

# SANITARY ENGINEERING AND PUBLIC HEALTH.

J. M. SMAIL, M. INST. C.E.

THE question of health has been more or less the subject of thought and of legislation from the earliest periods among the ancient Egyptians, Israelites, Greeks and Romans. The *scarabæus* or scavenger beetle was held sacred by the ancient Egyptians.

Under the Mosaic dispensation sanitary laws were formulated and religiously observed. The ancient subterranean works discovered at Jerusalem clearly indicate that the Jews were impressed with the necessity of removing all decomposing matter and filth as expeditiously as possible to places beyond the city. In ancient Rome questions affecting the health of the city were considered as carefully and attended to as assiduously as questions of State policy and government. The existence, after the lapse of twenty-five centuries, of the Cloaca Maxima bears the strongest evidence of the extent to which sanitary science had developed in that early period, the work, rivalling many such of modern date, being still utilised as a public sewer.

Coming to modern periods, the examples set by the Romans were followed more or less in England; the various old subterranean channels discovered at different times indicate the lines upon which the ancient conduits were constructed. Discoveries have been made in excavating for buildings at Chester that the early Romans were acquainted with the art of making pipes for sewers. In the twelfth volume of the "Transactions of the Institute of Civil Engineers," it is recorded that specimens of red unglazed pipes were exhibited, which, from the inscription on them, were believed to have been laid by the Twelfth Roman Legion. In the

chapter of historical notes in Mr. B. Lathan's work he states that, "although these ancient examples of sanitary works were executed when art and science had reached a high degree of excellence, we come to a period in history when both art and science declined, and with them the prosecution of those sanitary works which were of so beneficial and useful a character; in fact, the benefits derivable from sanitary science seem to have been forgotten and ignored, and the people sunk to the lowest depths of sanitary neglect, from which the powerful voices of plague, typhus, and cholera were the first to arouse them."

Dr. Lyon Playfair, in his address at Glasgow in 1874, stated that "when the civilization of the Egyptians, the Jews, the Greeks, and the Romans faded, the world passed through dark ages of mental and physical barbarism. For a thousand years there was not a man or woman in Europe that ever took a bath. How different that time was from the times which preceded it, when daily baths were common among the poor, you may gather from the praises of personal ablution which abound in ancient authors."

It is to Great Britain we must look for the first country to initiate reform in public sanitation, and the inception of the investigation which has led up to the development of sanitary science in the present day may be taken as dating from 1847, when the first compulsory Act of Parliament was passed in connection with the disposal of fæcal matter and organic wastes from dwellings in London. It was not, however, until the passing of the Local Government and Public Health Bills that any decided steps were taken in empowering local councils or vestries to make bye-laws, &c., for the proper regulating of sanitary matters in connection with the various centres of population.

In the opinion of authorities on the subject, after nearly thirty years' experience, permissive legislation has proved to be practically useless for attaining the object for which it was granted; this opinion not only exists in England but on the Continent of Europe, and especially in America.

Public opinion has lately become more alive to the consequences attending on sanitary neglect. In a paper read by

Professor H. Robinson, M. Inst. C.E., before the Association of Municipal and Sanitary Engineers, he states that "the thinking part of the community will now appreciate and support any legislation which has for its objects the amelioration of the conditions of the poorer classes, and the enforcement of those laws which are essential for the sanitary well-being of the people. It is a fact that in many respects even the existing mild legislation is not put into operation." Again, he states, "a great amount of preventible mortality arises from houses being occupied which do not conform to the most elementary rules of house sanitation. Those who have had to examine into the cause of epidemics will support the statement which we make, that there exists throughout the country a large amount of house property from which the landlords should be prohibited from receiving rents, and which should be condemned as unfit for habitation." The foregoing remarks have been quoted because they bear directly on the subject of this paper, and we have not far to travel in this city and suburbs to find causes for similar statements.

Sanitary legislation in the colonies has been piecemeal and permissive in its application. The principal Acts passed in the early days of the colony were chiefly connected with the prevention of sale of diseased meat and adulteration of food, and it was not until the passing of the Sydney Sewerage Act (17 Vic. No. 34) in 1853, that any practical steps were taken towards improving the sanitary condition of the city with regard to carrying off the organic waste of the community by underground sewers.

