# THE PUBLIC HEALTH.

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THE object of medicine is to prevent or to cure disease, and the medicine of the future will be increasingly exercised in the direction of keeping patients in health rather than of prescribing for them in sickness. For this and other reasons a medical man must be well informed upon matters affecting personal and public health. Thanks to the press, public health problems are now discussed with intelligence by the man in the street, and the last one who can afford to ignore every opportunity of keeping *au courant* with them is the medical man. He owes it to the community to advance the general health, and he can best promote this useful mission by helping to disseminate the knowledge of which the masses stand so much in need before many necessary advances can be made. Even nowadays he is frequently consulted with reference to the very latest scientific advance in public health and hygiene, and his lot in the future will be more exacting still. I would strongly emphasise the fact that if a sufficiency of this knowledge is to be acquired by future practitioners, it is necessary that they shall take greater advantage of the facilities which already exist in the medical schools for the teaching of hygiene and public health.

Opportunities for good work and fair remuneration are afforded to those who enter the public health service, and the practical application (and may be initiation) of measures designed in the interest of the public health is an attractive and beneficent work of great national importance, for *salus populi lex suprema* is an old and true adage. Imagine, if you can, a greater stimulus for work than the following reflection:—If by our exertions we can confer benefits upon those who live, our work will echo down the ages to the advantage of generations who have yet to live, and

the aggregate of life thereby saved may equal or even exceed all the life that now is. But owing to the paucity of endowments we have not in Great Britain a sufficient number of workers engaged upon this task of research in sanitary science, and there remain many fields of inquiry which when diligently cultivated will yield a rich harvest—for the devising of practical measures of public health is still hampered in many directions by the imperfections of our knowledge. Surely if there are those prepared to devote their time, ability, and energies to work of such national importance, those who are favoured with this world's riches might be expected to come to their aid and make more of such work possible.

Since the science of public health concerns itself with healthy being and embraces everything which bears upon the nature and causation of disease, the real task of hygiene is to teach men how to live and be healthy under the conditions which social and economical interests impose, and (if necessary) to devise practicable means of modifying adverse circumstances. If nowadays a thoroughly enlightened sanitarian were to emulate the example of the late Sir Benjamin Ward Richardson and put on record his conception of what ought to be in *his* model city of Hygeia, I venture to assert that a marked difference of treatment would be discernible. The late Sir Benjamin Ward Richardson's ideals related rather too exclusively to sanitation as applied more directly to sanitary environment and he paid insufficient regard to the claims of the individual. Environment counts for much, but in this country it has received in the past a disproportionate share of our consideration and administrative energy. The quantity which determines the survival of an organism is the ratio of its fitness to the strain imposed upon it by its environment, and public health policy yields the best results, in the aggregate, when it is directed towards increasing the fitness of the individual to withstand this strain; in other words, while sanitary improvements of dwellings and surroundings do much to better the outward circumstances of the people, they can make but little amends for faulty habits of life. It certainly was essential that the individual should adopt a satisfactory standard of healthy and decent living if the utopian death-rate of 5 per 1,000 was ever to be realised even in Hygeia; for the attainment of sound moral and physical health (the *mens sana in corpore sano*) demands more than is implied in the term sanitation. The habits of self-denial and self-respect are essential.

By the development of a sanitary conscience in the community, and thus by a general diminution of the favourable conditions of environment under which specific organisms thrive, and by an extended use of protective agencies, we should gradually reduce and finally wipe out much of the

communicable disease of the present day. This conception has already been partially realised in the past under altered conditions which for the most part we do not understand, but which have operated in the direction I have indicated.

Typhus has been practically exterminated from our midst during comparatively recent years, the necessary environment having been rendered uncongenial mainly by our altered conditions of living. The mortality from scarlet fever, owing to a remarkable natural attenuation of the virus of this disease, has fallen over 80 per cent. during the past thirty years, (in this connection it is a noteworthy and remarkable circumstance that whereas thirty years ago measles occasioned only half the mortality of scarlet fever, it now causes three times the death-rate from that disease). The mortality from enteric fever has been reduced 50 per cent. during the same periods; and although history reminds us of the occurrence of cyclical variations in the virulence of certain diseases, more especially of scarlet fever, there are good grounds for hope that the diminished virulence now to be noted in several communicable diseases is of a permanent nature.

