the corresponding antibody in the sera of convalscent cholera patients. In their views the absorption of this autolysate might play a part in aggravating the symptoms. Recently Gohar and Makkawi (1948) and Felsenfield (1948) showed 'O' antigenic relationship of *V. cholerae* with *enteritidis*, while many workers have suggested that the variation from agglutinable to non-agglutinable form is due to phage action (antigonism). A temporary change from NAG to AGG has also been observed by Krishnan (1950) in the presence of intestinal organisms.

Again, the observation of Linton, Shrivastava, Seal and Mookerji (1938-39) indicates that the cholera vibrio can assume a new antigenic component 'lipoid' by passage through human intestine during the rising trend of the epidemic. Also, Burrows et al (1947, 1948) observed that the specific cholera antibodies are excreted in the intestine in large amount. When these observations are considered vis-a-vis that of Shrivastava and White (1947) to the effect that in the presence of homologous mono-specific serum Ogawa can change their serological character, it is not difficult to assume that mutation is possible inside the human intestine. Thus this expected change from AGG to NAG was actually observed by Lal and Seal (1938) in three well-controlled human cases of cholera.

From these observations it may be suggested that the intestinal flora may play an important role in at least two ways, namely by enhancing the virulence of the organism and by bringing about mutation inside the human intestine perhaps at various phases of the epidemic. Sufficient attention has not to far been paid to this aspect of the work.

(h) *Variation in the gut of fish :*

Lahiri (1954) recently conducted a series of experiments in fish by artificially infecting

then with *V. choloræ*. The maximum period for which AGG vibrios could be isolated after infection was 5 days. In very experiment NAG vibrios were isolated from the water in which the fish were kept after infection was 27 days. As many as 5 Hieberg types were isolated on different days, the first isolation being of Heiberg VI. Thus as in human gut the organisms have been found to change its character in the gut of the fish.

4. *Origin of outbreaks :*

Having settled the question of the organism the next problem is to elucidate how the epidemics originate and how the infection persists in the endemic areas. However, on the basis of the definition of true cholera vibrio given by Gardner and Venkatraman several attempts have been made in India during the course of last 20 years to attack the problem in the field. The main field enquiries conducted for the purpose being the Diamond Harbour and Khulna enquiries in West Bengal and the Tanjore and the Cauvery Delta enquiries in Madras. The conclusions which these enquiries claimed to have reached are :

(1) *V. choleræ* as defined by Gardner and Venkatraman is commonly isolated from typical case of cholera (2) it is not found in the absence of cholera, (3) the period of persistance, according to Read and Pandit, is usually not more than 13 days in human gut and 16 days in water sources, nearly the same figure being obtained in the Cauvey Delta, (4) ordinarily water cannot be held responsible for the spread of the disease. (The same conclusion was arrived at in the last Egyptian Epidemic), (5) in the majority of instances at Khulna and Cauvey Delta, the source of infection could not be traced inspite of special efforts. These findings have been critically reviewed by Dr. Lal in 1953. Without unnecessary repetition the points that emerged from the fields observations are briefly as follows: (1) O-aggvibrios cannot be isolated in large proportion of cases and at times non-agg's are obtained, (2) O-agg's are relatively short-lived, (3) tank and canal waters when exposed to pollution do not ordinarily act as a vehicle of spread, at least in the endemic areas, (4) the source of infection cannot be traced in majority of cases. In other words, the problem of endemicity still remains unsolved.

On closely studying the paper of Gardner and Venkatraman in which they established the serological classification of vibrios it appears that they did not exclude the possibility of cholera vibrio being more varied than they had supposed it to be. Unfortunately, the outcome of the acceptance of the definition of true cholera vibrio was that all the field studies on cholera following the publication of their paper excluded the consideration of any other organism except what had been proposed by them as *V. choleræ*. In consequence, the results obtained cannot be directly employed to test the hypothesis advanced by them, namely "the cholera vibrio may be more varied than they supposed it to be." There are genuine reasons to believe, as discussed earlier, that choleragenic organisms whether they conform to the characteristic of Gardner and Venkatraman or not are derived from common ancestors.

Our trouble does not, however, end even if the proposition made above is accepted or found true. The question will arise regarding the essential character of the organisms in its different phases and how to recognise them. The question will also arise what is their role regarding pathogenicity and endemicity. If they are dissociants how does the conversion takes place i.e. how do these organisms after being discharged by one patient infect another and cause disease and where do they exist before infecting the next victim and how long do they survive there. These and many other questions may arise. It may be that the pre-epidemic phase in an endemic area or in a fair may start with the non-agglutinable vibrio causing milder cases followed by the epidemic phase with typical cholera cases. The past observation in the Kumbh Fair at Allahbad by Yajnik and Prasad (1954) lends support to this view.

5. *Pathgenicity of cheloragenic vibrio :*

The controversies discussed above in ragerd to the various characters of *V. choleræ* have remained unexplained or unsolved due largely to the absence of a susceptible experimental animal giving typical cholera syndrome. Griffith et al (1942) observed that supension of the cholera organisms in mucin caused death of the experimental mouse and this finding was utilized by them and later by Sokhey et al (1950) to test the virulence of the organism as well as the potency of anti-cholera vaccine on the basis of the m.l.d. of the mucinoid cholera vibrio. Although this artificial enhancement of the pathogenic activity of *V. choleræ* may be accepted and employed for determining the relative potency of

any two vaccines, it does not correspondent to the inherent character of the virulence of the organism. Dutta and Habbu (1955) recently repeating the work of Sanarelli (1922) in a modified manner corroborated his findings found that suckling rabbits.... (10-16 days old) proved very susceptible to a strain of cholera vibrio rendered virulent by animal passage when injected intra-intestinally under ether anæsthesia. But in the experience of the author and several other workers rabbits are generally susceptible to the toxin of the vibrio and particularly of the El Tor type and certain NAG s, and that the passage of the organism (*V. cholerae*) in animals rather leads to a change of character e.g. pathogenic to non-pathogenic so far as the human cholera is concerned. Thus it becomes a question in what way the virulence of the organism was enhanced by passage in Dutta et al's experiment. It may be that the organism was made more toxic and hence the young rabbits were behaving in the same manner as the adult rabbits, perhaps to a greater degree, and this may be one of the reasons why the authors did not get a good response by the administration of antibiotics and other drugs. Nevertheless, these findings have given us some scope for careful repetition of the experiment by other workers in the field.

6. *Enzymes of vibrios:*

Recently a fresh approach to problem of cholera was made through the study of different enzymic make up of the vibrios by various workers in the field with a view to throw some light on the pathogenicity of *V. cholerae* and also on the interrelationship, if any, among the various types of vibrios. (Dudani et al, 1952, 1953, Agarwala et al, 1953; Agarwala and Shrivastava, 1953; Iyer et at, 1953; Agarwala, Murti and Shrivastava, 1953, Saxena et al, 1954; Narayana et at 1953) Ogasawara and Kariya, 1954). The varieties of enzymes studied are: deaminase, dehydrogenase glutathione-hydrolysis, gelatinase, oxidase mucinase elastinase, collaginase, lysine decarboxylase and autolysin enzymes. Ogasawara and Kariya (1954) obtained adaptive lysine decarboxylase enzyme from *V. cholerae* at an acid pH which converted lysins into cadaverine (pentamethylene diamine) present in the cholera stools. This work may be extended to other vibrios certain possible *elastinase and collaginase* enzymic relationship between vibro groups was suggested by Ahuja (1954) in his report based on the work of Narayana et al (1952) who adduced both theoretical and experimental support to an enzymic hypothesis of cholera pathogenesis and thus revived the controversy of "non-cholera" type of virbios being incriminated in some way, at present not known, in the causation cholera. Similarly Sen and Bose (1954) stressed on the quantitative difference in the mucinase production by the cholera vibrio. These results, however, gave only some indications of possible differentiation between different vibrio groups but except for some quantitative difference no other characteristic distinguishing features could be established. Besides other intestinal organisms also showed similar enzymic activities. No fruitful results could thus be turned out of the study of the vibrio enzymes. But the scope for such studies still remains and the work need to be pursuing further.

7. *The question of cholera virus:*

Even with improved technique it has not always been possible to isolated *V. cholerae* at all. In many instances, in the endemic areas, sources cannot be traced, nor any explanation can be found for the peculiar distribution of infection simultaneously in different distant parts of the same village without any apparent, probable or possible connection. Again when the season starts cholera also appears almost simultaneously in several places contiguous or distant, as if without any rhyme or reason. It is of course true that other diseases also have seasonal prevalence. Such a situation often leads the workers to doubt whether vibrio by itself is really responsible for cholera and as an way out one may be inclined to think of some 'virus' involved in the disease either singly or in association with cholera vibrio, although such a chance seems remote considering the clinical and pathological findings so far made. Dr. Foulton's attempt (White, 1948) to isolate virus by inoculating chick embryo with the filtrate of cholera stools transported from Egypt to his laboratory in England, during the last Egyptian outbreak (1947-48), however failed. Considering the distance and the problem of transport perhaps there is still some scope for resorting to this work in a laboratory situated close to the field.

8. *The Problem of endemicity of Cholera:*

There is an important gap in our knowledge of epidemiology of cholera. Field studies show that in an endemic area cases of cholera occur

without contact with an active cholera case or its importation from outside. It has not been possible to demonstrate the presence of the *Cholera vibrio* of the classical form to persist in human or environmental sources during the period between the outbreaks in such places. Channels of spread are often not traceable.

These occurrences suggest that the organism assumes forms other than the classical form and thus remains undetected as an imported infection or as an infection bridging over the quiescent period between out breaks. Lines of spread also frequently appear broken for the some reason.

If we can discover the non-typical forms of true cholera vibrio, we may be able to fill up these gaps. This is the first step. The next step would be to find out the conditions under which the non-typical organism changes into the typical form and *vice-versa*. However, even then first step will greatly advance our knowledge of epidemiology and will have considerable practical application.

The statistical studies on cholera endemicity as carried out by Lal et al and Swaroop did throw some light on the problems of endemicity but on careful consideration of the problem it seems that these statistical studies can be further improved by taking into consideration the majority of the factors together besides trivariate variance, *e.g.* the parasitic host, morbidity and mortality, environmental including the meteorological and geographical factors and certain social factors.

Some suggestions for further work :

The essential and the moot problem, as discussed above is the identification of the causative organism or organisms themselves. The absence of suitable laboratory animals has been a real handicap in this direction. Nevertheless from the evidence so far obtained Gardner and Venkatramn's non-haemolytic 'O' subgroup I vibrios may be accepted as the organism of the "active" phase of epidemic cholera but it is possible that for biological reasons it changes its character during pre and interepidemic phases. The rough derivatives with typical biochemical reactions have already been recognised by some workers to have causal relationship with cholera and an interchange between sub-types of 'O' subgroup I has also been observed.

Since some El Tor vibrios are now recognised as serologically identical with the true cholera vibrio of Gardner and Venkatraman and have been found to give rise to cholera epidemics (though called 'paracholera' by de Moor) and since in the hands of some workers non-haemolotyc *V. cholerae* has, by serial subculture or passage through animals assumed haemolytic character the writer believes that the El Tor strains have descended from the 'active' cholera vibrio. In fact, all descendants of a vibrio which has caused cholera in man and is capable of doing so are entitled to that name, unless they have undergone permanent mutation. The results obtained in the study of dissociation, particularly in regard to the El Tor and certain NAG vibrios (negative to 'O' sub-group I antiserum) may prove to be of value in the understanding of the epidemiology of the disease specially with reference to the problem of endemicity.

The question, therefore arises how best to recognise descendants for certain. It is really a matter of tracing the body substance of the parents into their progency. Sufficient work has not been done on the effect of anaerobic and micro-aerofilic culture methods of the organisms. Bacteriophage typing and phase lysability can be one of the procedures which may be adopted if the proper phages are discovered and the methods standardised. Fresh attempts may therefore be made in this line. Certain possible enzymic relationship between vibrio groups has been suggested by different workers and this work should be pursued further for which some scope still exists.

Another possible method of tracing the dissociants is to use a tracer substance in the form of some radio-active or even stable isotope like P 33, C 14, etc., which may be incorporated in the constitution of some known cholera vibrios obtained from various stages of cholera patients, convalscents, contacts and certain environmental sources, through the media containing the tracer substance, and the descendants followed in nature and in the laboratory for detailed studies. The possibility of introducing a tracer of *E. Coli* by Kanche and Hardich (1948), Schmidt (1948) and Wang et al (1950 a, b). The workers of the Radio-chemical Centre, Amershem, England supported such a possibility. Advantage may be taken of the recent experiments in fish by Lahiri and others to carry out this work and later other possible lines may be worked out.

The significance of the lipoid-polysaccharide complex of the epidemic strains is not clearly understood, and sufficient notice has not been taken of this finding. This work may be revived for further studies. The possibility of transmutation in symbiosis with or antagonism

to other intestinal organisms may be throughly explored both *in vitro* and *in vivo*. In this connection labelled organism as suggested above may be required.

Some of the minor problems like haemolysis, metabolism and toxicity also need further clarification, and reinvestigation of cholera bacteriophage along certain lines may be carried out *e.g.* value of phage in the typing of cholera vibrio, development of resistant strains and changes in serology and so on. Help may be taken of the electron microscope to study the phage action.

Another point of importance is the cultural methods. New methods, aerobic, anerobic and microaerophilic should be tried. Since the question is still a closed chart various tissue culture methods including chick-embryo should be simultaneously tried. The filtrates may also be administered to various animals, both enterally and parenterally to watch the reactions, if any. Unfortunately none of the animals are strictly susceptible and experiments with human volunteers are also risky.

The above are the few lines of work that may be carried out in future, though it is not in the least comprehensive. For that a thorough review of all aspects of the problem would be necessary. But the most important point which the author wishes to stress is that all previous isolated work, though each by itself contributed some knowledge on the problem, ultimately failed to contribute effectively in the solution of the problem of endemicity of cholera. It is therefore suggested that the work should be handled by a Cholera Commission which should be instituted at a national level with facilities and staff to attack the problem of cholera as a whole and all the lines of work suggested above should be organised and coordinated by the Commission. One particular field in the endemic area close to the laboratory should be chosen, where the field investigation both epidemiological statistical can be constantly made and wherefrom the different branches of the laboratory fed with the materials for investigation and study. The clinical part may also be incorporated so that every case that occurs may be clinically thoroughly interpreted. At least one large hospital dealing with cholera cases should be included.

References

Abdoosh, Y. B. (1932)—Brit. J. Exp. Path. *13*: 42-51.

Abdou, S. (1947)—Lancet, ii: 696-97; (1948)—Ibid., *1*: 903-904.

Agarwala, S. C., Rao, V. K. M., and Shrivastava, D. L. (1953)—Experimentia, *9*: 257.

Idem, and Shrivastava, D. L. (1953—T. Sci. & Ind. Res., 12B, 195.

Idem, Krishna Murti, C. R., and Shrivastava, D. L.

Idem, Krishna Murti, C. R., and Shrivastava, D. L. 1953)—Ibid., 325.

Ahuja, M. L. (1954)—Rep. Sci. Ad. Board, I.C.M.R. for 1953, p. 1-6.

Ahuja, M. L. and Singh, G. (1939-40)—Ind. J. Med., Res., 27: 287-95; (1948)—Ibid, 36: 4, 3-14.

Idem, Krishnan, K.V., Pandit, S. R. and Venkatram, K. V. (1951)—Ind. J. Med. Res. *19*: 135-39.

Asheshov, I. N., Asheshov, I., Khan, S. and Lahiri, M. N. (1929-30)—Ind. J. Med. Res. *17*: 971-84.

Balteanu, I. (1926)—J. Path. Bact., *29*: 252-77.

Beeuwkes, H. (1939)—Zentr. Bakt. Parasitenk., Abt. I., *143*: 220-25.

Bernard, P. N., Guillerm, J. and Gallut, J. (1937a)—Compt. Rend. Soc. Biol., *126*: 180-82; (1937b)—Ibid., *126*: 303-305; (1937c)—Ibid., 568-70; (1939)—Ibid., *130*: 23-24 and 228-30.

Bhaskaran, K. (1953)—Ind. J. Med. Res., *414*: No. 2: 143-57.

Brahmachari, B. B. (1927)—Cal. Med. J. *24*: 181-90.

Burrows, W., Mather, A. N., McGann, V. G. & Magner, S. M. (1946)—J. Inf. Dis. *79*: 168-97.

Idem, Elliet, M. E. and Havens, I. (1947)—Jn. Inf. Dis. *81*: 261-81. (1948)—Ibid., *82*: 231-54.

Damboviceanu, A. and Barber, C. (1931)—Arch. roumaines, path. exptl. Microbiol., *4*: 5-40.

Datta, N. and Habbu, M. K. (1955)—Brit. J. Pharm. & Chem. *10*: No. 2: 153-9.

Doorenbes, W. (1932)—Ann. Inst. Pasteur., *48*: 457-69; (1936)—Compt. Rend. Soc. Biol. *121*: 128-29; 130-32; (1936)—Rev. Hyg. *58*: 675-97; (1937)—Ibid. *59*: 22-50 & 105-21.

Idem. Gossery, G. N. (1950)—J. Roy. Egypt. Med. Assoc. *33*: 212-15.

Dudani, A. Iyer, S. N. Krishna Murti, C. R. and Shrivastava, D. L. (1952)—Cure. Sa., *21*: 134; (1953)—Nature, *171*: 81.

Felsenfeld, O. (1948)—Proc. Soc. Exp. Biol. & Med. *69*: 95-96.

Freter, R. (1955)—J. Inf. Dis. *97*: 57.

Gallut, J. (1946)—Bull Soc. Path. Ex., *39*: 239-44; (1948)—Ann. Inst. Past., *74*: 27-39; (1949a)—de l' inst. Past., *76*: 122; (1949b)—Ann del' Inst. Past., *76*: 122.

Gardner, A. D. and Venkatraman, K. V. (1935)—J. Hyg., *35*: 262-82.

Idem, and White, P. B. (1937)—Bull. Mens. Office Interm. Hyg. Pub. *29*: 1853-54.

Genervray, J. and Bruneau, J. (1938)—Compt. Rend. Soc. Biol., *128*: 278-80.

Ghosh, H., and Chakrabarty, R. K. (1940)—Ind. J. Med. Res., *28*: 309-13.

Idem, H., and Mukherji (9141)—Ann. Bioch. Exp. Med., *1*: 99-100.

Gill, C. A., and Lal, R. B. (1931-32)—Ind. J. Med. Res., *18*: 1255.

Gispen, R. (1939)—Ann. Inst. Pasteur, *63*: 293-301.

Gohar, M. A. (1932)—Zentr. Bakt. Parasitenk., Abt. I, *126*: 61-68.

Idem., and Isa, A. A. (1948)—J. Trop. Med. & Hyg., *51*: 144-47.

Idem., and Makkawi, M. (1948)—Ibid., *51*: 959.

Goyle, A. N. (1938-39)—Ind. J. Med. Res. *26*: 611-24.

Idem., and Sen Gupta, P. N. (1932-33)—Ind. J. Med. Res., *20* : 35-41.
Greig., E. D. W. (1913-14)—Ind. J. Med. Res. *1* : 90, 481.
Griffith, J. J. (1942)—Pub. Hlth. Rep. Wash. *57* : 707.
Gupta, S. K. (1943)—Ind. Med. Gaz., *78* : 464.
Heiberg, B.—On the classification of *V. cholerae* and cholera-like Vibrios. Arnold. Busch, Copenhagen, 1935: (1936)—J. Hyg., *36* : 118-24.
Horowitz, L. (1911)—Zbl. Bakt. Abt., I, Orig., *58* : 79.
Inoye and Kakihara, T. (1925)—Sci. Rep. Govt. Inst. Inf. Dis., Tokyo Imp. Univ. *4* : 17.
Iyer, S. N., Dudani, A., Krishna Murti, C. R. S., Shrivastava, D. L. (1953)—J. Sci. & Ind. Res., 12B, 316.
Kabeshima, T. (1918)—Compt. Rend. Soc. Biol., *81* : 616-18.
Kansche, G. A. and Hardich, H. (1948)—Naturforch. *31* : 435-37.
Knight, B. C. J. G. (1936)—Bacterial Nutrition, Med. Res. Council, London. Spl. Rpt. Series, No. 210.
Krishnan, K. V. and Dutt, S. N. (1950)—Rep. Sci. Adv. Board., I.C.M.R., New Delhi, p. 4.
Lahiri, M. N. (1955)—Rep. Sci. Adv. Board, I.C.M.R. for 1954, New Delhi, p. 3-4.
Lahiri, S. C. (1951)—Brit. Med. J., *1* : 500-04.
Lal, R. B. (1935, 1936, 1937 & 1938)—Rep. Sci. Adv. Board for the year of 1935, 1936, 1937 and 1938, I.R.F.A., New Delhi, p. 11-18; 7-10; 4-11 (1937)—Ind. Med. Gaz., *72* : 96; (1946)—Sci. Cul. *11* : 489; (1947—Annual Rep. All-India Inst. of Hyg. & Pub. Hlth. for 1946-47, p. 21; (1950)—Ind. Med. Gaz. *85* : 469.
Idem, and Seal, S. C. (1938)—Changes in the *V. cholerae* in well-controlled cholera patients; studies in cholera in Basirhat and Rampurhat area—unpublished paper; (1946)—Ind. Med. Gaz. *81* : 261.
Idem, Ghosal, S. C. & Mukerji, B. (1939)—Ind. J. Med. Res. *26* : 597-609.
Idem, Raja, K. C. K. E., Swaroop, S. and Basak, K. C. (1941a)—Ind. J. Med. Res. *29* : 425-40; (1941b) Ibid., *29* : 441-63.
Linton, R. W. (1940)—Bacteriological Reviews, *4* : 261-319.
Idem., and Mitra, B. N. (1934-35)—Ind. J. Med. Res., *22* : 295-308; (1934-35)—Ibid., *32* : 464-68 and 468-73; (1936-37)—Ibid., *24* : 323-30.
Idem., Mitra, B. N., and Mullick, D. N. (1935-36) —Ind. J. Med. Res., *23* : 589-99; (1936-37)—Ibid., *24* : 317-21.
Idem., Mitra, B. N. and Seal, S. C. (1934-35)—Ind. J. Med. Res., *22* : 617-31; (1935-36)—Ibid., *23* : 601-07; (1936-37a)—Ibid., *24* : 19-35; (1936-37b)—Ibid., *24* : 331-48; (1938-39)—Ibid., *26* : 329-34.
Idem., Mitra, B. N. and Shrivastava, D. L. (1933-34)—Ind. J. Med. Res., *21* : 635-38; (1933-34)—Ibid., *21* : 749-60.
Idem., and Seal, S. C. (1935)—Ind. Med. Gaz., *70* : 68-69.
Idem., Seal, S. C. and Mitra, B. N. (1937-38)—Ind. J. Med. Res., *25* : 575-84.
Idem., Shrivastava, D., L., and Mitra, B. N. (1933-34)—Ind. J. Med. Res., *21* : 385-88; (1934-35) —Ibid., *22* : 309-312; (1934-35)—Ibid., *22* : 633-57.
Idem., Shrivastava, D. L. and Seal, S. C. (1937-38)—Ind. J. Med. Res., *25* : 569-74.
Idem., Shrivastava, D. L., Seal, S. C., and Mukerji, S. P. (1938-39)—Ind. J. Med. Res., *26* : 41-54.
Leghem, Van J. J. (1913)—Zbl. Bakt. I. Orig., *67* : 410 & *70* : 70.
Maddox, R. L. (1885)—Jour. Roy. Micros. Soc. (Ser. 2), *5* : 602-607 & 941-52.
Maitra, N. M. (1939)—Ind. J. Med. Res., *27* : 41-49.
Morton, W. K. and Beeuwkes, H. (1940)—Mededeel Dient. Volksgezondheid. Nederland-Indie., *29* : 10-26.
deMoor, C. E. (1938)—Bull. Office Intern. Hyg. Pub., *30* : 15-10-10; (1939)—Bull. World Hlth. Org., *2* : 5-17; (1939)—Mededeel. Dienst. Volksgezondheid. Nederland-Indie, *28*: 320-55; (1949)—Bull. World. Hlth. Org., *2* : 5-1.
Napier, L. E. and Gupta, S. K. (1942)—Ind. Med. Gaz., *77* : 717-21.
Narayana, E. K. and Menon, P. S. (1950)—Nature, *170* : 621.
Nobechi, K. (1923)—Sci. Rep. Goven Inst. Inf. Dis., Tokyo Imp. Univ., *2* : 43 (1933)—Bull. Office Intern. Hygn. Pub., 25:72-73.
Ogaswara, K. and Kariya, Y. (1954)—Nagoya J. Med. Sc., 17, No. 2:91-2.
Omar, W. and Vasailiadis, P. C. (1943)—J. Roy, Egypt. Med. Assoc., 26:348-56.
Otten, L. (1939)—Mededeel. Dienst. Volksgezondheid. Nederland-Indie, 28:13-21.
Pandit, S. R. (1938)—Rep. Sci. Adv. Board for 1938 I.R.F.A. New Delhi, p. 20-21.
Pandit, S. R. and Read, W. D. B. (1942)—Ind. J. Med. Res.
Pasricha, C. L. (1934-35, 1937, 1938 & 1939)—Ind. Med. Gaz. for 1934-35, 1937, 1938, 1939 I.R.F.A., New Delhi, p. 33; 3-7; 1-3; 13-16.
Idem, Lahiri, M. N. and Das, P. C. (1938)—Ind. Med. Gaz., 73:669-70.
Idem, De Monte, A. J. & Gupta, S. K. (1931)—Ind. Med. Gaz., 66:610 (1932)—*Ibid.*, 67:64-69 (1933)—*Ibid.*, 68:448.
Idem, Chatterjee, D. N. and Das, P. C. (1938)—Ind. J. Med. Res., 26:33-37.
Pollitzer, R. (1934)—Rep. Natt. Quarantine Serv., 51-59.
Raja, K. C. K. E. (1942)—Rep. Sci. Adv. Board, I.R.F.A., New Delhi for 1942, p. 4-8.
Read, W. D. B., Singh, G., Seal, S. C. and Bose, S. (1939)—*Ibid.*, 27:1-40.
Idem., Pandit, S. R. and Das, P. C. (1942)—Ind. J. Med. Res., 30:203-12.
Reiman, H. A. (1947)—Ann. J. Trop. Med. 27:503.
Sanarelli, G. (1922)—Trop. Dis. Bullotin, 19:379.
Saxena, K. E., Agarwala, S. C. and Shrivastava, D. L. (1954)—J. Sci. & Ind. Res. 13B, 338.
Scholtens, R. T. (1933a)—Compt. Rend. Soc. Biol., 114-420-22 (1933b)—*Ibid.*, 114:422-24 (1935)—*Ibid.*, 119:1023-25 (1936) Ann. Inst. Pasteur, 56:68-75 and 710-16.
Seal, S. C. (1935)—Ind. Med. Gaz., 70:614—19; (1936-37)—Ibid.
27:297-311 (1945)—*Ibid.*, 80:414—*Ibid.*, 81:321-26. (1947)—J. Ind. Med. Assoc. 17:85-90 (1948)—*Ibid.*, 17:319-21.
Idem and Mitra, B. N. (1938-39)—Ind. J. Med. Res., 26: 625-30.
Sen, A. K. and Bose, P. N. (1954)—Bull. Alumni Assoc., A.I.I.H. & P.H. 1:4; 47-49.
Sengupta, P. N. (1951)—Cal. Med. J., 481:65.
Schmidt. C. F. (1948)—J. Bact., 55:705-710.
Shortt, H. E. (1937)—Rep. Sci. Adv. Board for 1937, I.R.F.A., New Delhi p. 22-24.
Shousha, A. T. (1923-24)—J. Hyg., 22:156-63

(1931)—Bull. Office Intern. Hyg. Pub. 23:1022-37 (1947)—Bull. World. Hlth. Org., 1:353-81.