This Act repealed a former enactment passed in 1850, and provided for the appointment of commissioners who were to carry out the provisions of the Act in lieu of the old City Council, which was dissolved by Act of Parliament. The Act invested the Commissioners with certain compulsory powers, which it would appear had never been enforced. After about four years control of civic affairs the Commission was dissolved, and the present City Corporation (20 Vic. No. 37) was inaugurated in 1857.

The Council completed the scheme upon which the Commissioners were engaged, and during the succeeding years the

system was extended to almost every street in the city. The extension of the system and gradual abolition of the cesspit has undoubtedly favourably influenced the death rate of the city. The legislative powers under which the Council operated were of a permissive character, so that they were not in a position to accomplish better sanitary results than they would have otherwise done if compulsory powers had been enacted. Subsequent to the City Corporation Act, the Municipalities' Act was passed, which empowered the Suburban Council to carry out municipal works, and to pass bye-laws for regulating the sanitary affairs of the borough. This Act might be termed the first instalment of Local Government. Various other Acts connected with the sanitation of the city and suburbs, notably the "Dairies Act," and "Nuisances Prevention Act," and, in connection with regulating the construction of buildings and condition of existing tenements, the Building Act and Sydney Improvement Act have been passed. All these measures have materially contributed to the general health of the city.

A Commission was appointed to enquire and report on the best means of supplying the city and suburbs with an improved system of water supply. This was forced upon the Government of the day through the inadequacy of the Botany supply to meet the requirements of the daily increasing population. The result of the labours of this Commission, after careful consideration and enquiry, was the adoption of the present supply from Prospect. This magnificent work has been successfully carried out by the officers of the Harbours and Rivers Department. The available supply being equal to any possible demand for years to come. The effect of having such a supply has materially conduced to the health not only of the city, but also of the suburbs. On the completion of the work the Water and Sewerage Act (43 Vic. No. 32) was passed in 1880, and the whole of the question of water supply to the city and suburbs was transferred from the Government and the City Council to a Board partly nominated by the Crown and partly elected by the ratepayers in the city and such of the suburbs as are supplied by water from the conduit. The Act gives such powers to the Board

as to compel the use of water from the mains by householders, thereby causing the disuse of water from wells for domestic purposes. That the existence of the new supply has contributed in a marked degree towards the reduction of the yearly death rate is beyond a doubt.

The next step taken towards improving the sanitary condition of the city was an enquiry by Commission as to the best means to adopt to intercept the sewage of the city which discharged into various parts of the harbour. The state of the foreshores at the various sewer outlets became so foul and dangerous to health that it was deemed absolutely necessary to divert the daily sewage to some point remote from the densely populated centres. The results of the enquiries and considerations of the Commission resulted in the new system, now nearly completed as far as it affects the city, and making considerable progress in connection with the suburbs. This work was carried out by the Government Sewerage Department, and on its completion was handed over to the Board of Water Supply and Sewerage before referred to. In order that the new system could be extended to the "crowning point," the house service, an Amended Sewerage Act was passed in 1889 (53 Vic. No. 16), the provisions of which are now being carried out by the Board.

In contradistinction to the previous Sewerage Acts, the provisions are compulsory as to carrying out of house drainage, ventilation of private and public sewers.

The Sydney Improvement Act, passed in June, 1879, for better provision in the construction of buildings, and for the safety and health of the inhabitants within the City of Sydney. This Act provides for the proper construction of all buildings erected within the city boundaries, also for inspection of tenements which are deemed unfit for human habitation. Extensive powers are given to the Mayor, the chief administrator under the Act, to deal with any building which is inimical to the safety and health of the public—these powers have been exercised by the different Mayors with considerable advantage to the sanitary condition of the city. The Act is an important addition to the sanitary legislation, and it

is a matter of regret that it was not made to apply to the adjoining suburbs. If the principle of the Act were applied to erection of buildings in the suburbs, the present anomalous state of things would not exist. This defect will no doubt be covered by the proposed Local Government Act. The Sydney Improvement Act further provides for the appointment of a Board which is charged with the hearing of appeals against the decisions of the officers appointed to carry out the Act, and is empowered to determine any question involved in such appeals. The operation of this Act has been the means whereby numbers of hovels and similar disease-breeding spots were swept away to make room for larger and better constructed buildings. Since the passing of the Act in 1879 the improvement of the city has been marked. It might with truth be said that the old city is fast disappearing and giving place to the new. The buildings are constructed with some regard to sanitary laws with regard to light, space, and ventilation; but much has yet to be done in guarding the community from the effects of impure air, which causes fever and lowers the vitality of the occupants, if it does not destroy life itself.

