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PRIMARY VACCINATION OF YOUNG BABIES.

By

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Primary vaccination is generally done in babies during 4th to 6th month of age. It is usually considered that the immunity inherited from their mothers protects them against small pox in the early months. The present study was undertaken to find out how far the idea of inheritance of maternal immunity can be justified and whether the infants at such tender age as below three months can actively produce antibodies in their system after primary vaccination.

The vaccine, manufactured by the Vaccine Institute of the Calcutta Corporation, was used. The scratch-method for vaccination was used. After necessary sterilisation and drying of the skin over the outer aspect of the upper arm below the deltoid, two drops of the vaccine, from the capillary tube, were carefully dropped, one above the other, about three-quarters of an inch apart and two parallel linear incisions, each about one-fourth of an inch long, were made intradermally through the drops of the vaccine. These parallel linear incisions were about one-eighth of an inch apart from each other. Local reactions were noted on the 4th. and the 8th. days. Revaccination of the mothers was performed on the ventral aspect of the forearm, following the same technique and the reactions were noted at the end of 24 and 48 hours also.

The distribution of age group of one hundred babies vaccinated was as follows:—

Group	No. of babies
Group I —from 17 days to a month	16
,, II —above 1 month to 2 months	63
,, III —above 2 months to 3 months	21
Total	100

Results of primary vaccination

No. of babies Vaccinated	No. successful at two points	No. successful at one point	Total successful	Total unsuccessful
100	78	17	95	5

Of the five unsuccessful cases, 4 belonged to Group II, and 1 belonged to Group III. In two of them belonging to Group II, the vaccination became successful, when it was repeated about a month later, while in another case, belonging to the same Group, it was unsuccessful even after repeating the vaccination about three weeks later.

Out of hundred mothers of these babies, only eighty-two could be revaccinated, by persuasion, simultaneously at the time of primary vaccination of their babies.

The reactions of their revaccination are shown in the following table:—

Total No. of mothers revaccinated	No. showing immediate reaction	No. showing primary-like reaction		
		at one point	at two points	Total
82	69	4	9	13

Summary—95% of the infants, within the age group to 3 months, appear to have no immunity against small pox, and the results of their successful primary vaccination indicate that they can well develop such immunity after vaccination. Observation on the results of the mothers' revaccination shows that though the mothers are immune against small pox, their babies are not so in general.

Out of the five unsuccessful babies, three of them had mothers who showed immediate reaction of immunity; in another case, the baby's mother could not be persuaded to agree to revaccination, while in the fifth case, the mother showed positive primary-like reaction at one point only.

None of the infants in our series showed any untoward signs and symptoms, except the usual ones after vaccination.

Conclusion—The question of transference of maternal immunity against small pox, to infants is doubtful, and even if it occurs, partially or wholly, it requires to be studied further as to how long it lasts.

In most cases, infants take up vaccination successfully very early. There appears to be no reason why vaccination should be delayed up to 4th. to 6th. months. But if the vaccination is not successful at the 2nd or 3rd month, there should be no complacency that the infant is immune to small pox, but the infant should be vaccinated again after an interval of about a month, or between the 4th and the 6th month, when the infant generally shows successful primary reaction. In fact, this method is being followed in District IV of the Calcutta Corporation from January, 1959, with quite satisfactory results.

I would like to thank my anti-epidemic staff, particularly Dr. Sisir Kumar Banerjee (Retried) who had then been in charge of the Hazra Road Vaccination Station, as A.S.O., during the major part of this work for their active co-operation.

I also thank Dr. S. C. Seal, M.B.B.S., D.P.H., Ph.D., F.A.P.H.A., F.N.I., Officer on Special Duty, Directorate General of Health Services, New Delhi, for his kind constructive criticism for the presentation of this paper.

FREQUENCY OF AGGLUTININ IN THE SERA OF NORMAL SUBJECTS OF A WEST BENGAL VILLAGE AGAINST SOME COMMON ENTERIC ORGANISMS

By

Dr. C. R. Das, M.B.B.S., D.T.M. & H.,
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The ideal method of diagnosis of enteric fever is by isolation of the Salmonella organisms from blood of the patient. But culture of blood may not be always possible in all places due to lack of laboratory facilities. So we depend on indirect methods such as, Widal agglutination test which tends to be positive after about a week and gradually increase in titre. To comment on the report of the Widal test we are to keep in mind the normal level of agglutinin present in the population of the area concerned, against the disease. In this article an attempt has been made to record the normal agglutinin titre against the antigens of enteric organisms with particular reference to *Salm. typhi, Salm. paratyphi* A & B, in the rural area of Singur.

Enteric fever cases are not rare in this area. Patients with clinical symptoms and manifestations are often admitted in the Health Centre. So if we proceed carefully we can find out the presence of antibodies against these enteric organisms in normal population also. As the presence of antibodies in the sera of a population against a given organism is an index of the prevalence of its infection in that particular region, so this information if collected from random samples of population from a particular area will be of value in establishing normal levels of antibodies against a particular disease in the region.

The presence of antibodies against the organisms that cause enteric fever can be detected by the Widal agglutination test. But

there is no significant limit of the titre in this reaction. So when a Widal agglutination test is positive the next problem is to decide if the particular titre indicates the fever due to enteric group of organism. The interpretation of Widal test in a case of fever depends on many factors which affect the reaction considerably. These factors are:

(a) The level of normal agglutinin present in the general population of the area.

(b) Stage of the disease.

(c) Immunity status, i. e., history of previous inoculation with T.A.B. vaccine, or attack of enteric fever.

Members of a given population who have never been inoculated with T.A.B. vaccine, who give no previous history of enteric infection and are clinically without any disease may show agglutinin against enteric organisms in their blood. A certain proportion of the population are found to contain antibodies in their serum capable of reacting to a variable titre in the Widal test owing to the occurrance of latent or sub-clinical infection.

In India several observations have been made about the presence of agglutinin in normal population and the results are shown in Table No. 1. These examinations were carried out in Darjeeling and Calcutta by Pasricha (1933) and in Rajasthan by Subrahmanyam, Gupta and Goyal (1954). In Pasricha's observations the T'H' agglutinin was 1:80 titre in 8 percent of the cases examined at Darjeeling and 2.8 per cent in 1:80 dilution at Calcutta. A'H' and B'H' agglutinin was 1 percent and 3 percent in 1:80 titre at Darjeeling and 0.7 and 2.5 percent in 1:80 titre at Calcutta.

A survey work was also done in Jamshedpur to find out the normal titre and results are shown in Table No. II on page 85.

From these observations we find that 251 normal sera from the population of Jamshedpur showed 'H' agglutinin against *Salm. typhi, Salm. para-typhi* A and B in 10.3, 3.0 and 12.3 per cent respectively and 'O' agglutinin against *Salm. typhi* in 40.4 per-cent. The percentage of sera showing T'H' agglutination is 0.4 percent in 1:125 dilution, for A'H' agglutinin is 1.1 percent in 1:50 dilution and B'H' in 0.4 per cent in 1:250 dilution. The percentage for T'O' was 1.1 per cent in 1:250 dilution. These are the highest agglutinin titres in respective cases.

The purpose of this investigation was to record the presence of agglutinin in sera of normal persons against Typhoid and Paratyphoid organisms in the Singur Thana area. A random sample of sera were collected from normal persons who had no history of fever for the last one year and who were not inoculated with T.A.B. vaccine. The sera were initially examined in dilutions of 1:10, 1:20, 1.30. 1:40 and 1:50 and when any serum was positive in 1:50, it was further examined in dilutions of 1:60, 1:80 and 1:160. Each serum was tested against the following antigens:

Salm. typhi ... 'H' and 'O'
Salm. Para-typhi A. 'H'
Salm. Para-typhi B. 'H'

The agglutination reaction was carried out by Dreyers agglutination technique. The temperature of incubation was 54°C for 2 hours and later 37°C for overnight. Altogether 130 sera were examined. Results obtained from these sera are shown in table III.