Shrivastava, D. L. and Seal, S. C. (1937)—Proc. Soc. Exp. Biol. Med., 36:157-61.

Idem. and White, P. B. (1947)—Ind. Med. Res., 35:117-29.

Idem., Singh, G. and Ahuja, M. L. (1948)—*Ibid.*, 36:409-13.

Singh, G. and Ahuja, M. L. (1950)—Ind. J. Med. Res., 38:317-39.

Ibid., Malik, K. S., Lahiri, M. N. and Ahuja, M. L. (1956)—*Ibid.*, 38:125.

Sokhey, S. S. and Habbu, M. K. (1944)—Curr. Sci., 13:230 (1950)—Bull. World Hlth. Org., 3:43-53.

Soparker M. B. (1938)—Rep. Sci. Adv. Board for 1938, I.R.F.A., New Delhi, p. 25-29.

Soparker, M. B. (1938)—Rep. Sci. Adv. Board for 1938, I.R.F.A., New Delhi, p. 25-29.

Swaroop, S. (1950)—Chr. World Hlth. Org., 4: 24-25.

Takano, S. (1935)—Kitasate Rch. Exp. Med., 12: 101-38.

Takita, J. (1939)—Ktasao Arch., 16: 218-36.

Tanmal, S. J. W. (1948)—Neiderl. Tijdsch. V. Geneesk, 92:132.

Tang, F. F., Chu, C. M. and Wang, Y. W. (1944) —Ind. J. Med. Res., 32:1-8.

Tao, S. C., Woo, M. O. and Loh, W. P. (1948)— Chinese Med. J., 66:377.

Taylor, J. (1935-36-37)—Rep. Sci. Adv. Board for 1935, 1936 & 1937, I.R.F.A., New Delhi, p. 24; 19-24; 10-17 (1937)—Bull. Office-Intern. Hyg. Pub. 29: 1843-54 (1938)—*Ibid.*, 30: 1442-54 (1938)—Rep. Sci. Adv. Board, I.R.F.A., New Delhi fdr 1938, p. 15-18 (1941)—Cholera Res. in India, 1939-40, I.R.F.A., New Delhi.

Idem. and Ahuja, M. L. (1935-36a)—Ind. J. Med. Res., 23-95-119 (1935-36b)—*Ibid.*, 23:531-44 (1938-39) —*Ibid.*, 26:1-32.

Idem, Pandit, S. R. and Road, W. D. B. (1936-37) —*Ibid.*, 24:931-77 and 349-56.

Idem., Read W. D. B. and Pandit, S. R. (1936-37) —*Ibid.*, 24:349-56.

Tomb, J. W. and Maitra, G. C. (1925)—Ind. Med. Gaz., 61:537 (1927)—*Ibid.*, 62:61.

Vardon, A. C. (1940)—Ind. Med. Gaz., 75:522-27.

Vassiliadis, P. C. (1935a)—Compt. Rend. Soc. Biol. 119:339-41 (1935b)—J. Inf. Dis. 57:118-20 (1936)— *Ibid.*, 121:1069-71 (1937a)—Ann. Inst. Pasteur. 58: 165-80 (1937b)—"Etur sur la bacteriologie des. vibrios et al epidemiologie du cholera These., Louvain.

Venkatraman, K. V. (1939)—Rep. Kind. Inst. Guindy for 1939, p. 32-34 (1945)—Rep. Sci. Adv. Board., I.R.F.A., New Delhi for 1945, p. 106-109.

Idem, Krishnaswami, A. K. and Ramkrishnan, C. S. (1941)—Ind. J. Med. Res., 29:419-24.

Idem, and Pandit, C. G. (1938)—Ind. J. Med. Res. 25: 585-89.

De Vogel, W. T. (1932)—Bll. Office Intern. Hyg. Publ., 24: 262-70.

Wang, C. H., Tsoo, E. K., Vernon, H. C. and Bort, E. C. (1950a & b)—J. Biol. Chem. 188:753 & 759.

White, P. B. (1933)—J. Path. Bact., 36:65-76 (1934)—*Ibid.*, 39:530-31 (1935a)—J. Hyg., 35:347-53 (1935b)—*Ibid.*, 35:498-503 (1935c)—J. Path. & Bact. 41:567-68 (1936a)—Brit. J. Exp. Path., 17:229-34 (1936b)—J. Path. & Bact., 43:591-93 (1937a)— *Ibid.*, 44:490-521 (1937b)—*Ibid.*, 44:706-10—*Ibid.*, 44,276 (1938)—*Ibid.*, 46:1-6 (1940a)—*Ibid.*, 50.160-64 (1940b)—*Ibid.*, 50:165-66 (1947)—Lancet; 2:694; (1948)—Proc. Roy. Soc. Med., 41:176-77 (1948h)— Rep. 9th Meeting M. R. Liason Comm., March 1948.

Yang, Y. Nfl and White, P. B. (1934)—J. Path. Bact. 38:187-200.

Yajnik, B. S. and Prasad, B. G. (1954)—Ind. Med. Gaz., 89: No. 6:341-9.

Zimmermann, E. (1932)—Zbl. Bakt., 127:146 (1932)—Z. Immun. Forsch. 79:219.

INDIAN JOURNAL OF PUBLIC HEALTH

Official Quarterly Publication of the Indian Public Health Association

Volume 1 **JANUARY 1957** **Number 1**

FAMILY PLANNING

The population of India is increasing at the rate of five million per pear. As the food position stands at present the country is already under short supply. The question arises whether with all possible increase of food production through the working of the development plans the country will be able to cope with the rate of population growth. Some hold the opinion that the addition of mouths is accompanied by that of hands too. But there are perhaps serious danger in this complacent attitude. It should be remembered that the hands to be effective require an average minimum period of 16-18 years after birth and secondly, with the existing high proportion of unemployment it is doubtful whether there would be sufficient scope for the employment of this ever-increasing number of hands. There is thus little doubt that India's population has come to a stage when further growth cannot be allowed without apprehension of serious problems. Although it is heartening to find that during the First Five Year Plan period, the per capita income increased by about 10 per cent and the National Income by about 18 per cent, the number of unemployed is over 5 million and of under-employed about 20 million. To this number 2.5 million new hands are being added every year seeking employment.

Indeed, this progressive increase in India's population has become a vital issue for the public health workers. It is not merely a question of food supply and unemployment, a number of other social problems will also arise in consequence namely, those of clothing, shelter, education and mental equilibrium etc. Even after the successful completion of the Second Five Year Plans the situation will remain dangerous. It might seriously affect the health of the nation, particularly of the mother and the child and further lower the already low expectation of life and the living standards of our population. What India's public health and other ancillary developments during the last decade have done to reduce the death rate and to increase the expectation of life at birth from 27 to 35 years, will be lost if there is no stabilization of the population. In other words, successful public health has created a bigger gap between the birth and the death rates. If this gap is to be closed without a great deal of misery and possibly disaster, the birth rate must be reduced *pari passu* with the death rate to restore the lost balance. For the actual demographic position of India the readers may refer to Dr. Chandrasekaran's paper in this issue of the Journal.

Population control by a reduction of birth rate to the extent necessary to stabilize the population at a level consistent with the requirement of the National economy is therefore considered to be the solution of the problem but its achieve-

ment depends upon the realization of the people of the need for family limitation on a wider scale. This might be achieved if every married copule can be persuaded to realize their own share of responsibility and obligation towards the planned economy of reproduction. This is not easily possible in India with 80 per cent of the people remaining illiterate and the same percentage living in the villages where facilities and amenities are conspicuously absent. Neither a purely economic programme nor the birth control alone as an isolated remedy will succeed in reducing the population. It must be either linked with an overall social policy which would stimulate a new ambition among the people and a new dignity in our women folk or to a policy of a total attack in the entire living environment in which the people live. Therefore a programme which will create the necessary psychological background for applying birth control methods in a programme of all round improvement of our rural conditions is to be undertaken. In other words, a multipronged approach to the problem is desirable if any tangible success is to be obtained quickly in the control of population growth in India.

Amongst the various ancillary methods suggested in this connection the following may be mentioned vis., imprpovement of agriculture, redistribution of lands and co-operative farming, compulsory education up to age 16, introduction of sex education in higher classes in schools, enforcement of postponment of marriage to a higher age, introduction of social security in old age, gainful employment of women, higher consumption of animal protein and improvement of nutritional standards and extensive publicity and propaganda by newspapers, popularisation of family planning etc. For immediate result the most potent and effective measure would undoubtedly be the birth control, but it is perhaps the most difficult one to be practiced effectively by the majority of the people. Some of the difficulties now being encountered have been mentioned by one author (S.C.S.) in this issue of the Journal, while Dr. (Mrs.) Sen who has also contributed a paper on the subject is of the opinion that this family planning should not only be a part and parcel of the maternity and child welfare centres, to be established all throughout the country but has to be undertaken by trained men and women workers as a preventive public health programme (prevention of improvident maternity). The scope and activities of the programme will consist of (1) advice and treatment of sterility cases, (2) marriage councelling, (3) sex education and (4) advice on birth control. The principal obstacles in putting this programme into practice is the absence of trained personnel as also of the institutions where such training could be imparted and of a cheap, safe and ideal contraceptive.

To gain the confidence of the people, instructions and advice should be given by medical men or women and by those particularly dealing with the maternity and child welfare and specially trained for the purpose. In fact, the whole programme should be a part of the existing health and social services through which the ideas should be carefully and cleverly propagated. Similarly giving publicity to the idea and practice of birth control proper precaution should be taken to guard against the possibility of any misuse and of decreasing that section of the population which forms the middle class intelligentia, the brain-trust of the country.

The credit of establishing family planning advice as an essential service and of opening of clinics for the purpose, rightly goes to the Family Planning Association of India. This Association has been doing a considerable amount of spade

work under the able chairmanship of Shrimati Danavanti Rama Rau. All such private efforts by the social and welfare organisations should be encouraged provided these are motivated in the same spirit of service as the above named body. The Planning Commission also have recognized the need for development of Family Planning Programme on systematic lines and for a continuous study of population problems and have accordingly set up a Family Planning Board with the authority to spend on approved programmes of work, 5 crores of rupees in the Second Plan period. It is also a good augury to note that recognizing the importance of the problem the Central Council of Health at their recent meeting at Ranchi recommended the appointment of a whole time Family Planning Officer in the Health Directorate of each state. Thus, India becomes the first country in the world whose government would be actively organising a nationwide Family Planning Programme as a part of state Policy. To enlist public support this Board have already prepared a programme which includes establishment of clinics, enlisting of voluntary co-operation of the Indian Medical Association, granting of financial assistance to the deserving voluntary organisations, training of personnel, organisation of conferences, seminars, publicity and propaganda and improvement of the quality of contraceptives and so on. The crux of the problem, however, is the extension of the movement to the villages in India which constitute the base of her social and economic life. The right approach should therefore be made through the net work of National Extension and Community Development organisations in the country through their maternity and child welfare programme. It is only the persistent efforts by all concerned that can bring forth nation wide co-operation in the very vital task of controlling the population growth in India.

S.C.S.

HEALTH HAZARDS FROM ATOMIC RADIATION

The revelation of atomic energy is essentially a post-war feature and is the outcome of a high grade technical development that has led to the present place of nuclear power in the concept of economy of the future. Due to lack of proper information the general public has not yet developed any clear concept about the nature and feasibility of the nuclear power. It is no wonder therefore that they would look upon this great change in the coming industrial revolution with the usual caution and suspicion. Nevertheless, there is no doubt that this atomic energy is going to be accepted as an essential part of the background of our present day lives. It is also true that *Pari passu* with the benefits and revolutionary developments in industries, agriculture and power plants the stomic energy will also bring forth along with it, many complications among which the new and intangible problem of health and safety is of special concern particularly of the workers in close contact with ionising radiation, nuclear power station, radioactive wastes, atomic ash, etc.—the peace time uses of atomic energy.

Already certain skin diseases, leukaemia, cancerous growth of the bones and lungs are the maladies which have been encountered among the workers dealing with radioactive substances. Industries dealing with atomic energy has therefore to take special measures for the health and safety of these workers although the maximum permissible levels of exposure have been set up considerably below

the damaging level the question will arise in regard to effect of variation of doses of exposure e.g., constant or frequent small doses, single or infrequent high dose, and so on. It is therefore necessary to carry on extensive investigation on this subject and to keep constant and careful watch on the quantum of discharge of the radioactive substances in the effluents, ashes or wastes and on the health of workers.

Besides the workers directly associated with the application of radioisotopes in the treatment of diseases and in the medical, biological and physicochemical researches, the public in general will also be subjected to radiation in their own environment, e.g. air, food etc. as has been happening with the experimental testing of atom bombs. However, the radiation hazards from air and food can be measured. In fact the effect of radiation on vegetables, crops, fruits, flies and mice has been studied and very largely as result of such observations it has been assumed that radiation can influence even the course of human evolution, though no direct evidence for the phenomenon has yet been produced. On the other hand , man is also subjected to certain amount of natural radiation. The only possible safeguard therefore would be to maintain the additional radiation exposure below that amount.

In 1956, both the National Research Council of England and the National Academy of Sciences of the United States simultaneously released their reports on the Biological effects of Atomic Radiations. Their findings, though arrived at independently, are the essentially the same.

The National Academy of Science appointed a group of scientists to investigate the effects of high energy radiation on living things under the auspices of the Rockefeller Foundation on the aspects of genetics, pathology, agriculture, meteorology, oceanography and fisheries and disposal of radioactive wastes. While the studies will be continued, the preliminary reports published are of great significance and interest to the health officers and allied workers. Although most of the public attention is focussed upon the military weapons it has been pointed out in the report that so far as the radiation hazards are concerned peace-time uses are no less important. In fact, when the world-wide atomic power industry becomes fully operative its accumulated waste products will represent more radiation than would be released on any atomic war. In the latter case, however, the radiation will be uncontrolled and hence will broadcast widely in nature for a temporary period, but the magnitude of the problem of peacetime use should not be undermined for even low levels of radiations may have serious biological effects.

India has just started her atomic energy production and will probably embark upon peace-time uses of this energy in various industries and power plants in addition to the uses of radioactive substance in medical treatment and biological researches. The population of India therefore will now or in near future be subjected to the following radiation exposure:

(a) the natural background
(b) medical and dental X-rays
(c) fall out from atomic weapon testing (outside the jurisdiction of the state)
(d) atomic energy industries.

According to the National Academy of Science of U.S.A. the 30 year dose

to the gonads to be received by average person in U.S.A. from the natural background and X-rays would be to the extent of about 7.3 roentgens as against only 0.5 roentgen from the atom bomb tests. What is or will be the amount of radiation exposure received by an average Indian is not known but it is a problem which deserves to be taken in hand right at the beginning or the energy production and supply. According to Dr. Kothari* vegetarians are in greater danger than the non-vegetarians as the animals from which the latter obtain their food screen the roentgens normally by their metabolic activity. The major problem in routine waste disposal is what to do with the wastes resulting from the processing of reaction fuel. At the moment no method of disposal of these high level wastes is available. According to the reports referred to above the desirable limit of average exposure of the population's reproductive cells to radiation from conception to age 30 should not exceed 10 roentgens and the individuals should not receive more than a total accumulated dose of 50 roentagens up to age 30 or not more than 50 roentgens additional up to age 40.

In the above context and in the coming new and rapidly expanding industrial development both the Government of India and the health authorities of the country should be sufficiently forearmed to deal with the hazards of this atomic radiation.

S.C.S.

RACE AND DISEASE

That the racial difference influences the incidence of diseases is an established principle in epidemiologic teaching. This difference in the incidence is mostly explained by the extent of the acquired experience of the particular race to a specific infection or disease and the role of genetic factor has generally remained vague, though in certain instances the acquired experience was not found sufficient to account for the observed facts. For instance, in the Prophit Survey of Tuberculosis the susceptibility of the Irish Nurses to a higher incidence of Tuberculosis under the same conditions of exposure and living was established, whereas the Jews are well known to be racially resistant to Tuberculosis.

In India, the incidence of Yaws is typical among the tribal population, the civilized races being practically completely free from it. In the Venerology Department of the Government Hospital, Madras, extragenital familial transfer of syphilitic infection has been noted in certain families which perhaps belong to a racial group with lineage more towards the primitive stock than to the Indo-Aryan groups. There is thus a good scope of studying the cause of disease based on comparisons between one race and another. Even a better scope perhaps exists in South Africa due to the multiracial character of her population. An interesting example of the opportunities for research is the excessive prevalence of primary cancer of the liver in the Bantu race[2]. In these people the incidence is often more than 40 times as frequent as in the Western people and six times as frequent in those fromt the East coast (Portuguese East Africa). On the other hand, the highest racial incidence of coronary disease occurs there among the Europeans and the lowest in the Bantu. The cause has been attributed to environmental factors and dietetic deficiences, particularly proteins and Vitamin B Complex, and other effects of malnutrition on liver due to parasitic infestations, infective hepatitis, haemochromatemesis etc.

Similarly, in a survey of pulmonary tuberculosis in the Durban Clothing Industry among 7456 workers by means of miniature X-ray followed large sized plates, Fine et al[3] found the highest incidence of the disease among the Negroes, the percentage of cases increasing with age. The different races examined consisted of 414 Whites, 7,665 coloured, 4206 Asiatics and 1171 Negroes. In India, higher incidence has been recorded among the people from northern hills.

[1]Rangiah P. V.—Personal Communication. S.C.S.

[2]Berman, Charles (1955)—Ibid, 599-542, 1195-1197.

[3]Fine, E. H., Smart, P. and Cruise, S. E. (1955)—South Africa M. J. 29 : 539-543.

STAPHYLOCOCCAL FOOD POISONING

Of late, food poisoning has been a more common feature in our country, particularly in the towns, than in the past. Change in the food habits, popularisation of the use of dried, canned or tinned foods, preservation of used and unused food by refrigeration, rising number of eating houses and restaurants without proper control and negligence or ignorance in proper handling of dried or preserved foods are some of the factors which have been probably contributing to these outbreaks of food poisoning. Of the two types of food poisoning—the 'infection' and the 'toxin' types the latter arises out of the toxic substance in the food prior to consumption. The frequency of this type of outbreak varies in different countries.

In Great Britain, one third of the reported out-breaks are said to be due to Staphylococcal intoxication and another third to be due to toxic substances formed by other specis of bacteria. It is difficult to say about the conditions prevailing in this country as most of the outbreaks are not reported. But it seems that the toxic type of food poisoning is getting more prevalent in this country. One factor that greatly hinders exact knowledge on this subject is the absence of any single laboratory method for detecting the presence of toxic substance in the food or in the filtrate of the suspected organism. For this reason, even when attempts are made to find out the cause many bacteriological reports are ocmpletely negative and no further attention is paid to these outbreaks. Another difficulty which comes in the way is that by the time the investigation is started the food responsible for the outbreak is no longer available and the source ceases to exist. In such cases the following procedure often yields the desired results:

(1) Secure a complete list of cases, (2) Obtain particulars about individual cases, (3) Ascertain vehicle of infection, (4) Study the history of infected food and (5) Search for evidence pointing to the source of infection. By adopting these procedure Saha et al[1] successfully investigated a small outbreak of food poisoning in the city of Calcutta and were able to ascribe it to the Staphylococcal toxin. Such poisoning has of late become quite common, perhapsp due to the bad handling of dried milk which is commonly used now-a-days for the preparations of milk products and cakes etc. It is necessary for the health workers to see that such outbreaks do not go unnoticed and unreported.

Public also need to be warned about the proper handling of these dried and preserved food products, and be told how to avoid contamination of food to be preserved in the refrigerator. S.C.S.

CURRENT PUBLIC HEALTH LITERATURE

MALARIA

VECTORS OF MALARIA AT 8,000 FEET

OVAZZ, M AND NERI, P.—**Vectors of malaria at an altitude in the region of Addis Ababa, Ethiopia.**—Bull. Soc. Path. Exot. 48: 679-86, 1955.

A survey of the Anopheline fauna of Addis Ababa and its sorrunding areas (Ethiopia) was carried out by the authors in 1953-55. The altitude falls from 8,500 feet in Addis Ababa to 6,400 feet at Bichouftou, the power station, towards south.

Malaria cases sometime occur near the railway station at Filoha at an altitute of 8,100 feet and also around the artificial lakes in the vicinity of the power house 6,400 ft. and at Akaki 1,600 ft. from Addis Ababa at 6,400—6,900 ft.

In these areas the Larval collections contained larvæ of A. gambiæ, A. Christyi, A. coustani, A. demeilloni, A. garnhami, A. cinereus and A. squamosus. Adults were taken of all these except the last 2 and adults of the first 3 occurred in houses.

It seems not unlikely that these mosquitoes in certain circumstances extend its upward range and reach suitable breeding places in the warm spring of the Filoha quarter of Addis Ababa.

A VERY LATE RELAPSE OF QUARTAN MALARIA

LENTINI, D. AND TECCE, T.—**Relapse quartan malaria after a long interval**—Rev. di Malariologia. 34: 259-65, 1955.

The authors report on a case in which a relapse of quartan malaria occurred after 45 years of freedom from signs and symptoms of the disease. The subject was 70-year-old nun, who had entered a 'closed' religious order at the age of 24 and who had never since left her convent, which is situated in the central part of Rome, so that any chance of Indigenous infection can be excluded. But since she was suffering from malaria before she had entered the convent. After 2½ months febrile attacks she was admitted to hospital from her convent, with rigor and sweating, each lasting about 12 hours and at first recurring at about weekly intervals. There was considerable spleen enlargement and malaria parasite was demonstrated by sternal puncture.