The sweeping away of small tenements and the occupation of the space by larger premises brought to light a singular fact in connection with the buildings in the city. Shortly after the passing of the Act, viz., in 1880, the number of buildings within the city boundaries was given at 25,000; five years afterwards, viz., in 1885, there had apparently been no increase in number. It would appear, therefore, that no buildings had been erected during the above period, but such was not the case, buildings were erected. In many cases the new erections occupied areas formerly occupied by numbers of small tenements, and the absorption of the land for trade requirements accounts for the apparent non-erection of buildings.

The effect of the administrative powers conferred by the Act, and carried out by those charged with the duty, has been conducive to improving the sanitary condition of some of the older sections of the city and lowering of the annual death rate. It is obvious that had the powers been otherwise than compulsory, such result could not have been achieved.

The scavenging of a city is an important adjunct in the maintenance of health. The Municipal Acts impose certain obligations on the residents in keeping their premises clean and free from nuisance; but the enactments do not provide that the corporate bodies shall collect the household waste and other putrescible matter of one portion of the community and dispose of it in such a manner as to be inimical to the health of another portion. This is practically what is being carried out daily. We see low-lying ground utilised as "tips" for house rubbish and other filth, and in all probability the land so raised in level will form the site of future terraces or suburban villas. If compulsory legislation is needed in any direction, this is one where the effect will be most salutary. The provision that all local bodies shall dispose of the household wastes by other means than by reclaiming or raising low-lying lands would lead up to the question which must come in the near future, of disposing of such waste-matter by *fire*. As communities become more dense, the dangers to health increase; and it should be the aim of governing bodies to minimise such dangers as much as possible. The destructor is the natural complement of every sewerage scheme, and until the improved means of disposal is co-existent with the sewerage system, only partially favourable results can be expected in connection with public health. Great improvements have been made in this branch of sanitary engineering, the objectionable features of the older designs of the "destructor" having been eliminated by the complete destruction of the vapours given off by the refuse when in a state of incipient burning, as well as the arresting of the lighter particles of unconsumed material which, owing to the fierce draught, were rushed into the shaft and had the effect of salting and peppering the surrounding locality.

Compulsory legislation in sanitary matters has been in existence in New York since 1881. Professor Robinson, M.I.C.E., in a paper on "Sanitary Legislation and its Enforcement," remarks that "In 1881 an Act was passed to secure the registration of plumbers and the supervision of plumbing and drainage of

the cities of New York and Brooklyn. This Act was the outcome of a public movement which was set on foot by those who appreciated the evils attendant on defective drainage work and plumbing. Amongst the most prominent of these reformers, and the one to whom the passing of the Act was chiefly due, was Mr. Henry C. Meyer, the proprietor of the *New York Sanitary Engineer*. The powers which the Board of Health of New York have been granted by the State with reference to tenement houses are of the most sweeping kind, and are as clearly defined and capable of easy enforcement as the law relating to plumbing and draining.

The absence of a Public Health Act from the Statute Book of this colony is to be regretted. If such enactment had existed the evils arising from sub-division and sale of land in situations totally unfitted for residential areas would not have presented themselves. It is an established fact that some sanitary measures can only be carried out by compulsion, and the enforcement is not altogether unaccompanied by friction between the administrators and some portions of the public, which are not aware of the benefits derivable from the carrying out of such measures. Each householder considers his house to be his castle, and any interference from the sanitary authority as an impertinence; there is another section who views with alarm the institution of reforms, and consider their interests jeopardised when the authority steps in between them and the public.