Table III

Percentage of sera agglutinating at or above

No reaction in 1:10	1:10	1:20	1:30	1:40	1:50	1:60	1:80
T 'H' 62.3	10.8	14.6	6.9	3.1	1.5	0.8	0.0
T 'O' 62.3	10.8	20.8	6.1	0.0	0.0	0.0	0.0
A 'H' 86.2	2.3	4.6	6.1	0.8	0.0	0.0	0.0
B 'H' 88.5	3.8	4.6	3.1	0.0	0.0	0.0	0.0

In these series of examination only one serum showed T'H' agglutinin positive to a titre of 1:60. T'O' agglutinin was found positive to a titre of 1:30 in 8 cases. A'H' agglutinin was found positive to a titre of 1:40 in one case, and B'H' in 1:30 titre in 4 cases. From this study it was found that 130 normal sera from the population of Singur showed 'H' agglutinin for *Salmonella typhi, Salmonella para A and B* in 37.7, 13.1 and

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Table 1

Percentage showing agglutinin at specific titre and above

Author	Place	No of cases	S. tyhhi. 'H'			S. tyhhi 'O'				Para 'AH'				Para 'BH'			
			1/20	1/40	1/80	1/20	1/40	1/80	1/160	1/20	1/40	1/80	1/160	1/20	1/40	1/80	1/160
Pasricha (1933)	Darjeeling ...	85	32.0	14.0	8.0	—	—	—	—	9.0	4.0	1.0	1.0	25.0	12.0	3.0	—
Do	Calcutta ...	280	20.7	10.7	2.8	11.8	6.4	1.8	—	6.0	2.5	0.7	0.7	7.5	5.7	2.5	—
Subrahmanyam ... Gupta & Goyal ...	Rajasthan ...	250	7.5	1.0	—	36.6	10.0	3.0	1.0	4.5	1.0	—	—	15.0	6.0	6.0	4.5

Table II

Author	Place	No of cases	S. tyhhi 'H'			S- tyhhi'O'				Para 'AH		Para 'BH'			
			1/25	1/50	1/125	1/25	1/50	1/125	1/250	1/25	1/50	1/25	1/50	1/125	1/250
Balbir Singh (1951)	Jamshedpur ...	251	6.9	3.0	0.4	22.3	14.3	2.7	1.1	2.3	1.1	4.0	5.3	2.6	0.4

10.0 per cent and 'O' agglutinin for *Salm. typhi* in 30.46 percent.

From the work it is very clear that the agglutinin titre is every low in Singur area as compared to that of Calcutta, Jamshedpur, Darjeeling in West Bengal and Rajasthan as seen from the observation made above.

Conclusion

The evidence obtained from these studies is that the agglutinin titre in normal persons against enteric organisms is much low in rural area of Singur than City and Industrial areas where congestion of human population is prevailing. This low level is as expected, and in Singur area out of 130 normal sera T'H' was positive upto 1:60 titre in only one case and T'O' upto 1:30 titre and A'H' in 1:40 titre, B'H' upto 1:30 titre. From these observations it is also clear that a titre above this normal level in a case of fever is suggestive of enteric fever.

For this observation and work, I am grateful to my Professor Dr. M. N. Lahiri and Asstt. Professor Dr. D. N. Sen Gupta for their advice and guidance.

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LEPROSY AND THE LAW

By
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Recourse to compulsion through special legislative measures, in public health work is an admission of failure. Obtaining of public co-operation and consent for application of preventive measures, is the only way to attain "positive health" for the society. Health legislation, therefore, even when at its best, is but a necessary evil and for attaining the maximum good, due importance must be given to the human element, along with the juridical, in the framing of such enactments. This applies specially to the laws concerning the control of communicable diseases in general.

Unfortunately, however, what generally happens in connection with leprosy law is that the leprosy worker carries the human element, and the society the juridical perhaps much too far.

The society would do well to remember that the lepra bacillus is a "lowly pathogen" and that both the disease and the "infectivity" of the "infective" cases are amenable to modern chemotherapeutic treatment. The juridical basis of all laws is, that "no personal rights of an individual or a group of individuals be curbed except which become a public danger, and that too only to the extent to which they constitute a public charge". Anti-leprosy laws, any harsher than required, will cause un-necessary and avoidable suffering to the leprosy patients and the failure of such measures is certain. "Public health and not public fears and prejudices should determine the policy in respect of leprosy control".

The leprosy worker, at the same time, has to watch that he is not carried away by his very justifiable sympathy for his patient. For, one is apt to forget that some leprosy patients suffer from the infectious type of the disease. Their capacity to spread the infection may be limited but the time which they have to do damage, un-knowingly of course, is almost unlimited; because, the disease is liable to go unrecognised for a considerable length of time. It is essential, therefore, to ensure that no further time interval is added to the aforesaid period either through concealment on the part of the patient or through the ignorance of contacts regarding the disease. This is possible only by continuing to take proper precautions.

Then, in case of leprosy it is not the society alone that has to be protected from the patient. The patient also stands in greater need of

safeguards. The ostracism that even now falls to the lot of the patient is by no means inconsiderable. Enlightened leprosy law is, therefore, more in the interest of the patient.

Viewed in this light, the law appears as a tool to blunt the sharp edges of the extremes in public opinion relating to the leprosy problem; the extreme fear of contact on the one hand and the extreme disregard of the dangers of intimate and prolonged association with the disease on the other. These contrasts, are likely to be found quite frequently, even in the same community living in neighbouring areas. As for example, in the *Jaunsar Bawar* area of Dehradun district and the adjoining district of *Tehrigarhwal*, in Uttar Pradesh, this anachronism can be observed even by a casual eye. In the *Jaunsar Bawar* area the patient of leprosy is put in charge of house-hold work and entrusted with the care of the children of the family. In *Tehri-Garhwal*, on the other hand, he is uprooted from his hearth and home and banished from his village.

Provision of special State Leprosy Services in the various States, under the Ministries of Health is necessary in view of the peculiar problems of leprosy control. Facilities for free diagnosis and treatment of all cases of leprosy should be ensured by law.

Priority should be given to the application of "Preventive mass treatment of the infective cases". Legal provisions providing for compulsory notification of leprosy, and isolation of the infective are unavoidable. The latter, of course, should be used judiciously and sparingly. The law should provide for home isolation" or isolation in "village isolation centres" which may be provided in community buildings". This measure with a little sympathetic supervision is bound to prove of great value especially in large countries of South East Asia and Africa where the magnitude of leprosy problem is immense and the resources meagre. Restrictions on the infective cases regarding their engaging in occupations which expose the healthy to risk need continuing, and it may be unwise to abondone them at this stage.

The question of the law of divorce and leprosy needs reviewing. Fundamentally, the law should not become an instrument to "perpetuate a knot that binds unwilling partners". Those who want to continue to live together may do so, but the law should not be the only reason to keep them united. Even today when divorce on the ground of leprosy is permissible, the number of people seeking such divorces is not very large. Of course, the relevant provisions, wherever they exist may need modification so that they may apply only to the infective cases, who fail to respond to treatment within a reasonable length of time. Deletion of all provisions pertaining to divorce due to leprosy, from the statute book is no remedy, for it does not solve the problem of desertions.

Examined in the light of the foregoing the law on the subject of leprosy over a large part of the world will be found restrictive. Nevertheless, in those areas where the leprosy worker has carried conviction with his Government and his people, the law reflects appreciation of the latest knowledge regarding the disease. As an example may be cited the provisions in the Health Code of the United States of Mexico[2], wherein, leprosy is listed with nearly sixty other communicable diseases in section 73 of the aforesaid Code. Leprosy appears as one of the twenty-two diseases mentioned in sub-section 1, of section 73 with meningitis tuberculosis and plague etc.; thus obviously handled like any other disease and not as a special separate problem. Measures to be adopted in respect of all these diseases have been laid down and these include isolation and surveillance of suspected cases & carriers, prohibition of certain trades and callings to them and provision for laboratory examinations, disinfections and disinfestation etc, Then the regulations of June, 1955 (Mexico)[3] provide for establishment and maintenance of dispensaries, preventoria, sanatoria and a special service for leprosy control. These regulations, in brief, lay down that the head of the central technical office of the National Leprosy Control Service and Heads of Leprosy Institutions shall preferably be physicians making public health their career, with training in leprosy, or Leprologists with training in epidemiolgy. Leprosy dispensaries to be designated as "dermatological Centres" and their essential duties amongst others, being to search for new cases, study, classify, treat the patients and to examine and re-examine contacts, Bacteriologically positive patients to be hospitalised and child contacts to be placed temporarily in preventoria. Any form of coercion to be avoided but the patients shall be subject to the provisions of the Health Code.