Measles and whooping-cough, it is true, continue to exact a toll of suffering and death which is now but little less than in former years, but they offer very special difficulties of control, and the circumstances favouring their spread have multiplied enormously during recent years. The opportunities afforded by the aggregation in school classrooms for the spread of infectious disease among those of the most susceptible age-periods, and the overcrowding in our large urban communities, are mainly responsible for the fact that diphtheria, scarlet fever, measles, and whooping-cough (all diseases which often remain unrecognised) are as prevalent as they are. It seems that no powers or resources at present possessed by sanitary authorities suffice to secure that large measure of control that is necessary to check the spread of measles and whooping-cough. It is a matter of supreme difficulty to ward off attacks, but the future is sure to see a great reduction in *mortality* from these diseases. That the mortality is largely preventable is shown by the circumstance that it is always very largely borne by the poor. It is a mortality due in no small measure to parental ignorance, and the only remedy for that is the better education of the masses on subjects of vital importance.

Bacteriology has already built up a record which amply warrants the view that it is destined to become in the not very distant future a tremendous force in preventive medicine. That much of the most recent work has been of a nature to question or to discount the value of antecedent work (and the somewhat dogmatic conclusions based upon it) is

due to the fact that the science is as yet in its infancy. At the present time it is yielding excellent services by assisting in the diagnosis and cure of, and by furnishing the means of immunisation from, specific diseases; by making possible the rational selection and employment of disinfecting agents; by indicating the modes of conveyance of infection; and by aiding in the detection of dangerous forms of pollution in food and drink. In the course of time our knowledge will be extended in each of these respects, and the era will set in when every sanitary authority will regard its own well-equipped bacteriological laboratory, directed by a medical man well skilled in the science, as the mainspring of its clockwork public health administration; when all but the conscientious objectors will avail themselves of a preventive inoculation for the production of immunity against the specific infection from which they would protect themselves; and when curative inoculations of anti-toxic sera, such as have already been prepared and used for inoculation with beneficial results in diphtheria, tetanus, septicæmia, and puerperal fever, will be acknowledged by every practitioner to be the most potent and satisfactory drugs for the cure of infectious disease in his pharmacopœia. The triumphs of the anti-toxin treatment of diphtheria are now universally recognized, and the results of the treatment in the large fever hospitals of the metropolis are a striking testimony to its value. In these hospitals the case-mortality amongst the diphtheria patients, which in 1893 (the year before the disease was treated with anti-toxin) was 30·4 per cent., was last year only one third of that figure. While doubtless there has been some slight attenuation in the virulence of diphtheria during recent years, the beneficent effect of the administration of anti-toxin can alone be responsible for *the bulk* of this wonderful improvement in the short space of eleven years.

It is commonly stated that the practice of hygiene and preventive medicine tends to the preservation of the physically unfit, who would otherwise naturally fall victims to the law of the survival of the fittest. But there is doubtless both a credit and a debit side to the account, and there can be little doubt that the credit side presents a splendid balance. It must be conceded that some weaklings are permitted to survive, and, unfortunately, this circumstance affords them an increased opportunity for the transmission of their unfitness to future generations. But the same conditions which strengthen the weakest make also for the survival of the fittest, by increasing the virility of the naturally virile and tending to maintain the stock in a healthy condition. Preventable disease, moreover, often subtracts from the sum of the vigorous and adds them to the sum of the relatively inefficient; for it must not be forgotten that many forms of

preventable disease are indiscriminate in attack, and often strike down the strongest of the community. If then many members are left weak by the passing shadow of disease, and if hygienic measures, while raising above the line of viability a few degenerates, raise the whole of the community to a corresponding degree in the scale of good health, who shall measure the enormous gain; and who shall question the value of the labours of the sanitary reformer?

While during the last thirty years the population of England and Wales has increased by 10,000,000, the gross mortality is less now than it was then; and public health policy has not only neutralised the increase in the death-rate, which, through increasing urbanisation, would otherwise certainly have occurred, but it has secured a considerable balance on the right side. That the sanitary condition of this country has undergone a marked improvement since 1875 is incontrovertible, and the gains are well summarised in the Report of the Committee on Physical Deterioration. "Testimony is almost unanimous as to the improving conditions under which the denizens of large towns are called upon to exist. Rookeries are being dispersed; enclosed yards opened out; cellar dwellings and back-to-back houses are disappearing. One-roomed, two-roomed, and three-roomed tenements, with more than two, four, and six occupants respectively, are diminishing. . . . . Further, the water supply has been enormously improved both in purity and quantity; legislation has greatly extended the liabilities of owners and occupiers under the Public Health Acts and the Housing Acts, and under the said series of Acts wide powers have been placed in the hands of local authorities for cleansing unhealthy areas, closing insanitary houses, preventing overcrowding, abating nuisances, and enforcing generally a higher standard of sanitation. Machinery exists for the inspection and purification of cowsheds and dairies; pauperism has diminished; better and more complete accommodation is provided for the sick poor; the conditions of labour touching young persons and women in factories and workshops have been greatly ameliorated; and all the children of the State in workhouse schools, reformatories, and industrial institutions are started in life under far better auspices than formerly."