With regard to the interference of public authority with private interests, "it has been laid down as a fundamental rule that wherever the public health is concerned the interference of public authority is proper and justifiable." Mr. A. G. Henriques, barrister-at-law, and Hove Commissioner, states: "he ventures to submit that the proposition which he has laid down is true and universally accepted. It has received the assent in all times of statesmen and publicists, and has been throughout the whole course of history followed in practice under every aspect of civilisation. The public health has ever been regarded as so important and so essential to the public welfare that the interference of the State



with private right in order to promote public health has ever been the rule rather than the exception." He further remarks that "private effort and enterprise will surely continue to exist, notwithstanding the small amount of State control involved in the interference of sanitary supervision of dwellings. Private right will be as much respected, and private initiative be as energetic *after* the State has undertaken to control the direction of the drains and formulate the thickness of the walls. Private right will not be injured, but private wrong will be prevented. The ability as well as the opportunity to inflict private wrong will undoubtedly be taken away, but the power to do rightly and act justly will remain as clear and free as ever. The restrictions which the State will impose will be burdens on the evil-doer—on the scamping workman and on the jerry builder—but the honest builder or tradesman will not be interfered with, except as regards some general plan, which he will readily adopt, and to the requirements of which he will conscientiously conform. He will benefit by the destruction of his ill-doing rivals, and the public will benefit by the possession of that which they seek, that for which they stipulate, that for which they pay their money, but which at the present day they rarely obtain—a healthy, honestly built house. There will be a State guarantee of the *desiderata* of good construction. Fraud will be, if not impossible, exceptionally rare; deception will cease to be the rule, the public health will undoubtedly improve, and the principles which will underlie these much desired changes is one often quoted, and rarely controverted: "*Salus populi suprema lex.*"

The foregoing remarks can be applied with equal force in connection with the insanitary mode of construction of buildings adopted at the present time in our suburbs, and even in the city prior to the passing of the City Improvement Bill. The character of the dwellings erected by speculative builders in our suburbs at the present time, is ample evidence of the necessity of the extension of the provisions of the Act which affects the city to the suburbs, or empowering the local bodies to make bye-laws which would tend to correct the abuses now of daily

occurrence. Numbers of houses, of various classes, are being erected in the different suburbs on sites utterly unsuitable for dwellings, unless previously underdrained. In some instances the areas have been for years the receptacle of the sewage and flood-water of the adjoining uplands, the subsoil being thoroughly saturated with filth; and in this description of soil houses are being erected without any means being taken to prevent the miasmatic vapours arising through the dwellings.

The mode adopted, and the materials used in constructing the dwellings, is anything but calculated to contribute to the general health of the occupants. Inferior concrete, porous bricks, and timbers cut down to barest dimensions, no attempts at ventilation under floors being the rule. The buildings are made showy, and everything done to please the eye, and—*sell the building*. In fact, the purchaser gets the maximum of show and the minimum of health and comfort for his money. This is no exaggeration; it can be seen by visiting any of the suburbs, and is the result of the absence of controlling authority for regulating the construction and drainage of such dwellings. To the poorer classes the want of this legislative protection is of some import; the wealthier classes are not so much affected, as they are in a position to command the services of an architect to protect their interests. The Borough Councils not being vested with powers to make bye-laws in this direction, it points to a remedy, which, in the interests of public health, should be supplied without delay.

From a sanitary view the drainage of the site and impermeability of the foundations are most important points in house construction, as it has been proved that damp subsoil tended to promote phthisis. Dr. Bowdelch, of Boston, says: "Private investigations in Europe and America have in these latter times proved that residence on damp soil brings consumption; and second, that drainage of the wet soil of towns tends to lessen the ravages of that disease." In 1865-6, the British Government instituted an examination into the effect of drainage works on public health. Twenty-four (24) towns, several on the modern

system, were examined. From the returns it was shown that the yearly death rate was reduced, and the reduction in number of deaths from consumption was marked.

In a return given by the City Health Officer (Dr. Clay) in his quarterly report to the City Council, the number of deaths from phthisis was forty-five, or 8.39 per cent. of the total number of deaths. Other respiratory diseases, thirty-six, or 6.61 per cent. of the total number; it would be interesting to know the local conditions of the localities where the deaths occurred. Such information would be an unerring guide for the application of preventive measures. The total deaths from typhoid and other filth diseases is given as 72, or 13.24 per cent. of the total number; the application of locality test would be as serviceable in this case as in the former. Dr. Ashburton Thompson, Deputy Medical Adviser to the Government, in a paper on the "Sanitary State of New South Wales," gives the number of deaths from typhoid and diarrhœal diseases in the Metropolitan District, for the year 1884, at 700, or at the rate of 25 per 10,000 of the population. The average for ten years, viz., 1875 to 1885, is given at 26.17 per 10,000 of population. These numbers include deaths outside the limits of the city, and are no doubt considerably influenced by cases from districts which are not sewered, and are exposed to insanitary conditions. Within the city the records as given by the City Health Officer show that for the quarter ending 28th February, 1890, the total number of deaths from typhoid and other filth diseases amount to 71, or 47 per 1,000 of population.

