

People's health
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PEOPLE'S HEALTH

A Pioneer in the Field of Public Health

Vol. I MARCH No. 6

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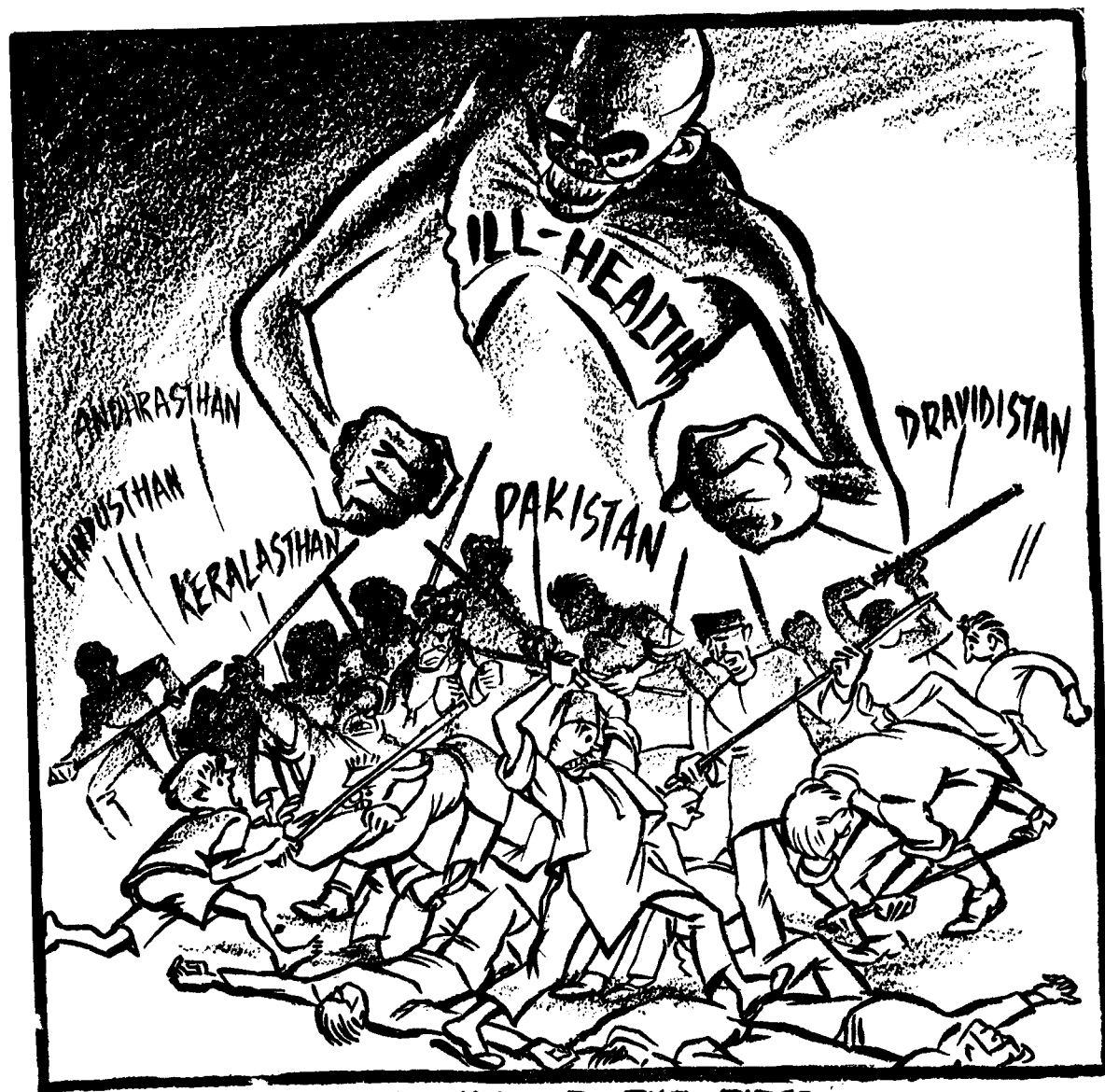
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PEOPLE'S HEALTH

A Pioneer in the Field of Public Health

VOL. I
No. 6

MARCH, 1947

ISSUED
MONTHLY

"Give me health and a day, and I will make the pomp of Emperors ridiculous"—Emerson.

EDITORIAL . . .

A LEAD TO OUR LEADERS.

It is well known that Bentham's famous remark about achieving the greatest happiness of the greatest number gave rise to more than a generation of heated and often embittered controversy as to the exact import of the terms, and the general drift of his epigram. He was trying to interpret in terms of a practicable utility the grand end and aim of life on earth. We speak of happiness as the ultimate end of all human exertion; but what exactly the term happiness connotes is a matter of great divergence of opinion from man to man. Bentham's utilitarian theory, like that of the modern followers of Marx, makes an attempt rigorously to exclude all but the purely materialist aspects of life. Taken in that light and applied to the different departments of human activity, it came to mean an indefinite multiplication of industries and an equal or equitable distribution of the fruits of such industry among all the people. But a very little reflection is enough to convince us that, granting for the sake of argument, all men in the world

are guaranteed equal or equitable incomes, and that every man is assured of his motor car, it does not follow that everyone of them will be equally happy. Therefore it was on this rock of materialism that Bentham's theory of utilitarianism foundered.

We are reminded of this dogma concerning the greatest happiness of the greatest number in connection with our labours in the cause of promoting public health in this country. It has been well said of a true friend that he multiplies our happiness while dividing our miseries in the act of sharing them with us. In the world of Bentham or Marx such a 'true friend' would be declared a bankrupt. For he produces no material goods; his production is love and brotherhood of man. Look at all the achievements of man today and you will find it hard to place your finger on any material fruit of labour which has given unalloyed happiness invariably. Consider wealth. The more one accumulates it the more does he become the target of other people's hatred. Consider genius—may be even a poet or a novelist. The very measure of his

success provokes detractors and rivals to belittle him. Consider the great nations. They are feared or dreaded by the smaller ones. Such are the inequalities incident to life from which inevitably flows a perennial stream of discontent, suspicion, hatred and division. The amount of energy wasted by exhibitions of these unsocial traits have not been properly computed by any competent authority; but if they could be assessed, the loss in terms of wasted national energy would be somewhat colossal.

There is, however, one direction in which we feel that we can promote the greatest happiness of the greatest number without any deleterious consequence to the body politic either individually or collectively, and indeed with positive benefits to both. We refer to the fact that each one of us can go on improving our health, and become a centre of life, light and leading ourselves without rousing the envy, anger or fear of our neighbours. "A Healthy Mind in a Healthy Body" is an old Greek dictum which is as relevant to our present day needs as it was in the remote past. In fact the drain of energy entailed by the exactions of modern civilisation is not being properly recouped by us. We are not providing again for wear and tear in our daily life, and so fall unresisting victims to premature illness, debility, decay or death. That shrewd observer of life and manners, Bacon remarks, "Nothing forwards the conclusion of business so much as good health." Here is an easily acquired individual potential which will stand us in good stead in the daily performance of our routine duties. If only we could organise in the years of youth a system of living according to the Laws of Nature, and if we could make a maximum use of science to promote Health, we can be

assured of a society filled not merely with able bodied men and women, but with people having a special extra-quantum of efficiency and morale at their command.

One wonders if there is a fatality dogging nations too, and whether it is impossible for some nations to recapture the vitality of their youth. The Spartans of yore are hardly to be found among the citizens of modern Greece. What a mockery it is for any Indian to say that he is a descendant of Bhima! There is undoubtedly a certain amount of dwindling in the strength and sturdiness of the breed as time goes on. There is a decadence which overtakes us through our own folly or ignorance of the elementary laws of health. If we could have training centres or gymnasia where the youth of the country could exercise their limbs and increase their strength,—which is merely another way of saying that they should increase their resistance to disease.—what a miraculous transformation is likely to come over us, our society, and in the temper of our people as a whole, and indeed in their attitude and approach to the solution of national problems.

In the name of any national emergency such as war, authority finds it very easy to drive us like a flock of sheep and to get things done. War effort takes priority over all other efforts, and a great variety of activities fare so concentrated upon a grand objective that a psychological as well as an emotional background is created for concerted, unanimous, ungrudging common effort. It is a marvel that a human enemy with external weapons should evoke such gigantic and totalitarian exertion and produce such prodigious results. On the other hand, it is a perplexing problem that the insidious and dreadful enemy masquer-

ading behind dirt, disease, debility and death should evoke so little response in us. No calamity in times of peace spurs us to the length of effort as the so-called national urge in times of war. There could be no more tragic commentary on modern civilisation! Is there no hope for thousands, nay millions, dying uncared for? Is it not a matter of grave national concern that our children or our expectant mothers should go with insufficient nourishment and saddle the community with inefficient men and women? Has it never struck our rulers that the most fruitful way of spending money would be to build up health rather than to fight disease. We would go a step further and dare affirm that if we could bring up the health of our people to something like the normality that is found in western countries, it is even possible for us to get rid of a good deal of that intolerance, misunderstanding and impatience of each other's points of view which are magnified for all the world under the shameful label "Communal Trouble in India." Two healthy men in perfect enjoyment of all their faculties are not likely to be afraid of each other, to be impatient of each other or suspect each other of designs against the other. There is something infectiously inspiring in the picture of a man in perfect health. There is an unforced beauty in looking at a healthy man or woman apart from their possessing good looks. It is an asset to have such men and women because they add to the pleasures of life. It is the shortest and the surest way to the greatest happiness of the greatest member.

We are almost inclined to think that part of the Englishmen's success throughout the world as conqueror, trader, colonist or explorer has been largely determined by their enviable command

of a high average of physical health. With their genius for oversimplifying things, the British call it—"keeping fit." If you ask them why they should 'keep fit,' they won't tell you why. They simply smile and pass on. In our country on the other hand, there is a fatalistic attitude towards this question. Illness is often tolerated as part of a divine dispensation, and preventive methods are discouraged as evincing lack of faith in Providence. No wonder that ours is the melancholy privilege of establishing new low records in regard to vital statistics.

It may be argued that it is a vicious circle which connects Health and Economics. Unless we better the economic conditions in general, health conditions cannot improve; and unless health is improved the output of the nation cannot be increased. But this is a dilemma which looks more formidable on paper than in reality. Education goes on continuously and at different levels through different agencies in the economy of a nation's life, and we must trust to these forces acting cumulatively to resolve the dilemma, and make it a rational sequence instead of remaining a vicious circle.

It has been pointed out by students of public health that a remarkable change occurred in England which could be traced to strides in education taken up after the dawn of democracy which also meant the dawn of the modern scientific era. We are about to witness the dawn of our democracy under conditions of untrammelled domestic freedom. Should we ~~not~~ therefore make the best use of ~~this~~ opportunity to effect an enduring improvement in the nation's political and economic levels by first taking up for overhaul the basis of the nation's health? If we could only do this, it will be reflected in the speed and success which

would attend our integrated efforts at national reconstruction. There is no surer or simpler way to national advancement and happiness than this, nothing that will subserve the interests of the country better. So long as we were contending with a common enemy, the people were content to be led; with the departure of that objective, the time has now come for the people to demand that the leaders take them to the next right goal. It is that popular demand that is voiced forth in this article; it is a demand that our leaders would do well to heed; to ignore it will be at their peril!

OUR VAGGINATORS.

India still continues to be a happy hunting ground for smallpox and all provinces share equally in this misfortune. So far as Madras province is concerned, while compared with the earlier decades there has been a distinct decline. Its incidence is still disquietingly high. Mexico, Africa and China report heavy incidence. Many countries which previously suffered from severe epidemics have been able to banish the disease from their midst. Apart from many European countries, Philipines and Ceylon have succeeded in largely eliminating smallpox. Unfortunately we have not so far been able to effectively tackle this problem. What are the causes that contribute to this unsatisfactory position?

It has been widely recognised that vaccination against smallpox is one of the most potent weapons we possess in our preventive medical armament. When the specific cause of a disease is known and when a specific preventive measure is available, the control measures naturally become well-defined. While other conditions, e.g., crowding and inadequate housing may be talked of, it is the specific cause that matters.

It is only by thorough and systematic vaccination that we can ever hope to tackle the problem.

In spite of the existence of vaccination for a very considerable time, it has never reached an effective level mainly on two accounts—one, the woefully inadequate number of vaccinators and the other the pitiful conditions of their pay and prospects. In fact, the second reason leads to the first.

It has been laid down that in Municipal areas one vaccinator is required for every 20 or 25 thousand of population. No such scale is suggested for rural areas. The average population for a vaccinator is nearly a lakh and the area which he has to traverse often ranges from 250 to 500 square miles! It is understood that attempts are being made to reach a scale of one vaccinator for 50,000 of population. It can be easily seen that it is impossible to expect vaccination to be timely, systematic or thorough. It is essential that the standards laid down for urban areas should be applied to rural areas as there are vastly stronger grounds.

The labourer, they say, is worthy of his hire. You cannot expect a conscientious and contented public servant of this class on the wages of an unskilled workman and with no prospect to look forward to! It will be admitted that basic employment for a young man of the matriculation standard cannot be less than that of a lower division clerk. The lower division clerk can definitely look forward to promotion as upper division clerk, superintendent, or manager. In the case of the vaccinator who besides being a matriculate is a S. I.—a qualification after one year's costly study in a Medical College—not only is he paid less than the lower division clerk but he is condemned to stagnation in his post as recruitment

to higher posts happens to be by direct recruitment. There is no wonder that the vaccinator has no heart in his job and no zest for his labour. It is therefore high time that this state of affairs is radically altered. The scale of pay should be put on a definitely better basis and the rules of recruitment should be so altered as to make it possible for the vaccinator to be promoted as Health Inspector in the normal course.

A word should be said about the "Vaccinator." The term was used originally when men with no special educational or technical qualifications were given a short training and employed as "vaccinators." The conditions are different now. All vaccinators are qualified Sanitary Inspectors and have as much right to be Health Inspectors as those who are now being recruited directly from freshers. Besides in the postwar dispensation it is expected that this class of men will be required to attend to all Public Health duties in a limited area with a small population. It is time that steps are initiated in the right direction, instead of waiting for the millenium to accomplish the reform.

Only one other matter remains to be mentioned. It is the role of potent lymph and the maintenance of this quality till it is applied to persons. Seasonal conditions play a great part in cutting down the effective period of vaccination to almost half of the year, in the absence of effective cold storage and transport facilities. This again has a bearing on the number of vaccinators required for timely and systematic vaccination.

The knowledge that there is a potent preventive measure and that it is perfectly practicable to apply it has not availed us in effectively reducing let alone banishing smallpox from our midst. It behoves those in authority

to subject the matter to a searching examination and carry out radical reform in the organisation of vaccination.

MADRAS PUBLIC HEALTH BUDGET.

So far as the health of the people is concerned, the Madras Budget is lamentable. It does not indicate any policy to promote the health of the people. The Ministry has not raised its little finger to implement the so-called election pledge. It has of course, taken care to go forward with 'schemes' which have been designed in the hope of pleasing the High Command! Much was talked about raising 'the living standard of the common man'. Little has been achieved and much less is proposed to be done during the coming year.

The Finance Minister states in his printed speech:

"Some important schemes relating to Medical and Public Health Departments included in the 5 year plan of post-war development, such as the opening of Medical and Public Health Centres in villages and the reconstruction and improvement of District and Taluq Headquarters Hospital have not yet been formulated in a final form".

Why were they not formulated in a final form and what were the insuperable difficulties which stood in the way? The speech does not attempt an answer to these and similar questions which would strike the common man. Many Committees and Sub-Committees had been constituted to formulate definite proposals. We are now told that all the Himalayan labours have all ended in the proverbial mouse!

The Budget Memorandum states:

"The Government have decided that the expenditure on rural water-supply schemes should be financed directly from current revenues as in the case of other post-war development schemes and that a separate fund for the purpose is unnecessary".

We may recall that the then Finance Minister while presenting the Budget for 1937-38 dwelt at some length on rural water supply. He stated:

"92 per cent of the total population of our province live outside the municipal towns. The problem of adequate drinking water supply for these people is still to be solved. Foremost among the things that the School of Public Service, which the present Government represents, wishes to achieve, is to make pure drinking water supply available for the people of every village in our land. Not roads, not even literacy can possibly be a greater or more urgent need".

He further stated then:

"The possibility of borrowing and creating a distinct fund for rural water supply from which money could be drawn according to requirements, thereby solving the problem of uncertainties in budgeting will also be explored".

After exploring the problem the then Ministry (Congress Ministry, by the way) created a Rural Water Supply Fund. Now we are told by its successor—another Congress Ministry—that these schemes should be financed directly from current revenues. The public are entitled to know the circumstances which led to this *volte face* in the policy of providing a fundamental necessity of life. When people

are dying in thousands through preventable water-borne diseases and when people are tossed about with parched tongues for a mouthful of safe drinking water, the Ministry in its wisdom, has provided in its budget for the conversion of the existing School of Indian Medicine into a College of Indian Medicine! These are according to the Ministry, the first and essential steps in promoting the health of the people! The Ministry cannot be congratulated on its sense of values; but the Province should feel thankful that it has been saved from a number of training Colleges for quacks being studded throughout the length and breadth of it. The Ministry stands *prima facie* condemned for its lack of policy or principle in improving the environment in which people live. The reconstruction or improvement of district and Taluq Hospitals should not certainly have in any case a preference over the provision of safe drinking water to our people.

The decrease in the revised estimate for 1946-47 is reported to be due to savings in the provisional grants to the Madras Corporation and other local bodies for water supply and drainage scheme, owing to the slow progress of works. Savings indeed! Such savings show that in budgeting competent forethought had not been bestowed. Was the poor progress due to unexpected circumstances? The Ministry has failed to recognise the bottle-necks in the Services organisation, which were responsible for the poor progress. The organisation of Public Health Services in general has been defective and ineffective for a long time. No steps have been taken to organise it on sound lines. For instance, the Public Health Engineering Department, had been the Cinderella of the permanent services under

Madras Government. Its history is a weary, disgusting tale of woe. This Department is being manned by *temporary* men; by men who have no permanent interest in running a competent service. Today the Sanitary Engineer is a *temporary* officer who is on a contract basis, terminable at short notice. One Deputy Sanitary Engineer's service is on an ever *temporary* basis; and naturally his heart cannot be expected to be on his work. The other Deputy Sanitary Engineer is one whose services have been *temporarily* placed at the disposal of this department by the P.W.D. The Mechanical Expert is also one whose service has been loaned *temporarily* to this branch. Thus, everyone of the responsible officers of the Department is *temporary*. They cannot be expected to have any abiding or permanent interest in it. Circumstances had been long conspiring to keep this important branch of service in this ineffective state, to say the least of it. In these circumstances, is it reasonable to expect the Department to render any service to the public worth the name? The officers can be only expected to draw their salary and cool their heels! Instead of organising the Department

as an independent one and filling posts by men competent to discharge the duties, proposals have been considered to open new Colleges, to train Textile Engineers and Aeronautic Engineers! At the same breath, the Ministry has proclaimed that the Textile industry through machinery should be tabooed! Not a word has been whispered about the training of technical men for service in this branch.