BURNETT, G. F.—**Variation in mortality with Differences in Humidity among Mosquitoes exposed to BHC, Dieldrin and DDT. Nature.** 177: 663-4, 1956.

The writer draws attention to the probable significant role of high atmospheric humidity in causing pronounced kills among mosquitoes exposed to BHC, dieldrin and perhaps DDT.

At Taveta, Kenya where for the past 7 years residual insecticides have been continuously applied in experimental huts, it is observed that the rather low dry season mortality in female anophelines (*Anopheles gambiæ* and *A. funestus*) entering houses treated with BHC and dieldrin, is considerably augmented on the onset of the next rainy season. This phenomenon is observed both in houses with porous and impervious walls. It was, however, not observed in houses treated with DDT, but Hocking records an increase in kills in a tent treated with DDT dissolved in kerosene when heavy rain fell.

The suspicion is that rising atmospheric humidity may be the reason for the increased mortalities. Should this be correct, the phenomenon will be of practical interest in two ways. First, an insecticide-spraying routine which is quite adequate in localities with high humidity, say coastal or forest areas, may not necessarily be effective in dry localities even in the same country. Secondly, when testing the persistence of residual insecticides, or detecting possible acquired resistence to insecticidies, misleading results are possible unless test conditions are standardized with regard to humidity.

KALAAZAR

TREATMENT OF INFANTILE KALA-AZAR WITH GLUCANTIME

LI MOLI, S.—**Treatment of Infantile Visceral Leishmaniasis with Glucantime—Giorn. di Malattie Infective e Parassit.** Rome 14-19, 1956.

Of 20 children treated by the author with glucantime 16 were cured, 2 died and 2 abandoned treatment.

The average of 20 injection of Glucantime were given. Each injection contained a dose of 25-30 mgm/kgm given on alternate days.

TUBERCULOSIS

JONES, G. R.—**The Epidemiological Approach to Pulmonary Tuberculosis.** Med. Officer, 1955, Nov. 25, v. 94, No. 22, 311-15.

The epidemiologist in the context of this paper is the medical officer of health or one acting for him who "directs the Central Medical Department, the medical staff and nursing staff, on all aspects of the prevention of tuberculosis within the administrative area. Once the clinical case has been isolated he mobilises and manœuvres the staff and facilities with exactly the same urgency, comprehensiveness and approach as he would if confronted with an epidemic of typhoid fever."

The area medical officer visits each new patient, decides what preventive measures should be taken and reports to the epidemiologist and the local health authority, The assistant medical officer supervises and takes part in the tuberculin testing of babies at welfare centres and of children in schools, teaches health visitors the techniques of testing, and reports the names of reactors to the epidemiologist.

The health visitors teach and carry out preventive measures in the home, supervise the health of young contacts attending welfare clinics and take part in tuberculin testing and reading, much of which is left to those who are highly skilled in the work. The jelly patch and Mantoux tests are both used, but only specially skilled health visitors are permitted to do the latter.

The welfare officer and the sanitary inspector play their parts, and the chest physician not only notifies new cases of tuberculosis but examines home contacts and children found to be reactors in schools and clinics and also takes part in special investigations.

The mobile mass radiography unit (which is not under the direction of the epidemiologist) is used in investigation "as far as the Unit accepts the direction of the Epidemiologist".

Routine tuberculin testing of infants is carried out as child welfare clinics and repeated annually. All reactors are notified to the chest physician, general practitioners and area medical officers. Where a case of tuberculosis occurs in any member of a school personnel, all the other members are tuberculin tested and X-rayed by the mass X-ray unit. An attempt has been made to follow up school leavers at night clinics; alternatively the records are sent to the medical officers of industrial establishments so that they may follow up young persons who have started work.

Residential children's nurseries are used to house child contacts of tuberculous persons, but only non reactors are admitted. Children awaiting B.C.G. vaccination are also kept in these nurseries for the isolation period if necessary.

Jones advocates the admission of patients with early non-infectious tuberculosis to cottage hospitals, and estimates that one-sixth of all new cases could be dealt with in this way. He believes that such a measure would encourage the public to seek early diagnosis and that treatment would be valuable in prevention by reducing the number of those who become chronic infectors.

Details of the staff and administration of the scheme in Monmouthshire are given. The only additional expenditure has been the salary of one clerk and the costs of the material for tuberculin testing. The work was incorporated in the routine duties of the medical and nursing staff of the Public Health Department without any additional appointments.

MASTER, J.—**Tuberculin Sensitivity in a Group of Hospital Children.** Indian J. Child Health. 1955, Nov., v. 4, No. 11, 576-86.

A Mantoux tuberculin survey (dose 10 TU of OT) was carried out among children attending the outpatient department of a Bombay hospital. There was no selection of the children tested. They were of every age and suffering from many and various illnesses. Those children attending the hospital where the survey was made were from a thickly congested district in Bombay in which there is much overcrowding and insanitary conditions, and poverty and malnutrition are common.

The total number tested was 2,568 but only 1,441 returned for the test to be read. The percentage of reactors rose from 8.45 in those aged 0-1 year to 90 per cent. at 12 years. The total number of reactors was 459 (30.5 per cent.), and of these 132 (28.6 per cent.) had some evidence of active tuberculosis. All reactors were examined clinically and radiologically. The largest percentage of tuberculous children was under 1 year, and the incidence of the disease was about 40 per cent, in the children aged 1-4 years.

There was no correlation between the degree

of sensitivity and the incidence of tuberculosis. History of contact with a source of tuberculous infection was found in only about one-fifth and such a history was as common in a similar number of children in whom there was no evidence of tuberculosis.

Five children who had had measles within 10-20 days of the test reacted, as did 16 children who had had whooping cough within the previous 3 months or more; 10 children had whooping cough at the actual time of the test of whom 3 reacted and 7 did not; 3 of the non-reactors had X-ray evidence of pulmonary disease of uncertain aetiology.

Various types of tuberculosis were seen, pulmonary predominating (113 Cases). The symptoms were similar to those of other sick children who were without evidence of tuberculosis but a proportionately larger number had chronic enlargement of the glands. Two children with extensive (tuberculous) infiltration of the lungs did not react to tuberculin. They were regarded as being in the state of terminal anergy.

BIOCHEMICAL DIFFERENTIATION OF MYCOBACTERIUM TUBERCULOSIS

SEGAL, W. AND BLOCK, H.—**Biochemical Differentiation of Mycobacterium Tuberculosis Grown** in vivo **and** inVitro—J. Bact., 72: 132-141.

Most of our knowledge concerning the tubercle bacillus are derived from the studies on bacteria grown *in vitro* under laboratory conditions and though various attempts have been made from time to time to determine indirectly the relationship between the host environment and the pathogenicity of the tubercle bacillus by studying both virulent and avirulent strains under conditions stimulating host environment and some consistent correlation have been found, yet there have been isolated reports in the literature indicating the lack of identity between *in vitro* and *in vivo* grown tubercle bacillus.

The authors utilised a method of separation of *Mycobatterim tuberculosis* in large numbers directly from the lungs of infected mice which has enabled them to make a comparative biochemical study of *in vivo* and *in vitro* grown bacilli of the same strain. The results of their study show a large difference in hydrogen transfer capacity between LRv (*in vivo* strain obtained from infected lung of mice) and H37Rv (same organism from *in vitro* cultivation), the former exhibiting a much lower state of metabolic activity in the presence of sub-strate. Paralleling the low hydrogen transfer capacity of LRv, complex culture media had little or no stimulating effect on its endogenous respiration, whereas they produced a large increase in oxygen uptake over the endogenous respiration of H37Rv. The endogenous rate of respiration was found to be similar for both types of bacilli.

Striking differences in the biochemical activity of H37Rv and LRv were observed with respect to substrate response. The positive respiratory responses of H37Rv to glucose, glycerol, lactic acid, sodium acetate, sodium pyruvate, sodium benzoate, benzaldehyde, sodium salicylate, n-heptanoic, octanoic, and oleic acids were found to be consistent with reports in the literature. In contrast, only sodium salicylate and the latter three fatty acids were found capable of stimulating the endogenous respiration of LRv. The biochemical reaction as given by the LRv in respect to glycerol and sodium acetate reverted to that of H37Rv after primary growth in artificial culture medium, showing the adoptive nature of organism.

These results indicate that tubercle bacilli grown artificially are dissimilar to bacilli of the same strain as they multiply in the lungs of an infected animal.

GOITRE AND TUBERCULOSIS

SENGUPTA, S. R. & SWARUP, S.—**Goitre and Tuberculosis in Children.**—I. J. Pediat. 23; 162-63 May, 1956.

In the course of their survey into the incidence of Goitre in Darjeeling district, a part of the Sub-Himalayan region, the authors examined a total of 8,204 children of which 67% were found to be suffering from Goitre. A large number of children were found to be tuberculous. Tuberculosis manifested itself chiefly in the form of enlarged lymph nodes specially in the posterior cervical region. The matting of glands, suppuration and old scars were also seen. It was observed that as high as 59.8% of the children were suffering from tuberculous lymphadenitis. Of the tuberculous children, 49% had goitre, whereas 10.8% of them did not show any enlargement of the thyroid gland. This observation made by the authors in Darjeeling further supports the view that hypothyroidism may increase the susceptibility of goitrous subjects to tuberculous infection.

LEPROSY

FERNANDEZ, J. M. M.—**Influence of the Tuberculosis Factor on the Clinical and Immunological Evolution of Child Contacts with Leprosy Patients. Internat. J. Leprosy. New Orleans. 1955, July**—Sept. v. 23, 243-58 (25 refs.).

The clinical and immunological evolution is described of 83 children who had lived in contact with open, lepromatous patients, and whose exposure to infection was therefore indubitable. These were of ages varying from 1 month to 15 years when first seen. For purposes of comparison they were divided into 3 groups: (1) a group of 28 (tuberculin reactivity immaterial) who had been vaccinated with BCG (mostly at birth), 22 of them by infection and 6 orally; (2) a group of 32, tuberculin positive, who were not vaccinated with BCG; (3) a group of 23, tuberculin negative, who were not vaccinated with BCG.

Of the first group 9 subsequently developed leprosy, 8 of these being tuberculoid and 1 indeterminate. In the Second group 13 developed leprosy, all but one indeterminate case being tuberculoid. In the third group 10 developed leprosy, 5 being tuberculoid, 2 indeterminate, and 3 lepromatous. The significant factor is the presence of the lepromatous cases in the third (tuberculin-negative) group, and their absence in the tuberculin-positive group. There is also a marked relationship between the positive Mitsuda reaction and the positive tuberculin reaction in the first 2 groups.

The author concludes that if BCG is effective in the prevention of leprosy, and if vaccination by mouth is innoocuous, he would advise mass oral vaccination of the people in an endemic area, but failing this priority should be given to lepromin-negative contacts with open leprosy.

CASES OF TUBERCULOSIS AMONGST THE LEPROSY PATIENTS

BALDO, J. I.—**Investigation of Tuberculosis in those suffering from Leprosy**—Rev. Sanidal Y Assistencia Social Carcas 19: 361-71, 1954.

This investigation was made in the patients of the Cabo Blanco Leprosarium, Venezuela. An enquiry about tuberculosis infection among these patients was first made 12 years previously and was repeated in 1954. Tuberculin allergy showed a high positivity in 709 leprous patients with an early incidence in the younger groups comparable with that found in those with poor economic and social standards outside the leprosarium. The positive percentage was rather in the second than in the first. 827 leprous patients were examined first with miniature fluoroscopy and was followed by examination of sputum and with large spinograms of those suspected to be suffering from tuberculosis. Pathology was found in 10.7 per cent of the patient as against 21.2 per cent in the former examination. Those with early active tuberculosis were only 0.6 per cent compared with 3.2 per cent formerly; and those with more advanced disease only 2.0 per cent. compared with 6.7 formerly.

There is thus a marked decline in the incidence of tuberculosis. This may be partly due to better hospital condition and mainly the sulphone therapy, which improves the general health of the patients.

RABIES

RAPID DIAGNOSIS OF RABIES WITH THE PHASE CONTRAST MICROSCOPE

CAJAL, N. & MATEESCU, S.—**Rapid diagnosis of Rabies with the phase contrast microscope**—Studii si Cercetari Inframicro-biol. Microbiol. si Parazitol. 1955, Jan-June, v. 6: 35-38, 1955. (Translated.)

The authors claim that the diagnosis of rabies can be made in a very short time (15 minutes) by examination of frozen sections of Ammon's horn measuring 20 to 50 mu by means of the phase contrast microscope after fixation in Dubosq-Brasil-Bouin reagent for 5 minutes at 60°C. or 5 minutes in 10 per cent. boiling formol-saline.

By this method the characteristic inclusions —Negri bodies—which are greyish—green, sharply defined and sometimes showing an internal structure, are visible in the cytoplasm of certain nerve cells.

INSECTIVOROUS BATS AS NATURAL CARRIES OF RABIES

BURNS, K. F., FARINACCI, C. F., MURNANE, C. —**Insectivorous Bats Naturally Infected with Rabies in South-Western United States**—A.J.P.H. 46: 1089-1094.

Insectivorous bats do not ordinarily ingest blood nor do they attack other animals unless

provoked to do so. However, some of the colonial insectivorous species particularly *Tadarida brasiliensis mexicana*, often migrate into Mexico and because of their gregarious nature, they may become infected by rabies-harboring vampire bats, who are known to harbor rapies infection. The vampire bats being intolerant of other species aggressively attack the smaller species and thereby infect them with the virus. The authors have made special studies of these infectious bats particularly of the two species: *T. Brasiliensis Cynocephela* and *M. veliferincautus* collected in Louisiana and Texas, respectively. In addition, two species of free-living insectivorous bats (*L. borealis borealis* and *A. pallidus pallidus*) collected in Texas were all found naturally infected with rabies.

Serums of apparently normal healthy bats representing fauna collected over an extensive geographical area revealed the presence of neutralizing antibodies for the virus of rabies in a large percentage of specimens. An extremely high percentage of bat brain tissues from which rabies virus was isolated were negative for negri bodies. Four strains of a bat salivary gland agent unrelated to rabies and sharing some antigen common to St. Louis encephalitis virus are reported.

PLAGUE

BURROWS, T. W.—**An Antigen determining Virulence in Pasteurella pestis** (Correspondence) Nature. 1956, Mar. 3, v. 177, 426-7.

The author suggests that the evidence presented in this paper shows that a major determinant of virulence in *Pasteurella pestis* is the antigen which confers on the organism the property of resistance to phagocytosis. This property was found to be possessed in quantity by all fully virulent strains examined and to be undetectable in the majority of avirulent strains. This antigen is regarded as the long-sought Vi-antigen.

Employing the agar diffusion technique the author produced visual evidence of the existence of an antigen differentiating strains sensitive to phagocytosis by the polymorphonuclear leucocytes of the mouse, from strains resistance to phagocytosis.

Virulent *P. pestis* grown on nutrient agar at 28°C. are highly sensitive to phagocytosis (V/S), but when grown for 3 hours with gentle rotation at 37°C. in tryptic-digest meat broth at pH7 they become resistant to phagocytosis (V/R). Avirulent organisms grown at 28°C, are also highly sensitive (AV/S) and remain sensitive at 37°C. (AV/"R").

Antisera prepared in rabbits against V/R when added in vitro to V/R organisms can render them sensitive to phagocytosis. In the same conditions antisera against AV 'R' are poorly able to render V/R sensitive. Both the above antisera contain many antibodies in common; they differ very little in their content of the antibody to fraction I, though this is the antibody which is regarded by many workers as playing the chief part in protecting against virulent infection, fraction I itself being regarded by some experts as being associated with virulence. The author does not agree with these views. He has found the V/R strains to have a low content of fraction I, to have no vilible capsule, and to be poorly agglutinated by high-titre rabbit antiserum prepared against purified fraction I. This antiserum does not render V/R sensitive to phagocytosis. For these reasons it is considered that some antigen other than fraction I is responsible for resistance to phagocytosis, and therefore for virulence. A photograph shows how the agar diffusion test clearly differentiates the strains sensitive to phagocytosis from those that are resistant.

JUVENILE TABES

RAJAM R. V. & RANGIAH P. N.—**Juvenile Tabes with Case Reports**—J. Ind. Med. Assoc. 27: 236-239, 1956.

Juvenile tabes is considered to be a rare manifestation among the neurological complications of infantile and childhood syphilis whether prenatal or acquired. In the vast majority of recorded cases the disease is, however, due to congenital syphilis. Although the first case of juvenile tabes was reported in 1885 by Remak, the total number of cases so far reported in the literature is about 250 and very few cases, if at all, have been reported from India. The present authors have reported 3 such cases which they have come accross at the Institute of Venerology, Madras, during a period of last 25 years. Among 1677 patients with neurosyphilis including 82 cases of tabes occuring amongst all age groups.

Failing vision followed by almost a complete blindness was the first symptoms that brought the patients for examination. The progress of optic atrophy was much more rapid in Juvenile tabes than in adult disease. The evidence or

history of vesical dysfunction may be lacking unless specifically enquired into and investigated, with the held of a cystometrogram.

The prognostic gravity of juvenile tabes is in direct proportion to the frequency and severity of atrophy leading to irrevocable blindness, no matter how mild or insignificant other symptoms may be.

THE CONTROL OF YAWS

HACKETT, C. J.—**The Control of Yaws**—Royal Soc. Health J.—76: 425-430, 1956.

The purpose of yaws control campaign according to the author is the rapid and complete elimination of infectious cases by mass treatment so that the transmission of disease is stopped. As far as is known the essential factor in the transmission of yaws is the close bodily contact of an uninfected person, usually a child with a patient having infectious yaws. Warm and humid climate directly or indirectly also favour transmission of the disease.

The most important points as regard yaws control are the frequent relapses of infectious lesions in the early state and the large proportion of individuals in an endemic yaws community without active lesion but with sore positive reactions (latent cases). The ratio of latent cases to clinically active case may be as 3 or 4:1. Cooperation of the population is an essential prerequisite for the success of the campaign.

The treatment schedule advocated by the WHO is given below.

(1) PAM doses (WHO 1956):

Under 15 years—0.6 mega units in 2 ml for early and late active cases and double the dose for 15 years and over and 0.3 mega units in 1 ml for latent cases and contacts and double the dose for 15 years and over.

(2) Treatment Policies in relation to prevalence of Active Yaws:

Approximate prevalence of clinically active yaws in community	Approximate percentage of sero-reactions	4 ml. is given to all active cases of yaws and, in principle, 2 ml. is given to:
High over 10 per cent	Over 60	the rest of the population as "latent cases and contacts".
HYPERENDEMIC		(TOTAL MASS TREATMENT, TMT).
Medium 5-10 per cent	25	all children under puberty and obvious contacts of infectious cases.
MESO-ENDEMIC		(JUVELINE MASS TREATMENT JMT).
Low under 5 per cent	Under 10	all household and other obvious contacts of infectious cases.
MESO-ENDEMIC		(SELECTIVE MASS TREATMENT, SMT).

The author also gives the following seven principles of yaws control.

(i) The work of all stages of the campaign, including the activity that will follow it, should be planned and financially provided for at the outset.

(ii) At the initial treatment survey, all the available population should be seen; coverage of less than 95 per cent. of the population cannot be regarded as satisfactory.

(iii) Treatment with a long-acting penicillin preparation, PAM or equipalent, should be given at the time of diagnosis to all persons with active yaws, and also to latent cases and contacts according to defined treatment policies.

(iv) Periodical resurveys are essential to find and treat cases of yaws occurring in that part of the population which is inevitably missed at the initial treatment survey, and also in newcomers to the community. At resurvey the household and other obvious contacts of infectious cases should be treated. Resurveys at 6-12 month intervals are needed until locally-established rural health centres can take over this surveillance work. Resurveys should, however, be undertaken in a simple manner by "yaws scouts," i.e., suitably-trained auxiliaries who will visit the villages and carefully look for active cases of yaws. These, together with the contact of infectious cases, would later report at some convenient place for the checking of the diagnosis and for treatment by a responsible officer.

(v) The expansion of the campaign should

be regular and uniform, so that a compact area of control is formed and thus re-introduction of infection by patients coming from untreated areas will be minimal. This implies the co-ordination of yaws-control activities firstly throughout an area and country, and later with the medical administrative authorities of adjacent countries so that large, even continental, areas may be co-ordinated into an extensive yaws campaign. At the Enugu Conference it was recommended that co-ordinated plans for this to take place in Africa should be considered.

(vi) Post-campaign activities, which include the development of rural health centres in the areas where mass yaws campaigns have been carried out, are an essential part in the final stages of the eradication of yaws. It might be pointed out, however, that such centres would have to be established in any case in these areas where they are not already present.

(vii) It is important that the campaign should be appraised at all stages of its progress to ensure that it is proceeding in the right direction and to indicate any modification of plans or activities that may be necessary to ensure its success.

ROUNDWORM

Oxygen in the treatment of Roundworm :

VORA, D.D.—**Use of oxygen in the treatment of Ascariasis :** J. Ind. Med. Assoc. 27: 395, 1956.

In 1954 Tolyzin wrote on the use of intragastric oxygen against human ascariasis. He quoted Krabitz as the pioneer of this new method of therapy. The method of administration was as follows: Patient was given a soap water enema in the morning and after the bowels were evacuated and 1 litre of oxygen was introduced in to the stomach through a stomach tube. This oxygen from the cylinder was first passed through the Davidson's pneumothorax apparatus so that the amount introduced could be measured. The patient was permitted to take fluid 1 hour after administration of oxygen and his meal 3½ hours after.

Fullness of abdomen, nausea, eructation and transient urge to defaecate were the only side effects noted. The number of worms expelled (mostly dead) within 24 hours varied from 1 to 40 at a time. The worm clearance rate was 30 per cent in the author's series and he considers oxygen as nearest to the ideal anthelmintic and compares favourably with santonin.

DIABETES

B Z55 in the treatment of Diabetes :

MENON, K. P. G. AND MESSES SAM G. P.—**Experience with an oral antidiabetic drug.** J. Ind. Med. Assoc. 27: 391, 1956.

The new sulpha compound B Z55 was found to have the property of reducing the blood sugar and is now under extensive trial in various countries. Chemically it is N_1-Sulphanilyl-N_2-n-butyl urea, a yellowish white crystalline substances, sparingly soluble in alcohol, dilute acids and alkalies. It does not irritate the mucus membrane of the mouth and reached appreciable concentration in the blood in 30 minutes attaining the maximum level in 3 hour and is retained for 6-7 hours. It is excreted in urine in acetylated form appearing in 7-8 hours after administration. A definite lowering of the blood sugar is noted as early as 3 hours after administration and this lasts up to 10 hours in normal as well as diabitic individuals (Franke and Fuchs, 1956).

The authors treated 40 patients over the age of 30 years, generally Obese individuals without any Ketosis or infection. All the patients were under maximum caloric diabetic diet (vegetarian—2000 calories, non-vegetarian—1900 calories). The dosage was uniform viz. 5 tablets (0.5 gm each) on the first day, 3 tablets on two subsequent days and later 2 tablets daily as the maintenance dose (sometimes varied between 1 to 3 tablets according to the blood sugar level). Blood sugar levels in majority of cases came down to normal level within 3 or 4 days with few exceptions and urine became sugar free. The action success to be qualitative and a small quantity of functioning insulin in the body appears to be definitely necessary. Age over 35 years seems to be suitable for this therapy. Cases within marked diabetic Ketosis or precoma conditions or diabetic coma must not be considered for B Z55 therapy. It can be easily administered together with insulin if necessary. Definite diabetic regime is still necessary. Toxic effects of the drug is negligible.

EXPERIMENTAL PRODUCTION OF ATHEROSELEROSIS IN RATS

FILLOS, L. C., ANDRUS, S. B., MANU, G. V. AND STARE, F. J.—**Experimental Production of Gross Atheroscleresis in the Rat**—J. Exp. Med., 104: 539-531.

Previous attempts to produce atherosclerosis

experimentally in rats based on cholesterol feeding with or without supplemental procedures resulted in no discernible vascular changes. Several investigations, particularly Wissler and his associates (Arch. Path. 1954, 57, 333 & 1956—: 245) and Malin et al (Rev. Argent. Cardiol., 1952, 19: 165; Acta Cardiologia, 1954, 9: 480), have, however, produced lesions consisting of lipide accumulation by proliferative changes of an extent that approaches that seen in the human counterpart. In the present study rats were fed purified diets containing cholestrol, sodium cholate and thiouracil and gross artherosclerosis was produced in the aorta and its major branches, the pulmonary artery and heart valves. The incipient lesion was detected as early as 31 days by staining the tissues with Sudan. Vascular lesions were characterized by medial and intimal lipide infiltration and cellular intimal plaque formation. Microscopically, intimal plagues were characterized by lipophagocytosis and proliferation of various stromal elements. This degree of intimal reactivity exceeds that previously reported in experimental vasucular lesions in rats. Nor have the structural changes in the smooth muscle accompanying medial lipide infiltration been described in this species. Coronary artery involvement in one animal had apparently given rise to thrombosis and myocardial infarction.