But the fact that, whereas during the past fifty years the general death-rate has fallen some 26 per cent. and some millions of lives have been saved, the infant population has not shared in this reduction even to the extent of 1 per cent., is a serious matter for reflection; and when it is considered in conjunction with the circumstance that the birth-rate has declined over 17 per cent. during the same period (a decline which during recent years has been at a greater rate than that of any other

European country), it becomes a matter for grave national concern. If the fall in the birth-rate of our nation is to continue, as there is little doubt that it will do, it is essential for our national vitality to curtail the heavy expenditure of infant life.

Among infants in both urban and rural counties there has been a marked increase in the deaths from gastro-intestinal maladies and premature birth, and these and other influences have counteracted the benefits to the infant population of the generally improved sanitary conditions of the people, and the fruits of over a quarter of a century of compulsory education. This excessive infant mortality is confined to the poorer classes, and it is the result of many forces, some of which are very complex; but the main factors are:—the employment away from home of those about to become mothers, and of those recently confined who should be nourishing their infants, the infants being badly cared for and ill-fed while those mothers are at work; and the greater ignorance among women as to feeding, clothing, and managing of infants. This maternal ignorance and neglect offends against every law of hygiene, and is responsible for the fact that approximately one out of every six children born fails to complete its first year of life. The mean rate for the past five years of infant mortality during the first year of life, exceeds 200 among every 1,000 births in some of our large industrial centres, and one shudders when one contemplates what this rate would be if it were drawn out for small slum areas and not taken for the whole city, including the rich and the poor, the wise and the ignorant, the careful and the indifferent. If the share of this death-rate which is due to ignorance, indifference, and neglect could be computed, it would probably exceed 100.

The domestic life in our midst is not now what it was, and compulsory school attendance and early female employment away from home have done away with much of the home education of the child-nurse. Much of the precious influences and associations of the family and the home seem to have been lost. This is deplorable, for a child who has never known proper home-life and motherly solicitude, has been deprived of that for which nothing in after-life can make amends. Although it is probably true that fewer present-day mothers are able to perform their maternal vocation of suckling their offspring than formerly, it is equally true that a large number deprive the infants of their natural food through selfishness, laziness, and indifference; and for pleasure and self-enjoyment many of the rich and poor alike are ready to sacrifice maternal aspirations and to subordinate maternal instincts.

Diarrhœal diseases and deaths from defective nutrition are always

truly referred to as the chief dangers to which hand-fed children are exposed, and this fact emphasises the argument against rearing a child by hand except in cases of absolute necessity. The proportion of hand-fed children to those who are suckled increases yearly, and everywhere the same testimony is forthcoming that children fed naturally from the breast have a prospect in life far in excess of those who are fed artificially. Even under the most favourable conditions the substitution for the infant's natural food of an artificial diet is disadvantageous, but when we find the mother's milk is very often substituted by such products as cheap brands of condensed milk and of artificial foods, administered by those who have little knowledge of the infant's requirements and none of the composition of the stuffs they are giving it, how can we hope to avert the Nemesis of much preventable sickness and death? But it is not only in the actual number of deaths that one sees the evil of this state of things reflected. One has to think of the far greater number of infants who escape death, but grow up with constitutions permanently damaged. Now I do not propose on this occasion to discuss the many remedies which have been advocated and adopted to check this slaughter of the innocents, but it is obvious that there are two main directions in which we must seek our remedy. We must get in touch with the mothers of to-day after the baby has made its appearance, guide and help them, and we must educate the mothers of the future while they are under our control at school, and while their minds are plastic and receptive. We must advocate breast-feeding, especially among the poor (and we need not remind them of the bad example which their better-educated and happier-circumstanced sisters in the higher classes set them). Failing breast-feeding, the only substitute is fresh cow's milk treated so as to resemble human milk as much as possible, and stored and administered under conditions of scrupulous cleanliness. For the neglect of these simple precautions, the infants of these islands are paying an annual toll of many thousands of deaths. The other remedies suggested and adopted to reduce this wastage of human life are numerous and manifold. Many are designed rather as palliatives of symptoms than as radical cures. Subsidiary measures to be discarded when better methods become practicable are the municipal milk depots and crêches. These have doubtless a great educative value, and the provision of the latter in most urban districts is becoming increasingly necessary now that education authorities are beginning to recognise that evils of a public health nature and the cost entailed outweigh the educational benefits to be derived from admitting babies to school under the age of five. If the poorer mothers of England

were all free to give the proper attention to their children, and if they were all educated to a proper performance of their maternal duties, a crêche might be held to do more harm than good by weakening parental responsibility. Let us hope that in time crêches may become unnecessary; but at the present pass at which we have arrived they are desirable, and they may be used with advantage in the education and training of the children who are to become the future mothers.

