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PREFACE.

The present Volume of Transactions is the second published since the incorporation of the Institute in August, 1888, but is numbered Volume XI. in continuation of the series published by the old Society, The Sanitary Institute of Great Britain.

It is principally a record of the Congress held at Brighton, and in order to place the print of the papers read in the hands of the members as soon as possible, the Volume is issued several months earlier than usual; this, however, prevents the Annual Report for the year 1890 being included, as the Volume had to go to press before the meeting was held.

SESSIONAL MEETINGS

For the reading of papers and for discussions upon subjects connected with Sanitary Science.

Some years ago meetings of this kind were held by The Sanitary Institute of Great Britain, but latterly their place has been taken by General Lectures during the winter and spring. As, however, several members expressed a wish for an opportunity of discussions, which were scarcely appropriate after a lecture, the Council decided to hold Sessional Meetings, at which discussions could be introduced.

The following meetings were held:—

December 11th, 1889, Mr. G. J. Symons, F.R.S., in the chair.

Paper read by Mr. W. Santo Crimp, on "Sewerage Works and Sewage Treatment"; a discussion followed, in which Mr. Rhodes, Mr. Sillar, Mr. Volheim, Dr. Howell Williams, Mr. Penny, and Mr. Worth took part.

February 12th, 1890, Prof. W. H. Corfield, M.A., M.D., in the chair.

Paper was read on "Dwellings for the Labouring Classes," the paper being prepared by Mr. K. D. Young. A discussion followed, in which Mr. Robins, Mr. Collins, J. Theodore Dodd, Sir H. S. Cunningham, and other members took part.

Wednesday, March 12th, 1890, Prof. W. H. Corfield, M.A., M.D., in the chair.

Paper was read by Major Lamorock Flower, for Mr. W. Kinninmond Burton, on "The Sanitation of Japan." A discussion followed, in which Dr. Drysdale, Mr. E. J. Poggio, Mr. H. H. Collins, Mr. Y. Nakajima, and Mr. T. Nakahashi took part.

April 23rd, 1890, Sir Robert Rawlinson in the chair.

The Chairman gave an address on "Sanitary Science," dealing principally with the Sanitation of Barracks and other Public Buildings.

At this meeting the Medals and Certificates awarded at the Worcester Exhibition were presented to the successful Exhibitors.

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INAUGURAL ADDRESS,

Delivered August 25th, 1890.

By SIR THOMAS CRAWFORD, K.C.B., M.D., LL.D.

PRESIDENT OF THE CONGRESS.

The formation of a national Society having for its main object the advancement of all subjects bearing upon the public health, was a philanthropic conception which found expression in the inauguration of the Sanitary Institute of Great Britain in 1876. That society has now been amalgamated with a kindred association, founded in honour of the great apostle of practical hygiene, the late Professor Parkes. The Sanitary Institute thus constituted, has extended its sphere of usefulness, without curtailing in any way the objects for which these allied institutions were originally founded.

One of the chief objects was, and still is, the holding of meetings and exhibitions like the present, in such populous and influential centres as might be moved, in the interests of the public, to offer the Institute facilities for the purpose.

The first and most pleasing duty devolving upon me as your President, is to tender the hearty thanks of The Sanitary Institute to the Mayor and Corporation of Brighton for their hospitable invitation, and for the very liberal provision which has been made for the accommodation of every branch of the congress, including the Health Exhibition, an educational auxiliary which is, in the opinion of the council, of very great importance.