In a part of this study the protein level of the diet was altered at the expense of sucrose. The lowest response was observed among these animals receiving the highest level of dietary protein. In all these experiments a close correlation existed between the serum cholesterol level and beta-lipoproteins of the Sf 20-100 range.

[Abstracts by S.C.S.]

NOTES & NEWS

1. Family Planning Clinics;

A scheme for an all-India training centre for the propagation of family planning is under the active consideration of the Central Government according to a spokesman of the Planning Commission. This centre will soon be opened either at Delhi or at Bombay and the training will be free. Training centres in some form or the other already exist in the Lady Hardinge Hospital in Delhi and in many state hospitals. This scheme which comes under the 2nd Five Year Plan which has allocated Rs. 5 crores for Family Planning.

The trainees, majority of whom will be women, will be required to move intimately with families in need of an advice and help, to win their confidence by genuine service, advise on benefits of planned parentheed, and aid them in adopting suitable means.

Among other items of the Family Planning programme will be the continued search for an effective, acceptable and cheap contraceptive to be popularized in the country. Researches have already been undertaken on this subject with hormenes, vegetable and chemical substances.

On account of low cost the authorities consider foam tablets (1-1½ annas each) to be most suitable at the present moment. A large scale distribution of these, along with added publicity for the "rhythm system," is contemplated.

For the implementation of this task, the number of family planning clinics is to be increased from 115 to about 3,000. Each clinic will stock contraceptives worth Rs. 1,000 for free distribution among the deserving poor and Rs. 500 for sale at cost price.

In addition to this, considerable research is being made into the biological and medical aspects of reproduction, endocrinology, genetics, sociology and demographic aspects including motivation in regard to family limitation.

2. Family Planning Board Set Up by the Union Government :

The Government of India has set up a high-level autonomous Family Planning Board to direct effectively the family planning programme of the country. The chairman of the Board is Rajkumari Amrit Kaur, Union Minister of Health. The members of the Board are: The Minister of Revenue and Civil Expenditure; Sm. M. Chandrasekhar, Deputy Minister of Health; Sm. Durgabai Deshmukh, Chairman, Central Social Service Board; Dr. J. C. Ghosh, Member, Planning Commission; Dr. John Matthai, Chairman, Governing Body, Demographic Teaching and Research Centre, Bombay; Sm. Dhanavanthi Rama Rau, President, Family Planning Association of India; Shri Choitram P. Gidwani, M.P.; Sm. Anasuyabai Kale, M.P.; Sm. Savitri Nigam, M.P.; Dr. S. C. Sen, former President, Indian Medical Association; Prof. P. C. Mahalanobis; Sm. Soundaram Ramchandran; Secretary, Planning Commission; Secretary, Ministry of Finance; Secretary, Ministry of Health; The Director-General of Health Services.

3. Annual Conference of the Trained Nurses Association of India :

The annual conference of the Trained Nurses Association was held at Calcutta between 23-28 October 1956 under the presidentship of Miss Florence Taylor. In inaugurating this annual conference Dr. A. D. Mukharji, Health Minister, West Bengal stressed upon the role of nurses in arousing health consciousness among the people particularly villagers, and in improving their health. About 950 delegates, men and women, attended the five-day conference.

Dr. Mukharji said that with the rapid multiplication of hospitals, and the increasing expansion of maternity, child welfare and family planning services and various public health activities all over the country, there was a great demand for educated girls to take up nursing, midwifery, child welfare and population control work as well as other activities in the curative and preventive spheres.

Indian society in the past had not perhaps extended to nurses due regard and consideration, and possibly because of this girls were not encouraged to join the profession. The outlook of society had changed considerably

and many taboos were fast disappearing. To-day many girls from various walks of life were eager to enrol themselves for training in the nursing and allied professions.

Miss Taylor said that provision had been made in the Second Five Year Plan to assist a number of schools of nursing to develop an integrated programme of institutional and public health nursing in the three-year basis course. This was the first step in implementing the recommendation of the Ministerial Committee on Nursing. Under the scheme every nurse would be prepared for work either in the hospitals or in the public health field and nurses working in hospitals would be able to meet more fully the patients' needs in relation to health advice and teaching.

4. General Health Education Bureau

It has been proposed by the Central Government to set up the Central Health Education Bureau at Delhi with an up-to-date Health Library and a Health Museum attached to it. The work in this connection will start shortly. Designed to foster health education to overcome ignorance of people about simple hygienic laws, which now causes considerable unnecessary and avoidable diseases this bureau is expected to be completed by the end of 1957.

It is equally necessary that similar institutions should be started in the states. This was unanimously stressed in the last meeting of the Central Council of the State Health Ministers. While no Health Education Bureau as it is, exists in India at present, there are health nuseums in Hyderabad, Mysore, Baroda and Lucknow. Special health education section have also been created in some State Health Directorate as well as in the Central Directorate General of Health Services.

The Union Health Ministry will bear the entire cost which amounts to 30 lakhs. Among the functions of the bureau will be to produce cheap and effective health education material, including film strips to serve as a central training and demonstration centre, to periodically evaluate the effectiveness of health education techniques and to coordinate health education in the states.

TRAINING IN HEALTH EDUCATION:

In this connection it may be stated that a training course for health education has already been started at the All-India Institute of Hygiene and Public Health, Calcutta. The second course of training will start in January 1957. Attempts are now being made to start a postgraduate course in Health Education affiliated to the University of Calcutta.

HEALTH EDUCATION IN U.S.S.R.:

In September 1955 a group of 15 medical men from the United Kingdom went to the Soviet Union to study preventive medicine. They made a journey covering some 8,000 miles from Leningard to Moscow, Tashkent, Samarkand, Sochi, Stalingrad, back to Moscow and finally to Leningrad. Their experiences have been recorded by Dr. John Burton (Health Education, Vol. 14, No. 1: March 1956). In the USSR, the doctor considers the purpose of medicine not to be the alleviation of suffering but the raising of the standard of living; prevention takes precedence over cure. The health services are not divided into cure and prevention, as they are in Great Britain, with hospitals and general practice on one side and public health on the other. Their divisions are paediatrics, adult medicine and environmental sanitation. Prevention and cure in these fields are carried on simultaneously in the same building, namely, the polyclinic. Every health worker—nurse, physician, sanitarian or surgeon—studies health education during his or her training.

5. Tuberculosis Survey Work in India :

The Indian Council of Medical Research has sponsored with the financial assistance from the Government of India, Tuberculosis Survey Work in six different regions of the country, which was to be completed by the end of the year 1956.

The survey work is expected to throw much light on the extent of the disease which has been recognized by the Union Government as a national problem to be tackled on an emergency footing during the second Plan period. The report of the survey will be placed before the coming International Tuberculosis Conference to be held in New Delhi during the Second week of January this year.

The first phase of survey work in West Bengal and Orissa regions has been completed. Besides working in the cities of Calcutta and Howrah, the regional team will also carry on survey work in six towns with a population between 10,000 and 50,000 and in 30 villages in the region and should cover the bustees, factory areas and the rich and prosperous areas of Calcutta.

The Government of India are now giving greater emphasis to the problem and propose to spend huge sums of money for controlling the disease during the second Five-Year Plan. Under this plan the Central Health Ministry has undertaken a 6-point scheme to tackle this problem. The Ministry proposes that the B.C.G. vaccination should be intensified and the mass campaign in favour of it completed during the second Plan period, that of the 186 clinics, 100 should be upgraded and 200 new clinics should be established, that 15 training demonstration centres should be set up in association with medical colleges, that at least 10,000 beds should be added for the isolation of the tuberculosis cases living in crowded areas, that 10 work centres should be set up for rehabilitation of ex-patients and that research schemes should be expanded.

At present there are only 20,000 beds for T.B. patients all over the country as against the estimated beds of 5 lakhs required. There are only 186 clinics in all. Though the number of beds and clinics had been increased four times after Independence, the number of beds and clinics has to be increased further.

Besides, the Union Government are now preparing a scheme in collaboration with the World Health Organization and the British Medical Research Council for the manufacture of medicines for T.B. patients at reduced cost. Preliminary work in this connexion has already begun and certain experts from the U.K. and the WHO have visited India.

6. Programme of Eradication of Malaria set up by W.H.O.:

The WHO expert Committee on Malaria has drawn up a strategy for total war against Malaria; with the object of eradicating the disease throughout the world. The group, which held its 6th session in Athens, under chairmanship of Professor G. Livadas of Athens, not only confirmed that malaria eradication was feasible, but that its enormous economic and social advantages made it the only rational policy to adopt. The cost of the programme though substantial would be much less than the cost of continued malaria control of a less intensive character on a long term basis. Moreover, at the present time, several international and national agencies, such as UNICEF, UN Technical Assistance and the US International Cooperation Administration are ready to assist governments that embark on such a programme.

The members of the Committee, pooling experience gained in such widely separated areas as Taiwan and Italy, India and Venezuela, recognized that one of the most urgent reasons for carrying out malaria eradication with the least possible delay, was the growing resistance of the mosquito carriers of malaria to insecticides like DDT. Other kinds of resistance could also be foreseen by the experts, including that of the public which, finding insecticides less and less effective against other insect pests, would object to continued spraying of their living quarters. There was also the resistance of public officials to continued annual expenditures for such spraying. In its report the WHO Expert Committeee outlines principles and practices by which malaria eradication could be achieved by health administrations throughout the world, and stated that it was possible "to describe a standard procedure which, if properly applied, would lead with certainty to eradication."

The report will not only guide the policy-makers on the national level but will constitute a manual for the field workers everywhere who are in the front line of attack against this ancient and widespread diseases. Inspite of the obvious danger that insecticides like DDT would eventually cease to be useful weapons, the Committee insisted that techniques were available to wipe out malaria, both in the mosquito and in man, before that day should arrive. Spraying, interior walls of houses with long-lasting residual insecticides should be carried out intensively and extensively until malaria no longer appears, and then the pockets of infection must be sought out by means of "fire-fighting" techniques until all possibility of re-infecting the population is removed. It was emphasized that when such a stage is reached, spraying must be definitely discontinued to avoid the possible development of resistance in mosquitoes and to enable the surveillance staff to discover whether or not transmission of the disease has really been stopped. A number of countries in the Americas and the Mediterranean region were cited where the results obtained by those methods has stood the test of time.

The report underlined the need for careful study of each country or area where malaria is a problem before applying the new strategy. Recommendations were made concerning the use of preventive and therapeutic drugs as additional help to spraying operations. The Committee's report also took note of some of

the gaps in knowledge that must be filled before all problems can be solved.

The danger of malaria crossing frontiers and re-infecting cleared areas was given serious attention and WHO was asked to help countries take the necessary steps to co-ordinate their efforts and protect each other.

Malaria on a global scale reached its peak in the last century but, despite its noticeable decline, there are still thought to be more than 250 million people in the world who suffer attacks each year, while about 2½ million die of the disease or its consequences.

7. Special Radioactive Isotopes for the treatment of cancer:

Radioactive isotopes are playing an increasingly important role in Medicine particularly in the treatment of certain forms of cancer. One practical advantage over X-Ray and radium treatment is that the radiation can be focussed more easily on the malignant growth than with either X-Ray or radium.

The scientists in U.K. as well as in U.S.A. are working on a method of extracting radioactive caesium from the atomic waste products and preparing it in a form suitable for use in Medicine. In Britain this research is being done in the Radiotherapy Department of the Royal Marsden Hospital in conjunction with the Physics Department of the hospital.

8. World Medical Association Meeting:

The 10th General Assembly was held in Havana, Cuba during October 9-15, 1956. The following office-bearers were elected for 1956-57:

President—Dr. Jose A. Bustamante (Cuba).
President elect—Dr. Ahmet Rasim Onat (Turkey).
Treasurer—Dr. Ernest Fromm (Germany) (for 1956-59).

Regional Secretaries:

Asia—Dr. S. C. Sen (India).
Australasia—Dr. John Hunter (Australia).
Europe—Dr. Paul Cibrie (France).
Latin America—Dr. Hector Rodriguez H. (Chile).

Members of the Council 1956-1959:

Dr. Lorenzo Garcia Tornel (Spain)—Chairman (for 1956-57).
Dr. L. R. Mallen (Australia)—vice—Chairman (for 1956-57).
Dr. Gunnar Gundersen (U.S.A.)—Member.
Dr. Marcel Poumailoux—France Member.
Dr. S. C. Sen (India) Member.

The following are among the numerous resolutions adopted by the 10th General Assembly of the W.M.A.—"It is the primary function of the medical doctors of the world to formulate any code of International Medical Law and The World Medical Association is the only organization that can speak for the doctors of the world."

Traffic Accidents—"Whereas: The death and maiming of humanity throughout the world is increasing rapidly each year; and

"Whereas: It is the duty and responsibility of the medical profession in every country of the world to assist in the preservation and maintenance of human life;

"Therefore; be it resolved: That the World Medical Association recommend to its member associations that they cooperate with other agencies and authorities within their country to whatever degree is possible and necessary in a concentrated endeavour to save and preserve human life."

9. UNICEF'S Chief Health Programme:

The Executive Board of UNICEF has approved the spending of $2,747,000 on child health programmes in Asia. The money is for projects in 14 countries and territories stretching from Afghanistan to Japan. India's mass programme of BCG vaccination against tuberculosis is to get $204,000. The announcement described this as "the largest vaccination campaign the world has seen" and said the project has a target of 170 million tests and about 50 million vaccinations. The allocations include—$52,000 for maternal and child health services in Afghanistan; $11,000 for handicapped children and $12,700 for followship for health personnel in India; $57,000 for handicapped children, $50,000 for milk feeding and $28,000 for emergency feeding of Hokkaido women and child victims of severe crop failure in Japan; and $99,000 for maternal and child health in Pakistan.

10. Nobel Prize for Medicine:

This year's Nobel Prize has been awarded jointly to Dr. Werner Forsmann of West Germany and Andro' Cournand and Dickinson W. Richards Jr. of the United States. This joint award marks their discoveries in the fields of heart catheterization and pathological changes in the circulatory system.

Dr. Forsmann has been a country doctor—

a general practitioner in the town of Bad Kreuznach in Rhine province. He pioneerd a new technique of getting what we may call "inside information of the heart" 27 years ago, by introducing a rubber catheter through a slit in the vein of his own arm inspite of the opposition of his friends. With the tube in position (which was pushed 25½ inches) Forsmann walked up 2 flights of the stairs to the X-ray room to got photographic proof that the tube had entered the heart. He reported his technique in a learned paper in 1929, wherein he indicated that it would be valuable in studying the blood pressure inside the heart and in taking its X-ray picture by introducing some opague substance through the catheter. Young as he was he gave up the experiment as he received no encouragement from his superiors.

The other two joint winners of the prize had been doing research work at Columbia University following the lines laid down by Forsmann. They have used the technique for diagnosis as well as research and have shown that Forsmann method can be used in studies of shock, in revealing abnormal connection between arteries and defects inside the heart. In many cases conditions that were formerly invariably fatal can be detected and corrected by surgery.

11. The Society for the study for Industrial Medicine:

The first Asiatic conference of Occupational Diseases and Hazards was held in Tokyo from 30th October to 3rd November 1956. The conference is unique as it was to discuss scientific matters and preventive measures against Occupational Diseases and Hazards throughout Asia, which would play a significant part in establishing Industrial Medicine on advanced modern scientific principles in the whole of Asia.

The following were the delegates from India who attended this conference as representatives of the Society for the study of Industrial Medicine Drs. A. D. Daftry, M. D. Engineer and Mrs. B. M. Dabash.

12. Need of Trained Health Personnel.

The Union Health Minister Rajkumari Amrit Kaur, while inaugurating the International Seminar on 12.11.'56 at the National Y.W.C.A. In New Delhi, said that until ignorance and poverty were overcome health standards would remain below the optimum. On an average, there was only one doctor for 6,000 persons. But these doctors were largely concentrated in towns and citits, which left only one doctor for as many as 30,000 to 50,000 persons in the rural areas. One of the basic problems to be tackled, therefore, was the production of trained health workers in sufficient numbers and the devising of ways and means for their even distribution.

In this connection the Health Minister mentioned about the various schemes for the expansion of training facilities which were being pushed forward at all levels with direct or indirect assistance from the Central Government to the States. This new orientation course was being planned to give the trainees a full appreciation of the actual problems, as far as possible, against the rural background.

13. Trachoma Control Pilot Project.

The Government of India have sanctioned this project initially for two years. Trachoma is responsible for maximum blindness especially amongst rural population. Control and eradication imply nation-wide activity. The project for the first year will limit its activity to the rural population of 20,000 grouped around Community Project Centres near Aligarh. The chief purpose of this project is to obtain first hand knowledge of incidence and factors responsible for its widespread catastrophic dissemination. School programme and mass treatment on a limited scale also is an important feature of the project. The work is being conducted under the joint auspices of the Government of India and World Health Organisation. The Indian Council of Medical Research will directly guide and control the scheme.

Dr. M. Radovanovic, W.H.O. Medical Consultant has been deputed by the W.H.O. to work as its principal advisor to this project. The Gandhi Eye Hospital and the Muslim University Institute of Ophthalmology will constitute the Base of the Project. On satisfactory result of this scheme will depend the possibility of launching a country-wide campaign to control this disease and consequent blindness.

14. All-India Institute of Medical Sciences.

The Government of India have nominated the Union Health Minister, Rajkumari Kaur, as the President of the All-India Institute of Medical Sciences under the All-India Institute

of Medical Sciences Act, 1956. The Institute has been established under the said Act with effect from November 15, 1956.

Besides the President, the other members of the Institute will be Dr. A. Lakshmanswami Mudaliar, Vice-Chancellor, University of Madras, Dr. Jivraj Mehta, Minister for Finance, Bombay, Dr. C. G. Pandit, Secretary, Indian Council for Medical Research, Dr. P. Sen, Professor of Entomology, School of Tropical Medicine, Chittaranjan Avenue, Calcutta.

Besides representatives of the Lok Sabha and Rajya Sabha the following will represent the Medical Faculties—Dr. Dukhan Ram, Head of the Department of Ophthalmology, Patna University, Patna; Dr. T. K. Raman, Principal, Medical College, Trivandrum; Lt.-Col. Amir Chand, I.M.S. (Retd.) Dr. R. M. Kasliwal, Principal, S.M.S. Medical College, Jaipur and the Director of the Institute (ex-officio).

15. Scheme for Eradication of Endemic Goitre.

Sm. M. Chandrasekhar, the Dy. Minister of Health, Government of India, in reply to a question in Lok Sagha said that a Goitre Pilot Survey Project in the district of Kangra had been established and was working since November, 1954. She said that a scheme for the eradication of endemic goitre through distribution of iodised salt at an estimated cost of Rs. 18.00 lakhs was under consideration of the Government of India. It may be noted that goitre was prevalent in endemic form in Jammu and Kashmir, Punjab, Himachal Pradesh, Bihar, West Bengal, Assam, North East Frontier Agency, Tripura and Manipur.

16. Medical Research in Second Five Year Plan.

Shri V. K. B. Pillai, Secretary, Union Ministry of Health, while inaugurating the annual meetings of the Scientific Advisory Board and the Advisory Committees of the Indian Council of Medical Research held in Mysore in November 16, 1956, said that the four problems had loomed large constantly in his mind wage: (1) environmental Sanitation (2) Provision of drugs in adequate quantity, (3) improving the nutrition of the people and (4) Limiting population growth. So far as the first problem was concerned he was of opinion that on considerations of climatic conditions, customs and other factors, the methodology and sanitary science should be adopted to meet our specific needs. There was a vast field for research in this area and he was glad that the Council had constituted a fullfledged committee of environmental hygiene and sanitation for drawing up a comprehensive programme of research, to be initiation in close and intimate collaboration with the State and Central Medical and Public Health authorities.

As regards communicable diseases the Council's activities had met with sufficient immediate practical gains in the fields of plague, cholera, malaria, filariasis and leprosy. Two projects in the field of anti-tuberculosis work had been included in the Second Five Year Plan and these had been initiated. One of these dealt with surveys of tuberculosis in different parts of the country and the other with a controlled clinical trial with chemotherapeutic and antibiotic agents in the treatment of tuberculosis patients in their home environment. This second project constituted perhaps one of the most outstanding activities of the Council during the year.

Amongst the various other projects of research that have been sponsored by the Government through the Indian Council of Medical Research, Sri Pillai said that the promotion of research in the medical colleges had been one of the major activities of the Council in recent years. Almost all colleges, he added, had requested for grants for research in one or the other field of medical science. To-date 86 fellowships had been awarded with the aid of the Rockefeller Foundation and 37 candidates had gone back to their earlier positions after training. The Government had also proposed the establishment of a Research Cadre in order to improve the terms of service and emoluments offered to medical research workers which were unsatisfactory.

He also disclosed that a provision of Rs. 412 lakhs had been made in the Second Five-Year Plan for medical research and he hoped that in the preparation of the new plans, the guiding principle would be that the medical research should be concerned not merely with the study of diseases of man but also with the study of factors which promote his mental and physical well-being.

17. Fifth Session of the Central Council of Health.

Financial aid for the Health Schemes:

Rajkumari Amrit Kaur, Union Health Minister, while addressing the Fifth Session of the Central Council of Health at Ranchi on the 15th December 1956, observed that the

sense of urgency which health programme demands had not yet been fully appreciated by the State Health Departments. She further observed that the assistance offered to the States in connection with the health schemes in the First Plan had not been fully utilized by them despite the fact that they has shown considerable keenness to take advantage of such assistance. A large amount of funds had therefore to be surrendered.

She hoped that this sad experience would make the state Government wiser and they would plan ahead to avail to the fullest possible extent all the financial assistance for the health schemes during the Second Plan. In this connection she stressed the need for the training of more nursing and ancillary personnel.

Control of Tuberculoses :

Speaking on the B.C.G. campaign in India she said it had made excellent progress till April last year. It deteriorated afterwards mainly due to unsatisfactory service conditions of the B.C.G. personnel and to the unfortunate propaganda launched against it. Except Bihar no other major state had plans to absorb the workers permanently in the State Health Department. She therefore urged all states to intensify the mass vaccination campaign. In this connection she gave accounts of the progress made and future plans regarding the tuberculosis and leprosy health education.

In referring to the Tuberculosis control policy of government she said that apart from the mass B.C.G. vaccination for the control of the disease in the country as a whole, under this programme 300 standard type T.B. Clinics (one per district) and 12 T.B. demonstration and training centres in association with medical colleges and teaching institutions would be established. There is also provision for 4,000 to 4,500 less in different parts of the country for the isolation of advanced cases of T.B. in the crowded urban areas.

Control of Leprosy :

The progress under the Leprosy Control scheme had been rather slow mainly due to scarcity of suitably trained personnel. Nevertheless out of 40 pilot project centres envisaged under the scheme, four treatment and study centres and 30 subsidiary centres had been established in various states. One hundred additional pilot projects would be established during the Second Plan period. A scheme for training of medical officers in Leprosy had also been sanctioned and the necessary personnel was being recruited.

Medical Education :

Medical Education had been engaging the special attention of the Government and under the Second Plan provisions were made for the opening of six more medical colleges in the country and expansion of some existing institutions. The plans for the building of the central Health Education Bureau had been finalised and including the Museum would be completed within a year or so. Another project nearing completion was the Maternal and Child Health project at the All-India Institute of Hygiene & Public Health, Calcutta.

Family Planning :

Regarding Family Planning she observed that the Family Planning Research and Programme Committee has been set up to recommend schemes for research and other programmes relating to Family Planning Rs. 497 lacks have been provided in the Second Plan for the assistance to be given to voluntary organisations in this field.

18. **Legislation on the Colouring of Food Products.**

In India, lately, the problem of colour in food products has been engaging the attention of Health Authorities. The problem here has acquired particular importance and urgency because of the wide-spread use of unauthorised dyes in colouring food products.

Until the advent of synthetic colours in recent times only products of animal, vegetable, or mineral origin were utilized for colouring food. These colours were harmless in character and consequently gave rise to no danger. It is with the intruduction of synthetic dyes, some of which are known to contain matter injurious to human organism, that the practice of colouring food took on the complexion of a serious problem from the point of view of public health. Need arose for determining the innocuousness or otherwise of dyes, and for preventing the use of harmul dyes in food products.

Public Health Authorities in leading countries of the world took up the matter. A couple of international conventions were called, under the auspices of organisations like the W.H.O. and the F.A.O., at which an attempt was made to co-ordinate research into the

nature of dyes most commonly in use, and to draw up an internationally acceptable list of authorised dyes for food products.