The Mexican Law thus, treats the leprosy sufferer at par with the patients of other com-

municable diseases; and at the same time provides for him special services to solve his problems which are peculiar to his case.

In several other countries the trend is towards ameliorating the lot of the leprosy patients. In Australia[4], Jamaica[5] and some other countries the words "Hensenide" and "Hensenide Colonies and Homes" have been used in their leprosy enactments. In Argentina there is a decree exempting medicaments for the control of leprosy from customs duty. There are countries where the law provides for help to patients in the form of family allowances or maintenance for the children.

On examining all the facts of this problem, the conclusion at which one arrives is that it shall be more fruitful if fresh legislation was both rational and humane. This is particularly true for the areas where the existing law is obsolete. In such cases a movement to abolish all such laws can hardly be expected to gather adequate support, whereas, a demand for improvement of these laws in keeping with the recent knowledge will perhaps be more acceptable, both to the administrator and to the man in the street.

A country without a national health code can frame either (I) an act dealing with the problem of all the communicable diseases, including leprosy, or (ii) an act dealing with tuberculosis, leprosy and the venereal diseases or at the worst (iii) an enactument dealing with leprosy alone.

The advantage of the first alternative is that such an enactment by a central government would ensure uniformity of methods and facilitate handling of inter-state problems in respect of the control of communicable diseases, and the problem of leprosy could remain a part of the general problem.

"Legislation in Public Health is a legal ratification of medical advance" (Macnalty). Far-reaching advances in the science of leprology have been made during the last two decades. It is time that these were ratified by the public health law of the countries where leprosy is a problem.

Summary

The juridical and human bases of public health law specially in relation to leprosy have been discussed. The existing leprosy laws of a few countries, particularly, those of Mexico have been examined. Suggestions for the enactment of central legislation for control of either (i) all communicable diseases, including leprosy or (ii) leprosy, tuberculosis and venereal diseases only, or (iii) leprosy alone have been advanced. Need for safeguards for the leprosy sufferers and establishment of special state leprosy services has been emphasised.

An early legal ratification of the advances which have been made in the science of leprology has been urged.

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GENERAL HEALTH SURVEY IN AN URBAN HEALTH CENTRE

By
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Introduction:

There are no records of any health survey having been carried out during the French occupation of Pondicherry State for nearly 280 years. After the *de facto* transfer of Pondicherry State to the Government of India in November 1954, two special surveys were carried out on leprosy and filaria.

With the establishment of the Department of Preventive and Social Medicine in the Medical College, Pondicherry, a pilot general health survey was launched in the Urban Health Centre, Kurichikkuppam. This centre is being used for the training of undergraduates.

Due to shortage of staff in the newly established department the scope of survey was limited. The survey was carried out for seven months from August 1959, to February 1960, and is the first of its kind in this area, to obtain an integrated picture of the state of health, environmental sanitation, socio-economic status and common prevalent diseases. The results of this survey are briefly described in this article.

METHOD AND ORGANISATION.

Sampling:

A census of housing along with births and deaths was carried out before starting the work. There were altogether 450 houses (five lying vacant).

The sample has been constituted by the method of systematic sampling and the unit is a house-hold. Every fifth house was selected for the survey. The relative position in the population of the different units included in this sample is fixed, consequently there is no risk that a large contiguous part of the population will fail to be represented as every fifth house can never be alike. The houses lying vacant and the house owners refusing to co-operate in the sample were not covered, with the result that out of a sample of 90 only 72 houses could be covered. This high rate of refusal was due to illiteracy, prejudice, political belief, economic reasons and language difficulty.

Schedules:

The information was collected on scientifically prepared schedules under the following headings.

1. *General survey schedule.* The items of information were, name of the Head of the family, no. of individuals in the family, their names, age, sex, marital status, religion, educational level, occupation, disabilities and addictions. No separate schedule was used for economic status, as it was resented by the population. The economic status was mentioned at the top of the general schedule as good, fair and poor according to the investigator's general impressions.
2. *Environmental sanitation schedule* which covered the sanitary condition of the house, surroundings, water supply, latrines and refuse disposal.
3. *Individual medical record.* This included information on each member of the family about his marital status, immunisation status and present state of health. In the case of females additional information on their menstural and pregnancy history, live births and infant mortality were collected.
4. *Physical examination* was carried out on all available individuals, supplemented by laboratory examinations.

Location:

Kurichikkuppam Ward is situated in the northern part of Pondicherry Municipality. It is rectangular in shape, bounded on the east by Bay of Bengal, west by *grami* garden, north by *Vaithikuppam* village and south by north Bouleward Road. An open sewage canal crosses it from west to east to join the sea.

Inside the ward, there are *semi-pukka* roads (not metalled) and *kutcha* lanes without any drainage system.

The ward is served by 5 municipal taps and 2 sets of public latrines with 5 seats each. The locality is typical of a mixed socio-economic group with poor environmental sanitation in a transitional stage of urbanisation with its peculiar problems.

The maximum and minimum temperatures in Pondicherry are 36.0°C. and 20.5°C. (1958) lowest in December-January and highest in May-June. The relative humidity remains high above 84% throughout the year. The main rainy season is from October to December (north east monsoon), but south west monsoon is also responsible for some rains from June-September. The normal rainfall is 47.9 inches (1958-59).

Vital Statistics :

The approximate area of Kurichikkuppam Ward is 0.06 sq. km. There are 479 families with a total population of 2,308, the average size being 4.81 as compared to 5.21 in India according to national sample survey. 72 families were included in the survey with a total population of 378, the average size of the family being 5.2. There were 188 males and 186 females, giving a ratio of 989 females per 1000 males, as compared to 1040 females per 1000 males in the whole Kurichikkuppam Ward.

The birth rate was 37.4 per mille as against the reported birth rate of 37.5 in the Pondicherry State (1958). There were only 3 deaths in the previous year, the rate being 8.02 as against 20.5 of the Pondicherry State (1958). There was only one death among the 14 infants born during the year, the I.M.R. being 71. There was one maternal death with M.D.R. being 71.4.

Age and Sex Distribution :

The age and sex distribution of the population in the sample is given in Table—I, for the purposes of comparison Pondicherry State's grouping by age and sex is given in Table—II.

Table I

Distribution of population by age & sex in the sample

Age groups	Female	Male	Total	Percentage of the population	Indian figure percentage
Under 1 yar ...	6	9	15	4.54	13.4
1-5 years	21	21	42	10.67	13.4
5-15 years	45	62	107	28.60	24.8
15-45 years ...	87	68	155	40.90	45.00
45-55 years ...	20	14	34	9.09	8.5
55 years & above ...	7	14	21	5.61	
Total: ...	186	188	374+4* 378		

*(2 females and 2 males—no age stated)

Table II

Age and sex distribution in Pondicherry State (1959) (*In thousands*)

Age group	Male	Female	Total	Percentage of the population
0—14 years	74	76	150	39.6
15—64 years	106	110	216	57.08
65 and above	6	6	12	3.1
Total:	186	192	378	

Religion :

There were 47.9% Christians, 45.5% Hindus, and 6.6% others in the sample.

Marital status, Pregnancy and Menstrual-History :

There were 59.2 per cent single, 34.2 per cent married, 6.1 per cent widowed, and 0.5 per cent divorced people in the population surveyed. Out of a total of 94 single females, 2 were unmarried mothers. There were 11.3 per cent widows as compared to 1.1 per cent of widowers. 1.1 per cent of females were divorced.

All the females above 20 years of age were married except five including two unmarried mothers.

Out of the 69 married women above 15 years of age, 30 had no living child. The average number of living children per married woman was 3.59 and the same per widow was 3.14.

Out of the 39 child-bearing women, 14 had pregnancy in the past year. 5 ladies had still births during last ten years and 2 ladies before 10 years. The figures are probably higher, as the ladies were shy to part with this information.

The mean age at puberty was 13.15 years based on the response of 69 ladies.