The distribution of clean milk from a municipal depot, in clean bottles which only hold sufficient for the child's meal and from which the child is directly fed, is a useful measure under existing circumstances, because the milk purchased at the door is generally dirty and the risks of home contamination are so great; but the measure is essentially a palliative one and must be regarded as only provisional. The radical cure is to be found in clean cows, clean cowsheds, cleanly milking and transit, and clean storage in the house. A pure milk supply is at the present day one of the greatest sanitary needs of the country, and if we can teach the masses the great importance of keeping the milk clean after it arrives in the homes many hundreds of infant lives will be saved each year. It is certain that if the educated section of the public were familiar with the conditions under which most of the milk is drawn in rural districts, it would not be long before they strengthened the hands of those who do know, and demanded an improvement.

In this country public health authorities are increasingly recognising the value of the services of female sanitary inspectors or health visitors. Voluntary lady health missioners are now in many districts helping to stem the tide of infantile mortality. I have myself succeeded in organising such a body in Stoke Newington. Their main duty is to visit the poorer houses when babies are born, to show a tactful interest in the child and to guide the mother in the care, feeding, and management of the infant. The medical profession itself can also do much more in the the future than it has done in the past, towards overcoming the ignorance which exists as to infant feeding and management; for I fear many medical men bring children into the world without giving any directions for their future welfare. A medical man attending a confinement has not completed his duty, either to the patient or to the State, when he has safely delivered the patient and handed over the child to the nurse. Detailed instructions should always be given as to the feeding and management of the infant.

I cannot leave this important subject of child-nurture without some brief reference to the evil consequence of the prevailing ignorance upon

the important subjects of the selection and cooking of food. It is responsible for much waste of food and money, and the population pays a heavy penalty in poor health and physical development. When the great economical interests at stake are considered, it is remarkable that no greater effort has been made to counteract it. Nowhere has this fact been more strongly exemplified than by the work of Mr. William Hall. He found that at Leeds, when comparison was made of some 3,000 children similarly circumstanced as to poverty and residence, a marked inequality in physical development of Jewish and non-Jewish children. The poor Jew was 3 pounds heavier and 2 inches taller than his non-Jewish brother at the age of 8 years: $6\frac{1}{2}$ pounds and $2\frac{1}{2}$ inches at the age of 10; and at the age of 12 he was 7 pounds heavier and $1\frac{1}{4}$ in. taller. Bone formation was much more satisfactory in the case of the Jew, the teeth were very much better, and there was a striking absence of rickets; the nasal chamber was large, the palate was, as a rule, large and flat, and the children were remarkably free from adenoids and were nose breathers. In all these particulars the non-Jewish child of the same age was decidedly a sufferer by the comparison. He attributes these great variations to the difference in feeding: *a difference which does not necessarily entail a greater expenditure of money.* Now if this state of things can be remedied we shall hear less of the lamentable fact of children being sent to school in a half-starved condition. The attempt to educate half-starved children is not only an unprofitable outlay of public funds, it is a cruelty to the children. If some of the necessary outlay, entailed by the provision of one good meal to the happily small percentage of those children who require it, can be recovered from the parents, it is a public duty to collect it; and it will lighten the public burden and impress parental responsibility. But whatever happens, the children must be fed, and if private philanthropy does not suffice, the public purse must, alas, be still further drawn upon.

The need of bodily health as the foundation of sound mental work is generally recognised, and the careful consideration and scientific and practical application of health conditions in all arrangements connected with education and school life, is of vital importance to the effective well-being and progress of the nation. The cultivation of child-life at school ages is a highly artificial process, for which Nature has made no special provision; and which, in fact, must even under the best conditions be carried on to some extent in actual defiance of her laws; and much remains to be done if the evil consequences which too often result are to be reduced to the absolute minimum. The six-year-old child, with his left ear on the desk,

strenuously rendering himself myopic by a steady glare at a pen-point wobbling in response to the clumsiness of his feebly-controllable hand-muscles, will then be no longer a common object of the schoolroom; and better ventilation and more cubic space in the classrooms will produce a more healthy and a more mentally-alert body of scholars. If much preventable disease is to be prevented, and if easily-curable conditions which determine so much the physical and mental well-being of the individual in after years are to be nipped in the bud, we must have medical inspection of all scholars at the commencement of their school career and repeated medical inspection during the continuance of it. Much educational energy is at present misspent; and the nation should, moreover, appreciate the economical advantage of insuring that all those who are being taught, at an enormous expense to the country, are made and kept as fit as possible to receive the maximum benefit from that education. The need for medical inspection of school children has been abundantly testified by the work undertaken in this connection in other countries. The results, of course, vary in the schools inspected: from 10 per cent. of children requiring medical help in better-class, to as many as 50 per cent. in schools drawing their scholars from the slums of large cities. It is a national shame and reproach that we threaten to be one of the last among civilised nations to undertake this obvious duty. I care not what excuses are advanced or what difficulties are imagined, they may all be met by one unanswerable retort: that what is found to be easily practicable in Germany, Japan, and elsewhere, is practicable in our own country.