In India, a specially constituted Food Advisory Committee examined the whole question in detail, and published a report, which for general guidance listed certain dyes that alone were found suitable for colouring food. A little later, legislation authorising the use of these dyes for colouring purpose was passed by the Indian Parliament.

19. Soviet Health Service in fight against Tuberculosis.

By PROFESSOR F. SHEBANOV

In Tsarist Russia the fight against tuberculosis was carried on by separate physicians and a small group of philanthropists. There were only 67 dispensaries and 50 sanatoriums for tubercular patients in Russia.

An anti-tubercular department was organized at the People's Commissariat of Public Health (now a ministry) soon after the October Revolution, in 1918. The first anti-tubercular dispensary was opened and after that the number of these establishments went on rapidly increasing. Specialized research institues were founded and staffs of physicians specializing in tuberculosis trained.

Vaccination of new-born children was conducted on a big scale, as a result of which the proportion of tuberculosis and mortality from it among children fell several fold. Steps were taken to have the personnel of children's institutions, food industry enterprises, etc., undergo medical examinations.

The dispensary is the main anti-tubercular establishment in the Soviet Union for the treatment and prevention of the disease. The work is organized so as to diagnose tuberculosis at an early stage and all the cases are taken under observation. The patients are given treatment in the dispensary and, if necessary, directed to tubercular hospitals and sanatoriums. The dispensary sees to the improvement of their living and working conditions and watches over the health of the patient's family and people who are in close contact with them. Under Soviet law tubercular patients may not be kept working in professions injurious to their health, connected with the discharge of steam, gas, dust, etc. They are transferred to other work which is harmless. Should the patient be unable to pursue his former occupation he is given facilities for changing his profession, every effort being made to do it so that the patient's material welfare will not suffer.

A great deal of care is given in the Soviet Union to the training of physicians specializing in tuberculosis and to having therapueutists broadly acquainted with modern methods of diagnosing the disease. Mass prophylactic examinations of the inhabitants are conducted by means of fluorography. For this purpose special teams of physicians are sent to the most distant districts of the country.

Soviet scientists are working hard in the search for effective methods of treating tuberculosis. Methods have lately been developed for obtaining certain preparations, such as streptomycin and PAS, phtivasid has been synthesised and a dry anti-tubercular vaccine obtained which can be kept in storage for a long time. The Soviet pharmaceutical industry is producing these highly effective medical substances in sufficient quantities. Lung surgery has reached a high stage of development. In combination with antibacterial therapy it achieves cures that were considered difficult before.

Considerable improvement in living conditions and the increasing material welfare of the pupulation, as well as constant improvements in the work of the anti-tubercular service, prophylactic measures conducted on a big scale, the use of effective medical preparations and surgical threatment have brought about a considerable fall in tuberculosis frequency and mortality. From 1949 to 1953, for instance, mortality from tuberculosis fell 67-75 per cent in a number of cities of the USSR.

Regardless of the success already achieved in this field intensive work still goes on in the Soviet Union with the subject of finding new effective methods of preventing and treating tuberculosis.

20. Public Health in the USSR

The Soviet Union can boast of over 150,000 functioning medical establishments. USSR holds the first place in the world by the provision of medical aid (16 doctors per 10,000 of the population).

* * *

Currently the public health system includes 2,500 sanatoriums and rest homes with a total of 388,000 beds.

* * *

There are some 15,000 pharmacies, 2,500 specialized shops and upwards of 70,000 chemist's stalls.

The Sixth Five-Year Plan stipulates the further development and the improvement of the quality of medical service for the population. In 1960 as compared to 1955 the number of hospital beds will increase by approximately 28 per cent. The total number of hospital beds in the Soviet Union will increase not less than by 360,000.

To improve the living and working conditions of women workers, it is envisaged to increase by more than 400,000 the number of nursery accommodation. Within the next five years some 112,000 doctors and pharmaceutists will be trained. During the sixth five-year period, 358,000 trained nurses and doctors' assistants will be graduated by medical schools.

21. **Human Blood Molecules**

CAUSE ATHEROSCLEROSIS IN RATS

Dr. Joseph Bragdon, Edwin Boyle and Richard Havel of the National Heart Institute, Bethesda, Md., have reported in the Journal of Laboratory and Clinical Medicine (July '56) that signs of atherosclerosis have been produced in rats by injections of big fat-protein molecules from human blood. These fatty deposits are found in their hearts and arteries, which are characteristic of early atherosclerosis, an important cause of death in human being. This finding gives evidence for faulty fat transport as a cause of atherosclerosis. The abnormal quantities of high density fat-protein molecules may block the natural mechanism for removal of those lower density. [Abst. Science News Letter, October 13, 1956]

22. **The International Tuberculosis Conference at New Delhi**

The International Tuberculosis Conference held at New Delhi between 7th and 12th January 1957, was attended by about 800 delegates from 50 countries, and was inaugurated by Dr. Rajendra Prasad—President of the Indian Union.

In his inaugural address Dr. Rajendra Prasad said that during the last fifty years or so such a large volume of knowledge on tuberculosis had accumulated that to-day the outlook on the disease had considerably changed. The old sense of despondency and frustration had given place to a feeling of optimism. This is only partly true. A large volume of knowledge on tuberculosis has certainly accumulated but doctors are found to disagree on the efficacy of B.C.G. vaccination and even on that of much-boosted specific drugs. For instance, Dr. P. V. Benjamin, Tuberculosis Adviser to the Government of India, cautioned against the use of new anti-biotics, specially I.N.H., on a community-wide basis as a prophylactic against tuberculosis. The search for better and more potent anti-biotics continues. Increased knowledge on tuberculosis has also helped sharpen the awareness of the people to the danger to which they are exposed. Economics plays an important part in the control of tuberculosis, President Rajendra Prasad said. It is now widely recognised that poor housing conditions and malnutrition breed tuberculosis. In India's premier city one man out of four lives in bustees into which neither sunshine nor air can enter. Malnutrition is also frightfully common. The School Medical Officers of Calcutta Corporation who examined over 5,000 children reading in municipal schools during the period from July to September last year found that the percentage of malnutrition among them was 49. These figures show how intractable is the economic factor. Housing, particularly housing of industrial workers in urban areas, must received more attention than it has hitherto done. Malnutrition is not a question of nutrition only. A famous British doctor once said: Give the people enough food and nutrition will take care of itself. Our people are not getting enough food.

23. **The Third All-India Conference on Family Planning.**

The Third All-India Family Planning Conference was held at Calcutta on the 5th January 1957 before a large gathering in a special colourful pandal erected for the purpose. Besides the members and invited guests from various sections of the Government and the public it was attended by the representatives from many neighbouring and Western Countries of the world namely, Pakistan, Burma, Singapore, Indonesia, China, Japan, United Kingdom and U.S.A. The conference assumed almost an international status. Lady Dhanavanti Rama Rau presided and Dr. J. C. Ghosh member of the Planning Commission inaugurated the Conference. Among the distinguished guest-speakers were Professor N. K. Siddhanta,—Vice-Chancellor of the Calcutta University, Professor S. C. Ghosh, Mayor of Calcutta, Dr. S. C. Sen, Ex-President of the Indian Medical Association and several others. The programme included a scientific discussion and an Exhibition which was opened by the

Governor of West Bengal—Shrimati Padmaja Naidu, and a seminar on "Marriage guidance and sex-education" conducted by Dr. David Maze.

Welcoming the delegates, Mr. P. C. Sen, West Bengal's Food Minister and Chairman of the Reception Committee said that India's rapid growth of population had cast gloom over her economic future. Indiscriminate reproduction was a serious handcap to the imprpovement of living standards and steps would have to be taken to arrest the growth of population.

Birth control alone, however, as an isolated remedy, would not succeed in reducing the population. It had to be linked with an overall social policy so as to inculcate new ambitions among the people and a new dignity in India's women.

The first and foremost item of the programme, he said, should be compulsory education since spread of education by diverting children from the fields and threshing floors to school would help to limit the family in rural areas. As it had been discovered that fertility went down with increased consumption of animal protein, improvement of nutrition standards by a large intake of such protein should be attempted as far as practicable.

Efforts, he said, should also be made for strict enforcement of the Child Marriage Act since marriage thus delayed would enable girls to take advantage of the opportunities of education and cultural pursuits which would thus bring about family limitation. There should also be a scheme of social security without which people could not develop the proper psychological attitude towards their future. In the absence of security in old age, sickness, unemployment or accident, people banked on a large family to afford them better security. Land redistribution, co-operative farming and caste equality should also be considered as part of the programme.

Outlining the work already done in West Bengal, he said that there were at present nine family planning centres under the Government and a number of others under non-official organizations. Under the Second Plan, the State Government had provided for opening 98 centres at a cost of Rs. 35.54 lakhs. It also proposed to provide for family planning service sections in all maternity, child welfare and health centres and hospitals under the Government.

Dr. J. C. Ghosh said in his speech that there is a general agreement to-day that planning of the family is an integral, perhaps the most important part of planing for better nutrition, better health and better living in general. According to a recent statistical survey of the U.N.O. India's population was the hungriest in the world. The people's food in terms of calories did not exceed 2,000 as against a normal adult's requirements of 3,000.

The protein content of high biological value was five grams against a normal requirement of 40 grams. There was also practically no protective ingredients in the food which were so vital for healthy living.

Thus under-nourished population was growing at the rate of five million a year, the growth in a decade exceeding the entire population of the U.K. Far from being in asset, such growth had become India's greatest liability. The Government, he said, had recognibed its evil implications and was anxious to render every possible help to all voluntary organizations which would help rid the country of the evil.

It was not very difficult to offer family planning service to women living in urban areas as 85% of the doctors lived there, though 85% of the population lived in the countryside. The crux of the problem was the extension of the movement to villages which constituted the base of India's social and economic life. It appeared that the placid contentment of that life had been disturbed.

Considerable progress had been made in providing the countryside with National Extension and Community Development organizations and it was hoped that by 1961, a network of these organizations would cover the whole country. These were expected to be the nucter round which would start a people's movement for beter health and better living.

Competent observers were agreed that in certain areas the energies dormant in the people had been released and the transformation of the social and economic life of the village was gaining momentum. This was a hopeful sign and should give confidence that the extension of the family planning movement to rural India might not prove to be an altogether baffling problem.

It did not require much optimism to believe that gradually all right-thinking men in India would begin to feel that voluntary parenthood was one of the most vital features of social welfare, but it was too much to expect real success until an ideal contraceptive—simple and cheap—had been discovered.

Lady Rama Rau, in her presidential address regretted that of the Rs. 65 lakhs which had been made available for family planning under the First Plan, less than half had been spent

in some of the States of India, she added, there was positive opposition to birth control.

In the Second Plan, Rs. 5 crores had been made available for family planning and she expressed the hope that setting up of the Central Institute of Family Planning, which would take place very shortly, the next All-India Conference in 1959 would be able to have a report of good progress made.

In was recognized, however, she added, that no Government plans in the general social development of India could be truly effective without the active help and support of voluntary organizations that had been working in the field long before Government aid could be made available. It was, therefore, of the utmost importance that the Family Planning Association of India should multiply its branches and maintain close contacts through these branches with work as it developed in different areas so that similar policies should be instituted and uniform standards maintained.

ANNOUNCEMENT

Scholarships for studies in Child Health :

Messrs Glaxo Laboratories have offered two scholarships for post-graduate studies in Child Health at the newly established Institute of Child Health in Calcutta. The Institute is affiliated to the Calcutta University, where members of the Medical and Nursing profession receive specialized training in the care of children.

International Congress for Social Medicine :

The 2nd International Congress for Social Medicine will be held in Vienna from May 31 to June 2, 1957. The theme of the Congress is "University and Public Health". Various questions concerning the above subject will be discussed at this meeting by world renowned experts. Details may be had from Prof. Dr. T. Antoine, Spitalgasse 23, Vienna 9 Austria.

World Conference on Medical Education :

The Second World Conference on Medical Education will be convened under the auspices of the World Medical Association with the collaboration of the World Health Organiza- and the International Association of Universities. National Medical Associations and Medical Schools of the world are invited to assist in planning this conference, recommending topics and well qualified speakers to participate; sending representatives to attend, and providing publicity relativt to it.

The Programme Committee of the Second World Conference on Medical Education announces the following plans for the convening of this conference:

Place—Chicago, Illinois.

Dates—August 30 September 4, 1959.

Theme—Medicine—Life Long Study,—A conference on the continuing education of the doctor after graduation from undergraduate medical schools.

REPORTS & REVIEWS

PASTEUR INSTITUTE OF SOUTHERN INDIA— COONOOR. Annual Report of the Director 1954 (Veereraghavan, N) and Scientific Report, 1951, 73 pp. Diocessan Press, Madras, 1956.

This annual report mainly deals with the subject matter of Rabies. Treatment for rabies at the Institute and its subsidiary centres during 1954 was given to 23,424 persons with 5% suspension of infected sheep brain vaccine, either in distilled water (DWV) or in normal saline (SV) prepared by Semple's method. The number of deaths among those treated was 21 (0.12 per cent) among 17,926 who received complete or incomplete treatment with either DWV or SV distributed as follows: 4 (0.048 per cent) among 8,212 completely treated with DWV; 2 (0.08 per cent) among 2,443 completely treated with SV; 4 (0.08 per cent) and 11 (0.42 per cent) among those incompletely treated with DWV and SV, respectively. All 21 deaths followed dog bites and occurred among Asian patients. Among 12,974 persons treated with DWV there were 3 cases of neuroparalytic accident, *i.e.*, 1 in 4,325, while among 5,129 treated with SV there was no case. (In the period 1933-54 only 13 persons treated with SV developed such accidents, *i.e.*, 1 in 23201). In view of the comparatively high incidence of these accidents complicating treatment with DWV, issue of this vaccine was discontinued from 1 November, 1954.

It is seen from observation made between 1946-1954 that among 213 persons, who were beaten by rabid animals and who received a complete course of treatment with SV 16 (or 7.5 per cent) died of rabies, while 85 persons who remained untreated after similar exposure 36 (42.3 per cent) succumbed to that disease. 5 out of every 6 persons have been saved by this treatment. Among the 31 persons treated with DWV only 2 died (6.45%) as against 8 (42.1 per cent) of 19 who had remained untreated. The main experiment was carried out by Veeraraghavan and his colleagues with DWV and SV. Rabies Vaccine prepared in distilled water did not indicate any superiority over SV vaccine prepared in normal saline. Experiments were carried out by the same authors to determine the protective power of hyperimmune anti-rabies serum, when administered by different routes to guineapigs. The result indicates that the administration of serum subcutaneously, intramuscularly or into the site of infection, while prolonging the incubation period, had no protective value for animals challenged previously with street rabies virus.

Trend of Population Growth

According to the United Nations Statistical Office the world population has more than doubles itself in the last hundred years. The demographic yearbook for the year 1955 quotes the estimated Figure as 2,652 million, more than half of which (1,451 million) live in Asia. The remaining population is contributed by Europe 404 million, America 357 million, Africa 210 million, Oceania 14 million and the USSR 214 million. The density of population is, however, highest in Europe with 82 persons per Sq. Kilometer as against 54 in Asia. Other countries are sparsely populated with less than 10 persons per sq. kilometer. The rate at which the number of mouths has been added daily since the last four years is 100,000. At this rate the population will rise to the figure of 3520 million by 1980 and 6000 million by 2056. Taken by the continents separately, the rate of increase has been highest, 2.5 per cent, in Oceania, USA coming next in the grade with 2.0%, while Asia, Africa and USSR are close to one with a rate of about 1.5%. The lowest rate of 0.7% has been in Europe.

Below is given a table showing the trend of population growth with birth and death rates in a few countries for comparison. At the present time the population in China is not less than 600 million *i.e.* about one quarter of the world popalution as against 355 million in India, and the rate of increase perhaps approximate 2.5% per annum. The average density of population is still, however, lower than in the European continent, being only 60 per sq. kilometer as compared to 293 in U.K. This is due to the fact that half the areas being not so habitable accommodates only 20% of the population and the other half is crowded with the remaining 80%. In Japan, on the other hand, there is very high pressure with nearly 90 milion population. She has kept down the rate of growth by legalising abortion which number about 1,500,000 annually, *i.e.* about 16.7 per 1000, which is only 2.7 less than the actual birth rate. The natural increase is, however, highest in China with more than 36 per 1000 per year. India's figure is just half of it is drawn with a figure of 31 is next to China, USA and Canada recpectively gives a figure of 15.9 and 20. The lowest 3.7 is shown by U.K. The problem of population thus differs in different countries and there are divergent views in different countries on the method of tackling of this problem.

It is undoubtedly true that the methods of birth control adopted by the westerners are difficult to implement in the oriental countries under prevailing circumstances. Perhaps for some years to come these countries have to depend upon the potential resources for increasing the food production on land and perhaps on the sea. The F.A.O. of the United Nations has given the rate of increase of world food production is only 1 per cent per annum whereas the rate of population growth is 1.5% per cent, if not more. The position therefore seems to be serious indeed, particularly in the Far East where the rate of increase of food is only 0.04%. Can the peaceful use of atomic energy take up the challenge?

REFERENCES

1. Demographic year book 1955—United Nations, Geneva.
2. Summary Report of World Population Conference—Rome, 1954, United Nations Geneva.
3. Monthly Bulletin of Statistics, United Nations, September, 1956.
4. The Times, July 27, 1956.

TABLE I

EXTRACT FROM MONTHLY BULLETIN OF STATISTICS—UNITED NATION, SEPTEMBER, 1956

Estimates of population, Birth Rate and Crude Death Rate of Certain Countries.

YEAR	INDIA	CANADA	CEYLON	CHINA	FRANCE	IRAN	JAPAN	NEW ZEALAND	SWEDEN	UNITED KINGDOM	UNITED STATES	SWITZERLAND
					NAMES OF THE COUNTRIES							
1950	358000	13712	7544	...	41944	18952	82900	1908	7017	50325	151683	4694
1951	356879	14009	7742	...	42238	19328	84300	1947	7073	50302	154360	4749
1952	367000	14430	7940	...	42545	19403	85500	1995	7125	50444	157028	4815
1953	372000	14781	8155	582603	42860	20253	86700	2047	7171	50611	159636	4877
1954	377000	15195	8385	...	42844	20721	88000	2093	7214	50785	162417	4923
1955	...	15601	8588	...	43300	21146	88900	2136	7262	50968	165271	4978
					BIRTH RATES							
1950	24.9	27.1	40.4	42.5	20.6	16.9	28.2	24.7	16.4	16.3	23.5	18.1
1951	24.9	27.2	40.5	49.9	19.6	17.4	25.4	24.4	15.6	15.8	24.5	17.2
1952	24.8	27.9	39.5	46.6	19.3	19.2	23.5	24.8	15.5	15.7	24.7	17.4
1953	26.7	28.2	39.4	45.3	18.3	19.5	21.5	24.1	16.4	15.9	24.6	17.0
1954	28.4	28.7	36.2	44.5	18.9	18.3	20.1	24.7	14.6	15.6	24.9	17.0
1955	30.5	28.3	37.9	45.3	18.4	40.9	19.4	24.9	14.8	15.4	24.6	17.1
					CRUDE DEATH RATES							
1950	16.1	9.0	12.6	11.3	12.7	8.1	10.9	9.3	10.9	11.7	9.6	10.1
1951	14.4	9.0	12.9	11.6	13.4	7.5	10.0	9.6	9.9	12.6	9.7	10.5
1952	13.6	8.7	12.0	9.9	12.3	6.1	8.9	9.3	9.6	11.4	9.6	9.9
1953	15.0	8.6	10.9	9.5	13.0	6.9	8.9	8.8	9.7	11.4	9.6	10.2
1954	13.2	8.2	10.4	8.1	12.0	7.1	8.2	9.0	9.6	11.4	9.2	10.0
1955	12.7	8.1	11.0	8.6	12.0	9.7	7.8	9.0	9.4	11.7	9.3	10.1

S.C.S. & A.L.S.

NOTICE TO SUBSCRIBERS

The Indian Journal of Public Health is the official organ of the Indian Public Health Association and is published by the Association quarterly in the months of January, April, July and October.

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

Subscription :

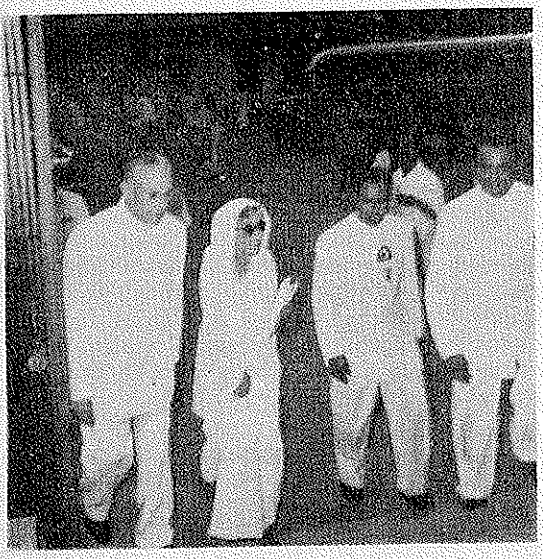
The annual subscription for the journal is Rs. 8/- inland, £0 18s. for U.K. and $3.00 for U.S.A. Single copy Rs. 2/8/- (Indian). The rates are inclusive of postage.

ASSOCIATION NEWS

Inauguration of the Association:

The Indian Public Health Association was inaugurated on Friday the 28th September, 1956 by the Union Health Minister Rajkumari Amrit Kaur, at the All-India Institute of Hygiene & Public Health, Calcutta amidst a large number of distinguished guests, delegates and members of the Association representing almost every state, national and international experts and other invited medical men and Public Health workers numbering more than 500 in all. The ceremony was performed in the gaily decorated auditorium hall of the Institute. The Hon'ble Mr. Justice Rama Prasad Mookerjee, Acting Chief-Justice of the Calcutta High Court presided and Dr. A. D. Mukherji, Health Minister and Dr. R. Ahmad, Minister of Agriculture and Animal Husbandry of West Bengal also graced the occasion by their presence.

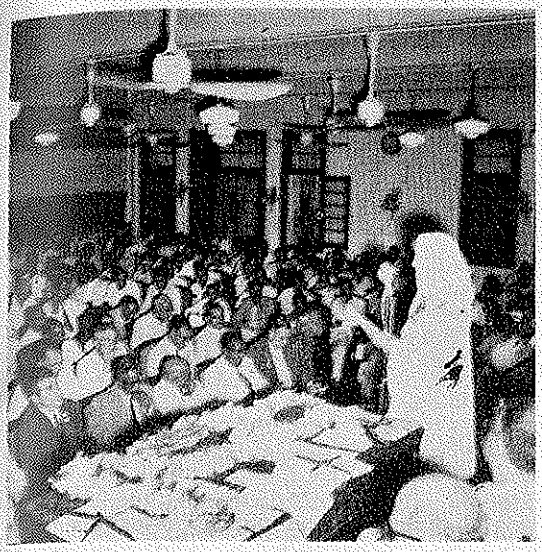
The Chairman of the Reception Committee, Dr. Amarnath Mukherji, a distinguished Surgeon and the Deputy Mayor of Calcutta welcomed Rajkumari, and other distinguished guests, delegates and members and said that the Association aspired to serve as a link between the people and the Government, the people and public bodies as well as between non-official and official organisations engaged in health and welfare work in the rural and urban areas. Dr. K. C. Patnaik, the Secretary of the Reception Committee read out the messages from Dr. B. C. Roy, Chief Minister of West Bengal, Dr. Ira, V. Hiscock, the President of the American Public Health Association, Dr. A. C. Ukil, President of the Indian Medical Association and of the National Institute of Sciences of India, Col. C. Mani, Regional Director of the World Health Organisation, Lt. General B. Chaudhuri, Director General of Armed Forces Medical Services, Shri Atulya Ghosh, President, West Bengal Congress Committee and several other distinguished personages in India.



The Union Health Minister Rajkumari Amrit Kaur arrives at the function

After Dr. S. C. Seal, the Organising Secretary of the Interim Committee of the Indian Public Health Association had defined the background, the aims, and the history of the Association which would be, according to him, an all embracing one, always keeping in view the path of cooperation and compromise rather than that of conflict with any other organisation in the matter of raising the standard of health of the peolpe of the country, the Union Health Minister Rajkumari Amrit Kaur delivered her inaugural address in which she stressed the need for coordinating medical and public health activities at all levels and stated that the Government of India was devising ways and means to achieve that purpose so that health work in the field might not suffer from compartmentation and exclusiveness.