My next words must be couched in terms of regret, for the loss of one who has long held a prominent position among the officers of the Institute, of which he was an esteemed Vice-President. I need hardly say I allude to Sir Edwin Chadwick,

whose recent death leaves a blank in the roll of worthies, whom philanthropists in general, and sanitarians in particular, delight to honour. Robust of frame, resolute of purpose, quick to perceive the irresistible logic of facts, and indefatigable in collecting such as throw light on the health condition of the wage-earning classes in particular, he exercised a powerful influence for good over the social and sanitary legislation of the past half century. It was mainly through his action, that Lord Lyndhurst was induced to support and carry through Parliament, an Act authorizing the establishment of the Registrar General's office, from which has since issued masses of carefully prepared vital statistics which are invaluable. We are also largely indebted to him for those earlier Royal Commissions, which have contributed so materially to improve the sanitary condition of our public services. Sir Edwin Chadwick was spared to exceed by many years the proverbial three-score years and ten, and to the last he retained a freshness and vigour of intellect, as much above the average as was his length of days.

In opening this Congress your President naturally looks to the past for guidance in the selection of a subject on which to address you; but I regret to say the further I proceeded in my investigation the greater became my difficulty. The able and exhaustive addresses of the distinguished men who have presided over previous Congresses, and the valuable and eminently practical suggestions to be found in them, as well as in the numerous papers read at the several meetings and recorded in our Transactions, have so fully traversed the whole subject of public health, that it is not easy to find anything new and at the same time worthy of my audience. The sections on *Engineering and Architecture, Chemistry, Meteorology, and Geology*, may be left with great confidence to those who have been selected to preside over them. *Sanitary Science* and *Preventive Medicine*, the section in which I find myself most at home, has been wisely entrusted to Dr. George Vivian Poore, from whom it is certain to receive ample elucidation. Taking my inspiration from a theologian of our own day, who announced his intention of repeating a particular discourse till his congregation had not only mastered its contents but put its precepts into practice, I shall endeavour to lay before you some fragments of a tale that cannot be too often repeated: the story of laws violated to the prejudice of health, and as swiftly and surely avenged, even to death as a penalty.

This thought recalls a nation in mourning for a royal prince, whose premature death from a disease now well known to be altogether preventable, was the text of many heart-stirring orations from pulpit and platform at the time, and subsequently.

Of these I remember with tolerable clearness two delivered on the Sunday following the sad event, by two of the most eloquent preachers then in London. The first took for his subject man in perfect health, and in the full vigour of his physical development. To the mere physiologist, presumably ignorant of the teaching of experience, that death is the common lot of all, such a man, so fully endowed with every means and appliance necessary for the repair or removal of wasted or damaged tissues, needed only the requisite sustenance to live indefinitely. Assuming that this physiological view was well founded, the preacher went on to ask, "Why does man die?" Then, turning away from physiology, he pictured to his audience the scene in the Garden of Eden, with its tragic ending in Adam's transgression, and so death fell upon all men.

In the afternoon the second pulpit orator took for his starting point a picture of nature in her loveliest aspect and most perfect development, and, beginning with the germ, quickened into activity by the genial glow of early spring, he described the development of the budding plant, the opening leaf, the full-blown flower, the ripening fruit, and, finally, the withering influences of autumn, and the eventual decay and ultimate death of the organism. Extending his illustration to all nature, he pointed out that, within fixed limits as to time, all must die. No exceptions. Plants, animals, man himself, the latest and most perfect work of God, all must bite the dust. And, having pronounced the sure doom of all, the preacher proceeded to draw his moral—"Be ye ready."

Without questioning either of these views, or the lessons drawn from them by their respective exponents, the scientist, who has given careful attention to biology as a science, is justified in asking whether they meet adequately the needs of man as a whole, morally and physically degraded as in too many instances he is by the vicious influences of unwholesome surroundings. The clergy of all denominations are indefatigable in their endeavours to save men's souls, and, with that object in view, they are zealous at all times in enforcing the due observance of the moral law; but it has often occurred to me that all this important work would be materially advanced if coupled in a larger measure with equally zealous efforts for the enforcement of those physical laws, the violations of which are, in many instances, the direct cause of the needless and wasteful suffering and misery, premature decay, and early death entailed by preventable disease.