Educational Level :

The percentage of illiterates above the age of five was 40.4 per cent (Males 22.1 per cent and females 60.8 per cent). The just literates comprised 14.4 per cent, primary school level 35 per cent, high school 9.4 per cent, and graduates 0.7 per cent.

Occupation :

71.7 per cent of the population were non-earning dependents and 1.3 per cent pensioners. Only 10.8 per cent were in service and 12.4 per cent working as domestic servants. 3.9 per cent were doing odd jobs of daily wages like Rickshaw pulling, etc.

Addiction:

Among males above the age of five years 23.7 per cent were addicted to both alcohol and tobacco. (1.8 per cent to alcohol alone and 10.6 per cent to tobacco alone). Among females none was addicted to alcohol, but 24.8 per cent were addicted to tobacco. The tobacco used is of chewing variety taken with beetle leaves. None was found addicted to opium.

Economic Condition :

This sort of health survey and interrogation had never been done before, so the people were suspicious. Therefore, detailed enquiries about their income and expenditure were discontinued. Only the team-leader's general impressions as good, fair, and poor were recorded. 30.5 per cent families had good, 43.1% fair and 26.4% poor economic status.

State of Health and Sickness :

At the time of survey 11.1 per cent of the population was found to be sick, 6.6 per cent were chronically and 4.5 per cent acutely ill. The commonest chronic diseases noted were Arthiritis, Ch. S.O.M., Peptic ulcer, Asthma and Filarial swellings.

The commonest prevalent diseases under acutely ill were diarrhoea, dysentry, scabies, boils, conjunctivitis and upper respiratory catarrh. Females were more affected than males. 87.9 per cent apparently did not have anything to complain.

The past history of families showed the prevalence of the following diseases in descending order:—diarrhoea and dysentry, intestinal worms, respiratory catarrh, small-pox, chicken pox, whooping cough, measels, mumps, typhoid, hepatitis, T.B., leprosy and skin diseases.

The diseases detected on physical examination of the families occurred in the following order:

Eye diseases	...	21%
Deficiency diseases	...	14.2%
Caries teeth	...	13%
Skin diseases	...	11%
Enlargement of glands	...	9%
Enlargement of liver and spleen	...	9%
Respiratory diseases	...	3%

Disabilities :

Out of the population surveyed, 1.06 per cent had complete disabilities like blindness, deaf and dumbness, (two blind, one dumb and one deaf).

Immunisation Status :

Out of the total number of 259 individuals available for physical examination. 73 per cent were protected against small-pox and 27 per cent had taken cholera inoculation at sometime or other (not in last six months). Only 1.2 per cent had taken T.A.B., 0.8 per cent B.C.G. and 0.4 per cent diphtheria immunisation.

Absence of immunisation against small pox in 27 per cent of the sample population is a very high figure. The data suggest a mass vaccination campaign in the area.

Intestinal parasitic infection :

From the stool samples examined the ova of the following helminths were noted:
Ascariasis, Trichuris Trichuria and Ancylostoma.
The percentages are given in Table-III.

samples were examined by calorimetric method in the Biochemistry Department.

Table-IV

Haemoglobin Level

Hb in gms./100 ml.		No. of persons.	Percentage.
— 7	...	1	1.
— 8	...	1	1.
— 9	...	2	2.
—10	...	12	12.5
—11	...	31	32.4
—12	...	34	35.4
Above 12	...	15	15.6
Total	...	96	100

Table III

Intestinal Parasitic Infection Rate

		No. of samples examined	Ascariasis	Trichuris Trichuria	Ancylos-toma	Amoebic Cyst	Nega-tive
Male	...	44	15 (34.1%)	5 9.1%)	13 (29.5%)	—	20 (45.5%)
Female	...	50	10 (20%)	1 (2%)	10 (20%)	1 (2%)	28 (26%)
Total:		94	27.6%	6.3%	24.4%	1%	50%

Nutritional Status

1. *Height and weight :*

The average height and weight of men above 17 years of age was 64.1 inches and 111.2 lbs. The figures for females were 58.4 inches and 87.8 lbs.

2. *Deficiency diseases :*

14.2 per cent of the population examined showed signs of deficiency diseases more in females than males (15.1 per cent and 13.3 per cent). The commonest were bitotspots and angular stomatitis.

3. *Haemoglobin :*

Hb levels are shown in Table IV. 96 16.5 per cent of the persons examined showed haemoglobin below 10 gms./100 ml.; 67.8 per cent had between 11-12 gms./100 ml.; and 15.6 per cent above 12 gms.

Environmental Sanitation

Housing :

77.1 per cent of houses in the area are *kutcha thatched*, and 8.6% *pucca* thatched; 71-8% are of back to back or side to side type. 79.3 per cent of the houses were clean from inside, but 66.1 per cent had their surroundings dirty showing thereby the lack of civic sense. It is to be noted that it is not the custom in Pondicherry to have dust bins on the road side. All the garbage is to be thrown in the streets in the early morning for collection and removal by the Municipal

authorities which is done very regularly. Thus the surroundings even of the isolated hutments not situated near the main road remain dirty, being inaccessible. This occurs in 10 per cent of families.

Kitchen :

32.8 per cent of the houses had no kitchen, which actually indicates that they do not cook at home. They depend on cheap food and eat from pavement hotels, vendors, market and in the houses where they work. Except two families having a separate kitchen, others use a portion of the verandah for cooking called as "kitchen". 67.2 per cent of the houses had a kitchen like this.

Water supply :

All except two families draw their water from public taps. Out of these two, one family has a tap connection inside the house and the other uses a sanitary well. There are only five taps which are insufficient for the whole locality with the result that people cannot keep themselves clean.

Latrines :

Excepting one family none had any latrine of their own inside the house. That latrine too was insanitary and of a service type. Thus 98.5 per cent of families depend on public latrines. The number of seats being grossly inadequate, indiscriminate daefecation is very common especially amongst children. The sea-shore and the open drains are freely used for this purpose.

Bath Rooms :

There was complete absence of bath rooms in the houses surveyed and with the absence of water supply in their houses, the general standard of personal cleanliness was poor as reflected in skin and eye diseases.

Light, ventilation and general condition :

Lighting and ventilation were bad in 1/3rd of the houses but fairly good in others.

Overcrowding : Only 28.3 per cent of the houses had more than 50 sq. ft. of floor space per head in their living rooms.

All houses were harbouring rodents, especially *bandicoots* and rats.

Summary :

An Urban Health Centre was established in Kurichikkuppam Ward of Pondicherry Municipality for the training of undergraduate students of Medical College, Pondicherry, in family advisory service. A pilot socio-economic and health survey was carried out in that ward between August 1959 to February 1960, to have an idea of the health problems. These are discussed in the paper.

The primary needs of the area are improvement in the housing, water supply and latrine facilities, followed by tackling of socio-economic factors like unemployment, nutrition, addiction, unmarried motherhood, divorces and widowhood, general health education, and a mass small-pox immunisation campaign.

Acknowledgement :

Our thanks are due to the staff of the Department for helping in the survey, and the Professor of Biochemistry for haemoglobin estimations carried out in his department.

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EDITORIAL

1961 CENSUS OF INDIA

We congratulate the Registrar General of India on bringing out so promptly a provisional population total of 1961 Census within a month of the completion of the Census operations. It is provisional, rightly called so by him because the figures released represent only the first Census count between February 10 and March 1. Revisions will have to be made by fresh count of new births and deaths and due attention will also have to be paid to complaints regarding non-counting. There is yet another reason why the figure is provisional. It does not take into account returns from Manipur, NEFA, Nagaland and Sikkim. Even so, it has given us a broad picture of the present condition of population growth and its possible repercussions on the Soio-Economic conditions as well as on the programme of National Planning. In fact the population figures have proved to be a cause of anxiety to the Planners, Administrators and the Public Health workers alike.

According to the statement of the Census Commissioner the average expectation of life at birth has increased from 32 to 42 years (round figures). Infant and maternal mortality rates have come down considerably—in some States more than in others. The provisional population of India excluding the territories mentioned above has risen from 359,216,905 (M—182,871,428; F—173,079,631) in 1951 to 436,424,429 (M—224,957,948; F—211,466,491) in 1961. Thus the increase in the last 10 years has been 21.49 per cent "an increase about equal to the population of Italy and France put together". Split into males and females the increase is observed to be 21.95% for males and 21.2% for females.