Justice Rama Prasad Mookerjee in his presidential remarks said that the conditions in the rural areas must improve to induce doctors to go to the villages and work among the masses. He stressed the need for cooperation among official and non-official public health organisations so that the people might benefit through their concerted efforts. He strongly felt that there should be a common platform under which all health workers irrespective of their profession and status would meet to devise ways and means for improving public health. He also mentioned that hospitals were



A view of the gathering

needed but more intensive work must be done on the preventive aspects so that there would be little need for any body to seek hospital treatment.

Before conclusion, Lt.-Col. C. K. Lakshmanan, Director General of Health Services, Government of India and Chairman of the Interim Committee offered vote of thanks to Rajkumariji, Mr. Justice Mookherji, the Chairman of Reception Committee, Organisers and others including those who contributed materially to the success of the inaugural meeting, entertainments, health exhibitions and scientific sessions.

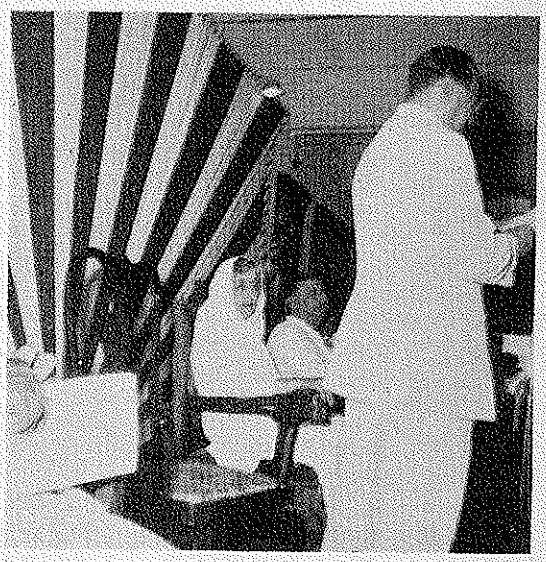
Later in the evening the Health Exhibition organised in connection with the inaugural meeting was opened by Dr. A. D. Mukherji, Health Minister of West Bengal at the premises of the All-India Institute of Hygiene & Public Health.

The addresses of Rajkumariji and other speakers are reproduced below:

WELCOME ADDRESS BY DR. AMARNATH MUKHERJI, DEPUTY MAYOR OF CALCUTTA AND CHAIRMAN OF THE RECEPTION COMMITTEE:

MR. PRESIDENT, RAJKUMARIJI, DR. MUKHERJI, COLONEL LAKSHMANAN, DELEGATES AND GUESTS, LADIES AND GSNTLEMEN,

On behalf of the members of the Reception Committee and the people of this historic city of Calcutta, it is my privilege and great pleasure to welcome you to the inaugural session of the Indian Public Health Association. May this auspicious 28th day of September, 1956 mark the beginning of a new era dealing with modern health knowledge and integrated health practices. It is indeed inspiring to find on this momentous occasion, present amongst us, the Hon'ble Union Minister of Health, Rajkumari Amrit Kaur, who has graciously agreed to perform the inaugural ceremony; the Hon'ble Chief Justice Sri Ramaprasad Mookerjee who has kindly consented to preside over the function; Dr. A. D. Mukherji, Health Minister of the State, who has kindly accepted our invitation to open the Exhibition; my esteemed friend Colonel Lakshmanan, Director General of Health Services as well as other national and international experts in the domain of public health.



Dr. Amarnath Mukherji, Chairman, Reception Committee, is delivering his welcome address.

Friends, we do miss today the presence amongst us of our Chief Minister Dr. B. C. Roy who is now away in Japan and who is a tower of strength in practically every sphere of our national life.

On the eve of its formation the Association gratefully recalls the magnificent services in the cause of relief rendered by our late lamented Governor Dr. H. C. Mookerjee. Notwithstanding heavy pressure of official business, the time and energy that he had spent in the cause of bringing lasting relief to the unfortunate sufferers from tuberculosis in the state will be remembered with gratitude by his countrymen.

It is in the fitness of things that the city of Calcutta which occupies a crucial position in the very life of the nation and yet paradoxically the most afflicted city in the Indian Union to-day, is witnessing the inaugural ceremony of an Association like this. The second global war found this city as one of the biggest war bases on this side of Asia, which brought in its train overwhelming socio-economic problems leading to famine and pestilence. Other calamities followed in quick succession—communal frenzy—partition and the impact of large scale immigration—which continues unabated—of a magnitude, unheard of and totally unantici-

pated. The density of population in the city verges on some 85,000 per sq. mile and on the basis of built-on ground area, the density per acre goes above 370 as compared to approximately 60 per acre, in the city of London. Every fourth man in the city is a bustee dweller! Water supply, housing, sanitation and other health problems have been causing utmost anxiety all round. Cholera and other preventable diseases are annual as well as endemic features in several zones. The incidence of tuberculosis is on the increase and unless we take on its control on the same footing as malaria—as a national health programme—we are bound to face a desperate situation in the near future.

Having made reference to the bleak atmosphere of city life I take the liberty to broach the matter which concerns us vitally, namely, problems of life in the villages where 4/5th of the nation dwells. Our task is two-fold—of rehabilitation on the one hand and of fresh construction on the other. The legacies of the past will have to be endured and surmounted—at the same time we have to launch upon a constructive programme of development and welfare on modern lines.

In the matter of giving practical shape to our national plan for expansion of health services, this Association aspires to serve as a link between the people and the Government, the people and public bodies as well as between non-official and official organisations engaged in health and welfare work in rural as well as urban areas. Through the establishment of both Urban and Rural Health Centres, you, Rajkumariji, have already played the pioneering role in our country. Poonamallee in Madras, Singur in West Bengal, Ramnagar in Mysore and Najafgarh in Delhi have already seen the establishment of Rural Health Centres under your scheme. In the matter of selecting the site for establishing the first Urban Health Centre in the Indian Union, Calcutta (Chetla) has rightly deserved your preference. It must gladden your heart as it does ours, on the eve of formation of the Indian Public Health Association that Calcutta, the problem city, has again been chosen as the venue for ushering in, this Association, amidst momentous happenings during the changeover from the First to the Second Five Year Plan period.

Battle for Health

Battle for health is not merely one levelled against disease. The inter-dependence between health and production, particularly in an agrarian economy, hardly needs emphasis and now that we have embarked upon a programme of extensive industrialisation, industrial health has also become a matter of supreme importance. The cost of sickness is high but in terms of loss of economic production it is much higher—more so, with the low expectancy of life in our country. These and allied statistical figures make depressing revealations in terms of health and high-light the discrepancy between what we are and what we wish to be. These and other realisations have provided the impetus for the establishment of the Indian Public Health Association which will supplement national efforts to promote positive health, particularly in the rural areas. Price of health in terms of money is very much less than the cost of sickness—prevention is not only better but also cheaper than cure.

Health Front

We have come a long way in the history of health services from the study of disease in man, with its private relationship between tthe physician and the patient, to the present position of man in disease—a shift in the emphasis from the individual to the group. In short, health service has become a social science having a social goal. It observes and studies man, not simply as a case but as a social being; a unit of a family—a member of the community. Within the expanded frontiers, the health services include environmental sanitation, control of communicable disease, material and child health, school health, health education, social and preventive medicine, industrial health, mental health, etc., aiming at "social security" which provides for all contigencies of an individual from the time of inception within the mother, to the time he goes into the womb of mother earth.

New Concept of Medical Education

The first world conference on medical education held in London in 1953 observed—"While the basic background and preparation of the students for admission to the study of medicine has fairly common denominator, the methods, technique and actual needs in medical training vary greatly, depending on the objectives being sought in various parts of the world to meet the specific medical and health needs of the different areas." In our country, I am constrained to observe that we have been imitating blindly the practices of other nations, whose socio-economic conditions, tradition and culture are quite different to ours; we are running after the "Mirage of uniformity" which is neither desirable nor practicable. We have still been turning out medical graduates with predominant bias for curative medicine under the glimmer of urban life. The medical undergraduate course in our country should be so revised that preventive and social medicine are heavily weighted therein. A new generation of doctors must be evolved to meet the growing demands of the nation. Our Association will endeavour to carry out research in and to lay down standards of, public health for the country. To this end we shall mobilise the public health front and indicate to the authorities, such measures as would be conducive to the promotion of positive health.

The Silver Line

You will agree that our national plan for the control of malaria, for instance, has already borne fruit. Campaigns against kala-azar, fllariasis, leprosy, venereal diseases and tuberculosis through B.C.G. campaign are all efforts in the right direction. In the State of West Bengal death rate per thousand has diminished from 18.1 in 1948 to 9.3; infant mortality rate from 136.7 to 86.9 per 1,000 live births; maternal death rate from 8.5 to 4.9 per 1,000 births. These are clear indications that positive health measures taken so far have not gone in vain. Heavy burdens of preventable and communicable diseases can and must be lifted. The clamour for more beds in the hospitals will continue to defy solution until the problems are tackled at the roots. Public health is no longer the monopoly of any profession, institution or specialised cadre of workers—

hence this Association seeks to work with the people and not without the people—it is for the first time that an all-embracing and an integrated organisation is being brought into existence.

Statistics are telling

In this context I would make a brief reference to trained personnel, scientific methods at our disposal and our socio-economic levels.

(*a*) *Personnel:* The Bhore Committee (1946) in reviewing the question of personnel, pointed out the acute shortage of health workers in proportion to the population, viz.—1 doctor for 6,000, 1 nurse for 43,000, 1 health visitor for 400,000 1 midwife for 60,000, 1 qualified pharmacist for 40,00,000 and 1 qualified dentist for 3,00,000 persons. The corresponding figures for U.K. being: 1 doctor to 1,000, 1 nurse to 300, 1 health visitor to 4,779, 1 midwife for 618, 1 qualified pharmacist to 3,000, 1 qualified detist to 2,700 persons.

The situation in regard to qualified doctors at any rate, has changed considerably during the intervening ten years since Bhore Committee's report. Wheras Bhore Committee recommended as its target after a ten year plan period—1 to 2,000 as the doctor-population ratio, West Bengal and Calcutta have far exceeded that target figure; the present ratio in West Bengal being approximately 1 to 1,400 and in Calcutta 1 to 400. I carve the indulgence, Rajkumariji, of drawing your pointed notice to this state of affairs and suggest that ways and means be found for their re-distribution within the Indian Union, thereby preventing wastage of talent which should be fully utilised in the service of the nation. We are also aware that there is in an overall shortage of medical man-power in this country of the order of 90,000. In the circumstances, it is impossible to reconcile unemployment or even under-employment of essential technical man-power while acute shortage still exists in other States! All artificial barriers to redistribution must give way before the surging need of the country.

There is another matter which, I respectfully submit, should be labelled "Top priority" and that is—facilities for postgraduate training. One All-India Institute of Hygiene and Public Health in Calcutta and a newly opened unit in Bombay cannot be expected to meet the growing demand for trained personnel in the country. I feel that our minimum requirements are at least four health institutions of the stature of the one in Calcutta.

(*b*) *Socio-economic levels:* Recent analysis reveals that India's per capita income in Rs. 284/- as compared with Rs. 1,500/- in Europe and Rs. 5,000/- in U.S.A.; a literary rate of 14% as compared with 98.5% in Japan; a life expectancy of 32 years as against 67 in the West.

The *per capita* expenditure on health programme is as follows: U.K.—Rs. 110/- approx.; U.S.A. Rs. 80/-; India (Statewise) -/--/- annas (with Orissa) to Rs. 2-12-0 (in West Bengal). The Bhore Committee's recommendation was to 1-14-0 *per capita* only.

From the above you will observe that West Bengal spends maximum *per capita* amongst all the States in the Union. The figure for per capita expenditure for 1956 is Rs. 3-5-0.

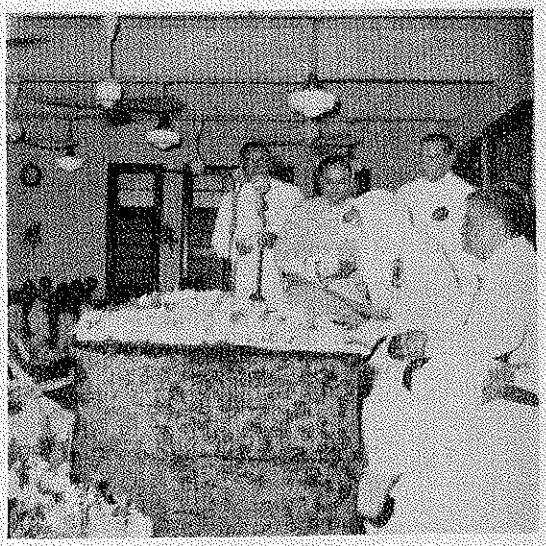
(*c*) *Scientific methods:* There is no dearth of either knoweldge or methods in our country. Science today is not the monopoly of any nation or community. Any drug or any new type of service discovered in any part of the world is forthwith dessiminated through journals and international agencies.

Indian Journal of Public Health

This Association will be publishing a quarterly Journal incorporting the results of intensive investigation as well as original researches carried out under the auspices of the Association. It will also high-light important discoveries on health matters made elsewhere in the world.

The Souvenir

A souvenir copy 'Health of India' is a compilation of existing health services. A health exhibition demonstrating spurious drugs, adulterated food, radio-active isotopes, industrial lighting and other items will bring to light some of the important discoveries harnessed for betterment of life.



Presentation of the Souvenir and the inaugural issue of the Journal to Rajkumariji

One World

Friends, I have attempted to present before you in a nutshell our achievements and our wants—our hopes and aspirations and a vision of things yet to come through our united effort. In the contracted world of to-day, health problems are global and are no respecters of geographical limits. This concept, among others, as incorporated in the Magna Charta of Health adopted by the WHO, has given birth to the WHO itself, the UNICEF, the FAO, the International Division of the Rockfeller Foundation, the Ford Foundation and other international agencies, the distinguished representatives of some of which are happily present amongst us to-day. In that view of the matter our health problems are not only a challenge to the Nation but to the entire world—on the basis of the theme—"each for all and all for each".

Before I close may I once more extend to you our cordial welcome and hope that your stay in

this city will be pleasant and enjoyable. It is indeed our privilege to look after your comforts, but should we fall short of your expectations I do hope that we shall be forgiven.

Jai Hind

ON THE PUBLIC HEALTH ASSOCIATION

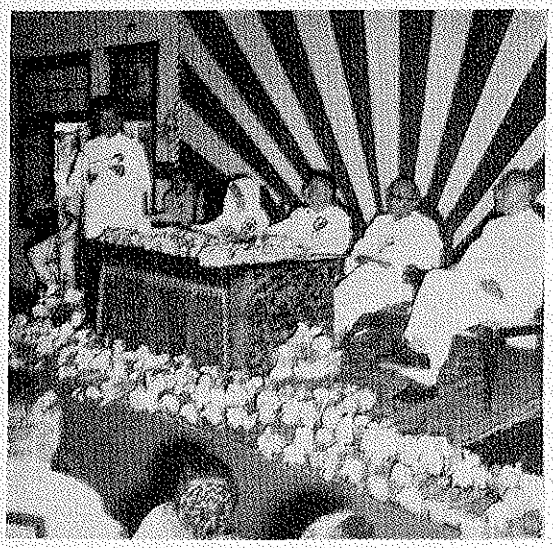
By DR. S. C. SEAL, *Secretary, Interim Committee*:

MR. PRESIDENT, RAJKUMARIJI, DR. MOOKHERJI, DELEGATES AND MEMBERS, LADIES AND GENTLEMEN:

It is my proud and honoured priviiege to present the report of the inaugural session of the Indian Public Health Association.

On an occasion like this it is fit and proper to review the history of the Association in the background of those of similar Associations, in other parts of the world.

England organised its first Society of Medical Officers of Health in the year 1856 and celebrated its first centenary only a few months ago. The United States of America established its Public Association in 1873 and Canada in 1912. India is celebrating the inauguration of her Indian Public Health Association in the year 1956, by coincidence exactly a century after the first Public Health Association in England—(the Society of Medical Officers of Health) —was inaugurated. The American Public Health Association is older than ours by 83 years, and that of Canada by 44 years.



Dr. S. C. Seal, Secretary Interim Committee, is speaking on the history of the Association.

A review of facts on the progress of public health activities in India reveals certain important landmarks. The period began with the appointment of the Royal Commission to investigate into the health conditions of the British Army in 1859. The first Chair of Hygiene was established in the Calcutta Medical College in 1865, but the period between 1866 and 1896 may be called as a period of hibernation during which there was very little progress except the appointment of Sanitary Commissions and sporadic enactment of a few public health laws. The ravage of the pandemic of plague towards the end of the 19th and the earlier part of the 20th centuries directly brought home the need and importance of sanitation and preventive methods to the authorities and the people alike. In 1912 the Government of India decided upon establishing the rudimentary public health departments in the provinces by the appointment of Sanitary Commissioners and deputy Sanitary Commissioners, but the World War I intervened causing a set back. Thus the active public health work actually started in this country following the Mantague-Chelmsford Refords in 1919 which provided for the transfer of some of the public health services, including sanitation and vital statistics, to the provincial governments as the first step towards decentralisation of the public health administration of the country. Strangely, this reform coincided with the upsurage of another pandemic disease—Influenza, which took a toll of life unprecidented in the history, not only of India but also of the whole world. The Government of India Act 1935 granted greater autonomy to these provinces giving further momentum to its progress. At this stage, the fourth impetus was given by the break of the World War II to the public health activities in India which had to be strengthened many folds in order to cope with the famine and deteorating health conditions in many parts of the country. As an aftermath of this war, post-war reconstructions schemes were initiated and the Health Survey and Development Committee, popularly known asr the Bhore Committee contributed by its report in 1948 an important mile stone in the public health progress of the country. Finally the upsurge at the wake of independence and the subsequent development with the establishment of the National Planning Commission and the Community Projects organisations thanks to the leaders of our country, have inspired the people and the Governments alike to bring about a radical change in the policies and practice of public health in our country which is leading us towards the progressive realization of the dictum "Prevention is better than cure".

With such a short history, the present public health service for India is much younger than the medical service and though some attempts were previously made to organise the Association on an All-India basis it seems that time was not opportunie for the purpose. A brief account of these disjointed efforts is given below:

The first attempt, as far as is known to the author, was made in 1936 when the late Dr. R. B. Lal and Dr. K. V. Krishnan of the All-India Institute of Hygiene & Public Health, Calcutta and Col. A. C. Chatterjee, the then Director of Public Health, Bengal tried to organise a Health Association on an All-India basis but having failed to do so started a society called the Public Health Society of Calcutta. This society of which the author was a member functioned for about 3 years and was holding a monthly meeting for scientific discussions. The papers read were published in the Indian Medical Gazette and were finally brought out in the form of a volume at the end of each year. The Society did not function after the commencement of the 2nd World War. It may be mentioned here that an Association under the name of Bengal Public Health Association was already in existence at that time with Col. A. C.

Chatterjee, as its Chairman. This Association is now named as West Bengal Public Health Association. There are similar associations in many of the States in India at the present time, most of them are only service association.

The next attempt to bring about an All-India Association was made by the author in conjunction with the late Dr. R. B. Lal in the year 1944 when an Association under the name Asoka Society was established with Dr. Lal as its Chairman and the author as the Secretary. The membership was first extended to the Public Health Officers who came to the Institute for post-graduate training. For birth of active workers this Association had a premature death but the account is still being maintained by the Central Bank of India, Calcutta. The situation, however, turned for the better after independence. As a first measure, the author with the active cooperation and assistance of Dr. K. C. Patnaik and Dr. K. V. Krishnan (Ex-Director of the Institute) started an Alumni Association of the All-India Institute of Hygiene and Public Health, Calcutta, with 40 Founder Members and a cash amounting to Rs. 400. Col. Lakshmanan, the Chairman of the Interim Committee of the Indian Public Health Association has also been the Chairman of that Association since its inception. The author and Dr. K. C. Patnaik respectively acted as its organising and general secretaries for the first two years. This Association had a good start. Its membership now exceeds 700. It publishes a bulletin and has accumulated a fund of several thousand rupees.

In September, 1953 the late Col. A. C. Chatterjee of Calcutta and Dr. A. C. Banerjee of U.P. and several others including Dr. B. Ganguly published an appeal in the newspapers for an all India Association. This was followed up by Dr. Ganguly who met the authorities at New Delhi to secure their cooperation. He was however, advised to see Dr. Krishnan, the then Director of the All-India Institute of Hygiene and Public Health, Calcutta, in the matter. On the suggestion of the latter Dr. Ganguly discussed the matter with the author which led to the preparation of a draft scheme, later endorsed by Dr. B. C. Roy, Dr. Krishnan, Dr. B. C. Dasgupta, Col. Lakshmanan and other leading workers in the field. Finally a preliminary meeting was called on July 10th 1954 at the Calcutta Medical Club under the Chairmanship of Dr. B. C. Dasgupta. Over 50 prominent public health workers including Dr. K. C. K. E. Raja, Dr. T. Lakshminarayan and many others attended the meeting at which the proposal for the formation of the Public Health Association was approved and Col. C. K. Lakshmanan was proposed as a Chairman and Dr. B. Ganguly as the convener Secretary. A special committee was also appointed to draft the constitution.

A second meeting largely attended by medical men and public health workers was held on the 18th July, 1954 at the All-India Institute of Hygiene and Public Health, Calcutta, under the Chairmanship of Col. Lakshmanan. It was decided at that meeting to take steps for enlisting members from all over the country. It was also recommended that the memorandum and rules of the Association as drafted by the sub-committee be ratified at a general meeting of the regular members of the Association after it has been duly inaugurated.

A third meeting was held on the 10th September, 1955 under the Chairmanship of Col. Lakshmanan at the All-India Institute of Hygiene and Public Health, Calcutta. This was the first meeting of the Founder Members at which over 120 persons including representatives from 12 States and various branches of Public Health Work registered themselves as members. An Interim Working Committee was formed with Col. Lakhhmanan as Chairman, Dr. B. C. Dasgupta as Vice-chairman, Dr. S. C. Seal, the Secretary cum Treasurer and Dr. K. V. Krishnan, Dr. B. Ganguly, A. Mukherjee, Mrs. Muktha Sen, J. K. Bhattacharjee and Sri S. N. Mitra (Engineer) and Mrs. U. Gupta (Nursing Superintendent) as members with power to co-opt members from the various States in India.

Perhaps on this occasion I may also briefly narrate the need for an All-India Public Health Association. While there are at the all India level the Indian Medical and several other associations dealing with various medical specialities and several voluntary associations interested in social diseases, in addition to several voluntary social welfare organisations, there is no single all India Public Health Association which can coordinate and put across all public health problems and specialities for joint action. During the 1st and 2nd 5-year plan periods the need for such an organisation is keenly felt to establish closer links with the several medical, social and social welfare organisations with the national and international health services, the Planning-Commission, the Social Welfare Board and the Community Project Administration.

In the light of the experience of failures in the past for the establishment of the Association the organisers embarked upon this venture in the midst of hopes and fears. But it is a matter of insjpiration and great joy to the members of the Association to see, ladies and gentlemen, the birth of this Association under the kind patronage and blessings of Rajkumari Amrit Kaur, our Union Minister of Health and of the Chief Justice of West Bengal Hon'ble Shri Ramaprasad Mookherjee and under the good will of Dr. A. D. Mukherjee, State Minister for Health and able guidance of Col. Lakshmanan, Director General of Health Services Government of India and with the cooperation and help of national and international health workers, many of whom are present here to-day.

I am happy to announce that the strength of the Foundation members have exceeded 500 to-day, consisting of representatives from all states, the Union Government, international bodies, all specialities and all shades of health workers. To enumerate a few, the membership covers from the Director General of Health Services with the Government of India to a midwife and a health assistant in a health unit. Besides a large number of clinicians, public health engineers, nurses, dieteticians, statisticians and social workers have been brought into the fold of this organisation. However, I would like to make it clear that this all-embracing public health Association will always keep in view the path of cooperation and compromise rather than that of conflict with any sister organisation working for raising the standard of health of the people of the country.

Inspite of shortage of time we are able to include in the programme of this inaugural session the following activities: (1) Scientific Session with special emphasis on rural health problems, (2) Exhibition, (3) entertainments, (4) the publication of a Souvenir and (5) publication of the inaugural issue of the Journal of the Association. I now request Dr. K. C. Patnaik, the Secretary of the Reception Committee

to present the inaugural issue of the Journal and the Souvenir volume to Rajkumariji, to Justice Mookherji, to Dr. A. D. Mukherji and to Col. Lakshmanan for their kind acceptance.

I am conscious that this being the first attempt on the part of the Association, you will discover many shortcomings in our arrangements but I hope in the light of our objectives you will kindly forgive the errors of omission and commission which are inevitable.