—o—
Let us not delude ourselves in the belief that *people's government* is in power. Gandhiji's name is exploited fully at every turn by cliques and groups to capture power; but Gandhiji's fervent appeals to improve the environment of our villagers go unheard. His appeals even at prayer meetings to improve the sanitation of our villages, are not implemented in practice by his so-called followers, who have captured power. The common man should continue to suffer and at the same time he should gain strength by galvanising his heart to enable him to assert himself when the day comes. The politicians who play the game of power-politics have no compunction to sacrifice human lives at the altar of their ego, vanity or self-interest.

UNITY OR DIVERSITY ?

Under this caption we drew attention in our issue of November, 1946, the untenability of the position taken by the Madras Minister of Health as also the Minister of Health, Bombay Government, in respect of a resolution of the Health Ministers' Conference at New Delhi accepting the principle of amalgamation of Medical and Public Health Departments. We searched in vain for the reasons which impelled these two Ministers to sound a dissenting note. Now the Government of Madras have been pleased to issue a *Press Communiqué* setting out the reasons in support of the stand taken by the Minister of Health. We shall in due course examine the reasons now put forward in favour of *co-ordination* between the Medical and Public Health Departments in preference to *amalgamation* of the two branches.

VILLAGE SANITATION

BY

DR. T. S. S. RAJAN,

Ex-Minister of Health, Madras and Father of the First Public Health Act in India.

Reginald Reynolds in his 'Gleanliness and Godliness' states :

"Sanitation has its history, its archaeology, its literature and its science. Most religions concern themselves with it, sociology includes it within its sphere, and its study is imperative to social ethics. Some knowledge of psychology is necessary to understand its development and retardation, an æsthetic sense is required for its full appreciation, economics determine, to a large degree, its growth and extent, while the ultimate disposal of sewage must be viewed in the light of biology."

In my last article which appeared in 'People's Health,' pages 179-181 (January, 1947), I drew attention to the fact that even the best designed public convenience failed to fulfil the objects of providing modern sanitary conveniences. This was the case in an urban area. The conditions would prove to be infinitely worse if such conveniences are introduced in our rural areas. The failure is largely due to the want of appreciation of the points brought out pointedly in the extract given above. It is difficult to knock out of the mind of the masses the traditional ideas which are saturated in their very blood. *Charaka Samhita* published about the second century A.D. has taught people that domestic latrines are intended only for the sick and infirm and that healthy people should proceed a bow-shot from the dwellings to answer the calls of nature. This idea of open air latrine even now



persists in the minds of the masses. It is extremely expensive to provide modern sanitary convenience in all our villages. To educate them as to how these conveniences should be used is a Herculean task. Tradition has taught people not to defecate in water and some have therefore objection to ease themselves in the water held up in water closets! Sanitation is not to be confused with any particular notion or prevalent system. It should be considered in relation to the best and most expeditious disposal of sewage, the abatement of nuisance and causes of infection, the fertility of the soil and many other matters such as the climate and the means at our disposal.

Mr. G. Rajagopalachariar once discussed with me the desirability of devising a method which would meet the habits of our people without putting them through a course of training in the art of using a public sanitary convenience. The idea appealed to me. It appeared to be quite a feasible proposition. The principles underlying this idea are :

PEOPLE'S HEALTH.

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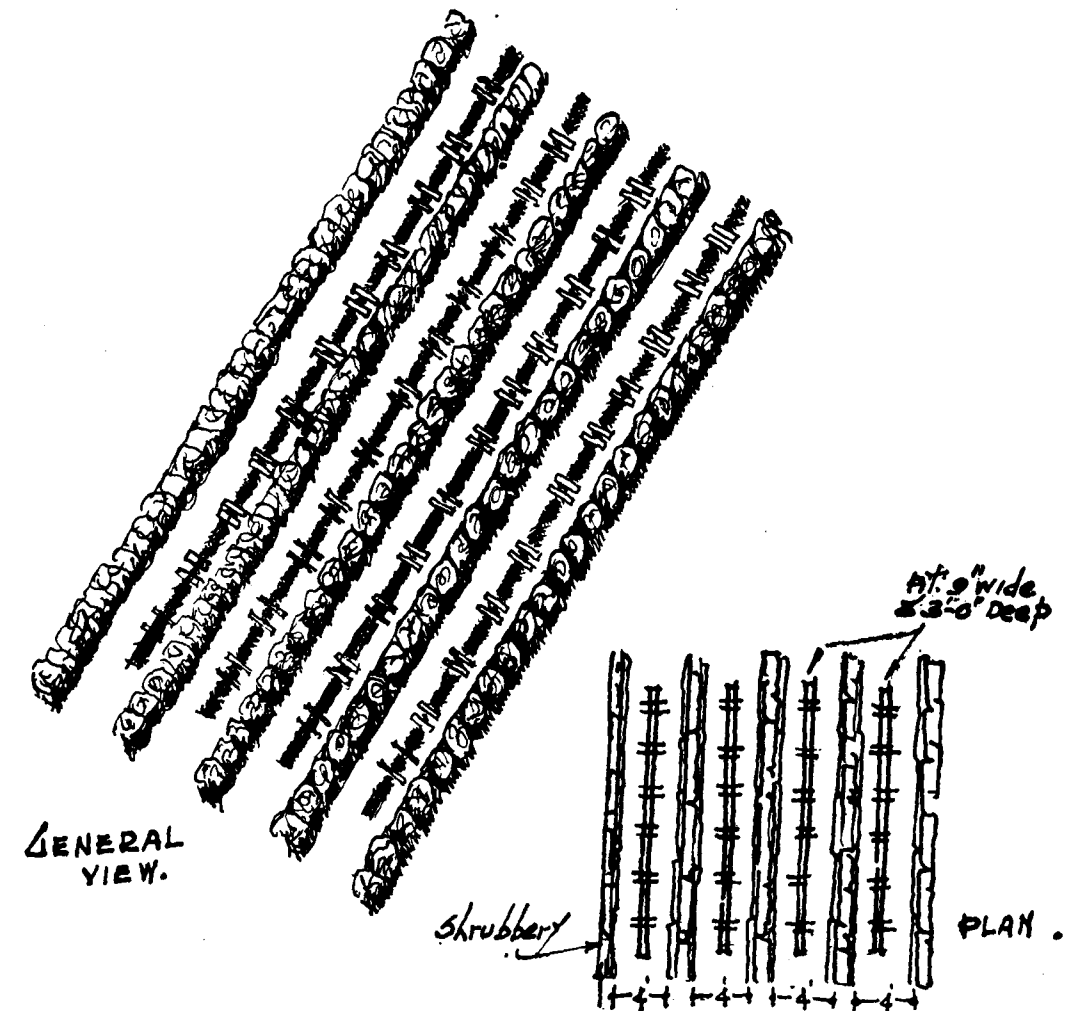
(a) The villager is generally averse to get himself imprisoned as it were, in a closed cell for any time to enable him to answer nature's call. Why he has a revulsion to such imprisonment is obvious.

(b) The villager is blissfully ignorant of the evils of exposure of the faecal matter. He is not aware of the dangers to which the society would be exposed by such exposure of filth. He does not see any need for burying it. He generally considers a latrine as a foul place in every sense of the term. Where public latrines are provided

they are not generally maintained in a condition which would attract people to use it. A public latrine was once defined by Mr. (now Sir) T. Vijayaraghava Acharya as one *around* which people defecate. What an apt definition!

(c) The sense of decency of the masses is not sufficiently developed to prevent them from exposing themselves while answering the calls of nature.

(d) People who are accustomed to smoke during the act, want to do it



leisurely without feeling that they are locked up in a closed cell. This practice probably applies equally for both sexes.

Whatever provision is made, one should bear in mind that handling, collection and conveyance of nightsoil in leaky carts drawn by lifeless bulls or buffaloes as we often see in our Municipal towns, should be avoided. Composting putrescible matter is an ancient art which has been developed almost to perfection by the ancient Chinese. Conversion of nightsoil into good humus for the use in the field is quite practicable. In the name of 'modern sanitation' and sewage purification, the soil should not be impoverished.

I suggest that the following method of providing public latrines in rural areas, may be given consideration :

A site some distance away from the dwellings proper should be selected for locating the latrine. The soil should be fairly dry. It should be capable of being drained readily. It should not admit of rainwater stagnating. The extent of site selected would be governed by the local requirements. A live hedge may be reared in the first instance as indicated in the sketch given above. Several variations of the layout are possible. For instance, cubicles could be formed with a live hedge to give greater privacy. So long as the underlying principles are observed these variations may perhaps improve the amenity. I suggest that Malabar nut (*ADHATODA VASIKA*) (ஆடாத்தாடை) or the sweet scented henna (*LAWSONIA ALBA*) (மஞ்சளாணி) may be chosen for forming the hedge. These are bushy ever-green plants, easily raised from cuttings and not browsed by goats or cattle nor attacked by plant pests or diseases. The hedge should be well watered in the

early stages of growth. When it has grown to a height of 2 to 3 feet, trenches should be excavated as indicated in the plan. The earth so removed may be put either at the bottom of the live hedge or heaped up at any convenient spot. Locally available stones; slabs or any other material may serve as foot rests. If no local stone is available suitable for the purpose, then pre-cast concrete slabs may be used. When the trench is nearly full, the live plant may be pruned and thrown into the trench finishing it off with earth. It should be so finished as to avoid water getting into it. After a few months when the fermentable matter would have been converted into poudrette, it may be dug out and carted away to the fields. Before this is done, a new plot of ground may be similarly laid out.

It may be mentioned that in the early stages, it may be necessary to instruct the people as to how the convenience should be used. It is also necessary that a little attention should be given every day to cover the faecal matter with a small quantity of earth. Covering the excreta with earth is essential not only to prevent flies breeding in the trenches but also to prevent foul smell. Earth is the cheapest and the best deodorant. Filling the trench with leaves and twigs will encourage aeration and thus accelerate the conversion of the putrescible matters into odourless fertiliser. Mixing wood-ash with the earth, wherever possible, would further accelerate nitrification of the nightsoil.

The advantages of this simple and inexpensive scheme are :

(i) The live hedge gives the necessary seclusion.

(ii) The urge of the people to use open air for answering nature's call is satisfied.

(iii) This avoids manual removal of faecal matter.

(iv) A well composted manure is obtainable.

(v) An additional expenditure in the construction of sanitary convenience in individual houses is made unnecessary.

(vi) No special effort is necessary to educate the users as the conveyance provided satisfies the psychology of the users.

(vii) Maintenance charge is almost negligible as also the capital cost.

The construction of such public conveniences provide the necessary environmental conditions to ensure the success of the scheme. Most of the houses in our village have no latrines. Even if one finds any, one would be shocked at the condition in which it is maintained. Such ill-kept latrine is a potential danger to people's health. It is difficult to secure the services of scavengers in our villages. The suggestion which I have now put forward satisfies the well-known principles of soil sanitation. Possibly, the only areas where this type of latrine may not work

satisfactorily are those subjected to heavy monsoon rainfalls such as West Coast, or in areas which are low lying and water-logged. Even in these areas, with a little care, it would be possible to keep the bottom of the trench well above the maximum sub-soil water. If the site is selected carefully or if a site is formed suitably, this method could be adopted even in areas which are ordinarily water-logged.

Every nation has developed its own curious customs. We cannot ignore them. Nor can they be knocked out readily from the cranium of the people. In some parts of our country, some classes of men and women do not use water for ablution after answering nature's call! They seem to be content with brickbats or pieces of stone! This practice was much in evidence when I inspected a modern sanitary convenience in a large urban area where one had been constructed at enormous expense on the principle of a septic tank. I was shocked to find that the tank was nearly filled with brickbats! A public latrine of the type suggested in this article satisfies even these curious habits.

GROUND WATER POLLUTION AND THE BORED HOLE LATRINE.

Caldwell, E.L. and Parr, L.W.J. *Infect. Dis.*, 1937, 61, 148. *Public Health Engg. Abstr.* 1938, 18, W. 4.

Studies were carried out by the Alabama State Department of Health to determine the effect of bored latrines on the pollution of ground water. The latrines examined were pits, 10-25 in. diameter, which penetrated into ground water and in which septic decomposition of faecal matter occurred. Preliminary studies showed that typical *B. coli* and chemical products were obtained only from wells in or very near the flow of sewage from the latrines. The flow from one latrine was studied intensively. Bacterial pollution was carried different distances up to 35 ft. and chemical pollution for different distances up to 85 feet at different depths depending upon the rate of flow of ground water. After a time the distance at which pollution could be detected decreased, owing to clogging of the soil and the formation of a mat of sludge and scum in the latrine. The distribution of *B. coli*, *Cl. welchii* and chemical products was examined.

(*W. P. R.*, Vol. XI, No. 10, Abstract No. 1409.)

AN APPEAL TO THE INDUSTRIALIST

BY

SIR WILFRID GARRETT, *Chief Adviser, Factories, Government of India.*

In my first article I dealt with the elementary necessity of an Industrial nation to provide food and shelter for its manual workers. Whether the first is to be done through standards of wages or by the provision of canteens or by both methods, or how or by whom the houses are to be provided, I must not attempt to suggest. I would, however, like to discuss in this article how much all this warrants attention in the new factory areas that may come into existence, and even, as far as possible, in those areas where the neglect of them is already apparent.

My only postulate is that these matters are of great interest to everyone concerned with the building up of an efficient and contented labour force, and therefore, is of vital importance to the Industrialist.

It is not correct to say that an industry cannot afford these things; it is a fact that no industry can afford to ignore them. When the first Trade Boards were introduced into the United Kingdom I was told, when visiting the factories affected, that this would be my last visit because they would certainly be ruined and have to close down. What really happened was that, under the pressure of the increased wages, they purchased or developed labour-saving machinery and adopted other methods leading to greater efficiency to such purpose that they are, both employers and workers, in the greatly improved economic position which they now occupy.

It is not sufficient to say that it is no use supplying the physical amenities necessary because the workers will not use them, or will even mis-use them



and break them up. Factories should lead the way in setting a high standard in such amenities as latrines, drinking water, washing accommodation, canteens and creches; in so doing, quite apart from the added efficiency they will give to their own workers, they will be doing something great for the community in teaching people the correct use of these amenities. The first pit-head baths on a coalfield well known to me were so badly used (by about 2 per cent. of the miners) when first erected that it was openly asserted that the money expended had been wasted. Twenty-five years later (one generation) 90 per cent. of the miners at these pits were using the baths with the result that a new standard of cleanliness has been set up in the miners' houses. I am old enough to remember the introduction of modern water closets into factories often before they had been fitted into the neighbouring houses. The use of these closets was so bad that they were constantly under repair, but improvement soon

came and as a result, when these amenities became general in the houses the experience in the factories had taught their proper use.

The same results will follow in the case of new and better houses. The slum dwellers of our cities in England when removed to the suburbs into new blocks of flats or houses erected by peabody or other philanthropic trusts in the middle of the last century, often created such disturbances and made such slums of the new dwellings that Policemen had to be given free accommodation in the buildings to maintain order. In the next generation, however, the actual children of the original people who were moved turned these dwellings into clean and respectable abodes. The factory then can do much to help in teaching the villagers new to town life and the slum dwellers the proper use of these amenities; but, of course, they must, in the first case be provided because no human being should be asked to work in any place where they are not provided, and secondly because the law requires such provision.

The point that many industrialists find it hard to understand is that these amenities are so often provided by good firms up to a standard above that required by law while so many others are able to avoid even the minimum requirements of the law. The only comfort that can be derived from the experiences of the Western nations is that in all countries this weight must be carried by the pioneers to whom all honour must be given. In fact in Great Britain we have advanced beyond this stage in that we have, generally, a higher level of conformity than I find in India. I put this down to two reasons—(1) the pressure of public opinion and (2) a better all-round respect for law on these matters;

perhaps you will allow me to discuss these points in some detail because I think they are important.

When Inspectors of Factories began their work in the United Kingdom in 1833 they were opposed from every quarter by master, by magistrates, by the general public and even by workers; the only exceptions were a few philanthropists, a few good employers, and those who were organised into Trade Unions with leaders who had the vision to see the advantages of the ultimate objects. In face of this opposition Inspectors could do little more act than in a police capacity and force compliance with the law, often by sheer character, often against the very courts who were supposed to administer the law. With the first World War came a change; the value of the individual worker was more appreciated and with it the value of the work done under the Factory Acts during the previous 80 years. From that time onwards, to a greater and greater extent both employers and workers accepted inspectors as highly trained in the techniques of their own job and as persons who were able and willing to give advice in the increasing hazards and dangers that were coming so rapidly into industry through the inventions of new processes in the Chemical and other industries. The Inspectorate took advantage of this and developed this advisory side of their work in every way possible. An Industrial Safety Museum was established in London which, in addition to staging actual demonstrations of the best and safest methods of avoiding accidents and industrial diseases, became also a centre where instruction was given by lectures and demonstrations both by Inspectors and representatives of outside bodies. This Museum thus became a focus for the instruction both of young Inspectors

and of all kinds of persons interested in Industry from directors to the youngsters about to go out to work. Pamphlets were issued on a great variety of subjects, written by Inspectors, but with the help of the Industries concerned and in collaboration with them. Difficult problems were tackled by Committees made up of technical representatives from both sides of Industry and of Inspectors and solutions found that were acceptable to the industries because both employers and workers had had a hand in their devising. In this field notable work was done in connection with the Rubber and Printing Industries and with the difficult question of the Safety of power presses of all description. Inspectors were always in close touch with Employers' Associations and the Trade Unions on all relevant questions and agreements were made with Joint Industrial Councils on accepted methods of meeting definite requirements of the Act and on points not directly covered by law. Lectures were given to Trade Councils, Rotary Clubs and the like to build up a public opinion even outside those directly engaged in Industry. In this way there was built up an understanding opinion that was beginning to accept and support the Inspectors in practically every factory in the country.

Then come the Second World War to complete the progress to which all the foregoing was but an introduction. I shall now try and show the influence of these years on public opinion and deal with my second point concerning respect for law.

* * * *

I am sure that one of the landmarks in the social history of my country will be the change in public opinion towards an insistence of better condi-

tions in our industrial undertakings that occurred during the years of the recent war. It is difficult yet to apportion all the reasons for this. The appointment of Mr. Ernest Bevin as Minister of Labour & National Service in 1940 may be taken as the start in point of time. Mr. Bevin with his great personality and drive and his acute perception of the fact that however great were our technical achievements and our plans the secret of the success of any of our efforts lay in the men or women behind the gun, the ship or the machine. I feel he did much to protect the man in the field by perfecting the machine. I know that he did for that great mass of women that had to be enrolled for work in our factories.