The clergy as a body do undoubtedly take an active interest in the physical as well as the spiritual condition of the people, but if one may judge from the polluted atmosphere which too

often pervades the places set apart for religious assemblies, they are not sufficiently equipped with that sanitary knowledge which is so essential for those who undertake to guide the people in such matters. It is for this reason we hail with special satisfaction such sermons as that delivered by the Dean of York, on the occasion of our visit to that city in 1886; and still later by Canon Creighton, before the Congress at Worcester, in 1889. I cannot pass on without quoting two sentences from the admirable address of the latter: "It is hard," says the Canon, "for those who live with enfeebled frames, amid neglected and filthy surroundings, to feel strong aspirations after the beauty, the purity, and the truth of a spiritual life." "The conditions under which life is lived—the unwholesome air of the factory, the crowded room, the ill-ventilated chamber, all these rob the body of its vigour, how must they react on the soul? You heard in the epistle this morning of the works of the flesh—uncleanness, hatred, variance, drunkenness, revellings; do not these things, think you, come very largely from, and are they not very largely affected by, the physical conditions with which life is lived?" But read for yourselves; the Sermon is published in extenso in Vol. X. of the Transactions of The Sanitary Institute just issued. These Sermons and the kindred Address recently delivered by His Grace the Archbishop of Canterbury before the British Medical Association at Birmingham, make us hope that in the near future the clergy will rival the medical profession in their pursuit of that knowledge, by means of which the suffering and misery entailed upon the people by preventable disease can alone be effectually met; and that, with this end in view, they will enroll themselves in large numbers as members of The Sanitary Institute.

The laws which govern the origin and spread of preventable disease are not merely physical, as some scientists are apt to assume, nor are they merely moral laws, the violation of which entails those terrible consequences to which Canon Creighton alludes. They are both. There is a moral as well as a physical code which must be observed if men are to realize all that may reasonably be hoped for in preventive medicine.

Take for example those more common forms of contagious diseases which are spread mainly by human intercourse, and test how far individuals observe those precautions which are known to be sufficient to protect others, and you will find the results most unsatisfactory. Any lady who is accustomed to district visiting among the poor, will be able to recount instances of mothers of families visiting such cases out of mere idle curiosity, a blind appeal to the inevitable, or a boastful trust in God, being pleaded in justification, if their conduct is challenged. I do not

think that any possible danger to the individual should stand in the way of the performance of an obvious duty, whether imposed as a legitimate personal obligation, or springing out of a benevolent desire to aid those in distress; but where so undertaken, it is clearly a duty to adopt all needful precautions for the protection of others against the spread of contagion. Is this always done? Are all classes sufficiently informed not only as to the danger, but also as to the best available measures of prevention? This is a sphere in which the clergy might exercise a vast influence for good, if well informed as to the nature of contagia, and the best methods of preventing their spread. It is to scientists we must look for this needed information, and recent discoveries in bacteriology and organic chemistry, point to a not distant future in which we may hope for more light. Till that clearer light comes, we are, I think, justified in maintaining that the violation of the moral law in such matters as temperance, chastity, and our duty to our neighbour, stands prominently forward as a fruitful source of disease. The adulteration of foods and drinks, the pollution of air and water by refuse products discharged into both by men in their haste to be rich, to the prejudice of all who use them, are sufficiently familiar illustrations.

As we cannot enforce compliance with moral laws, nor secure a strict observance of physical laws, even when tolerably clear, we must trust largely to amendments in our social laws for a remedy in such cases. Our legislators have done much of late to amend the laws for the protection of the public health; and if the bar and the bench could be induced to add their influence in simplifying procedure, much would be gained. The Archbishop of Canterbury is reported to have said, in addressing the British Medical Association, at Birmingham, lately, that:—"the three great professions occupied the three chief fields of practical thought. They were the self-revelation of God to man, or religion; the equitable relations of man to man, or jurisprudence; and the mystery of the life of man itself, or medicine." A cynical world, less philosophical than the Archbishop, and less charitable to the professions also, is prone to regard man as a chattel, the care of which is monopolized by the three faculties:—the clergy undertake for his soul; the doctors for his body; and the lawyers for his worldly possessions. Of the three the lawyers seem to be the more successful, for while wealth increases by leaps and bounds, the moral and physical condition of the great mass of the people lags sadly behind. How is this to be remedied? United and well-directed efforts on the part of the learned professions in the cause of public health will do much to dissipate ignorance, and create a