JAID HIND

INAUGURAL ADDRESS

By RAJKUMARI AMRIT KAUR, *Minister for Health, Government of India*

It always gives me great pleasure to associate myself with and to lend whatever support I can to co-operative constructive work in the field of social service generally and, in keeping with my present responsibilities, in "Health" work particularly. I could perhaps give you no better indication of my estimate of the significance of the occasion this afternoon than by telling you that inspite of heavy calls on me I accepted without hesitation your kind invitation to inaugurate this first session of your Association. A certain amount of form and ritual is indeed inseparable from human affairs but, in wishing you God-speed today, I speak not in the conventional language of formal inaugurations but in a spirit of dedication to the noble end, at the same time, colossal task of raising the health standards of our masses which it is our proud privilege to be called upon to perform. In spite of what little progress we have been able to make in the last few years, I need hardly remind the health workers assembled here, of our woeful indices of health—the general, infantile and maternal mortality rates, the low expectation of life, the high incidence of communicable diseases, only to mention a few—and of the general backwardness, in comparison with currently accepted modern standards of health conditions prevailing over the greater part of the country. To meet the challenge of this situation there are, among others, certain basic requirements that must be fulfilled. Stated briefly they are:—

(1) A stock-taking, as it were, of the current position—in the light of historical and other factors concerned in the evolution of the situation as it obtains,

(2) The formulation of a plan of action, taking taking into account the availability of resources and the estimated capacity to add to these in the course of the working of the plan,

(3) The gearing of the health machinery to a new tempo of work and the mobilisation of all available assistance, be it in the form of technical knowledge, trained manpower or plan and equipment,

(4) The creation of "health consciousness" among the people and the arousing of their interest and enthusiasm in public health matters.

Preventive medicine has a very important role to play in the furtherance of these objectives. It seems to me, however, that the very repetition of the slogan of prevention being better than cure has tended to make it so commonplace that its import is apt to be lost sight of in practice. Situated as we are, the significance of this principle is fundamental to our progress. We may well ask ourselves where

Inaugural address by Rajkumariji

able to give within a reasonable period of time are the resources in men and material for us to be adequate scientific medical care to the millions of our people living in the thousands of our villages? The answer has to today, I am afraid, to be in the nagative. But then are we to close our eyes and ears to the sickness and suffering around us until we are in possession of all the means of tackling these problems? Prevention of disease is for us, therefore, not only the scientific and rational way of grappling with our health problems but also an inescapable expedient.

There has been phenomenal progress in recent years in Medicine, in common with advances in other fields of Science, leading to a better understanding of the cause and nature of disease. This has given rise to new concepts in the field of preventive medicine calling for a new orientation in the outlook not only of public health workers but also of the medical profession as a whole. That is why I am determined to encourage departments of Social and Preventive Medicine in all our Medical Colleges. While we are far behind many advanced countries of the world, in that we are still tackling problems as, for example, of the eradication of communicable diseases which they had solved, more or less, decades ago, we have the advantage of having today better tools and better understanding of disease. We continue to work, however, under the handicap of a legacy of the old order of things and, even though administrative fushion of the curative and preventive services has taken place in most of the States, functional unity is far from having been achieved. Not only this, but the public health man is still far from being given the pride of place which is usually the portion of the purveyor of the bottle of medcine. The need for balanced and co-ordinated progress in the fields of curative and preventive medicine makes it incumbent on us to devise ways and means of

integrating closely the medical and public health machinery at all levels, so that health work in the field does not suffer from compartmentalism and exclusiveness. This is a problem that requires urgent attention if the health programmes launched in the First Five Year Plan and those to be undertaken now, particularly the Rural Health Centre programmes, are to yield results commensurate with the money and effort being put into them.

To anyone making even a cursory study of the Five Year Plans, it will be obvious that the *motif* of the health schemes is predominantly preventive and that is as it should be. Most of those activities, like antimalaria and antifilaria work, B.C.G. Vaccination, mass leprosy control, V.D. Control and environmental sanitation work and being carried out now by separate groups of workers, but their integration and canalisation through common agencies at the district and rural Centres will have to be brought about as early as possible. These are all different but essential aspects of the preventive bias and the inter-relationship between the curative and preventive arms of the health services.

The second important aspect of health work that I would like to draw your attention to, is that of co-operative and collective effort. In saying this I have in mind not only such effort on the part of the workers but also of the people. Every health worker who has been in the field must know that no large scale health programme or, for the matter of that, any programme of any pretension, can succeed unless it is sustained by the cooperation and enthusiasm of the people. The method of approach in this regard is, however, of the utmost importance. Have we the correct outlook in this matter or are we inclined to take up our tasks in the fieldseither as just matters of official duty to be done and finished with or as acts of benevolence on our part towards the people we serve? I would like to believe that this is not so, but we must be constantly on our guard against such trends.

The art of working for people without making it appear either an act of charity or of compulsion needs to be cultivated and the enlistment of the active support of the community in health activities must be considered as an index of the success of any programme. The education of the masses in matters of health is surely an essential component of health work. Health Education is the crying need of the day and use must be made of every instrument available for the purpose of spreading this gospel among the people, for it does not need a moment's reflection to realise that if health conditions are to be improved to any considerable extent, this will never be possible through services imposed on the people even if this were possible. It can only be through the people's active participation in programmes in the shaping of which they have been enabled to take an active interest. Essential as this approach to health work is, it has not been practised as widely as is necessary and the equipment of the future health worker must, therefore, include a grounding in methods of health education. Just as a good family doctor is the beloved friend of those to whom he ministers, so must the public health servant from the lowest to the highest rung of the ladder be the friend, philosopher and guide of the people for whose mental and physical well-being he is responsible.

There is yet another matter of some importance to which I would like to draw your attention. We are apt to be circumscribed in our work by depending too much on tools and plants, so that the lack of ready availability of these is often pleaded as justification for inaction. Now tools and plants are necessary but, in situations arising every now and then, improvisations and expedients will have to be resorted to. If, instead of becoming bounden slaves of the tools of our trade, we learn to exercise resourcefulness in devising ways and means of overcoming deficiencies in this respect, we will succeed not only in saving much valuable time and human material, but we may actually end in shedding newer light on our current knowledge and techniques. Until such time as we can achieve self-sufficiency in the production of the goods we need, the knack of being able to "make do" must be considered a valuable asset. I may mention here how very struck I was during my recent visit to the States to find more than once how intricate machines had been imporvised in the laboratory by keen workers very little cost. I want our youngmen to follow this example.

I may not omit to mention in passing the gigantic tasks of environmental sanitation, of water supply and drainage, of housing, of nutrition, of population control and a number of other problems that need to be attacked on all fronts and which together constitute the heavy burden which has to be shouldered.

If in referring to some of the matters of basic importance, as I see them, I have shared my thoughts with you this afternoon, it is because I feel that an Association such as yours must concern itself closely with the bringing about of the conditions necessary for meeting the challenge of health conditions in the country. It is indeed a big challenge needing big minds and big hearts. The birth of your Association has taken place at an opportune moment and if it is to live up to our expectations, its members will have to enter the field in the spirit of crusaders.

There are, I know, a number of Associations and learned societies in existence already, representing various shades and specialities of the medical profession. The Indian Public Health Association, even though in its infancy, can legitimately claim to be treated with respect and attention if it truly reflects modern trends in public health work, if it succeeds in firing its members with the zeal of enlightened servicee and if it can create not only among its constituents but also among the public at large, a sense of awareness and urgency. Such an Association can be much more than a forum for the periodical meeting of health workers. It can, through intelligent and constructive effort, give a "New look" to health work, and become a source of help to the Governments by such suggestions and constructive criticism as may crystallize from the pool of knowledge and experience that it can muster. I welcome, therefore, the birth of this Association and congratulate all those who have been instrumental in bringing it about. By a happy coincidence, the year of birth of this Association falls in the Centenary year of the Association of the Medical Officers of Health of the United Kingdom. I am glad to hear that contacts have already been made with them and the corresponding Association in the United States for I am sure such collaboration as may take place among the respective national organisations will be found to be of mutual advantage.

I trust also that similar liaison will be maintained by your Association with all other professional bodies and societies in India and abroad since a close relationship with these cannot but enrich the fruit of your labours. The assistance received by us from international agencies and from other Organisations and Foundations has been most valuable and I take the presence here this afternoon of the representatives of some of them as further evidence of their keen interest in our problems and activities.

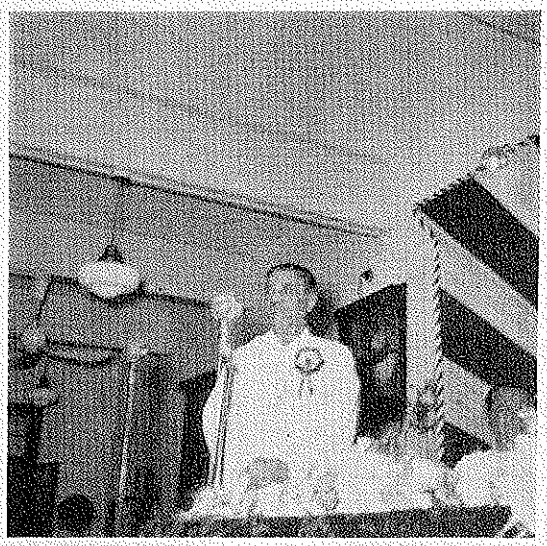
I shall watch the progress of your Association with close interest and I am sure the Central as well as the State Governments will welcome your considered views and suggestions on our in-numerable public health problems.

I have great pleasure now in declaring open this inaugural meeting of the Indian Public Health Association and in doing so I offer it again my blessings and good wishes for a long and successful career.

PRESIDENTIAL ADDRESS BY THE HON'BLE RAMAPRASAD MOOKERJEE, *Chief Justice Calcutta High Court.*

RAJKUMARI AMRIT KAUR, MEMBERS OF THE INDIAN PUBLIC HEALTH ASSOCIATION, LADIES AND GENTLEMEN:

You have just heard words of hope and encouragement from the Minister of Health in the Centre himself not only the Deputy Mayor of this city but a renowned Medical man. I come here before you as a layman and can only give expression of the aspirations of and the expectations by people like myself.



Justice Mookerjee is delivering his Presidential address

As a Welfare State it is now one of the most important duties cast upon the state itself to solve the problems of health. Merely promulgation of laws and regulations cannot improve the health of a country and of its people. On the one hand facilities are to be and are being offered for looking after the afflicated and the suffering humanity. On the other hand the people are to be made health-conscious. No doubt as has been stated by the Chairman of the Reception Committee that as a result of the efforts by the state and the University Bengal is now occupying the highest position amongst all the states in India as having proportionately the largest number of trained medical men. Inspite of such a large number of medical practitioners being available they are not equitably distributed in the rural and urban areas. With the establishment of and better facilities being made available in Medical Colleges medical men are coming out in larger numbers. Attempt is also being made to make them better equipped than what they were in the past. Such persons, however, are all flocking to the cities and to other urban areas. About 80% of the available men are in urban areas to look after about 20% of the total population. The remaining 20% or so are distributed in the rural areas for the remaining 80% or more of the rural population. Special efforts will have to be made for taking the trained men more to the villages.

The concept of public health has been materially altered in recent times. It is not now pure sanitation and environmental hygiene only—not merely the absence of diseases and infirmity but a compete physical, mental and social well being of the people. The work which has been done by the Public Health Department and the Voluntary Health Organisations are certainly laudable. The ideal, however will not be reached by merely sending out workers to the different localities. A comprehensive public health programme includes preventive and curative medicine, improvement of standard of living and intensive cooperation between the different organisations, whether managed by the state or voluntary ones and the members of the public. The problem assumes in this comprehensive a mixed one of education, economics and health.

Unless and until elementary education is imparted and made available the people cannot appreciate the full significance of the advice rendered to them by the health experts and workers or of the various shemes which are being launched. In the present condition of a very low standard or the absence of elementary education the ordinary man and woman cannot appreciate what are the benefits which will accrue by adopting the ways of life advocated by the health workers. The first step, therefore, to be taken is to introduce on a large and wider scale basic education both in the rural and urban areas, even though compulsory primary education cannot be introduced for some years to come.

The second factor which has to be taken note of is how to improve the standard of living. Serious attempts are for sometime being made to improve the lot of those persons who join industrial undertakings but it has been possible to do very little to improve the conditions of non-industrial areas specially in Bustees, in large towns particularly in Calcutta and of the land-less agricultural labourers in rural areas. Community projects have been taken in hand with an idea to meet this lacuna. Social work for the improvement of the health of the people therefore would include schemes to raise the economic and educational standards of the people along with schemes for the improvement of health.

For such a comprehensive and all round scheme a large band of workers in different spheres of life will be urgently necessary. Such workers will include in addition to those trained in medical sciences the non-medical personnel also.

This can be done only by forging links not only between the people and the Government but also between official and non-official bodies and public institutions. The inaugural ceremony which we are now holding is a good augury as through this new body it will be possible for the different wings of social, educational and health workers to meet on a common platform. In different parts of India, particularly in Bengal, there had been in the past and is even at the present time a very large body of selfless social workers. Association of such non-official workers and organisations with the facilities offered by the State Departments will yield results much more quickly and effectively than it can be by departments of Government only. The objectives of community projects can only be achieved and continue to be a source of strength after Government completes these scheme only if an interest is created in the people living within the area not only to maintain but to improve the facilities which are being introduced whether it be to tackle problems of unemployment, improve village communications, foster primary education, public health and recreation, promote indigenous handicrafts or increase the agricultural output.

I am glad to find that the new Association has been made broad based to include public health workers medical and non-medical. It is heartening also to be told that you will be giving special attention for more intensive and effective solution of health problems in the rural areas. I trust attempts will be made to set up organisations which will induce more public health workers to go to the village. This Association will provide a forum for diagnosing community ills and for suggesting methods for their elimination. Under the Second Five Year Plan big schemes are being introduced and some have already been launched. The authorities will have the opportunity of not only providing necessary incentive for studying these schemes but the more important aspect also of discussing the difficulties of and suggesting solutions of the problems when such schemes are actually being executed.

Considered in terms of loss of economic production the cost of sickness is very high and the economic effect of low expectation of life in our country is appalling.

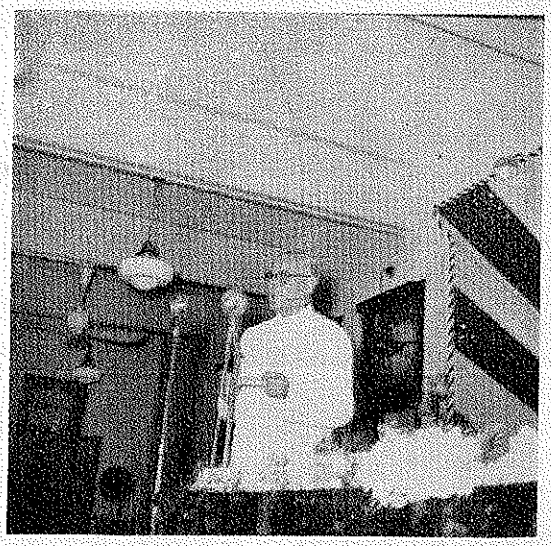
Statistics have been placed before us to demonstrate reduction in the death rate and of infant mortality. There is one question to which I would draw your pointed attention before I resume my seat. Although there is a downward trend of mortality from some of the causes, deaths from respiratory diseases are going up. The contagion is spreading very first not only in industrial areas and in and a careful analysis of problems of health by the Chairman of the Reception Committee, who is crowded cities but have now entered the villages as well. Hospitalization, after-care arrangements and intensive health propaganda will I trust achieve the same result as in other continents. I was reading the other day a report that in certain towns of America and in Norway Hospitals which had been established a few years ago to fight Tuberculosis were now avcailable for being utilised for other purposes. Within a decade intensive and effective measures have made the people free from the germ of T.B. May we not expect the same result in India?

There is one other other aspect of social work to which I cannot but advert to. It is no doubt true that the mortality rate is going down not only in India but particularly in Bengal but is it possible to maintain the vitality of the people at the optimum rate? The social workers who go about cannot but note that on account of the prevailing high price of food stuff and of the necessaries of life it has become much more difficult at the present stage to have full square meals for all concerned. We have to be mindful of the fact that it is the ideal not only to increase the longevity of the people but to see that each of us in whatever station of life and in every starta of society gets adequate nourishment pure and in sufficient quantity. Pure and good quality of food at a cheaper rate, within the capacity of the ordinary man, must be made available as an essential part of the programme to improve the health of the society. We must make the common man healthier, happier and stronger to maintain the freedom which we have got.

I thank the organisers of this Association for giving me this opportunity to be associated with you on this occasion. I am confident that this Association will have a bright future. The manner in which people throughout India have responded I am confident of the future health and welfare of the people. I wish the new Association good speed and success in years to come.

Thanks by Col. C. K. Lakshmanan, Chairman of the Interim Committee.

I have the pleasant duty of offering our heartiest thanks to you, Rajkumariji, for very kindly agreeing to inaugurate the Association in spite of your busy programme for the last few days. That even



Vote of thanks by Lt.-Col. C. K. Lakshmanan, Chairman of the Interim Committee

on the eve of your departure to foreign countries you kindly agreed to be present at this inaugural function is a gesture and an indication of your sustained interest in the cause of public health. The valuable advice you have given to us—the health workers, on this occasion is needed in our most important task of improving the health of our people.

To you (Justice Rama Prasad Mookerji) Sir, we offer our thanks for kindly agreeing to preside over this inaugural function. The suggestions given by you to-day will be borne in mind and efforts will be made to implement some of them.

To you, Dr. Mukharji, Minister of Health of West Bengal, we offer our thanks for your gracious presence here to-day.

I should not forget to acknowledge with many thanks the help and generous contributions received from various firms and organisations in Calcutta for the success of this function. Our thanks are also due to the various national and international organizations and the individuals participating in the Exhibitions and also to the artists, clubs, institutions and others who have contributed to the programme of entertainment.

I am also taking this opportunity of expressing my heartfelt thanks and gratitude to all my colleagues and members of various committees and sub-committees whose co-operative efforts have contributed substantially to the success of this inauguration. I must specially mention about the efforts of Dr. Amarnath Mukherji, Chairman of the Reception Committee for making excellent arrangement for this function. The presence of such a large number of Health workers and others is very stimulating to us and to the Association which has been inaugurated. With your goodwill and help our Association will grow from strength to strength and will be of great value to us in our future health planning and implementation of the programme.

PROGRAMME

SATURDAY, THE 29TH SEPTEMBER, 1956

SCIENTIFIC SESSION

MORNING

9 A.M.—Opening remarks by Colonel C. K. Lakshmanan, Director General of Health Services.

Subject :—**Public Health, Man Power & Rural Health Service**

Chairman :—Dr. B. C. Das Gupta.

DR. B. C. DASGUPTA

SRI P. C. BOSE

DR. M. R. FIELDS

COL. BARKATNARAIN

A. Medical Nursing and other Health Personnel.

(i) Opening remarks by the Chairman.

(ii) Objectives of Rural Health Services—by Dr. K. S. Viswanathan, All India Institute of Hygiene & Public Health, Calcutta.

(iii) Rural Health Services in connection with the 2nd Five Year Plan with special reference to Health Centres—by Dr. B. C. Das Gupta, Calcutta.

(iv) Need for the Nursing personnel in the Rural Health Programme—by T. K. Adranvala, Nursing Advisor, D. G. H. S. Office, New Delhi.

(v) Organisation and staffing pattern of Rural Health Units—by Dr. D. K. Viswanathan, W. H. O. Regional Office, New Delhi.

(vi) Technical staff for the 2nd Five Year Plan—by Dr. T. Lakshminarayana, Adviser on Health Programme, Planning Commission.

SCIENTIFIC SESSION

AFTERNOON

Subject :—**Public Health, Man Power & Rural Health Services.**

Chairman :—Dr. B. C. Das Gupta

2-30 P.M.—B. Training of Personnel:

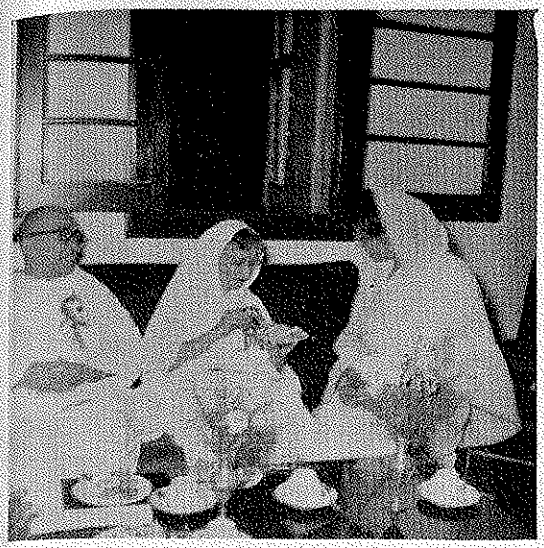
(i) Training of Medical and Senior Health Personnel by:

(1) Dr. K. C. K. E. Raja, Bombay

(2) Dr. S. E. D. Masilamani, All India Institute of Hygiene & Public Health, Calcutta.

(ii) Duties and training of Auxilliary Health Personnel in Rural Areas—By Dr. Issac Joseph, Poonamalle Health Centre, Madras.

(iii) Training of Nurses with special emphasis on Public Health—by Mrs. U.



Rajkumariji in the Tea Party

Gupta, Nursing Superintendent, D. H. S. Office, Government of West Bengal.

(iv) Utilisation of Rural Health Centres in the teaching of Social & Preventive Medicine by Dr. N. K. Tampi, Professor of Social and Preventive Medicine. Medical College Trivandram.

(v) Orientation in Health for:—
(a) Rural Health Workers
(b) Administrators and Technical Staff in Fields other than health—by Col. Barkat Narain, Adviser, Community Project, Administration.

5 P.M.—Tea.

6 P.M.—Entertainment.—(See Special Programme).

SUNDAY, THE 30TH SEPTEMBER, 1956

SCIENTIFIC SESSION
MORNING

Subject: ENVIRONMENTAL SANITATION
Chairman:—Sri P. C. Bose

9 A.M. to 12-30 P.M.

(i) Opening remarks by the Chairman.

(ii) National Programme on Environmental Sanitation during the 2nd Five Year Plan—with special reference to rural Areas—by Mr. O. C. Hopkins, Sanitary Engineering adviser, Govt. of India.

(iii) Human Factor in Environmental Sanitation—by Dr. H. Leavell, Consultant Ford Foundation, New Delhi.

(iv) Disposal of Human Excretas in Rural Areas—by Dr. S. K. Chatterjee, Deputy Director of Health Services, Government of West Bengal.

(v) Disposal of Garbage and animal wastes in rural areas by Mr. Charles Spangler, Ford Foundation, New Delhi.

(vi) Rural Water supplies—by Mr. K. R. Bhide, Chief Engineer, P.H. Engineering Dept., Bihar, Patna.

(vii) Rural Housing—by Mr. N. Majumder, All India Institute of Hygiene and Public Health, Calcutta.

(viii) Research and Rural Sanitation during the 2nd Five Year Plan—by Dr. T. R. Bhaskaran, All India Institute of Hygiene and Public Health, Calcutta.

AFTERNOON

BUSINESS MEETING

2-30 P.M.—(a) Alumni Association, the All India Institute of Hygiene and Public Health, Calcutta.

3-30 P.M.—(b) Indian Public Health Association.

5 P.M.—Tea.

6 P.M.—Entertainment (see Special Programme).

A view of the Tea Party

MONDAY THE 1ST OCTOBER, 1956

SCIENTIFIC SESSION
MORNING

Subject :—HEALTH EDUCATION

Chairman :—Dr. Morey R. Fields

Opening remarks by the Chairman

(i) Health Education, An essential part of Rural Health Service in India—by Dr. V. Ramakrishna, Superintendent, Bureau of Health Education, Bangalore.

(ii) Changing Health Behaviour in India Through Health Education—by Dr. Elmer J. Anderson, TCM—Adviser on Health Education Govt. of India.

(iii) Training Health Education Specialists —by G. R. Amritmahal, All India Institute of Hygiene and Public Health, Calcutta.

(iv) Inservice Training in Health Education—by Dr. D. Anand, Health Education Officer Health Centre, Chandigarh.

(v) Group Responsibility through Health Education—An Important Factor of Public Health—by Dr. Donald T. Rice, Department of Preventive Medicine and Public Health, Christian Medical College, Ludhiana, Punjab.

SCIENTIFIC SESSION
AFTERNOON

2-30 P.M.—5 P.M.

Chairman :—Col. Barkat Narain

Opening remarks by the Chairman

(i) Health Services in the Community Project Areas—by Col. Barkat Narain, Adviser Health, Ministry of community Development, New Delhi.