During the last few years experts and expert bodies have made estimates of the population in 1961 by projection. But the actual count of 438 million during the present Census has exceeded these different projection estimates varying between 402 to 431 million giving a deficiency of 1.6 to 7% in the estimates. This deficiency became the subject of discussion in various platforms, and numerous reasons were offered. But one of the reasons which perhaps escaped the notice of most of us concerns the absolute validity and reliability of 1951 Census somewhat disturbed by the influx of refugees and movement of population. It is not unlikely that the 1951 Census was to some extent an underestimate for some reason or other.

Another noticeable feature of the population differentials is that there has

been a reduction in the female sex ratio from 946 to 940 per 1000 males—the absolute increase in the female population is 21.20 per cent against 21.97 per cent in the males. But all the States did not uniformly suffer from the lesser increase of females than males. Actually 6 out of 14 States of which the record is available, namely, Assam, Bihar, Punjab, West Bengal, Delhi and Himachal Pradesh have shown higher rates of increase of females than males. However from the previous Census records it appears that there has been a steady decline of female sex ratio from 972 in 1901 to 940 per 1000 males in 1961 except for a halt between 1941—1951 with ratios of 945 and 946 per 1000 males respectively. Besides the question of emigration and immigration, one other factor which may be responsible for this difference is the reduction of infant mortality rate which means saving of more male infants who are usually born in larger number and also die in same proportion at the infant stage. Nevertheless this change in the sex ratio should form a subject of intensive population study.

Numerous views have been expressed as the first reaction to the increased population revealed by the Census. They are from men of eminence and position and some of them directly concerned with studies in Demography. Some maintain that the rise in the total population is mainly due to the improved health conditions in the last decade. Some hold the view that it is only one of many causes. Again others think that it is due to inefficient implementation of the family planning plans. In fact the unprecedented rate of growth of population is largely due to a substantial fall in the death rate. It must also be noted that the growth rates revealed by the Census vary from 9.7 per cent in Jammu and Kashmir to 34.3 per cent in Assam. Generalisations can therefore be misleading and it is just possible that in certain areas the fertility rate has increased. It does not seem unlikely that an overall improvement in health conditions tends to increase fertility in the initial stages particularly when the knowledge and practice of family planning are very restricted.

We believe that there is a combination of factors involved in the issue of the growth of the population. To the extent Malaria Control measures have reduced diseases and deaths, improved health condition is responsible for the rise in the population figure. The advent of antibiotics and chemotherapeutic drugs have also played their part in reducing deaths. But the incidence of disease in rural areas where environmental sanitation is yet very poor has not been lowered to any great extent to establish the claim for improved health conditions in villages where 80% of the people live, as the cause of increase in the total population. Combined with the reduced death rate an increase in the birth rate in some areas, and in others it having remained static, has produced this unexpected growth of the population.

In so far as Health Services are concerned, after the attainment of Independence, much greater attention has been paid to the control and prevention of communicable diseases with augmentation of Publicity and health propaganda, particularly in places of religious congregation where epidemics of cholera and small-pox used to occur and served as main foci for spread of similar epidemics in distant rural areas. These measures have resulted in a considerable reduction in death rate and relative improvement of Health conditions. Not long ago the

rural population was deprived of its energy and vital capacity due to malaria, was also subjected to various illness and loss of life. Within the last few years the anti-malaria operations (N.M.C.P.) have practically freed them from these adverse conditions. It has considerably reduced general death rate, infant death rate and indirectly maternal deaths. There is also an indication of improvement in the economic standards in certain sectors of population. Though the price levels of essential food stuff have considerably increased to the detriment and hardship of the middle class population it cannot be denied that the labourers and workers in factories and other industrial establishments rapidly developed as part of the Five-Year Plans, have gained fairly well in the shape of increased salaries and emoluments. As against this silver lining in the Socio-Economic clouds the population by and large have been facing overcrowding, shortage of housing, adulteration of food and drugs, and low purchasing power. One class of unsocial and designing people are exploiting the situation causing serious deterioration of social health conditions. But in spite of these unusual conditions there has been reduction in the death rates without much affecting the birth rate. As a consequence there has occurred a high survival rate, rise in expectation of life almost threatening dislocation in every sphere of life, food, housing, education and employment. If the population continues to increase at this rate there will be further shortage of food and deterioration of Socio-Economic conditions in spite of the developmental schemes which have in their wake brought in fresh problems of concomitant inflation.

The growth of population has thus assumed the biggest problem in India. The estimated unemployment ranges round 10-12 millions. The planners may have to reconsider and adjust their plans to face the situation. This is why persons in responsible positions and leaders of the country have become perturbed over the question and are freely and frankly advocating measures of Family Planning and birth control. The budget grant under this head has been raised from 5 to 25 crores under the Third Plan. But mere allocation of funds will lead us no where. No doubt some good work has been done by the Government as well as voluntary bodies to rouse consciousness among the people for family planning, though it will yet take considerable time for the idea to percolate into the poorer classes and the rural population. Whatever work has hitherto been done, it is obvious, has produced no effective impression on the growth of the population. People's co-operation and understanding are essentially needed in the campaign besides the simplification and reliability of the methods advised. Vigorous efforts to improve the socio-economic and cultural environments and simultaneously spreading extensively and intensively the message of family planning are necessary. Family planning services require to be rapidly extended through the Hospitals and Health Centres in the country and integrated with normal health services. Fresh flow of supplies should be ensured and all kinds of contraceptives should be produced in the country. While surgical sterilisation measures may be adopted in labour areas it is doubtful if this can, at this stage of ignorance and illiteracy be introduced in rural areas. Research on oral contraceptives should be undertaken at various centres in the country and above all a vigorous drive for effective family planning carried out under proper supervision and guidance.

REPORTS & REVIEWS

ARTIFICIAL COOLING AND LIFE

By ELENA DOSKAOH

An unusual incident took place in the country's north some time back. A man was brought back to normal life at a small rural hospital in circumstances nearly fantastic to medicine. It was hard to believe that this man could live. But he lived all the same.

He had been found frozen in the fields, where he had been caught in a snow-storm. He was brought to the local hospital. His whole body was covered with hoar-frost, and when knocked with a percussion hammer, gave out a wooden sound. A film of ice covered the glossy, staring eyes, with their dilated pupils. The nurses had a hard time cutting and pulling off the clothes. There was neither breathing, nor heartbeat, nor pulse to feel.

After a careful examination, Pavel Abramyan, the chief doctor, made up his mind to save the man. There were chances, he thought. For one thing, nobody knew for how long the man had been frozen. Secondly, it was evident he was young and had 'died' not from disease, but from cold. What was equally clear was that he had 'died' in conditions very close to those of artificial sub-cooling or hypothermy. At normal temperature the time when a dying body can still be restored to normal life is very short—a few minutes after the heart stops beating and breathing ends. However, the time is much longer if the temperature of the body is sharply reduced. Incidentally, this is the reason why recently hypothermy has been widely used as a precautionay measure in heart surgery.

In his monograph "The Resuscitation of the Organism and Artifiicial Hypothermy" Professor Negovsky, who has specialised in this line, has devoted a whole chapter to hypothermy. He describes cases when experimental animals were revived an hour after death had been caused by deep narcosis and the body temperature was kept at 22 to 24 degrees Centigrade. Later, after writing the book, he had experimented with much lower temperatures too. Even what Pavel Abramyan had learnt from the book gave him the courage to make an attempt to save the life of the frozen man.

Two factors could mar the effort. First, the body temperature was too low, and it was not known whether tissues could retain their vitality under such conditions. Secondly, hypothermy calls for narcosis, whether in a clinic or in a laboratory, so that it may not affect the patient's health. But it was hard to say in what condition the man was when he was freezing. It was likely he had not lost consciousness, for his eyes were open.

All the same, the decision was to make an attempt, however hopeless it might seem.