healthy public opinion on the importance of sanitary legislation, and the due administration of all laws bearing upon the health and physical condition of the people, and more especially of the working classes. But more is needed. The people must be up and doing. Lessons in personal and domestic hygiene must find a place in the curriculum of the elementary schools, before we can hope for the realization of all that is practicable in the prevention of sickness and the prolongation of life. Mental, moral, and physical culture must go hand in hand in the training of the children of all classes, if we desire to retain that racial supremacy of which we are at present so confident.

The chief point to which I desire to call attention this evening is the wastefulness of ignorance in regard to sanitation in general, and domestic hygiene in particular; and the ample financial returns which all may realise by grappling vigorously with the whole question of disease prevention, the practicability of which The Sanitary Institute is yearly endeavouring to bring home more clearly to the masses of the people. Of the excellent work done in this direction, the development of these annual congresses is, perhaps, the most practical. They demonstrate the importance of sound sanitary principles in every detail of domestic life. The papers read at these meetings, and published in the Transactions, and the valuable body of vital statistics and health reports compiled from the writings of Dr. Farr, and Sir John Simon, and now made easily accessible to the public by The Sanitary Institute, are efforts in this direction of which any society might be proud. And yet we are still at a loss for reliable data on which to base accurate calculations of the suffering and loss entailed upon the people by preventable disease. The facts as to mortality have been carefully noted, and tabulated with great advantage to the public, but the facts regarding sickness, apart from mortality, are only approximately known. It is in this direction that the labours of the medical officers of the army have proved of value to sanitary science, and it is to the results of these labours, as set forth in the reports of the medical department, that I now wish to direct your attention.

Those of you who have studied these volumes are aware that it is customary in the army to record every form of illness, however casual, which renders the soldier unfit for duty. These records are subsequently collated by the medical officers, and tabulated for transmission to the War Office. The vast aggregates of facts so collected have been carefully compiled and published in reports which have been annually presented to Parliament since 1859. The facts so recorded are as reliable as any statistics of a similar character can be, so long as any grounds for differences of opinion in matters of diagnosis

remain unsolved. Making a liberal allowance for such doubts, the statistics of sickness in the army form a convenient basis for estimating the loss entailed upon the people by preventable disease.

Turning to the report on the health of the Army for 1888, just published, I find the average strength at home and abroad was 198,851; the admissions into hospital were 193,233; deaths 1,845; discharged as invalids 2,776; constantly non-effective from sickness, 10,715. Taking the United Kingdom alone the numbers were:—average strength 101,695; admissions 75,345; deaths 570; discharged as invalids 1,641; constantly non-effective from sickness 4,520. The average sick time to each soldier in the army at large during the year was 19·90 days; in the army at home 16·27 days. If to this be added the probable duration of the non-effectiveness of men invalided, who pass into civil life while still unable to earn a livelihood, the average sick time would be considerably increased, probably to the extent of twenty days per man per annum. Stated in round numbers, the loss to the army from non-effectiveness through sickness, is equal to a force of 10,716 men. Assuming the cost of each soldier to be one pound per week, or £52 a year, a very low estimate, this loss from sickness amounts to the very considerable sum of £557,232.