The hygienic reform of the future will depend almost entirely for its success on the proper education of the people. We are all too painfully aware of the large amount of wasted energy and life which results from ignorance and neglect of the laws of health, and which, apart from the misery it entails, constitutes itself such a heavy economical loss to the State; and there can be no gainsaying that the ignorance among the poor of household management and of the elementary principles of hygiene, is responsible in no small measure for their high preventable mortality, their poor physique, their intemperance, and their poverty. The possession of citizens of good moral and physical stamina is the most valuable and abiding of all national assets, and for this the nation is largely dependent upon what the educational influences of school life are made to be. Despite overcrowding and structural defects in so many of the tenements occupied by the poor, if those who occupied them had only been trained to observe cleanly habits and to recognise the importance of fresh air, how enormously these people would benefit. There is much to be

said against the negative results of an education in which girls are largely separated from domestic influences and experience during the most impressionable years of life, and there is no doubt that the elementary facts of cooking and of infant management and feeding should be taught to every female child. The feeble efforts in these directions which have already been made have mostly failed on account of the unreality and incompetence of the teaching. Herbert Spencer's disputation of our educational aims, written many years ago, applies with equal force to-day.

> "If by some strange chance not a vestige of us descended to the remote future save a pile of our school-books or some college examination papers, we may imagine how puzzled an antiquary of the period would be on finding in them no sign that the learners were ever likely to be parents. 'This must have been the curriculum for the celibates,' we may fancy him concluding. 'I perceive here an elaborate preparation for many things, especially for reading the books of extinct nations and co-existing nations (from which it seems clear that these people had very little worth reading in their tongue), but I find no reference whatever to the bringing up of children. They could not have been so absurd as to omit all training for this gravest of responsibilities. Evidently this was the school course of one of their monastic orders.'"

During the past sixty years there has been a reduction of some 66 per cent. in the deaths attributed to phthisis, and 40 per cent. of this diminution has taken place as recently as the last thirty years. Of the deaths registered thirty years ago, a fraction over 1 in 10 were attributed to phthisis, whereas the ratio is now 1 in 13. But even at the present time it is estimated that about a quarter of a million persons are suffering from this disease; and the mortality exceeds 40,000 individuals every year in England and Wales. Consumption claims its victims mainly from the effective population, the bread-winners. Of males between 20 and 50 years of age it slays annually in England and Wales some 17,000, and on an average each death has been preceded by three years of sickness. It is easy then to see why this disease is one of the leading causes of pauperism. On the estimate made by the late Dr. Farr of the monetary value of human life to the State, these 17,000 male deaths alone would represent an annual national loss of between three and four millions of pounds sterling. If there had been no consumption the average length of life for each individual born would have been lengthened by two and a half years, and the working period of life would be increased on the average by very nearly two years. All will agree that the measures designed by sanitary authorities for the prevention and relief of phthisis can only be regarded as complete when they are carried with certainty and promptitude to those who more particularly stand in need of them, and the initiated recognise

that the measures at present adopted do not reach that desirable standard. It is necessary to know early where all the infected homes are, and this information can alone be obtained by compulsory notification of the disease.

At the present time we are disposed to overrate the value of sanatoriums and we are constructing and equipping them on extravagant and faddy lines. It must be borne in mind that without sanatoriums, phthisis has been reduced in this country some 66 per cent. during the past sixty years, and efforts to still further improve the adverse conditions under which so many of the community are compelled to live and work, and to reduce the death-rate due to ignorance, will achieve the best results; moreover, they possess the advantage of at the same time shrinking the wastage from many other preventable diseases. Institutions are also wanted which are not provided primarily for the benefit of the patient, but for the isolation of the patient for the benefit of others, and which may therefore be fairly supported out of the public funds. There are no such institutions in London, if we exclude the inadequate provision for phthisical paupers, and until they are provided we lack one of the essential provisions for coping with the disease. But whatever the extent of the provision made in a sanatorium or isolation hospital, the great majority of the sufferers from phthisis would remain outside with their families and at their work until the latest stages of the disease are reached, rather than enter an institution for several months. The use of sanatoriums for educational purposes has therefore much to recommend it. Even a short sojourn will often suffice to habituate the sufferers to the proper mode of procedure, so that when they return to their homes they are trained to practice the habits of educated cleanliness, and so the dangers of spreading the disease are much reduced. Consumption, then, must be variously dealt with in its different stages. In the earlier stages what is wanted is education and open-air treatment for those able and willing to avail themselves of it. The advice to a consumptive that he should keep his mouth shut and the window open, is of that simple and concise nature that appeals, and it is sound. That even the general public has taken this salutary advice to heart is evidenced by the larger number of open windows nowadays to be observed, and the great reduction in the dangerous and disgusting habit of spitting everywhere. In the latter stages isolation is needed, for every word that the patient speaks and every cough is the cause of the dissemination of the tubercle bacillus, and then, whatever instruction has been given to the patient in the sanatorium, nothing can prevent him from being a source of danger to all about him. Above all we must aim at raising the general standard of healthy living, because in