Under Mr. Bevin's leadership a greater proportion of the women available were recruited to Industry in Great Britain than in any other country in the world and these women had a great effect on the opinion concerned with conditions in our factories. In peace time the great majority of the labour in factories is recruited direct from school and at that age we are all, more or less, prepared to accept what we find as the normal which must be accepted. In the War years, however, women of all ages up to 40 came into our factories, many of them from middle class homes, and these women were not prepared to accept the conditions they found. It is true, they caught the factories at a bad time before the necessary amenities could be prepared for this influx of women and when, under the influence of the production drive, every available man had been put on to a machine. In consequence the factories were both deficient in the actual requirements and dirtier and more unkempt than usual owing to the removal of the

maintenance men and even the cleaners on to productive work. From this we learnt the lesson that such men are of such great value that any industrial concern simply cannot be run without them.

Against these bad conditions the women rose in their might, they were not going to accept dark and unclean W. C's. or washing accommodation that was either non-existent or uncared for. In consequence they exerted such an influence that in spite of all scarcities these amenities had to be provided in the new War-time factories up to a high standard. This had such an influence on all concerned that, as soon as the labour and materials are available, I am convinced that we shall see such an advance in these respects in every factory as was not thought possible some years ago.

A third possible reason for this advance in opinion is the scarcity of young persons coming from our schools into industry owing to the fall in the birth-rate in 1920's and 1930's. The old industries like cotton, wool and pottery whose factories are old because the industries are old and because insufficient capital has been put back into the industries in the way of new buildings, now see that they will not attract this young labour unless conditions are improved. As a result, immense efforts are being made in these and similar industries to improve amenities as one stage in the attraction of the labour that is necessary to build up their working force.

Lastly, there is the influence of the ex-servicemen who, whatever their hardships in the field, have been well-fed and well-clothed for the job in hand and have been so trained as to feel that they have a share in all the operations planned. He is returning to industry

with a disciplined self-reliance that is quite noticeable, but he is also quite determined that he must be treated as a man worthy to have a greater say not only in the day to day running of the factory but also with regard to the conditions under which he must work.

The Factory Department took advantage of this growth of public opinion on which every advance must, in the long run, depend in a democratic country. Before the end of the war a beginning was made in setting up a number of Committees composed again of representatives of both sides of industry with Inspectors, this time to deal with these points as far as one particular industry was concerned. The Factories Act must of necessity be drawn on broad lines to cover all factory work, but there are points that can be settled for a particular industry in greater detail. Such questions are the best types of W. C's., washing accommodation, clothing stores and where these should be placed; the spacing and protection of the machinery, the control of dust and of other health hazards. These and other particular requirements of the Act can be considered and an agreed decision reached for each industry and often for each process in the Industry. These questions are being or have been tackled by Committees in Cotton, Wool, Jute and Pottery and Inspectors have also been consulted on these points by other Committees in Cutlery, Hosiery, Boots and Shoes and other Industries.

In general, so great has been the change of opinion throughout the country concerning conditions in works that it has even influenced the Courts of Law that deal with Factory Act cases, to such an extent that the ave-

rage penalties imposed for breaches of the Factories Act are now almost three times as great as they were in the years immediately before the war.

During the last 30 years there has also grown up in my country a respect for the law concerned with these matters that has helped to a considerable extent. No democracy can succeed until it has sufficient determination to accept the laws which it imposes on itself though its statesmen may occasionally have to force certain enactments on certain sections of the community that are resented by that Section. This was certainly the case with regard to Factory Law in the United Kingdom, but that resentment is now largely a thing of the past. The effect of the general acceptance of these Acts is that even the rogue is constrained from committing flagrant breaches of the law because of the scorn of his fellows in the same industry and because he knows that his organised workers will not stand for it, while the effect on the good employer is that he is determined not only to be abreast of the law in all particulars but to lead the way and to be well in advance of the bare minimum required by Act of Parliament. This respect for law is of the greatest help in bringing up the general standard of compliance. Inspectors are necessary, and always will be, to force the laggards, but it is a fact that a high standard of compliance cannot come from Inspection

alone without the acceptance by all concerned of the law as it stands and a determination to see that the very fact that the law requires it, is one of the great reasons for doing these things.

As far as my short experience goes my criticism of India is that in industrial matters it lacks that public opinion that I have tried to deal with in this article. The educated public that can mould general public opinion does not know the facts and is not very interested in the subject. As a result, the law is not observed as it should be in that great number of small works which are so difficult to cover by inspection and the Inspectors responsible for enforcement are disheartened both by the lack of support and by the progress made. The knowledge and drive are already there amongst a devoted few and world opinion on these subjects is growing so rapidly that their task will be easier in the future. In the meantime, however, till this opinion operates the only method by which better conditions can be obtained is by enforcing the necessary standards by legal enactment and by rigid inspection. Every country must go through this stage and the sooner it is faced the better, but for India I am always hoping that we shall soon reach that wider support that the general educated opinion of the country alone can give.

(By Special permission of the Author and Labour Bureau, Government of India.)

● INHUMANITY.

Man's inhumanity to man

Makes countless thousands mourn!

Burns.

THE EVOLUTION OF MALARIA CONTROL

BY

DR. D. K. VISWANATHAN, B.S.SC., M.P.H., (HOPKINS),

Assistant Director of Public Health (Malaria), Government of Bombay.

MISCHIEF OF MALARIA.

Malaria arrests our attention in several respects. One of the oldest diseases known to mankind, it has yet tripped in its early baptism. It was so named on account of the then prevalent idea that bad atmospheric emanations caused the disease. Malaria has always stood between human endeavour and accomplishment and baffled the efforts of the pioneer and the planter, especially in areas which have copious rainfall, virgin soil and warm sunshine. Though a slow killer, it has caused far more deaths in the global wars that have taken place than even what the force of arms of the belligerent nations accounted for. Malaria acts in a vicious circle making the poor malarious and the malarious poor. It takes all the efforts of the statistician to assess its ravages in precise measure; for, unlike cholera, plague or small-pox which have a sudden onset, a spectacular course and a rapid termination, Malaria causes damage, for more by its indirect effects. The hygienist is often perplexed in the choice of a suitable method of control which varies between arboriculture, the cultivation of deterrent plants and zoophilism, the provision of an animal barrier. On this account the administrator has his tilt: "if preventable, why not prevented?"

THE MALARIA TRIANGLE.

The patient, the carrying mosquito and the healthy recipient of infection close in the Malaria Triangle, which can therefore be disarticulated by tackling any one of the three sides. The real villain of the piece is the parasite,



and man and mosquito are but victims of this triangle.

CARE OF THE RECIPIENT.

One of the most ancient precautions against Malaria was the wearing of veils and respirators. Though they were worn to prevent the inhalation of infection, they may be deemed to be the precursors of the modern mosquito net. The correct use of a mosquito net is the most effective individual method of personal prophylaxis, at least until quite recent times; but, certain essential requisites of a good net have to be observed. Otherwise, it may conceivably act as a trap for mosquitoes instead of a screen against them. The mesh must be small. There must be no doors or other entrances. It must not be hung over the top frame but tied to the inside of the poles. It must be tucked under the mattress well before dusk. There must be at least 12" calico at the bottom so that there will

be 9" of it above the mattress to prevent mosquitoes resting outside the net and feeding on the exposed limbs touching its inside. Holes or defects should be darned and not merely looped up and tied by means of a string.

The use of an anti-mosquito cream especially Di-methyl-Phthallate will protect against infection during the period prior to retiring under the net. Screening of houses, which has been carried out with success in Plantations and in Italy, is a very useful measure provided, it is adequately carried out. In the Tropics a feeling of being cabined and confined especially in the oppressive atmospheric conditions makes it less suitable for the upper classes and perhaps not psychologically suitable for the lower classes.

The most recent advance in personal prophylaxis is the use of drug therapy. The most ideal drug is one which, when given in non-toxic doses, will prevent the sporozoites or the infective stage of the Malarial parasite injected by the mosquito into the tissues from invading the blood-stream. Till recently, plasmoquin was the only drug which had this property, but it is too toxic for general use. The brilliant researches of Curd, Davey and Ross and the no less interesting investigations of Hamilton, Fairley and others in Cairns have placed Paludrine in the forefront in the chemo-therapy of Malaria. One tablet of this drug (100 m.gr.) if taken twice a week throughout the Malaria season will effectively prevent blood infection in the case of malignant tertian Malaria and considerably delay infection in benign tertian Malaria. In the latter case, even if infection is not completely prevented, the person will still be free from Malarial disease since the parasites will not multiply to the required level to cause symptoms.

THE PATIENT OR THE DONOR OF INFECTION.

Effective treatment of Malaria cases will naturally minimise the number of donors of infection. The Malaria parasite, however, has two stages in man one of which, called the asexual, gives rise to symptoms of the disease and the other, called the sexual, which alone when imbibed by the mosquito is capable of further development to the infective stage and later transmission to a fresh human host. Most anti-malarial drugs have a fair effect on the asexual stage but little or none at all on the sexual stage. Hence even with a clinical cure of the symptoms of the disease, a person may continue to be a donor of infection. Screening of houses and the use of a net would not only prevent a recipient from getting infection but equally prevent a donor from transmitting it. Plasmoquin is the only drug which is known till recently to have any action on the sexual stage of Malaria. When given in non-toxic doses, Plasmoquin appears to make the sexual stage of the parasite non-viable in the mosquito so that the chances of transmission of the disease can be entirely frustrated. From the purely pragmatic point of view, however, this action is of little avail, because, it is seldom possible in our rural areas effectively to subject every man, woman and child to a rational spacing of drug-therapy when there is no stimulus of actual disease at the time. Even if a small fraction were left out, the chain of malaria transmission will be quickly established with the advent of favourable climatological conditions and increase in the number of the carrying mosquitoes. One point to be remembered in this connection is that the precursor of the sexual stage is the asexual phase and hence any method

of treatment ensuring radical elimination of the asexual parasites would indirectly lead to an absence of the sexual stage. No anti-malarial drugs, however, satisfy this condition. The efficacy of treatment of cases depends upon a number of factors such as virulence of the parasite, the dose of infection and the state of resistance or susceptibility of the recipient. In the tropics where the people have acquired by repeated infections in childhood a certain degree of tolerance for the disease, clinical cures are often effected much more readily than in the case of non-immune people in the temperate regions. On this account, a plea is not infrequently made that it will be unwise to alter this state of acquired tolerance in the tropics by any radical means of treatment of cases or even by active malarial control methods since in the event of a breakdown in the machinery a much more severe toll will result on account of the absence of the acquired tolerance. What is, however, not realised is the price that the people of the tropics have had to pay for their acquired tolerance by way of abortions, still-births, a high infantile mortality, anaemia, devitalisation, greater degree of pre-disposition to other diseases with consequent increased death rate: all these have to be reckoned in building up the acquired tolerance. To allow transmission of the disease or infections to continue in the tropics in order to build up a tolerance would seem to be akin to the prescription of gin and bitters for the cure of a morning's headache after a night's good cheer!

One should strongly endorse the plea put forward by Fairley et. al. for a change in policy in the treatment of semi-immunes and strive towards radical cure of infections undeterred by the fear of disastrous results following

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in the wake of loss of premunity. Indian Provinces now exhibit a far greater zeal for malaria control in fostering which the Malaria Institute of India and the experience of anti-malarial campaigns in the recent war have exerted no small part. Large scale rural malaria control with the use of D.D.T. has not only made possible but is actually in progress in several parts of India and Ceylon and the time has now arrived for a world-wide perspective of application of methods of control of diseases without any regimentation as tropical and nontropical. At best the advantage of premunity was only the last refuge of the tropical malariologist and it is time to discard its benefits won at great odds in favour of modern advances in prevention and cure, of D.D.T. and of Paludrine.

In view of the great tendency of malaria to relapse, no drug gains any popularity and people seldom take even the minimum prescribed doses of quinine or atebrin for about 5 to 7 days. The advent of Paludrine marks yet another advancement in the provision of treatment facilities for rural malaria in the absence of dispensaries nearby. A single administration of 1-3 tablets of Paludrine gives relief from the primary attack of malaria almost as readily as a five-day course of treatment with atebrin or quinine. While relapses are just as frequent as in any other mode of treatment, the efficacy of a single administration of a drug in the clinical cure of a primary attack makes it extremely capable of adoption both in the endemic rural tracts and in the event of epidemic prevalence of malaria.

THE MOSQUITO:

And finally, we will deal with the mosquito. The mosquito may effectively be tackled either in its larval

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147-1-6

stage or in its adult stage. The determining factor in the choice of mosquito control is often the question of cost. While anti-larval control will be economic in urban areas, anti-adult mosquito control will alone be possible in the rural tracts. Care would need to be taken not to imitate blindly any anti-mosquito measures which may prove of success in one part of the world; for, the habits of mosquitoes differ widely. For instance, the felling of jungle in the mangrove swamps of Malaya undertaken by Sir Malcolm Watson as an anti-malarial measure was accidentally the most appropriate thing to do since the local malarial mosquito loves shade and its removal put it out. If, on the other hand, the same removal of jungle had been carried out in Malaya on the hills, a little more inland, then the result would have been a considerable increase in malaria incidence because the malarial mosquito in that region loves sunlit water courses. Again, stagnant borrow pits are often a source of danger in most parts of India. One method usually adopted to drain them is to link them up if the levels would permit and to drain off at the lower end. In the hilly tracts of Nilgris or the Sahyadris borrow pits are entirely harmless and attempts at draining them by means of a canal would introduce a fruitful source of breeding of the local malarial mosquito. A set standard of instructions cannot, therefore, be given until the habits of the local mosquito are fully studied.

We may here refer to the close connection between irrigation and malaria. Engineers must recognise and act in accordance with the axiom that 'any engineering which leaves a trail of malaria behind is bad engineering.' Irrigation projects are often undertaken without any prior consultation with the health authorities or in disregard of

any advice that may be received after such consultation. While it is true that at a time when the growth of more food has taken a place of prime importance in the country, all efforts at irrigation should be actively encouraged, it must be equally conceded that the very object of the schemes should not be frustrated by increased ill-health in the scheme area and consequent non-availability of an adequate number of farmers for cultivating the land. Several instances may be furnished in support of the increased prevalence of malaria as a consequence of ill-conceived irrigation schemes. The Sarda Canal, the Irwin Canal and the Mettur Irrigation Canal have all shown how irrigation without adequate safeguards may increase malaria and in the case of some of them, it has also been demonstrated that, with a little understanding, an optimum combination of better irrigation facilities and freedom from malaria may usefully be provided for the people at large. Sometimes it happens that after decades of irrigation, there is a regression of malaria. Indeed, in several parts of the U. S. A., (the fresh water districts) in the Thames Valley, in Spain and in Central Europe, malaria has largely disappeared of its own accord in the absence of any specific control measures directed either against the mosquito or against the human reservoir of infection. Such changes occur over long periods of time and while these secular trends should be duly noted by the epidemiologist, it should on no account lull the hygienist or the administrator to any false sense of security that a regression in malaria is inevitable in every case. A plea is often raised by the engineers that if quarries for earth or stone are selected far away from human habitations, then estimates for constructional works will be greatly increased on account of the

higher cost in leads. They, however, fail to realise that a sister department have often to fill such excavations in order to preserve the health of the people at a cost which is even more than the original cost of excavation. Will it not, therefore, be prudent to arrive at some understanding that should the P.W.D. refuse to have its estimate raised purely from a public health aspect, the difference may usefully be debited to the public health budget, the site for quarrying being determined half a mile away from the farthest point of likely human habitation over a future period of say twenty years?

It is a somewhat sad reflection that until recent times, there was no large scale rural malaria control project undertaken in India despite the enormous amount of researches on the disease carried out in the country. Organisations for tackling the disease have either been lacking or been employed without the full complement of the required personnel or permanency. Provincial Malaria Organization should have a Malarialogist (say of the grade of Assistant Director of Public Health), an Entomologist, a Malarial Engineer and a suitable subordinate staff both in the field and at headquarters. A good Entomologist is an essential requisite to the Malaria Organisation, since the bulk of the studies would be related to mosquitoes. The Malaria Engineer may be suitably appointed, say within a couple of years after the initiation of the organization so that there will be sufficient work for him from the beginning. It is not as though that the Malaria Engineer will have large schemes of irrigation or drainage frequently needing his technical services, but his services will more often be required in comparatively minor matters of engineering which will, however, have a great bearing on the efficacy of

the control methods. Flushing of hill streams, canalisation, maintenance of channels, designing of spraying equipment and its maintenance will, to name a few, be the main occupation of the Engineer not to speak of the preparation of maps and plans of areas where survey or control is in progress. In some provinces, there are a few field units without any adequate provision for direction and co-ordination by a senior officer. In some other provinces, there used to be an organization at headquarters ill-equipped and subject to tenure appointment for a period of years without any field units. In neither case, could the evolution of Malaria Control be properly organised.

In these circumstances, it is a matter of no small satisfaction that the Government of Bombay, though they were late in the field, or perhaps because of it, created a Malaria Organization in 1942. The most outstanding features of it are:

- (1) Its permanency, (2) The provision of an Entomologist on an adequate scale of salary, (3) The contemplated inclusion of an Engineer, (4) Judicious combination of research and control programmes and (5) Close collaboration with the Malaria Institute of India.

A couple of instances of utility of a good organization may here be furnished.

In Urban Poona, Malaria has been engaging the attention of the authorities for nearly 25 years; but, time and again, the question has been shelved because of the seeming magnitude of the problem of malaria especially in rural Poona and because of the then prevalent idea that unless the latter was tackled, it was no use controlling Malaria in the Urban area. Malaria is an extremely local disease and its preva-

lence is purely conditioned by the range of flight or infiltration of the carrying mosquito and so long as that range is effectively controlled, good results may be confidently expected irrespective of the degree of prevalence of malaria beyond that limit. Within less than a year after the commencement of an anti-larval programme of malaria control in urban Poona, the authorities have been thoroughly satisfied with the results achieved and there is a reduction in the number of cases treated for malaria in all the dispensaries to the extent of about 20,000 in a year. The actual reduction in the number of malaria cases will, however, be very much larger since the number of people resorting to Municipal Dispensaries for treatment will only be a fraction of the total population. The total cost of the scheme is about Rs. 50,000 per year. Its essential features are the emphasis on the permanency and the unification of the agency for direction and control vesting with the Assistant Director of Public Health. It may also be mentioned that it is in this area that the use of copper cyanide as the most economic larvicide has been demonstrated. The second instance is even more interesting. Efforts of the Bombay Malaria Organization for controlling rural malaria in the Kanara District either by the treatment of the previously determined breeding places or by spraying with pyrethrum twice a week proved entirely unsuccessful in the latter case and only partially successful in the former case. This led to further researches on the behaviour of the mosquito and to determine firstly

additional breeding places and secondly its outdoor resting habits. Based on these studies, further programmes of anti-larval and anti-adult methods of control were instituted, with conspicuous success. This was possible only because of the realization by the Organization that no Government can countenance research for its own sake unless followed by progress close upon its wake. Equally, the authorities realised the need for research to ensure progress.