Some 30 years ago, while serving as a regimental surgeon in Secunderabad, I attempted an analysis of the disease factors at work in producing the sickness then prevalent in the corps under my medical charge. The late Professor de Chaumont gave a brief resumé of the result, in his Address to the Congress at Leicester, in 1885, from which I quote the following paragraph:—

"Taking all the factors together to value 100, those which were due to errors beyond the control of the individual, but remediable by the authorities, were taken to value, 35; personal errors under the control of the individual himself, 34; agencies undefined and contingencies, 6; peculiarities of climate, 25; so that 69 per cent. was regarded as distinctly remediable, and only 25 as due to climate." Professor de Chaumont adds, "this was a quarter of a century ago, I think that in the present day climate would figure for even a smaller amount." Although the word climate, as used by me in this analysis of disease factors included other influences not strictly climatic, but equally beyond human control, I see no sufficient reason after a further lapse of time, to take exception to Dr. de Chaumont's criticism. On the contrary, I am disposed to concur with him in the very definite opinion expressed further on in the Address from which I have quoted, that, putting aside the West Coast

of Africa and other pestilential spots specially dangerous to life, "we may confidently say there is not a spot on the globe where men may not be kept in health and vigour by proper attention to hygiene."

Applying the same principle of classification to men of similar ages, and subject to similar influences and disease factors in civil life, it is possible to make a tolerably accurate estimate of the actual loss in money entailed upon the wage-earning classes by preventable disease. True we have no trustworthy record of sickness among civilians, nor is it likely that we will ever be able to apply the numerical methods, so valuable in the study of vital statistics, to such attacks terminating in recovery. Something is done in this direction by benefit societies, sick clubs, and other labour organizations; and much more might be done with advantage by the great companies and large employers of labour. The coming International Congress of Hygiene and Demography, which includes the study of the life conditions of communities from a statistical point of view, will, it is hoped, throw much light on this important point. Meantime, and till some such record is available, we must be satisfied with such approximation to truth as we may be able to obtain. Sir James Paget delivered an address at the Health Exhibition in 1884, in which he established, on reasonably conclusive evidence, that the loss from sickness, between the ages of 15 and 65, in England and Wales, amounted to about 20,000,000 weeks' work in the year, or about one-fortieth part of the work done in the year by the whole population between these ages. Rather more than half this loss falls upon those whom the Registrar-General describes as the domestic, agricultural, and industrial classes. Valuing these lost services as equal, on an average, to one pound per individual per week, the amount at which the soldier's services have been valued, the loss to the annual wealth of the country from sickness among these classes alone amounts to £11,000,000 sterling. Of the other classes who lose the remaining 9,000,000 weeks' work, it would be hard, Sir James adds, to make a guess in any known coin; for these include our great merchants, judges, lawyers, clergy, medical men, statesmen, legislators, poets, writers, musicians, painters, philosophers, and princes, who certainly do more for the wealth and welfare of the country than can be told in money. These estimates do not include the still greater loss inflicted upon the people by the premature death of our most industrious bread-winners, at an age, too, when they are most productive; nor do they touch the cost of subsistence and nursing, and other sources of expenditure which spring out of sickness; or the sorrow and suffering of the widow and orphan left desolate by such bereavements. Sir

Edwin Chadwick considered Sir James Paget's estimate of loss too low by many millions, and that the burden of taxation, arising from this cause, is three times greater than the poor rate. "In London this burden, from preventable disease, was £700,000 a year at a very moderate estimate."

I pass over the burdens entailed on the productive classes, by the vast numbers of halt, blind, imbecile, epileptic, and insane—waste products in too many instances of inconsiderate marriages, and the evil effects of depraved moral and physical surroundings to which they have been exposed during infancy and youth. This is undoubtedly great, and much of it is obviously attributable to violation of those moral, physical, and social laws, which should govern the rearing of the young.

Here then is a mine of national wealth, or I should perhaps more appropriately describe it as a river of national waste of almost incalculable value, and in which every member of the community has a direct personal interest, daily and nightly passing our very doors, which a united and intelligent effort ought to be able to stem.