the low standard of domestic and personal hygiene, and in overcrowding and bad sanitation, we have the conditions which favour the disease. The importance of a careful selection of occupation for those who inherit a predisposition to phthisis and, where practicable, for those who are discharged from sanatoriums, cannot be exaggerated; and since, otherwise, work has often to be persisted in by a phthisical patient to the detriment of his own recovery and the safety of his fellow-workers, the German measure of compulsory insurance has much to recommend it. In Germany at present all persons, male and female, engaged for wages or salary in trade or business (excluding domestic servants and agricultural labourers), are compulsorily insured against sickness and death, the employer paying one-third, and the employee the remaining two-thirds of the premium. In this as in some other respects a comparison with Continental methods is not to our advantage.

We all hope that the efforts being made in this and other countries will soon lift the veil which hides the secret of that terrible disease, cancer. The difficulties of diagnosis and the faulty certification of mortality have combined to vitiate the statistics of this malady to such an extent that it is dangerous to base conclusions upon them, but personally I find it difficult to believe that some of the steadily progressive increase indicated in even the last few Annual Reports of the Registrar-General, can be explained by better diagnosis, and that it does not represent a real increase of suffering and death from this disease. Here is an excellent, though necessarily extensive, field for genuine research; but we have had sufficient of wild theorising from conclusions based upon insufficient and inaccurate premises. It now seems almost certain that cancer is not due to a specific parasite which enters the body from without, and that the related instances which appeared to point to the contagiousness of cancer (of auto-infection, of reported cases of *cancer-à-deux*, and of cancer-houses) were mere coincidences—although it is possible that a susceptibility to cancer may be transmitted to offspring. We have to discover why cancer arises *de novo* in the individual attacked; why it is so intimately associated in its incidence with the latter stages of the life of the animal; and what are the changes which the tissues undergo when they acquire cancerous properties. If cancer occurs, as there is now good reason for believing that it does, in wild as well as tame animals, and in savage as well as civilised man, the determining factors of its causation must have an extensive range in nature. The one suggestive fact is the essential relationship between age and the disease, whether it

be of the individual or (which is a different thing) of the separate organs and tissues of which it is composed.

Sanitary progress in the Navy and Army has been very considerable in the past, and statistics demonstrate a great reduction in mortality in both arms of the Service during peace times; but there remains one problem of surpassing importance to be solved. I refer to the enormous mortality from enteric fever among our troops in India; and the circumstance, recently demonstrated in South Africa, that the ravages of this disease are still capable of exceeding the losses of actual combat in time of war. While fully realising that it is not always practicable to apply our scientific knowledge to the circumstances of life, yet I cannot doubt that with a determined effort, some solution of these problems will be found to lie in the lap of the near future.

Workshop legislation in the interest of the health of the workers is gathering some of the best fruit of preventive medicine. Dust diseases are exacting a rapidly diminishing toll of diseases of the chest, and the notified cases of poisoning by lead, phosphorus, arsenic, mercury, and of anthrax were, in 1903, only about half of those notified as recently as five years ago. But if all factories and workshops could be efficiently ventilated, and at the same time kept at a reasonable temperature (conditions which I regard as physical impossibilities in many of the workrooms which I have visited, unless they are reconstructed) then a large section of the community would be spared a still considerable amount of preventable illness, would become more healthy and vigorous, and soon repay the pecuniary outlay by work more quickly and better performed. Many occupations still sin against the children, either directly by working them under unfavourable conditions during the period which should be devoted to education and physical growth, or indirectly by injuring the parents' health and lowering their vital state during the reproductive period of their lives. Cheap and effective transit so that the wives and children of workmen may have the benefit of fresh air and more roomy and cheerful surroundings; or, what is better still, the establishment of works and factories in country districts (as in the Garden City scheme), would do much to promote the physical, mental, moral, and social welfare of the workers.