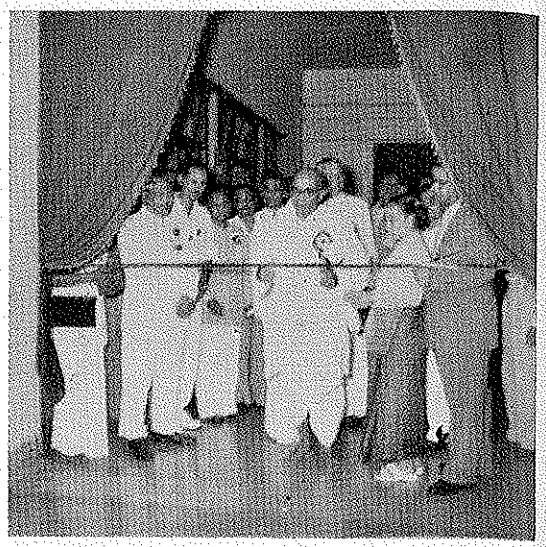
(ii) Social Welfare Organisation in relation to Community Project Areas—by Smt. Anu Banerjee, Development Department, Raj Bhaban, Calcutta.

(iii) Need for surveys and for assessment of work—by Dr. C. Chandrasekaran, All India Institute of Hygiene & Public Health, Calcutta.

EXHIBITION

LIST OF EXHIBITIONS AND EXHIBITS

1. United States Information Service—Public Health in the United States with special reference to Salk vaccine.
2. British Information Service—Public Health in Britain.



Opening of the Exhibition by the Hon'ble Dr. A. P. Mukharji, Minister of Health, West Bengal

3. U.S. Technical Co-operation Mission—TCM. Sponsored Projects in India.
4. UNICEF—UNICEF sponsored projects in India.
5. WHO—Public Health in the East.
6. Christian Medical College, Ludhiana, and —ANDHRA MEDICAL COLLEGE, VISAKHAPATAM,—Social & Preventive Medicine.
7. Hind Kust Nivaran Sang—How Leprosy spreads in a family.
8. Central Social Welfare Board-Activities of the W.B. Branch.
9. Calcutta Police—Spurious drugs and adulterated food stuff.
10. All India Institute of Hygiene and Public Health :
    (a) Training of Health Personnel.
    (b) Environmental Sanitation.
    (c) Water Purification.
    (d) Statistical Machines.
    (e) Audio-Visual Aids in Health Education.
11. Armed Forces Medical College—Poona.
12. Calcutta Medical College, Department of Experimental Medical Sciences and Department of Physiology, University of Calcutta—Isotopes in Public Health.
13. Medicinal Plants Scheme—Government of West Bengal.
14. Oxford Book Company—Books on Public Health.
15. George Miller & Co. Ltd., Water purification sedimentation.

Rajkumariji visiting the Exhibition with Dr. Mukherji

16. Patterson Engineering—Water purification —Sedimentation.
17. Imperial Chemical Industries—Insecticides.
18. Burmah Shell—Insecticides.
19. Malaria Institute of India, Delhi.
20. Community Project,—Administration posters.
21. Calcutta Central Co-operative Anti Malaria and Public Health Society Ltd.—Old records, journals, pamphlets etc.

Films Shows

Films (on subjects relating to Public Health) by courtesy of:

1. U. S. I. S.—11-1 A.M.—Monday 1st October,
   —2-4 P.M.—Saturday,
2. B. I. S.—11-1 A.M.—29th September,
3. I. C. I.—2-4 P.M.—Saturday 29th September.
4. Burmah-Shell—2-4 P.M.—Saturday 29th September.
5. Ravison Pharmaceuticals.—11-1 A.M.—Sunday 30 Sept.
6. Ministry of Information & Broadcasting, (Govt. of India)—2-4 P.M., Sunday 30th September.

ENERTAINMENT PROGRAMME

Saturday, the 29th September 1956

6 P.M.—Physical feats by Gobar's Gymnasium.
7 P.M.—Variety shows by Howrah Club.
8 P.M.—Dance Drama by Octave Association.

Sunday, the 30th September, 1956

6 P.M.—Magic Show by Dr. S. R. Dasgupta.
8 P.M.—Dance Programme by the I. P. T. A.

Proceeding of the First Business Meeting of the Inbian Public Health Association held on tne 30th September, 1956

The first Business meeting of the Indian Public Health Association was held at the All India Institute of Hygiene & Public Health, Calcutta under the Chairmanship of Lt.-Col. C. K. Lakshmanan, Director General of Health Services at 3-30 P.M. on the 30th September, 1956.

About two hundred members and delegates from different parts of India who assembled at Calcutta on the occasion of the inauguration ceremony of the Association held on the 28th September 1956 attended this first Business Meeting. Among them the following members of the Interim Committee were also present:

Col. C. K. Lakshmanan—*Chairman.*
Dr. B. C. Dasgupta—*Vice-Chairman.*
Dr. S. C. Seal—*Secretary cum Treasurer.*

Members

Dr. S. E. D. Masilamani.
Dr. K. S. Viswanathan.
Dr. B. Ganguly.
Dr. (Mrs.) Muktha Sen.
Mrs. U. Gupta.
Sri G. N. Mitra.
Dr. A. Mukherji.

The Agenda of the meeting were as follows:

1. Report about the Association by Dr. Seal.
2. Adoption of the constitution and Rules and Regulations.
3. Election of Office-bearers:
   (a) the Council.
   (b) the Journal Committee.
4. Association year and the next venue of the Association.

Agenda 1:

Report about the Association by the Secretary is given at the end.

A rough estimate of income and expenditure up to the inaugural time of the Association showed a probable excess of expenditure over income excluding the subscription for Life membership to the extent of about Rs. 7,000/-. A provisional budget for the remaining part of the 1956 and the whole year of 1957 as given by Dr. Seal was as follows:

INCOME

Membership :		
Ordinary 500	... ...	6,000/-
Associate 250	... ...	1,500/-
Journal advertisement for 4 issues		6,000/-
		13,500/-
Deficit	... ...	3,450/-
	Rs.	17,050/-

EXPENDITURE

Printing & Stationary including the journal	...	8,000/-
Postage	... ...	800/-
Commission for advertisement		1,500/-
Honorarium to auditor	...	250/-
Establishment	... ...	3,000/-
Contingency	... ...	1,500/-
One typewriter and furniture	...	2,000/-
	Rs.	17,050/-

This was approved excluding the item of typewriter and furniture.

Agenda 2 :

The house adopted the constitution with the provision suggested by the Chairman that the necessary correction of the nature of printing mistakes or any discrepancies was to be made by a small committee consisting of the following persons:—Dr. B. C. Dasgupta, Dr. S. C. Seal, Dr. Chandrasekaran, Dr. M. N. Rao and Dr. Masilamani. This sub-committee should do this correction within 7 days and get the constitution examined by a solicitor. The final copy thus prepared should be sent to the President before the Association is registered.

Agenda 3 :

Election of office-bearers and members of the Central Council etc.:

The list of the Office-bearers and the members of the Central Council and of the Journal Committee who were elected in the last General Meeting is given below:

1956 & 1957

President—Lt. Col. C. K. Lakshmanan, D.G.H.S., New Delhi.

President-elect—Dr. B. C. Das Gupta, Ex-D.H.S., West Bengal.

Vice-President—(1) Sri P. C. Bose, P. H. Engineer, West Bengal.

(2) Col. Barkat Narain, Adviser Health Ministry of C.D.P., New Delhi.

Honorary General Secretary—Dr. S. C. Seal, Calcutta.

Hony. Jt. Secretaries—(1) Dr. K. C. Patnaik, Najafgarh, Delhi.

(2) Dr. T. R. Bhaskaran, Calcutta.

Editor of the Journal—Dr. B. C. Das Gupta, Ex-D.H.S., West Bengal.

Managing Editor—Ex-officio—Hony. General Secretary—Dr. S. C. Seal.

Treasurer—Dr. S. E. D. Masilamani, A.I.I.H. & P.H., Calcutta.

Auditor—M/s. M. Mukherji & Co., Calcutta.

10 elected members of the Council:

Dr. T. B. Patel, D.P.H., Bombay, Poona.

Dr. K. N. Rao, D.M.S., Andhra State.

Dr. Seshagiri Rau, Mysore State.

Dr. Mrs. Mukta Sen, A.I.I.H. & P.H., Calcutta.

Dr. B. V. Bhoota, Sanitary Engineer, Bombay.

Dr. R. V. Rajam, Madras.

Dr. S. K. Sinha, Patna.

Dr. N. K. Tampi, Trivandram.

Mrs. U. Gupta, Nursing Supdt., West Bengal.

Col. N. D. P. Karani, A.F.M.C., Poona.

Journal Committee:

Editor—Dr. B. C. Das Gupta, Calcutta.

Associate Editor—Dr. K. S. Viswanathan, Calcutta.

Managing Editor—Ex-officio—Hony. Genl. Secretary, Dr. S. C. Seal.

Assistant Editor—Dr. S. R. Sen Gupta A.D.H.S., West Bengal.

Five other members:

Dr. M. N. Lahiri, Calcutta.

Sri K. R. Bhide, Patna.

Dr. C. Chandrasekaran, Calcutta.

Dr. B. Ganguly, Calcutta.

Dr. S. K. Chatterji, D.D.H.S., West Bengal.

Agenda 4 :

At the suggestion of Dr. Seal the calender year was accepted by the house to be the Association year. Since the inauguration had taken place on the 28th September Dr. Seal also proposed that the next Annual General Meeting be held in December, 1957 and that the office-bearers and the members of the Council elected this day might continue for the year 1957. The Journal Committee as provided in the constitution would however function for three years. These proposals were accepted by the house unanimously.

As to the next venue of the Annual General Meeting the house decided that if the invitation provisionally offered by Sri Bhide of Patna did not finally materialise the next venue would be at Calcutta.

With vote of thanks to the chair the Business meeting came to a close.

ADDRESS OF WELCOME BY DR. S. C. SEAL, SECRETARY, INTERIM COMMITTEE:

COL. LAKSHMANAN, MEMBERS AND DELEGATES, LADIES AND GENTLEMEN,

It is my most pleasant duty to welcome all of you to this first Business Meeting of the Indian Public Health Association. We are indeed fortunate to have Col. Lakshmanan, the Director General of Health Services as the Chairman and Dr. B. C. Dasgupta, Ex-Director of Health Services, Government of West Bengal, as the Vice-Chairman of the Interim Committee. I must say that but for the help and guidance of these two stalwarts and personalities in public health it would not have been possible for us to bring this Association into being. As I said in our inaugural meeting that several past attempts having failed it was only natural for us to embark upon this venture with caution and care. But every effort that was made during the last two decades, though appeared to be a failure served as the pillar on which we are only building the superstructure.

The need for an All-India Public Health Association has already been emphasised during this inaugural sessions or also previously from various platforms. Though overdue, this is the first time that an integrated and all embracing organisation in public health with membership participation of medical, non-medical and paramedical personnel has been brought into existence. The aims and objects of the Association are:

The promotion and advancement of public health and allied sciences in their different branches in India, the protection and promotion of public and personal health of the people of this country, the raising of the standard of Public Health profession in general and the promotion of co-operation and fellowship among the members of the Association.

Membership

The membership is extended to clinicians, health officers, sanitary inspectors, nurses, health visitors, midwives, health assistants, laboratory technicians, nutritionists, dieticians, health educators, industrial health workers, psychologists, epidemiologists, pharmacists, protozoologists, helminthologists, and also the social workers. One of the important difference of this Association with other allied associations is that a large majority of the members will be non-medical personnel whose active participation is essential in promoting the health of the peoples. In order to accommodate them all we had to classify the membership into four categories, namely Ordinary, Associate, Honorary and Life Membership. The necessary qualifications for each of these categories of membership have been mentioned in the constitution, already in your hands.

I am happy to announce that the membership strength of the Association till to-day is 532 which includes 18 Life members and 152 Associate members. They represent 24 states. The maximum membership has been registered in the State of West Bengal, the figure of 230 has been already reached.

In the campaign for enlisting membership considerable enthusiasm was shown by three members namely, Dr. Jagjit Singh of Punjab, Dr. S. K. Sinha of Bihar, and Dr. B. Mukherjee, Health Officer of Howrah.

Absence of a Scientific Public Health Journal in India was a great handicap for the public health workers and scientists to ventilate their ideas, field experiences and results of investigations or experiments and to obtain information about the recent advances that are being made from time to time in the fields of public health.

You will therefore, be glad to see the first inaugural issue of the journal published simultaneously with the birth of this Association. We have been fortunate enough to have Dr. B. C. Das Gupta, as the Editor-protem of the Journal. Though it has been announced as a quarterly periodical to begin with, we hope, very soon it will be converted into a regular monthly one.

As provided in our constitution we also have a plan to publish a popular journal to cater the needs of the Associate members and to disseminate the health knowledge to the people of the country.

As upon the history of the past that we build our present and project for the future the Committee, though very late, also embraked upon publishing a Souvenir volume enclosing a treatise on the Health of India. In this volume the present has been reviewed in the background of the past and the health problems high-lighted with a view to stimulate better planning for the future. With more than 200 pages and blocks the cost has been high being about Rs. 10/- per copy. Even with the income from advertisements we shall have a clear deficit of at about 4,500/- to 5,000/- rupees. The volume has necessarily been priced at Rs. 10/-. All members of the Indian Public Health Association or the Reception Committee may have a volume by paying a concessional rate of Rs. 5/-. There are as many as 52 contributors to this volume. It was decided to present each contributor with a copy of it, besides the advertising agents, advertisers and newspapers and some distinguished visitors.

I am sure that with the patronage and blessings of Rajumari Amrit Kaur, the Union Minister for Health, the help and guidance of Col. Lakshmanan, the Director General of Health Services and the united goodwill and co-operation of our national and international experts, and the will and determination of the members, this Association will grow from strength to strength in years to come.

RECOMMENDATIONS OF THE PANEL ON RURAL HEALTH SERVICE AND PUBLIC HEALTH MAN-POWER

1. This Association recommends that comprehensive Health care should be provided for Rural areas, integrating promotional, preventive, curative and rehabilitative activities through Health Centres where not only physical but functional integration is ensured and the highest emphasis is laid on preventive services. For this purpose financial allocations should be more adequate than hitherto.

2. This Association is of opinion that Health care in rural areas should form an integral part of total development for raising the standard of living and that the goal should be the provision of minimum basic health services in the National Extension Service Blocks so that the widest possible coverage may be obtained in the quickest possible time. Further service should be of a generalised nature, closely linked integrated and coordinated with a better organised District service and institutions which should be stepped up for this purpose in order tox facilitate provision of specialised services, and to ensure that the Medical and Health care are regionalised to avoid overlapping and gaps.

3. This Association is of opinion that the jurisdiction of those Health Centres should cover about 66,000 population and agrees with the staffing pattern for Health Centres provided in the Second Five-Year Plan, decentralised care being provided through sub-centres with auxiliary personnel under Medical supervision. Part-time medical and health workers wherever they are employed should be replaced as soon as possible by full-time workers.

4. In the provision of the various health services, this Association feels that Environmental Sanitation and Health Education measures should be given the highest priority.

5. This Association recommends that a College of Nursing be established in as many states as possible and that adequate financial assistance be given to Hispital Nursing Schools for integration of public health in the basick course for Nursing and for training of nurses in Hospital Management.

6. This Association is further of opinion that a Public Health Nurse should be allocated for the out-patient department of the Hospital and also at the District level to supervise Public Health Nursing work in the District and give in-service training to the nurse-midwives.

7. This Association is of opinion that considering the inadequacy of nursing services in Rural areas at present, it would be helpful to organise classes in Home Nursing for women in Rural areas and for girls in all girls schools.

8. This Association is of the opinion that until a sufficiently large number of Public Health Nurses become available, there is a definite place and need for Health Visitors in the Public Health organisations.

9. This Association feels that man power budgeting from the point of view of supply as well as demand is of as great importance as the budgetting of financial of physical resources. In view of the large-scale development of Health Programmes and the extreme shortages of the various categories of health personnel, the Association feels that a much greater effort should be made to increase the training facilities available in the country. The Association, however, wishes to emphasize that training programmes should be closely linked with the employment of the trained personnel.

10. This Association feels that there is need for two more institutions for post-graduate training in Public Health and its specialities on the lines of the All India Institute of Hygiene & Public Health, Calcutta—possibly in the southern and western regions of the country besides the All India Institute of Medical Sciences.

11. In regard to doctors, more than actual shortage the problem is one of maldistribution and short employment by States. This uneven distribution causing shortage in one State and surplus in another, should be remedied by taking suitable steps from the Centre. This Association recommends that an adequate number of doctors should be employed at all levels of the Central and State Health Organisations—in particular to redress the lack of medical care in rural areas.

12. This Association recommends that medical graduates should be recruited to the

State Cadre and after working for certain periods in the larger hospitals under seniors, should be posted for a definite period to Rural areas and thereafter be given opportunities to work their way back to larger institutions or to specialize in any field that they would like. Essential conditions for the success of Rural Health Services are the provision of housing, transport and special allowances to meet the extra expenditure which the officers have to incur when posted to Rural areas.

13. In view of the rapidly expanding health services and the acute shortage of sanitary inspectors, this Association recommends that the States should be stimulated into taking necessary steps for providing more training centres for sanitary inspectors and standardise and regulate their training in order to ensure uniformity. Similar steps should be taken by the States in regard to other medical audilliaries.

14. This Association strongly recommends that a chair of Preventive and Social Medicine be established in every Medical College in India without further delay and that a Rural and an Urban Health Unit be developed in association with it for a practice field. It is further recommended that the training in Preventive and Social Medicine should begin from the time the student joint the Medical College.

15. This Association recommends that the DHS/DPH of different States should take full advantage of the Orientation Training Centres in Singur, Poonamallee and Najafgarh by deputing Medical and Health personnel to undergo training in Rural Health problems and in the Extention techniques of approach to the villager. This Association further recommends that D.H.S./D.P.H. of States should assume the responsibility of providing adequate teaching staff and teaching aids in the Extension Training Centres and establish close contacts with the training centres for Block Development officers and Social Education officers where facilities for orientation training in Public Health are provided.

16. This Association recommends that with a view to keeping the workers in the Public Health field conversant with rapidly advancing knowledge and the changing trends in Public Health science and techniques, measures should be taken to organise in-service training, group meetings, seminars and refresher courses on a regional and All India basis and at different levels, at frequent intervals.

The Conference recommends that for the purpose of stimulating and maintaining a high level of efficiency of Public Health personnel, the States should have an organisation and programme for in-service training of their staff through refresher courses, holding of seminars, conferences and field visits.

17. The Conference also recommends that all environmental sanitation work in the rural areas including the Community Development and N.E.S. areas should be coordinated and integrated with all the Public Health Engineering activities of the State as part and parcel of the comprehensive State Programme.

18. As there is an acute shortage of subordinate engineers in the public health engineering field, this Association recommends that a suitable 1-year course be initiated in all the States for subordinate personnel to meet the situation. Such trainees should be sanitary inspectors or Intermediates in Science. These qualified personnel may be appointed in the Public Health Engineering Departments of the States for rural water supply and sanitation work in positions equivalent to those of overseers.

ENVIRONMENTAL SANITATION

1. The Conference feels that implementation of the environmental sanitation programme in the rural areas depends to a great extent on the human factors. For this purpose, proper organisation and programme to take care of this factor should be immediately initiated.

2. The Conference recommends that every individual home should be provided with a satisfactory sanitary latrine. There are at present several types of latrines used in the different parts of the country. The Conference feels that further research and investigation is necessary regarding suitability and acceptability of such latrines.

3. The Conference recommends that for the disposal of animal wastes, composting and manure pits may be adopted. For this purpose proper technical guidance should be made available to the rural population.

4. The Committee recommends that adequate water supply should be provided each and every village.

It is recommended that since tube well water is usually safe, wherever possible underground source of supply should be provided in preference to other sources.

Surface wells wherever constructed should be protected from extraneous contamination and should be fitted with suitable pumps for drawing water. Surface source may be considered as satisfactory supply only after suitable treatment.

5. The Conference considers the problem of rural housing is of enormous dimensions and improvement of rural housing should form a part of a large scheme of rural upliftment. It recommends that indigenous materials like mud, bamboos, thatch etc. may be used in the construction of rural houses. Research should be stimulated in the country to make these materials more durable and weather resistant. Provision and maintenance of basic amenities such as safe water supply, safe disposal of human and animal waste, should be considered as integral part of housing. Demonstration houses may be built in the villages. Technical guidance should be made available to the villagers in planning and construction of their houses. Subsidy in the form of loans or grants should be made available to the villagers for building their houses. As Rural Housing is intimately related with planning, a country planning act should be enacted.

6. The Conference recommends that in view of the wide range of problems to be taken up for research in the field of rural sanitation there is necessity for a permanent research organisation in those directions to tackle this problem in the country.

RECOMMENDATIONS OF THE SCIENTIFIC SESSION ON HEALTH EDUCATION, 1st OCTOBER 1956

1. Health education is an essential part of public health programmes, and persons trained in health education are important members of the public health team. It is imperative therefore that a Health Education Section be established as a permanent section of the Indian Public Health Association. This Section should serve to bring together all those who are interested and concerned in planning, developing and carrying out programmes in health education.

2. The importance of health education in India has been recognized by the Central Government by the establishment of a Central Bureau of Health Education. State Governments should also establish Bureaus of Health Education administered by a person trained in health education and staffed by those trained in health education.

3. The need is aparent for health workers to be trained in health education and it is anticipated that there will be increasingly greater requests for such persons as the positive results of health education become apparent. To meet the demands for those trained in health education and to encourage the development of health education in India, departments of Health, Education, and Community Development and other agencies, official and voluntary, should depute staff for training in health education and as health educators.

Training in health education should be given to a large number of health workers so they can do some health education as part of their work as medical officers, nurses, sanitary inspectors, teachers, community development workers, and others.

In addition, training in health education should be given to a limited number of highly qualified health workers so they can be prepared to plan, organize and supervise health education programmes.

4. The major responsibility for health education training of personnel so that these persons can carry on health education along with and as part of their regular work responsibilities rests with the State Government. After a nucleus of highly qualified health workers has been trained, these workers should be given the responsibility for planning, organising and, where possible, supervising the in-service training of a large number of health personnel, within their respective states.

5. Health education should be given recognition as an integral part of public health and community development programmes and persons trained in health education should be considered essential members of the public health, school health and block development teams.

6. Health education in India should be planned, developed, carried out and evaluated according to needs and resources in India. Reference to health education programmes in other countries should be in relation to understanding the health education experiences of other countries and selecting for trial in India, these experiences that may be readily adapted to local needs.

7. To give health education the best apportunities for demonstrating its importance in public health programmes, it should receive the unqualified ,support by top health, education, community development and civic administrators.

8. There should be training in school health education for all health workers who have contact with the school child. But major stress should be given to providing school health education for teachers-in-training and in-service.

RECOMMENDATIONS OF THE PANEL ON THE HEALTH PROGRAMME IN THE COMMUNITY DEVELOPMENT AND N. E. S. BLOCKS

1. In addition to setting up Primary Health Units in all the N.E.S. Blocks as provided in resolution No. 3 of the Panel on Rural Health Services and Public Health Man Power this Association strongly recommends that the union staff as provided in the Community Development Scheme be placed in position as early as possible to render health care to the people. This Association feels that the sense of urgency which is necessary for such a multi-purpose programme should be appreciated by all concerned.

2. This Association strongly recommends that the State Governments should take immediate steps for the improvement of the collection of the Vital Statistics in the Community Development and N.E.S. Blocks. This is an essential step to evaluate the improvement in the health of community as a result of this total development programme. It further recommends that to get a detailed picture of the "Health Status" of the community, health surveys should be carried out in selected Blocks, and repeated after an interval of five to seven years.

3. This Association strongly recommends to the State Governments to take full advantage of the facilities offered by various voluntary and social organisations in the development of the health programme in the Community Development and N. E. S. Blocks.

(*Contd. from page 20*)

has undertaken to gather and extend these observations.

Just as the engineer builds on the biological principles—the "health aspects" of the problem—so must the health educator build upon sound information about the beliefs and attitudes of the people—the "public aspects". The research-cum-action project will be much concerned with testing different health education approaches in the centres where it is working, namely, Najafgarh (near Delhi), Poonamallee (near Madras) and Singur (near Calcutta).

This research job is too big for any single group. People in many places must work on different parts of the problem, and this is already being done. A number of agencies are taking part in the Government of India project, including the All-India Institute, the state governments of Madras and Delhi, the United States Technical Co-operation Mission, WHO and the Ford Foundation. The Uttar Predesh government has well under way a very interesting parallel project under its Planning, Research and Action Institute. Several anthropologists are working or will work on related problems. It must be a team-work job if it is to succeed.

BIBLIOGRAPHY:

World Health Organisation Technical Report Series No. 77, Expert Committee on Environmental Sanitation, Third Report, Geneva, April 1954.

NOTICE TO CONTRIBUTORS

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

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

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

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

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

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