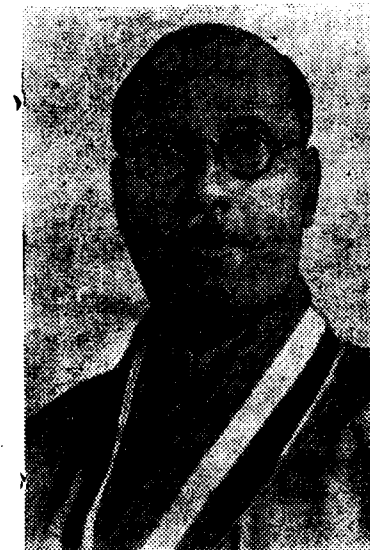
The advent of D.D.T. has made the above phase of the evolution of little interest since large scale rural malarial control projects which were hitherto not even dreamt of are now possible at a reasonable cost. Fortified by the results of a preliminary field-work in 1945, the Bombay Malaria Organization has, since July 1946, launched an extensive and comprehensive control of rural malaria in the two districts of Dharwar and Kanara. The area included in the scheme is 6,000 square miles with 1,200 villages and a population of a little over a million. The Government of Bombay have evinced a considerable interest in the scheme and the Hon'ble the Prime Minister and the Hon'ble the Health Minister were both present at a public inauguration of the scheme when an appeal was made for the co-operation of the public. A special message of 'asirvad' for the success of the scheme from Mahatma Gandhi was also telegraphically conveyed to the large gathering. A scheme begun under such excellent auspices has, judging from the first season's results, more than fulfilled its great expectations.

HYGIENE IN ANCIENT INDIA

Vaidyasastranipuna, Gaveshakathilaka

L. A. RAVI VARMA, M.B. & C.M. (MADRAS), D.O.M.S. (LONDON),

Consultant, Government Ophthalmic Hospital, Trivandrum.



Ancient Indian treatises that have come down to us are clothed in such terse, technical language that the generally accepted meanings of the terms will often be found insufficient to bring out their full and real import. When the art of easy manifolding as printing was unknown, it was essential to condense matter to the smallest possible size to ensure survival of the texts. Voluminous works would tend to suffer loss through unpopularity mainly on account of the great difficulty in making copies or of learning them by rote. Hence arose the terse *Sutra style* of India. In the process of condensation arguments were often omitted recording only the final findings or *Siddhantas*. These works were not expected to serve the students as modern text-books; they served mainly as a guide for the teacher and as a memory aid for the pupils to learn by heart. The teachers were expected to supply the rationale behind the *Siddhantas*. With the vanishing of the *Gurukulas* we are practically left with the *Siddhantas* alone, which bereft of the reasons behind them often appear as irrational dogmas. Most of the available annotations (even much of the texts themselves have undergone various forms of mutilations at the hands of scribes and redactors) are of comparatively recent periods far removed from the halcyon days of the *Gurukulas* and are more a hindrance than a help to understand the *raison d'être* of the *Siddhantas*. But, thanks to the extraordinary capacity of the Sanskrit language to retain volumes of sense in small compass, one could by a careful and analytical study of every

phrase and word of the texts, get a clue at least, to the reasoning behind the final findings or *Siddhantas*. This, no doubt, is a laborious process and often irksome to a degree ; but if done, it will show that our forefathers were far more scientifically advanced than what the modern world is inclined to credit them with. This does not however mean that we can substitute the older methods for modern ones. For the past six or seven centuries, if not more, Indian thoughts have been at a standstill and neglected. During this selfsame period, Europe was engaging itself in intensive and extensive studies in every field of thought with the result that our old measures were left far behind the modern ones in efficiency and useableness. Again, the measures elaborated by our forefathers were intended to meet conditions of life and society far different from what they are today and hence, those measures will be found unsuited to meet present requirements. A full and clear understanding of the old teachings has a value of its own ; it would tend to increase our sense of self-respect, which by itself is no mean achievement ; it would also enable us to feel that the modern teachings are basically the same in principle as the old teachings. This will act as a patriotic *vis a tergo* to enhance popularity for modern measures, in this connection, hygienic measures. It is also possible that one may meet with clues which may be of help for further improvements in modern measures. It will be noted that in the ancient teachings mental hygiene formed an important part of the subject. This for example, is something worth assimilating into modern teachings.

One does not find in ancient treatises all thoughts on hygiene brought together as in a modern text book ; often they are scattered in various texts and under diverse headings. Personal hygiene is found arranged in medical treatises under the headings *Dinacarya* and *Ritucarya* ; dietetics as well as purification of water, etc., will be found under "foods and drugs" or *Dravya* ; factors based on omission and commission of various acts are to be found mainly in *Dharmasastras* and *Brahmanas* ; selection of site for houses, problems of ventilation, etc., may be found only in *Vastu-vidyas* and *Silpa-tantras* and questions on infections and epidemics are to be found scattered in medical works, the exception being the work of *Caraka* where epidemic factors are treated under a separate heading *Janapadodhvasaniyam*. Within the limits of a single article it will be impossible to cover the whole field or even a large part of it ; hence only a sampling as it were, and even that in a scrappy form, is all that is attempted here.

HOUSE AND HOUSE-SITES.

In works on *Vastuvidya* there are specific descriptions and classifications of lands fit or otherwise for house construction. The sense underlying the descriptions relates mostly to factors of hygiene. *Silparatna* of *Srikumara* describes a good house site as :—

गोमलैः फलपुष्पदुग्धतरुभिश्चाद्या समा प्राकृष्टवा ।
स्निग्धा धीरवा प्रदक्षिणजलोपेताऽशुबीजोद्भवा ।
सा प्रोक्ता बहुपांसुरक्षयजला तुल्या च शीतोष्णयोः
श्रेष्ठा भूरधमा समुक्तविपरीता मिश्रिता मध्यमा ॥

"A good house-site should be one having a rich flora of flowering and latex-bearing trees and where domestic animals and men abound ; surface should

be level but with a slight declination to the east ; the soil loamy ; the ground giving a bold sound ; having plenty of earth and water and with a uniform climate. Those having opposite qualities are bad for house-sites and those of mixed qualities, fair."

The sense underlying the text is as follows. The wording "where domestic animals and men abound" (गोमलैः....आद्या) points to the condition that the place should be healthy for men and domestic animals to thrive, the term *Go* standing for domestic animals in general as *upalaksana*. The reference to a rich flora of tall trees (तरु) envisages a moisture free healthy condition of the soil. It is well known that large trees tend to reduce sub-soil moisture by drawing it off by the roots and final evaporation through the leaves. There is no evidence to deny this knowledge to our forefathers and there is positive evidence that they knew that large trees would tend to make the soil good for house sites. The surface of the land was to be level but with a slight decline to the east (समा प्राकृष्टवा). The declivity points to the condition necessary for natural sub-soil drainage. The mention of 'east' is interesting. I shall cite a parallel from modern sanitary engineering and then explain the meaning of the phrase "with a slight declination to the east." In modern books, even those written in South India and for the use of South India, one may notice marked preference given to 'North light'. In Northern latitudes as in Europe such a preference has great sense as 'North light' there, will be uniform throughout the day and the whole year and without the direct rays of the sun ever getting in. In South India and other equatorial regions neither north light nor south light will be uniform for the whole year ; each will admit direct heat rays of the sun for some six months and neither has an advantage over the other. Still, even in Indian books one meets with the direction for north light. This error is due to the want of proper recognition of the underlying principle. In a similar manner, in the Gangetic basin, where most of our works arose, the lie of the land is such that natural drainage is towards the east ; hence the direction "with a declivity towards the East." In course of time the sense underlying the direction was lost sight of and the formula repeated without reference to the natural drainage course of the place in question. To understand the sense we now have to make out the original intention and habilitate that meaning for the term "declivity to the East." Hence, the meaning of the direction is that there should be convenience for natural sub-soil drainage. The word *Snigdha* means unguent and stands for a loamy soil. This means that the soil should not be one which will retain much moisture. *Dhirarava* means bold solid sound, denoting thereby that the site should not be too porous or sandy or one having underground caverns. A loose or sandy soil will give a dull sound on striking and one with underground caverns a hollow sound. The loose soil type tends to harbour moisture and the other tends to make the foundations weak. The term *Bahupamsu* is technical ; it is defined in *Vastu* works thus :— If a pit is made and the earth obtained therefrom is returned to the pit and rammed in, there may be an excess of earth left after completely filling the pit. When there is such an excess that soil is known as *Bahupamsu*, "having plenty of earth." If the earth is insufficient to fill the pit the soil is very loose and is called

Alpapamsu. Here again the recommendation is for a solid, hard soil. *Akshayajala*; the locality should have perennial water available. And, the climate of the place should be uniform and not subject to steep changes (तुल्या च शीतोष्णयोः)

From the above annotation it will be seen that they had understood the essential requirements of a residential area and that their description is on all fours with the most modern teachings on the subject.

They direct that certain soils are unfit for house building; "soils containing ashes, charcoal, grain-husks, bones, hair, brick-bits, ant-hills, etc., are unfit." (भस्माङ्गारतुषास्थिकेशचितिवल्मीकादिभिः संयुता वर्ज्या. *Silpa*:); In other words, "made up" soils by dumping refuse, burial grounds, grounds containing rotting vegetable matter resulting in ant-hills, etc., are to be avoided as house sites.

They had an interesting and very practical method of testing a soil to find out its fitness as a dwelling site. तत्खातं वा जलपूर्णं कृत्वा शतपदं ब्रजेत् । पुनरागच्छतः प्राग्वत् पूर्णं चेद् भूमिरुत्तमा ॥ यवन्यूना मध्यमा स्यात् त्याज्या न्यूना ततोऽधिकम् । (*Silpa*.) "A pit is to be dug on the ground to be tested and filled with water and the observer walks a hundred paces and returns to the pit. (By actual observation the time required to walk forth and back 100 paces is found to be one minute). If the pit is found still full, i.e., full after one minute, the ground is good; if the water is lower by one *yava* ($\frac{1}{8}$ "") it is fair; if the water level is still lower the ground is bad and unfit for habitation." It is clear that the experiment was to determine the porosity of the soil and hence its moisture holding capacity.

The extent of ground for the smallest house is given as 15 *dandas* (nearly 160 ft., 1 *danda* being equal to $3\frac{1}{2}$ yds.) square. It is stated that the width or *vistara* is the same as the length or *ayama* in respect of plots for house building. Technically the north-south distance is considered as 'length' and the east-west distance is taken as the breadth irrespective of the comparative measurements of the two distances. यदुक्तं वेदिविस्तारमायामं चापि तत्समम् । दक्षिणोत्तरमायामं वास्तोः सर्वत्र कारितम् ॥ (*Silpa*.) The extent of ground for palaces for kings is given as 50, 40 or 30 *dandas* (525', 420' or 315' in length and breadth). For Sudras, the smallest sizes are 25, 20 or 15 *dandas*.

पञ्चाशदण्डमानं वा त्रिंशद्वा कथितं बुधैः । चत्वारिंशच्च वा कुर्यान्नृपाणां वेदिविस्तृतम् ॥

* * * * *

पञ्चविंशच्च विंशच्च दण्डमानमुदाहृतम् । पञ्चादशायवा कुर्याच्छूराणां वेदिविस्तृतम् ॥

उत्तमं चाधमं चापि मध्यमं च यथाक्रमम् ।

From these directions as well as from considerations of *sutras* and *karnas* (which are not entered into here) it will be seen that usually houses stood in their own compounds giving plenty of free space all around and the available dimensions of the smallest plot were satisfactory for all practical purposes.

It is often said that ordinary Indian house architecture had little eye for ventilation and proper lighting. No doubt, due to various causes, notably economic reverses and want of proper knowledge of the old teachings, things have come to a sorry pass, though the original teachings were sound and healthy. *Susruta* in speaking about hospital buildings states that "they should be solidly

constructed, well ventilated but avoiding draughts" (दृढं निवातं प्रवतैकदेशम्). Here, the word *nivatam* points to the avoidance of draughts and the word *pravatai-kadesam* to the need of proper ventilation.

The *Catussala* (चतुश्शाला) or quadrangular construction with a central court-yard is ideal for tropical climates. The central open area functions as a perfect flue-ventilator; it also allows plenty of healthy sun-light while only a minimum of direct heat rays of the sun is allowed in. A better form cannot be conceived for the tropics which satisfies at once the needs of privacy, security, good ventilation without draughts and plenty of sun-light with a minimum of heat rays.

They also had windows and ventilators on the walls. Three types are described. The modern type of windows with closeable shutters were known by the name of *Vatayana* (=way for air). कवाटयुगलं वैकं घाटनोद्घाटनक्षमम् । जालकाकृति चेत् तत्तु वातायनमिति स्मृतम् ॥ Windows with lattice but with no doors were known as *jalakas* and mere openings, often small and many, with neither lattice nor doors were known as *gavakshas* (=openings for light). In the case of lofty buildings with high walls there were to be latticed ventilators both near the top as well as near the bottom or floor levels. (पादवर्गे गले चैव प्रासादानां तु जालकम् । *Silpa*:). This evidently means that they were careful about ventilation. This could not have been for purposes of light or vision as these latticed windows admitted little light and were nearly useless for purposes of vision. It is not improbable that they recognised the respective functions of the lower and upper set of ventilators, viz., the ingress and egress of air, though one cannot be sure of it. In the case of very lofty rooms they advised a third series as well in the middle of the wall; (प्रासादेषु महाशास्त्रव्यन्तरालस्य मध्यमे । *Silpa*:). The size of the ventilators too was very liberal, the largest being four *dandas* and the smallest, two. चतुर्दण्डविशालं तदुत्तमम् । त्रिदण्डं वा द्विदण्डं वा मध्यमं त्वधमं क्रमात् ॥ *Silpa*: It is also interesting to note that they had varieties of damp-proof cements like *Baddhodaka-sudha* and *Vajralepa-sudha*. Incidentally it may also be mentioned here that they were using a sort of 'water-level' (equivalent to the spirit-level of modern engineering) to determine the levelness of any surface; समत्वं सलिलेनैव साधयित्वा—*Mayamatam*).

Susruta's description of what a Royal kitchen should be gives a clue to the hygienic conditions demanded in respect of kitchens and dining rooms. प्रशस्तदिग्देशकृत शुचिमाण्डं महत् शुचि । सजालकं गवाक्षाढ्यमाप्तवर्गनिषेवितम् । विकक्षसृष्टसंस्पृष्टं सवितानं कृताचनम् । तत्राभ्यक्षं प्रयुज्जीत प्रायो वैद्यगुणान्वितम् । शुचयो दक्षिणा दक्षा नीचकेशनखाः स्थिराः । स्नाता दृढं संयमिनः कृतोष्णीषाः परिकर्मिणः ॥ *Susruta. Kalpa* : 1.

"The kitchen should be located in a good area (प्रशस्तदिग्देशकृतम्) should be large and clean महत्, शुचि, provided with net covered openings in

plenty (सजालकं गवाक्षायम्,) (evidently the netting is for protection from fleas, etc.) and also should have a canopy (सवितानं) to protect food from falling dust and soot. The vessels used therein should be clean. (शुचिभाण्डं) It is interesting to note that a knowledge of medical principles was recommended for the *major domo*; तत्राध्यक्षं प्रयुञ्जीत प्रायो वैद्यगुणान्वितम्. The cooks were enjoined to keep their hair cut short and nails trimmed, to take daily baths and to wear a head cover (नीचकेशनखा...स्नाताः...कृतोष्णीषाः.) The description shows the high and correct sense of sanitation they had. Even in the case of ordinary people the same sanitary directions held good as can be made out from general directions on the subject. "The kitchen should be uncrowded, clean and prepared foods should be kept covered in clean places. (असङ्कीर्णं शुचि कार्यं महानसम्.....अन्नं सुसंस्कृतं शुचौ देशे सुसंगुप्तं समुपस्थापयेत् Su. su. 46.) The dining room should be quiet, pleasing, where dust and dirt may not fall from above (निःसम्पाते), clean and embellished with sweet smelling flowers; (भोक्तारं विजने रम्ये निःसम्पाते शुभे शुचौ । सुगन्धपुष्परचिते समे देशे च भोजयेत् ॥ Su. su. 46.) It is to be noted that they had taken into reckoning even psychological factors, as embellishment of dining rooms.

WATER.

Glosely related to housing are the problems regarding the source, purity, impurity and purification of water. They classified potable water into three groups according to their sources. The best was rain water properly collected and stored without chance for pollution; (एन्द्रमम्बु सुपात्रस्थमविपन्नं सदा पिबेत् Ast. Hr.) The next in order is water having qualities nearly equal to those of rain water and obtained from dark or white earth, the source being open to air and sunlight. Wells, etc., fall under this class. (तदभावे च भूयिष्ठमन्तरिक्षानुकारि यत् । शुचिपृथ्वसितथेते देशेऽर्कपवनाहतम् ॥ Ast. Hr.) Finally comes river water, if it has a good flow; if the flow is poor, water covered with moss or muddy, it is recognised as 'heavy' and is not potable. नद्यः शीघ्रवहा लघ्व्यः प्रोक्ता याश्चामलोदकाः । गुर्व्यः शैवालसंछन्नाः कलुषा मन्दगाश्च याः ॥ Su. su.

There were elaborate directions for the collection and storage of rain water. Even rain water was considered unpotable, if it was of unseasonal origin; even when collected during the proper season, if it was collected during the first few days of the season it was considered unfit for drinking as the water of the first few showers are likely to be polluted with cobwebs, and other products of small insects; (अनार्तवं च यद्विष्यमार्तवं प्रथमं च यत् । क्षतादितन्तुविष्णुमूत्रविषसंश्लेषदूषितम् ॥ Ast. su. v.) They had an interesting biological test to determine the purity of rain water. It speaks volumes for their capacity for scientific observations. "Some clean, fresh cooked rice is taken in a clean silver vessel and a quantity of the water

to be tested is added and kept for a *muhurta* (1½ Hrs). If the water was pure, the rice grains would have suffered no change; if polluted, the rice grains would get softened." (शाल्योदनपिण्डमकुथितमविदग्धं रजतभाजनोपहितं वर्षति देवे बहिष्कुर्वीत; स यदि मुहूर्तं स्थितस्तादृश एव भवति तदा गाङ्गम्....सिक्थप्रकृदे च सामुद्रमिति विद्यात्; तन्नोपादेयम्..... ।

Su. su. 45.)