From whatever direction we approach the consideration of questions affecting the health and physical development of the people, we soon come upon the housing question; and though much has been done and more is in store to improve the housing of the poorer classes, it seems destined to remain a problem for which no complete solution is to be found. In

England two-thirds of our population live in towns of over 10,000, and town life will soon prevail for three-fourths of our people. In large and small towns alike the same congested areas of population are to be found, and the same want of houses suited to the needs and the means of the working class. At the housing debate in the House of Commons in April, 1903, it was well stated by the member for Shoreditch that the character of the new century will be largely determined by the kind of houses out of which the children come. One of the greatest services, therefore, which science can render to healthy living at the present day, is to devote its knowledge and inventive power to the problem of simplifying, improving, and if possible cheapening, the ordinary middle-class houses and the homes or tenements in which the masses of our city population must not only live but rear their children. The huge depressing block-dwellings now erected in some of our largest towns, or the dreary monotonous rows of gardenless houses are I fear the only solution, if with the provision of improved and cheapened means of transit to the suburbs, people are too short-sighted to avail themselves of these. In towns there are many families who occupy but two rooms, and the overcrowding which results not only vitiates the air and leads to disease and weakly devolpment of children but also leads to immorality and vice, because of the almost necessary disregard of decency. Those in humble circumstances cannot afford to pay more for rent than one-sixth of the income earned. The class therefore which stands in most need of help is the class which does not earn more than 20 to 25 shillings per week on an average, and which therefore wants suitable accommodation at from 3s. 6d. to 4s. per week. It is in the interest of the whole of the community that these people should be housed sanitarily; but sanitary authorities are powerless to effect much good under existing conditions, for both private and municipal building enterprise are heavily handicapped by the increasing cost of land, material and labour.

At present these circumstances lead to the substitution of dwellings which can only be let at a rental too high for the bnlk of those evicted, who therefore increase the overcrowding on adjacent areas. It is a question whether in order to make municipal help possible some subsidy from the rates is not called for and whether the outlay would not be compensated by a reduction in the poor rate, police rate, and sanitary rates of the district. It is now impossible for a poor family to obtain two or three rooms in London for the same sum which would have procured them a small house of their own a few years back, and thousands are almost starving themselves to pay extortionate rents. These extortionate rents

for poor class property have a great deal to answer for; they are indirectly responsible for a high death-rate, a high infectious sickness-rate (for communicable disease must run through the whole of the susceptible members of the over-crowded family), physical and moral decadence, and the restriction of families. This housing question is, therefore, not only one of local interest and concern: it is a grave national question, affecting the health, morals, and vigour of our country. It is the most pressing and important subject which Great Britain has to deal with.

With legislation that recognizes the connection of alcoholism with insanity, and with the municipal mind well attuned to recognise the connection between bad housing and alcoholism, the future is likely to see some alleviation from this disease; but most will be effected by educating the moral sense of the individual to see that excessive indulgence is a crime against one's self, the community, and even posterity—for the consequences of man's conduct in life, be it honourable or infamous, do not end with him. The expenditure on drink in the United Kingdom is about £180,000,000 a year, and it is calculated that the working classes spend about one-seventh of their income upon alcohol. Social problems are complex, and causes and results act and react. Poverty, alcoholism, and degradation tend to create and perpetuate the conditions which cause them. There can be no doubt that poverty, and the unhealthy conditions of housing which it entails, tends to promote alcoholism; but there can be no reasonable doubt that a very large proportion of this poverty is due to drink. In the opinion of those who have specially studied this question, drinking is far more often the cause of poverty than poverty is the cause of drinking. Much of the inability to secure satisfactory food and comfortable homes results from the circumstance that the money necessary to provide them is spent on drink, and as a consequence, apart from the drink itself, the associated conditions beget disease and deteriorate physical vigour. Any effective legislation which reduces alcoholism will affect at the same time every social public health problem of the day.

Although the harm resulting from over-indulgence in animal food is not to be compared with the harm that results from intemperance in alcohol, it is none the less very considerable. If the amount of proteid food needed daily for the actual physiological wants of the body is not more than from a third to one-half that ordinarily consumed by the average individual, as Professor Chittenden's experiments indicate, not only is there waste and loss of energy from the vital forces being engaged in the metabolism of matter which is not required and is of no service, but there is also the danger of the accumulation in and imperfect removal of

such waste products from the system; and even if for a time those waste matters are properly removed, excessive metabolism implies greater efforts on the part of the excretory organs than would be needed under a diet suited to the exact physiological wants of the body. This over-eating furnishes the conditions which are known to be causative of degenerative changes in the tissues, and which lead in middle life to many chronic diseases of important organs, and to death at an age when impairment of functional activity should hardly have commenced. Hence the growing popularity of certain continental institutions which have been provided for the victims of a too elaborate cuisine. Probably we should all be better, if we could, at any rate occasionally, revert to the simple elementary methods of procuring food of our Simian ancestors. These instincts are responded to by many of us, but the benefits which would otherwise accrue from sport are largely discounted by the introduction of "villainous saltpetre." If we had to stalk our game with only spears or bows and arrows (and not with a modern breech-loader) and only fed on what our prowess enabled us to capture, we might grow thin, some of us, but little would be heard of indigestion, biliousness, gout, or rheumatism.