The body was warmed up, rubbed with alcohol and warm water. When the tissues thawed a little, and the body grew less stiff, heart massage and artificial respiration were resorted to. Some 150 cubic centimetres of a donor's blood were injected into the artery, and a dose of glucose dissolved in alcohol into the vein. At first, everything seemed hopeless. All of a sudden, however, when artificial respiration had been applied for forty minutes, there came signs of spontaneous breathing. Five minutes later a very weak pulse could at last be felt. Hot-water bottles were immediately placed around the body, and the physicians redoubled their efforts. Gradually the breathing grew steadier. In an hour and fifty minutes the man was restored to life. But he remained unconscious for a long time still.

Gradually however he recovered consciousness and told of the events which had remained engraved in his memory: the freezing stormy night, the breakdown of the tractor, how he felt himself grow weak, and desperately desired to remain alive. Then he fell fast asleep.

A special frame was made, with electric bulbs fitted all over it. The warmth thus provided improved the state of the patient. Yet the traumas due to prolonged exposure to cold became more and more apparent. On the second day a very severe pneumonia set in and the patient gave signs of mental disorder.

When he grew stronger he had to undergo an operation: two phalanges had to be amputated from four fingers on the right hand and three on the left.

But the young man was saved. Today—nearly a year since the events described—he is alive, reasonably healthy and can even work.

This case proves what promise deep cooling or hypothermy holds out for medicine. So far, hypothermy has been widely employed only in surgery. The explanation is simple. It cannot be applied to a dead man, for it takes the physician at least an hour to reduce the body temperature to 24 degrees, while the cells in the cerebral cortex start decaying in just a few minutes after clinical death. The application of hypothermy for the resuscitation of human organs is therefore still in an experimental stage. But the outlook is undoubtedly promising.

What is the basis of resuscitation? Is this basis sufficiently scientific? The answer is definitely, yes. Science has long since proved that some tissues and organs of the human body can stop functioning for a while and then go back to work again.

Scientific investigations concerning anabiosis and hibernation have established that even the living organism as a whole is able to stand a temporary standstill without any harm to its vital functions. An example is the brown Russian bear whose winter sleep lasts from autumn to spring. The sleep is so deep that the bear does not take any food, but it does not die of exhaustion, either. Metabolism continues in its tissues, but so slowly that life practically ceases. As soon as spring comes, the bear wakes up and goes out hunting.

Early in the 20th century P.I. Bakhmetyev, the Russian pioneer of researches into anabiosis, made intriguing experiments on bats in winter sleep. He froze them down to 4.9 degrees below zero and then warmed them up. The bats would come back to life again. As Bakhmetyev found out, each living organism has its own limit of cooling. For bats the limit is 9° degrees below zero. Cooled more than that the bat would really die, as its tissues would be beyond restoration.

What about man? Man cannot remain asleep for weeks on end. But when he dies, slowed-down metabolism still continues in his organism, much as it goes on in a dormant or, rather, an anabiotic animal. This is a state in between life and death, and is at any rate, different from biological death, when there is decay of the cells.

As experiments have shown, this state can be prolonged by cooling. But how far can the human body be cooled without damaging the cells of the brain, the most sensitive and susceptible to adverse conditions?

This question has a practical aspect. Quick cooling applied artificially to preserve the vitality of tissues in the state of clinical death for subsequent resuscitation is only possible with very low temperatures. This problem is currently being investigated by Professor Negovsky and his colleagues. The numerous experiments carried out by them have proved that a dog under deep narcosis can be cooled down to 10 or 12 degrees above zero and resuscitated after a period of clinical death of two hours. This is the first time such results have been obtained anywhere in the world. But, probably, they are not the limit. The scientific and practical value of these experiments lies also in that a direct relationship has been established between the time during which the body can be resuscitated, and the degree of cooling. With the body temperature at 24 degrees, a dog can be restored to normal life after it has been in a state of clinical death from half an hour to an hour and a half. At 10 to 12 degrees above zero, resuscitation remains possible after two hours. It remains to be seen what is the final limit of resuscitation.

Ours is a remarkable time. What seemed to be sheer fantasy quite recently has become today a scientific problem the key to which is in the hands of man. It may well happen that we shall live to see how the 'dead' will be brought back to life after they have been dead for two or three days.

Skurkovich's serum. The struggle for Zoya's life lasted several weeks. but in the end death was forced to retreat. Zoya N. recuperated and went back to work. Some time ago we heard that she was happily married.

Then there was another case in a far away northern town. An exploded boiler caught five workers in a blast of hot steam. It was at night that this happened. The factory director put through a long distance call to Moscow and before sunrise Dr. Pushkar had flown in with a case containing the life-saving serum. And again the surgeon's battle against burns was victorious; once again several lives were saved.

Wide Use

More and more emergency calls were answered (Moscow surgeons have been out on quite a number of them) and every time local centres of anti-burn therapy were instituted in the town concerned, with volunteers eager to forward the cause initiated in Moscow.

Now Fyodorov and Skurkovich's serum is being used in Yerevan and Lvov, Sverdlovsk and Voronezh, kiev and in the Far-East.

The method has justified the hopes of its initiators, and is being used with success.

Burn Vaccine

We are swiftly approaching the time when the doctors will no longer have to depend on serum obtained from volunteers. Professor N. Fyodorov and S. Skurkovich, working in conjunction with Dr. V. Freiman, an associate at the Mechnikov Institute in Moscow, are engaged in research with a view to treating patients with anti-burn serum obtained from animals. Eventually, they hope, every hospital and every blood transfusion station will have an adequate supply.

The scientists are planning another interesting development, burn vaccine. Yes—real preventive inoculations with a burn vaccine. If a very small and harmless dose of poison extracted from burnt tissue is administered to a healthy person the organism responds to this vaccination by vigorously developing anti-bodies. If, subsequently, such a person suffers burns, the effects are much milder. The burn vaccine is now undergoing laboratory trials. In time it will certainly be of great help to firemen, steel smelters, chemists, to all whose occupation involves a risk of burns.

MATHEMATICS OF THE BRAIN

By Y. Loktionov

The functioning of live tissue—of the glands, the muscles, and the nerve cells—is attended by electrical events. Metabolism produces in different regions of the organism potential differences, or what are also known as bio-currents. They can be gauged, recorded, and used for purposes of diagnosis.

The bio-electric events of the brain are of particular interest for science. Tell us how the brain acts and we shall create its likeness, the specialists in cybernetics say. This is no idle statement. after all, cybernetic machines tackle the thorniest of problems, play chess, write verse, and also translate. These machines will improve, the more we get to know about the "mechanism" of the brain.

Ivan Pavlov devoted many years of his life to the study of the apparatus we use for thinking. He said once:

"If we were able to penetrate into the skull and if that place in the cerebrum which was excited most were to shine, we would see—in the case of a consciously thinking person—a bright continually changing spot of a fanciful asymmetrical shape moving in the cerebrum through much darker areas."

Today we can do that.

"Brain Telly"

Soviet scientists have invented a special machine for investigating the brain. This machine, the first ever of its kind, is called the electroencephaloscope, or, in plain language, a "brain telly". Its inventors are Prof. M. Livannov and Engineer V. Ananyev, both of the U.S.S.R. Academy of Sciences Institute of Bio-Physics. By simultaneously

Skurkovich's serum. The struggle for Zoya's life lasted several weeks. but in the end death was forced to retreat. Zoya N. recuperated and went back to work. Some time ago we heard that she was happily married.

Then there was another case in a far away northern town. An exploded boiler caught five workers in a blast of hot steam. It was at night that this happened. The factory director put through a long distance call to Moscow and before sunrise Dr. Pushkar had flown in with a case containing the life-saving serum. And again the surgeon's battle against burns was victorious; once again several lives were saved.

Wide Use

More and more emergency calls were answered (Moscow surgeons have been out on quite a number of them) and every time local centres of anti-burn therapy were instituted in the town concerned, with volunteers eager to forward the cause initiated in Moscow.

Now Fyodorov and Skurkovich's serum is being used in Yerevan and Lvov, Sverdlovsk and Voronezh, kiev and in the Far-East.

The method has justified the hopes of its initiators, and is being used with success.