The above test is for all practical purposes a culture-test using cooked rice as the medium. When the test was negative the water was considered as pure or *Gangam* (गाङ्गं); if positive, i.e., if the rice grains got broken up due to the presence of yeast cells from the atmosphere, the water was considered unfit and was called *Samudram* (सामुद्रं).

Of the types of water obtained from the earth, well water is the one most used for drinking purposes. In respect of wells, *Silparatna* has a description which is interesting. जलवत्यजलेन गतेऽधस्ताजलमुपरि भवति विपरीते । जलवद्द्वयसम्पाते प्रभूतमुदकं विनिर्देश्यम् ॥ The text demands careful study to understand its real meaning. The wording, "if both waters join together" (जलवद्द्वयसम्पाते) shows that two distinct sources of water are contemplated. The text reads "when water is (first) struck and is followed by a waterless layer which when passed, water will be found below, though the upper layer was waterless. If both these waters are allowed to mingle, there will be abundance of water." The first or superficial water is the water of "shallow wells" and that encountered after passing through the waterless layer is the water of "deep-wells." That they knew both these sources is beyond doubt though one cannot assert that they recognised the better quality of the deeper source water.

In the case of river water (नद्यः शीघ्रवहाः....vide ante) they advised its use only when it had a good flow and exposure to air and light. We now know that sunlight and air help to sterilise water, a good flow helping the process considerably.

Good water was recognised by its odourlessness, tastelessness, clearness, palatability and thirst-quenching properties; it also should be cool and light. (निर्गन्धमव्यक्तरसं तृष्णाघ्नं शुचि शीतलम् । अञ्जं लघु च ह्रस्वं च तोयं गुणवदुच्यते ॥

Su. su. 45.)

"Water that is slimy to the feel, that containing living animalcules, in which leaves, mosses and mud have putrified, that is coloured, that having abnormal taste and that is foul-smelling, is dangerous" (पिच्छिलं कृमिलं क्लिन्नं पर्णशैवालकदर्दमैः । विषणं किरसं सान्द्रं दुर्गन्धं न हितं जलम् ॥ Gh. su.)

"He who drinks or bathes in water polluted by the excreta, eggs, or putrifying bodies of insects, or which is covered with leaves and grass, or which is muddy or poisoned, or water to which freshes or surface water had access during recent rains, may get both internal and external diseases." कीटमूत्रपुरीषाण्डशवकोयप्रदूषितम् ।

तृणपर्णोत्क्रियुतं कलुषं विषसंयुतम् ॥ योऽवगाहेत कर्वासु पिबेद्वाऽपि नवं जलम् । स बाह्याभ्यन्तरान् रोगान् प्राप्नुयाद् क्षिप्रमेव तु ॥ Su. su. 45-

They also advised against the same source of water as a tank or lake for both drinking and bathing purposes, the only exception being a river with a good flow : (.....स्नानपानादिषु प्रायो नैकजलं नदीजलमृतेऽत्रान्यान् पृथक् कल्पयेत् ।

For bathing they recommended rivers, natural ponds, natural and artificial lakes and springs. The force of the locative case points to plunge-bath. नदीषु देवखातेषु तटाकेषु सरस्व च । स्नानं समाचरेन्नित्यं गर्तप्रस्रवणेषु च ॥ Manu. iv.

To prevent wanton pollution of water sources there was prohibition against throwing urine, excreta, spittle, other dirt objects, blood or poisons into the sources of water. नाप्सु मूत्रपुरीषं वा घृतिवर्षं वा समुत्सृजेत् । अमेध्यलिप्तमन्यद्रा लोहितं वा विषाणि वा ॥ Manu. iv.

They prohibited the use of polluted water in unmistakable terms. "Polluted water including non-seasonal rain water is never to be used as they are likely to be dangerous" (व्यापन्नं वर्जयेन्नित्यं तोयं यच्चाप्यनार्तवम् । दोषसंजननं ह्येतन्नाददीताहितं तु तत् ॥ Su. su. 45.)

Their methods for purification of water are interesting, the principle underlying the processes being sterilisation by heat after removal of gross impurities by sedimentation or filtration. (व्यापन्नस्य चाग्निकथनं सूर्यातपप्रतापनं तप्तायःपिण्डसिकतालोहणां वा निर्वापणं प्रसादनं च कर्तव्यम् ; नागचम्पकोत्पलपाटलापुष्पप्रभृतिभिश्चाधिवासनमिति ॥ तत्र सप्त कलुषस्य प्रसादनानि भवन्ति । तद्यथा—कतकगोमेदकविसप्रन्थिशैवालमूलवस्त्राणि मुक्तामणिश्चेति ॥ Su. su. 45.)

"To purify polluted water it may be boiled over fire, may be made very hot in the sun, red-hot blocks of iron, bricks or sand may be thrown into the water, muddiness removed and scented with flowers of *naga*, etc. The following materials will clear muddiness of water; Strychnos potatorum, gomedaka (= *patraka*, leaves of *Laurus cassis* and not the gem known by the name *gomedaka*), roots of *Nelumbium speciosum*, mosses (particularly, Bladder wort), cloths (for filtering) and *muktamani* (pearls?). *Vastrani* (plural indicating several layers), cloths are for filtering and removing gross impurities; other materials mentioned are with the exception of pearls (if it is pearls they have meant by the term) mucilagenous in character and hence would help sedimentation. In fine, their measures consisted of sedimentation and mechanical clearing and sterilisation by heat; the purified water was further scented for aesthetic reasons.

DIETARY.

Food materials, in fact all materials (*dravyas*), were classified into six groups based on taste or *Rasa* as sweets, acids, salts, pungents, bitters and astringents (*Madhura, Amla, Lavana, Katu, Tikta and Kashaya*). Insipid materials (*Apyakta-rasa*) as water were often included under *Madhura* and salts got grouped under *Madhura* after digestion (*Pake Madhuram*). This meant that the elements composing salts were assimilated after digestion and were used for the building up of tissues; for, the main function of *madhura* or 'sweet' is body building. (तत्र मधुरो रसो रसरक्तमांसमेदोऽस्थिमज्जौजःशुक्रस्तन्यवर्धनश्चक्षुष्यः केशयो वर्ण्यो बलकृत् Su. su. 42.)

Under the group 'sweets' or *madhura* are included starches, sugars, proteins, fats, salts after digestion and water. (क्षीर, घृत, वसा, मांस, मज्जा, शालि, षष्टिक, यव, गोधूम, माषद्राक्षा, खर्जूर....इक्षुविकार....मधुरो वर्गः । Su. su. 42.)

That is, "milk, ghee, fat (animal fat) meat, bone-marrow, rice, barley, wheat, black gram, etc., (pulses), grapes, dates sugarcane products, etc.." fall into this group. Even a superficial observer can make out that this group *Madhura-varga* covers materials containing the proximate principles of foods as well as salt and water. They had not separated the proximate principals as we understand them today; still, the above enumeration of type-materials points to the probability that they had envisaged, even if dimly, a classification based on the essentially different food values of the materials. It may also be remembered that this classification is at least some two or three thousand years old, when the rest of the world, to the best of our knowledge was in utter darkness.

Speaking, about milk, it is said, that "fresh milk is like nectar but if cooked much it becomes difficult of digestion." भवेद्भरीयोऽतिशृतं धारोष्णममृतोपमम् । A. Hr. su. v. More or less the same idea is repeated in respect of meat also; in fact, too much cooking is said to be bad for all materials. धरोष्णं गुणवत् क्षीरं विपरीतमतोऽन्यथा । तदेवातिशृतं सैवं गुरु बृंहणमुच्यते ॥ Su. su. 45.

From the above directions regarding cooking, it is clear that they recognised changes in the material due to prolonged cooking which tended to make it more and more difficult of digestion.

In Caraka (su. v. 12, *et seq*) there are directions regarding food materials that ought to be regularly used and those which ought not to be used regularly or solely. षष्टिकान् शालिमुद्गांश्च सैन्धवामलके यवान् । आन्तरीक्षं पयः सर्वं जाङ्गलं मधु चाम्यसेत् ॥ Ca. su. v. 12.

"Rice varieties, green gram, common salt, *Phyllanthus emblica*, barley, rain water (pure water), ghee, meats of deer, goat, etc., and honey should be daily used." From the inclusion of water and salt among the materials it is clear that the recommendation was not to use any single item alone daily but to use the group as such for daily use. Against this, the following articles were not to be used habitually, *i.e.*, habitually alone. They are बल्लूरं शुष्कशकानि शाळकानि बिसानि च । नाभ्यसेत्; "dried flesh, dried greens, dried roots and dried stems of lotus." It will be clear that most of the materials recommended for habitual use are those that contain vitamins while those prohibited are devitaminised materials. The recommended ones also contain such essential articles of diet as salts and water. This does not mean that they knew about vitamins as we know today; but it is certain that they envisaged the daily need of certain materials which we now know as containing essential vitamin factors. They had also advised against habitual use of certain other articles on the score of indigestibility. They are, cheese (a cheese like preparation made by inspi sating milk curdled with sour curds), milk inspissated by boiling, ham, bacon, pork, beef,

flesh of buffaloes, fishes, curd, black gram and rye. गौरवात्...कूर्चिकांश्च विलाटांश्च सौकरं गव्यमाहिषे । मत्स्यान् दधि च माषांश्च यवकांश्च न शीलयेत् ॥ Ca. su.

Meat of diseased animals was completely forbidden ; मांसं कृशं नैवोपयोजयेत् Ca. su.

Dalhana annotates *mamsam krisam* as “कृशं अपुष्टं रोगाद्युपहतमृगादिसम्भवम्” i.e., flesh of diseased animals. They also recognised meat as unfit for consumption if it was “dry, foul smelling, or of diseased animals or animals killed by snake bite or poisoned arrows, or of old, weak or very young animals or of animals living in unnatural surroundings.” शुष्क-पूति-व्याधि-सर्प हत विषदिग्ध-विद्ध-जर्ण-कृश-बालानां असात्म्यचारिणां मांसान्यमदयाणि । Su. su. 46.

All foods were considered unfit for consumption if they were “unclean, polluted by dirt, leavings from another's plate, contaminated by foreign materials as stones, grass or sand, etc., unpleasant, very old, bad tasting or putrid.” (अचोक्षं दुष्टमुच्छिष्टं पाषाणं तृणलोष्टवत् । द्विष्टं व्युषितमस्वादु पूति चान्नं विवर्जयेत् ॥ Su. su. 46) Prepared foods exposed for sale were also prohibited, obviously on the score of want of proper cleanliness ; (शत्रुसन्नगणाकीर्णगणिकापणिकाशनं...त्यजेत् A. Hr. su. ii).

The directions for eating are also interesting and instructive. “The food should be warm, should be demulcent, i.e., not dry or rough, should be limited in quantity ; eating should be only after the previous meal is digested ; the various articles forming the diet should not be incompatibles ; dining place should be pleasing ; eating should not be too quick, (i.e., one should not gulp down food) nor should it be too slow ; one should not talk or laugh too much while eating but should attend to eating mainly ; one should eat thus taking into reckoning one's need and capacity.” उष्णं क्षिप्तं मात्रावत् जीर्णं वीर्याविरुद्धं इष्टे देशे नातिदुतं नातिविलम्बं अजल्पन् अहसन् तन्मना भुञ्जीत आत्मानमभिसमीक्ष्य सम्यक् । Ca. vi. i

Psychological factors too are well recognised. It is said that “even if one eats moderately and only wholesome foods, digestion is liable to be impaired by mental worry, grief, fear, anger or distress or if one goes to sleep directly after meals or if one keeps awake unduly at night after meals. मात्रयाऽप्यभ्यवहृतं पथ्यं चान्नं न जीर्यति । चिन्ता-शोक-मय-क्रोध-दुःख-शय्या प्रजागैः ॥ Ca. Vi. ii.

CLEANLINESS.

Topics on general cleanliness are mostly dealt with in the *Dharmasastras* under *Suddhi*.

“Hard and polished materials as gems are to be cleansed by washing with ashes, earth and water” तैजसानां मणीनां च सर्वस्याश्ममयस्य च । भस्मनाद्भिर्धृदा चैव शुद्धिरुक्ता मनीषिभिः ॥ (Suddhimayukha).

From the wording सर्वस्याश्ममयस्य, articles like glass are to be included in this category. The use of ash is for its alkalinity which tends to remove

greasy matter and earth for its scouring effect. Vessels of gold, conch shell, hard materials of the order of stones, and silver can be cleaned with water alone if they are not greasy with dirt or ornamented. निर्लेपं काश्चनं भाण्डमद्विरेव विशुध्यति । अञ्जमश्ममयं चैव राजतं चानुपस्कृतम् ॥ Manu. v.

Gold and silver articles can be well purified by boiling in water. The use of the copula “and” in the phrase अपामग्नेश्च संयोगात् makes it to mean heat and water used together ; i.e., boiling in water. अपामग्नेश्च संयोगात् हेम रूप्यं च निर्बभौ । तस्मात्तयोः स्वयोन्यैव निर्णेको गुणवत्तरः ॥ Manu v.

Other metals as copper, iron, bell metal, tin and lead are to be cleansed with alkaline or acid solutions and water as required. ताम्रायःकांस्यरैल्यानां त्रपुणः सीसकस्य च । शौचं यथाहं कर्तव्यं क्षाराम्लोदकवारिभिः ॥ Manu v.

Earthenware vessels are to be cleansed by reburning. पुनःपात्रेन मृन्मयम् Manu v. Houses are to be cleansed by sweeping and replastering मार्जनोपाजनेर्वैश्म Manu v. Rivers (and incidentally other water sources as tanks, wells, etc.) are purified by the addition of counteracting agents (अकार्यकारि), by the action of natural flow in rivers and by bailing out the water and mud. (अकार्यकारिणां दानं वेगो नषाश्च शुद्धिकृत् । शोध्यं च मृच्च तोयं च Manu.)

(To be continued.)

ANCIENT INDIAN IDEAS.

According to old Indian ideas, cosmic forces govern the life of every individual. Consequently, towns and houses must be built in accordance with these influences. Religious, magical and geomantic considerations therefore play an important part. E. B. Havell gives a translation of some relevant passages from the Essay ON THE ARCHITECTURE OF THE HINDUS by Ram Raz, published in 1834.

The true position of the cardinal points having been carefully ascertained by means of the shadow of a gnomon, rules for the construction of which are given in the Silpasastras, the alignment of the main street of the village was marked out. The general plan of the larger villages followed that of the cosmic cross and the so-called magic square representing the four quarters of the universe ; but the reader must not misunderstand this association of mysticism with the practical business of the Indian craftsman. All art in ancient India was held to be magic, and the magic virtues of these figures simply lay in the fact that the experience of many generations had proved that they were best for purposes of defence and gave the most healthy, pleasant and practical layout for an Indian village or town. The easterly axis of the plan ensured that principal streets were purified by the rays of the sun sweeping through them from morning till evening ; while the intersection of main streets by shorter ones running north and south provided a perfect circulation of air and the utmost benefit of the cool breezes In the case of a temple city there were four streets round the temple where the priests and other servants of the temple were accommodated In the case of a palace the ministers, the advisers, the soldiers guarding the palace, the rich merchants and the Brahmins were housed in streets planned round the palace.—(Extract from ‘Revolution of Environment’ by E. A. Gutkind. Publishers, Kegan Paul, Trench, Trubner & Co., Ltd. London).

POOR MAN'S DIET

BY

DR. P. V. GEORGE, B.A., L.M.S., B.S.SC., M.P.H. (HOPKINS),

Nutrition Officer, Public Health Department, Madras.

Scarcity of accustomed foods and increased prices of available ones contribute a direct threat to health and well being. Positive health much depends on the food we eat, the habits we cultivate and the knowledge we acquire to tide over food emergencies. To the worker especially, the reaction to low food is quick, acute and progressive, resulting in low outturn, low earning, low health and a growing apathy, with worst and lasting impact on the dependant family. It is the fortunes of the workers which ultimately mould the destinies of nations. The poor man's diet is therefore a matter of vital public concern and a challenge to the thinking man and the favoured man.

This note is an answer to a specific question set to me by the energetic Editor of this esteemed journal. The question is, *can a working man (vegetarian), with his wife and one child (7 years), manage with only Rs. 25 a month, for food?* Considering the prevailing prices and limited choice of food articles the easy answer would have been 'No, Sir; impossible, if they should eat well, work well and thrive well.' Such an answer would however, be not appreciated from a practical nutrition worker, though excusable on the basis of ideal nutritional standards. The diet described below is therefore at best a subsistence schedule limited to the cost stipulated.



DIET SCHEDULE.

Vegetarian family—Madras.

(Three members—husband, wife and child, 7 years old.)

Food articles for the family per day.	Lbs.	Ozs.
Rice, wheat,	..	1 7
Ragi, maize, etc.	..	0 11.5
Pulses (dhals, grams)	..	0 4.6
Groundnut flour	..	0 4.6
Green leafy-vegetables:		
Amaranth, drumstick leaves, 'gongura', etc.	0	9.2
Root vegetables: (tapioca, sweet potato, etc.)	..	0 9.2

Other vegetables :

brinjal, cucumber, green plantain, nellikai (amla), etc.	..	0 4.6
Cooking oils	..	0 4.6
Milk	..	0 6.9
(or 16 to 20 ozs. buttermilk).		

Nuts :

Groundnuts, cashewnuts, etc.	..	0 1.2
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Salt, condiments, etc.—minimum quantities required.

Diet Analysis :—Food factors and calorific value.

Proteins	..	193 gramms per day.
Fat	..	181 ..
Carbohydrates	..	983 ..
Calories	..	6,505 per day.

Cost of this diet will be approximately Rs. 25 per month according to average prices prevailing in Madras Province.

The quantity of milk provided in the schedule is low, though it is nearly three times the prevailing average consumption among poor people in this Province. It has, however, to be remembered that it is through milk that strict vegetarians should derive the much wanted animal proteins in diets. In places where food stuffs will be available at cheaper rates, the savings should be used for the purchase of more milk upto at least 20 ozs. for the family per day. The schedule may be considered adequate as far as proteins, fats and carbohydrates are considered. It provides a total of over 6,500 calories which, reckoned on the basis of 3,000 for the worker, 2,100 for his wife and 1,300 for the 7 year child, may

also be considered sufficient, though the margin for normal wastage is rather small. It is the inclusion of groundnut cake flour and whole groundnuts which has made it possible to make up the protein and fat value of this diet at comparatively cheap cost. Groundnut is largely grown in this province, and in several districts it is also commonly eaten, though it has not become generally popular as a valuable article of food. Groundnut flour prepared from cleaned and hand-picked nuts from which much of the oil has been removed, will require to be made more and more available at reasonable prices as is being attempted in Bombay. This flour mixed with wheat flour or other cereal flours will make very tasty and nutritious 'chappathis' (15 parts groundnut flour, 85 parts atta), biscuits (equal proportions of groundnut and atta), etc.