Preventive medicine recognises no distinction of race or tongue, and I should like to refer to the remarkable progress in the reduction of diseases of the tropics. The triumphs of the past few years of tropical medicine are truly remarkable. Every succeeding year is so rich in results that it becomes a most exacting duty upon those who have to keep pace with recent advances; for they lead us wide of the fields of bacteriology and parasitology into the realms of botany and zoology. A knowledge of the details of the flora and fauna of areas in which certain diseases flourish is essential in order to arrive at the truth of the cause of these diseases, now that so many of them have been proved to be carried by certain insects. Lectureships on parasitology and helminthology have recently been endowed in this country, and there is no doubt that such lectureships will be increased in the near future, and there will be a demand for men specially qualified in this branch of work. Here tropical medicine will probably be a post-graduate study for many years to come and perhaps for all time, for a limit must be recognised to the claims upon the time and mental energies of the medical student; but those who contemplate practice in the tropics or who are likely to number among their patients many who have resided abroad, cannot afford to neglect their opportunities in this branch of study. Nor must it be forgotten that certain endemically tropical diseases sometimes threaten our own shores.

The story of the remarkable change in the yellow fever history of

Havana reads almost like a romance. The annual number of deaths from yellow fever in Havana for the ten years preceding the establishment of the mosquito theory averaged about 500, and they were cut down in two years to nothing. Little less remarkable are the results obtained in some directions from the efforts made to exterminate the malarial mosquito; but the time and money expended in this great work are quite out of proportion to the losses resulting from the malady. The part which insects play in the transmission of disease is being more and more demonstrated each year, and the dangers of the ordinary house-fly in this country are being increasingly recognised. When nowadays the house-fly enters your window, fresh from his exploits upon the nearest accumulation of filth, and then proceeds upon his perambulations upon your butter or preserve, or commits suicide in your milk, he doubtless brings upon his dirty legs filth organisms which may subsequently develop to a harmful if not dangerous extent. That this is the explanation of a certain proportion of the summer incidence of zymotic diarrhœa, I have not the shadow of a doubt.

However good and wise public health legislation may be, it is of little service unless it can be backed by equally effective administration, and at the present day it is the latter rather than the former which is at default. Prejudice, apathy, ignorance, selfishness and vested interests still exist as bars to sanitary progress, as in the days of old, and they clog the wheels alike of legislation and of administration. We possess the knowledge of how to speedily reduce the sum of infantile mortality; the death-rates of enteric fever, smallpox, puerperal fever, and consumption; the diseases due to alcoholism; and to a less degree the mortality from diphtheria, scarlet fever, measles, and whooping-cough: yet existing social conditions make progress slow and difficult. Dwellings are still ill-ventilated, dirty and overcrowded, public and domestic water supplies are still polluted, food is still adulterated, chimneys still vomit black smoke and chemical fumes, sanitary work is still badly executed, local authorities still indifferent, employers still exact labour under conditions which are disastrous to the worker's health and individuals are still careless or ignorant of the simple laws of health practised in the days of Moses. There is then so much spade work of major importance to be effected that we do well to direct our attention to this at the expense of minor matters, and to studiously eschew all sanitary fads and fancies. The sanitarian who advertises abroad a risk in licking a postage-stamp, and a danger attending the touching of street door-handles, is doing no good service to the cause. He only excites ridicule and labels us all in the eyes of the public as faddists.

But the solution of many public health problems depends upon the solution of problems which are social and political. When Mr. Charles Booth declares that 30 per cent. of the population of London are unable to obtain a livelihood; when Mr. J. S. Rowntree states that from 25 to 30 per cent. of the town population of the United Kingdom are living below the poverty line: when we are confronted with the fact that about 400,000 people in London alone are living a one-room life, where decency is not possible and morality is a farce; the magnitude of the social and political problems to be solved cannot be exaggerated. Problems of public health, moreover, change with altered circumstances and new ones are constantly evolving; many of the old ones are becoming more complex year by year, and some are so dependent upon a high ethical level among the general public for their complete solution that only the millenium can be expected to see them solved. The public health worker, therefore, can never hope for a complete realisation of his schemes and ambitions, and to his labours there can be no end. But his reward is the satisfaction of witnessing, almost daily, some beneficent result from his work, and it is this that stimulates and gives him zest.

"Does the road wind up-hill all the way?
Yes, to the very end.
Will the day's journey take the whole long day?
From morn to night, my friend."