Burn Vaccine

We are swiftly approaching the time when the doctors will no longer have to depend on serum obtained from volunteers. Professor N. Fyodorov and S. Skurkovich, working in conjunction with Dr. V. Freiman, an associate at the Mechnikov Institute in Moscow, are engaged in research with a view to treating patients with anti-burn serum obtained from animals. Eventually, they hope, every hospital and every blood transfusion station will have an adequate supply.

The scientists are planning another interesting development, burn vaccine. Yes—real preventive inoculations with a burn vaccine. If a very small and harmless dose of poison extracted from burnt tissue is administered to a healthy person the organism responds to this vaccination by vigorously developing anti-bodies. If, subsequently, such a person suffers burns, the effects are much milder. The burn vaccine is now undergoing laboratory trials. In time it will certainly be of great help to firemen, steel smelters, chemists, to all whose occupation involves a risk of burns.

MATHEMATICS OF THE BRAIN

By Y. Loktionov

The functioning of live tissue—of the glands, the muscles, and the nerve cells—is attended by electrical events. Metabolism produces in different regions of the organism potential differences, or what are also known as bio-currents. They can be gauged, recorded, and used for purposes of diagnosis.

The bio-electric events of the brain are of particular interest for science. Tell us how the brain acts and we shall create its likeness, the specialists in cybernetics say. This is no idle statement. after all, cybernetic machines tackle the thorniest of problems, play chess, write verse, and also translate. These machines will improve, the more we get to know about the "mechanism" of the brain.

Ivan Pavlov devoted many years of his life to the study of the apparatus we use for thinking. He said once:

"If we were able to penetrate into the skull and if that place in the cerebrum which was excited most were to shine, we would see—in the case of a consciously thinking person—a bright continually changing spot of a fanciful asymmetrical shape moving in the cerebrum through much darker areas."

Today we can do that.

"Brain Telly"

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recording potential differences in various parts of the brain, the brain telly" seems to open "the lid" of the cranium and thus enable us to observe the activity of this most complex of human organs.

The first electroencephaloscopes were able to register the action potentials of the brain in 50 to 100 places at once. Scientists are now putting the finishing touches on a 400-channel machine which will broaden the field considerably.

Unfortunately, it is quite a teaser to make out the readings on the "brain telly" screen. To trace interaction at hundreds of different points, a human being would need dozens of years. Now this job is quickly and accurately done for him by electronic computers.

The people studying the "mathematics of the brain" work at the Laboratory of Electrophysiology of the U.S.S.R. Academy of Sciences Institute of Higher Nervous Activity. By comparing the host of signals received from various parts of the brain and recorded as figures, scientists are learning the "mechanism" of the thinking apparatus, are trying to discover similarities between potential differences at various points, and whether excited changes in the different regions of the brain happen simultaneously, and so on.

All this is helping scientists to detect pathological changes in the brain, take successful action against several grave mental disorders, and recreate a most exact likeness of the brain for purposes of cybernetics.

A special automatic encoder is now being designed. When it is ready the scientists studying the "mathematics of the brain" will have the complete set—the electro-encephaloscope, the encoding and a midget electronic computer.

NOTES & NEWS

TREATMENT OF TB PATIENTS AT HOME

A year of follow-up studies in a tuberculosis control project in Madras has strengthened the earlier conclusions that "the results of home treatment by drugs...approach sufficiently closely to the results of sanatorium treatment to suggest that it is appropriate to treat the majority of patients at home".

The studies—reported in the Bulletin of the World Health Organization Vol. 23 No. 4-5 (1960)—have been carried out by the Tuberculosis Chemotherapy Centre, Madras, under the joint auspices of the Indian Council of Medical Research, the Madras State Government, the World Health Organization and the British Medical Research Council.

When the original report was issued, a year ago, it was stated that further information was needed on several points. Chief among them were (1) does the treatment of TB patients at home, instead of in a sanatorium, expose their families to any special risk of contracting the disease? And (2) how would the two groups of patients (home and sanatorium) respond to a second year of treatment?

* * *

Question (1) is answered by a report on the family contacts of the patients admitted to treatment either at home or in sanatorium.

The number of cases of tuberculosis developing in the families of patients treated at home *was found to be no greater than the number in the families of patients in sanatorium.*

Furthermore, serial tuberculin tests performed during the year did not yield evidence that more tuberculosis infection occurred in the contacts of home-treated than in the contacts of sanatorium-treated patients.

Of 26 cases of active tuberculosis which developed among contacts, 17 were attributed to infection by the index (original) case *before the start of treatment.* Further, 15 of the 26 cases were under the age of five years: 21 of the cases were under the age of ten.

The report concludes that the major risk to contacts during the year resulted from exposure to the index case *before* diagnosis. Contacts of home-treated patients were not exposed to any special risk of contracting the disease as compared with the contacts of those treated in sanatorium but *it must be emphasised*

that the patients were given effective treatment.

* * *

Question (2)—How do home and sanatorium-treated patients respond to a second year of treatment?—is answered in a further report, which, after recording exhaustive tests, states:—

> "It is concluded that, at two years, there was very little difference between the patients in whom the disease had reached a stage of quiescence following a year of treatment at home and those who had reached that stage after a year of the same treatment in a sanatorium"

REHABILITATION OF LEPROSY SUFFERERS

Early detection and treatment of leprosy may prevent the deformities which brand the leprosy patient for life and make it difficult for him to be accepted in society as a normal member of the community even after he has been cured. This opinion was expressed at a W.H.O. sponsored Scientific Meeting on Rehabilitation in Leprosy held in Vellore in the last week of November 1960.

10 Million Sufferers

A report adopted by the meeting said that while an exact estimate of the prevalence of leprosy was impossible at present, 10 million cases in the world was probably a conservative estimate. Of these, fewer than 5% could be accommodated in existing institutions. The vast majority were living in their own homes and probably not more than 20% were receiving treatment of any kind. The second W.H.O. Expert Committee on Leprosy had estimated that 25% of all leprosy patients suffer from some degree of physical disability.

As a means of accelerating progress in rehabilitation the meeting strongly urged that leprosy be studied and treated along with other diseases in centres where a wide range of medical scientists was available. Leprosy research should no longer be carried out only in institutions confined to leprosy and by leprosy specialists who do not have the assistance of basic scientists and experts in other fields. In addition to strengthening leprosy research this would have a great psychological advantage. *It was felt that as long as the medical profession continued to treat leprosy separately from all other diseases the public could hardly be expected to believe that it was not "a disease apart".*

Deformity Studies

It was recommended that surveys be undertaken not only to find out the extent of the disease but also to study the manner and time of the onset of deformities and their relationship to the stage of the disease, the treatment given and the occupation of the patient.

The meeting discussed the causes and cures of the various types of deformities—of hands, feet, face and those resulting from bone changes. Facial deformities such as collapse of nose, loss of eyebrows and sagging face were recognized to be of great significance in the rehabilitation of patients. The scientists agreed that these deformities were to a large extent preventible and in advanced cases much could be achieved by corrective surgical treatment.

People Must be Told . . .

The meeting stressed the need for large-scale educational and propaganda campaigns to inform the public about the facts of the disease. It was felt that widespread and deep-rooted prejudices with regard to leprosy formed the greatest single barrier to rehabilitation. *The public should be educated to appreciate the fact that leprosy is curable and that the deformities which remain after cure do not necessarily mean that the disease is still active.*

Rehabilitation agencies in various fields were urged to include leprosy patients in their programmes. It was felt that the experience of these agencies in combating prejudice concerning physical disability and in mobilizing professional and public understanding could be a great asset in developing future leprosy programmes.

Educating the Patient

Equal stress was laid on the education of the patient himself. He should know what routines to follow to avoid getting deformities. *Rehabilitation should begin when the disease was first diagnosed.* Therefore, the doctor or para-medical worker in the field must help all patients to adjust themselves both to the limitations imposed by the disease and to the expectancy of returning to full and normal life. It was felt that no rehabilitation programme could be a substitute for this basic education given by medical advisers. The great majority of patients should complete their rehabilitation with no other outside help and without admission to any institution.

LARGE-SCALE TESTING OF MEASLES VACCINE

A large-scale field trial of a new measles vaccine was initiated recently in Buffalo, New York, by the County Health Department and the University of Buffalo Medical School.