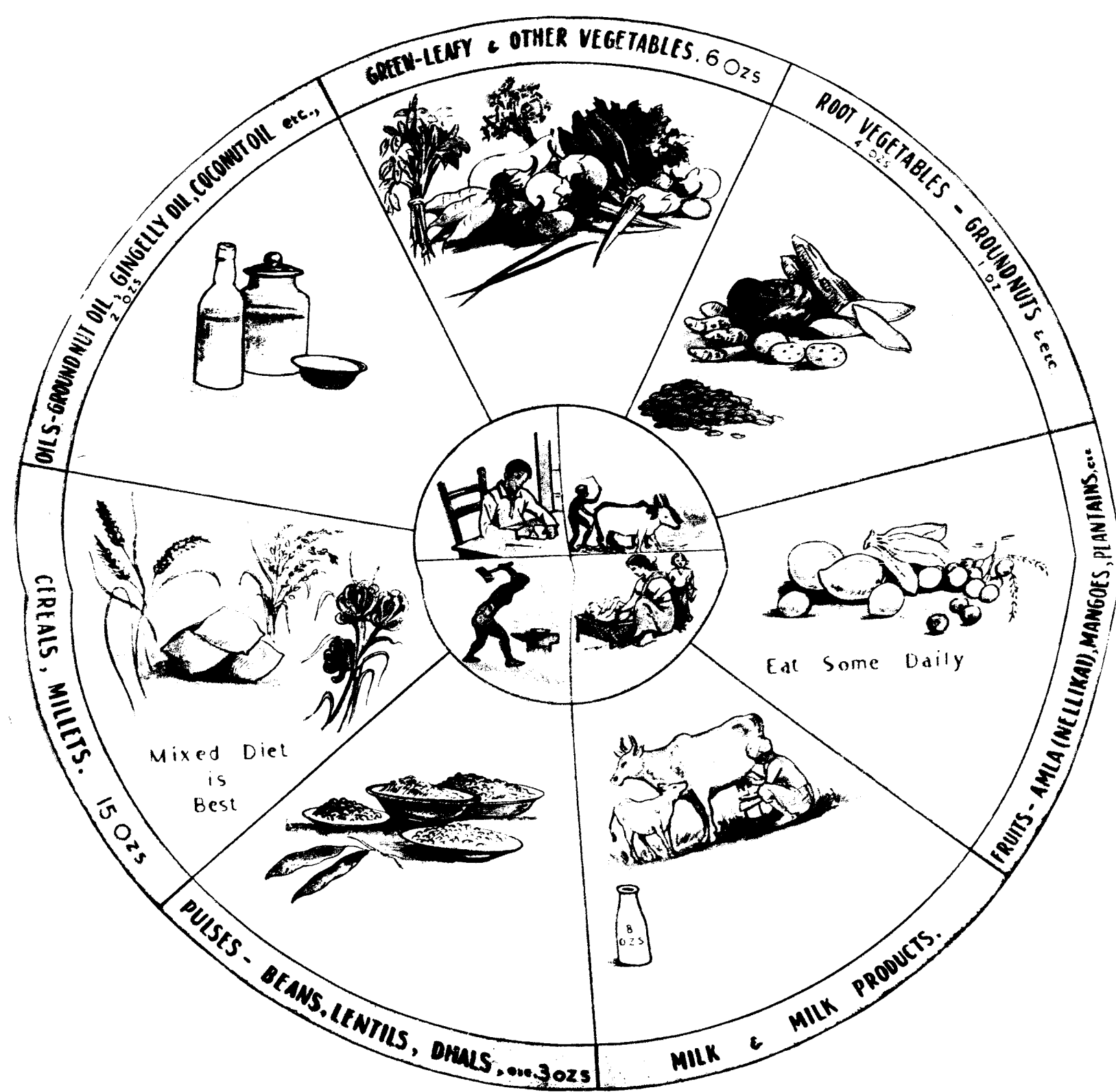
The diet suggested above is also adequate in respect of vitamins and mineral salts. The vitamin value of the diet can be further enhanced by the larger use of sprouted pulses, 'Nellikai' (amla), etc., without materially increasing the cost.

The full value of such diets which are largely limited by considerations of cost, can be obtained only by adopting proper methods of cooking, to minimise wastage of essential nutrients in the foodstuffs. Change of food habits alone holds considerable prospect of improving the poor South Indian diets without materially affecting the cost, but this indicates sustained educative measures.

The accompanying chart represents the scheme of a general vegetarian diet very much on the lines of the poor man's diet described in the above note.

THE BASIC FOODS - VEGETARIAN
SIMPLE, CHEAP, NUTRITIOUS, DELICIOUS.

WHAT TO EAT AND HOW MUCH PER DAY?



NURSING & EXPECTANT MOTHERS, INFANTS & CHILDREN
AND THE WORKERS REQUIRE MORE FOOD.

REPPING FROM
PEOPLE'S BEACH, MADRID, SPAIN
MARCH, 1967.

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The Health of the State is the State of your Health

BY

PURTEJ SINGH, M.S., (Harvard).

II. INTESTINAL DISEASES.

Before entering into a discussion of the methods of control, it will be profitable to know some particulars about diseases communicated through human excreta.

The following are some fundamental facts applicable to all diseases.

(1) For each disease there is a specific germ, which is called its causative agent.

(2) The germs of each disease originate from a specific source.

(3) Germs of certain diseases are transmitted purely mechanically; of others by specific insects, and the germs go through a period of development in the body of the insect before being infective.

(4) The germs must enter a healthy person through a specific channel to cause disease. This channel is called the portal of entry.

Thus malaria is caused by four species of a micro-organism called Plasmodium. The reservoir of these germs is the blood of a person suffering from malaria. The transmission takes place through certain species of anophelene mosquitoes. The germs go through a period of development in the body of the mosquito before they are infective.



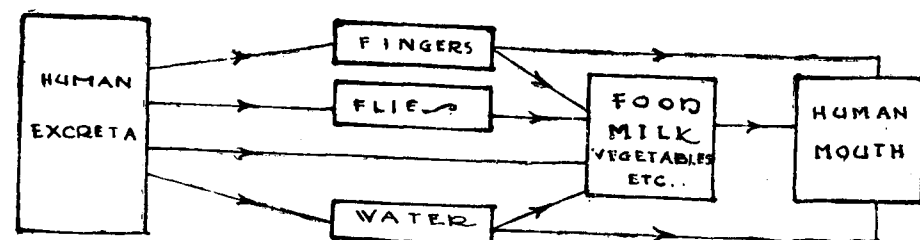
These germs are injected into the blood of a healthy person to cause malaria.

To emphasise the points, malaria cannot be caused by any other germs excepting Plasmodium. These germs will not be found in the sputum, excreta, or urine of the patient, but only in his blood. The germs cannot be transmitted by lice, or ticks or even by all species of anophelene. If the malaria germs are swallowed by mouth, they can not cause malaria.

With the above principles in view, let us consider the epidemiology of important intestinal diseases.

Cholera.

Causative Agent ... A germ called *Vibrio comma*.



(Diagram—After LUMSDEN of U. S. Public Health Service.)

Source of infection.	Excreta and vomits of infected persons.	<i>Paratyphoid fevers.</i>
Mode of transmission.	Mechanical. By contaminated water and foods; by flies.	Causative agent ... Paratyphoid bacillus, A, B, or C; and various species of Salmonella.
Portal of entry	Through the mouth.	Source of infection. Excreta and urine of patients and carriers.
<i>Dysentery, Amebic.</i>		Mode of transmission. Mechanical. By contaminated water, food and milk; and in some case by flies.
Causative agent	... A germ called <i>Endamoeba histolytica</i> .	Portal of entry ... Through the mouth.
Source of infection.	Excreta of infected persons.	
Mode of transmission.	Mechanical. By contaminated water and food; by flies.	<i>Hookworm Disease.</i>
Portal of entry	Through the mouth.	Causative agent ... Worms called <i>Nicator Americana</i> and <i>Ancylostoma dudernale</i> .
<i>Dysentery, Bacillary.</i>		Source of infection. Soil contaminated by excreta of infected persons.
Causative agent	... Various species of the germs called <i>Shigella</i> .	Mode of transmission. When people walk with bare feet over contaminated soil, the larvæ of the worm penetrate through the skin, reach the heart, then lungs, then throat, and finally when swallowed reach the intestines.
Source of infection.	Excreta of patients and carriers.	
Mode of transmission.	Mechanical. By contaminated water and food; by flies.	
Portal of entry	Through the mouth.	
<i>Typhoid fever.</i>		
Causative agent	... Typhoid bacillus, <i>Eberthella typhi</i> .	Portal of entry ... Through skin, or directly through the mouth.
Source of infection.	Excreta and urine of patients and carriers.	
Mode of transmission.	Mechanical. By contaminated water, food and milk; and in some cases by flies.	
Portal of entry	Through the mouth.	

It will be seen from the above that with the exception of Hookworm disease, the mode of transmission of all other diseases mentioned is identical, and is purely mechanical. Whereas for biological transmission only a specific insect is involved, for mechanical transmission there are various possibilities.

The portal of entry is the mouth. So that anything you eat or drink, if it is contaminated will serve as the vehicle for transmission.

Thus, communication of intestinal diseases is very easy and a very rigid control of environments is necessary. As many lines of defence must be set up as conceivable.

As seen from the diagram given in this article, the following are the measures of control for intestinal diseases.

1. Sanitary disposal of human excreta.
2. Protection of food against contamination by human handling.
3. Control of fly breeding and screening of kitchen and eating places.
4. Adequate protection of drinking water against contamination, or sterilisation by chlorination.

These measures of control will be discussed one by one in subsequent articles.

SOIL POLLUTION AND HEALTH.

It was formerly supposed that the soil was breeding ground for many diseases such as malaria, yellow fever, typhoid fever, plague and tuberculosis. With our present knowledge of disease it has been established that very few of them have any connection with the soil and of these still fewer are propagated there. The infection must be carried to the soil and it remains there for a longer or shorter period. The most dangerous soils are those which have been polluted by the urine and feces of man. If the pollution is not greater than the soil can treat or reduce no nuisance will result, in any event the disease bacteria will be destroyed in a varying length of time. The most important of the diseases connected with the soil, typhoid and dysentery, are rarely contracted through direct contact with the soil but usually through the intermediate action of some vehicle, such as water, which it has contaminated. Vegetables grown in ground which has recently been fertilized with human excreta have been implicated in intestinal diseases. Such fertilization is a dangerous practice and is frowned upon by health authorities. Flies may also carry pathogenic organisms from excreta to man's food. In general, the only infection which is obtained directly from polluted soil is hookworm disease and possibly some other parasitic infections.—(From *Municipal and Rural Sanitation* by Victor M. Ehlers and Ernest W. Steel, Publishers, McGraw-Hill Book Co., Inc., New York and London).

THE WAY TO PEOPLE'S HEALTH

BY

RAO BAHADUR DR. C. RAMAMURTHI, B.A., M.B., B.S., B.S.SC.

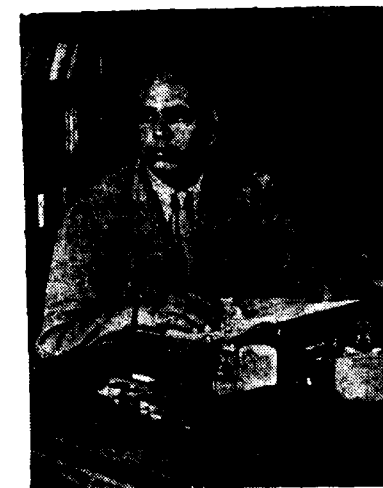
THE SCHOOL.—Now we reach the stage in the child's life when the charming innocence of the young child gradually gets submerged by the developing activities of the young savage, who tries to shake himself free from the restraints of the protecting care of the parents at home and the other kindly persons outside, within the range of his activities. Now he wants to live in his own way ; and he does not like being taught or shown things overmuch. He likes to feel there are others to whom he may extend a protecting arm, if necessary, and to whom he may undertake to explain the mysteries of the universe as he knows them. He likes to play the senior's role.

These are days of childhood which are most full of surprises to the onlooker—even to those who may happen to remember something of their own thoughts of the days of their childhood.

You can notice in their faces the radiant smile at one moment of the triumph and glory of achievement, yet at the next, a scowl of black determination upon some opposed course which he is bent on taking.

At this stage the child yet remains a despiser of much of our civilisation, though he enters gladly into many of the elements of his environments, delighting in colours, sounds and stories, imitating certain social activities, and is curious about machinery, railway engines, motor cars and aeroplanes.

In some instances, the child finds the occupations of the nursery trivial, especially if the younger ones also be there ! He often resents and feels the vigilance of the parent or nurse a trial. And when he is sent to school he feels that



[This is the sixth of the series of articles by the author. This series is intended to educate the 'educated' and the 'common man' on the fundamentals of the health of the people.

—Ed., P.H.]

he is a "nobody" among so many other "somebodies" who claim attention there ; therefore, there, either he seeks to preserve and assert his individuality to some extent by making himself a nuisance ; or he sinks among the rest of the class becoming passive and acquiescent with the new order of things into which he is thrown. In the latter case, there still remains for him the possibility of boasting of school experiences to the little ones at home ! It is some consolation for him.

There is a change that comes over the faces of many children at this age when

they are sent to school. This change is not either agreeable and pleasant; nor is it desirable. It looks as though the quaint childish grace has fled from its face; and its place has been taken by a blankness (sometimes almost verging on stupidity) that comes from the over-disciplined school room. Now and again one may notice, on the way, a young fighter, with a fiery face and a bursting heart trying to assert himself. Whatever it may be, the child takes on a new self frequently; and it has by no means the charm of the boy into whom he promised to grow. This is not altogether his fault. He may have been thwarted, or bent in a direction contrary to his nature; or he may have been over-protected and over-stimulated; or he may have been let severely alone without the encouragement and gentle guidance he needs. All these kinds of treatment of the child are bad and some of them even very disastrous. The right line of treatment for them is to allow them that much of little rain and sunshine that will help the seed of childhood to swell and put forth the will-energy which should grow like the sturdy plant bearing the flowers and fruits of life. One can do most for these children by living in close touch with them and yet interfering as little as possible with them and trying to help them, perhaps best by wisely withholding it when it is likely to be too much. The egoist, the poet, the musician, and the robber chief are all to be found in some fashion or degree among the young barbarians. They are not confined to any social grade; for natural childhood knows no such distinctions.

One important feature of this age period is this: the cup of life, for them, is full to the brim. Sometimes they taste of rapture in it; at other times they taste of despair; and often though

so young, they taste of discontent. There is no grown-up that still knows the fierce longings hidden in a child's heart. It is true that the longings are not all after the good; but in those early days at least, evil is less attractive.

We like to hear the echoes of the voices at play in the child garden (kindergarten). A word of explanation is needed here to understand what it means: Kindergarten is a German word meaning children's garden. It is used for the system of educating young children. It was introduced by the German educational reformer Froebel. The system provides for play and allows the child to exercise its creative faculties in a number of ways. Froebel held that children should grow up naturally in happy surroundings; that play was of the utmost importance and that a child's natural creativeness should be encouraged. His ideas were largely adopted in England in its school system. In the Kindergarten as Robert Louis Stevenson says: "They figure so prettily, pretty like flowers and innocent like dogs". But some of these children are already passing from the age of Innocence to that of Experience. Who knows what may be recorded of their later life! Let us try to put the grace of courage into their hearts and the power of endurance into their bodies so that they may cheerfully encounter whatever may lie before them in the future. It may be our earnest endeavour and prayer that we may also be enabled to give the greatest gift our humanity can bestow; that is, the sunshine of a wise and understanding love of it, that is so lacking even in the civilised communities and nations of the world to-day.

The child enters the school age when it reaches the seventh year. It is the age when the child goes out into a world wider than the home and the

world it knew hitherto. The attention paid to the child is now beginning to be shared by the school teacher as well as the parents, though the latter still play the major part.

Our subject is concerned primarily with the health of the school child which means simple wholesome living under trained supervision and with friendly understanding. The seeds of child health should have been well planted during the pre-school period. But the school years form the strategic period for "rooting and grounding" the child in health. The teachers in the school should have the knowledge of child health and child psychology. And there must be the machinery in the school for the teaching necessary to intrench the habits of health firmly in mind and body. In this matter the school must have the co-operation of the home and the community to promote health as well as the other aims of public education.

The health of the school child directly affects the everyday life of the people of the cities and towns and the rural areas. It presages the future. It forms an issue of great importance to the family, to the school, to the community, and through all these to the country as a whole. It will be a great good for them if the teacher of the school at this stage is at once a teacher and a doctor of medicine. Then the two professions of health and education may be combined in him to impart "Health Education" to the children in the school. But this expectation is too good to be realised. What we need at this stage of school life, is a scientific study of child nature combined with a sympathetic understanding of children's activities, to serve it successfully.

There was never a greater need for a hardy race of healthy and intelligent citizens in this world than now. The

seeds of sound health and endurance will have to be sown during the years of school life. In this matter the home and the community in general should co-operate.

The child ready to enter school should be fit to receive the best that education can bring to him. He should be free to grow and develop; free to discover the best in himself in physical, mental and social personality. He must be free from all the handicaps which may be prevented or removed by intelligent and devoted care of the home and environment.

Often the child that begins his school career is found handicapped because he was neglected at home. It is not generally realised that the pre-school period is one of preparation. Even in intelligent homes the important influence of these years on mental, moral and physical development is frequently disregarded. Both mental and physical development must proceed simultaneously. The former progresses by definite well-recognised steps.

In the pre-school years, habits of right living and right thinking must be formed, though the child may not know the why and the wherefore of the habits formed. Physical development also must be supervised. Strength and ability to wait on himself, at least, partially, and to take part in the ordinary physical activities of his age is just as necessary as is the possession of adequate mental power. Health examinations must be regularly carried out at regular and stated intervals, at least once every six months; and weighing must be done once a month. This latter measure offers an easy simple and thoroughly scientific and practical means of following the physical progress of the child. Measurement of height every three months gives another valuable clue, if there be any retardation of progress.

Only, one must not stop with finding the weight and height; if any physical defects are found in the health examinations, they should be corrected. For all this the parent should take the responsibility in the pre-school child. They should also prevent the child from getting infections of communicable diseases by carefully avoiding exposure of the children to them, and controlling the spread of the diseases, when any child happens to have an attack, by isolating it. Another preventive measure that may be taken is to get every child duly vaccinated against small-pox. Keeping the mouth and teeth of the child clean prevents diseased teeth, throat and tonsils.