In one case, we have (in 1884) 700 deaths, and in another (1889) within the city boundary, an average of 284 deaths from preventable diseases.

The general death rate of a city is a guide to its healthiness or otherwise, but for preventive measures detail statistics are required of the locality and general surroundings where deaths occur from zymotic diseases; these are more prevalent where there is overcrowding or insanitary conditions. In the city there are certain localities, the surroundings of which are more conducive

to a higher death rate than others more favourably situated; to take the mean death rate of the two is not a true guide as to where preventive measures should be carried out.

In the city the returns of 1888 show the estimated number of dwellings at 21,437, and miles of sewers at 60 miles. With few exceptions, the whole of the dwellings are either connected with the public sewers or drain into the harbour by private ducts. The whole of the old city system, constructed at various times from 1857, is unventilated by public ventilators, but the gases generated in same find vent through other means, which will be explained.

Professor Kerr, in a lecture before the Society of Engineers on "Foul Air in London Houses," said: "The popular idea of drainage is very simple; you empty the slops into the sink, and they go—the devil knows where." This statement could be applied to the drainage of the majority of houses in the older parts of the city. Numerous old drains, the lines of which have been forgotten, have been in the past utilised for conveying the slops and waste water from dwellings; the lateral branches have been added to from time to time, until a perfect network of pipes is available for carrying the mephitic gases from the old and unventilated ducts to the dwellings connected thereto. What is generally recognised as the city system, that is, the system initiated by the City Commissioners, is wholly unventilated, except in cases where the street gullies happen not to be trapped. As this system was designed on what is termed the "combined system," and the outlets being exposed to tidal influences, the conditions are such as to cause them to be "sewers of deposit;" the organic filth which accumulates from time to time in dry weather in the sewers generates dangerous sewer gases which find vent where?—through gully-shafts at the side-walks where they are not trapped, or oftener through the house drains, thence into the houses by the agency of defective sanitary fittings. You cannot bottle the gas up. It would be no exaggeration to say that the old city system is, to a very great extent, ventilated by the house drains. The effect of this system of ventilation on the health of the community can readily be imagined. Through the absence of proper ventilation

sewer gas finds its way into dwellings, not only of the poorer classes, but into superior dwellings. Examination by the officers of the Board of Water Supply and Sewerage has revealed a state of things in connection with the sanitary fittings of private and public dwellings which would appear incredible, if not supported by actual fact. A few cases which came under the author's notice will be mentioned to illustrate the danger to which the public are exposed: 1st. In what might be termed a first-class dwelling, the waste pipe from a bath was connected into a soil pipe from a W.C. The soil pipe from this W.C. was not ventilated, nor was there any intercepting trap between house and public sewer. The closet trap became choked, and the fœcal matter found its way through the bath waste pipe into the bath. In another case, in a building where a large number of persons are employed, the overflow pipe from a cistern from which the drinking water used by the employés was drawn, was connected directly with an unventilated soil pipe, which carried off the soil from W.C.'s, urinals, etc. The evil was aggravated by the fact that there was no trap between the sewer and soil pipe. The cases mentioned are comparatively mild and are a few of the many, clearly showing the absolute necessity of supervision by a controlling authority, and the futility of permissive legislation. Under the Corporation Act the City Council were not vested with powers that they could control the supervision of internal sanitary plumbing work and ventilation of drains, although there are evidences in the buildings of later date, where my colleague, when acting as City Engineer, has carried this into effect as far as the legal powers at the time would admit.

Under the powers granted to the Board, which now controls the water supply and sewerage, the defects referred to are gradually being remedied as they are discovered. Under the Act not only the carrying out of the work, but the plumbers and drainers are under the immediate control of the Board. In this way the interests of the public and competent men are protected against ignorant and incompetent workmen, who have in times past acted on their individual ideas of sanitation.