There is one other aspect of the condition of the people upon which the Reports of the Army Medical Department throw considerable light. Turning again to the Report for 1888, we find on pages 32 to 41 a careful analysis of the recruiting statistics for the year. From this it appears that 49,172 men offered themselves for enlistment, of whom 23,571, or nearly one half, were rejected. Bearing in mind that the ages within which recruits are enlisted range from 18 to 26, and that all those who are suffering from obviously disqualifying disabilities are refused by the recruiters and do not therefore come before the Examining Medical Officer, these figures are sufficiently startling. In order that the significance of rejection may be more clearly understood, it is desirable to recapitulate briefly the *minima* as to standard. These are, height 5 ft. 4 ins., chest girth 33 ins., weight 115 lbs., with a power of relaxation of all three in favour of likely lads who are still growing. Making liberal allowance for rejections on account of age and other causes not necessarily implying defective development, or unsoundness of constitution, these figures indicate grave defects, if not something worse, in the genesis and rearing of the lower orders of the people from whom the recruits are drawn. Much is no doubt attributable to moral influences not usually included within the purview of the sanitarian, but much is also due to unwholesome physical surroundings which call loudly for amelioration.

The limits of an address on such an occasion as the present do not admit of more than a passing allusion to the methods by

which this amelioration is to be secured. Nor can I venture upon an examination of the etiology of preventable diseases, although without clear knowledge on this point sanitary progress must be seriously retarded. The subject is too important, however, to be passed over in silence. Take, for example, the so-called infectious diseases, the immediate causes of which have long been held to be entities endowed with vital properties—a *contagium vivum*, as maintained by Hufeland. To Henle we are indebted for the earliest clearly-expressed views regarding the relationship of micro-organisms to these diseases. The micro-organisms which have as yet been recognised as existing agents of fermentation and putrefaction, or of disease, belong almost entirely to the lower fungi. Their agency in causing and spreading disease is, Flügge points out, limited, in some cases, by the fact that the multiplication of infective material takes place only under given conditions, and requires the active intervention of the individual, in whose person the contagion is so multiplied, to transmit it to others. There are, however, contagia which retain their vitality in the surroundings of the sick, after they are given off from the body, and are therefore capable of transmission, not only by direct contact, but by other transporting agencies, although the multiplication of the infecting material takes place only in the body of the sick. These are classed as obligatory parasites, and include such diseases as small-pox, measles, scarlatina, tuberculosis, glanders, diphtheria, and many of the infective diseases of wounds.

"But there are also contagious infective agents which can lead a saprophytic existence on the dead materials in our surroundings, and must therefore be classified as facultative parasites. In this case there is a multiplication of the sources of infection outside the body of the patient, and this may go on to such an extent in our surroundings, that there are, in fact, more chances of infection by infective agents produced outside the body, than by direct or indirect transmission by indifferent objects of the infective agents given off from the patients." (Flügge.) To this group belong the bacillus of typhoid fever, cholera, and anthrax; but the distinction between this and the previous class is not of such great importance as is the fact that both classes possess considerable resisting power, and are dangerous in proportion to the duration of their survival.

There is still another class of infective agents presumably located in our surroundings, which, finding access into healthy individuals, multiply there and cause disease, although such disease is of a non-contagious character. The most important representatives of this group are the infective agents of malaria.

Without following further the very interesting researches of

Flügge and others into the nature and habits of these disease-producing organisms, or noticing the views of Pettenkofer that such organisms, as they pass from the sick, are not capable of causing disease till they have first acquired infective properties in a suitable soil, I pass on to notice briefly two other points of great importance, viz., the surrounding conditions to which allusion has been frequently made, and the no less important question of predisposition, which makes a man a prey to such organisms.