In short, the home of the pre-school child should have as part of its duties the establishment of a proper routine of living for the child, with well-regulated hours of play, rest, sleep and meals; important health habits such as bathing daily, cleaning the teeth at least once daily, love of fresh air both day and night and sunshine, liberal use of fruits, whole food grains and fresh green vegetables in food, drinking of four to five glasses of water a day, depending of course on age, regular bowel and bladder habits and the proper use of towel or handkerchief particularly while coughing and sneezing.

The health school child possesses an abundance of life—life for the child and those round him is joy and happiness. Such a child's wealth in health ought to manifest itself in clear skin; clean and sound teeth; in keen and bright eyes; and in well set-up and well-functioning body that is steadily and properly growing and that can meet the day's demands on its muscles, organs and energy. The child's mind must be desirous and able to learn; and it must be of a cheerful and joyous dis-

position. From the rising hour till bedtime, the child must find joy in work, recreation and in the successful fulfilment of its tasks. He finds, daily, new attractions in his little world. With his feeling of well-being he can surmount the obstacles that are insurmountable to those less fortunate in health.

The organs of his body function properly; and the child is scarcely aware of it. He eats his food eagerly with a gusto and with an unpampered and appreciative appetite, thereby showing his vigorous growth and sturdy health. He eliminates daily from the intestinal tract. When the day is over the carefree refreshing sleep of the nightly hours provide him with ample renewed vigour for the growth and activities of the morrow.

Mental health accompanies physical health. This should be manifested by the child's well-controlled and balanced emotions; by modesty, by fearlessness (and not foolhardiness) which is true courage; by cheerfulness; and by the desire to be truthful. Such a child enjoys contact with others, strangers included; and particularly those of his own age. He plays the game fairly; and selfishness does not play any part in his activities. These qualities will manifest themselves more clearly and in a greater degree as the school child grows older reaching higher standards and classes.

The school in a community or country must be a healthy agency. It must form the agency for leading an educational programme of health among the children of school age. It is the special privilege and obligation of the school to standardise the principles and methods of child nurture and training, though the home, the State health department and voluntary organisa-

tions may bear much of this responsibility.

The child must have its education in health. The courses in physiology taught in school must not be uninteresting and uninspiring. The child must enjoy its education in health. He is interested in the routine monthly weighing, and he is proud when he finds he has reached the normal weight faster than his friend and classmate; or gained more weight than he in the past month. To him it is fun, not drudgery. If physiology is taught in such a way as to require memorising the names of bones and organs in the body parrot-fashion, the child will develop a disgust for health education. If the child is taught how to promote his own growth and health, then a living interest is roused in the child for learning the laws of health and the ways of healthy living.

To satisfy the varied requirements of the nation along the above lines educational facilities should be available in the country. It will be necessary to establish a complex system of diversified schools to suit all the ages. Fundamental in such a system would be the *primary schools*; these should provide the thorough elementary training so essential and effective to make good citizens. Following these schools should be the *secondary schools* (middle schools) and *high schools* which afford the advantages of a higher education along more liberal lines. Besides these there should be the technical schools; schools for trade, manual arts, agricultural and horticultural institutions, naval and military academies which will offer the training to the children giving them careers. Then there should be the Universities that will provide both professional education in law, medicine and engineering; and offer opportunities of higher studies and research in

science, history and philosophy and the pursuit of studies in Literature and Art. There should also be proper training schools and colleges to train teachers for the various standards in the different branches of knowledge in the schools.

Private institutions of high merit operating side by side with State institutions can render valuable service to the community and State by creating healthy rivalry and thus exert a wholesome influence.

The uniformity in the high school standards of preparation in the schools will enable a close correlation between the several special technical schools and make it easy for the pupil to pass from one school to another when necessary or desired. This will give a solidarity and unity in which co-operation can be natural and mutually beneficial.

A word about the exceptional child is here necessary. There are two kinds of exceptional children; the specially gifted ones and they are very few; and the defective ones, these forming a larger number.

THE GIFTED CHILD.—It is unfair to the exceptionally gifted child to be held back by the ironclad classifications of the ordinary schools. The psychological effects on children lingering in classes that they have outgrown is distinctly bad. Such children must have special opportunities to make special progress. Gifted pupils are easily taught. They are not in any need of special methods and unusually trained teachers. Ordinarily they need merely to be put in advanced classes and kept going. This is an inexpensive provision and it is very important that this provision should be made. It is not suggested that there should be a laxity in the strictness with which children should be admitted to the standard of their classes. On the other hand, in the matter of their admission and

promotion, the children must not be placed in classes the standard of which they have outgrown as manifested by their special capacity. These children must not be hurried in their pace of learning.

It is the defective pupil that requires the specially trained teacher. Recognition must be given to the difference in physiological and mental age of children. Those that are definitely lacking in mentality should be segregated into classes suited to their capacity. Expert teachers should exert every effort to improve the conditions to overcome the handicaps of the unfortunate defective children.

Morally delinquent children should be placed in homes or institutions for correction, where they are supervised and taught. They must not be herded together with confirmed criminals without a chance of their redemption. Taking children away from environments that are likely to develop evil and lawless traits is wholesome to them.

Both the State and parents should recognise this principle. It is disastrous to leave children to the care of parents unfit to control them. There will be much less prevalence of delinquency if this principle is more generally realised and observed in practice. Taking a child out of an evil environment before he becomes a moral delinquent and placing him under moral surroundings in some good institution—or even in a good home—without hesitating to interfere with parental rights—as though they were greater than social rights is sound practice. This will prevent the child from becoming a law-breaker. This suggestion is drastic but it deserves a better attention of the State and parents than it received up till now.

Closer co-ordination of these educational institutions and their functions will prevent much misfortune, cure a vast amount of misery, avoid all preventable discontent and confer a more satisfactory social benefit on the community.

A CALL TO ACTION.

In the opinion of Dr. Luther Gulick, the shame of the cities in 1946 is found in three things: first, lazy citizenship with low standards; second, lack of city pride; and third, failure to look ahead and make great plans for the future.

Our shame is urban mediocrity without revolt; filth, slums, decay, and traffic snarls without action; private preoccupation and lazy contentment, without compelling civic loyalties or great civic dreams.

"Why," asks Dr. Gulick, "do we fail to make the modern city a centre of pride to mankind, and a source of inspired and ennobled living?"

(*The American City*, December 1946, p. 68).

LIFE IN A VILLAGE

BY

RAO BAHADUR T. S. RADHAKRISHNA IYER,

Deputy Accountant-General (Retd.).

A Rural Dispensary has been maintained in my village since 1925, at the cost of Government and the District Board, Tinnevely, the former meeting the annual subsidy of Rs. 500 (i.e., Rs. 41-10-8 per mensem) paid to the Doctor and the latter defraying the cost of medicines amounting to Rs. 720 a year. Prior to 1941, medicines of the value of Rs. 360 only were supplied annually by the District Board. About a year ago, the appointment of a Midwife on Rs. 30 per mensem was sanctioned by Government, though the necessity for the post had long been keenly felt. As over 50 patients are treated daily in the Dispensary, the Government orders, I am told, would justify the appointment of a Male Nursing Orderly or Attender, but the District Collector has recently informed me that there are no funds for sanctioning such an appointment.

Out of the princely monthly remuneration of Rs. 41-10-8, received by the Medical Officer, he has to pay the rent of the Hospital Building and the wages of a sweeper and peon. Though theoretically he is entitled to charge fees for the treatment of patients, whose family income exceeds Rs. 30 a month, such patients are few in a small village and the receipt from private practice is therefore practically negligible.

I was taken aback, when I came to know that Government expected a qualified Medical Officer who had taken the diploma of L.M.P. to work whole time in a village without any prospect of getting any extra income, on a monthly remuneration of Rs. 41 only, which is perhaps less than the pay and allowances of a Municipal sweeper or a postman. I understand that about 18 Rural Allopathic Dispensaries out of 25 have been closed in this District for want of qualified hands unwilling to work on the poor remuneration sanctioned by Government and no arrangements have been made by Government to provide medical help to the villagers in those places where Dispensaries have thus ceased to function. Even in this village, the Doctor in charge of the Dispensary resigned his job owing to certain domestic calamities and left the place in August 1944. The Dispensary was closed



from that month. The local quacks began to have a roaring practice during his absence and mercurial preparations in the form of Sindhurams (சிந்துரம்) were freely administered to children and adults alike, for curing fevers of all kinds. I personally felt the absence of the late Doctor very keenly and the villagers benefited by his treatment, even more so. We therefore requested the Doctor to return to this village and he was kind enough to accede to our request having remained in this village for nearly 18 years and formed strong attachments to the people thereof. The Dispensary was re-opened in March 1945 and the villagers are very grateful to the Doctor for his having subordinated his personal inclination to their wishes, especially at a time when no sort of relief could be expected from Government. The return of the Doctor to this village and his continued stay there are due to the fact that he has got landed property to fall back upon, to meet the excess of his expenditure over his income and that he is very much attached to the village and its residents on account of his long association with them. I am bringing these facts to the notice of the public, to show, how much the

essential requirements of villages are ignored and neglected even after the advent of a National Government, though almost all the food required for the Province is produced by the villagers by the sweat of their hard labour. With no sort of amenities such as Theatres, Cinemas, etc., with no facilities for getting good drinking water even, the villagers continue to eke out their miserable living doing hard work year in and year out with insufficient and unbalanced food and it is the prime duty of the National Government to improve the lot of the villagers in the first instance in preference to spending money at

the Capital of the Province on a lavish scale on the construction of stadia, beautiful parks, cement roads, etc. It may be mentioned in this connection that there are no village roads worth mentioning and that the life of my Motor Car Tyres is reduced to half their normal span of life by my frequent journeys from my residence to the Main Road which itself is not in a passable condition at any time, except perhaps during a Gubernatorial visit! I take this opportunity to invite the attention of the Government to the absence of village roads or to their unsatisfactory condition, where they actually exist, in name.

DEVELOPMENT OF NATIONAL MEDICAL SERVICE.

The Union of Soviet Socialist Republics.—The attitude of the Soviet Government towards the health of the people has been described by Professor Sigerist in the following words:—

"Health is one of the goods of life to which man has a right; wherever this concept prevails the logical sequence is to make all measures for the protection and restoration of health accessible to all, free of charge; medicine like education is then no longer a trade, it becomes a public function of the State."

This conception of health as a public function has resulted in the development of a co-ordinated scheme of preventive and curative health services, which exists in no other country, and in the recognition of the need for providing an environment which will enable the body to remain healthy and to resist disease. "For this reason the control of housing, of industrial conditions, and other aspects of life, comes under the care of the People's Commissariat of Public Health. Another function of that department is to encourage and look after the communal restaurants which, in the Soviet Union, have achieved such popularity that they serve 20 million people a day."

The health service is entirely free to the people, and places at the disposal of the patient not only the services of the general practitioner but also of the specialist as well as laboratory facilities.

(Extract from the Report of the Health Survey and Development Committee, Vol. II, Recommendations Chapter II, p. 10).

LAW AND PEOPLE'S HEALTH.

LIABILITY OF LOCAL AUTHORITIES. A SUMMARY OF THE LAW.

By K. S. S.

In *Shelfer v. City of London Electric Lighting Co.*, (1895) 1 Ch. 287, an Electric Lighting Co., incorporated under the Companies Act erected powerful engines and other works on land near a house which was subject to a lease to the plaintiff. Owing to excavations for the foundations of the engines and to vibration and noise from the working of them, structural injury was caused to the house and annoyance and discomfort to the plaintiff. In an action by the plaintiff for injunction and damages, the Court decreed both holding that there was

it was for the defendant to prove that it was impossible for them to carry on their business without creating nuisance.

Similarly in *Midwood & Co., Ltd. v. Manchester Corporation*, (1904) 2 K.B. 597, where under the Manchester Electric Lighting order the defendants were empowered to supply Electrical energy in their District and for that purpose to lay down electric mains, one of their mains fused and there was an explosion causing fire by which the plaintiff's goods were damaged, it was held that even apart from negligence the defendants were liable to the plaintiffs as for a nuisance; and there was an "obligation resting upon the defendants to use all reasonable

Ignorance of law is no excuse. Therefore a person has to act on his peril even though he may not know his legal obligation. Hence, it is necessary to educate the 'Common man' on the subject.

By giving extracts from the decisions of the Courts of Law in these columns, we do not encourage or recommend people to resort to litigation, at the slightest provocation. Our purpose is only to bring to notice the duty which the public authorities or individuals owe to the people and the rights and duties of individual citizen.

At the same time, it can not be gainsaid that a knowledge of their fundamental rights by all citizens and the realisation thereof by public authorities will be the finest check on such authorities which may otherwise be tempted to trample down those rights with impunity.

It should be remembered that litigation is an expensive luxury. But those who can afford to bear the cost and stand the strain of litigation, owe a duty to the public by establishing valuable public rights through Courts of Law.
—Ed., P. H.

nothing in the Electricity Lighting Act, 1882, to relieve undertakers thereunder from liability to an action at Common Law for nuisance to their neighbours caused by their works. Where a Public Authority undertakes a business, they must exercise all the skill and care to prevent a nuisance. Section 10 of the Electricity Act, 1882, while authorising the erection of machinery contained a clause that nothing in the order shall exonerate the undertakers for any indictment, action or other proceedings for nuisance in the event of any nuisance being caused by them. Lord Lindley added that

known means to secure the public against such damage as was occasioned in this case." Lord Romer explained the position when he said, "Express power is given to break up the streets for the purpose of laying mains, to lay mains, and to send electricity along them; but there is no authority, either expressly, or I think impliedly, given to the defendants by the order authorising them to allow leakage of electricity from their mains so as to cause an explosion, or to injure the property of the plaintiffs in the way in which they have injured it. (See p. 609).

In *Dawson & Co. v. Bingley Urban District Council*, (1911) 2 K.B. 149, an Urban authority was required to cause fire plugs to be provided and maintained and to mark on the buildings or walls within the streets words to denote the situation of the fire plugs. The defendant a local authority, erected a fire plug, but gave a wrong length in the mark on the wall. Fire broke out on the plaintiff's premises, but owing to the misleading mark on the wall there was considerable delay in the firebrigade finding the exact position. In consequence of the delay, the fire assumed greater dimensions and caused more damage than what it would otherwise have done. It was held that the defendants were liable as for misfeasance. After citing Lord Halsbury's dicta in *Shoreditch Corporation v. Bull*, Vaughan Williams, L.J. proceeded to lay down "I gather from this extract from the judgment of Lord Halsbury that, although well-established authorities make it clear that public bodies representing the public are not liable to be sued by an individual member of the public who has sustained injury in consequence of the omission of such a body to perform a statutory duty created for the benefit of a class of which such person is one, yet the public body will be liable if by its acts it alters the normal condition of something which it has a statutory duty to provide or maintain and in consequence some person of a class for whose benefit the statutory duty is imposed is injured. The reason why the

public body is liable in such a case is that it is not mere non-feasance but misfeasance of the public body which has caused the injury; and I think, although it is not necessary to decide it in the present case, mere negligence by the public body in the course of the performance of its duty may constitute misfeasance if the result of negligent doing of the statutory duty makes that which the statute requires to be provided dangerous for those for whose benefit such statutory duty is imposed."

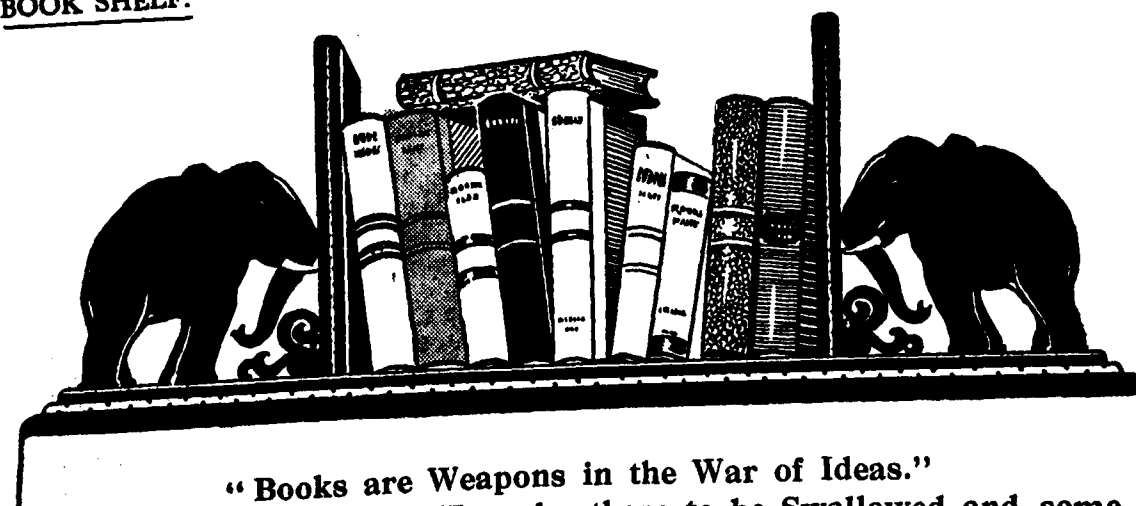
So also in *Charing Cross Electric Supply Company v. Hydraulic Power Company*, (1914) K.B. 772, where the plaintiffs were the owners of electric cables which had been laid under certain public streets, and the defendants were the owners of Hydraulic mains which had been laid under the same streets under statutory powers and the defendants' mains burst and damaged the plaintiff's cables, it was held that although the bursting of the mains was not due to the negligence on the part of the defendants, the defendants were liable. The principle stated and followed was "when one person in managing his own affairs causes, however innocently, damage to another, it is obviously only just that he should be the party to suffer" and the rule of law was that "one who for his own purposes brings on his land and keeps there anything likely to do damage if it escapes must keep it at its peril."



Doctor: "Madam, I am sorry, but I can't cure your husband of talking in his sleep."

Patient's wife: "Well then, couldn't you give him something to make him talk more distinctly?"

BOOK SHELF.



"Books are Weapons in the War of Ideas."
"Some Books are to be Tasted, others to be Swallowed and some few to be Chewed and Digested," . . . and some to be Eschewed!

BOOKSHELF HANDBOOK OF INFECTIOUS DISEASES

WITH NOTES ON PROPHYLAXIS, SERUM
TREATMENT AND VACCINATION.

Authors.—The Staff of the Cantacuzene Institute
under the direction of PROF. C. IONESCU-
MIHAESTI AND PROF. M. CIUCA.

Publishers.—League of Nations, Geneva.

Price.—Not given.

Size.—6" x 4 1/4". 1945.