Dr. Carpenter, in his address before the Sanitary Institute of Great Britain on "Public Health as a Working Man's Question," says "that according to the reports of your officials the mortality of some parts of Glasgow has been 50 and 60 per thousand in the course of the year. Do you know what that death rate means? It does not mean simply that so many people have died; for every one who has died 20 have been laid in beds of sickness in the course of the year. For every one who has died in a healthy district—I take my own district—there has been two on an average on a bed of sickness every day throughout the whole year. Now, if you will only consider that point you will see that the bearing of the death rate of a district has immense influence upon the prosperity of working men."

This question concerns the working classes here as well as in Great Britain, a reduction of the death rate implies also a reduction in sickness, and consequent saving of expense and money. This point leads up to the consideration of the advisability of obtaining statistical information as to the sick rate from various causes in different sections of the city and suburbs.

The number of sick cases to deaths is variously stated. Dr. Carpenter gives 20 cases for every death; Dr. Playfair, 28. Taking the lowest estimate and comparing it with the returns of the City Health Officer for last year, the amount of sick cases from preventable diseases equals 1,440 in one year.

The proportion of deaths from typhoid and diarrhœal diseases, given in a table connected with a paper read by Dr. Ashburton Thompson before the Australian Association for the Advancement of Science, is 2.5 per 1,000 of population. The mean population of the metropolitan area for the period given in the table, 1876 to 1885, is 225,460; and the number of deaths from preventable diseases is 565 per year or 5,650 for 10 years. Taking the estimated cases of sickness for each death, as before-mentioned, viz., 20, we have  $5,650 \times 20 = 113,000$  cases of preventable sickness in 10 years. Although we individually consider life as priceless, yet it is obvious that if preventable measures are adopted such as would result in the saving of so many valuable lives and

immunity from sickness, not only would the State be benefited but individuals also.

If a value could be put upon lives so saved and sickness prevented by preventive measures, the above results could be summarised as follows :—

Lives saved, 5,650 at £200 ... ..	...	...	£1,130,000
Sickness prevented, 5,650 × 20 = 113,000—			
taking the average duration at 5 weeks' say			
at £1 per week = 113,000 at £5 ...			565,000
5,650 funerals at £5... ..			28,250
			£1,723,250

Nearly sufficient to pay the interest on the public debt of the colony, or sufficient to pay for the cost of the new sewerage system.

There is one branch of sanitary work in which practical knowledge is especially necessary, and which has not been so prominently considered or attended to as it should be, and this is the plumbing work of houses. However carefully an architect may design your house the whole may be rendered nugatory by scamped work and carelessness in details. The traps may be fixed in such positions as not to fulfil the end for which they are intended; the junctions with the drains may be faulty; the soil pipes may be to all appearances perfect, but they may not be connected with the drain or may ventilate into the house. It is easy to conceal a bad joint, and it is some time before the defect is discovered; the discovery, as a rule, is made when sickness if not death occurs in the house. It is, therefore, not only the officers of the sanitary authority who require knowledge and to be educated in this important branch, but also the foreman and workmen each in his own degree.

Waring, in his work on "Sewerage," says, with regard to house drainage, that the general public in America seems to have formulated its convictions somewhat as follows :—

1. No house drainage is really good which has not the approval of the family plumber.

2. Unlimited expenditure in the plumbing work ensures the safety of the house.
3. The public sewer is the root of all evil.

The Sanitary Engineer cannot interfere with the general conditions of a climate, but he may produce important changes in the immediate surroundings of a locality, modify the conditions and temperature of the soil under the air-power, and provide a supply of pure water. He may also provide for the rapid carrying off of organic wastes and rainfall; but it is to the physiologist and chemist that we must look for the causes from which the epidemics or diseases arise, and what are the conditions which should be altered to prevent or remove them. The engineer steps in when the causes have been pointed out, and it is for him to design the methods of prevention or removal.

The diagram, Plate VIII., shows the annual death rate, rainfall, and mean temperature of the city of Sydney from 1871 to 1889. It will be seen in comparing the lines the points of death rate and rainfall in some cases approach each other in proportion to the rainfall.

In conclusion, it is to be understood that whatever progress science may make in the discovery of the causes of epidemic diseases; and, however completely the authorities may seek to carry out preventive and curative measures founded upon such discoveries, it rests in the end with the people to say whether such discoveries and preventive measures shall be productive of good. All the discoveries of science and all the care of the authorities will avail nothing if the people themselves are careless in matters of house sanitation and domestic hygiene.

---