Bearing in mind the saprophagous character of some at least of these organisms, there is presumptive evidence in favour of the views held by some, that after all these microbes are in the main scavengers, and that it is only when the healthy human frame has been in some way weakened that they are able to find a lodgment in it. But however this may be, it is obvious that the removal and destruction of all decaying organic matter is clearly indicated. Starve the microbe and save the man. In one particular this important principle is too often neglected: I allude to the present system of dealing with house refuse, which is in many instances a convenient and attractive nidus for such organisms, and an effective vehicle for their spread. Dr. Louis Parkes has dealt so admirably with this subject in his excellent manual—"Hygiene and Public Health," the second edition of which has just been issued, that I cannot do better than refer you to it for further particulars. Dr. Parkes truly says, "The best method of getting rid of dust-bin refuse is to burn it," and he gives a description of a destructor furnace which seems to be well suited for the purpose. The Jews, more advanced in sanitary precautions than most nations, were well aware of the purifying power of fire. Would that we too had a *gehenna* in every locality in which people are permitted to shoot rubbish! There would be fewer complaints regarding the foulness of the sub-soil, or the made ground on which the modern *jerry builder* is permitted to erect his speculative blocks of artisans' dwellings.

Similar observations apply with equal force to the laundry system of this country. In too many instances foul linen and other articles of wearing apparel, &c., are handed over to a laundress ill equipped for dealing with such articles, even when not laden with the germs of contagious diseases, but when so tainted, how inadequate is the provision for the purpose? This industry offers a promising field for the judicious investment of capital, with the certainty of good returns, to those who may be induced to embark in a well considered scheme.

While I write, the press is loud in its complaints regarding the state of the kitchens of many of our places of public resort

and entertainment, to which might probably be added other places in which human food and drink are prepared. It is especially to be desired that all such places should be subject to periodical inspection, and official supervision by competent persons of probity and position, beyond the range of temptation to overlook abuses.

But of all the causes which contribute to the origin and spread of preventable disease, overcrowding is perhaps the most important. This evil is met with in its most mischievous forms in large centres of human industry, where, for want of space, buildings are crowded together, and carried up to undue elevations; and where the prospects of employment at high wages attract numbers of the working classes greatly in excess of the available accommodation. Nothing short of prohibitive legislation will check this. Every human habitation, whatever its height, should have open spaces in front and rear, commensurate with such elevation, so as to secure a free and adequate supply of both air and light to every part of the building; and the number of persons inhabiting such dwellings, or congregating in places of public assembly, should also be limited to that for which its aerial capacity is pronounced by competent authority to be adequate.

Another indispensable requisite is a full and continuous supply of fresh potable water of good quality. Unfortunately the rapid and progressive increase of population in our large towns, and the wasteful prodigality of past generations in the matter of water conservancy, have surrounded this question, of a full, free, and wholesome water supply, with many difficulties. Still these are not insuperable, and till they are overcome we must not rest, or admit that we are satisfied. Our sanitary engineers and medical officers of health are thoroughly alive to the urgency of our needs in this direction, and we have confidence in their ability and readiness to do all that is necessary as soon as they are clothed with the requisite powers, and provided with the means. For the first we must look to the legislature, for the second to the liberality of the nation.

Pure air and water, the direct light of the sun and absolute cleanliness, with ample space in and around our dwellings, are the best safeguards against the invasions of disease producing micro-organisms.

Of predisposition to disease and heredity, time will not permit me to say more than this:—that just in proportion to the perfection of physical development, and the normal adjustment of all the functions of the individual, will be his freedom from disease, provided his surroundings be all that is desirable in a hygienic point of view. Assuming a healthy parentage in a

climate like England, a healthy happy home, with regular mental and physical training under wholesome moral influences, and a fair provision of the necessary food and clothing, would secure to every member of the community a physical development proof against such disease-producing agencies as we have been describing. The healthy homes and suitable sanitary surroundings are not at present available for the masses, and but partially so for the classes. It is no doubt difficult to secure, at all times, a reasonably pure atmosphere in a house, the apartments of which are fully and constantly occupied, or in places of assembly liable to marked fluctuation in the number of occupants, and in the duration of occupation. Still it is important this should be done, and that other equally essential sanitary arrangements including a continuous wholesome water supply, should be secured, and to this end The Sanitary Institute is endeavouring to point the way. But it requires aid and encouragement, and I know no more hopeful source to look to for both, than the ladies. They have won their way, in the face of some discouragement, into the ranks of the most humane of all professions. I hope they will soon be found, in still larger numbers, among those whose ambition it is not only to cure but also to prevent disease.