Some 750 children, all kindergarten and first-grade pupils in 15 public and parochial schools, received the first of three shots in a double-blind study. Half of the pupils were inoculated with the killed-virus vaccine and half with a placebo that does not contain any active ingredient. The children will receive a second and third injection during a period of 3 weeks.

The Buffalo test was prompted by some encouraging results obtained in smaller clinical trials conducted in several cities. Nearly 2,000 children received parental permission to participate in the Buffalo test, but many were excluded when they contracted measles prior to the start of the study during an outbreak of the disease in that city. Shots will not be given to children who have had measles.

Experimental studies on both live virus and killed virus measles vaccines, had reached a point where experimental animal data justified the initiation of carefully controlled limited studies in children. Several of the killed virus measles vaccines, had reached a point where experimental animal data justified the initiation of carefully controlled limited studies in children. Several of the killed virus vaccines were tested, first in adult volunteers and then in children, and found to be completely free of any side effects and capable of stimulating anti-measles substances in the blood. Each of these studies had been performed in widely separate geographical areas on the assumption that some of these children would be subsequently exposed to natural measles and it would then be possible to determine their degree of resistance. Based upon preliminary data the County Health Department decided that there was sufficient merit in the inactivated measles vaccine to undertake a study in Buffalo involving several hundred children. This study is aimed at determining the general safety of the product when administered broadly to small children, its ability to stimulate anti-bodies to measles and the capacity to protect children against subsequent exposure to the natural disease.

CURCUMIN AS COLOURING AGENT FOR VANASPATI

Investigations in progress at the Central Food Technological Research Institute, Mysore, suggest the suitability of curcumin derived from turmeric as a colouring agent for hydrogenated vegetable oil.

When powdered turmeric is extracted with alcohol, curcumin is obtained as a crude extract (7-8 per cent of the dry powder), mixed with the oil of turmeric. Addition of the extract (0.04 per cent on the weight of the fat) to hydrogenated vegetable oil imparts to it a pleasant acceptable colour. When added (even at 10 per cent level) to ghee, the colour is clearly visible and responds to the lime test.

Taking the present market price of turmeric in bulk at Rs. 48 per maund (80 lb.) and reckoning the yield of crude curcumin at 8 per cent, the cost of colourization per pound of vanaspati inclusive of the extraction process comes to less than 1 nP.

On the basis of average production of vanaspati in the country at 4 lakh tons, the country will need 2,000 tons of turmeric which represents about 1 per cent of the total production of turmeric in the country.

The addition of turmeric colour (at 0.04 per cent level of the extract) may serve as a deterrent for the adulteration of ghee with vanaspati because it acts both as a visible and as a latent colour.

It is considered desirable that the addition of sesame oil should also be continued as it will serve as an additional check. This is not affected by the presence of the turmeric colour in the suggested concentration.

MANUFACTURE OF FREE-FLOWING TABLE SALT

Optimum conditions have been worked out for preparing free-flowing table-salt from marine salt at the Central Salt Research Institute, Bhavnagar. The process involves purification of salt with lime and soda-ash and crystallisation under controlled conditions so as to produce grains of size and shape conducive to the free-flowing quality.

Cost estimates indicate that a one-ton per day plant would give a 21.5 per cent return on investment.

Ordinary common salt contains certain hygroscopic impurities. Thus, even when powdered to the requisite grain size, it is not free-flowing particularly in humid weather. Even when freed from impurity, the salt absorbs moisture when the humidity goes beyond a certain limit. It is therefore necessary to incorporate small quantities of certain chemicals (driers) to form a protective coating on the grains so as to perserve the free-flowing quality under varying atmospheric conditions. The free-flowing property is further improved by providing a very thin coat of a non-offensive paraffin wax in addition to small quantities of the usual driers.

IMPROVED PASTEURIZER

An improved pasteurizer has been evolved at the Central Food Technological Research Institute, Mysore. The pasteurizer, which has been patented, is stated to be an improvement over the equipment available in some of the industrially advanced countries.

The colour, flavour, texure and vitamin content of many canned foods are most effectively preserved by high-temperature, short-time cooking or pasteurization. Commercially, this is accomplished through flash-pasteurization and agitation.

Flash-pasteurizers are, however, suitable only for liquid food products like fruit juices and have not been successful in processing semi-fluid or viscous food products like fruit juice concentrates, pulps, pastes, soups, etc. and of canned fruits on account of their high viscosity.

The Mysore Food Technological Research Institute has developed a batch-type agitating cooker in which heremetically sealed cans containing acid foods (fruits) rotate axially in steam at atmospheric pressure for some time (depending upon the nature of the product) enabling spin-cooking of the cans under water sprays within the cooker.

The salient features of the design are:—

* A variable speed drive gives a wider range of axial rotation of cans thereby providing facilities for the processing of a greater range of canned acid foods of different viscosities.
* The processing time of various fruit products ranges from 1 to 3 minutes as compared to 20-30 minutes required with the conventional stationary processing.
* Heat-sensitive fruit products can be destroyed without affecting the product.
* The cost is only about a fourth of similar imported equipment.

About 500 cans per day have been spin-processed over the last two years in a prototype spin pasteurizer. Products which have been spin-processed in this unit include canned fruits, such as, mango slices, pineapple, orange segments, banana chunks, papaya chunks and tomatoes; fruit pulps like mangola, mandarin orange juice, pineapple juice, tomato juice and mango pulp; fruit juice concentrates of orange, mosambi orange and pineapple, and tomato soup.

All these have stood storage tests for 6-12 months at 30°C.

MALTED MILK POWDER

A new process for producing malted milk powder has been developed at the Mysore Food Technological Institute. The process consists in mixing concentrated malt extract with milk powder, fats and carbohydrates followed by vacuum drying.

A notable advantage of the process is the use of milk powder in place of liquid milk and concentrated malt extract in place of mash liquor prepared from green or kilned malt, which eliminates the need for evaporation.

Fifty lb. batches of the milk products have been successfully prepared and found to compare favourably with imported products both in taste and flavour. The shelf life of the product is about one year at 37°C.

Raw materials required for the process, namely milk, ragi, jawar, barley and wheat are all available indigenously.

Total capital outlay on a plant having a capacity of 300 tons per annum is estimated at about Rs. 6.05 lakhs, and the equipment required includes vacuum shelf driers, powder filling unit, mixers, seamers and granulator.

PROTOTYPE HEARING AIDS

Interesting details are available of the designs of cheap and efficient hearing aids which would be sufficiently cheap to be within the reach of the institutions for the deaf and dumb in the country.

Of the two personal hearing aids designed, one employs miniature valves and the other transistors.

In these hearing aids, minimum number of imported components have been used and both the initial and maintenance costs of the units are lower than those of imported units.

Based on laboratory estimates the cost of the personal hearing aid using the transistors works out to Rs. 175/- and that of the group hearing aid to Rs. 1,800/-.

The group hearing aid designed consists of a unit to mix the output for several microphone channels followed by a properly shielded amplifier which has two outlets and six channels each, thus providing listening facilities for 12 deaf students.

Steps have been taken by the N. P. I. to pass on the new invention to the industry for commercial manufacture.

WORLD CONGRESS ON GYNAECOLOGY & OBSTETRICS

The 3rd World Congress of the International Federation of Gynaecalogy and Obstetrics will be held in Vienna from September 3 to 9, 1961.

The scientific program will include main lectures, colloquia, fireside conferences and so on.

Chiefly the following subjects will be the topic of discussions:

I. Surgical treatment in gynaecology and obstetrics
   Conservative operations of fibroids
   Operations of stress incontinence
   Operations of aplasia vaginae
   Surgical treatment of Carcinoma of the Collum
   Treatment of incompetent cervical os
   Forceps
   Vacuum extractor
   Treatment of breech presentation
   Anesthetics in cesarean section

II. The role of the pituitary gland in the physiology and pathology of genital organs
   Diagnosis and treatment in Sheehan's disease
   Treatment with Gonadotropin in anovulatory cycles
   Induction of labour with Pituitrin

APPEAL TO MEMBERS

Donation list for the W.H.O. Malaria Eradication, special account will be kept open till 31st December 1961, so as to enable all members to contribute liberally for this noble cause.

* * * *

Members will kindly remit their annual subscriptions without delay so as to ensure regular receipt of the journals.