The cynic may word his epitaph on the League of Nations as "Spawned by war and swallowed by war." Whatever be the verdict of posterity of this institution in its main field, there is one sphere where it has justified its existence. The Health Organisation throve independent of the play of opposing forces. It standardised international products, fostered research and promoted honest co-operation. Speedy communication led it to organise an excellent epidemiological intelligence service for the protection of western nations who were world carriers. It went into the problem of nutrition of post-war Europe and has helped to increase our knowledge in that subject. This useful institution is now to be replaced by the "World Health Organisation" of the U.N.O.

The publication under review is almost the last one before it moulds into its new form. Looking at all its voluminous productions over the past quarter of a century, one is tempted to say that the Handbook of Infectious Diseases is the most useful one. It is a pocket book for the average medical man and Health worker. To the former it summarises information in a

field with which he is not fully acquainted in ordinary practice. To the latter it is a helpful reminder in emergencies.

It is not however, the first of its kind. The American Public Health Association has brought forward a small booklet on the same subject and with the same purpose. It has passed through several editions during which it has grown in size and utility. The book under review has gone one better in the same direction.

The book is divided into three parts. The first one is a compendium of important data regarding all communicable diseases grouped according to the nature of the causative agents. This is more rational than the alphabetical arrangement adopted in the APHA booklet. The information furnished is condensed though up-to-date as far as war circumstances in an Eastern European State permitted. The book is stated to be the translation of the third—or perhaps the fourth—edition of the book in Roumanian language. This part could have been made more useful by the incorporation of information regarding "period of infectivity" and "carriers" under each disease. The portions under prophylaxis are generally rather curt and sometimes even unhelpful.

The second and third parts of the book relate to "general and specific immunology" and to collection of pathological specimens. About 40 per cent. of the bulk of the book is covered by these two parts. This is a definite improvement over the American counterpart. Part II is a specially good and useful summary. It gives succinct information of all biological diagnostic tests, immuno-prophylaxis, treatment

by vaccines and sera, blood-transfusion and latest weapons of the Sulpha drugs and antibiotics. Part III deals with instructions for collection and examination of pathological material including insects and water samples. These two parts are bound to be very useful, and it is in these that it scores over the American production.

The get up and the printing is good. The size is quite handy; the volume will go into the pocket or the bag of every practitioner. It is a volume which should be in the hands of every medical student, physician and health worker.

The new W.H.O. which threatens to become the legatee of the League of Nations Health Organisation, should take steps to have the book revised in an authoritative way incorporating recent western European and American experience. While doing so, a small part on the essential methods and principles of concurrent disinfection could be usefully added.

"BELL."

"BATTLE FOR HEALTH"

Author.—Sir Frederick James.

Publishers.—Messrs. Tata Sons, Ltd., Bombay, 1946.

Price.—Rupee One.

Size.—7" X 4³/₄".

Pages 156.

This is the third number of 'Tata Studies in Current Affairs'. The publishers should be congratulated for the publication of this very useful little book. They also deserve to be congratulated on the selection of the author who, as the foreword states, is singularly qualified to speak on the subject. Sir Frederick apart from his wide and varied experience of the public affairs in this country, was a Member of Health Survey and Development Committee. He has had therefore excellent opportunities to study the problem of the health of the people. The book is written in a popular style. The diagrams are attractive and grip the attention of the readers. There is a good deal of scope for educating public opinion on the subject. This pamphlet serves a very useful purpose indeed, and it ought to be read by everyone who is interested in the subject: And which thinking man is not interested in it?

The arrangement of the text has been well thought out and at every suitable context the author rightly appeals for the co-operation of the people in the battle for health. He has not overlooked to lay special emphasis on the responsibility of the State in promoting the health of the people.

Perhaps, the author might have avoided reference to technical matters such as the disposal of refuse, and sewage and industrial waste. He suggests that householders should burn their dry rubbish! Hotels, restaurants and other public institutions should be compelled by law to do so. He proceeds to comment on the refuse disposal in India which is carried out by dumping it in low lying areas in our towns or villages. This is bad. He lays stress that refuse ought to be burnt and that it should be made compulsory for towns of 50,000 population and over to provide the necessary incinerators. Modern sanitarians would certainly take exception to these suggestions which were usually being tendered before the scientific aspects of controlled dumping was understood. Apart from the merits of controlled dumping in the disposal of refuse, there is also another aspect which is of special importance to an agricultural country like India. Refuse should be converted into manure and it can very well be done by the manufacture of compost under scientific supervision.

In regard to the disposal of sewage and industrial wastes his suggestion is that there should be a Board of Public Health for each district. In doing so, he is but reflecting the recommendation of the Bhore Committee. In our country it is not the lack of Boards of this kind that had been responsible for the poor progress in the past. Nor had there been conflict between one local body and another either in developing water supplies or in the disposal of sewage. By constituting Boards of this kind, the State would be adding but a fifth coach in the wheel of progress.

We cannot help pointing out that one of the author's standing in Public affairs and experience in this country should have succumbed to the recommendations of the Bhore Committee without recording his emphatic protest against the lopsided development of the Services which the Committee had proposed. We should have thought that the author who comes from a country which produced a Chadwick should have overlooked that the first and foremost improvement which is required in the country is the development of the environment and the provision of essential amenities of life such as water supply, drainage and housing. It is most unfortunate that he had not raised his powerful voice to place these requirements among the first and foremost items in a programme for the promotion of the health of the people.

"R"



THREE STAGES OF PROGRESS IN THE PREVENTION, CONTROL AND TREATMENT.

"With most of these diseases we may trace three stages, first the lowering of the death rate by prevention of the disease through public sanitation, which progressed most rapidly between 1870 and 1890, but has not yet wholly completed its work; then a period of prevention by improvement in housing isolation of cases, etc., and finally in some cases a period of lowering of the death rate through the discovery of means of cure. This may perhaps be considered to be the characteristic of the latest period." (*The Century of Science*, BY SHERWOOD TAYLOR, 1942).

"The year 1880, when the germ-theory of infectious disease became generally accepted, marks the transition from empirical to scientific medicine. Between 1880 and 1940 the science of health has progressed in five chief directions. The first, already begun by the sanitation of the seventies, has been towards the prevention and cure of germ-diseases; the second has led to the opening up of the whole field of modern surgery; the third led to the application of the new powers of physics and chemistry to medical diagnosis and treatment; and the fourth to a new physiology; that is, a much increased knowledge of the mode of working of the body, which knowledge has borne fruit in new herapeutic methods. Lastly, we have begun

WHAT DO THEY SAY ABOUT IT?

Readers can contribute to this section. They are requested to send extracts of current literature which, in their view, would interest the people.

—(Ed., P.H.)

an advance which is social rather than scientific—the provision of means by which everyone may have the right to receive medical treatment." (*The Century of Science*, BY SHERWOOD TAYLOR).

INDUSTRIAL AND ENVIRONMENTAL SANITATION.

This article is concerned with the industrial sanitation in places of employment. All places of employment should provide safe, clean, cool, and wholesome drinking water; adequate water closets, chemical or private privies for each sex; proper sanitary facilities for maintaining personal cleanliness; personal services such as separate dressing rooms and retiring rooms for women; separate eating places for employees who are unable to go elsewhere; adequate receptacles for garbage and rubbish disposal; and correct ventilation, heating, and illumination. EARL V. PORTER: (*From P. H. Engg. Absts.*, Vol. XXI).

"HOUSE FLY."

Missed him!

Bad luck. But if you'd studied some photographs taken by Professor Egerton of Massachusetts you would have been able to swat that fly first time. Let me explain.

Using a special apparatus, the professor was able to photograph various moving objects difficult to observe at normal speeds. Now one of the things he photographed was the

take-off of the common house-fly. What he did was to put a piece of sugar on a piece of paper, attach a few feet of string to the paper, and wrap the string round the shaft of a high-speed camera. As the camera brought the film up to running speed, it would pull on the string attached to the paper, eventually jerking the paper out from under the fly which had settled on the sugar. As the fly felt the paper start to move, it took off, and the resulting motion of the fly was observed by the high-speed camera.

The photographs showed that when the fly takes off from his aerodrome, so to speak, he first of all springs backwards for about an inch, making an angle of some 60° with the ground. Then his wings begin to beat as he flutters out towards the place from which he's just taken off, and from that moment onwards his flight is in a forward direction. Now, is that quite clear? He starts backwards, then drops down, then goes forwards. But why does he do this?

Well, he has to because of his peculiar anatomy. The muscles and joints on his legs are so arranged that when he lands, the shock is lessened by the special angle at which his legs are set. In a word, his legs act as shock-absorbers. But this special angle has one distinct disadvantage: when he takes off for a flight he can only do so backwards.

And the moral of all this? Well, if you want to swat a fly first time, you must remember, that after he has taken off, he will begin his flight backwards. So, if you aim about half an inch behind where the fly is resting, you will stand a good chance of bringing him down. ANTHONY WEYMOUTH: (*From Science Broadcasts: Publishers: Littlebury & Co., Ltd., The Worcester Press, Worcester.*)

TOXICITY OF DDT TO FISH.

GINSBURG J.M.S., *Econ. Ent.* 1945, 38, 274.

During experiments on the use of DDT (2,2-bis (p-chlorophenyl) 1, 1, 1 trichlorethane) for the control of mosquito larvæ, several species of fish were killed. Tests were therefore made to determine the toxicity of DDT to fish, using the goldfish, *Carassius auratus*, as the test animal. In the first series of tests a colloidal dispersion of DDT in ethyl alcohol was added to a series of 1 gal. jars in amount sufficient to give concentrations of DDT ranging from 1 p.p. 100,000 to 1 p.p. 20,000,000. Five fish were placed in each jar. All fish died within 24 hours in concentrations of DDT of 1 or more parts per 500,000. In water containing 1 part of DDT in 1 to 5 million parts of water all the

fish were killed in 2 days. Only 40 per cent. of the fish were killed in 6 days in a concentration of 1 in 10 million; no fish died in the most dilute solutions used or in the controls, during the six days that the test lasted. Emulsions of DDT in kerosene were applied to the surface of water in 1 gal. jars. Within 6 days 60 per cent. of the fish were dead in water to which DDT has been applied at rates of 0.42 and 0.85 lb. per acre, and 80 per cent. were dead when DDT had been applied at a rate of 1.7 lb. per acre; no fish died when kerosene alone were applied to the water. Dusts of soapstone, containing 1 and 0.1 per cent. DDT were distributed over the surface of water in small aquaria filled to a depth of 5 in. and each containing 6 litres of water. Six fish were placed in each aquarium. After 6 days, only 33 per cent. of the fish were dead when DDT had been applied at a rate of 0.1 to 1 lb. per acre; 83 per cent. were dead after 6 days in the aquaria to which DDT was applied at a rate of 2 lb. per acre. When 12 surviving fish were washed and transferred to tap water, 5 were dead within the next 6 days showing that the deleterious effect of DDT persisted even after treatment had been discontinued. Comparison of the results shows that DDT is most toxic to goldfish when added as a colloidal dispersion, and least toxic when applied as dust. In all forms the toxicity was sufficiently great to make the unrestricted use of DDT dangerous in waters where fish are to be preserved. GINSBURG J.M.S., *Econ. Ent.* 1945, 38, 274. (*Extract from W.P.R. Summary, Vol. XIX, Abstract No. 238.*)

THE VALUE OF AFFORESTATION.

During the last 30 years the demand for water for domestic purposes in the area supplied by the Durham County Waterboard has been doubled and is now 24 gal. per head per day. The moorland watersheds in use have a run-off calculated to be 25 m.g.d., but the volume of water which can be made available from impounding reservoirs for public use is 15 m.g.d. A further 1 m.g.d. is obtained from storage reservoirs at Sikehead and from 2 collieries. During periods of heavy rainfall considerable volumes of turbid water have to be diverted from the impounding reservoirs. To counteract this, afforestation is being practised on some of the gathering grounds. The effects of forests on conservation of water are discussed. When a reservoir is sheltered by trees, the water is comparatively free from agitation by wind which stirs up mud and silt. The effect of high winds on water in the Smiddy Shaw

reservoir increases the turbidity of the water to such an extent that the cost of treating the water is more than doubled. Of the 7,000 fractures of trunk and distribution mains which have occurred in the Board's area during the last 20 years, 40 per cent. have been attributable to subsidence caused by mining. Of the 42 service reservoirs owned by the Board, 24 have been damaged by colliery operations. More than 27 mil. gal. of water which could be treated for public use are pumped daily from coal mines in the centre of the County. (J.R. SANIT. INST. 1945, 65, 272). RODWELL J.A. J. BRIT. WATER W. ASSN. 1945, 27, 264. (*Extract from W. P. R. Summary Vol. XIX, Abstract No. 113.*)

VEGETABLE INSECTICIDES IN INDIA.

In a leaflet (No. 20) published by the Forest Research Institute, Dehra Dun, information is revealed concerning the usefulness of certain vegetable insecticides. These insecticides are preferred to others, such as lead, copper salts, arsenic, etc., because they are non-toxic to man and animals.

Formerly the demand for this kind of insecticide was met by a plant called "derris" from Malaya, Dutch East Indies and Philippines. Research has revealed that other plants bearing the same toxic elements as "derris" are available in India, and they produce emulsions of proper quality.

Successful experiments with these plants have been under way in Mysore, Cochin, and Assam. C.F. ADAMS. *Indian Med. Gaz.*, 77, 632, (Oct. 1942). *From P. H. Engg. Absts., Vol. XXIII.*

WHY DOGS AND CATS EAT GRASS.

Both dogs and cats are occasionally seen to eat grass. This is not one of their usual foods, but it is taken by them as a medicine. Somehow the cat knows that, when its stomach is not operating properly, the eating of green grass will bring about a readjustment.

Wild bears are said to eat roots and berries at certain times, just as we take a cathartic.

It is known also that animals induce vomiting by eating certain things. Animals do indeed, doctor themselves.

Extract from "Nature is Stranger than Fiction" by John Y. Beaty. Publishers: George G. Harrap & Co., Ltd., London, Toronto, Bombay, Sydney.

SAFETY AND SANITATION IN INSTITUTIONS OF HIGHER EDUCATION.

The study discusses the data obtained by questionnaires sent to 100 co-educational institutions and embraces official in charge of sani-

tation, preparation of sanitarians, rooming facilities, food service, and swimming pools.

The report states "from the somewhat superficial evidence obtained from a distance, hardly more than five per cent. of our institutions of higher education seem to take the matter of the physical welfare of their students as seriously as they do their mathematical or linguistic welfare, by appointing someone fully prepared to meet their student needs in this field. As compared with 40 years ago there has been little advance in the assumption of responsibility for conditions in rooming houses, and there is still neglect in many instances of full precautions in the food service of college dining rooms.

"Lastly, it should not be overlooked that we are dealing with educational institutions and that the living and working conditions of these institutions should be educational. Unsafe and ill-conducted dormitories or rooming houses, badly managed dining rooms, poorly lighted and ill-ventilated classrooms and gymnasiums reeking with the odors from unclean bodies and soiled clothes are not educational. It is not at all consistent to furnish infections from dressing-room floors, from unclean swimming pools or from infected milk along with information in personal hygiene and public health." J.E. BACON. J. F. Rogers, *Pamp. No. 84, U. S. Dept. of Interior, Washington, D.C.*, 22, pp. (1938). *From P. H. Engg. Absts., Vol. XXI.*

THE USES OF PENICILLIN.

At the meeting of the American Philosophical Society in Philadelphia, Pa., April 20, 1944, Dr. Chester S. Keefer of Boston, who is in charge of civilian allocations of penicillin, summarized the utility of the new drug for a variety of conditions.

Confirming the great effectiveness of penicillin as recently reported in syphilis, Dr. Keefer stated that it is now the best remedy for controlling the gonococcus, meningococcus, and the staphylococcus and that it is effective for some of the streptococci and pneumococci. He said that, it is also useful for tetanus, gas gangrene, diphtheria, some of the pneumonias, and the large series of infections caused by the organisms already named.

According to Dr. Keefer, the drug is not useful in influenza, typhoid, and para-typhoid fevers, in cularemia, bubonic plague, cholera, whooping cough, tuberculosis, nor any known virus diseases. He stated that, when organisms ordinarily susceptible to the drug become seated on the heart valves, penicillin loses most

of its curative power. (Extract from *J.A.P.H.A.*, Vol. 34, p. 591).

RAPID TREATMENT FOR GONORRHEA WITH PENICILLIN.

Rapid and simplified methods for treating gonorrhea with penicillin which require no hospital care for the patient and which can be used conveniently by physicians in private practice or by clinics were recently reported by physicians of the U.S. Public Health Service, Washington, in connection with the Service's responsibility for treatment of men from the Coast Guard and Merchant Marine. One schedule of five treatments can be completed in 7½ hours.

Patients are required to be at the clinic for one hour at each of the five or six sessions designated for penicillin injections. These rapid treatment schedules were developed because of the urgency of returning men to active duty. According to these reports, the new methods have been effective in almost as large a percentage of cases as the standard 12 to 21 hour treatment schedules. These so-called out-patient schedules of treatment were developed by Drs. C. J. Van Slyke of the Venereal Disease Research Laboratory, Statens Island, N.Y. and S. Steinberg of the U. S. Marine Hospital, New York, N.Y. (Extract from *J.A.P.H.A.*, Vol. 34, p. 1172.)

A National Policy for Trade Effluents. HURLEY J. J. Brit. Water W. Assn. 1946, 28, 19. Paper read at a meeting of the Institute of Sewage Purification in November, 1945. The legal position with regard to discharge of trade waste waters into sewers and to treatment of trade waste waters at sewage works, before and after the passage of the Public Health (Drainage of Trade Premises) Act, 1937, is discussed. The author considers that a national policy for disposal of trade waste waters is desirable. Trade waste waters should be treated at sewage works at reasonable charges which should be uniform throughout the country for any particular type of waste water. Preliminary treatment of waste waters at factories should be kept to a minimum. Manufacturers should not be compelled to discharge their waste waters to the sewers if the quality of the treated waste water is sufficiently good to allow it to be discharged to a stream. Prescriptive rights of discharge should be abolished. Establishment of industries in districts where waste waters could not be treated at sewage works should be discouraged. It is suggested that levies for treating trade waste waters at sewage works should be paid by manufacturers into a central fund, from which local authorities would be re-imbursed at 3 different rates according to whether complete, partial, or negligible treatment was given to the waste waters. If any trader was required to give a degree of preliminary treatment to waste water higher than that laid down by the central authority, the trader should be re-imbursed from the central fund and the money should be deducted from that payable to the local authority. The preliminary work which would be required before such a scheme could be put into operation, and the place in the scheme of the Water Pollution Research Board and other bodies concerned with prevention of pollution of water are discussed. (Munic. Engng. Sanit. Rec. 1946, 117, 22 and 41; Surveyor, Lond. 1945 104, 731.)

(Extract from *W.P.R. Summary*, Vol. XIX, Abstract No. 451, pp. 118 & 119.)