But what evidence have we to show that sanitation has done, or can do, anything commensurate with its cost, to lessen sickness and to lower the death rate? And assuming the existence of such evidence, what are the benefits conferred upon the people at large by prolonging lives, whether young or old, whose enfeebled frames preclude the hope of much productive usefulness or gain to the community by such extension?

Turning again to the reports on the health of the army, we find that the rate of mortality among the European troops stationed in India during the half century prior to the date of the Report of the Royal Commission, was, in round numbers, 60 per 1,000; and in the army at home, about 17 per 1,000. Since then, thanks to the wiser policy pursued both in India and at home, the death rate in the army has been a steadily decreasing quantity. According to the report for 1888, from which I have already quoted, the death rate in all India was 15·20 per 1,000, and at home 5·52 per 1,000. I am not able to refer to the statistics of sickness among the troops serving in India prior to 1859, but were these accessible, I have no doubt they would shew a corresponding diminution of the non-effective rate from sickness. In this instance there can be no question as to the great advantage, even in a pecuniary point of view, of the decreasing sick and death rates, because the individuals concerned are all of the

most productive ages; and, also, because the expense entailed on the State in replacing them, more particularly in India, is very large. And yet the health of the army is not as satisfactory as it should be, nor are the barracks in anything like a reasonably satisfactory sanitary condition. Thanks to the liberality of the House of Commons and the determination of the Secretary of State for War to do all that is possible to remedy known defects, we may hope that the £4,000,000, just voted for barrack construction and improvement, will remove all cause of complaint on this score. In civil life, too, we see satisfactory results following sanitary improvements. Take an illustration from London in which such works are progressive, although still far from complete. In the quarter ending June last, the death rate was 17·3 per 1,000, of which 2·5 only was from zymotic disease. Ten years ago the death rate was 19·0, and twenty years ago it was 22·0 per 1,000. This shows steady progress, and is in happy contrast to similar conditions prior to the completion of the main-drainage scheme. In Brighton the death rate is still lower, being only 15·5 per 1,000. This is, with two exceptions, the lowest death rate of any large town in England. Still there is room for improvement, even in Brighton; and with the improved laws now on the eve of passing the legislature, there is a fair prospect of seeing the mortality reduced to 10·0 per 1,000 before the lapse of another decade.

The prolongation of the lives of the old and enfeebled, as well as of the young, is so intimately blended with the larger question of disease-prevention that it is hardly necessary to pursue it further. But were it otherwise it would not be difficult to show that, as a matter of ethics, we have no choice. The saving of life is an obvious duty, the neglect of which must, I fear, be regarded as an equally obvious crime. As Farr says, "The family, the clan, the town, the tribe, the nation, all acknowledge even now the claims of children, of the sick, of the wounded, of the infirm, to help in times of trouble. Few men refuse to bind up the wounds of their fellow men."

A word in conclusion regarding these Congress meetings. It is our hope that each meeting will leave behind it an active organisation which will carry on the good work in harmony with the parent society. The Sanitary Institute has had difficulties to contend with, and its friends have been frequently called upon to find the means needed to carry on its philanthropic work. Even now its museum is in urgent need of further development to make it what we desire to see it—a faithful record of progressive advancement in sanitary engineering to which not only the profession, but the public also, can resort

when in need of reliable means of solving sanitary doubts regarding their own domestic arrangements. Brighton is already so favoured in a hygienic point of view, that a Branch Institute established here would be in the van of sanitary progress. Should such a branch be organised, let me suggest for your motto a word which means more than even the favourite phrase of Sir Edwin Chadwick, "Wash and be clean," it is the single, but much-embracing word,

"PURITY."